



**INDUSTRIAL
CONTROL &
AUTOMATION
CATALOG**

Think Automation and beyond...



kodawari

\kō-dä-wō-rē\ – (noun) the uncompromising and relentless pursuit of perfection. A time-honored philosophy originating from ancient Japan, it reflects a commitment to attaining the highest degree of excellence.

Every detail has a purpose. For more than 65 years, the philosophy of Kodawari has been the driving force inspiring us to design the best in industrial control products. Our meticulous attention to detail and fierce dedication to quality and safety produces products that exceed the highest industry standards.

At IDEC, we believe even a simple switch must do more than just turn a piece of equipment on or off, it must deliver an unparalleled experience. From the overall concept to the smallest detail, we want to enhance the efficiency and comfort of human interaction with our products. IDEC engineers spend years researching and testing just to develop the ideal shape, size and feel for our switches. These small, but critical improvements ensure you are satisfied every time you touch an IDEC switch.



Our enduring commitment to this philosophy has also found unmistakable expression in the sharp, crisp images and superior visibility of our operator interface touchscreens. IDEC displays are a testament to our tenacious desire to meet our customers' every need. Through diligence and hard work, we have been able to generate intense, true-to-life screens by originating a process in which a dual-screen memory buffer produces a smoother transition between screens.



In the mastery of extraordinary workmanship, we strive to manufacture superior products by exploring all the options available to us. Influenced by an architectural method used for thousands of years to build Japanese shrines and temples without nails, we designed our heavy-duty LED lighting with precision-fitted joints for improved strength and durability. The result is a more resilient product for harsh environments.



The cornerstone of our success lies in the intrinsic presence of Kodawari in all our products. Known as a pioneer in the micro PLC market, in recent years, IDEC made a bold decision to develop the fastest micro-PLC in its class. By adding a Logic Engine to our micro PLCs, we enabled them to process



www.IDEC.com/usa

800-262-IDEC (4332) USA & Canada

instructions faster, freeing up the main processor for additional functions like PID, complex math and communications. As we move forward, we continue to add instructions, making complex machine automation simpler for the engineers designing them. In this era of great technological change, we are dedicated to offering our customers the most innovative products.

With each generation of IDEC products, we get closer to attaining perfection. Although light towers have been available in the market for many years, traditional designs let light bleed between modules, often making it difficult to view status. We imagined a new way to see light towers—a better way. Endeavoring to try something different, we undertook the challenge of constructing an improved design by separating signaling modules and using a one-of-a-kind elliptical lens to diffuse light, increasing brightness and visibility of status. This unique approach and aesthetic style are the very essence of Kodawari.

We place the highest value on providing you with the safest products in the world, while also providing

an exceptional experience. Existing safety standards for emergency stops only protect users under normal circumstances, but are not sufficient when the emergency device itself is damaged. At IDEC, our unique “Safe Break Action” is incorporated into our Emergency Stop switches, surpassing existing safety standards and making them the safest on the market.

As IDEC moves into the future, we are dedicated to our vision of a future where people, technology, and information come together in a perfect blend. The greatest reward for our commitment and adherence to the Kodawari philosophy is a sense of fulfillment and pride, knowing that we have made a difference in the daily lives of our customers. Although perfection can never truly be achieved, for us the true reward is in the pursuit itself.

Kodawari—it's in our DNA





General Lighting pg 486

- Six different lengths (134 to 1,080mm)
- Space saving: Width 27.5mm, Thickness 16mm
- Long life: Five times longer than fluorescent lamps
- Vibration and shock resistant

General Lighting pg 494

- Energy saving: One-third of fluorescent lamps
- Long life: 40,000 hours (Half-life)
- Multiple sizes and color configurations
- Rated voltage up to 24V DC

Heavy Duty Tool Lighting pg 490

- Brightest in their class at up to 67.2 Lumens/Watt
- Life: 70% of initial luminance at 50,000 hours
- Durable, stainless steel cover
- Standard or recessed mounting for lower profile

Hazardous Location Lighting pg 490

- Explosion-proof LED illumination
- Two types of light distribution
- On/off switch for ease of operation
- Adjustable or fixed angle mounting



OI Touchscreens pg 24

- Super-bright, sharp LCD screens
- Up to 65K colors supported
- Remote access, monitor and control plus multimedia
- Basic and high-performance models with wide range of connectivity



PLCs pg 51

- Fastest micro PLC in the market
- Maximum 512 I/Os
- Embedded Ethernet and USB ports
- All models meet the highest safety standards



Power Supplies pg 165

- Slim, standard or metal frame
- 10W, 15W, 30W, 60W, 90W, 120W and 240W
- Convenient mounting options
- Worldwide approvals



Sensors pg 199

- Vision, application, universal photoelectric and proximity
- Variety of housing sizes, styles and functions
- High reliability and precision
- High-speed response times



E-Stops pg 275, 481, 553, 558, 592

- 16mm, 22mm and 30mm
- Unique "safe-break action" technology
- Turn reset and push-pull functions built-in
- Available in both plastic or metal bezel and finger-safe contacts

Interlock Switches pg 295

- Basic and solenoid locking models
- Subminiature to full-size models
- Up to 6 contacts
- Integrated cable or screw termination

Enabling Switches pg 389

- Ergonomic three-position functionality
- Variety of contact configurations
- DPDT contacts
- Available with or without rubber covers for watertight seal

Safety Relays pg 421

- EN ISO 13849-1 PLe, Safety Category 4 compliant and EN 62061 SIL 3
- Removable and fixed terminal models
- LED status indicators
- Finger-safe protection



Switches & Pilot Devices pg 483

- 8mm, 16mm, 22mm and 30mm
- Illuminated pushbuttons, pushbuttons, pilot lights, selector switches and key selector switches
- Solder terminals, screw terminals or PC board pins for direct board mounting
- Metallic or black bezels, standard or flush mount models



Signaling Lights pg 841

- 360-degree visibility of status
- LED or incandescent lamp illumination
- Steady and flashing units with optional alarm
- Five mounting styles



Relays pg 889

- General purpose, PCB, latching and force-guided models
- Contact ratings up to 16A
- Correlating sockets available
- DIN rail, panel or PCB mounting



Circuit Breakers pg 1081

- Available in 1, 2 or 3 poles
- Current ratings up to 50A
- Standard and electronic time delay curves
- DIN rail, socket or panel mount options

Table of Contents

LED Lighting	Lumifa	1
Automation & Sensing	OI Touchscreens	21
	Programmable Logic Controllers	51
	Automation Software	147
	Power Supplies	165
	Sensors	199
	Communication & Networking	235
	Barriers	241
Safety	Safety Overview	281
	XW Series E-Stops	285
	Interlock Switches	295
	Enabling Switches	389
	Safety Control	419
	Light Curtains	457
	AS-Interface Safety at Work	475
Switching & Controls	Switches & Pilot Devices	483
	Signaling Lights	841
	Relays	895
	Timers	991
	Contactors	1041
	Terminal Blocks	1059
	Circuit Breakers	1081
Index	Index	1093
	Hazardous Location Products	1103
	Approvals & Standards	1105
	Mature Product List	1107
	General Terms & Conditions	1103

Lumifa.....	1
Heavy Duty Machine Tool Lighting.....	4
LF1D and LF2D Series.....	4
General Machine Lighting	11
LF2B Series	11
LF1B-N Series	13
LF1A Series	15
Hazardous Location Lighting.....	17
EF1A Series.....	17

OI

Touchscreens	21
Selection Guide.....	22
High Performance Series.....	24
Enhanced Series	29
Basic Series.....	29
Compact Series.....	29
Automation Organizer Suite	30
Supported Drivers	31
Part Numbers	39
Accessories	41
Cables	42
Specifications.....	45
Dimensions.....	49

PLCs	51
Selection Guide.....	52
MicroSmart Family	53
MicroSmart FC6A Part Numbers	53
MicroSmart Pentra CPU Part Numbers	78
MicroSmart CPU Part Numbers	79
Digital I/O Expansion Modules	81
Analog I/O Expansion Modules	84
Accessories.....	91
Automation Organizer Suite	93
Specifications	94
Dimensions	115
FT1A SmartAxis.....	118
Part Numbers.....	122
Starter Kits.....	123
Accessories.....	124
Specifications	126
Dimensions	135
FL1F SmartRelay.....	138
Part Numbers.....	140
Starter Kits	141
WindLGC Software	142
Specifications	143
Dimensions	146

Automation Software	147
Selection Guide.....	148
Automation Organizer Suite	149
WindO/I-NV2 and NV3 and NV4	150
WindLDR.....	155
WindCFG.....	159
WindSRV	161
WindLGC	164

Power Supplies..... 165

Selection Guide.....	166
PS6R Standard Series.....	167
Part Numbers.....	167
Specifications	168
Dimensions	170
PS5R-V Series.....	174
Part Numbers.....	174
Specifications	175
Dimensions	178
PS5R Slim Line Series.....	182
Part Numbers.....	183
Specifications	184
Dimensions and Terminal Markings.....	186
PS5R Standard Series.....	188
Part Numbers.....	188
Specifications	189
Dimensions	192
PS3X Series.....	193
Part Numbers.....	193
Specifications	194
Dimensions	196
Safety Precautions	198

Sensors..... 199

Selection Guide.....	200
Datalogic Sensors Selection Guide	201
SA1E Miniature Photoelectric.....	210
SA1U Heavy Duty Photoelectric	226

**Communication
& Networking 235**

AS Interface Overview:	236
------------------------------	-----

Barriers.....241

Selection Guide.....	242
Discrete Input Barriers.....	244
EB3C Discrete Input Barriers.....	244
EB3N Discrete Input Barrier	254
Discrete Output Barriers	259
EB3L Discrete Output Barriers	259
Switches and Pilot Devices	267
General Information	273

Safety Overview 281

Safety Overview	282
Safety Components.....	284

XW Series E-Stops 285

Selection Guide.....	288
ø22mm XW E-Stops	289

Interlock Switches 295

Selection Guide.....	296
HS6B Subminiature.....	297
HS5D Miniature	302
HS2B Full Size	309
HS1B Full Size	313
HS6E Subminiature with Solenoid.....	316
HS5E Miniature with Solenoid	325
HS1E Full Size Solenoid Locking	341
HS1C Full Size Solenoid Locking.....	347
HS1L Interlock Switches with Solenoid	352
HS5E-K Key Locking.....	355
ø22 HW Key Switch.....	364
HS7A-DMC Non-Contact Magnetic	368
HS7A-DMP Non-Contact Magnetic.....	372
HS3A Non-contact RFID	376
HS5B/HS5E Door Handle Actuator	380

Enabling Switches 389

Selection Guide.....	391
Panel Mount Enabling Switches.....	392
HE1B Series.....	392
HE2B Series.....	394
HE3B Series.....	397
HE5B Series.....	400
HE6B Series.....	403
Grip Enabling Switches.....	406
HE1G Series.....	406
HE1G-L Series.....	410
HE2G Series.....	413
HE5B Housing.....	417

Safety Control419

Selection Guide.....	420
Safety Relay HR1S-AC.....	421
Safety Relay HR1S-AF.....	424
Safety Relay HR1S-DM.....	427
Safety Relay HR1S-ATE.....	429
Safety Relay HR2S-301.....	432
Safety Relay HR2S-332N.....	437
FS1A Multi-function Safety Relay.....	443

Light Curtains 457

Selection Guide.....	458
SE4D Series: Type 4.....	459
SG Series.....	464
SG2 Series: Type 2 Basic & Extended Models.....	464
SG4 Series: Type 4.....	468
Mounting Brackets and Accessories.....	472

AS-Interface Safety at Work....475

Emergency Stop Switches.....	478
Operating Instructions.....	482

Switches & Pilot Devices..... 483

Selection Guide.....	484
Miniature Switches & Pilot Devices.....	486
AP Series ø8-16mm.....	486
A8 Series ø8mm.....	490
ø16mm Switches & Pilot Devices.....	497
X6 E-Stops ø16mm.....	497
XA E-Stops ø16mm.....	501
LB Series ø16mm.....	508
A6 Series ø16mm.....	543
L6 Series ø16mm.....	557
LBW Series ø22mm.....	580
ø22mm Switches & Pilot Devices.....	603
XW E-Stops ø22mm.....	603
AP22M Series ø22mm.....	609
CW Series ø22mm.....	612
HW Series ø22mm.....	634
TW Series ø22mm.....	696
FB Series Enclosures.....	737
ø30mm Switches & Pilot Devices.....	739
XN E-Stops ø30mm.....	739
TWND Series ø30mm.....	745
TWTD Series ø30mm.....	775
EU2B & EC2B Series ø30mm.....	805
Cam Switches - CS Series.....	828
Mono-Lever Switches - ARN Switches.....	835
Piezo Switches.....	837

Signaling Lights.....841

Selection Guide.....	842
SignalLight Towers.....	844
LD6A LED SignalLight Towers.....	844
LT7 LED Series Light Towers.....	853
Surface Mount Indicators.....	856
LH Series Surface Mount Indicators.....	856
Jumbo Dome Pilot Lights.....	861
Panel Mounted Annunciators.....	862
30mm SLC30 Series.....	862
30mm SLC30-IPS Series.....	870
40mm SLC40 Series.....	878

Relays	895
Selection Guide.....	896
General Purpose Relays.....	898
RV8H Series 6mm Interface Relays.....	898
RJ Series Slim Power Relays	911
RL Series Power Relays.....	921
RQ Series PCB Relays.....	927
RH Series Compact Power Relays	931
RR Series Power Relays	941
RU Series Universal Relays.....	948
RY/RM Series Miniature Relays	957
RF1V Force Guided Relays.....	968
RF2V Force Guided Relays.....	974
Solid State Relays.....	982
RSC Series Solid State Relays	982
RSS Series Panel Mount	
Solid State Relays	985
 Timers.....	 991
Selection Guide.....	992
RTE Series - Analog Timers.....	998
Accessories.....	1003
Dimensions	1004
GT3A Series - Analog Timers	1005
GT3F Series - True Power OFF	
Delay Timers	1013
GT3W Series - Dual Time Range Timers..	1017
GT3 Series.....	1021
Accessories.....	1021
Dimensions	1025
GE1A Series - ON Delay Timers.....	1027
Accessories.....	1029
Dimensions	1030
GT5P Series - ON Delay Timers.....	1031
Accessories.....	1034
Dimensions	1035
GT5Y Series - ON Delay Timers	1036
Accessories.....	1039
General Instructions for	
All Timer Series.....	1040
Dimensions	1040

Contactors.....	1041
Selection Guide.....	1042
YC1N K Mini Contactors	1043
Part Numbers.....	1043
Accessories.....	1045
Specifications	1045
Dimensions	1046
Electrical Diagrams.....	1046
YC1U Series Contactor AC Coil	1047
Part Numbers.....	1047
Accessories.....	1049
Specifications	1050
Dimensions	1051
Electrical Diagrams.....	1053
YC1N Series Contactors AC Coil	1054
Part Numbers.....	1054
Accessories.....	1055
Specifications	1056
Dimensions	1057
Electrical Diagrams.....	1058
 Terminal Blocks	 1059
Selection Guides	1060
General Purpose Terminal Blocks	1061
BN/BNH Modular Terminal & Fuse Blocks	1061
BN High Current Power Blocks.....	1065
BA One Piece Terminal/Fuse Blocks &	
Small Current Power Blocks	1067
BX Break-Out Modules	1077
 Circuit Breakers	 1081
Selection Guide.....	1082
NC1V Series	1083
Dimensions	1089
Accessories.....	1092
 Part Number Index.....	 1093
Hazardous Location Products.....	1103
Approvals & Standards	1105
Mature Product List.....	1107
General Terms & Conditions.....	1103

Selection Guide..... 2

Heavy Duty Machine Tool Lighting 4

 LF1D and LF2D Series4

General Machine Lighting 11

 LF2B Series11

 LF1B-N Series13

 LF1A Series15

Hazardous Location Lighting..... 17

 EF1A Series.....17

Lumifa



www.IDEC.com/usa/LED



Selection Guide

				Application Examples	Illumination Color ¹	Reference Illumination ²	Power Consumption	Operating Voltage	Page	
LF1D/2D	Mini	LF1D-C (IP67F/IP67/IP69K)			· Machine tools · Food processing machines · Automatic manufacturing machines · Printing machines · Production system · Test equipment	White (5700K)	180lx	4.6W	24V DC	page 4
		LF1D/2D Wide-angle and High Luminance (IP67F/IP67/IP69K)	Slim		· Machine tools · Food processing machines · Automatic manufacturing machines · Printing machines · Production system · Test equipment	White (5700K)	1450lx	11W	24V DC	
			Wide				1200lx	12.5W		
	Long	LF1D-H (IP67F/IP67/IP69K)			· Machine tools · Food processing machines · Automatic manufacturing machines · Printing machines · Production system · Test equipment	Neutral White (4700K) ³	560lx	18.4W	24V DC	
		LF1D-J (IP67F/IP67/IP69K)					840lx	27.6W		
	LF2B (IP65)		Clear Cover		· Various machines and systems · Control panel · Plant · Solar power equipment	White (6500K)	LF2B-B: 290lx LF2B-C: 540lx LF2B-D: 1065lx LF2B-E: 1385lx LF2B-F: 1520lx	12/24V DC LF2B-B: 2.6W LF2B-C: 4.9W LF2B-D: 10.6W	12/24V DC	
		White Cover		LF2B-B: 265lx LF2B-C: 500lx LF2B-D: 980lx LF2B-E: 1275lx LF2B-F: 1400lx			100 to 240V AC LF2B-B: 2.2W LF2B-C: 4.4W LF2B-D: 7.8W LF2B-E: 12.2W LF2B-F: 15.9W	100 to 240V AC		

1. K: Color Temperature (typ.), mm: Dominant Wavelength (typ.).

2. Directly below at 1m unless otherwise noted.

3. To match traditional cool fluorescent lamps.

			Application Examples	Illumination Color ¹	Reference Illumination ²	Power Consumption	Operating Voltage	Page
LF1B-N (IP65)	Clear/ White Cover		· Machine tool · Plant equipment · Test equipment · Control panel	Cool white (6500K)	LF1B-NA: 95lx LF1B-NF: 1350lx	Cool white/ Warm white/ Blue LF1B-NA: 1.5W LF1B-NB: 2.9W LF1B-NC: 4.4W LF1B-ND: 8.7W LF1B-NE: 13.0W LF1B-NF: 17.3W Yellow/Red/ Green LF1B-NA: 1.0W LF1B-NB: 2.0W LF1B-NC: 2.9W LF1B-ND: 5.8W LF1B-NE: 8.7W LF1B-NF: 11.6W	24V DC	13
			· Food processing machines · Cosmetic plant · Chemical plant · Show cases	Warm white (3000K)	LF1B-NA: 90lx LF1B-NF: 1300lx			
			· Semiconductor manufacturing equipment · IC foundry	Yellow (590nm)	LF1B-NA: 20lx LF1B-NF: 180lx			
			· Photosensitive material · Semiconductor manufacturing equipment · Darkroom experiment	Red (620nm)				
			· Advertising Display · Light ornaments	Blue (455nm)	LF1B-NA: 10lx LF1B-NF: 80lx			
				Green (525nm)	LF1B-NA: 30lx LF1B-NF: 300lx			
LF1A (IP40)	Clear Cover		· Control Panels · Manufacturing Equipment	Cool white (5500K)	LED Array 3x2: 190lx LED Array 6x2: 380lx LED Array 12x2: 760lx	LED Array 3x2: 1.8W LED Array 6x2: 3.6W LED Array 12x2: 7.2W	24V DC	15
				Warm white (2800K)	LED Array 3x2: 130lx LED Array 6x2: 260lx LED Array 12x2: 520lx			
				Yellow (590nm)	LED Array 3x2: 130lx LED Array 6x2: 260lx LED Array 12x2: 520lx	LED Array 3x2: 2.2W LED Array 6x2: 4.4W LED Array 12x2: 8.7W		
				Red (625nm)	LED Array 3x2: 85lx LED Array 6x2: 170lx LED Array 12x2: 340lx			
EF1A (IP67 or IP65 with switch)			For Hazardous Locations: · Oil, gas and mining industries · Printing factory · Gas station · Chemical complex control panel	White (5700K)	Clear glass surface: 1,100lx (condensing light) 205lx (diffused light)	19W	100 to 240V AC	17
					Translucent glass: 450lx (condensing light) 175lx (diffused light)	17W	24V DC	

1. K: Color Temperature (typ.), mm: Dominant Wavelength (typ.).

2. Directly below at .5m unless otherwise noted.

LF1D and LF2D

Machine Tools • Food and Beverage Processing Equipment • Vision Systems

LF1D (IP67, IP69K) and LF2D (IP67, IP67F) Series

With their rugged construction, the LF1D/2D series of light units are ideal for machine tools, automated label and package inspection equipment, and food and beverage processing equipment. Their design provides equally brilliant light at the center or edges of the units. Plus with their ratings, the LF1D (IP67, IP67F, IP69K) and LF2D (IP67, IP67F) can be used where high-pressure and high-temperature washdowns are used.

Mini (LF1D-C)

- Compact unit only 100 x 50 x 25mm
- Single LED module design eliminates multiple shadows while distributing light over a wide area (120°)

Slim and Wide (LF1D/2D-EH, FH)

- Brightness: 1450lx at 1m
- Available with terminal block or spring clamp connections for easy installation
- Angle adjustable mounting brackets provide installation flexibility

Long (LF1D-H/J)

- Two lengths available: 365mm and 510mm
- The flat light design reduces glare and multiple shadows, improving visibility from a distance
- M12 Quick Disconnect option (Pig Tail)



LED Optical Specifications

Model	Mini	Slim	Wide	Long	
	LF1D-C	LF1D/2D-EH	LF1D/2D-FH	LF1D-H	LF1D-J
Illumination Color	Cool White			Neutral White	
Total Luminous Flux	560lm	1000lm	1260lm	2000lm	3000lm
Color Temperature	5700K			4700K	
Reference Illuminance at 1.0m	180lx	1450lx	1200lx	560lx	840lx

LED modules and illumination units may vary in color and brilliance. Luminous flux, color temperature, and illuminance values shown are typical.

General Specifications

Model	Mini	Slim	Wide	Long	
	LF1D-C	LF1D/2D-EH	LF1D/2D-FH	LF1D-H	LF1D-J
Rated Voltage	24V DC				
Voltage Range	21.6 to 26.4V DC				
Rated Power (typ.)	4.6W	11W	12.5W	18.4W	27.6W
Insulation Resistance	100MΩ minimum (500V DC megger)				
Dielectric Strength	1000V AC, 50/60Hz, 1 minute				
Vibration Resistance (damage limits)	Frequency 5 to 55Hz, amplitude 0.5mm				
Shock Resistance (damage limits)	1000m/s ²				
Operating Temperature	-30 to +55°C (no freezing)				
Operating Humidity	45 to 85% RH (no condensation)				
Storage Temperature	-35 to +70°C (no freezing)				
Operating Environment	No corrosive gases				
Life ¹	50,000 hours (The illumination duration in which the illuminance maintains a minimum of 70% of the initial value at 25°C.)				
Degree of Protection ²	IP67F (reinforced glass), IP67 (all models), IP69K (LF1D)				
Material ³	Housing: Diecast aluminum (LF1D/LF2D), Lens: Reinforced glass or polycarbonate (LF1D/LF2D) Cover: Stainless steel (LF1D), Flange cover: Diecast aluminum (LF2D)				
Weight (approx.)	420g	LF1D-EH-2W*: 750g LF1D-EH-2W-A*: 950g LF2D-EH-2W*: 850g LF2D-EH-2W-A*: 1,000g	LF1D-FH-2W*: 800g LF1D-FH-2W-A*: 1,000g LF2D-FH-2W*: 900g LF2D-FH-2W-A*: 1,050g	1200g	1600g

1. LED life depends on the operating environment.

2. Waterproof or oil-proof characteristics specified by IEC 60529 and JIS0920. For illumination units without accessories, use a cable gland and cables that satisfy IP67F or IP67 degree of protection.

3. The reinforced glass and polycarbonate lens types have the same appearance, but have different degrees of protection (IP67F or IP67).

Part Numbers

Mini (LF1D-C)

Cable		
Location	Length	Part Number



Side	3m	LF1D-C2F-2W-330
	5m	LF1D-C2F-2W-350
Back	3m	LF1D-C2F-2W-430
	5m	LF1D-C2F-2W-450

Long (LF1D-H 365mm)

Cable			Part Number
Location	Length		



Side	5m	LF1D-H2F-2N-350
	1.5m + M12 connector	LF1D-H2F-2N-3B0
Back	5m	LF1D-H2F-2N-450
	1.5m + M12 connector	LF1D-H2F-2N-4B0

Long (LF1D-J 510mm)

Cable			Part Number
Location	Length		



Side	5m	LF1D-J2F-2N-350
	1.5m + M12 connector	LF1D-J2F-2N-3B0
Back	5m	LF1D-J2F-2N-450
	1.5m + M12 connector	LF1D-J2F-2N-4B0

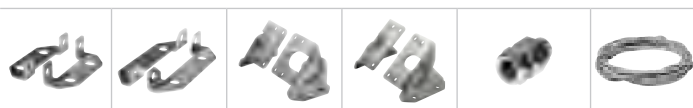
Slim and Wide Surface Mounting (LF1D-EH, FH)

Model			Slim Model (10 LEDs × 1 row)		Wide Model (7 LEDs × 2 rows)	
Cable Gland LF9Z-A11	Cable LF9Z-C05	Mounting Bracket LF9Z-B11,B12	Clear Reinforced Glass	Clear Polycarbonate	Clear Reinforced Glass	Clear Polycarbonate
— (hole on the side)	—	✓	LF1D-EH2F-2W LF1D-EH2F-2W-101	LF1D-EH3G-2W LF1D-EH3G-2W-101	LF1D-FH2F-2W LF1D-FH2F-2W-101	LF1D-FH3G-2W LF1D-FH3G-2W-101
— (hole on the back)	—	✓	LF1D-EH2F-2W-200 LF1D-EH2F-2W-201	LF1D-EH3G-2W-200 LF1D-EH3G-2W-201	LF1D-FH2F-2W-200 LF1D-FH2F-2W-201	LF1D-FH3G-2W-200 LF1D-FH3G-2W-201
✓ (Side)	—	✓	LF1D-EH2F-2W-300 LF1D-EH2F-2W-301	LF1D-EH3G-2W-300 LF1D-EH3G-2W-301	LF1D-FH2F-2W-300 LF1D-FH2F-2W-301	LF1D-FH3G-2W-300 LF1D-FH3G-2W-301
	✓	✓	LF1D-EH2F-2W-350 LF1D-EH2F-2W-A	LF1D-EH3G-2W-350 LF1D-EH3G-2W-A	LF1D-FH2F-2W-350 LF1D-FH2F-2W-A	LF1D-FH3G-2W-350 LF1D-FH3G-2W-A
✓ (Back)	—	✓	LF1D-EH2F-2W-400 LF1D-EH2F-2W-401	LF1D-EH3G-2W-400 LF1D-EH3G-2W-401	LF1D-FH2F-2W-400 LF1D-FH2F-2W-401	LF1D-FH3G-2W-400 LF1D-FH3G-2W-401
	✓	✓	LF1D-EH2F-2W-450 LF1D-EH2F-2W-451	LF1D-EH3G-2W-450 LF1D-EH3G-2W-451	LF1D-FH2F-2W-450 LF1D-FH2F-2W-451	LF1D-FH3G-2W-450 LF1D-FH3G-2W-451

Slim and Wide Recessed Mounting (LF2D-EH, FH)

Model		Slim Model (10 LEDs × 1 row)		Wide Model (7 LEDs × 2 rows)	
Cable Gland LF9Z-A11	Cable LF9Z-C05	Clear Reinforced Glass	Clear Polycarbonate	Clear Reinforced Glass	Clear Polycarbonate
—	—	LF2D-EH2F-2W	LF2D-EH3G-2W	LF2D-FH2F-2W	LF2D-FH3G-2W
—	—	LF2D-EH2F-2W-200	LF2D-EH3G-2W-200	LF2D-FH2F-2W-200	LF2D-FH3G-2W-200
✓ (Side)	—	LF2D-EH2F-2W-300	LF2D-EH3G-2W-300	LF2D-FH2F-2W-300	LF2D-FH3G-2W-300
	✓	LF2D-EH2F-2W-A	LF2D-EH3G-2W-A	LF2D-FH2F-2W-A	LF2D-FH3G-2W-A
✓ (Back)	—	LF2D-EH2F-2W-400	LF2D-EH3G-2W-400	LF2D-FH2F-2W-400	LF2D-FH3G-2W-400
	✓	LF2D-EH2F-2W-450	LF2D-EH3G-2W-450	LF2D-FH2F-2W-450	LF2D-FH3G-2W-450

Accessories



Item	Mounting Bracket				Cable Gland	Cable
	Fixed		Adjustable Angle			
Part Number	LF9Z-B11	LF9Z-B12	LF9Z-1MDE1	LF9Z-1MDF1	LF9Z-A11	LF9Z-C05
Applicable Unit	LF1D (Slim)	LF1D (Wide)	LF1D (Slim)	LF1D (Wide)	LF1D/2D (Slim and Wide)	
Material	Stainless Steel				Brass	PVC
Notes	1 pair, Left and Right				M8*	Length: 5m

*Applicable wire size (10-12 AWG)

Part Number Structure (use for interpreting part numbers only)

LF 1 D - EH 2F - 2 W - 300

Shape
1: Surface mount
2: Recessed mount

Size (LED arrangement)
C: Mini 100mm (3.94")
EH: Slim Model (10 LEDs × 1 row)
FH: Wide Model (7 LEDs × 2 rows)
H: Long 365mm (14.37")
J: Long 510mm (20.08")

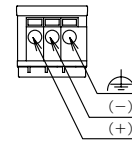
Illumination Color
W: White (except LF1D-H/J)
N: Neutral White (LF1D-H/J)

Lens Type Degree of Protection
2F: Reinforced glass IP67F, IP69K (LF1D) IP67F(LF2D)
3G: Polycarbonate IP67, IP69K (LF1D) IP67 (LF2D)

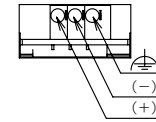
Accessory Options (see chart)

Terminal Block Wiring

Slim Type



Wide Type

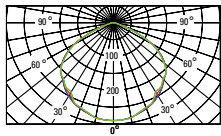


Applicable ferrules: 0.25 to 0.75 mm²
Recommended source - Phoenix Contact:
AI 0,25-12 BU, AI 0,34-12 TQ,
AI 0,5-12 WH, AI 0,75-12 GY

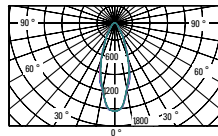
1. Mounting bracket available for LF1D (wide and slim) only.
2. Only available for LF1D (wide and slim) models.
3. 1.5m cable with M12 connector for Long only (LF1D-H, J).

Illuminance Charts

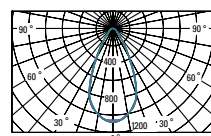
LF1D-C



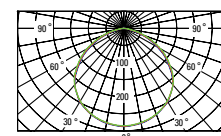
LF1D/2D-EH



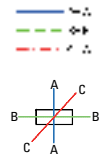
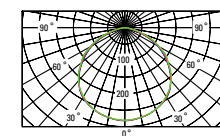
LF1D/2D-FH



LF1D-H

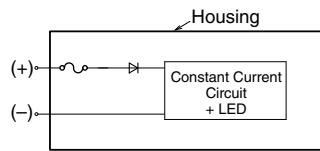


LF1D-J

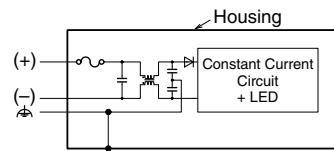


Internal Circuits

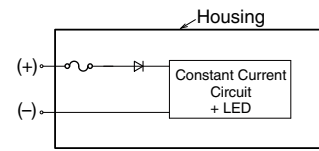
LF1D-C



LF1D/2D-E, EH, F, FH

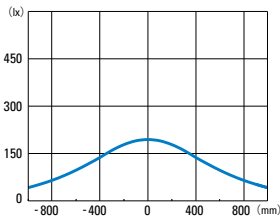


LF1D-H/J

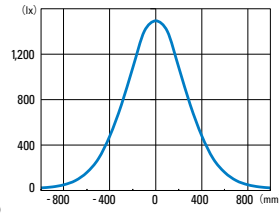


Distribution Characteristics

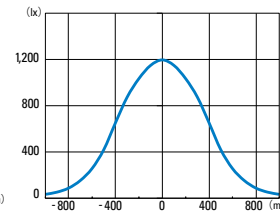
LF1D-C



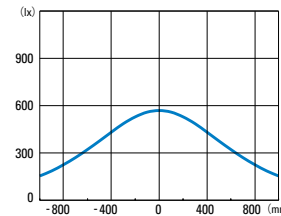
LF1D/2D-EH



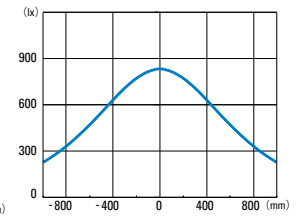
LF1D/2D-FH



LF1D-H

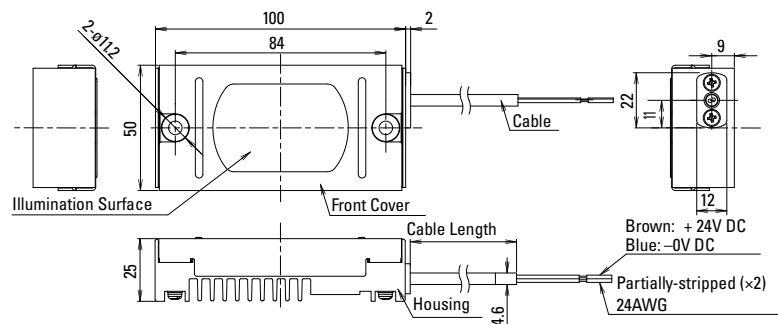


LF1D-J



Dimensions (mm)

LF1D-C Mini



Note: When leading the cable from the cable gland on the back, provide a hole in the mounting plate. Also, provide a proper sealing.

Recommended M5 screw:

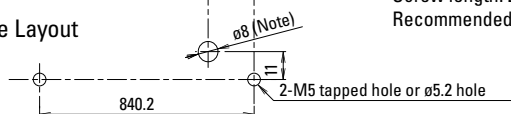
Screw head height: 9.5mm max.

Screw head diameter: 10mm max.

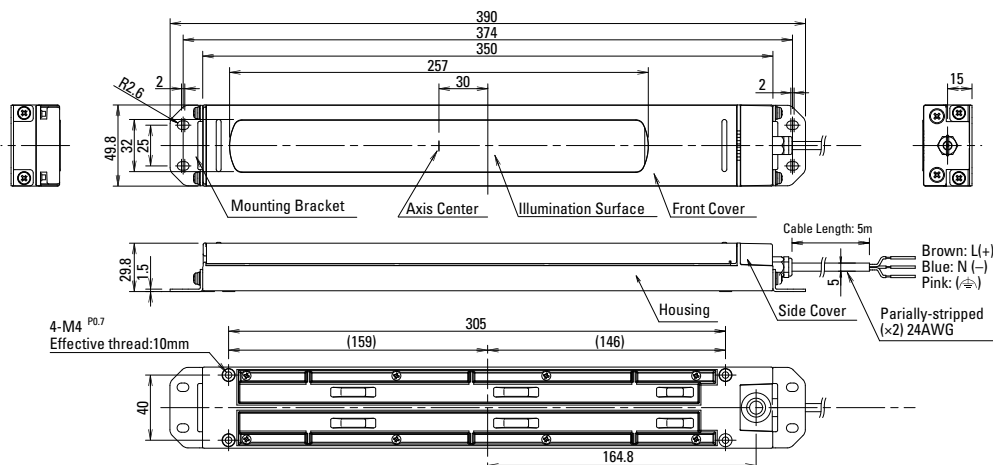
Screw length: 20mm min.

Recommended washer diameter: 10mm max.

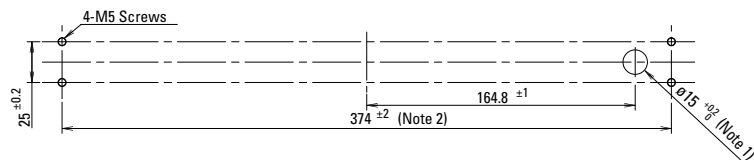
Mounting Hole Layout



LF1D Slim

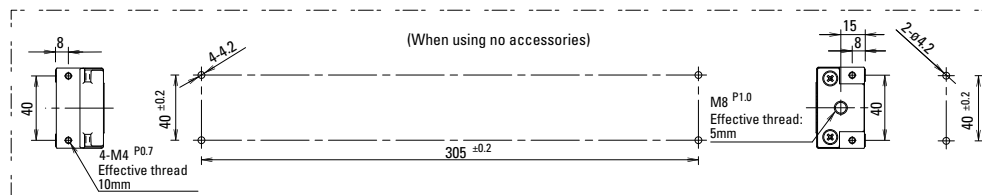


Mounting Hole Layout

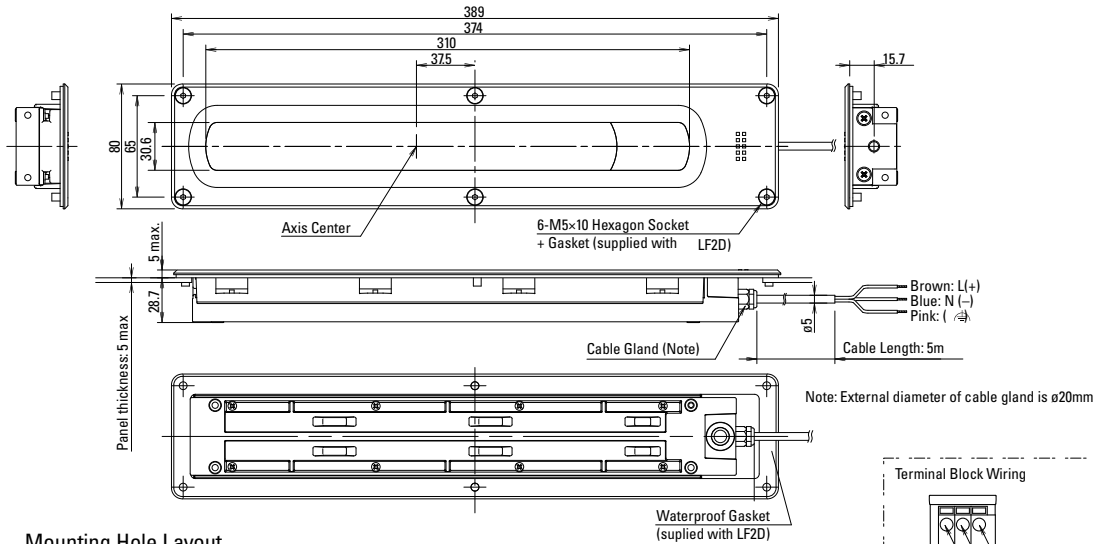


Note 1: When leading the cable from the cable gland on the back, provide a hole in the mounting plate.

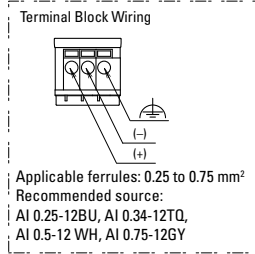
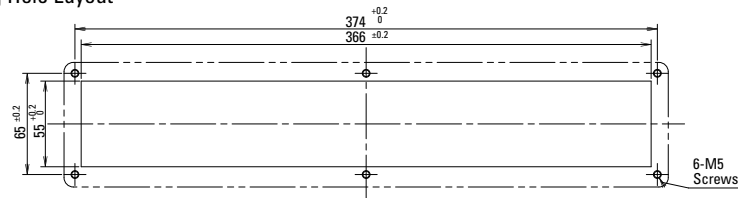
Note 2: When using the adjustable mounting bracket, the tolerance is $374^{+2.0}_{-0.5}$ when the gasket diameter is larger than $\varnothing 10$ and $\varnothing 12$ or smaller



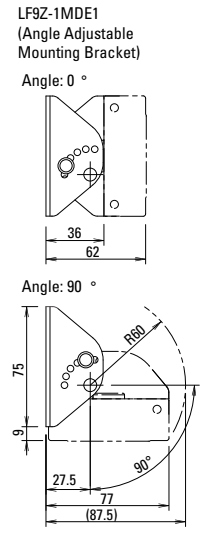
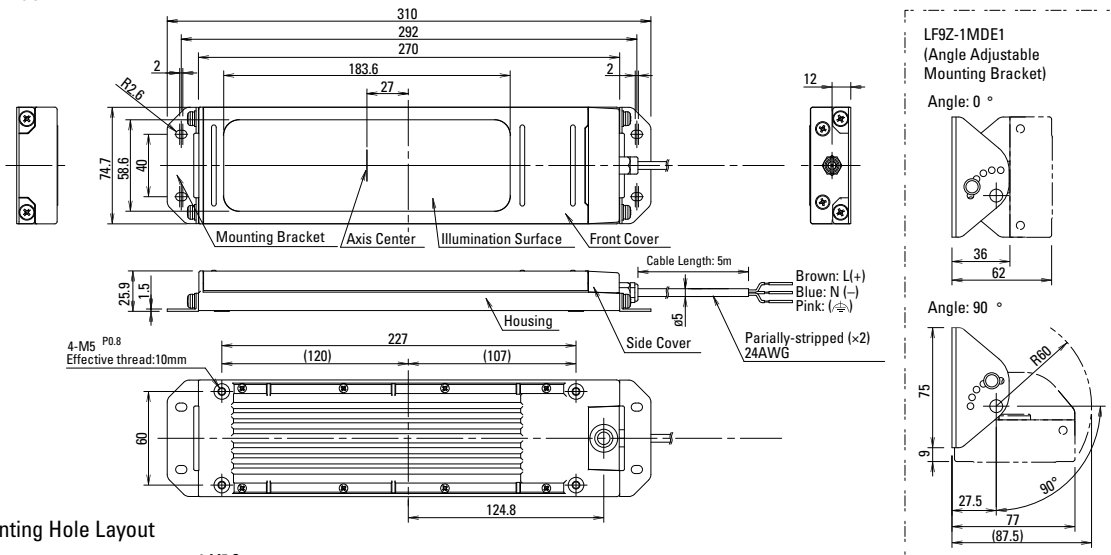
LF2D Slim



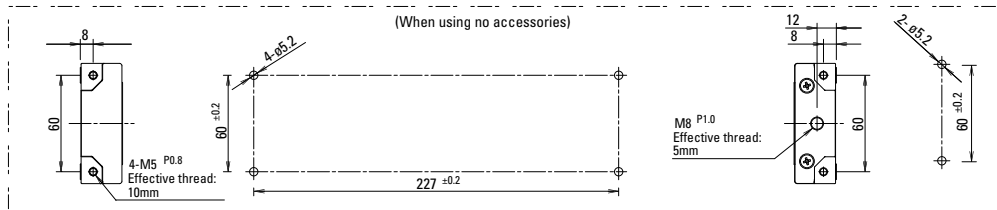
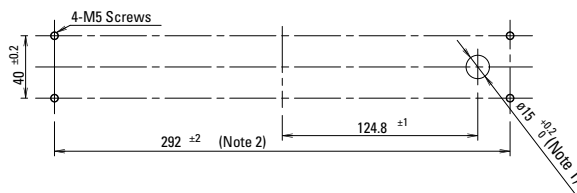
Mounting Hole Layout



LF1D Wide

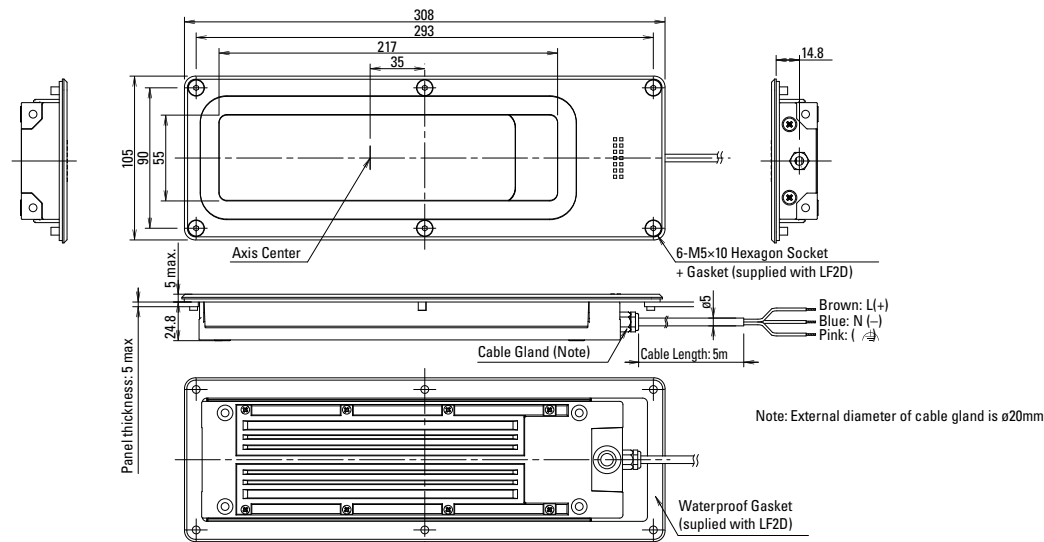


Mounting Hole Layout

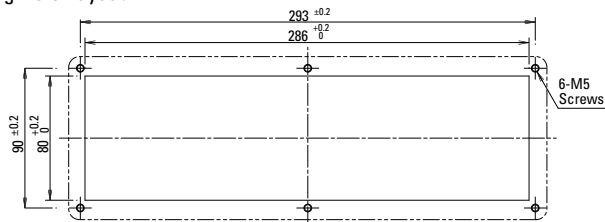


All dimensions in mm.

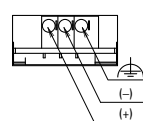
LF2D Wide



Mounting Hole Layout

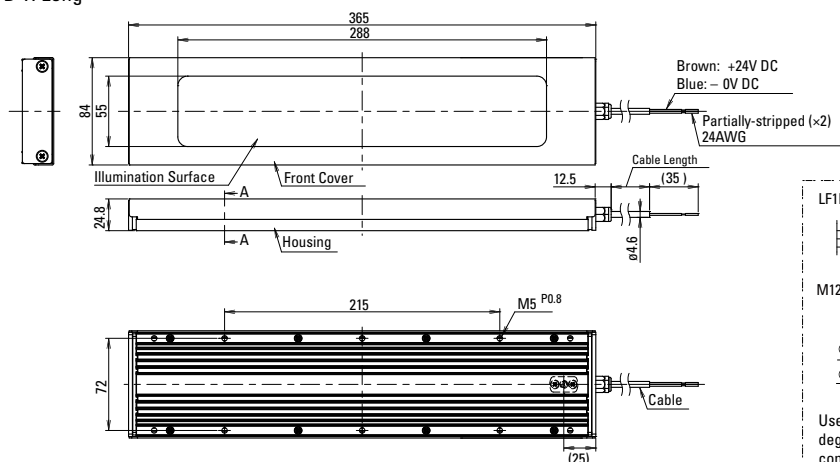


Terminal Block Wiring

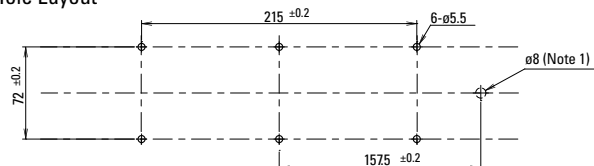


Applicable ferrules: 0.25 to 0.75 mm²
Recommended source:
Al 0.25-12BU, Al 0.34-12TQ,
Al 0.5-12 WH, Al 0.75-12GY

LF1D-H Long

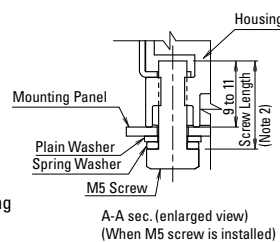
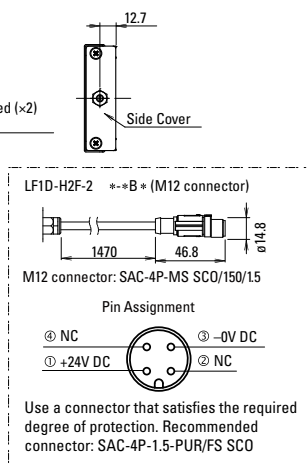


Mounting Hole Layout

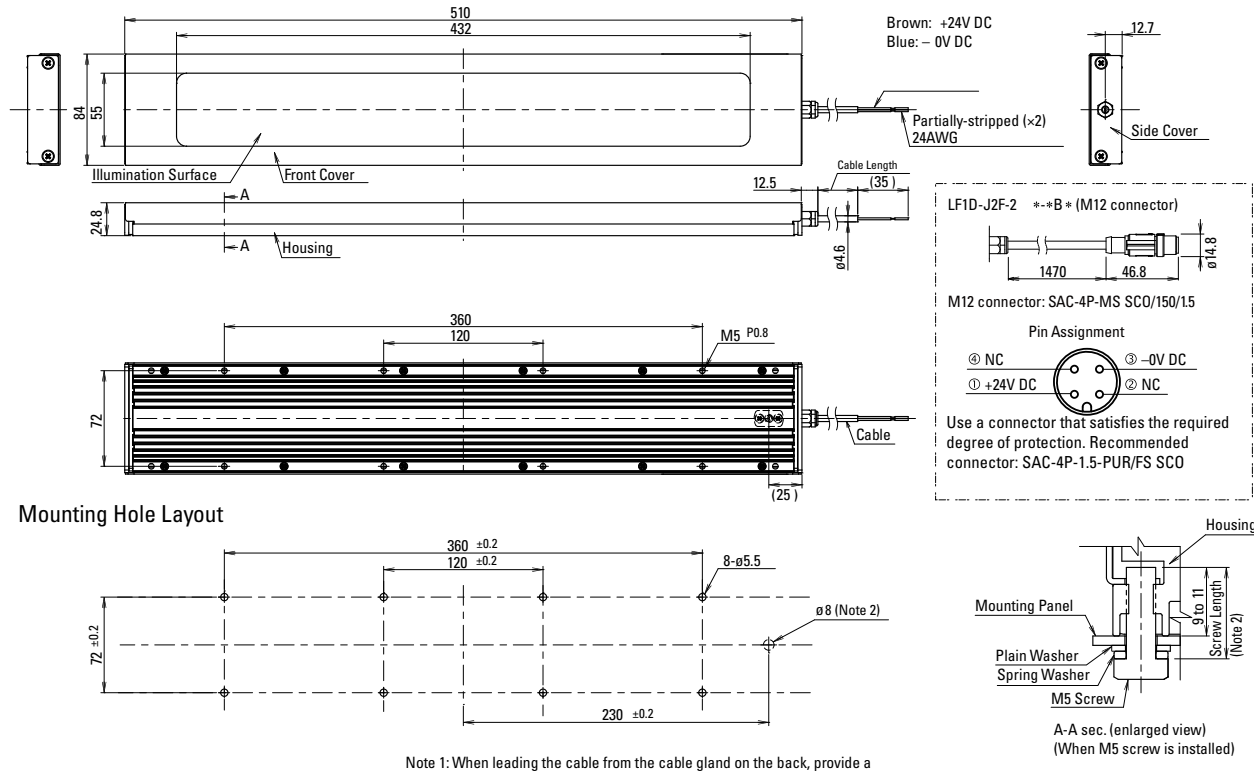


Note 1: When leading the cable from the cable gland on the back, provide a hole in the mounting plate. A $\varnothing 16$ hole is necessary when using the LF1D-2F-2N *B* (M12 connector type)

Note 2: Choose mounting screws in consideration of mounting plate thickness.



LF1D-J Long



Safety Precautions

Do not disassemble, repair, or modify the LF1D/2D. Otherwise electric shock, fire, or malfunction may occur. Before wiring, confirm that the LF1D/2D has cooled down sufficiently. Ensure the correct operating temperature. Otherwise internal temperature rise may result in damage. LED illumination unit is general-purpose industrial electric device. Do not use for electronic equipment which may damage the human body or threaten life in case a malfunction or failure occurs.

Instructions

LED modules may vary in illumination colors and illuminance. Before designing equipment and powering up illumination units, confirm the specifications described in the instruction sheet. Apply voltage within the rated value, otherwise the LED elements may be damaged. Do not loosen screws, otherwise the protection characteristics will be impaired. Do not use or store in a place subjected to vibration and shock. Otherwise electric shock or failure occurs. To clean the cover, use a soft cloth with water or neutral detergent. Do not use solvents such as thinners, benzene, or alkaline, otherwise discoloration, deterioration, or decrease in strength may occur.

LF2B

Control Panels • Industrial Equipment • Commercial Products

Wide range of input voltages (100 - 240V AC) for commercial applications, and 12/24V DC are available for battery or industrial usage. Slim units can be used in many applications and installations where space is limited. Rated IP65 (protection from water and dust), LF2B is great for environments where there is water spray.

- Slim units: 40mm wide x 29mm high
- One-step installation in a narrow space is possible when using mounting brackets
- Five Lengths (210/330/580/830/1,080mm) are offered to meet space requirements and illumination coverages
- Bright and clear white LED illuminates the shapes and colors of target objects
- Two covers: clear or white



LED Optical Specifications

Model	LF2B-B (210mm)		LF2B-C (330mm)		LF2B-D (580mm)		LF2B-E (830mm)		LF2B-F (1,080mm)	
Illumination Color	White									
Color Temperature	6500K									
Luminous Flux (typ.)	180lm		360lm		720lm		1080lm		1440lm	
Cover	Clear	White	Clear	White	Clear	White	Clear	White	Clear	White
Reference Illuminance (typ.) at 0.5m directly below	290lx	265lx	540lx	500lx	1065lx	980lx	1385lx	1275lx	1520lx	1400lx

LED modules and illumination units may vary in illumination colors and illuminance.

General Specifications

Model		LF2B-B (210mm)	LF2B-C (330mm)	LF2B-D (580mm)	LF2B-E (830mm)	LF2B-F (1,080mm)
Rated Voltage		100-240V AC 50/60Hz (Voltage range: 90-264V AC)				
		12V/24V DC (Voltage range: 10.8-30V DC)				
Input Current (typical) (at the rated voltage) ¹	AC100~240V AC	28mA	57mA	80mA	128mA	165mA
	12V/24V DC	215mA	409mA	880mA	—	—
Rated Power (at the rated voltage)	100~240V AC	2.2W	4.4W	7.8W	12.2W	15.9W
	12V/24V DC	2.6W	4.9W	10.6W	—	—
Insulation Resistance		100MΩ minimum (500V DC megger)				
Dielectric Strength	100~240V AC	2,000V AC				
	12V/24V DC	1,000V AC				—
Vibration Resistance		Frequency 5 - 55Hz, Amplitude 0.17mm, speed acceleration 20m/s ² , 3 directions, 2 hours each				
Shock Resistance		300m/s ² , 6 directions, 5 times each				
Operating Temperature		-30 to +55°C (no freezing)				
Operating Humidity		45 to 85% RH (no condensation)				
Storage Temperature		-35 to +70°C (no freezing)				
Operating Atmosphere		No corrosive gases				
Life ²		40,000 hours (Ta = 25°C) (The total illumination life in which the brightness maintains a minimum of 70% of the initial value.)				
Degree of Protection		IP65 (IEC 60529)				
Material		Front Cover: Polycarbonate Resin; End Cover/Cable Gland: Polyamide Resin; Cable: PVC sheathing (24AWG)				
Weight (approx.)	100~240V AC	200g	255g	400g	520g	645g
	12V/24V DC	175g	235g	370g	—	—

1. 100V AC input for 100 - 240V AC; 12V DC input for 12V/24V DC.

2. LED life is dependent on the operating environment and conditions.

Part Numbers

Illumination Color	White			
Cover	Clear Cover		White Cover	
				
Rated Voltage	100 - 240V AC		12V/24V DC	
LF2B-B (210mm)	LF2B-B3P-ATHWW2-1M	LF2B-B3P-BTHWW2-1M	LF2B-B4P-ATHWW2-1M	LF2B-B4P-BTHWW2-1M
LF2B-C (330mm)	LF2B-C3P-ATHWW2-1M	LF2B-C3P-BTHWW2-1M	LF2B-C4P-ATHWW2-1M	LF2B-C4P-BTHWW2-1M
LF2B-D (580mm)	LF2B-D3P-ATHWW2-1M	LF2B-D3P-BTHWW2-1M	LF2B-D4P-ATHWW2-1M	LF2B-D4P-BTHWW2-1M
LF2B-E (830mm)	LF2B-E3P-ATHWW2-1M		LF2B-E4P-ATHWW2-1M	
LF2B-F (1,080mm)	LF2B-F3P-ATHWW2-1M		LF2B-F4P-ATHWW2-1M	

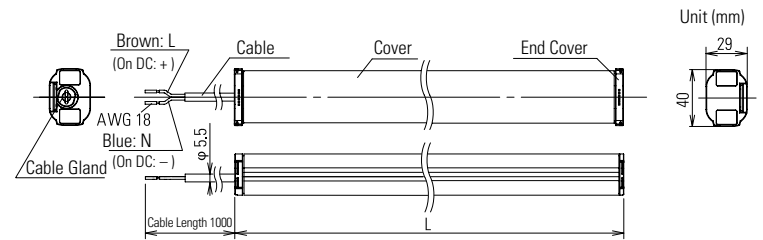
Part Number Structure (use for interpreting part numbers only)

LF2B - C 3 P - ATHWW2 - 1M

Length	Cover	Rated Voltage
B: 210mm (8.27")	3: Clear	A: 100/240V AC
C: 330mm (12.99")	4: White	B: 12V/24V DC
D: 580mm (22.83")		
E: 830mm (32.68")		
F: 1,080mm (42.52")		

DC12V/24V Length: B (210mm), C (330mm), D (580mm) only

Dimensions (mm)



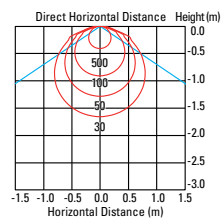
Accessories

Dimension Table

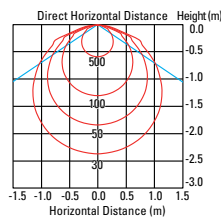
LF2B-B and -C includes 2 brackets each; LF2B-E 3 brackets, and LF2B-F 4 brackets.

Illuminance Distribution at 0.5m (clear cover)

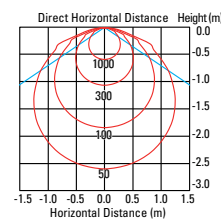
LF2B-B (210mm)



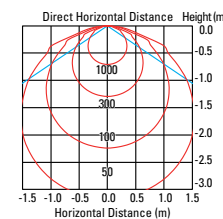
LF2B-C (330mm)



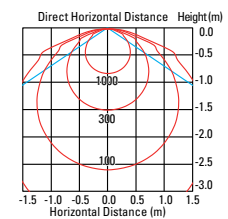
LF2B-D (580mm)



LF2B-E (830mm)



LF2B-F (1,080mm)



LF1B-N Series

Control Panels • Industrial Machines • Commercial Display Cases

The LF1B-N series LED light strips are slim and perfect for applications where space is a concern. They come in six different lengths and six distinct colors, making them a very flexible lighting solution.

- Compact design: 27.5mm wide, 16mm high, and 134 to 1,080mm long
- 6 Colors: cool white, warm white, yellow, red, blue, green
- All units come standard with 3 meter connection cables
- 2 Cover options: clear, white
- IP65 degree of protection (waterproof, dustproof), suitable for use in wet locations



LED Optical Specifications

Illumination Color		Cool White		Warm White		Yellow		Red		Green		Blue	
Cover		Clear	White	Clear	White	Clear	White	Clear	White	Clear	White	Clear	White
Color Temperature/ Dominant Wavelength (typ.)		6500K		3000K		590nm		620nm		525nm		455nm	
Reference Brightness (typ.) at 0.5m	LF1B-NA	95lx	85lx	90lx	80lx	20lx	18lx	20lx	18lx	30lx	27lx	10lx	9lx
	LF1B-NB	240lx	215lx	230lx	210lx	40lx	36lx	40lx	36lx	60lx	55lx	20lx	18lx
	LF1B-NC	455lx	410lx	440lx	395lx	75lx	65lx	75lx	65lx	110lx	100lx	30lx	27lx
	LF1B-ND	840lx	750lx	815lx	725lx	125lx	110lx	125lx	110lx	190lx	170lx	50lx	45lx
	LF1B-NE	1100lx	995lx	1065lx	960lx	160lx	145lx	160lx	145lx	260lx	235lx	60lx	55lx
	LF1B-NF	1350lx	1210lx	1300lx	1170lx	180lx	160lx	180lx	160lx	300lx	270lx	80lx	70lx

LED modules and illumination units may vary in illumination colors and brightness.

General Specifications

Model		LF1B-NA (134mm)	LF1B-NB (210mm)	LF1B-NC (330mm)	LF1B-ND (580mm)	LF1B-NE (830mm)	LF1B-NF (1,080mm)
Rated Voltage		24V DC (operating voltage range: 21.6 to 26.4V)					
Input Current (typ.) (at the rated current)	cool white/warm white/blue	60mA	120mA	180mA	360mA	540mA	720mA
	red/yellow/green	40mA	80mA	120mA	240mA	360mA	480mA
Power Consumption (typ.) (at the rated voltage)	cool white/warm white/blue	1.5W	2.9W	4.4W	8.7W	13.0W	17.3W
	red/yellow/green	1.0W	2.0W	2.9W	5.8W	8.7W	11.6W
Insulation Resistance		100MΩ minimum (500V DC megger)					
Dielectric Strength		1,000V AC, 1 minute (between live and dead parts)					
Vibration Resistance (damage limits)		Frequency: 5 to 55Hz, Amplitude 0.5mm Acceleration 60m/s² (6G), 2 hours each in 3 axes				Frequency: 5 to 55Hz, Amplitude 0.17mm Acceleration 20m/s² (2G), 2 hours each in 3 axes	
Shock Resistance (damage limits)		1,000m/s² (100G), 5 shocks each in 6 axes				300m/s² (30G), 5 shocks each in 6 axes	
Operating Temperature		−30 to +55°C (no freezing)					
Operating Humidity		45 to 85% RH (no condensation)					
Storage Temperature		−35 to +70°C (no freezing)					
Operating Atmosphere		No corrosive gases					
Life (Note)		40,000 hours (Ta = 25°C) (The total illumination life in which the brightness maintains a minimum of 70% of the initial value.)					
Degree of Protection		IP65 (IEC 60529)					
Material		Cover: polycarbonate, End cover/cable gland: polyamide, Wire: PVC (24AWG)					
Weight (approx.)		95g	125g	165g	255g	430g	740g

1. LED life depends on the operating environment.

Part Numbers

Illumination Color	Cool White	Warm White	Yellow	Red	Blue	Green
Appearance						
						
LF1B-NA (134mm)	LF1B-NA⊙P-2THWW2-3M	LF1B-NA⊙P-2TLWW2-3M	LF1B-NA⊙P-2SHY2-3M	LF1B-NA⊙P-2SHR2-3M	LF1B-NA⊙P-2THS2-3M	LF1B-NA⊙P-2SHG2-3M
LF1B-NB (210mm)	LF1B-NB⊙P-2THWW2-3M	LF1B-NB⊙P-2TLWW2-3M	LF1B-NB⊙P-2SHY2-3M	LF1B-NB⊙P-2SHR2-3M	LF1B-NB⊙P-2THS2-3M	LF1B-NB⊙P-2SHG2-3M
LF1B-NC (330mm)	LF1B-NC⊙P-2THWW2-3M	LF1B-NC⊙P-2TLWW2-3M	LF1B-NC⊙P-2SHY2-3M	LF1B-NC⊙P-2SHR2-3M	LF1B-NC⊙P-2THS2-3M	LF1B-NC⊙P-2SHG2-3M
LF1B-ND (580mm)	LF1B-ND⊙P-2THWW2-3M	LF1B-ND⊙P-2TLWW2-3M	LF1B-ND⊙P-2SHY2-3M	LF1B-ND⊙P-2SHR2-3M	LF1B-ND⊙P-2THS2-3M	LF1B-ND⊙P-2SHG2-3M
LF1B-NE (830mm)	LF1B-NE⊙P-2THWW2-3M	LF1B-NE⊙P-2TLWW2-3M	LF1B-NE⊙P-2SHY2-3M	LF1B-NE⊙P-2SHR2-3M	LF1B-NE⊙P-2THS2-3M	LF1B-NE⊙P-2SHG2-3M
LF1B-NF (1,080mm)	LF1B-NF⊙P-2THWW2-3M	LF1B-NF⊙P-2TLWW2-3M	LF1B-NF⊙P-2SHY2-3M	LF1B-NF⊙P-2SHR2-3M	LF1B-NF⊙P-2THS2-3M	LF1B-NF⊙P-2SHG2-3M

In place of ⊙ insert 3 for clear cover and 4 for white cover.

Part Number Structure (use for interpreting part numbers only)

LF1B - NC 3 P - 2 THWW2 - 3M

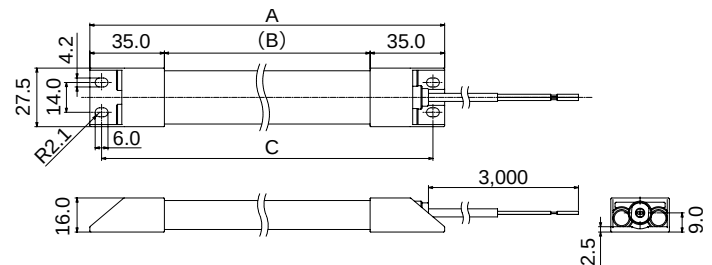
Length
 A: 134mm (5.28")
 B: 210mm (8.27")
 C: 330mm (12.99")
 D: 580mm (22.83")
 E: 830mm (32.68")
 F: 1,080mm (42.52")

Cable Length
 3M: 3m
 1M: 1m

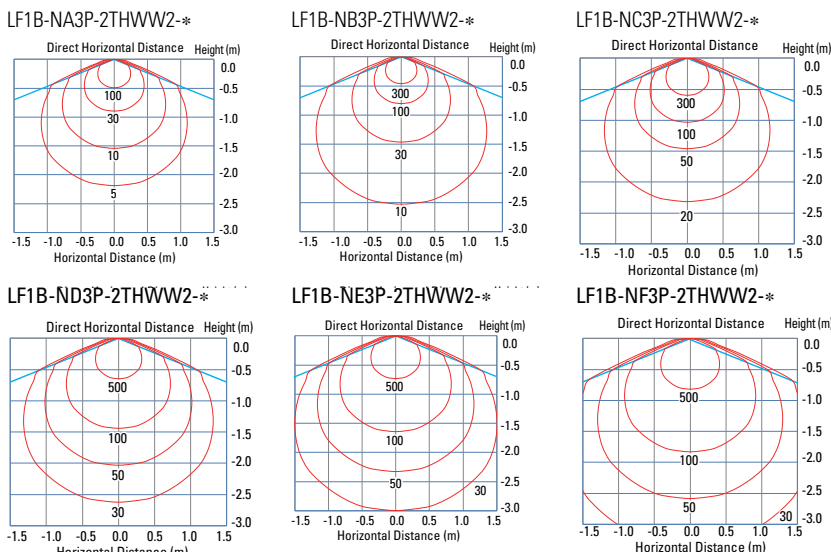
Cover
 3: Clear
 4: White

Illumination Color
 THWW2: Cool white
 TLWW2: Warm white
 SHY2: Yellow
 SHR2: Red
 THS2: Blue
 SHG2: Green

Dimensions (mm)



Illuminance Distribution (lx)



Accessory

Dimension Table

Model	A		B		C	
	mm	inch	mm	inch	mm	inch
LF1B-NA	134	5.28	64	2.52	123	4.84
LF1B-NB	210	8.27	140	5.51	199	7.83
LF1B-NC	330	12.99	260	10.24	319	12.56
LF1B-ND	580	22.83	510	20.08	569	22.40
LF1B-NE	830	32.68	760	29.92	819	32.24
LF1B-NF	1080	42.52	1010	39.76	1069	42.09

LF1A Series

Control Panels • Manufacturing Equipment

LF1A LED strips use super-bright multi-chip LEDs providing illumination equivalent to a 25W fluorescent lamp, while consuming only one-third the power. They come in a thin housing available in three sizes with four color configurations: cool white (5500K), warm white (2800K), yellow (590nm) and red (625nm).

- Brightness: 66.6 Lumens/Watt
- Energy savings: One-third of fluorescent lamps
- Long life: 40,000 hrs (Half-life)
- UL Listed
- RoHS Compliant
- IP40



LED Optical Specifications

Model		LF1A-*2THWW6	LF1A-*2TLWW6	LF1A-*2SHY8	LF1A-*2SHR8
Illumination Color		Cool White	Warm White	Yellow	Red
Luminous Intensity (Single LED module)		6000mcd	4000mcd	4000mcd	2500mcd
Color Temperature / Dominant Wavelength		5500K	2800K	590nm	625nm
Reference Illuminance at 0.5m	LED Array 3 x 2	190lx	130lx	130lx	85lx
	LED Array 6 x 2	380lx	260lx	260lx	170lx
	LED Array 12 x 2	760lx	520lx	520lx	340lx

*LED Array A1 = 3x2 , B1 = 6x2, D1 = 12x2

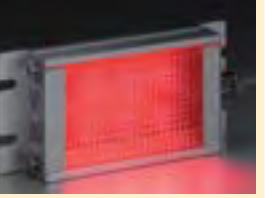
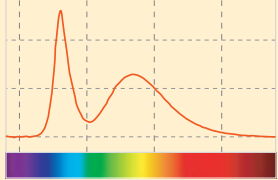
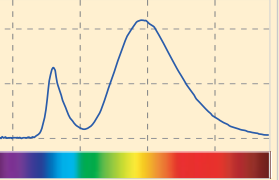
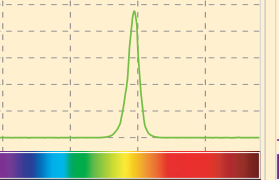
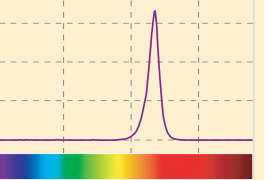
General Specifications

Model		LF1A-*-2THWW6	LF1A-*-2TLWW6	LF1A-*-2SHY8	LF1A-*-2SHR8
Rated Voltage		24V DC (non-polarized)			
Input Current (at rated voltage)	LED Array 3 x 2	75mA		90mA	
	LED Array 6 x 2	150mA		180mA	
	LED Array 12 x 2	300mA		360mA	
Rated Power (at rated voltage)	LED Array 3 x 2	1.8W		2.2W	
	LED Array 6 x 2	3.6W		4.4W	
	LED Array 12 x 2	7.2W		8.7W	
Dielectric Strength		Between live and dead parts: 1000V AC, 1 minute			
Insulation Resistance		Between live and dead parts: 100 MΩ (500V DC megger)			
Operating Temperature		-20 to +50°C			
Storage Temperature		-25 to +70°C			
Operating/Storage Humidity		45 to 85% RH (no condensation)			
Life (half luminance) ²		40,000 hours			
Weight (approx.)		LF1A-A1: 190g, LF1A-B1: 270g, LF1A-D1: 470g			
Degree of Protection		IP40			

1. *LED Array A1 = 3x2 , B1 = 6x2, D1 = 12x2

2. LED life depends upon operating environment.

Part Numbers

Color	Cool White	Warm White	Yellow	Red
Part No.	LF1A-*2THWW6	LF1A-*2TLWW6	LF1A-*2SHY8	LF1A-*2SHR8
Appearance				
Light Spectrum				

*LED Array A1 = 3x2, B1 = 6x2, D1 = 12x2

Part Number Structure (use for interpreting part numbers only)

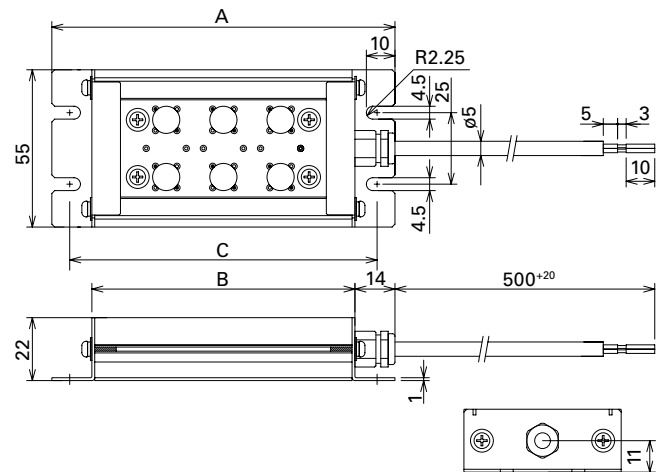
LF1A – A1 – 2 THWW6

LED Module Arrangement
 A1: 3 LEDs × 2 rows
 B1: 6 LEDs × 2 rows
 D1: 12 LEDs × 2 rows

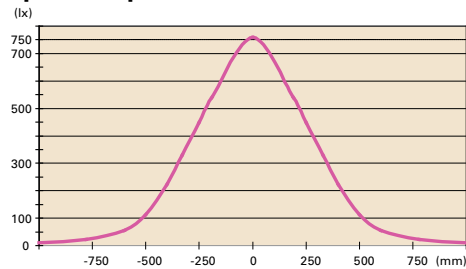
LED Illumination Color
 THWW6: Cool White
 TLWW6: Warm white
 SHY8: Yellow
 SHR8: Red

Dimension Table

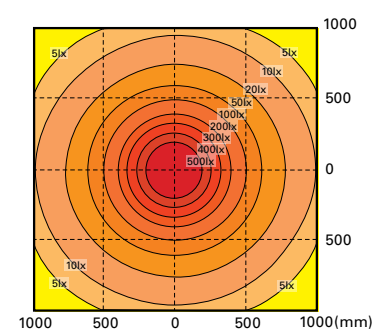
Dimensions (mm)



Optical Dispersion at 0.5m LF1A-D1-THWW6 (Cool White)



Illuminance Chart LF1A-D1-2THWW6



Accessories



Item	Mounting Bracket- Adjustable Angle
Part No.	LF9Z-1MA1
Material	Stainless Steel

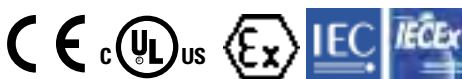
1 pair, Left and Right

EF1A Series

Hazardous locations: Oil & Gas, Water Treatment, Chemical Plants, Painting Booths

With UL Class I, Zone 1 and Type 4X ratings, the EF1A series can be used in hazardous locations, making it well-suited to handle applications in oil & gas industries, water treatment, chemical plants, painting booths and more. This design also allows for increased mounting versatility with mounting options including adjustable, fixed angle, or no mounting bracket. And with major international certifications, EF1A can even be used in applications worldwide.

- Hazardous location LED flood lights (Class I, Zone 1 and Zone 2)
- Heavy-duty aluminum housing with reinforced glass lens
- Narrow-angle and wide-angle beam models available
- Clear or translucent lenses
- Available with adjustable, fixed angle or no mounting bracket
- Four conduit sizes available
- Type 4X (IP67) without switch
- Type 3S (IP65) with switch
- IP65 (with switch)



LED Optical Specifications

Lens Type Collecting Lens (Optical Dispersion)	Clear		Diffused	
	With	Without	With	Without
Number of LEDs	16			
Illumination Color	Cool White			
Color Temperature (typ.)	5700K			
Total Luminous Flux (typ.)	960lm			
Reference Illuminance (typ.) At 1.0m directory below	1100lx	450lx	205lx	175lx

Certifications and Compliances

NEC and CEC	IEC and ATEX (94/9/EC)
Cl. I, Zone 1, Groups IIB	Zones 1 & 21 and 2 & 22
UL: Class I, Zone 1, AEx d IIB T4 Gb	ATEX: II 2G Ex d IIB T4 Gb II 2D Ex tb IIIC T 130°C Db IP67 (or IP65)
c-UL: Ex d IIB T4 Gb X	IECEx: Ex d IIB T4 Gb Ex tb IIIC T 130°C Db IP67 (or IP65)
Certificate/file number: UL/c-UL E353024	Certificate numbers: DEMKO 14 ATEX 1208667X IECEx UL 14.0048X

General Specifications

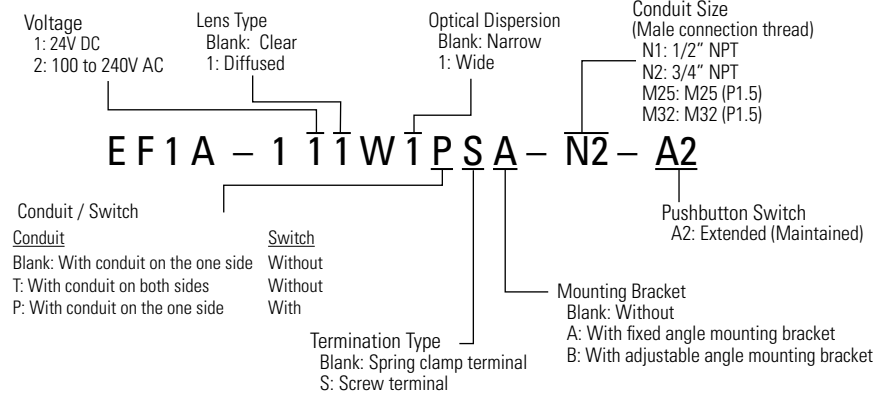
Model	EF1A -11	EF1A -12
Rated Voltage	24V DC	100 to 240V AC
Voltage Range	21.6 to 26.4V DC	90 to 264V AC
Rated Power (Typ.)	17W (at rated voltage)	19W (at rated voltage)
Dielectric Strength	500V AC 1 minute input - FG	2000V AC 1 minute input - FG
Insulation Resistance	100MΩ minimum (500V DC megger) input - FG	
Vibration Resistance (damage limits)	Frequency 5 to 55Hz, amplitude 0.5mm	
Shock Resistance (damage limits)	1000m/s ²	
Operating Temperature	-20 to +50°C (no freezing)	
Operating Humidity	45 to 85% RH (no condensation)	
Storage Temperature	-35 to +70°C (no freezing)	
Life ¹	Over 50,000 hours (The illumination duration in which the brightness maintains a minimum of 70% of initial value at 25°C)	
Material	Housing: aluminum, Front panel: stainless steel, Mounting bracket: stainless steel Lens: reinforced glass	
Weight (approx.)	2.9Kg (without mounting bracket), 3.1Kg (with mounting bracket)	

Part Numbers

Rated Voltage	Optical Dispersion	Lens Type ①	Conduit Entry ②	Termination Type ③	Conduit Size ④	Pushbutton Switch ⑤	Mounting Bracket	Part No.
100 to 240V AC	Narrow	Blank: Clear glass 1: Diffused glass	Blank: One Side T: Both Sides P: One Side (Another Side Switch)*	Blank: Spring Clamp Terminal S: Screw Terminal	N1: 1/2"NPT N2: 3/4"NPT M25: M25 (P1.5) M32: M32 (P1.5)	Empty: Without pushbutton switch - type 4x (IP67)	Without (4-M6 screw on the back of EF1A)	EF1A-12①W②③-④-⑤
							With (Fixed angle)	EF1A-12①W②③A-④-⑤
							With (Adjustable angle)	EF1A-12①W②③B-④-⑤
	Wide						Without (4-M6 screw on the back of EF1A)	EF1A-12①W1②③-④-⑤
							With (Fixed angle)	EF1A-12①W1②③A-④-⑤
							With (Adjustable angle)	EF1A-12①W1②③B-④-⑤
24V DC	Narrow	(Male connection thread)	A2: With pushbutton switch - type 3S (IP65)	Without (4-M6 screw on the back of EF1A)	EF1A-11①W②③-④-⑤			
				With (Fixed angle)	EF1A-11①W②③A-④-⑤			
				With (Adjustable angle)	EF1A-11①W②③B-④-⑤			
	Wide			Without (4-M6 screw on the back of EF1A)	EF1A-11①W1②③-④-⑤			
				With (Fixed angle)	EF1A-11①W1②③A-④-⑤			
				With (Adjustable angle)	EF1A-11①W1②③B-④-⑤			

* End of Part No. is marked A2 (pushbutton switch)

Part Number Structure (use for interpreting part numbers only)



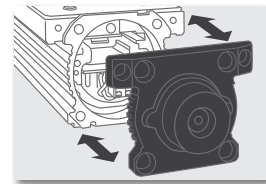
Termination Type



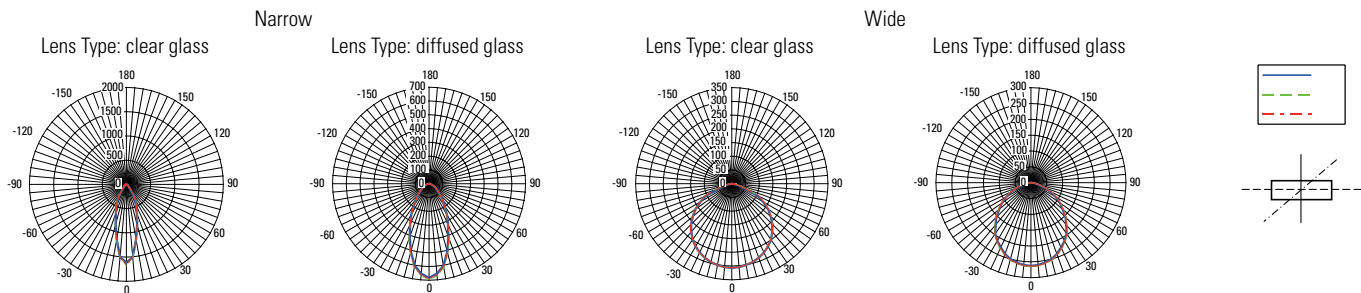
Spring clamp terminal



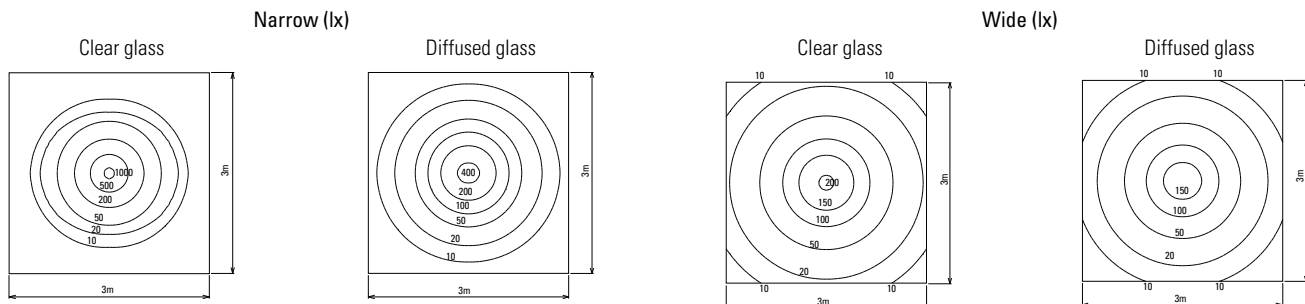
Screw terminal



Optical Dispersion (cd/1000lm)

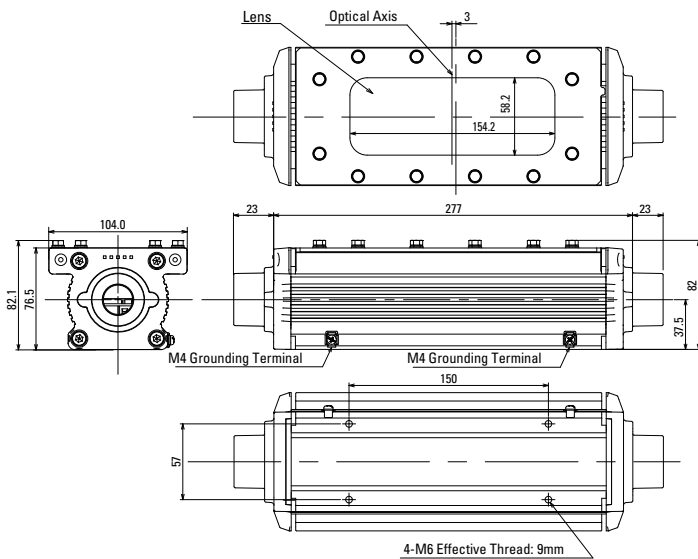


Illuminance Distribution (at 1.0m)

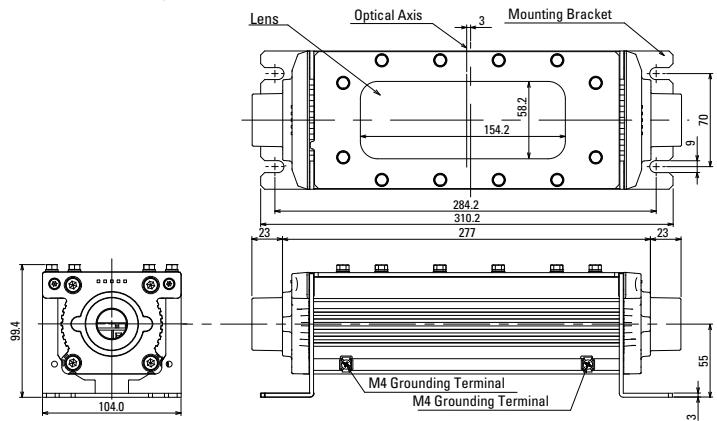


Dimensions

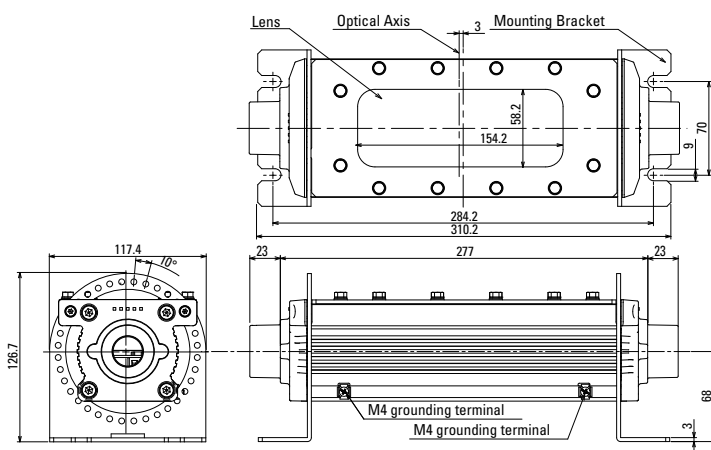
1) Direct mounting



2) With fixed mounting bracket

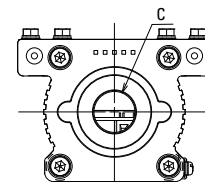
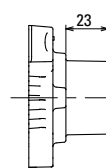


3) With angle adjustable bracket

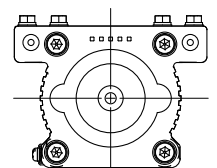


(4) Dimension of conduit entry and ON/OFF switch and end cover

Conduit entry or End cover



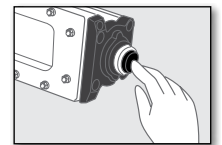
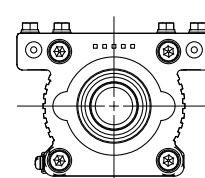
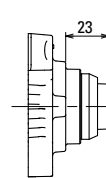
Conduit Entry Cover



End Cover

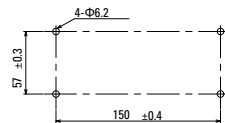
Conduit entry size	C
N1	1/2" NPT
N2	3/4" NPT
M25	M25 ^{P1.5}
M32	M32 ^{P1.5}

With ON/OFF Switch

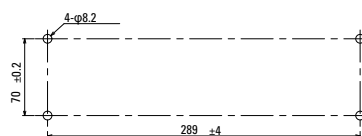


(5) Mounting hole layout

1) Direct mounting



2) With mounting bracket/angle adjustable bracket



(6) Attachments

- Instruction Manual.....1
- Hexagon Wrench (3).....1 (only with bracket)
- Hexagon Wrench (5).....1



With angle adjustable bracket

Selection Guide.....	22
High Performance Series	24
Enhanced, Compact and Basic Series.....	29
Automation Organizer Suite.....	30
Supported Drivers	31
Part Numbers	39
Accessories.....	41
Cables.....	42
Specifications.....	45
Dimensions.....	49

OI
Touchscreens



www.IDEC.com/oi



Selection Guide

		Compact Series	Basic Series	Enhanced Series	
		4.3"	4.6"	5.7"	
					
Display Type		Color-TFT	Monochrome	Monochrome	Color-TFT
Color Depth		65,536	2	2	65,536
Rated Power Voltage		12 to 24 VDC	24VDC	12 to 24VDC	12 to 24 VDC
Resolution		480 x 272	300 x 100	320 x 240	320 x 240
Mount Portrait or Landscape		✓	✓	✓	✓
Brightness (cd / m²)		800	500	1100	500
SD Card Slot		—	—	—	—
Expansion I/O module					
Serial Ports		1 (RS-232), 1 (RS-485, RS-422)	RS232 RS485(422)	1 (RS232, RS485,RS422)	1 (RS232, RS485,RS422)
Ethernet Port		Standard	—	Standard	Standard
USB Ports		1 Type A/ 1 MiniB		1 Type A/ 1 MiniB	1 TypeA / 1 MiniB
Video In *1		—		—	—
Audio In/Out *2		—		—	—
Remote Control / Monitor		✓		✓	✓
Multiple Protocols		✓		✓	✓
FTP Server Function		✓		✓	✓
Approvals		IP66F/IP67F, UL508, CSA C22.2 No. 142, 213 ANSI/ISA - 12/12.01, Type 4X & 13, Class 1 Div 2	IP65, Type 13,UL508, UL1604, CSA C22.2 No.213	IP66F, UL508, CSA C22.2 NO 142.213 ANSI/ISA:12.12.01 Type 4x & 13 Class I Div 2	IP66F,UL508, CSA C22.2 No.142/213, ANSI/ISA:12.12.01 Type 4x & 13 Class I Div 2
Bezel	Light Gray Black Silver	— HG1G-4VT22TF-B HG1G-4VT22TF-S	HG1F-SB22BF-W HG1F-SB22YF-W HG1F-SB22BF-B HG1F-SB22YF-B — —	HG2G-5TN22TF-W HG2G-5TN22TF-B HG2G-5TN22TF-S	HG2G-5TT22TF-W HG2G-5TT22TF-B HG2G-5TT22TF-S

*1. Composite Video RCA connector (NTSC or PAL).

*2. 3.5mm audio mini jack(stereo).

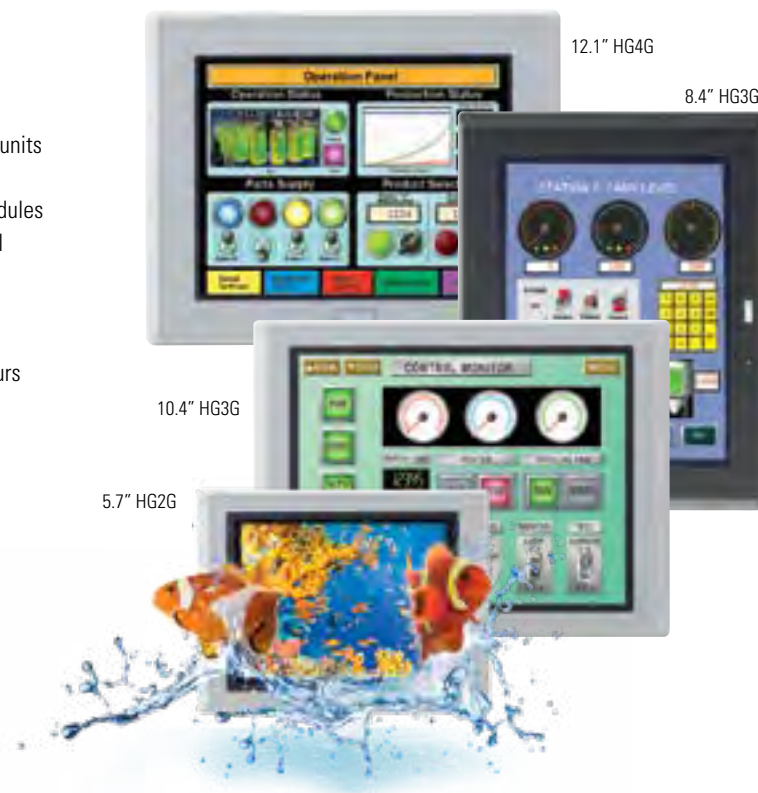
*3. Calendar, Battery Life and Power Failure Backup Data are not available for HG2G-5ST22VF

		High Performance Series			
		5.7"	8.4"	10.4"	12.1"
					
Display Type		Color-TFT	Color-TFT	Color-TFT	Color-TFT
Color Depth		65,536	65,536	65,536	65,536
Rated Power Voltage		24VDC	24VDC	24VDC	24VDC
Resolution		640 x 480	800 x 600	800 x 600	800 x 600
Mount Portrait or Landscape		✓	✓	✓	✓
Brightness (cd / m²)		800	600	700	550
SD Card Slot		✓	✓	✓	✓
Expansion I/O module		✓	✓	✓	✓
Serial Ports		2 (RS232, RS485, RS422)	2 (RS232, RS485, RS422)	2 (RS232, RS485, RS422)	1 (RS-232), 1 (RS485, RS422)
Ethernet Port		Standard	Standard	Standard	Standard
USB Ports		1 TypeA / 1 MiniB	1 TypeA / 1 Mini B	1 TypeA / 1 MiniB	1 TypeA / 1 MiniB
Video In *1		–	✓	✓	✓
Audio In/Out *2		–	–	✓	✓
Remote Control / Monitor		✓	✓	✓	✓
Multiple Protocols		✓	✓	✓	✓
FTP Server Function		✓	✓	✓	✓
Approvals		IP66, UL 508, CSA C22.2 No.142, ABS, LR, NK, Type 4X & 13 Class I Div 2	IP66, UL508, CSA C22.2 No.142/213, ANSI/ISA-12.12.01-2007, ABS, LR, NK, Type 4X & 13 Class I Div 2	IP66, UL508, CSA C22.2 No.142/213, ANSI/ISA-12.12.01-2007, ABS, LR, NK, Type 4X & 13 Class I Div 2	IP66, UL508, CSA C22.2 No.142, ANSI/ISA-12 12.01-2007, ABS, LR, NK Type 4X & 13 Class I Div 2
Bezel	Light Gray Black Silver	HG2G-5FT22TF-W HG2G-5FT22TF-B HG2G-5FT22TF-S	HG3G-8JT22MF-W HG3G-8JT22MF-B –	HG3G-AJT22MF-W HG3G-AJT22MF-B –	– HG4G-CJT22MF-B –

High Performance Series

Key Features:

- 5.7", 8.4", 10.4", and 12.1" sizes
- 65,536 Color TFT LCD
- Mounts Portrait or Landscape
- Video and Audio Interface on select units
- Super Bright: Up to 800 cd/m²
- Supports Expansion Discrete I/O modules
- Remote Access, Monitor and Control
- Serial, Ethernet, and USB ports
- Multiple protocols simultaneously
- FTP and Email functions
- LED backlight lifespan: >100,000 hours



Our high-performance OI Touchscreens are so vivid thanks to cutting-edge color conversion technology, the same technology used in LCDTVs. These screens deliver a superior experience with intense screens.

High-Definition Quality TFT LCD displays

Brightest on the market

With an LED backlight shining up to 800 cd/m², OI Touchscreens create a very powerful visual presentation. Immediately after the touchscreen is turned on, the screen lights up and lasts much longer than a CCFL (Cold Cathode Florescent Lamp) with a lifespan of 50,000 hours or greater. A 48-level adjustment also provides flexibility, allowing you to determine the brightness.

SVGA resolution

The High Definition Quality TFT LCD Screens with SVGA resolution (8.4", 10.4" and 12.1" OI Touchscreens) provide sharp images and superior visibility. The high resolution also gives you more space to create additional images and parts for your project, while enjoying exceptional clarity.

65,536 Colors

With so many colors, screen views are realistic and crisp, providing true-to-life images and making it easy to view precise readings of data and images. Distinctly different from 8-bit, 256 color screens, the high-performance series offers an intense depth-of-color perfect for graphical displays.



Real-time video monitoring

Play movie files and audio right on your touchscreen

The high-performance series (8.4", 10.4" and 12.1" OI Touchscreens) feature a built-in video interface (Video In) and audio interface (Audio In/Out). That means a video camera, microphone and speaker can be connected to the OI Touchscreen and used in the following ways:

- Display video images on the touchscreen display
- Play movie files on the touchscreen display (MP4 supported)
- Play audio files on the touchscreen display
- Video recording function

Using the video and audio interfaces, you can monitor machine conditions on the plant floor simply by using a video camera and microphone and setting it to display on the OI Touchscreen. You can also play your operation manual as a movie or play movie files to give information or instructions to a user or customer. This makes it easy to explain detailed information and makes it a useful feature when you are troubleshooting.



Remote access, monitoring and control

Connect anytime, anywhere using your PC, PDA or Smart Phone

Distance isn't an issue with our high-performance line of OI Touchscreens. When you need access to your machine or equipment, but can't get to the factory floor or even to the office, all you need is a computer, PDA or Smartphone and you can remotely access, monitor and control your touchscreen through a web browser. It's that simple!

Monitor current values or processes, click pushbuttons to control operation, print, switch screens or even change program values just as if you were in front of your touchscreen on site. You can also troubleshoot, test and do maintenance.

- No additional software tools or modules needed to use the Remote Monitor and Control function
- Up to 5 clients can remotely monitor and control simultaneously
- Simple configuration to enable remote access

Expand your control

With a wide range of connectivity options, our high-performance OI Touchscreens offer a communication solution for every application. Store programming or log data with up to 12MB of user memory, communicate with multiple controllers and devices and even remotely monitor and control. If extra storage is needed, an SD card or USB flash drive can easily be used.

SD Card

- Supports up to a 32GB SD card for storage
- Store IDEC MicroSmart ladder and touchscreen programs, pictures, log data, alarm logs, screen hard copies, recipe data, operation logs, audio and video files

USB Port A (USB 2.0)

- Connect a USB flash drive
 - Store IDEC MicroSmart ladder and touchscreen programs, log data and screen capture (if transferred from SD card)
- Connect barcode readers

USB Port mini B

- Connect PC directly to OI Touchscreen for high speed transfer of program upload, download, or monitoring
- Connect to a USB printer

Ethernet Port

- 10BaseT or 100Base-TX connection
- Remote communication with the PLC and download, upload or monitor PLC and OI Touchscreen projects
- Allows remote access for monitor and control



The connectivity you want, the flexibility you need

Expansion Module

Depending on your application and OI Touchscreen size, up to 4 MicroSmart expansion digital I/O modules can be connected. They easily snap on the back of any High-performance Series OI Touchscreen to offer simple I/O control with the option to perform independently of the touchscreen scan time using Cyclic Script.

2 Serial Ports RS232 and RS485 (422)

- Host – Communicate with a PLC/device using 1:1 or 1:N PLC communication
- Sub Host – Communicate with an IEC MicroSmart PLC or Modbus RTU device
- O/I Link – Various PLCs including the IEC MicroSmart PLC can network with multiple OI Touchscreens, where one is a master and up to 15 slaves are connected
- User – Communicate using transmit or receive instructions to build your own protocol

Audio Out Port:

- Connects to speakers to playback pre-saved .WAV audio files for custom alarms or alerts

Audio In Port

- Connects to a microphone to listen and monitor audio sounds

Video In Port

- Connects to a video camera to display video images on the touchscreen



Fast. Flexible. Environmentally-friendly!**Mounting Flexibility**

All High-Performance series can be mounted with the screen orientation set to portrait or landscape mode depending on space requirements. This allows you the flexibility of mounting the touchscreen according to your specific application needs. Plus OI Touchscreens are designed with a slim body style, providing a big advantage in situations where panel space is at a premium.

**Low Energy Consumption**

Designed with an energy-saving design and LED backlight, these touchscreens use 50% less energy compared with conventional models. While all OI Touchscreens in the high-performance series consume a maximum of 27 Watts of power (depending on model size), if a USB Host and Expansion I/O are not used, less wattage is used. For instance, the 8.4" and 10.4" consume a maximum of 15 Watts when not using these devices. Similarly, having full control of how and when the LED backlight dims or goes to sleep mode allows you to save more energy.



Portrait



Landscape

**Approvals**

We are dedicated to ensuring the safety of life and property at sea. To that end, IDEC OI Touchscreens are trusted and approved by leading maritime classification agencies, such as the American Bureau of Shipping (ABS Type Approval), Lloyd's Register and NK. This means our touchscreens meet technical and safety needs that allow them to be used in marine, offshore structures and shore-based installations. All high-performance models are also CE-marked and c-UL-us listed.

High-speed CPU

The fastest in its class, a 400MHz RISC processor means that these touchscreens have quick operation and response times, as well as exceptional performance. Not to mention, start-up is 3 seconds from power on, so you can start working without delay.

Enhanced Series

5.7" HG2G-5T LCD OI Touchscreen



Key Features

- 5.7-inch TFT LCD HMI
- Supports up to four protocols simultaneously
- Remote monitor and control
- FTP and Email functions
- Operating temperatures: -20°C to 60°C
- 65,536 colors or 16 shade monochrome
- Super Bright 500cd/m² (color), 1100 cd/m² (monochrome)
- LED backlight lifespan: >100,000 hours
- 320 x 240 pixels
- Portrait and landscape mounting
- Rated power voltage: 12-24V DC
- Two Serial ports, 2 USB ports and an Ethernet port
- IP66F, Type 4X, Type 13, Class 1 Div 2

4.6" HG1F LCD OI Touchscreen



Compact Series

4.3" HG1G OI Touchscreen



Key Features

- 4.3-inch TFT LCD HMI
- Supports up to four protocols simultaneously
- Remote monitor and control
- FTP and Email Functions
- Operating temperatures: -20°C to 55°C
- 65,536 colors with 800cd/m²
- 480 x 272 Pixel Resolution
- LED backlight lifespan: >70,000 hours
- Portrait and landscape mounting
- Rated power voltage: 12-24V DC
- Two Serial ports, 2 USB ports and an Ethernet port
- IP66F/IP67F, Type 4X, Type 13, Class 1 Div 2

Basic Series

Key Features

- 16 level Monochrome
- Available in RS232 or RS422/RS485 version
- Super bright LCD screen with 500 cd/m²
- Analog resistive touch panel enables flexible screen layout
- High resolution: 300x100 pixels
- Screen orientation: landscape or portrait
- Large memory capacity of 1MB

Automation Organizer Suite

Programming Software

Part Number

SW1A-W1C

Automation Organizer Software Suite



PLC programming with WindLDR



OI programming with WindO/I-NV2



System Configuration with WindCFG



Programming software for HG2G-5T

Automation Organizer (AO), the IDEC software suite combining the latest versions of our popular PLC programming software (WindLDR) and OI programming software (WindO/I-NV2) and (WindO/I-NV4) with new system configuration software (WindCFG) , is made to enable you to see the layout of your system design and basic configuration of devices. AO gives you a powerful and easy-to-use tool to design, debug, and document control systems, saving valuable time and money.

Intuitively working with you, WindO/I-NV2 and WindO/I-NV4 walks you through an easy step-by-step configuration of your images and your workspace. Dragging and dropping makes screen creation fast, even for beginners. Plus debugging, previewing and editing can be handled through the easy-to-use graphic user interface. Designed with a modern look and feel, similar to MS Office 2007 style, a customizable toolbar and workspace with drop down menu and ribbon control make it simple to select parts, objects and functions. You can also change the toolbar by adding icons frequently used on your project, saving programming time and allowing you to customize your workspace.

For more information, see page 149.

Supported Drivers

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1" HG4G	8.4" and 10.4" HG3G	5.7" HG2G	4.3" HG1G	4.6" HG1F
IDEC	MicroSmart/ Pentra MicroSmart (FC4A/FC5A)	FC4A, FC5A, FC6A	Built-in Port or Comm. Module	RS232	OpenNet(FC3A), MicroSmart (FC4A/FC5A)	x	x	x	x	x
				RS485 (422)		x	x	x	x	x
			Built-in or Web Server Unit (FC4A-SX5ES1E)	Ethernet	Web Server Unit (FC3A/FC4A/FC5A)	x	x	x	x	—
	OpenNet	FC3A	Built-in Port	RS232	OpenNet(FC3A), MicroSmart (FC4A/FC5A)	x	x	x	x	x
				RS485		x	x	x	x	x
			Web Server Unit (FC4A-SX5ES1E)	Ethernet	Web Server Unit (FC3A/FC4A/FC5A)	x	x	x	x	—

Drivers continued on next page.

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1" HG4G	8.4"and 10.4" HG3G	5.7" HG2G	4.3" HG1G	4.6" HG1F
Allen Bradley	MicroLogix	MicroLogix 1000	Built-in Port	RS 232	MicroLogix / SLC 500 Full Duplex	x	x	x	x	x
			1761-NET-ENI	Ethernet	Ethernet / IP	x	x	x	x	—
		MicroLogix 1100	Built-in Port	RS 232	MicroLogix / SLC 500 Full Duplex	x	x	x	x	x
			Built-in or 1761-NET-ENI	Ethernet	Ethernet / IP	x	x	x	x	—
		MicroLogix 1200	Built-in Port	RS 232	MicroLogix / SLC 500 Full Duplex	x	x	x	x	x
			1761-NET-ENI	Ethernet	Ethernet / IP	x	x	x	x	—
		MicroLogix 1500	Built-in Port	RS 232	MicroLogix / SLC 500 Full Duplex	x	x	x	x	x
			1761-NET-ENI	Ethernet	Ethernet / IP	x	x	x	x	—
	ControlLogix	ControlLogix 5550	RS232	Built-in Port	Logix DF1 (Full Duplex)	x	x	x	x	x
			1756-ENBT	Ethernet	Ethernet / IP	x	x	x	x	—
					Ethernet / IP (Native Tag)	x	x	x	x	—
		ControlLogix 5555	RS232	Built-in Port	Logix DF1 (Full Duplex)	x	x	x	x	x
			1756-ENBT	Ethernet	Ethernet / IP	x	x	x	x	—
					Ethernet / IP (Native Tag)	x	x	x	x	—
	CompactLogix	1768 CompactLogix	Built-in Port	RS232	Logix DF1 (Full Duplex)	x	x	x	x	x
		1769 CompactLogix	Built-in Port	RS232	Logix DF1 (Full Duplex)	x	x	x	x	x
				Ethernet	Ethernet / IP (Native Tag)	x	x	x	x	—
			Ethernet / IP		x	x	x	x	—	
	FlexLogix	1794-L33	Built-in Port	RS232	Logix DF1 (Full Duplex)	x	x	x	x	x
		1794-L34								
	PLC-5	PLC-5	1770-KF2	RS232 or RS485	PLC-5 (Half Duplex)	x	x	x	x	x
			Built-in Port							
			1785-ENET	Ethernet	Ethernet / IP	x	x	x	x	—
	PLC-5E	Built-in Port								
	SLC 500	SLC 5/03, 5/04, 5/05	Built-in Port	RS 232	SLC 500 Half Duplex or MicroLogix / SLC 500 Full Duplex	x	x	x	x	x
1761-NET-ENI			Ethernet	Ethernet / IP	x	x	x	x	—	

Drivers continued on next page.

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1" HG4G	8.4" and 10.4" HG3G	5.7" HG2G	4.3" HG1G	4.6" HG1F
Automation Direct (Koyo)	DirectLOGIC 05	DL05	D0-ECOM,	Ethernet	DirectLOGIC (Ethernet)	x	x	x	x	—
	DirectLOGIC 06	DL06	D0-ECOM100			x	x	x	x	—
	DirectLOGIC	D2-240, D2-250, D2-250-1, D2-260	D2-ECOM, D2-ECOM-F, D2-ECOM100			x	x	x	x	—
	DirectLogic DL205	D2-240	Built-in Port	RS232	DirectLogic DL 205/405	x	x	x	x	x
	DirectLogic DL405	D4-430, D4-440	Built-in Port	RS232		x	x	x	x	x
				RS485(422)		x	x	x	x	x
		D4-440	D4-DCM	RS232		x	x	x	x	x
		D4-430, D4-440, D4-450	D4-ECOM, D4-ECOM-F, D4-ECOM100	Ethernet	DirectLOGIC (Ethernet)	x	x	x	x	—
Emerson	Fisher Roc Driver	FloBoss	FloBoss 107	Built-in	RS232, RS485	x	x	x	x	—
FANUC	Power Mate	Power Mate-MODEL D	Built-in Port	RS422	Power Mate-MODEL D/Series 16i	x	x	x	x	x
	Series	16i, 160i, 18i, 180i, 30i, 31i, 32i	Built-in Port	RS232		x	x	x	x	x
FUJI	FLEX-PC	NB1, NB2, NB3, NJ-CPU-E4, NJ-CPU-A8, NJ-CPU-B16, NS	Built-in Port	RS232, RS485	FLEX-PC (CPU)	x	x	x	x	x
		NB1, NB2, NB3	NB-RS1-AC/DC	RS232, RS485	FLEX-PC(LINK)	x	x	x	x	x
		NJ-CPU-E4, NJ-CPU-A8, NJ-CPU-B16	NJ-RS2, NJ-RS4	RS232, RS485		x	x	x	x	x
		NS	NS-RS1	RS232, RS485		x	x	x	x	x
	MICREX-F	FS5	NV1L-RS2	RS232	MICREX-F	x	x	x	x	x
		F70	NC1L-RS2	RS232		x	x	x	x	x
			NC1L-RS4	RS485		x	x	x	x	x
		F80H, F120H, F120S, F140S, F150S	FFU120B	RS232		x	x	x	x	x
		F30, F50, F50H, F55, F60, F70, F70S, F80H, F81, F120H, F120S, F140S, F150S, F250	FFK120A-C10	RS232, RS485		x	x	x	x	x
	Series 90-30	CPU331, CPU341, CPU350, CPU351, CPU352, CPU360, CPU363, CPU364, CPU374	IC693CMM311	RS232	Series 90 (XNP-X)	x	x	x	x	x
				RS485(422)		x	x	x	x	x
		CPU311, CPU313, CPU323, CPU331, CPU341, CPU350, CPU351, CPU352, CPU360, CPU363, CPU374	Built-in Port	RS485(422)		x	x	x	x	x
GE Fanuc Automation	VersaMax	Nano, Micro (14point), Micro (23, 28 point)	Built-in Port	RS232		x	x	x	x	x
				RS485		x	x	x	x	x

Drivers continued on next page.

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1" HG4G	8.4" and 10.4" HG3G	5.7" HG2G	4.3" HG1G	4.6" HG1F
Hitachi	S10mini	S10mini	Built-in Port	RS485(422)	S10mini	x	x	x	x	x
			LQE160, LQE560	RS232		x	x	x	x	x
			LQE165, LQE565	RS485(422)		x	x	x	x	x
	S10V	LQP510	Built-in Port	RS232, RS485		x	x	x	x	x
			LQE560	RS232		x	x	x	x	x
			LQE565	RS485(422)		x	x	x	x	x
INVERTER	FREQROL	FREQROL-E500, FREQROL-S500	Built-in Port	RS485(422)	FREQROL	x	x	x	x	x
JTEKT (Toyota)	TOYOPUC-PC2J	PC2J	Built-in Port	RS485(422)	TOYOPUC-PC3J	x	x	x	x	x
	TOYOPUC-PC3J	PC3J, PC3JD, PC3JG				x	x	x	x	x
Keyence	KV-700/1000/3000/5000	KV-700, KV-1000, KV-3000	Built-in Port	RS232	KV-700/1000	x	x	x	x	x
		KV-700, KV-1000, KV-3000, KV-5000	KV-L-20R	RS232 (Port 1,2), RS422/485		x	x	x	x	x
			KV-LE20A, KV-LE20V	Ethernet	KV (Ethernet)	x	x	x	x	—
			KV-5000	Built-in Port		x	x	x	x	—
	Visual KV	KV-10, 16, 24, 40	Built-in Port	RS232	KV/KZ	x	x	x	x	x
	Conventional KV	KV-10, 16, 24, 40/80				x	x	x	x	x
LS Industrial Systems	MASTER-K	K10S1, K80S, K120S, K200S	Built-in Port	RS232	MASTER-K	x	x	x	x	x
		K80S	G7L-CUEB, G7L-CUEC			x	x	x	x	x
		K200S	G6L-CUEB, G6L-CUEC			x	x	x	x	x
		K300S	G4L-CUEA			x	x	x	x	x
Mitsubishi	MELSEC-A	A1N, A2N, A3N	AJ71C24-S3/S6/S8 or AJ71UC24	RS232	MELSEC-AnN (LINK)	x	x	x	x	x
		A1SH	A1SJ71C24-R2/R4 or A1S-J71UC24-R2/R4	RS232		x	x	x	x	x
		A2CCPUC24	Built-in-Port	RS232		x	x	x	x	x
		A0J2, A0J2H	A0J2-C214-S1	RS232		x	x	x	x	x
				RS485		x	x	x	x	x
		A2A, A3A, A2U, A3U, A4U	AJ71C24-S6/-8, AJ71UC24	RS232		x	x	x	x	x
				RS485		x	x	x	x	x
		A2US, A2USH-S1	A1SJ71C24-R2, A1SJ71UC24-R2	RS232		x	x	x	x	x
				RS485		x	x	x	x	x
		A2N, , A2A, A3A, A2US, A2USH, A2U, A2USH-S1	Built-in Port	RS485(422)	MELSEC-AnA (CPU)	x	x	x	x	x
		A1SH, A2SH, A2C, A0J2H			MELSEC-A1S/A2C(CPU)	x	x	x	x	x

Drivers continued on next page.

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1" HG4G	8.4" and 10.4" HG3G	5.7" HG2G	4.3" HG1G	4.6" HG1F
Mitsubishi	MELSEC-QnA	Q4ACPU, Q4AR-CPU, Q3ACPU-S1, Q2ACPU	AJ71QC24N-R2, AJ71QC24N,	RS232	MELSEC-Q/QnA (LINK)	x	x	x	x	x
			AJ71QC24N-R4	RS485		x	x	x	x	x
			AJ71QE71N3-T, AJ71QE71N-B2, AJ71QE71N-B5	Ethernet		x	x	x	x	—
	MELSEC-QnA	Q2ASHCPU-S1, Q2ASHCPU, Q2ASCPU-S1, Q2ASCPU	A1SJ71QC24N-R2	RS232	MELSEC-Q/QnA (LINK)	x	x	x	x	x
			A1SJ7AQC24N	RS485		x	x	x	x	x
			A1S-J71QE71N3-T, A1S-J71QE71N-B2, A1SJ71QE71N-B5	Ethernet		x	x	x	x	—
	MELSEC-Q	Q00CPU, Q01CPU	Built-in Port	RS232	MELSEC-Q/QnA (LINK)	x	x	x	x	x
		Q02CPU, Q02HCPU, Q06HCPU, Q12PH-CPU, Q25HCPU	QJ71C24N-R2	RS232		x	x	x	x	x
			QJ71C24, QJ71C24N	RS485		x	x	x	x	x
						x	x	x	x	x
		Q02CPU, Q02HCPU	Built-in Port	RS232	MELSEC-Q (CPU)	x	x	x	x	x
		Q02CPU-A			MELSEC-AnU(CPU)	—	—	—	—	x
		Q00JCPU, Q00CPU, Q01CPU	QJ71E71-100, QJ71E71-B5, QJ71E71-B2	Ethernet	MELSEC-Q/QnA (Ethernet)	x	x	x	x	—
		Q02CPU, Q02HCPU, Q06HCPU, Q12H-CPU, Q25HCPU				x	x	x	x	—
	MELSEC-FX	FX1, FX2, FX2C	Built-in Port	RS485(422)	MELSEC-FX (CPU)	x	x	x	x	x
		FX0, FX0N, (FX1N), FX0S, FX1S				x	x	x	x	x
		FX2N, FX2NC, FX1N, FX1NC	FX2NC-232ADP	RS232	MELSEC-FX2N (CPU)	x	x	x	x	x
						x	x	x	x	x
		FX2N	FX2N-232-BD	RS232		x	x	x	x	x
			FX2N-422-BD	RS485(422)		x	x	x	x	x
		FX1N	FX1N-232-BD	RS232		x	x	x	x	x
			FX1N-422-BD	RS485(422)		x	x	x	x	x
		FX3UC, FX3U	Built-in Port	RS485(422)	MELSEC-FX3UC(CPU)	x	x	x	x	x
			FX3U-232ADP, FX3U-232-BD	RS232		x	x	x	x	x
		FX3G	Built-in Port	RS485(422)		x	x	x	x	x
			FX3U-232ADP	RS232		x	x	x	x	x

Drivers continued on next page.

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series					
						12.1” HG4G	8.4”and 10.4” HG3G	5.7” HG2G	4.3” HG1G	4.6” HG1F	
Omron	SYSMAC-C	C500, C500F, C1000H, C2000, C2000H	C120-LK201-V1	RS232	SYSMAC-C Series	x	x	x	x	x	
			C120-LK202-V1	RS485(422)		x	x	x	x	x	
			C500-LK201-V1	RS232		x	x	x	x	x	
				RS485(422)		x	x	x	x	x	
			C500-LK203	RS232		x	x	x	x	x	
				RS485(422)		x	x	x	x	x	
		C1000HF	C500-LK203	RS232		x	x	x	x	x	
				RS485(422)		x	x	x	x	x	
		C200HS	C200H-LK201	RS232		x	x	x	x	x	
			C200H-LK202	RS485(422)		x	x	x	x	x	
		C200HE, C200HG, C200HX	C200H-LK201, C200HW-COM02/COM04/COM05/COM06			RS232	x	x	x	x	x
			C200H-LK202, C200HW-COM03/COM06			RS485(422)	x	x	x	x	x
		C120, C120F	C120-LK201-V1	RS232		x	x	x	x	x	
			C120-LK202-V1	RS485(422)		x	x	x	x	x	
		C20H, C28H, C40H, C60H	Built-in Port	RS232		x	x	x	x	x	
		CQM1H, C200HS-CPU21/23/31/33				x	x	x	x	x	
		C200HE-CPU42, C200HG-CPU43/63, C200HX-CPU44/64				x	x	x	x	x	
		CPM1, CPM1A, CPM2A				CPM1-CIF01	x	x	x	x	
		CMP2A				CPM1-C1F11	RS485(422)	x	x	x	x
						Built-in Port	RS232	x	x	x	x
	SYSMAC-CS1	CS1G, CS1H	Built-in Port	RS232	SYSMAC-CS1 Series	x	x	x	x	x	
			CS1W-SCB41 (Port1)			x	x	x	x	x	
			CS1W-SCB41 (Port2)			x	x	x	x	x	
			CS1W-ENT01, CS1W-ENT11, CS1W-ENT21, CJ1W-ENT21		Ethernet	SYSMAC-CS1 CJ Series (Ethernet)	x	x	x	x	—
	SYSMAC-CJ1	CJ1M, CJ1H, CJ1G	Built-in Port	RS232	SYSMAC-CS1 Series	x	x	x	x	x	
			CS1W-ENT01, CS1W-ENT11, CS1W-ENT21, CJ1W-ENT21	Ethernet	SYSMAC-CS1 CJ Series (Ethernet)	x	x	x	x	—	
			Built-in Port	x		x	x	x	—		
	SYSMAC-CP1	CP1H	CP1W-CIF01	RS232	SYSMAC-CS1 Series	x	x	x	x	x	
			CP1W-CIF11	RS485(422)		x	x	x	x	x	

Drivers continued on next page.

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1” HG4G	8.4”and 10.4” HG3G	5.7” HG2G	4.3” HG1G	4.6” HG1F
Panasonic (Aromat)	FP Series	FP0, FP1	Built-in Port	RS232	MEWNET	x	x	x	x	x
		FP(SIGMA symbol)	Built-in Port	RS232		x	x	x	x	x
			AFPG801			x	x	x	x	x
			AFPG802	RS485		x	x	x	x	x
			AFPG803			x	x	x	x	x
		FP10, FP10SH	Built-in Port	RS232		x	x	x	x	x
			AFP3462			x	x	x	x	x
		FP2, FP2SH	Built-in Port			x	x	x	x	x
			AFP2462			x	x	x	x	x
Sharp	New Satellite JW	JW-10	Built-in Port	RS422-MMI Port, RS485	JW	x	x	x	x	x
		JW-21CPU, JW-22CU, JW-31CUH/H1, JW-32CUH/H1, JW-33CUH1/H2/3	JW-21CM	RS485(422)		x	x	x	x	x
		JW-50CU/CUH	JW-10CM			x	x	x	x	x
		JW-70CU/CUH				x	x	x	x	x
		JW-100CU/CUH	x	x		x	x	x		
		JW-22CU, JW-70CU/CUH, JW-100CU/CUH	Built-in Port	RS232		x	x	x	x	x
		JW-32CUH/H1, JW-33CUH/H1/H2/H3		RS485(422)		x	x	x	x	x
		SIEMENS	S7-200	CPU212,CPU214, CPU215, CPU216, CPU221, CPU222, CPU224, CPU224XP, CPU226, CPU226XM		Built-in Port	RS485(422)	S7-200 (PPI)	x	x
S7-300	CPU313, CPU314, CPU315, CPU315-2DP, CPU 316, CPU 318		CP-340, CP-341	RS232	S7-300 3964(R)/RK512	x	x	x	x	x
				RS485(422)		x	x	x	x	x
	CPU313-2PtP		Built-in Port	RS485(422)	S7-MP1	x	x	x	x	x
	S7-400	CPU 412, CPU 414, CPU416, CPU 416F-2, CPU417	CP-440, CP-441	RS232, RS485(422)	S7-300 3964(R)/RK512	x	x	x	x	x

Drivers continued on next page.

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Supported Drivers, con't

Manufacturer	Series	Applicable CPU	Communication Module	Comm. Type	Host I/F Driver	Support OI Touchscreens Series				
						12.1” HG4G	8.4”and 10.4” HG3G	5.7” HG2G	4.3” HG1G	4.6” HG1F
Toshiba	PROSEC T	T1 (T1-16, T1-28, T1-40)	Built-in Port	RS232, RS485(422)	PROSEC T	x	x	x	x	x
			CU111			x	x	x	x	x
		T1S (T1-40S)	Built-in Port	RS232, RS485(422)		x	x	x	x	x
			CU111			x	x	x	x	x
		T2 (PU224)	Built-in Port	RS485		x	x	x	x	x
		T2E (PU234E)	CM231E	RS485		x	x	x	x	x
			CM232E	RS232		x	x	x	x	x
		T2N (PU215N, PU235N, PU245N)	Built-in Port	RS232		x	x	x	x	x
				RS485		x	x	x	x	x
	T3, T3H (PU315, PU325, PU325H, PU326H)	Built-in Port	RS485	x		x	x	x	x	
V Series	S2T, S2E, L1, S2, S3 (PU672T, PU662T, PU612E, L1PU11H, L1PU12H, S2PU82, S2PU72, S2PU32, S2PU22, S3PU65, S3PU55, S3PU45, S3PU21)	Built-in Port	RS485	x	x	x	x	x		
Toshiba Machine Works	TC200	TC3-13B1	Built-in Port	RS232	TC200	x	x	x	x	x
	TCmini	TC03-01, TC03-02				x	x	x	x	x
VIGOR	VB or VH	VB: V0, VB1, VB2 or VH: VH	Built-in Port	RS232	VB/VH	x	x	x	x	x
			VB-485A	RS485		x	x	x	x	x
			VB-CADP	RS232		x	x	x	x	x
				RS485		x	x	x	x	x
			VB-232	RS232		x	x	x	x	x
			VB-485	RS485		x	x	x	x	x
YASKAWA	Machine Controller	MP920, MP930	Built-in Port	RS232, RS422, RS485	MP920_R	x	x	x	x	x
			217IF			x	x	x	x	x
		MP2300	217IF-01	RS232, RS422, RS485		x	x	x	x	x
YOKOGAWA	FA-M3	FA-M3 (F3SP05, F3SP20, F3SP21, F3SP25, F3SP30, F3SP35, F3SP38, F3SP53, F3SP58, F3FP36, F3BP20, F3BP30)	F3LC11-1N	RS232	FA-M3	x	x	x	x	x
			F3LC11-2N	RS485		x	x	x	x	x
		FA-M3 (F3SP05, F3SP21, F3SP25, F3SP28, F3SP35, F3SP38, F3SP53, F3SP58)	Built-in Port	RS232		x	x	x	x	x

Part Numbers

		Style	Part Numbers	Bezel Color	Description
High Performance Series	12.1"		HG4G-CJT22MF-B	Black	12.1" 65K Color TFT, Video In, Audio In/Out
	10.4"		HG3G-AJT22MF-W	Light Gray	10.4" 65K Color TFT, Video In, Audio In/Out
			HG3G-AJT22MF-B	Black	
	8.4"		HG3G-8JT22MF-W	Light Gray	8.4" 65K Color TFT, Video In, Audio In/Out
			HG3G-8JT22MF-B	Black	
	5.7"		HG2G-5FT22TF-W	Light Gray	5.7" 65K Color TFT
			HG2G-5FT22TF-B	Black	
			HG2G-5FT22TF-S	Silver	
Enhanced Series	5.7"		HG2G-5TT22TF-W	Light Gray	5.7" 65K Color TFT, Ethernet Port, 12-24V DC
			HG2G-5TT22TF-B	Black	
			HG2G-5TT22TF-S	Silver	
			HG2G-5TN22TF-W	Light Gray	5.7" Monochrome, TFT, Ethernet Port, 12-24V DC
			HG2G-5TN22TF-B	Black	
			HG2G-5TN22TF-S	Silver	
Compact Series	4.3"		HG1G-4VT22TF-S	Silver	4.3" 65K Color TFT
			HG1G-4VT22TF-B	Black	4.3" 65K Color TFT
Basic Series	4.6"		HG1F-SB22BF-W	Light Gray	4.6" Monochrome, RS232 Type
			HG1F-SB22BF-B	Black	
			HG1F-SB22YF-W	Light Gray	4.6" Monochrome, RS-485 / RS-422 Type
			HG1F-SB22YF-B	Black	

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Starter Kits and Solution Packages

Touchscreen Starter Kits

Operator Interface Touchscreen			Power Supply	Software and Cable	Part Number
Compact Series		4.3" 65K color TFT Display, HG1G-4VT22TF-B	30W	✓	SMARTTOUCH-1G-B
Basic Series		4.6" Monochrome, RS232, HG1F-SB22BF-B	30W	✓	SMARTTOUCH-1F
Enhanced Series		5.7" Monochrome, USB mini-B Ethernet Port 12-24V DC, HG2G-5TN22TF-B	30W	✓	SMARTTOUCH-2G-5TN
		5.7" 65K Color TFT LCD, 12-24V DC, HG2G-5TT22TF-B	30W	✓	SMARTTOUCH-2G-5TT
High-Performance Series		8.4" 65K Color TFT, Video In, Audio In/Out, HG3G-8JT22MF-B	60W	✓	SMARTTOUCH-3G8HP
		10.4" 65K Color TFT, Video In, Audio In/Out, HG3G-AJT22MF-B	60W	✓	SMARTTOUCH-3GAHP
		12.1" 65K Color TFT, Video In, Audio In/Out, HG4G-CJT22MF-B	60W	✓	SMARTTOUCH-4GHP

*All packages come with Automation Organizer software suite and a communication cable.

Automation Solution Packages

Operator Interface Touchscreen		CPU	Power Supply	Part Number
	4.3" 65K color TFT, HG1G-4VT22TF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG1G
	4.3" 65K color TFT, HG1G-4VT22TF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG1G
	4.3" 65K color TFT, HG1G-4VT22TF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG1G
	4.3" 65K color TFT, HG1G-4VT22TF-B	24 I/O, FC6A-C24R1CE	60W	KIT-FC6A-24-RC-HG1G
	5.7" 65K color TFT, HG2G-5TT22TF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG2G-5TT
	5.7" 65K color TFT, HG2G-5TT22TF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG2G-5TT
	5.7" 65K color TFT, HG2G-5TT22TF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG2G-5TT
	5.7" Monochrome TFT, HG2G-5TN22TF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG2G-5TN
	5.7" Monochrome TFT, HG2G-5TN22TF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG2G-5TN
	5.7" Monochrome TFT, HG2G-5TN22TF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG2G-5TN
	5.7" Monochrome TFT, HG2G-5TN22TF-B	24 I/O, FC6A-C24R1CE	60W	KIT-FC6A-24-RC-HG2G-5TN
	5.7" 65K color TFT, HG2G-5FT22TF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG2G-HP
	5.7" 65K color TFT, HG2G-5FT22TF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG2G-HP
	5.7" 65K color TFT, HG2G-5FT22TF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG2G-HP
	8.4" 65K color TFT, HG3G-8JT22MF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG3G-8HP
	8.4" 65K color TFT, HG3G-8JT22MF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG3G-8HP
	8.4" 65K color TFT, HG3G-8JT22MF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG3G-8HP
	8.4" 65K color TFT, HG3G-8JT22MF-B	24 I/O, FC6A-C24R1CE	60W	KIT-FC6A-24-RC-HG3G-8HP
	10.4" 65K color TFT, HG3G-AJT22MF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG3G-AHP
	10.4" 65K color TFT, HG3G-AJT22MF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG3G-AHP
	10.4" 65K color TFT, HG3G-AJT22MF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG3G-AHP
	10.4" 65K color TFT, HG3G-AJT22MF-B	24 I/O, FC6A-C24R1CE	60W	KIT-FC6A-24-RC-HG3G-AHP
	12.1" 65K color TFT, HG4G-CJT22MF-B	16 I/O, FC6A-C16R1AE	60W	KIT-FC6A-16-RA-HG4G-HP
	12.1" 65K color TFT, HG4G-CJT22MF-B	16 I/O, FC6A-C16R1CE	60W	KIT-FC6A-16-RC-HG4G-HP
	12.1" 65K color TFT, HG4G-CJT22MF-B	24 I/O, FC6A-C24R1AE	60W	KIT-FC6A-24-RA-HG4G-HP
	12.1" 65K color TFT, HG4G-CJT22MF-B	24 I/O, FC6A-C24R1CE	60W	KIT-FC6A-24-RC-HG4G-HP

OI Touchscreens have black bezels. All packages come with Automation Organizer software suite and communication cables.

Accessories

Item	Part Number	Description	Applicable Models						
			12.1"	8.4" and 10.4"	5.7"			4.3"	4.6"
			HG4G-CJT-22MF	HG3G-8JT/AJT	HG2G-5FT	HG2G-5TT	HG2G-5TN	HG1G	HG1F
Programming Tools	SW1A-W1C	Automation Organizer (includes WiindLDR, WindOI-NV2, and WindCFG Programming Software)	✓	✓	✓	✓	✓	✓	✓
	HG9Z-XCM2A	USB Programming Cable USB-miniB (2m)	✓	✓	✓	✓	✓	✓	–
	HG9Z-XCM1A	Cable connecting PC to Touchscreen via RS-232 Serial Port	–	–	–	–	–	–	✓
Mounting Clips	FC4A-USB	USB to RS-232 Converter for PCs without Serial Ports	–	–	–	–	–	–	✓
	SLD-K02	Replacement clips (4 pcs are supplied with HMI)	–	–	–	✓	✓	–	✓
	HG9Z-4K2PN04	Replacement clips (4 pcs are supplied with HMI)	✓	✓	–	–	–	✓	–
Host Communication Plug	HG9Z-XTO9V	Replacement terminal block plug. (1 is supplied w HMI)	–	–	✓	✓	✓	✓	–
	HG9Z-XTO9	Replacement terminal block plug. (1 is supplied w HMI)	✓	✓	–	–	–	–	–
Replacement Battery	HG9Z-XR1	Lithium battery CR2032 (one battery is supplied with HMI)	✓	✓	✓	✓	✓	–	✓
USB Cable Lock Pin	HG9Z-XU1	Used to lock USB cable (for USB2)	✓	✓	✓	✓	✓	✓	–
USB panel-mount extension cable	HG9Z-XCE11	For USB-A port (1m)	✓	✓	✓	✓	✓	✓	–
	HG9Z-XCE21	For USB-mini B PORT (1m)	✓	✓	✓	✓	✓	✓	–
Memory Card	HG9Z-XMS2	SD Memory Card (2GB)	✓	✓	✓	–	–	–	–
Protective Cover	HG9Z-2E2	Use with 5.7" HMI. Covers entire front of HMI.	–	–	✓	✓	✓	–	–
	HG9Z-2D5	Use with 5.7" HMI. Sheet lays over LCD area.	–	–	✓	✓	✓	–	–
	HG9Z-3D8	Use with 8.4" HMI. Sheet lays over LCD area.	–	✓	–	–	–	–	–
Protective Sheet ¹	HG9Z-3DA2	Use with 10.4" HMI. Sheet lays over LCD area.	–	✓	–	–	–	–	–
	HG9Z-4DC	Use with 12.1" HMI. Sheet lays over LCD area.	✓	–	–	–	–	–	–
	HG9Z-1D	Use with 4.6" HMI. Sheet lays over LCD area.	–	–	–	–	–	–	✓
Expansion Module Clamp ²	HG9Z-1DPN05	Use with 4.3" HMI. Sheet lays over LCD area. (5 pcs/pack)	–	–	–	–	–	✓	–
	HG9Z-XJ3	Short type for installing expansion I/O modules (Total width 17.6 to 41.1mm)	✓	✓	✓	–	–	–	–
	HG9Z-XJ4	Long type for installing expansion I/O modules (Total width 47 to 68.8 mm)	✓	✓	✓	–	–	–	–
L-shaped Terminal Block Connector for I/O Module	HG9Z-XJ5	Extra-Long type for installing expansion I/O modules (Total width 70.1 to 93.9 mm)	✓	✓	✓	–	–	–	–
	HG9Z-PMT10L	For 10 pole MicroSmart I/O Module (min. 2 pcs)	✓	✓	✓	–	–	–	–
	HG9Z-PMT11L	For 11 pole MicroSmart I/O Module (min. 2 pcs)	✓	✓	✓	–	–	–	–
Replacement Backlight	HG9Z-1FB	Replacement backlight for 4.6" HG1F	–	–	–	–	–	–	✓
O/I Link Unit	HG9Z-2G1	Communication module for O/I Link mode	–	–	–	–	–	–	✓
Panel Mount Adaptor	HG9Z-2A1	Adaptor for mounting HG2G to the panel cut-out of HG2F	–	–	✓	✓	✓	–	–
	HG9Z-2A2	Adaptor for mounting HG2G to 156 x 123.5 mm panel cut-out (other mfr.)	–	–	✓	✓	✓	–	–
Converters	HG9Z-GWDF1DH485-4	AB SLC500 (w/RJ45 connector)DF1 / DH485 Communication Pakg for 4.6" HG1F	–	–	–	–	–	–	✓
	HG9Z-GWDF1DH485-5	AB SLC500 (w/RJ45 connector)DF1 / DH485 Communication Pakg for HG2G/HG3G/HG4G	✓	✓	✓	✓	✓	✓	–



1. The protective sheet is UV resistant, however, resistance against direct sunlight in outdoor usage is not guaranteed.

2. Use the expansion module clamp when using expansion modules.

Order the module clamp by referring to the width of the module shown in the dimensions of each module.

Note: When connecting more than 3 expansion modules to the HG3G/4G, note the limits shown below:

-Current flow rate at 5V: 130 mA max. Total width: 92.3 mm max.

-Current flow rate at 24V: 150 mA max.

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Expansion Modules (Applicable for 12.1" HG4G, 8.4" and 10.4" HG3G, and 5.7" HG2G-5FT22TF)

Input Type	Part No. (Ordering No.)	Connector	Dimensions (L × W × H mm)	Consumption Current (mA)	
				5V	24V
Input Modules	8 points/AC Input	Removable Terminal Block	90.0 × 23.5 × 70.0	25	0
	8 points/DC Input		90.0 × 23.5 × 70.0	25	0
	16 points/DC Input		90.0 × 23.5 × 70.0	40	0
	16 points/DC Input	MIL Connector	90.0 × 17.6 × 70.0	35	0
	32 points/DC Input		90.0 × 29.7 × 70.0	65	0
Output Modules	8 points/Relay Output	Removable Terminal Block	90.0 × 23.5 × 70.0	30	40
	16 points/Relay Output		90.0 × 23.5 × 70.0	45	75
	8 points/Transistor Sink Output		90.0 × 23.5 × 70.0	10	20
	8 points/Transistor Source Output		90.0 × 23.5 × 70.0	10	20
	16 points/Transistor Sink Output	MIL Connector	90.0 × 17.6 × 70.0	10	40
	16 points/Transistor Source Output		90.0 × 17.6 × 70.0	10	40
	32 points/Transistor Sink Output		90.0 × 29.7 × 70.0	20	70
	32 points/Transistor Source Output		90.0 × 29.7 × 70.0	20	70
Mixed I/O Modules	4 points/DC Input 4 points/Relay Output	Removable Terminal Block	90.0 × 23.5 × 70.0	25	20
	16 points/DC Input 8 points/Relay Output	Non-removable Terminal Block	90.0 × 39.1 × 70.0	65	45



1. Use the expansion module bracket when using expansion modules.
2. Order the module bracket (S), (L) or (XL) by referring to the width of the module shown in the dimensions of each module.
3. When connecting more than 3 expansion modules to HG3G/4G, note the limits shown below:

Limits

Current flow rate at 5V: 130 mA max.

Total width: 92.3mm max.

Current flow rate at 24V: 150 mA max.

4. See instruction manual for details on MicroSmart expansion modules.

Cables

Manu- facturer	Series	Applica- ble CPU	Comm. Type	Communication Module	4.3" HG1G	4.6" HG1F	5.7" (HG2G-5T, HG2G-5FT), 8.4" & 10.4" (HG3G-8JT/-AJT) , 12.1" (HG4G-CJT22MF)	
							Terminal Block Type	9-Pin Dsub
IDEC	Mi- croSmart/ Pentra Mi- croSmart (FC4A/ FC5A)	FC4A, FC5A	RS232	Built-in Port	HG9Z-AC102	FC4A-KC1CA	HG9Z-AC102	HG9Z-AC501
				FC4A-PC1/HPC1	HG9Z-AC102	HG9Z-XC183 or FC4A-KC1CA	HG9Z-AC102	HG9Z-AC501
				FC5A-SIF2	HG9Z-AC312	N/A	HG9Z-AC312	N/A
			RS485	FC4A-PC2/HPC2	HG9Z-AC172	HG9Z-1C12A	HG9Z-AC172	N/A
				FC4A-PC3/HPC3	Use Shielded Pair	HG9Z-1C131A	Use Shielded Pair	HG9Z-AC502
				FC5A-SIF4	Use Shielded Pair	N/A	Use Shielded Pair	HG9Z-AC502
			Ethernet	FC4A-SX5ES1E	Use CAT 5 Ethernet cable	N/A	Use CAT 5 Ethernet cable	CAT 5 Ethernet cable
				Built-in	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	Mi- croSmart FC6A	FC6A	RS232	Built-in Port	FC6A-KC1C	N/A	FC6A-KC1C	FC6A-KC2C
			RS485	Built-in Port	FC6A-KC1C	N/A	FC6A-KC1C	N/A
			Ethernet	Built-in Port	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable

Manu- facturer	Series	Applica- ble CPU	Comm. Type	Communication Module	4.3" HG1G	4.6" HG1F	5.7" (HG2G-5T, HG2G-5FT), 8.4" & 10.4" (HG3G-8JT/-AJT) , 12.1" (HG4G-CJT22MF)	
							Terminal Block Type	9-Pin Dsub
Allen Bradley	SLC 500	SLC-5/03, SLC-5/04, SLC-5/05	RS232	Built-in Port	HG9Z-AC112	HG9Z-XC100	HG9Z-AC112	HG9Z-AC504
			DH485	Built-in Port	HG9Z-GWDF1DH485-5	HG9Z- GWDF1DH485-4	HG9Z-GWDF1DH485-5	N/A
			Ethernet	Built-in(SLC-5/05), 1761-NET-ENI	CAT 5 Ethernet cable	N/A	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	Mi- croLogix	1000, 1200, 1500	RS232	Built-in Port	HG9Z-AC122	HG9Z-XC500	HG9Z-AC122	HG9Z-AC511
			Ethernet	1761-NET-ENI	CAT 5 Ethernet Crossover cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet Crossover cable
		1500	RS232	Built-in Port (9 Pin Dsub)	HG9Z-AC132	N/A	HG9Z-AC132	HG9Z-AC505
		1100, 1400	RS232	Built-in Port	HG9Z-AC152	N/A	HG9Z-AC152	HG9Z-AC518
		1100	Ethernet	Built-in Port	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	Control- Logix	5550, 5555	RS232	Built-in Port	HG9Z-AC142	N/A	HG9Z-AC142	HG9Z-AC503
			Ethernet	1756-ENBT	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	Compact- Logix	1768, 1769	RS232	Built-in Port	HG9Z-AC142	N/A	HG9Z-AC142	HG9Z-AC503
			Ethernet	Built-in Port	CAT 5 Ethernet cable	N/A	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	FlexLogix	1794-L33, 1794-L34	RS232	Built-in Port	HG9Z-AC142	N/A	HG9Z-AC142	HG9Z-AC503
Automa- tion Direct (Koyo)	Direct Logic 05/06	DL05 , DL06	Ethernet	D0-ECOM, D0- ECOM100	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	Direct Logic	D2-240,- 250,-250- 1, -260	Ethernet	D2-ECOM,-ECOMF,- ECOM100	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable
	Direct Logic 205	D2-240	RS232	Built-in Port	N/A	HG9Z-XC400	N/A	HG9Z-AC508
	Direct Logic 405	D4-430, D4-440	RS232	Built-in Port	N/A	N/A	N/A	HG9Z-AC506
			RS422	Built-in Port	N/A	N/A	N/A	HG9Z-AC507
		D4-430,- 440,450	RS232	D4-DCM	N/A	N/A	N/A	HG9Z-AC506
			Ethernet	D4-ECOM, -ECOM-F, ECOM100	CAT 5 Ethernet cable	Not Supported	CAT 5 Ethernet cable	CAT 5 Ethernet cable
GE Fanuc	Series 90-30	CPU331, 341, 350, 351, 352, 360, 363	RS232	IC693CMM311	N/A	N/A	N/A	HG9Z-AC510
			RS485					

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Manu- facturer	Series	Applica- ble CPU	Comm. Type	Communication Module	4.3" HG1G	4.6" HG1F	5.7" (HG2G-5T, HG2G-5FT), 8.4" & 10.4" (HG3G-8JT/-AJT) , 12.1" (HG4G-CJT22MF)	
							Terminal Block Type	9-Pin Dsub
Mitsubi- shi	MELSEC A	A1N, A2N, A3N, A0J2, A0J2H, A2A, A3A, A2U, A3U, A4U	RS232	AJ71C24/-S3/- S6/-S8, AJ71UC24, A0J2-C214-S1, AJY1C24-S6/-S8, AJ71UC24,	HG9Z-AC192	HG9Z-XC145	HG9Z-AC192	N/A
	MELSEC- QnA	Q4A, Q4AR, Q3A, Q2ACPU- S1, Q2ACPU		AJ71QC24N-R2, AJ71QC24N				
	MELSEC Q	Q02CPU, Q02HCPU, Q06HCPU, Q12PH- CPU, Q25HCPU	RS232	QJ71C24N-R2, QJ71C24, QJ71C24N	N/A	HG9Z-XC203	N/A	N/A
	MELSEC- FX	FX0, FX0N, FX1N, FX0S, FX1S	RS485(422)	Built-in Port	N/A	N/A	HG9Z-AC182	N/A
Siemens	S7-300	CPU 313- 2PtP	RS485	Built-in Port	HG9Z-AC510	N/A	N/A	HG9Z-AC510

Note: For a complete list of Supported PLC/Host Manufacturers, please check our Com. Manual.

N/A: Communication cable not available.

Specifications

High Performance Series Specifications

Display Specifications

	5.7"	8.4"	10.4"	12.1"
Model	HG2G-5FT22TF	HG3G-8JT22MF	HG3G-AJT22MF	HG4G-CJT22MF
Display Type	Color TFT LCD	Color TFT LCD	Color TFT LCD	Color TFT LCD
Color Depth	65,536	65,536	65,536	65,536
Portrait or Landscape Mounting	√	√	√	√
User Memory	12MB	12MB	12MB	12MB
Display Resolution	640W × 480H pixels	800W × 600H pixels	800W × 600H pixels	800W × 600H pixels
Backlight	LED	LED	LED	LED
Backlight Life ¹	50,000 hours	100,000 hours	100,000 hours	100,000 hours
Brightness ²	800 cd/m ²	600 cd/m ²	700 cd/m ²	550 cd/m ²
Brightness Adjustment	48 scales	48 scales	48 scales	48 scales
SD Card Slot	√	√	√	√
MicroSmart Digital I/O Cards Supported	2	4	4	4
Ethernet Port	1 RJ-45	1 RJ-45	1 RJ-45	1 RJ-45
USB Port	1 Type A and 1 mini-B	1 Type A and 1 mini-B	1 Type A and 1 mini-B	1 Type A and 1 mini-B
Serial Ports	2 (RS-232, RS-485, RS-422 configurable)	2 (RS-232, RS-485, RS-422 configurable)	2 (RS-232, RS-485, RS-422 configurable)	2 (RS-232, RS-485, RS-422 configurable)
Video In	–	Composite Video RCA connector (NTSC or PAL)	Composite Video RCA connector (NTSC or PAL)	Composite Video RCA connector (NTSC or PAL)
Audio In/Out	–	3.5mm audio mini-jack (Stereo)	3.5mm audio mini-jack (Stereo)	3.5mm audio mini-jack (Stereo)
Remote Monitor and Control	√	√	√	√



1. The backlight life refers to the time until the surface brightness reduces by half after continuous use at 25°C.
2. Brightness of the LCD only.

General Specifications

	5.7"	8.4"	10.4"	12.1"
Model	HG2G-5FT22TF	HG3G-8JT22MF	HG3G-AJT22MF	HG4G-CJT22MF
Rated Power Voltage	24V DC	24V DC		24V DC
Power Voltage Range	20.4 to 28.8V DC	20.4 to 28.8V DC		20.4 to 28.8V DC
Power Consumption	19W maximum 10W maximum when not using USB interface (USB2) or expansion module interface (EXT)	25W maximum 15W maximum when not using USB interface (USB2) or expansion module interface (EXT)		27W maximum 18W maximum when not using USB interface (USB2) or expansion module interface (EXT)
Allowable Momentary Power Interruption	10 ms maximum	10 ms maximum		10 ms maximum
Inrush Current	30A maximum	30A maximum		30A maximum
Dielectric Strength	1,000V AC, 10 mA, 1 minute between power and FG terminals	1,000V AC, 10 mA, 1 minute between power and FG terminals		1,000V AC, 10 mA, 1 minute between power and FG terminals
Insulation Resistance	10 MΩ minimum between power and FG terminals (500V DC megger)	10 MΩ minimum between power and FG terminals (500V DC megger)		10 MΩ minimum between power and FG terminals (500V DC megger)
Operating Temperature	0 to +50°C (no freezing)	0 to +50°C (no freezing)		0 to +50°C (no freezing)
Operating Humidity	10 to 90% RH (no condensation)	10 to 90% RH (no condensation)		10 to 90% RH (no condensation)
Storage Temperature	-20 to +60°C (no freezing)	-20 to +60°C (no freezing)		-20 to +60°C (no freezing)
Storage Humidity	10 to 90% RH (no condensation)	10 to 90% RH (no condensation)		10 to 90% RH (no condensation)
Pollution Degree	2	2		2
Vibration Resistance	5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² 10 cycles (100 minutes) on each of three mutually perpendicular axes	5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² 10 cycles (100 minutes) on each of three mutually perpendicular axes		5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² 10 cycles (100 minutes) on each of three mutually perpendicular axes
Shock Resistance	147 m/s ² , 11 ms 5 shocks on each of three mutually perpendicular axes	147 m/s ² , 11 ms 5 shocks on each of three mutually perpendicular axes		147 m/s ² , 11 ms 5 shocks on each of three mutually perpendicular axes
Noise Immunity	Fast transient/burst test, Power terminals: ±1 kV, Communication line: ±0.5 kV (IEC/EN61131-2: 2007)	Fast transient/burst test, Power terminals: ±2 kV, Communication line: ±1 kV (IEC 61131-2: 2007)		Fast transient/burst test, Power terminals: ±2 kV, Communication line: ±1 kV (IEC/EN61131-2: 2007)
Electrostatic Discharge	ESD-3 (RH-1), Level 3 (Contact ±6 kV, air ±8 kV) (IEC/EN61131-2: 2007)	ESD-3 (RH-1), Contact ±6 kV, air ±8 kV (IEC 61131-2: 2007)		ESD-3 (RH-1), Level 3 (Contact ±6 kV, air ±8 kV) (IEC/EN61131-2: 2007)
Corrosion Immunity	Free from corrosive gases	Free from corrosive gases		Free from corrosive gases
Degree of Protection	IP66 (IEC 60529) (front part when mounted) Type 4X, Type 13	IP66 (IEC 60529) (front part when mounted) Type 4X and 13		IP66 (IEC 60529) (front part when mounted) Type 4X and 13
Switching Element	Analog resistive membrane	Analog resistive membrane		Analog resistive membrane
Operating Force	3N maximum	0.55 to 2.3N	0.55 to 2.3N	3N maximum
Mechanical Life	1,000,000 operations	1,000,000 operations		1,000,000 operations
Sound Acknowledgement	Electronic buzzer	Electronic buzzer or speaker output		Electronic buzzer or speaker output
Dimensions	167.2W × 134.7H × 54.4D mm	231W × 176H × 54.4D mm	270W × 212H × 52.7D mm	314W × 240H × 54.1D mm
Weight (approx.)	0.65 kg	1.25 kg	1.65 kg	2.1 kg
Approvals	Safety Standards: UL508, CSA C22.2 No.142, Ship Classification Standards: ABS, LR, NK, DNV Type 4X and 13	Safety Standards: UL508, CSA C22.2 No.142, CSA C22.2 No.213, ANSI/ISA-12.12.01-2007 Ship Classification Standards: ABS, LR, NK, DNV, Type 4X and 13		Safety Standards: UL508, CSA C22.2 No.142, Ship Classification Standards: ABS, LR, NK, DNV, Type 4X and 13



Do not use the touchscreen in an environment subject to strong ultraviolet rays, otherwise the LCD quality will deteriorate.

*1 Protection degree of the front surface after mounting. Operation not guaranteed in certain environments.

Enhanced Series Specifications

Display Specifications

Model	5.7" HG2G-5TT	5.7" HG2G-5TN
Display	TFT Color LCD	TFT Monochrome LCD
Color/Shade	65,536	16 shades
Effective Display Area	115.2W × 86.4H mm	
Display Resolution	320W × 240H pixels	
View Angle	Right and left 80°, up 80°, down 80°	Right and left 65°, up 80°, down 60°
Backlight	LED	
Backlight Life	100,000 hours minimum*1	
Backlight Control	Automatic off	
Brightness	500 cd/m ² *2	1100 cd/m ² *2
Brightness Adjustment	32 levels	
Backlight Replacement	Not possible	



*1 The backlight life refers to the time until the brightness reduces by half after use at 25°C.

*2 Brightness of the LCD only.

General Specifications

Model	HG2G-5TT (Color) / HG2G-5TN (Monochrome)
Rated Power Voltage	12 to 24 V DC
Power Voltage Range	10.2 to 28 VDC
Power Consumption	8W maximum 4W maximum when not using USB interface (USB2)
Allowable Momentary Power Interruption	10ms maximum (Voltage 20.4 to 28.8V DC) 1ms maximum (Voltage 10.2 to 20.4V DC)
Inrush Current	40A maximum
Dielectric Strength	1000V AC, 10 mA, 1 minute between power and FG terminals
Insulation Resistance	50 MΩ minimum between power and FG terminals (500V DC megger)
Operating Temperature	-20 to +60°C (no freezing)
Operating Humidity	10 to 90% RH (no condensation)
Storage Temperature	-20 to +70°C (no freezing)
Storage Humidity	10 to 90% RH (no condensation)
Pollution Degree	2
Vibration Resistance	5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² 10 cycles (100 minutes) on each of three mutually perpendicular axes
Shock Resistance	147 m/s ² , 11 ms 5 shocks on each of three mutually perpendicular axes
Noise Immunity	Fast transient/burst test, Power terminals: ±2 kV, Communication line: ±1 kV (IEC/EN61000-4-4)
Electrostatic Discharge	ESD-3 (RH-1) Level 3 (Contact ±6 kV, air ±8 kV) (IEC/EN61000-4-2)
Corrosion Immunity	Free from corrosive gases
Mounting	Panel mounting
Degree of Protection	IP66F (IEC 60529) (front part when mounted)*1 TYPE 4X TYPE 13 *2
Dimensions	167.2 W × 134.7 H × 40.9 D mm
Weight (approx.)	0.5 kg



Do not use the HG2G in an environment subject to strong ultraviolet rays, otherwise the LCD quality will deteriorate.

*1 Protection degree of the front surface after mounting. Operation not guaranteed

*2 Operation not guaranteed when used with certain types of oils under certain environments.

Operation Specifications

Model	HG2G-5TT (Color) / HG2G-5TN (Monochrome)
Switching Element	Analog resistive membrane
Operating Force	3N maximum
Mechanical Life	1,000,000 operations
Acknowledgement Sound	Electronic buzzer

Function Specifications

Model	HG2G-5TT (Color) / HG2G-5TN (Monochrome)
Screen Types	Base screen, popup screen, system screen
No. of Screens	Base screen: 3,000 max. Popup screen: 3,015 max.
User Memory	5 MB (including expansion fonts)
Parts	Bit Button, Word Button, Goto Screen, Print Button Key Button, Multi Button, Keypad, Selector Switch, Potentiometer, Numerical Input, Character Input, Pilot Lamp, Multi-State Lamp, Picture Display, Message Display, Message Switching Display, Alarm List Display, Alarm Log Display, Numerical Display, Bar Graph, Trend Chart, Pie Chart, Meter, Calendar, Bit Write Command, Word Write Command, Goto Screen Command, Print Command Screen Script Command, Multi Command, Timer
Calendar	Year, Month, Day, Hour, Min., Sec., Day of Week ±60 sec per month (at 25 °C)
Power Failure Backup Data	Calendar, log data, keep internal relay, keep internal register
Battery	Recommended replacement span: every 4 years (at 25°C)

Interface Specifications

Model		HG2G-5TT Color / HG2G-5TN Monochrome	
Serial Interface 1 (COM1)*	RS232C	Electrical Characteristics	EIA RS232C compliant
		Transmission Speed	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
		Synchronization	Asynchronous
		Communication Method	Half or full duplex
		Control System	Hardware control or none
		Connector	Detachable 9-pin terminal block
	EIA RS422/485	Electrical Characteristics	EIA RS422/485 compliant
		Transmission Speed	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 187500 bps (Note)
		Synchronization	Asynchronous
		Communication Method	Half or full duplex
Control System		None	
Connector	Detachable 9-pin terminal block		
Ethernet Interface (LAN)		Interface	IEEE802.3u (10BASE-T/100BASE-TX) compliant
		Connector	Connector (RJ-45)
USB Interface (USB2)		Interface	USB 2.0 full speed (12 Mbps)
		Connector	USB Type Mini-A connector
USB Interface (USB1)		Interface	USB 2.0 high speed (480 Mbps)
		Connector	USB Type Mini-B connector

*RS232C and RS 422/485 can be used simultaneously.

Note: 187,500 bps is available only with SIEMENS SIMATIC S7-300/400 series (MPI port direct connection).

Basic and Compact Series Specifications

General Specifications

Model	4.6" HG1F Monochrome
Voltage	24V DC
Voltage Range	20.4 to 28.8V DC
Power Consumption	10W maximum
Inrush Current	20A maximum
Allowable Momentary Power Interruption	10 ms minimum
Dielectric Strength	1,000V AC, 10 mA, 1 minute between power and FG terminals
Insulation Resistance	50 MΩ minimum between power and FG terminals (500V DC megger)
Backup Battery	CR2032 lithium battery Life approx. 4 years (25°C)
Operating Temperature	0 to 50°C (no freezing)
Operating Humidity	10 to 90% RH (no condensation)
Storage Temperature	-20 to +60°C (no freezing)
Storage Humidity	10 to 90% RH (no condensation)
Pollution Degree	2 (IEC 60664-1)
Corrosion Immunity	Atmosphere free from corrosive gases
Vibration Resistance (damage limits)	10 to 20Hz amplitude 0.625 mm, 20 to 55Hz acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axes
Shock Resistance (damage limits)	147 m/s ² (15G), 11 ms, 5 shocks on each of three mutually perpendicular axes
Noise Immunity	Fast transient/burst test, common mode: Level 3, power terminals: ±2 kV, communication line: ±1 kV (IEC/EN 61000-4-4)
Electrostatic Discharge	ESD-3 (RH-1), Level 3, (contact ±6 kV, aerial ±8 kV) (IEC/EN 61000-4-2)
Mounting	Panel mounting
Degree of Protection	IP65 TYPE 13, ANSI/ISA-12.12.01-2007
Dimensions (mm)	147W x 47H x 39.3D
Weight (approx.)	280g

Operation Specifications

Model	4.6" HG1F Monochrome
Switching Element	Resistive membrane
Touch Region Resolution	1 x 1
CC Switch Quantity	
Operating Force	0.2 to 0.8N
Mechanical Life	1,000,000 operations
Acknowledge Sound	Electronic buzzer
Screen Types	Base screen, popup screen, system screen
Number of Screens	Base screen: 3000 max., popup screen: 3015 max.
User Memory	1MB (including expansion fonts)
Parts	Bit Button, Word Button, Goto Screen Button, Print Button, Key Button, Keypad, Selector Switch, Potentiometer, Numerical Input, Character Input, Pilot Lamp, Multi-state Lamp, Picture Display, Message Display, Message Switching Display, Alarm List Display, Alarm Log Display, Numerical Display, Bar Graph, Trend Chart, Pie Chart, Meter, Calendar, Bit Write Command, Word Write Command, Goto Screen Command, Timer, Print Command, Screen Script Command

Operation Specifications con't

Model	4.6" HG1F Monochrome
Calendar	Year, Month, Day, Hour, Min., Sec., Day of Week
Print Function (support)	ESC/P, PC-PR: Epson VP-700 SII: DPU414
Power Failure Backup	Backup data: Calendar, log data, keep internal relay, keep internal register
Backup Duration	1 month (at 25°C) after full charging for two days
Battery Life	4 years (at 25°C)



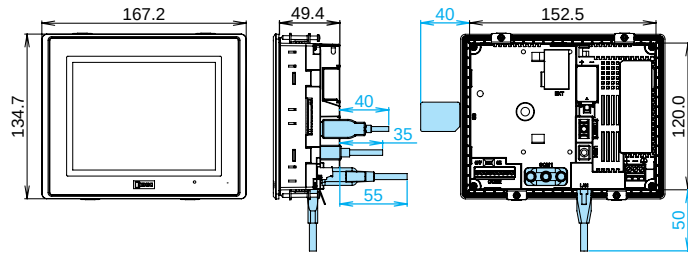
*2MB for OS

General Specifications

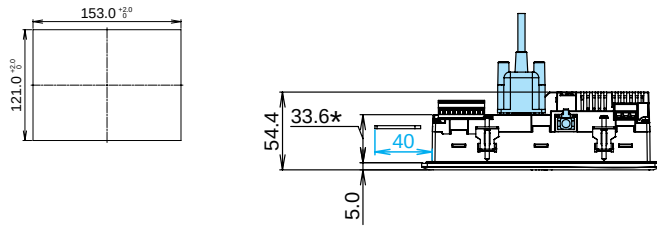
	Model	4.3" HG1G Color
Electrical Specifications	Rated Power Voltage	12-24V DC
	Power Voltage Range	10.2 to 28.8V DC
	Power Consumption	8W maximum 4W maximum when not using USB interface (USB2)
	Allowable Momentary Power Interruption	10ms maximum (voltage 20.4 to 28.8V DC) 1ms maximum (voltage 10.2 to 20.4V DC)
	Inrush Current	40A maximum
	Dielectric Strength	1,000V AC, 10mA, 1 minute between power and FG terminals
Environmental Specifications	Operating Temperature	-20 to +55°C (no freezing)
	Operating Humidity	10 to 90% RH (no condensation)
	Storage Temperature	-20 to +70°C (no freezing)
	Storage Humidity	10 to 90% RH (no condensation)
	Pollution Degree	2
	Vibration Resistance	5 to 8.4Hz amplitude 3.5 mm, 8.4 to 150Hz, acceleration 9.8m/s ² 10 cycles (100 minutes) on each of three mutually perpendicular axes
	Shock Resistance	147m/s ² , 11ms 5 shocks on each of three mutually perpendicular axes
	Noise Immunity	Fast transient/burst test, Power terminals: ±2kV, Communication line: ±1kV (IEC/EN 61131-2, IEC/EN 61000-4-4)
	Electrostatic Discharge	Contact ±6kV, air ±8kV (IEC/EN 61131-2, IEC/EN 61000-4-2)
	Corrosion Immunity	Free from corrosive gases
Structure	Mounting	Panel mounting (panel thickness: 1.0 to 5.0mm)
	Degree of Protection	IP66F/IP67F (IEC 60529, JIS C0920) (see JIS C 0920 Annex 1 for "F") (front part when mounted) *1 IP65F/IP67F when panel thickness is below 1.5mm TYPE 4X TYPE 13 *2, Class I Div 2
	Dimensions	128 W x 102 H x 31.8 D mm
	Weight (approx.)	300g

High-Performance Series Dimensions and Panel Cutouts (mm)

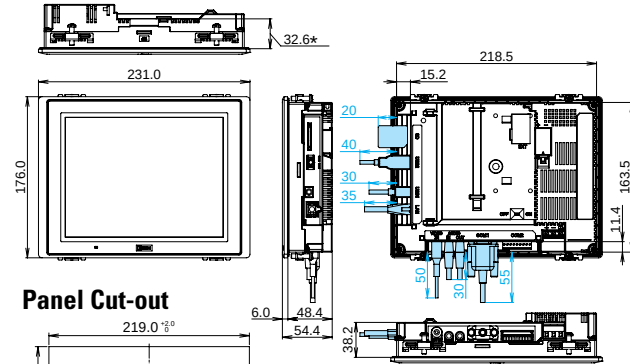
5.7" HG2G-5FT22TF



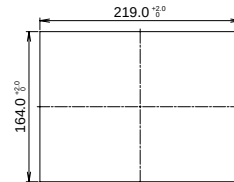
Panel Cut-out



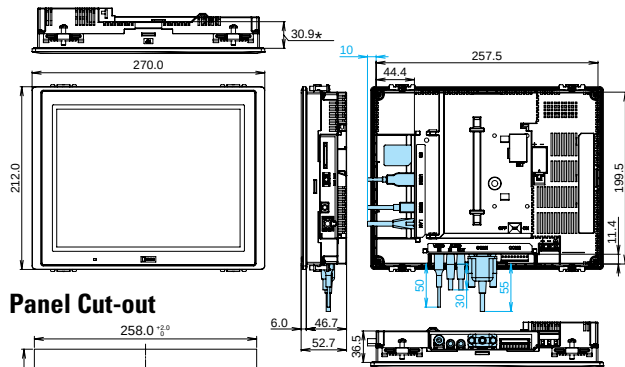
8.4" HG3G-8JT22MF



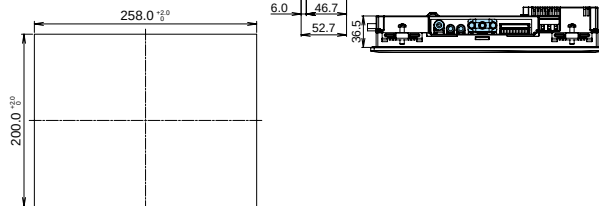
Panel Cut-out



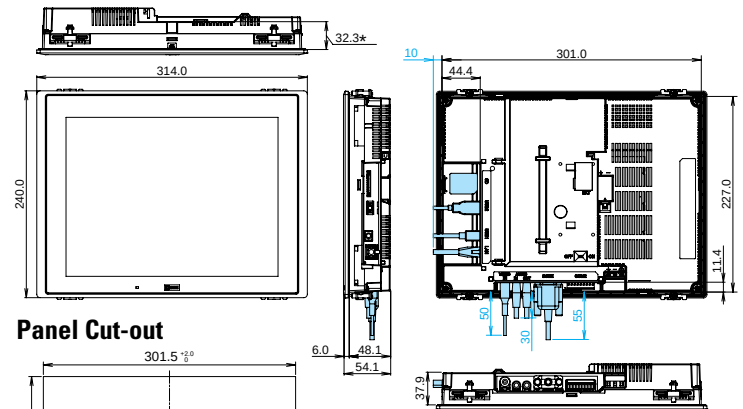
10.4" HG3G-AJT22MF



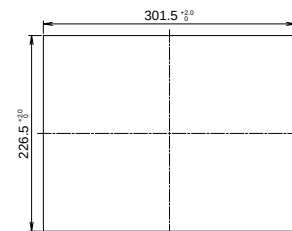
Panel Cut-out



12.1" HG4G-CJT22MF



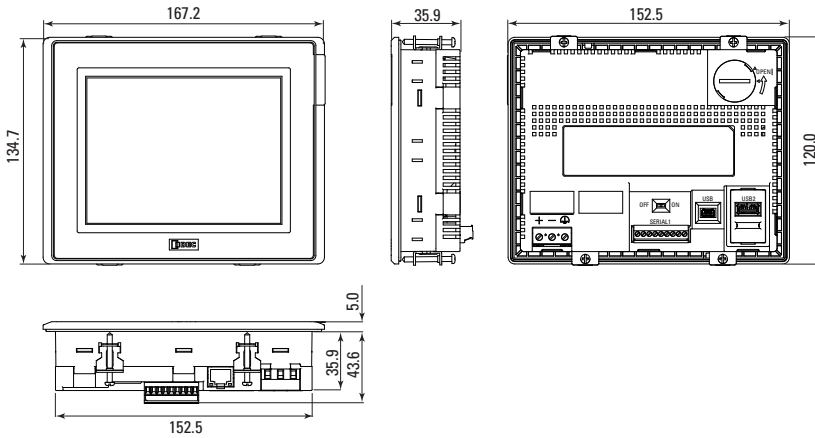
Panel Cut-out



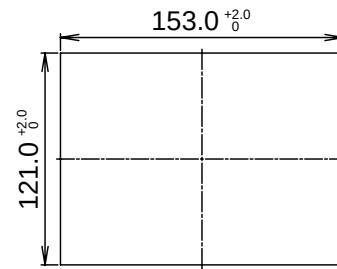
1. Dimensions in blue show the mounting dimensions of the cable.
2. Dimensions in the figure vary depending on the type of cable connected.

Enhanced Series Dimensions and Panel Cutouts (mm)

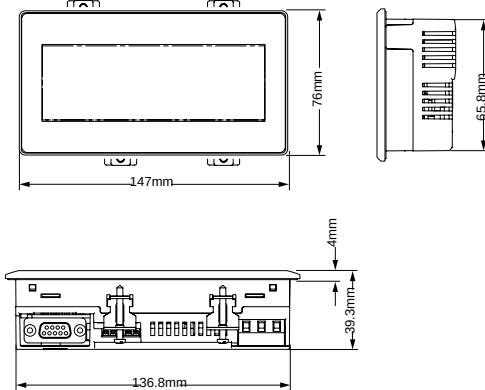
5.7" HG2G-5TT22TF/HG2G-5TN22TF



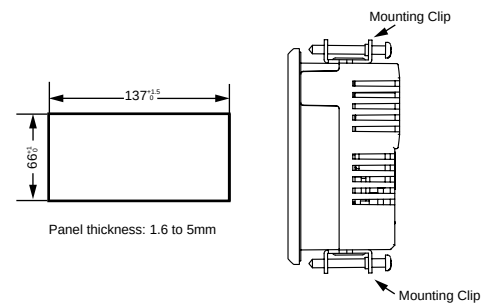
Panel Cut-out



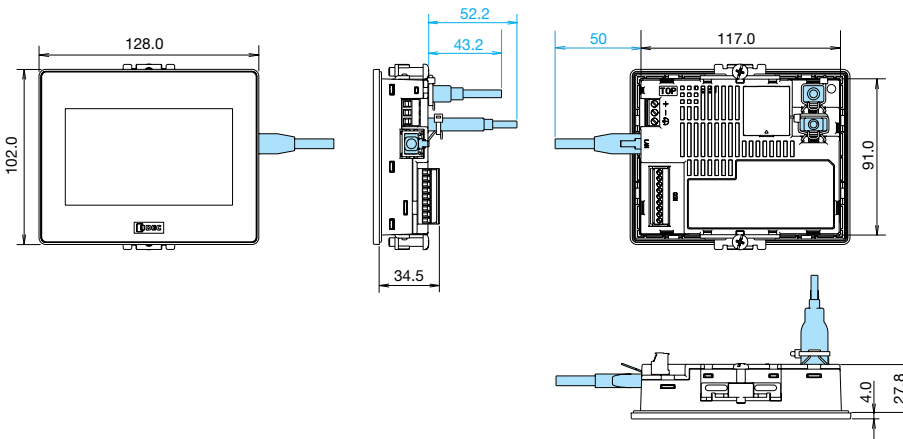
4.6" HG1F (Monochrome)



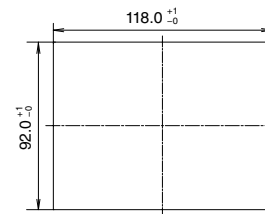
Panel Cut-out



4.3" HG1G



Panel Cut-out



1. Dimensions in blue show the mounting dimensions of the cable.
2. Dimensions in the figure vary depending on the type of cable connected.
3. Install the HG2G into a panel cut-out by tightening the four mounting clips (supplied) to a torque of 0.2 to 0.3 N·m. Do not tighten with excessive force, otherwise the HG2G and screen may be distorted. Also waterproof characteristics may be lost.

PLCs

Selection Guide.....	52
MicroSmart Family.....	53
MicroSmart FC6A Part Numbers	54
MicroSmart Pentra CPU Part Numbers.....	78
MicroSmart CPU Part Numbers	79
Digital I/O Expansion Modules	81
Analog I/O Expansion Modules	84
Accessories	91
Automation Organizer Suite	93
Specifications.....	94
Dimensions	115
FT1A SmartAxis.....	118
Part Numbers	122
Starter Kits	123
Accessories	124
Specifications.....	126
Dimensions	135
FL1F SmartRelay.....	138
Part Numbers	140
Starter Kits	141
WindLGC Software	142
Specifications.....	143
Dimensions	146



www.IDEC.com/plc



Selection Guide

Programmable Logic Controllers

Series	MicroSmart Family			SmartAXIS		IDEC SmartRelay
	MicroSmart FC6A	MicroSmart Pentra FC5A	MicroSmart FC4A	Controller	Touch	
Appearance						
Page Number	53	71	79	118		138
Rated Voltage	12 VDC, 24 VDC, 100-240 VAC	12 VDC, 24 VDC, 100-240 VAC	24 VDC, 100-240 VAC	24 VDC, 100-240 VAC	24 VDC	12-24 VDC, 24 VAC/DC, 100-240 VAC/DC
Max. Digital I/O	520	512	264	"48 (local)	12 (local) 156 (Remote I/O)	44
Max. Analog I/O	192 (remote I/O)"	"14 (local)	56	8 (Local) 32 (Remote I/O)	8	16
Base CPU I/O Configuration	158 (remote I/O)"	44	Slim style: 20, 40 I/Os	12, 24, 40, 48	12	12 I/O
	126	56	56			
Maximum Program Capacity	32 (remote I/O)"	8	16	48KB	5 MB/48K bytesx	2K bytes
Max. Communication Ports	16, 24, 40	"Slim: 12 I/O w/ Ethernet, 16, 32	2	4	3	1
Embedded Ethernet	Brick: 10, 16, 24"	"Slim: 20, 40	—	Yes	Yes	Yes
Modbus TCP	Brick: 10, 16, 24"	12, 24, 40, 48	12, 14	12	Yes	—
Modbus TCP	640K Bytes	128K Bytes	31.2K Bytes	48K Bytes	48K Bytes	2K Bytes
Modbus RTU and ASCII	3	7	2	4	3	1
CAN J1939	Yes	Yes	-	Yes	Yes	Yes
Web Server	Yes	Yes	-	Yes	Yes	-
Email and Text Message	Yes	Yes	-	Yes	Yes	-
User Web Page	Yes	-	-	-	-	-
USB Maintenance Port	Yes	Yes	-	-	-	Yes
32-bit Data & Floating Point Math	Yes	Yes	-	-	-	-
High Speed I/O Frequency	Yes	Yes	-	-	-	-
	Yes	Yes	-	Yes	Yes	-
	Yes	Yes	-	Yes	Yes	-
	100 KHz	100 KHz	20 KHz	100 KHz	10 KHz	5 KHz

Power, Performance, Connectivity MicroSmart FC6A



16x

Fast Execution

MicroSmart FC6A execution time is comparable to those of PAC controller. It's 16 time faster than FC5A MicroSmart Pentra.

6x

Fast I/O Refresh

Expansion I/O refresh is 6 time faster than FC5A MicroSmart Pentra resulting in more efficient and faster machines.



Expanded Memory

Program memory is 640 kB (80,000 steps) with 1,024 timers and 512 counters, six high-speed at rates up to 100kHz. Double the capacity of a typical micro PLC, allows handling of large programs with complex control requirements such as PID, flow totalization and recipes.



Up to 520 Discrete and Analog I/O

Maximum of 126 analog I/O, much more than a typical micro PLC, and approaching PAC capacity



High Speed Outputs

Allows implementation of PAC-like features including:
ARAMP — Ramp pulse output with table
JOG — Jog control
ABS — Initialize Absolute Counter



Upgradable Firmware

Get the latest features without changing CPU or expansion module hardware



Time-Base Applications

Use built-in real time clock or obtain time from SNTP server

MicroSmart FC6A PLC CPU Module Specifications



Key Features

- Embedded Ethernet port
- Embedded SD memory port
- Modbus TCP and RTU
- Embedded RS232C/RS485 user selectable
- Maximum 520 digital I/O
- Maximum 126 analog I/O
- Data Logging
- Web Server Functions
- Large programming and data memory
- CAN J1939 CPU
- Built-in Web Page Editor for user webpage

Standard Base Module

Part Number	Total I/O	Power Voltage	Input Voltage	Output Type	Maximum Digital I/O	Maximum Analog I/O
FC6A-C16R1AE	16 (9 inputs, 7 outputs)	100-240V AC	24V DC Sink/Source	Relay	400	100
FC6A-C16R1CE		24V DC		Relay		
FC6A-C16P1CE				Transistor Source		
FC6A-C16K1CE				Transistor Sink		
FC6A-C24R1AE	24 (14 inputs, 10 outputs)	100-240V AC		Relay	504	124
FC6A-C24R1CE		24V DC		Relay		
FC6A-C24P1CE				Transistor Source		
FC6A-C24K1CE				Transistor Sink		
FC6A-C40R1AE	40 (24 inputs, 16 outputs)	100-240V AC		Relay	520	126
FC6A-C40R1CE		24V DC		Relay		
FC6A-C40P1CE				Transistor Source		
FC6A-C40K1CE				Transistor Sink		
FC6A-C40R1DE		12V DC	12V DC Sink/Source	Relay	40	6
FC6A-C40P1DE				Transistor Source		
FC6A-C40K1DE				Transistor Sink		

CAN J1939 Base Module

Part Number	Total I/O	Power Voltage	Input Voltage	Output Type	Maximum Digital I/O	Maximum Analog I/O
FC6A-C40R1AEJ	40 (24 inputs, 16 outputs)	100-240V AC	24V DC Sink/Source	Relay	520	126
FC6A-C40R1CEJ		24V DC		Relay		
FC6A-C40P1CEJ				Transistor Source		
FC6A-C40K1CEJ				Transistor Sink		
FC6A-C40R1DEJ		12V DC	12V DC Sink/Source	Relay	40	6
FC6A-C40P1DEJ				Transistor Source		
FC6A-C40K1DEJ				Transistor Sink		

Specifications

Part Number		FC6A-C16R1AE FC6A-C16R1CE FC6A-C16P1CE FC6A-C16K1CE	FC6A-C24R1AE FC6A-C24R1CE FC6A-C24P1CE FC6A-C24K1CE	FC6A-C40R1AE FC6A-C40R1CE FC6A-C40P1CE FC6A-C40K1CE FC6A-C40R1DE FC6A-C40P1DE FC6A-C40K1DE	FC6A-C40R1AEJ FC6A-C40R1CEJ FC6A-C40P1CEJ FC6A-C40K1CEJ FC6A-C40R1DEJ FC6A-C40P1DEJ FC6A-C40K1DEJ
Rated Power Voltage		AC: 100 to 240V AC, DC: 24V DC, 12V DC			
Allowable Voltage Range		AC: 85 to 264V AC 24V DC: 20.4 to 28.8V DC (including ripple), 12V DC: 10.2 to 18.0V			
Rated Frequency		AC: 50/60Hz (47 to 63 Hz)			
Maximum Power Consumption (CPU module)	AC	FC6A-C16R1AE: 100-240V AC, 33VA FC6A-C24R1AE: 100-240V AC, 35VA FC6A-C40R1AE: 100-240V AC, 41VA FC6A-C40R1AEJ: 100-240V AC, 37VA			
	DC	FC6A-C16R1CE: 24V DC 140mA, 3.36W FC6A-C24R1CE: 24V DC 155mA, 3.72W FC6A-C40R1CE: 24V DC 195mA, 4.68W FC6A-C16P1CE: 24V DC 190mA, 4.6W	FC6A-C24P1CE: 24V DC 200mA, 4.8W FC6A-C40P1CE: 24V DC 205mA, 5.0W FC6A-C40P1CEJ: 24V DC 175mA, 4.2W FC6A-C40K1CEJ: 24V DC 175mA, 4.2W	FC6A-C40R1DEJ: 12V DC 340mA, 4.08W FC6A-C40P1DEJ: 12V DC 320mA, 3.9W FC6A-C40K1DEJ: 12V DC 320mA, 3.9W	
Allowable Momentary Power Interruption		10 ms (at rated voltage)			
Dielectric Strength		Between power and ground terminals: 1,500V AC, 1 minute Between I/O and ground terminals: 1,500V AC, 1 minute			
Insulation Resistance		Between power and ground terminals: 100 MΩ minimum (500V DC megger) Between I/O and ground terminals: 100 MΩ minimum (500V DC megger)			
Noise Resistance		AC or DC power terminal: 1.5kV (DC type: 1kV), 50 ns to 1 μs I/O terminals (coupling clamp): 1.5kV, 50ns to 1μs coupling adapter			
Inrush Current		AC: 40A maximum 24V DC: 35A maximum 12V DC: 35A maximum			
Power Supply Wire		AWG22, AWG18			
Operating Temperature		-10 to +55°C (no freezing)			
Storage Temperature		-25 to +70°C (no freezing)			
Relative Humidity		Level RH1 (IEC 61131-2-10 to 95% (no condensation)			
Altitude		Operation: 0 to 2,000m, 795 to 1,013hPa, Transport: 0 to 3,000m, 701 to 1,013hPa			
Pollution Degree		2 (IEC 60664-1)			
Corrosion Immunity		Free from corrosive gases			
Degree of Protection		IP20 (IEC 60529)			
Ground		D-type ground (Class 3 ground)			
Grounding Wire		AWG16			
Vibration Resistance		5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz acceleration 9.8 m/s2 (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC 61131-2)			
Shock Resistance		147 m/s2 (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes			
Mounting		DIN rail or panel mounting			
Weight		AC: 350g DC: 340g	AC: 420g DC: 400g	AC: 560g DC (relay): 530g DC (transistor): 480g	AC: 560g DC (relay/24V DC): 530g DC (relay/12V DC): 560g DC (transistor/24V DC): 480g DC (transistor/12V DC): 530g

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Specifications Cont.

Part Number		FC6A-C16R1AE FC6A-C16R1CE FC6A-C16P1CE FC6A-C16K1CE	FC6A-C24R1AE FC6A-C24R1CE FC6A-C24P1CE FC6A-C24K1CE	FC6A-C40R1AE FC6A-C40P1CE FC6A-C40R1DE FC6A-C40K1DE	FC6A-C40R1CE FC6A-C40K1CE FC6A-C40P1DE	FC6A-C40R1AEJ FC6A-C40P1CEJ FC6A-C40R1DEJ FC6A-C40K1DEJ
Control System		Stored program system				
Instruction Words	Basic	42				
	Advanced	124				
Program Capacity ¹		384KB (48,000 steps)/72KB (9,000 steps) ²				640KB (80,000) 72KB (9,000 steps) ²
User Program Storage		Serial Flash Memory (100,000 times rewritable)				
Processing Time	Basic Instruction	42us/1,000 steps				
	END Processing ³	1ms maximum				
I/O Points	Input	9 points	14 points	24 points		
	Output	7 points	10 points	16 points		
Expandable Modules		4 modules	7 modules			
Expandable I/O Points with Expansion Modules		128 points	224 points			
Expandable Modules with Expansion Interface Modules		8 modules				
Expandable I/O Points with Expansion Interface Modules		256 points				
Internal Relay		12,400 points				
Special Internal Relay		256 points				
Shift Register		256 points				
Data Register		54,000 points				
Special Data Register		500 points				
Counter		512 points				
Timer (1ms, 10ms, 100ms, 1s)		1,024 points				
Clock		Clock accuracy: ±30 sec/month (typical) at 25°C				
RAM Backup	Backup Data	Internal relay, shift register, counter, data register, timer, special data register, special internal relay				
	Battery	Lithium primary battery (BR2032)				
	Battery Life	Approx. 4 years				
	Replaceability	Possible				
Self-diagnostic Function		Keep data, user program sum check (EEPROM), user program sum check (RAM), timer/counter preset value sum check,user program syntax check, user program execution check, WDT check, user program write check, power failure, clock error,data ink connection check, I/O bus initialization check				
Input Filter		0 ms (without filter), 3 to 15ms (selectable in increments of 1 ms)				
Catch Input/Interrupt Input		Six inputs I0, I1, I6, I7 Minimum turn on pulse width: 5μs max. Minimum turn off pulse width: 5μs max.	I3, I4 Minimum turn on pulse width: 35μs max. Minimum turn off pulse width: 35μs max.			
High-speed Counter	Maximum Counting Frequency and High-speed Counter Points	Total 6 points Single/two-phase selectable: 100 kHz (single-phase: 4 points, two-phase: 2 points) Single-phase: 5 kHz (2 points)				
	Counting Range	0 to 4,294,967,295 (32 bits)				
	Operation Mode	Rotary encoder mode, adding counter mode, frequency measurement mode				
Analog Potentiometer	Quantity	1 point				-
	Data Range	0 to 1,000				-
Analog Voltage Input	Quantity	1 point				-
	Input Voltage Range	0 to 10V				-
	Input Impedance	Approx. 100KΩ				-
	Digital Resolution	Approx. 1,000 steps (10 bits)				-
Pulse Output	Quantity	4 points				
	Maximum Frequency	High speed output port: 100 kHz (2 points) maximum		Middle speed output port: 5 kHz (2 points maximum)		High speed output port: 100 kHz maximum
External Power Supply for Sensor (AC only)	Output Voltage/Current	24V (+10%, -15%) / 250mA				
	Overload Detection	Impossible				
	Isolation from the internal circuit	Transformer-isolated				
USB Port		USB mini-B (maintenance communication)				
Serial Port 1, CAN Port		RS232C or RS485 ⁴				CAN J1939
Ethernet Port 1		Ethernet (maintenance communication, user communication, user communication, Modbus TCP server/client)				
SD Card Slot		Embedded				
Cartridge (option)		One cartridge can be added			Two cartridges can be added	
HMI Module (option)		Yes	Yes	Yes		Yes

Note: The maximum number of relay outputs that can be turned on simultaneously is limited.

Note 1: 1 step equals 8 bytes.

Note 2: When 72KB is selected, download function can be used during RUN.

Note 3: Not including expansion I/O service time, counter timer processing time, data link processing time, and interrupt processing time.

Note 4: Maintenance communication, user communication, data link, Modbus RTU master/slave communication.

Specifications Cont.

Part Number		FC6A-C16R1AE FC6A-C16R1CE FC6A-C16P1CE FC6A-C16K1CE	FC6A-C24R1AE FC6A-C24R1CE FC6A-C24P1CE FC6A-C24K1CE	FC6A-C40R1AE FC6A-C40P1CE FC6A-C40R1DE FC6A-C40K1DE	FC6A-C40R1AEJ FC6A-C40P1CEJ FC6A-C40R1DEJ FC6A-C40K1DEJ
Control System		Stored program system			
Instruction Words	Basic	42			
	Advanced	124			
Program Capacity ¹		384KB (48,000 steps)/72KB (9,000 steps) ²			640KB (80,000) 72KB (9,000 steps) ²
User Program Storage		Serial Flash Memory (100,000 times rewritable)			
Processing Time	Basic Instruction	42us/1,000 steps			
	END Processing ³	1ms maximum			
I/O Points	Input	9 points	14 points	24 points	
	Output	7 points	10 points	16 points	
Expandable Modules		4 modules	7 modules		
Expandable I/O Points with Expansion Modules		128 points	224 points		
Expandable Modules with Expansion Interface Modules		8 modules			
Expandable I/O Points with Expansion Interface Modules		256 points			
Internal Relay		12,400 points			
Special Internal Relay		256 points			
Shift Register		256 points			
Data Register		54,000 points			
Special Data Register		500 points			
Counter		512 points			
Timer (1ms, 10ms, 100ms, 1s)		1,024 points			
Clock		Clock accuracy: ±30 sec/month (typical) at 25°C			
RAM Backup	Backup Data	Internal relay, shift register, counter, data register, timer, special data register, special internal relay			
	Battery	Lithium primary battery (BR2032)			
	Battery Life	Approx. 4 years			
	Replaceability	Possible			
Self-diagnostic Function		Keep data, user program sum check (EEPROM), user program sum check (RAM), timer/counter preset value sum check,user program syntax check, user program execution check, WDT check, user program write check, power failure, clock error,data ink connection check, I/O bus initialization check			
Input Filter		0 ms (without filter), 3 to 15ms (selectable in increments of 1ms)			
Catch Input/Interrupt Input		Six inputs I0, I1, I6, I7 Minimum turn on pulse width: 5μs max. Minimum turn off pulse width: 5μs max.	I3, I4 Minimum turn on pulse width: 35μs max. Minimum turn off pulse width: 35μs max.		
High-speed Counter	Maximum Counting Frequency and High-speed Counter Points	Total 6 points Single/two-phase selectable: 100 kHz (single-phase: 4 points, two-phase: 2 points) Single-phase: 5 kHz (2 points)			
	Counting Range	0 to 4,294,967,295 (32 bits)			
	Operation Mode	Rotary encoder mode, adding counter mode, frequency measurement mode			
Analog Potentiometer	Quantity	1 point			—
	Data Range	0 to 1,000			—
Analog Voltage Input	Quantity	1 point			—
	Input Voltage Range	0 to 10V			—
	Input Impedance	Approx. 100KΩ			—
	Digital Resolution	Approx. 1,000 steps (10 bits)			—
Pulse Output	Quantity	4 points			
	Maximum Frequency	High speed output port: 100 kHz (2 points) maximum		Middle speed output port: 5 kHz (2 points maximum)	High speed output port: 100 kHz maximum
External Power Supply for Sensor (AC only)	Output Voltage/Current	24V (+10%, -15%) / 250mA			
	Overload Detection	Impossible			
	Isolation from the internal circuit	Transformer-isolated			
USB Port		USB mini-B (maintenance communication)			
Serial Port 1, CAN Port		RS232C or RS485 ⁴			CAN J1939
Ethernet Port 1		Ethernet (maintenance communication, user communication, user communication, Modbus TCP server/client)			
SD Card Slot		Embedded			
Cartridge (option)		One cartridge can be added		Two cartridges can be added	
HMI Module (option)		Yes	Yes	Yes	Yes

Note: The maximum number of relay outputs that can be turned on simultaneously is limited.

Note 1: 1 step equals 8 bytes.

Note 2: When 72KB is selected, download function can be used during RUN.

Note 3: Not including expansion I/O service time, counter timer processing time, data link processing time, and interrupt processing time.

Note 4: Maintenance communication, user communication, data link, Modbus RTU master/slave communication.

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

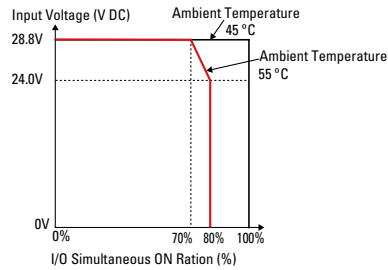
Communication

Barriers

Temperature derating curves: Input voltage vs. I/O Simultaneous ON Ratio (%)

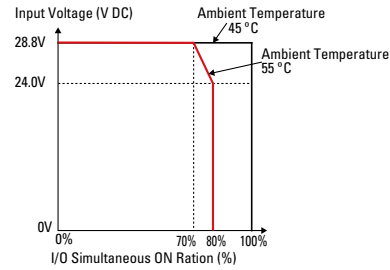
Input (with cartridge)

FC6A-C16K1CE FC6A-C40K1DE
FC6A-C24K1CE FC6A-C40K1CEJ
FC6A-C40K1CE FC6A-C40K1DEJ



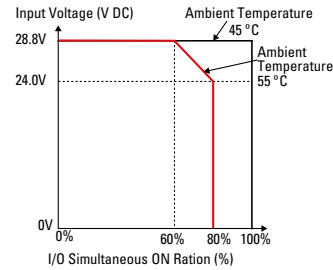
Output (with cartridge)

FC6A-C16K1CE FC6A-C40K1DE
FC6A-C24K1CE FC6A-C40K1CEJ
FC6A-C40K1CE FC6A-C40K1DEJ



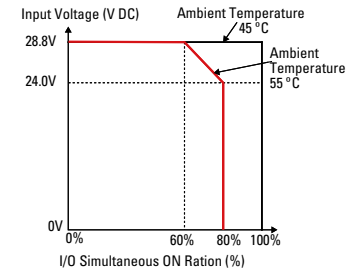
Input (w/o cartridge)

FC6A-C24P1CE FC6A-C40P1CEJ
FC6A-C40P1CE FC6A-C40P1DEJ
FC6A-C40P1DE



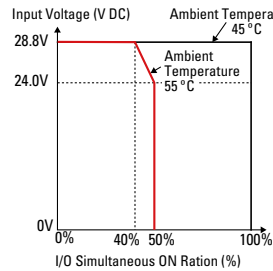
Output (w/o cartridge)

FC6A-C24P1CE FC6A-C40P1CEJ
FC6A-C40P1CE FC6A-C40P1DEJ
FC6A-C40P1DE



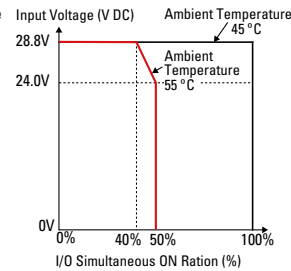
Input (with cartridge)

FC6A-C24P1CE FC6A-C40P1CEJ
FC6A-C40P1CE FC6A-C40P1DEJ
FC6A-C40P1DE



Output (with cartridge)

FC6A-C24P1CE FC6A-C40P1CEJ
FC6A-C40P1CE FC6A-C40P1DEJ
FC6A-C40P1DE

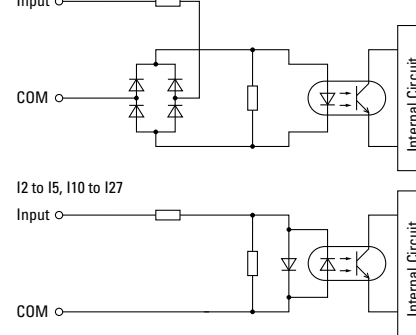


Input Internal Circuit

100V to 240V AC, 24V DC

Transistor Sink Output

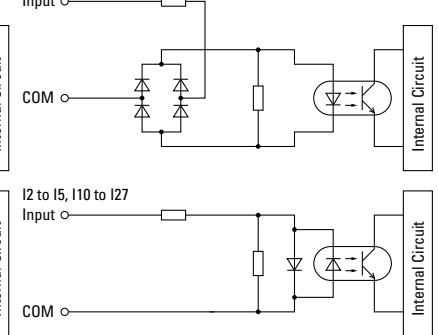
I0, I1, I6, I7



12V DC

Transistor Sink Output

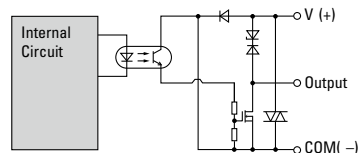
I0, I1, I6, I7



Output Internal Circuit

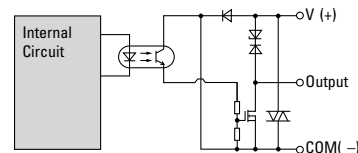
100V to 240V AC, 24V DC

Transistor Sink Output



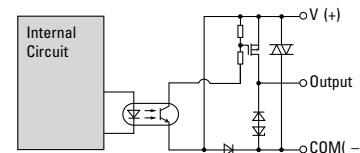
12V DC

Transistor Sink Output



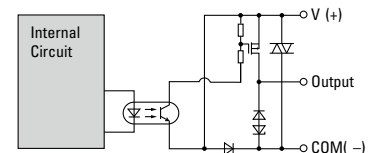
100V to 240V AC, 24V DC

Transistor Source Output



12V DC

Transistor Source Output



MicroSmart FC6A PLC Digital I/O Specifications



Key Features

- 16 modules to choose from
- Screw or MIL type terminal block
- 8/16/32 points I/O module

Specifications

Input Module Specifications

Part Number		FC6A-N08B1	FC6A-N16B1	FC6A-N16B3	FC6A-N32B3	FC6A-N08A11
Input Points		8 (8/1 common)	16 (16/1 common)		32 (16/1 common)	8 (4/1 common)
Rated Input Voltage		24V DC sink/source input signal				100 to 120V AC
Input Voltage Range		0 to 28.8V DC				0 to 132V AC (50/60 Hz)
Rated Input Current		7 mA/point (24V DC)		5 mA/point (24V DC)		17 mA/point (120V AC, 60 Hz)
Input Impedance		3.4 kΩ		4.4 kΩ		0.8 kΩ (60 Hz)
OFF Voltage		5V maximum				20V maximum
ON Voltage		15V minimum				79V minimum
OFF Current		1.2 mA maximum		0.9 mA maximum		—
ON Current		4.2 mA minimum (at 15V DC)		3.2 mA minimum (at 15V DC)		
Input Delay Time (24V DC)		Turn ON: 4.1ms, Turn OFF: 4.1ms				Turn ON: 25ms, Turn OFF: 30ms
Isolation		Between input terminals: Not isolated Internal circuit: Photocoupler-isolated				Between input terminals in the same common: Not isolated Between input terminals in different commons: Isolated Between input terminals and internal circuits: Photocoupler-isolated
External Load for I/O Interconnection		Not needed				
Signal Determination Method		Static				
Effect of Improper Input Connection		Both sink and source input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.				If any input exceeding the rated value is applied, permanent damage may be caused.
Cable Length		3m in compliance with electromagnetic immunity				—
Connector Insertion/Removal Durability		100 times minimum				
Applicable Ferrule		1-wire: AI 0.5-8 WH (Phoenix Contact) 2-wire: AI-TWIN 2×0.5-10 (Phoenix Contact)		—		
Internal Current Draw	All Inputs ON	30mA (5V DC) 0mA (24V DC)	40mA (5V DC) 0mA (24V DC)	40mA (5V DC) 0mA (24V DC)	65mA (5V DC) 0mA (24V DC)	40mA (5V DC) 0mA (24V DC)
	All Inputs OFF	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)
Internal Power Consumption (at 24V DC while all inputs ON)		0.20W	0.27W	0.27W	0.44W	0.27W
Weight (approx.)		110g	105g	75g	110g	110g

Relay Output Module Specifications

Part Number		FC6A-R081	FC6A-R161
Output Points		8 (4/1 common)	16 (8/1 common)
Output Type		1NO	
Maximum Load Current		2A per point	
		7A per common	8A per common
Minimum Switching Load		1 mA/ 5V DC (reference value)	
Initial Contact Resistance		30 mΩ maximum	
Electrical Life		100,000 operations minimum (rated load 1,800 operations/hour)	
Mechanical Life		20,000,000 operations minimum (no load 18,000 operations/hour)	
Rated Load		Resistive load: 240V AC 2A, 30V DC 2A Inductive load: 240V AC 2A (cos φ = 0.4) 30V DC 2A (L/R = 7 ms)	
Dielectric Strength		Between output and ground terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute	
Connector Insertion/Removal Durability		100 times minimum	
Applicable Ferrule		1-wire: AI 0.5-10 (Phoenix Contact) 2-wire: AI-TWIN 2x0.5-10 (Phoenix Contact)	
Internal Current Draw	All outputs ON	35mA (5V DC) 50mA (24V DC)	50mA (5V DC) 100mA (24V DC)
	All outputs OFF	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)
Internal Power Consumption (at 24V DC while all outputs ON)		1.44W	2.74W
Weight (approx.)		130g	140g

Transistor Output Module Specifications

Part Number		FC6A-T08K1 FC6A-T08P1	FC6A-T16K1 FC6A-T16P1	FC6A-T16K3 FC6A-T16P3	FC6A-T32K3 FC6A-T32P3
Output Points		8 (8/1 common)	16 (16/1 common)		32 (16/1 common)
Output Type		FC6A-T□K□: Transistor sink output FC6A-T□P□: Transistor source output			
Rated Load Voltage		24V DC			
Operating Load Voltage Range		19.2 to 28.8V DC			
Maximum Load Current		0.5A per point		0.1A per point	
		3A per common		1A per common	
Voltage Drop (ON Voltage)		1V maximum (voltage between COM and output terminals when output is on)			
Inrush Current		1A maximum			
Leakage Current		0.1mA maximum			
Clamping Voltage		Approx. 50V			
Maximum Lamp Load		12W		2.4W	
Inductive Load		L/R = 10ms (28.8V DC 1Hz)			
External Current Draw		FC6A-T□K□: 100 mA maximum, 24V DC (power voltage at the +V terminal) FC6A-T□P□: 100 mA maximum, 24V DC (power voltage at the -V terminal)			
Overcurrent Protection		Transistor Sink Output: No Transistor Source Output: Yes			
Isolation		Between output terminal and internal circuit: Photocoupler-isolated Between output terminals: Not isolated			
Connector Insertion/ Removal Durability		100 times minimum			
Applicable Ferrule		1-wire: AI 0.5-10 (Phoenix Contact) 2-wire: AI-TWIN 2x0.5-10 (Phoenix Contact)			
Internal Current Draw	All outputs ON	25mA (5V DC) 15mA (24V DC)	30mA (5V DC) 25mA (24V DC)		45mA (5V DC) 50mA (24V DC)
	All outputs OFF	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)	17mA (5V DC) 0mA (24V DC)
Internal Power Consumption (at 24V DC while all outputs ON)		0.53W	0.80W		1.50W
Output Delay	Turn ON Time	400 μs maximum			
	Turn OFF Time	450 μs maximum			
Weight (approx)		110g	105g	75g	115g

Mixed I/O Module Specifications

Part Number		FC6A-M08BR1	FC6A-M24BR1
Input Specifications	Input Points	4 (4/1 common)	16 (16/1 common)
	Rated Input Voltage	24V DC sink/source input signal	
	Input Voltage Range	0 to 28.8V DC	
	Rated Input Current	7 mA/point (24V DC)	
	Input Impedance	3.4 kΩ	
	OFF Voltage	5V maximum	
	ON Voltage	15V minimum	
	OFF Current	1.2 mA maximum	
	ON Current	4.2 mA minimum (at 15V DC)	
	Input Delay Time (24V DC)	Turn ON Time: 4.1ms, Turn OFF Time: 4.1ms	
	Isolation	Between input terminals: Not isolated Internal circuit: Photocoupler-isolated	
	External Load for I/O Interconnection	Not needed	
	Signal Determination Method	Static	
	Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.	
	Cable Length	3m in compliance with electromagnetic immunity	
Output Specifications	Output Points	4 (4/1 common)	8 (4/1 common)
	Output Type	1NO	
	Maximum Load Current	2A per point 7A per common	
	Minimum Switching Load	1 mA/ 5V DC (reference value)	
	Initial Contact Resistance	30 mΩ maximum	
	Electrical Life	100,000 operations minimum (rated load 1,800 operations/hour)	
	Mechanical Life	20,000,000 operations minimum (no load 18,000 operations/hour)	
	Rated Load	Resistive load: 240V AC 2A, 30V DC 2A Inductive load: 240V AC 2A (cos φ = 0.4), 30V DC 2A (L/R = 7 ms)	
	Dielectric Strength	Between output and PE terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute	
	Connector Insertion/Removal Durability	100 times minimum	
	Applicable Ferrule	1-wire: AI 0.5-10 (Phoenix Contact), 2-wire: AI-TWIN 2×0.5-10 (Phoenix Contact)	
	Internal Current Draw	All I/Os ON	30mA (5V DC), 25mA (24V DC)
		All I/Os OFF	17mA (5V DC), 0mA (24V DC)
	Internal Power Consumption (at 24V DC while all I/Os are ON)	0.80W	0.97W
	Weight (approx.)	120g	165g

OT Touchscreens

PLCs

Automation Software

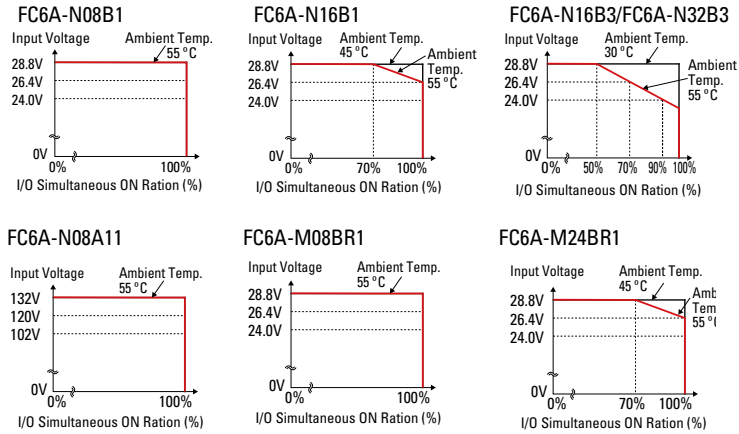
Power Supplies

Sensors

Communication

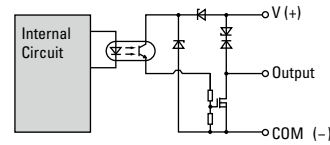
Barriers

Temperature derating curves: Input voltage vs. I/O Simultaneous ON Ratio (%)

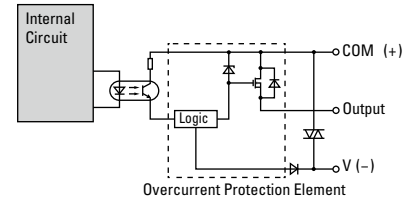


Output Internal Circuit

FC6A-T08K1/FC6A-T16K1
FC6A-T16K3/FC6A-T32K3

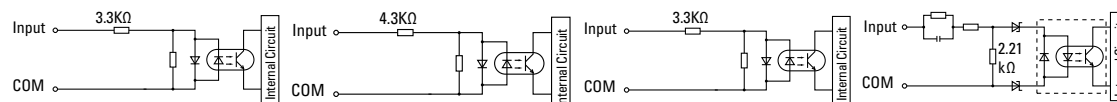


FC6A-T08P1/FC6A-T16P1
FC6A-T16P3/FC6A-T32P3

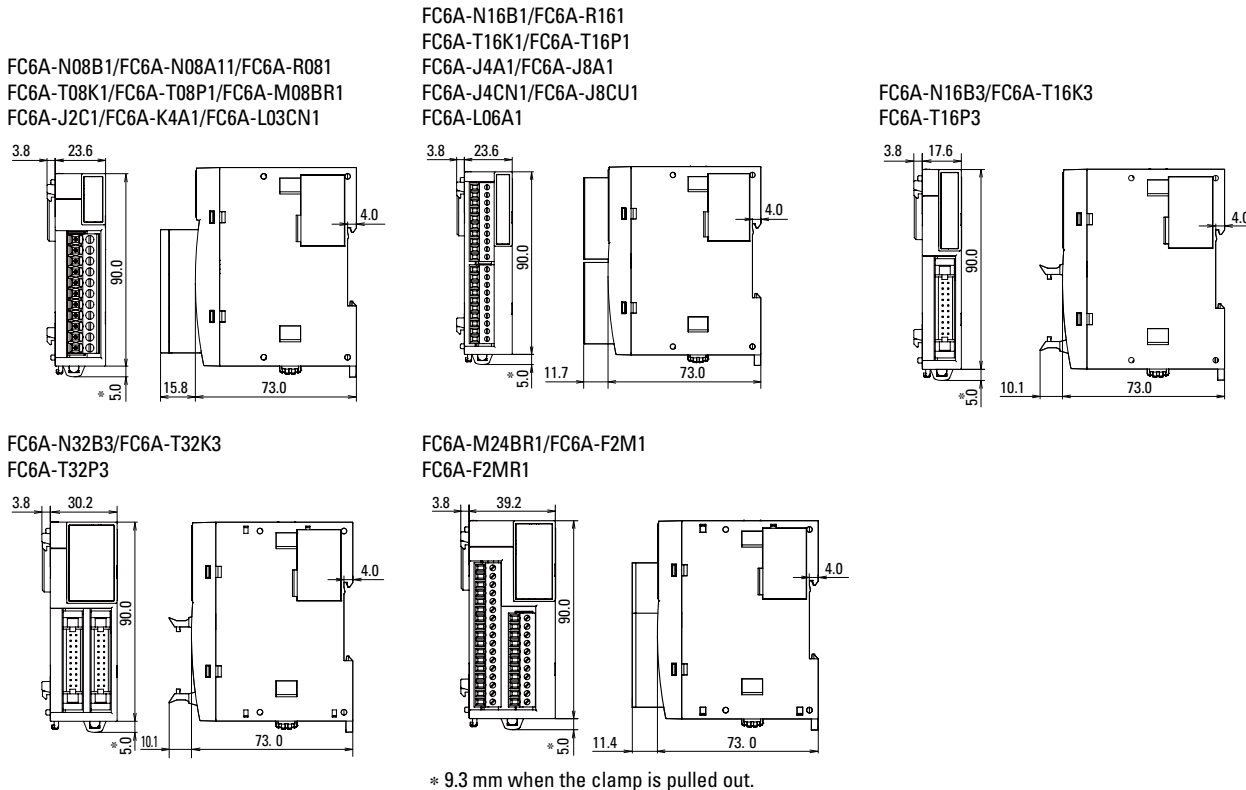


Input Internal Circuit

FC6A-N08B1/FC6A-N16B1 FC6A-N16B3/FC6A-N32B3 FC6A-M08BR1/FC6A-M24BR1 FC6A-N08A11



Dimensions (all dimensions are in mm)



MicroSmart FC6A PLC Analog I/O Module Specifications



Key Features

- 8 modules to choose from
- Up to 16-bit resolution
- Fast sampling rate
- Wide range of signals:
- 0/4-20mA, 0-10V DC, -10 to 10V DC, Type K, J, R, S, B, E, T, N, C thermocouple and RTD

Specifications

Analog I/O Module Specifications

Part Number	FC6A-J2C1	FC6A-J4A1	FC6A-J8A1	FC6A-L06A1	FC6A-L03CN1	FC6A-J4CN1	FC6A-J8CU1	FC6A-K4A1
Input Points	2	4	8	4	2	4	8	–
Input Signal Type	Voltage (0 to 10V) Current (0 to 20mA)				Voltage (0 to 10V) Voltage (-10 to +10V) Current (0 to 20mA) Current (4 to 20mA) Thermocouple Resistance Thermometer		Thermocouple Thermistor (NTC, PTC)	–
Output Points	–	–	–	2	1	–	–	4
Output Signal Style	–	–	–	Voltage (0 to 10V) Voltage (-10 to +10V) Current (0 to 20mA) Current (4 to 20mA)	–	–	–	Voltage (0 to 10V) Voltage (-10 to +10V) Current (0 to 20mA) Current (4 to 20mA)
External Power Supply	Rated Power Voltage 24V DC, Allowable Voltage Range 20.4 to 28.8V DC							
External Current Draw (24V DC) ¹	25mA	30mA	40mA	100mA	80mA	40mA	30mA	125mA
Connector Insertion/ Removal Durability	100 times minimum							
Applicable Ferrule	1-wire: AI 0.5-10 (Phoenix Contact), 2-wire: AI-TWIN 2x0.5-10 (Phoenix Contact)							
Internal Power Consumption (5V DC)	40mA max.	45mA max.	40mA max.	55mA max.	55mA max.	50mA max.	45mA max.	50mA max.
Internal Power Consumption (at 24V DC while all I/Os are ON)	0.27W	0.30W	0.27W	0.37W	0.37W	0.34W	0.30W	0.34W
Weight (approx.)	115g	110g	110g	110g	115g	110g	110g	115g

Note 1: The external current draw is the value when all the analog inputs are used and the analog output value is at 100%.

Analog Input Specifications (1)

Part Number		FC6A-J2C1		FC6A-J4A1/FC6A-J8A1/FC6A-L06A1	
Input Signal Type		Voltage Input	Current Input	Voltage Input	Current Input
Input Range		0 to 10V -10 to +10V	0 to 20mA 4 to 20mA	0 to 10V -10 to +10V	0 to 20mA 4 to 20mA
Input Impedance		1MΩ maximum	50Ω maximum	1MΩ maximum	50Ω maximum
Input Detection Current		–	–	–	–
AD Conversion	Sampling Duration Time	1ms		1ms or 10ms (selectable with application software)	
	Sampling Repetition Time	Sampling time × valid input channels			
	Total Input System Transfer Time	Sampling time + sampling interval + 1 scan time			
	Type of Input	Single-ended input			
	Operating Mode	Self-scan			
	Conversion Method	Σ Δ type ADC			
Input Error	Maximum Error at 25°C	±0.1% of full scale		±0.2% of full scale	
	Cold Junction Compensation Error	–	–	–	–
	Temperature Coefficient	±0.006% of full scale/°C		±0.01% of full scale/°C	
Data	Digital Resolution	65,536 increments (16 bits)		4,096 increments (12 bits)	
	Input per Resolution	0 to 10V: 0.15mV -10 to +10V: 0.30mV	0 to 20mA: 0.30μA 4 to 20mA: 0.244μA	0 to 10V: 2.44mV -10 to +10V: 4.88mV	0 to 20mA: 4.88μA 4 to 20mA: 3.91μA
	Data Type in Application Program	Optional: -32,768 to 32,767 (selectable for each channel) ¹			
	Monotonicity	Yes			
	Input Data Out of Range	Detectable ²			
Noise Resistance	Input Filter	Soft filter (0 to 10 s, selectable in increments of 0.1 s)			
	Recommended Cable for Noise Immunity	Twisted pair shielded cable			
	Crosstalk	1LSB maximum			
Isolation		Between input and power circuit: Transformer-isolated Between input and internal circuit: Photocoupler-isolated			
Effect of Improper Input Connection		No damage			
Maximum Permanent Allowed Overload (No Damage)		13V DC	40mA	13V DC	40mA
Selection of Analog Input Signal Type		Using programming software			
Calibration or Verification to Maintain Rated Accuracy		Not possible			

Note 1: The data processed in the analog I/O module can be linear-converted to a value between -32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

Note 2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Analog Input Specifications (2)

Part Number		FC6A-L03CN1/FC6A-J4CN1				FC6A-J8CU1		
Input Signal Type		Voltage Input	Current Input	Resistance Thermometer	Thermocouple	Thermocouple	NTC Thermistor	PTC Thermistor
Input Range		0 to 10V DC -10 to +10V	0 to 20mA 4 to 20mA	Pt100, Pt1000 3-wire type (-200 to 850°C) Ni100, Ni1000 3-wire type (-60 to 180°C)	Type K (-200 to +1,300°C) Type J (-200 to +1,000°C) Type R (0 to 1,760°C) Type S (0 to 1,760°C) Type B (0 to 1,820°C) Type E (-200 to +800°C) Type T (-200 to +400°C) Type N (-200 to +1,300°C) Type C (0 to 2,315°C)	Type K (-200 to +1,300°C) Type J (-200 to +1,000°C) Type R (0 to 1,760°C) Type S (0 to 1,760°C) Type B (0 to 1,820°C) Type E (-200 to +800°C) Type T (-200 to +400°C) Type N (-200 to +1,300°C) Type C (0 to 2,315°C)	-90 to +150°C	100 to 10,000Ω
Input Impedance		1 MΩ minimum	50Ω maximum	1 MΩ minimum	1 MΩ minimum	1 MΩ minimum	1 MΩ minimum	
Input Detection Current		—	—	0.1mA maximum	0.1mA maximum	0.1mA maximum	0.1mA maximum	
AD Conversion	Sampling Duration Time	10ms, 100ms or 104ms (selectable using application software)					104ms	
	Sampling Repetition Time	Sampling time × valid input channels						
	Total Input System Transfer Time	Sampling time + sampling interval + 1 scan time						
	Type of Input	Single-ended input						
	Operating Mode	Self-scan						
	Conversion Method	Σ Δ type ADC						
Input Error	Maximum Error at 25°C	±0.2% of full scale		FC6A-L03CN1: ±0.1% of full scale + cold junction compensation error FC6A-J4CN1: ±0.2% of full scale + cold junction compensation error ³		±0.2% of full scale + cold junction compensation error ³		
	Cold Junction Compensation Error	—	—	±4°C maximum		±4°C maximum		
	Temperature Coefficient	FC6A-L03CN1: 0.006%/°C of full scale FC6A-J4CN1: 0.01%/°C of full scale				0.01%/°C of full scale		
Data	Digital Resolution	65,536 increments (16 bits)		Pt100: approx. 10,500 increments (14 bits) Pt1,000: approx. 8,000 increments (13 bits) Ni100: approx. 2,400 increments (12 bits) Ni1,000: approx. 2,400 increments (12 bits)	Type K: approx. 15,000 increments (14 bits) Type J: approx. 12,000 increments (14 bits) Type R: approx. 17,600 increments (15 bits) Type S: approx. 17,600 increments (15 bits) Type B: approx. 18,200 increments (15 bits) Type E: approx. 10,000 increments (14 bits) Type T: approx. 6,000 increments (13 bits) Type N: approx. 15,000 increments (14 bits) Type C: approx. 23,150 increments (15 bits)	Type K: approx. 15,000 increments (14 bits) Type J: approx. 12,000 increments (14 bits) Type R: approx. 17,600 increments (15 bits) Type S: approx. 17,600 increments (15 bits) Type B: approx. 18,200 increments (15 bits) Type E: approx. 10,000 increments (14 bits) Type T: approx. 6,000 increments (13 bits) Type N: approx. 15,000 increments (14 bits) Type C: approx. 23,150 increments (15 bits)	NTC: approx. 2,400 increments (12 bits) PTC: approx. 9,900 increments (14 bits)	
	Input Value of LSB	0 to 10V: 0.15mV -10 to +10V: 0.30mV	0 to 20mA: 0.30μA 4 to 20mA: 0.244μA	0.1°C	0.1°C	0.1°C	0.1°C	1Ω
	Data Type in Application Program	Optional: selectable for each channel from -32,768 to 32,767 ¹						
	Monotonicity	Yes						
Noise Resistance	Input Data Out of Range	Detectable ²						
	Input Filter	Software						
	Recommended Cable for Noise Immunity	Twisted pair shielded cable		Twisted pair cable				
	Crosstalk	1 LSB maximum						
Isolation		Between input and power circuit: Transformer-isolated Between input and internal circuit: Photocoupler-isolated						
Effect of Improper Input Connection		No damage						
Maximum Permanent Allowed Overload (No Damage)		13V DC 40mA						
Selection of Input Signal Type and Input Range		Using programming software						
Calibration or Verification to Maintain Rated Accuracy		Not possible						

Note 1: The data processed in the analog I/O module can be linear-converted to a value between -32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

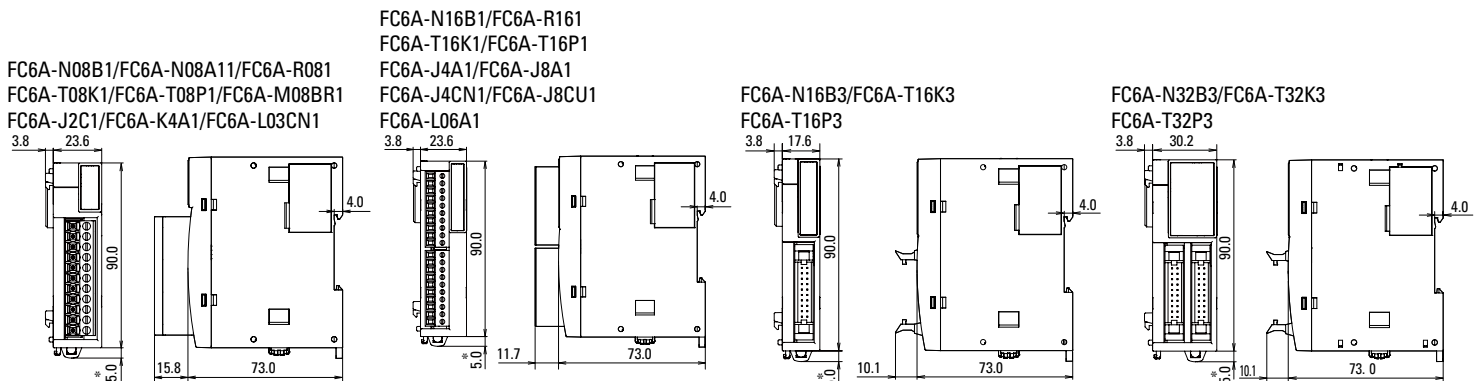
Note 2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Note 3: R, S: ±6 (0 to 200°C) B: no compensation K, J, E, T, N: ±0.4% of full scale (0°C maximum)

Analog Output Specifications

Part Number		FC6A-K4A1	FC6A-L06A1	FC6A-L03CN1
Output Signal Style/Output Range	Voltage	0 to 10V DC -10 to +10V DC		
	Current	0 to 20mA 4 to 20mA		
Load	Impedance	Voltage output: 1 k Ω minimum Current output: 300 Ω maximum		
	Load Type	Resistive load		
DA Conversion	DA Conversion Time	1ms		
	Output Update Interval	1ms		
	Total Output System Transfer Time	DA Conversion Time + Output Update Interval + 1 scan time		
Output Error	Maximum Error at 25°C	±0.2% of full scale	±0.1% of full scale	±0.2% of full scale
	Temperature Coefficient	±0.01%/°C of full scale	±0.006%/°C of full scale	±0.01%/°C of full scale
	Repeatability after Stabilization Time	±0.4% of full scale		
	Output Voltage Drop	No damage		
	Non-linearity	±0.2% of full scale	±0.01%/°C of full scale	±0.2% of full scale
	Output Ripple	20mV maximum		
	Overshoot	0%		
Data	Total Error	±1% of full scale		
	Digital Resolution	4,096 increments (12 bits)		
	Output Value of LSB	0 to 10V DC: 2.44mV -10 to +10V DC: 4.88mV		
		0 to 20mA: 4.88 μ A 4 to 20mA: 3.91 μ A		
	Data Type in Application Program	Optional: -32,768 to 32,767 (selected for each channel)		
	Monotonicity	Yes		
	Current Loop Open	Undetectable		
Noise Resistance	Recommended Cable for Noise Immunity	Twisted pair shielded cable		
	Crosstalk	1LSB		
Isolation	Between output and power circuit	Transformer-isolated		
	Between output and internal circuit	Photocoupler-isolated		
Effect of Improper Output Connection		No damage		
Selection of Analog Output Signal Type		Using software programming		
Calibration or Verification to Maintain Rated Accuracy		Impossible		

Dimensions (all dimensions are in mm)



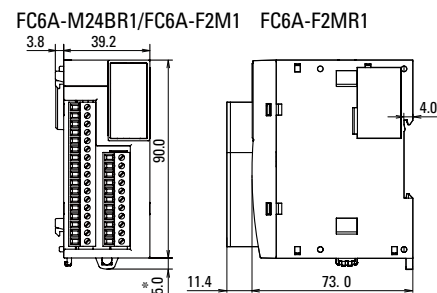
Specifications

Input Range

Part Number	FC6A-F2MR1 FC6A-F2M1		
	Input Range (Digital Resolution)		Input Value of LSB
K	-200 to 1,370°C	-328 to 2,498°F	1°C (°F)
	-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C (°F)
J	-200 to 1,000°C	-328 to 1,832°F	1°C (°F)
R	0 to 1,760°C	32 to 3,200°F	1°C (°F)
S	0 to 1,760°C	32 to 3,200°F	1°C (°F)
B	0 to 1,820°C	32 to 3,308°F	1°C (°F)
E	-200 to 800°C	-328 to 1,472°F	1°C (°F)
T	-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C (°F)
N	-200 to 1,300°C	-328 to 2,372°F	1°C (°F)
PL-II	0 to 1,390°C	32 to 2,534°F	1°C (°F)
C (W/Re5-26)	0 to 2,315°C	32 to 4,199°F	1°C (°F)
Pt100	-200 to 850°C	-328 to 1,562°F	1°C (°F)
	-200.0 to 850.0°C	-328.0 to 1,562.0°F	0.1°C (°F)
JPt100	-200 to 500°C	-328 to 932°F	1°C (°F)
	-200.0 to 500.0°C	-328.0 to 932.0°F	0.1°C (°F)
DC 4 to 20mA	-2,000 to 10,000 (12,000 increments) ¹		1.333μA
DC 0 to 20mA	-2,000 to 10,000 (12,000 increments) ¹		1.666μA
DC 0 to 1V	-2,000 to 10,000 (12,000 increments) ¹		0.083mA
DC 0 to 5V	-2,000 to 10,000 (12,000 increments) ¹		0.416mA
DC 1 to 5V	-2,000 to 10,000 (12,000 increments) ¹		0.333mA
DC 0 to 10V	-2,000 to 10,000 (12,000 increments) ¹		0.833mA

Note 1: Linear-conversion is possible.

Dimensions



* 9.3 mm when the clamp is pulled out.

MicroSmart FC6A PLC PID Module Specifications

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers



Key Features

- Configure up to 15 modules
- Maximum 30 PID loops
- 2 analog inputs and 2 relay or 4-20mA Non-contact voltage output for SSR drive

Ratings

Part Number		FC6A-F2MR1	FC6A-F2M1
Control Mode	Independent PID Control	Possible	
	Heating/Cooling Control	Possible (overlapping deadband settings available) ¹	
	Difference Input Temperature Control	Possible ¹	
	Cascade Control	Possible ¹	
Input Points		2ch	
Input Type Input Range	Thermocouple	K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26) External resistance: 100Ω maximum	
	Resistance Thermometer	Pt100, JPt100, 3-wire type	
	Current Input	0 to 20 mA DC, 4 to 20 mA DC Input impedance: 50Ω	
	Voltage Input	0 to 1V DC Input impedance: 1MΩ minimum 0 to 5V DC, 1 to 5V DC, 0 to 10V DC Input impedance: 100kΩ minimum	
AD Conversion	Sampling Duration Time	100 ms	
	Sampling Repetition Time	100 ms	
	Total Input System Transfer Time	Sampling time + sampling interval + 1 scan time	
	Type of Input	Differential input	
Maximum Error at 25°C	Conversion Method	Σ Δ type ADC	
	Thermocouple Input	±0.2% of full scale or ±2°C (4°F), whichever is greater However, R, S inputs: 0 to 200°C (0 to 400°F): ±6°C (12°F) B input: 0 to 300°C (0 to 600°F) Accuracy is not guaranteed. K, J, E, T, N inputs: Less than 0°C (32°F): ±0.4% of full scale	
	Resistance Thermometer Input	±0.1% of full scale or ±1°C (2°F), whichever is greater	
	Voltage/Current Inputs	±0.2% of full scale	
Cold Junction Temperature Compensation Accuracy		±1°C at 0 to 55°C	
Temperature Coefficient		±0.005%/°C of full scale	
Noise Resistance	Input Filter	Yes	
	Recommended Cable for Noise Immunity	Twisted pair shielded cable (current/voltage) / Twisted pair cable (temperature input)	
	Cross Talk	None	
Isolation	Between input and power circuit	Transformer-isolated	
	Between input and internal circuit	Photocoupler-isolated	
Output Points		2ch	
Output		Relay output 1NO Rated load 5A 250V AC/30V DC (resistive load) 3A 250V AC (inductive load cos φ=0.4) 3A 30V DC (resistive load VR=7ms) Minimum open/closed load: 10 mA 5V DC (reference value) Electrical life: 100,000 cycles (at the maximum rating of resistive load)	Non-contact voltage output (for SSR drive) 12V DC±15% Maximum 40 mA (short circuit protected) Analog current output 4 to 20 mA DC Load resistance: 550Ω maximum Analog output digital resolution: 1,000 LSB input value: 0.016 mA
	Recommended Cable for Noise Immunity	—	Twisted pair shielded cable
Noise Resistance	Cross Talk	—	None
Isolation		Between input and power circuit: Transformer-isolated Between input/output and internal circuits: Photocoupler-isolated Between input circuits: Photocoupler-isolated	
Power Voltage		24V DC (External power), 5V DC (Internal power)	
Allowable Voltage Range		20.4 to 28.8V DC	
Maximum Power Consumption		3.6W	
Internal Power Consumption		65mA (5V DC)	
Weight (approx.)		140g	

Note 1: Dual channel input is required for one loop control.

MicroSmart FC6A PLC HMI and Communication Adapter Specifications



Key Features

- Add 2nd Ethernet port
- Add additional serial port
- HMI module supports User Web Page
- HMI module supports Web Server Functions
- HMI module supports Email and Text Message notifications

HMI Module Specifications

General Specifications

Part Number	FC6A-PH1
Power Consumption Inside Module (without connection cartridge)	100mA (5V) 1.5mA (24V)
Cartridge (option)	One analog cartridge can be added
Weight (approx.)	170g

Display Specifications

Part Number	FC6A-PH1
Display	TFT Monochrome LCD
Color/Shade	Monochrome
Effective Display Area	47.98W × 8.22H mm
Display Resolution	192W × 64H pixels
View Angle	Right and left 30°, up 20°, down 40°
Contrast adjustment	Impossible
Backlight	LED (green)
Brightness	45 cd/m ²
Brightness Adjustment	Impossible
Backlight Control	ON/OFF
Backlight Replacement	Impossible
Display Character Size	1/2 size 8 × 16 pixels (JIS 8-bit code, Western European language ISO 8859-1, Cyrillic ANSI1251) Full size 16 × 16 pixels (Japanese JIS first level characters, simplified Chinese)
Quantity of Characters	1/2 size 24 characters × 4 lines Full size 12 characters × 4 lines
Character Attribute	Blink, reverse,

Communication Adapter

Part Number	FC6A-PC1	FC6A-PC3
Standards	EIA RS232C	EIA RS485
Maximum Baud Rate		115,200bps
Maintenance Communication	Possible	Possible
User Communication	Possible	Possible
Data Link Communication	—	Possible
Half-duplex Communication	—	Possible
Maximum Cable Length	5m	200m
Quantity of Slave Stations	—	31
Isolation between Internal Circuit and Communication Port		Not isolated
RS485 Cable		
Cable	—	3-core shielded cable with a minimum core wire of 0.3 mm ²
Conductor Resistance		85 Ω/km maximum
Shield Resistance		20 Ω/km maximum

Operation Specifications

Part Number	FC6A-PH1
Operation Method	Rubber Switch
Operating Force	2.0N minimum
Mechanical Life	10,000 operations
Multiple Operation	Possible

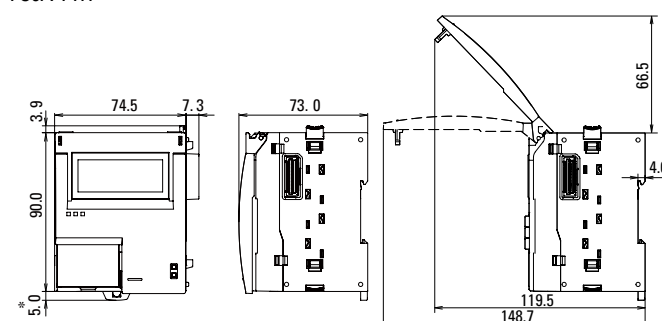
HMI Ethernet Port Specifications

Part Number	FC6A-PH1
Communication	Complies with IEEE802.3
Transmission speed	10BASE-T, 100BASE-TX
Protocol	Datalink layer: IP/ARP Network layer: TCP/UDP, ICMP Application layer: DHCP, DNS, HTTP, SMTP
Connector	RJ45
Cable	CAT 5. STP
Maximum Cable Length	100m
Isolation from Internal Circuit	Pulse transformer isolation
Remote Maintenance	Uploading, downloading and monitoring using WindLDR Number of connections: 8
Web Server	Page data of 5MB maximum (total of system web page and user web page) can be stored. (System web page: approx. 450 KB) Number of connections: 8 maximum Authentic method: digest authentication
Send E-mail	Sends preregistered e-mails. Up to 255 types of e-mails can be sent. Authentic method: SMTP-Auth (login), SMTP-Auth (CRAM-MD5), SMTPs Encoding method: BASE64
E-mail Size	The maximum size of texts for To or Cc is 512 bytes. ¹ E-mail subject: 255 bytes maximum E-mail body: 4096 bytes maximum Attached CSV file: 4096 bytes maximum (includes spaces, separator characters, and newlines)

Note 1: Comma (,) is inserted as a separating character between e-mail addresses.

Dimensions

FC6A-PH1



MicroSmart FC6A PLC Expansion Interface Module Specifications

01 Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers



Key Features

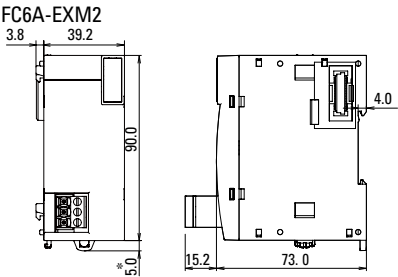
- Required when expanding to more than 7 expansion modules
- Allows FC6A to expand an additional 8 expansion modules

Expansion Interface Module Specifications

Part Number		FC6A-EXM2
Rated Power Voltage		24V DC
Allowable Voltage Range		20.4 to 28.8V DC
Power Consumption		Internal power (supplied from CPU module): 20 mA (5V DC), 0 mA (24V DC) External power: With I/O modules ¹ 750 mA (26.4V DC)
Maximum Power Consumption (External Power) ¹		0.5W (24V DC)
Allowable Momentary Power Interruption		10ms minimum (24V DC)
I/O Expansion		Between CPU module and expansion interface module Connectable I/O modules: 7 maximum (224 I/Os maximum) Beyond the expansion interface module Connectable I/O modules: 8 maximum (256 I/Os maximum)
Isolation from Internal Circuit		Not isolated
Connector	Insertion/Removal Durability	100 times minimum
	Applicable Ferrules	1-wire: AI 0.5-10 (Phoenix Contact) 2-wire: AI-TWIN 2x0.5-10 (Phoenix Contact)
Weight (approx.)		150g

Note 1: Power consumption by the expansion interface module and eight I/O modules.

Dimensions (all dimensions are in mm)





The Power to Control. Anywhere. Anytime.

Power, Performance, Connectivity

Maximize efficiency and cut development time! MicroSmart Pentra PLCs combine advanced networking capabilities with unparalleled power, performance and connectivity. Designed to meet all your communication requirements, now and in the future, MicroSmart Pentra PLCs give you the flexibility to expand your system with as many as fifteen modules! Our new Embedded Ethernet PLC with built-in Modbus TCP also lets you remotely monitor status in real-time, receive email alerts and customize your own web page.

Safety

All MicroSmart Pentra PLCs meet the highest standards for safety including: cULus listed for Class 1 Division 2 hazardous locations*, CE compliant, as well as certified for marine use by ABS, DNV, and Lloyd's Registry*.

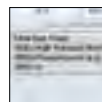


*Not applicable for all models. Visit www.IDEC.com/approvals for details.

The MicroSmart Pentra PLC Family: Everything you need in a controller



Embedded Ethernet Port



Email and text notifications



Modbus TCP, RTU and ASCII



USB programming port



Seven communication ports



NEW Advanced PID control modules



User web page

Battery-less models

MicroSmart Pentra Performance

Embedded Ethernet Port

**Remote Access and Control**

The new MicroSmart Pentra PLC with an embedded Ethernet port, you can configure the MicroSmart Pentra PLC for remote monitoring and control. Using WindLDR software, you can remotely monitor or update the PLC programs without having to be near the PLC.

Web Server Functions

Using standard web browsers like Internet Explorer or Firefox, you can remotely log-in and access web pages that are stored directly on the MicroSmart Pentra PLC. Up to 1 MB of memory is dedicated for web page storage! Use the built-in web pages or create your own using an HTML editor.

14 Simultaneous Connections

The new embedded Ethernet Pentra supports up to 14 simultaneous connections through its Ethernet port. Through the Ethernet port, the embedded Ethernet Pentra can be configured to communicate to WindLDR for maintenance communications, to an Operator Interface touchscreen, and to VFD using Modbus TCP communications, all simultaneously.

Embedded USB Maintenance Port

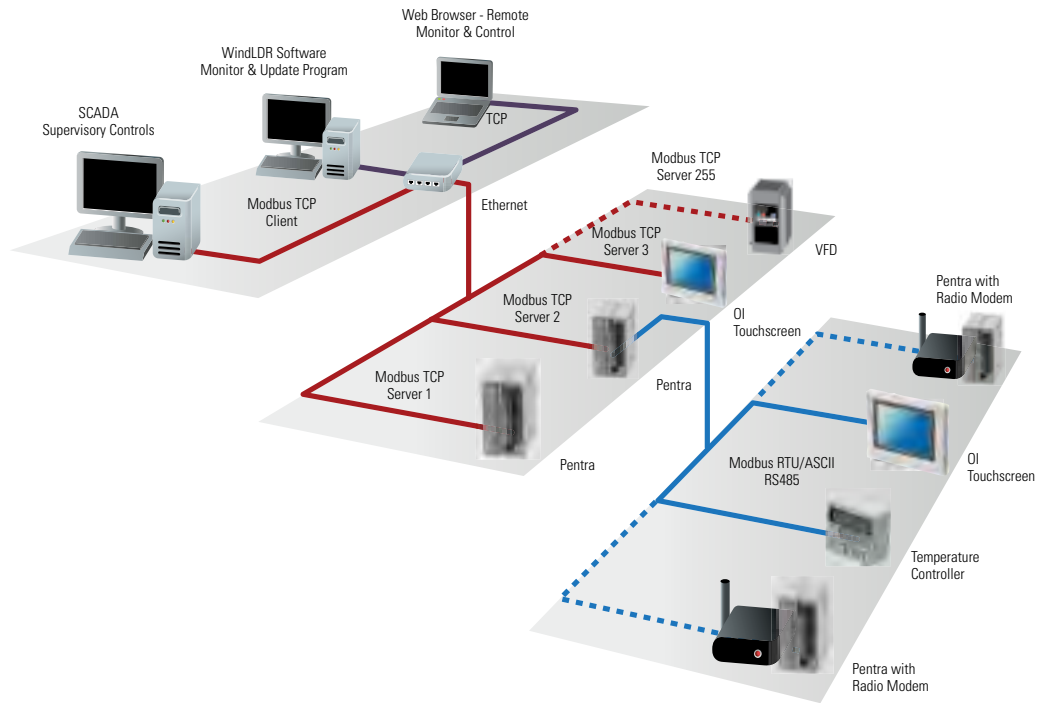


The new MicroSmart Pentra PLC with an embedded Ethernet PLC port also has an embedded mini-B USB port for maintenance.

You can now easily connect your PC to this PLC using a standard USB cable.



Modbus TCP, RTU and ASCII



Using intuitive WindLDR software, you can configure the MicroSmart Pentra to be a Master or Slave device on a Modbus network. All MicroSmart Pentra PLCs support Modbus RTU/ASCII protocols and our CPU with embedded Ethernet port also supports Modbus TCP protocol.

Email and Text Message



Easily configure the MicroSmart Pentra PLCs to send out system status and alarms to your email or mobile phone. Data registers values in the PLC can also be incorporated in the body of the email. It also supports email login authentication so third party email server like Yahoo can be used. Up to 255 email templates can be configured with multiple recipients can be included.

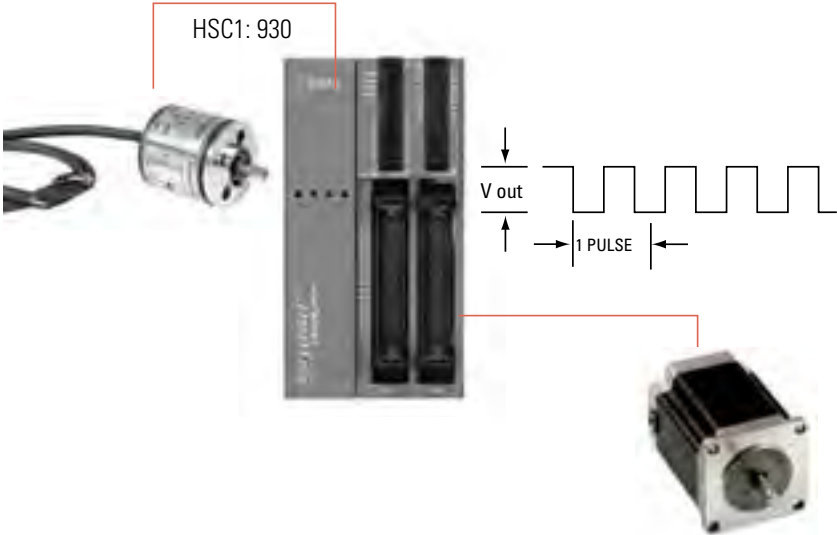
User Web Pages



With IDEC MicroSmart Pentra, users do not need to know JAVA programming to embed dynamic values and parts on their PLC web pages. Even novice HTML programmer can take full advantage of the integrated IDEC system library of numerical display/input, horizontal and vertical bar graphs, trend chart, ON/OFF pilot lights and pushbuttons. Up to 1MB of memory is reserved for user web pages.

Integrated 100KHz Fast Inputs and Outputs

Configure up to four high-speed inputs from high-speed output devices such as rotary encoders or proximity switches at a maximum frequency of 100KHz, independent of the scan time. Up to three high-speed outputs can be used for simple positioning controls for stepper or servo motors.



Maximum 7 Communication Ports



With MicroSmart Pentra PLCs, you don't have to worry about limited communication capabilities. It doesn't matter if you're just starting out or a current user expanding your MicroSmart Pentra PLC, you can rest assured that these communication modules will provide reliable and seamless communication. If RS485 modules are used for all six ports, up to 186 RS485 slave devices can be connected with as high as a 115K baud rate available for fast transmission.

Battery-less CPUs

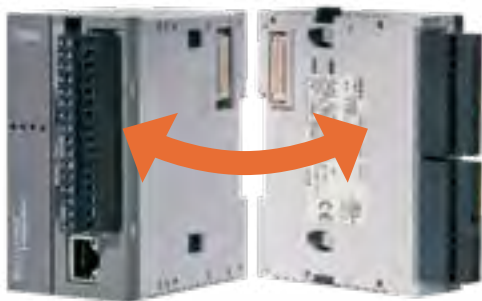
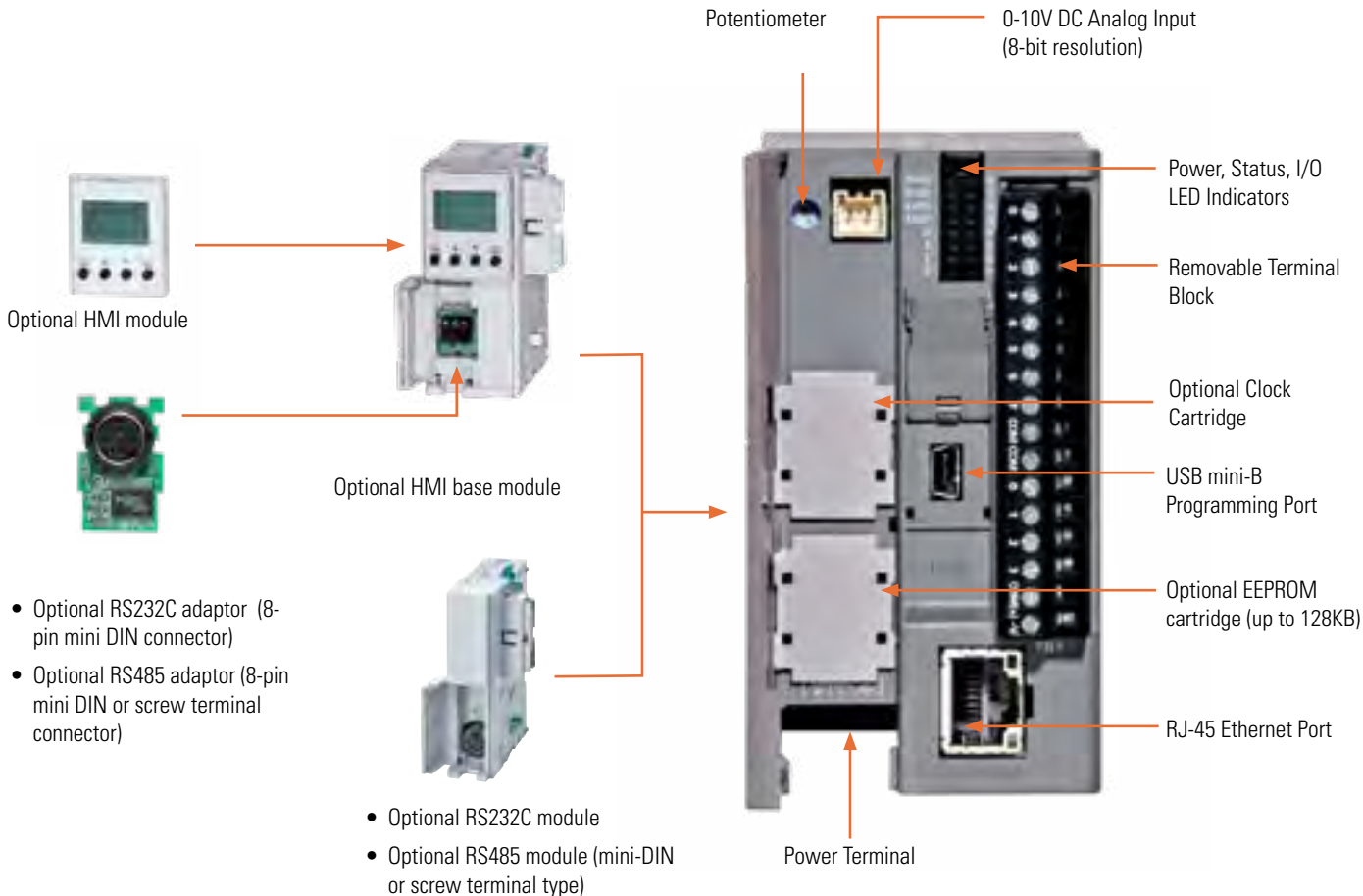


With most PLCs, dynamic values are stored and backed up by a rechargeable lithium battery. In most instances, this battery can only back up data for up to 30 days when the PLC is not powered, otherwise all data will be reset. Not only that, but most lithium battery only last up to 5 years. In that case the battery needs to be replaced or in some cases the entire unit.

Now, thanks to the MRAM memory designed into our new FC5A controllers, these limitations are a thing of the past! Values can be stored permanently to eliminate the hassle and worry of losing dynamic and preloaded data. This makes them ideal for applications that need to retain critical data permanently.

Choose a CPU for every application

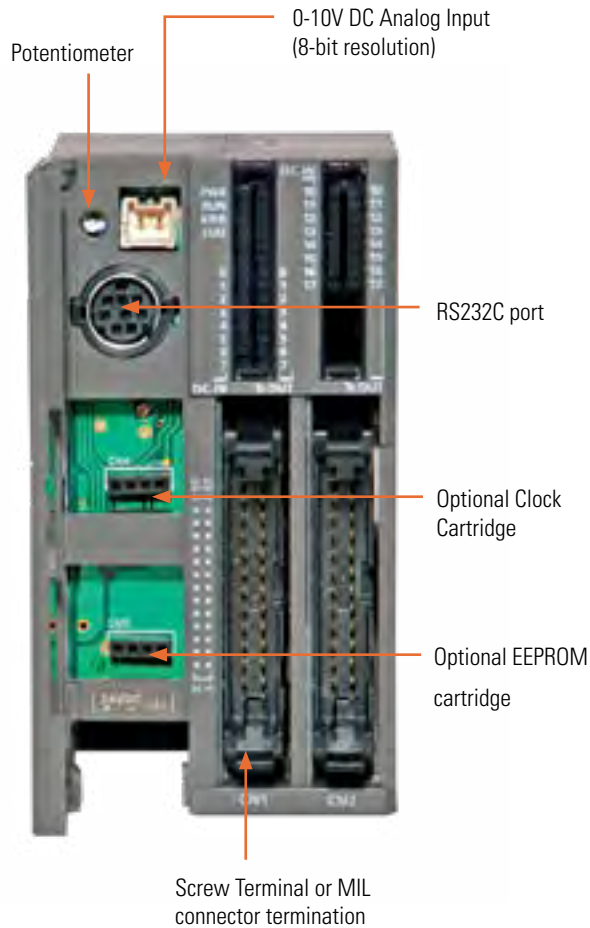
With three controller types to choose from, MicroSmart Pentra PLCs offer the features you need for your applications. Built to allow you the flexibility to expand when you need to, MicroSmart Pentra PLCs are the best way to get everything you need in just one controller.



Modules snap together easily without the need for additional tools.

Slim CPU with Ethernet Port

The perfect design when you need Ethernet capability, this slim CPU with embedded Ethernet port is available with 24V DC power and equipped with eight DC inputs and four transistor outputs (sink or source). Up to seven functional modules, including analog and communication modules can be mounted on the right-hand expansion bus. Using an expansion interface module, an additional eight discrete expansion modules can be mounted.



Slim CPU

If you don't need Ethernet, but still want a high-performance CPU, the MicroSmart Pentra slim CPU is your best choice! Available with 24V DC power, this controller has all the functionalities you need in 16 and 32 I/O configurations. Each 16 I/O CPU is equipped with eight DC inputs, two transistor outputs (sink or source) and six relay outputs, while the 32 I/O CPU is equipped with 16 DC inputs and 16 transistor outputs (sink or source).

All-in-One CPU

Available with 12V DC, 24V DC and 100-240V AC power, you can choose from 10, 16 and 24 I/O configurations. The 10 I/O CPU is equipped with six DC inputs and four relay outputs, while the 16 I/O CPU is equipped with nine DC inputs and seven relay outputs. The 24 I/O CPU is equipped with 14 DC inputs and ten relay outputs. The 24 I/O CPU (24V DC and 100-240V AC models) can also be expanded with a maximum of four functional or discreet expansion modules.

MicroSmart Pentra CPU Part Numbers

Slim Base Module with Embedded Ethernet

Style	Part Number	Permanent Data Backup	Embedded I/Os	Operating Voltage	Ethernet & USB Port	Output	Maximum No. of Expansion Modules
	FC5A-D12K1E	—	12 (8in/4out)	24V DC	Yes	Transistor Sink	15 (Maximum 492 digital I/Os)
	FC5A-D12S1E					Transistor Source	
	FC5A-D12K1E-DS0838	Yes				Transistor Sink	
	FC5A-D12S1E-DS0838					Transistor Source	

Slim Base Module

Style	Part Number		Operating Voltage	Ethernet & USB Port	Output	Maximum No. of Expansion Modules		
	FC5A-D16RK1	16 (8in/8out)	24V DC	—	6 Relays, 2 Trans. Sink	15 (Maximum 496 digital I/Os)		
	FC5A-D16RS1				6 Relays, 2 Trans. Source			
	FC5A-D32K3	32 (16in/16out)					Transistor Sink	15 (Maximum 512 digital I/Os)
	FC5A-D32S3						Transistor Source	

All-in-One Base Module

Style	Part Number		Operating Voltage	Ethernet & USB Port	Output	Maximum No. of Expansion Modules
	FC5A-C10R2	10 (6in/4out)	120-240V AC	—	Relay	—
	FC5A-C10R2C		24V DC			
	FC5A-C10R2D		12V DC			
	FC5A-C16R2	16 (9in/7out)	120-240V AC			—
	FC5A-C16R2C		24V DC			
	FC5A-C16R2D		12V DC			
	FC5A-C24R2	24 (14in/10out)	120-240V AC			4 (Maximum 88 digital I/Os)
	FC5A-C24R2C		24V DC			
	FC5A-C24R2D		12V DC			

MicroSmart Performance

Key features:

- Available in 10, 16, 20, 24, and 40 I/O CPUs.
- PID Controls
 - Program up to 14 PID loops
- High Speed I/O
 - Built-in 4 high speed inputs
 - Single or Dual Phase
 - Max. 20KHz frequency
- Built-in 2 High speed outputs (Slim model only)
- Configure up to 264 I/O Points
- Data link up to 32 MicroSmart and Pentra CPUs
- Using RS485 communication module/port, you can create a network of up to 32 CPUs.
- Worldwide Approvals
 - cULus listed, CE marked
 - Class 1 Div. 2 for hazardous locations
 - Lloyds Registered and ABS approved for shipping industry



MicroSmart CPU Part Numbers

All-in-One

Style	Part Number	Power	I/O Points	Input	Output	Maximum No. of Expansion Modules
	FC4A-C10R2C	24V DC	10 (6 in/ 4 out)	24V DC (Sink/Source)	Relay	—
	FC4A-C10R2	100-240V AC				
	FC4A-C16R2C	24V DC	16 (9 in/ 7 out)			
	FC4A-C16R2	100-240V AC				
	FC4A-C24R2C	24V DC	24 (14 in/ 10 out)			4 (Maximum 88 digital I/Os)
	FC4A-C24R2	100-240V AC				

MicroSmart CPU Part Numbers

Slim

Style	Part Number	Power	I/O Points	Input	Output	Maximum No. of Expansion Modules	
	FC4A-D20RK1	24V DC	20 (12 in/8 out)	24V DC (Sink/Source)	6 Relays, 2 Transistor Sink	7 (Maximum 244 digital I/Os)	
	FC4A-D20RS1				6 Relays, 2 Transistor Source		
	FC4A-D20K3				Transistor Sink	7 (Maximum 148 digital I/Os)	
	FC4A-D20S3				Transistor Source		
	FC4A-D40K3		40 (24 in/16 out)		Transistor Sink	7 (Maximum 264 digital I/Os)	
	FC4A-D40S3				Transistor Source		

01 Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Digital I/O Expansion Modules

Key features:

- 15 modules to choose from
- Available with Screw or MIL connectors
- Easy snap-on
- Available 8, 16 or 32 point modules
- Up to 512 I/O can be configured in the Pentra and 264 I/O in the MicroSmart system

Input Modules

Style	Part Number	Input	Input Points	Terminal
	FC4A-N08A11	100-120V AC	8	Removable Screw Terminals
	FC4A-N08B1			
	FC4A-N16B1	24V DC	16	MIL Connector (ribbon cable)
	FC4A-N16B3			
	FC4A-N32B3		32	

Digital I/O Expansion Modules

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Output Modules

Style	Part Number	Output	Output Points	Terminal
	FC4A-R081	Relay	8	Removable Screw Terminals
	FC4A-R161		16	
	FC4A-T08K1	Transistor Sink	8	MIL Connector (ribbon cable)
	FC4A-T16K3		16	
	FC4A-T32K3		32	

Digital I/O Expansion Modules

Output Modules (cont.)

Style	Part Number	Output	Output Points	Terminal
	FC4A-T08S1	Transistor Source	8	Removable Screw Terminals
	FC4A-T16S3		16	MIL Connector (ribbon cable)
	FC4A-T32S3		32	

Combination I/O Modules

Style	Part Number	Input	Output	I/O Points	Terminal
	FC4A-M08BR1	24V DC (Sink/Source)	Relay	8 (4 in/4 out)	Removable Screw Terminals
	FC4A-M24BR2			24 (16 in/ 8 out)	Wire Spring Clamp

Analog I/O Expansion Modules

Key features:

- 9 different modules to choose from
- 0-10V, 4-20mA, RTD, Thermocouple, Thermistor inputs, 0-10V DC or -10V DC to 10V DC output
- 12 or 16-bit resolution
- Fast conversion time
- Maximum of 56 I/O can be configured in the MicroSmart Pentra system
- Easy to configure using a Macro instruction in WindLDR

Modules

Style	Part Number	I/O Points	Input	Output	Resolution	Terminal
	FC4A-J8C1	8 (8 inputs)		—	16-bit (0-50000)	
	FC4A-L03A1	3 (2 inputs, 1 output)	0-10V DC, 4-20mA	0-10V DC, 4-20mA	12-bit (0-4095)	
	FC4A-J2A1	2 (2 inputs)		—		Removable Screw Terminals
	FC4A-J4CN1	4 (4 inputs)	0-10V DC, 4-20mA, RTD, Thermocouple	—	16-bit (0-50000)	
	FC4A-L03AP1	3 (2 inputs, 1 output)	RTD, Thermocouple	0-10V DC, 4-20mA	12-bit (0-4095)	

Analog I/O Expansion Modules

Modules (cont.)

Style	Part Number	I/O Points	Input	Output	Resolution	Terminal
	FC4A-J8AT1	8 (8 inputs)	Thermistor (NTC/PTC)	—	12-bit (0-4000)	Removable Screw Terminals
	FC4A-K2C1	2 (2 outputs)	—	-10 to 10V DC, 4-20mA	16-bit (0-50000)	
	FC4A-K1A1	1 (1 output)	—	0-10V DC, 4-20mA	12-bit (0-4095)	
	FC4A-K4A1	4 (4 outputs)				

Communication Modules

Web Server Module

Features:

- Easy to configure
- Comes with interface cable and Quick Start Guide

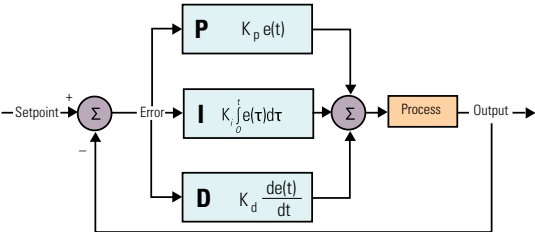
Part Numbers

Style	Part Number	Description
	FC4A-ENET	Web Server Module (includes cable and Quick Start Guide)

Style	Part Number	Description
	FC9Y-QS100-0	Quick Start Guide

Advanced PID for precision control

PID (Proportional Integral Derivative) is the most commonly used feedback control loop in industrial control systems. PID calculates an error value as the difference between a measured process variable and a desired set point. The controller then attempts to minimize the error by adjusting the process control. With MicroSmart Pentra PLCs, PID implementation can be deployed in two ways: integrated PID controls or a dedicated Process Control module, which can be mounted on the MicroSmart Pentra expansion bus.



Advanced PID Control Module Part Numbers

Style	Part Number	Description
	FC5A-F2M2	PID Control Module with 2x analog inputs and 2x 4-20mA/non-contact voltage for SSR drive
	FC5A-F2MR2	PID Controls Module with 2x analog inputs and 2x Relay Outputs

Advanced PID Control Module

A dedicated PID Control module is available for extreme stability and complex applications. This particular module has more functionalities than you will find in any other controller on the market. Independent of CPU scan time, the PID Control module does the work, reducing PLC scan time without taking up PLC memory space.



PID Control Module Highlights:

- Precise, stable and accurate PID control with less than a 0.2% error
- Available in two models:
 - Built-in 2 analog inputs, 2 x 4-20mA/non-contact voltage for SSR drive
 - Built-in 2 analog inputs, 2 x relay outputs
- Each input individually configured to accept different signal types
- Up to seven modules can be mounted on the MicroSmart Pentra
- Maximum 14 PID loops with auto-tuning
- 14-bit resolution
- ARW (anti-reset windup)
- Accepts many different input types including:
 - Type K, J, R, S, B, E, T, C, PL-II and N thermocouples
 - RTD
 - 0-20 mA and 4-20 mA
 - 0-1V, 0-5V, 1-5V, and 0-10V DC
- Numerous control methods including:
 - Cascade
 - External set point
 - Heating and cooling control action
 - Difference input control

Communication Module

Style	Part Number	Description
	FC5A-SIF4	RS485 Communication Module for MicroSmart Pentra configure as port 3 to 7
	FC5A-SIF2	RS232 Communication Module for MicroSmart Pentra configure as port 3 to 7

Communicate with up to seven different serial devices

Only IDEC offers communication modules that enable you to configure up to seven serial devices! Now you can connect your operator interface, PC, barcode reader, RFID equipment, printer and more. Just imagine the possibilities.

Using the MicroSmart Pentra slim CPU, you can configure up to seven communication ports. Using the All-in-one MicroSmart Pentra you can communicate with up to five serial devices.



Optional Modules

Style	Part Number	Description	Usage
	FC4A-HPH1	HMI Base Module	For mounting HMI module and communication ports with slim model CPU module (HMI module is not included)
	FC4A-PH1	HMI Module	For displaying and changing operands
	FC4A-PM32	EEPROM memory cartridge	32KB EEPROM memory cartridge
	FC4A-PM64	EEPROM memory cartridge	64KB EEPROM memory cartridge
	FC4A-PM128	EEPROM memory cartridge	128KB EEPROM memory cartridge
	FC4A-PT1	Clock cartridge	Real-time clock cartridge

Communication Ports

Style	Part Number	Description	Terminal
	FC4A-PC1	RS232C	Mini DIN
	FC4A-PC2	RS485	Mini DIN
	FC4A-PC3	RS485	Screw Terminal

Communication Module — for Slim CPU

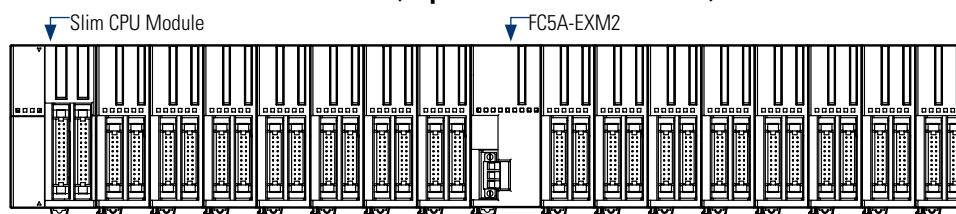
Style	Part Number	Description	Terminal
	FC4A-HPC1	RS232C	Mini DIN
	FC4A-HPC2	RS485	Mini DIN
	FC4A-HPC3	RS485	Screw Terminal

Expansion Power Supply Module

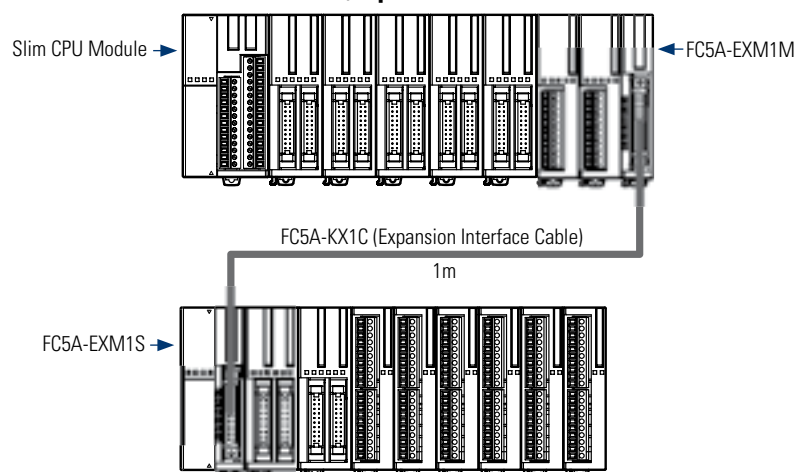
Style	Part Number	Description
	FC5A-EXM1M	Master Expansion Power Supply For MicroSmart Pentra
	FC5A-EXM1S	Slave Expansion Power Supply For MicroSmart Pentra
	FC5A-EXM2	Expansion Power Supply For MicroSmart Pentra

Expansion Power Supply System Configuration

FC5A-EXM2 (Expansion Interface Module)



FC5A-EXM1M and FC5A-EXM1S (Expansion Interface Master & Slave Modules)



Cables

Communication Cables

Appearance	Part Number	Length	Expanded Description
	FC4A-KC4CA	5ft. (1.53m)	Programming cable (Maintenance/User Communication Mode selectable)
	FC4A-USB	6ft. (1.83m)	USB to Serial Converter
	FC4A-KC3C	0.33ft. (100mm)	Web Server Module interface cable
	HG9Z-XCM2A	6ft. (1.83m)	USB programming cable for embedded Ethernet CPU

Appearance	Part Number	Length	Expanded Description
	FC2A-KM1C	9.84 Ft. (3m)	Modem cable. Used to connect a modem to the MicroSmart RS232C port.
	FC2A-KP1C	9.84 Ft. (3m)	User communication cable. Used to connect RS232C equipment to the MicroSmart RS232C port.
	FC5A-KX1C	3.28 Ft. (1m)	MicroSmart Pentra expansion power supply interface cable. Used to connect expansion interface master and expansion slave modules.

MIL Connector Cables (use with Breakout Modules)

Use with	Part Number	Model	Length
CPU Module (26-wire) BX1D-S26A, BX1D-T26A	FC9Z-H050B26	Non-shielded	1.64ft. (0.5m)
	FC9Z-H100B26		3.28ft. (1m)
	FC9Z-H200B26		6.56ft (2m)
	FC9Z-H300B26		9.85ft. (3m)
	FC9Z-H050A26	Shielded	1.64ft. (0.5m)
	FC9Z-H100A26		3.28ft. (1m)
	FC9Z-H200A26		6.56ft (2m)
	FC9Z-H300A26		9.85ft. (3m)
	FC9Z-H100C26A	Shielded Single Connectors	5ft. (1.5m)

Use with	Part Number	Model	Length
I/O Expansion Modules (20-wire) BX1D-S20A, BX1D-T20A	FC9Z-H050B20	Non-shielded	1.64ft. (0.5m)
	FC9Z-H100B20		3.28ft. (1m)
	FC9Z-H200B20		6.56ft (2m)
	FC9Z-H300B20		9.85ft. (3m)
	FC9Z-H050A20	Shielded	1.64ft. (0.5m)
	FC9Z-H100A20		3.28ft. (1m)
	FC9Z-H200A20		6.56ft (2m)
	FC9Z-H300A20		9.85ft. (3m)
	FC9Z-H100C20A	Shielded Single Connectors	5ft. (1.5m)

Breakout Modules

Use with	Part Number	Description
26-wire MIL connector cable 	BX1D-S26A	26-terminal breakout module
	BX1D-T26A	26-terminal touch-down terminal breakout module
20-wire MIL connector cable 	BX1D-S20A	20-terminal breakout module
	BX1D-T20A	20-terminal touch-down terminal breakout module

Accessories

Part Number	Use with	Description
FC4A-PMT13	CPU module	13-position left-side terminal block for FC4A-D20RK1/-D20RS1 CPU
FC5A-PMT13		13-position left-side terminal block for FC5A-D16RK1/-D16RS1 CPU
FC4A-PMTS16		16-position right-side terminal block for FC4A-D20RS1 and FC5A-D16RS1 CPU
FC4A-PMTK16		16-position right-side terminal block for FC4A-D20RK1 and FC5A-D16RK1 CPU
FC4A-PMT11	I/O expansion modules	11-position terminal block for 8-pt I/O expansion modules
FC4A-PMT10		10-position terminal block for 16-pt I/O expansion modules
FC4A-PMC20		20-position connector socket for MIL connector I/O expansion modules
FC4A-PMC26		26-position connector socket for MIL connector CPU modules
FC4A-PSP1		Direct mounting strips for mounting on a panel
FC4A-PMAC2		Analog voltage input cable for slim CPU
FC4A-DS824-SW14		14-pt input simulator switch for 24 I/O CPU
FC4A-DS824-SW9		9-pt input simulator switch for 16 I/O CPU
FC4A-DS824-SW6		6-pt input simulator switch for 10 I/O CPU
FC9Y-B812-0A		MicroSmart user manual
FC9Y-B1138-0		MicroSmart Pentra user manual
SW1A-W1C		Automation Organizer Software Suite

RV8 Series 6mm Interface Relays

Key Features

- Space-saving 6mm width
- Only 70mm in height from DIN rail
- Gold-plated contacts
- Pre-assembled relay and DIN mount socket
- Universal screw terminals (flat and Phillips)
- Universal AC/DC socket with built-in surge suppression and green LED
- Lever for easy locking and removal of relay
- Wide input voltage range: 6 to 240V
- High dielectric strength and impulse withstand voltages
- Sensitive coil 170mW
- Reverse Polarity protected
- 400V AC maximum switching voltage
- 1500VA maximum switching power
- RoHS compliant



Part Numbers

Coil Voltage	Screw Terminal	Spring Clamp
DC	6V	RV8H-L-D6 RV8H-S-D6
	9V	RV8H-L-D9 RV8H-S-D9
	12V	RV8H-L-D12 RV8H-S-D12
	18V	RV8H-L-D18 RV8H-S-D18
	24V	RV8H-L-D24 RV8H-S-D24
AC/DC	12V	RV8H-L-AD12 RV8H-S-AD12
	18V	RV8H-L-AD18 RV8H-S-AD18
	24V	RV8H-L-AD24 RV8H-S-AD24
	48V	RV8H-L-AD48 RV8H-S-AD48
	60V	RV8H-L-AD60 RV8H-S-AD60
	110V - 125V	RV8H-L-AD110 RV8H-S-AD110
	220V - 240V	RV8H-L-AD220 RV8H-S-AD220

Standard stock models in bold.

Accessories

Item		Color	Part Number
Jumper (20 combs) ¹		Black	SV9Z-J20B
		Gray	SV9Z-J20W
		Blue	SV9Z-J20S
Spacer (circuit separator) ²		-	SV9Z-SA2W
Marking plate (10 pcs)		-	SV9Z-PW10



1. Jumper combs come with 20 points, if shorter lengths are needed simply cut off the excess points.
 2. Width of spacer: 2mm
- Note: When using a cut jumper, please use a spacer on the cut side. For additional information see instruction sheet.

Starter Kits and Solution Packages

MicroSmart Starter Kits

Item	Part Numbers	Controller	Power Supply	Software (Prog. Cables Included)
	MM-SMART-10	10 I/O FC4A-C10R2 CPU	–	Automation Organizer Software Suite
	MM-SMART-16	16 I/O FC4A-C16R2 CPU	–	
	MM-SMART-20	20 I/O FC4A-D20RK1 CPU	15W	
	MM-SMART-24	24 I/O FC4A-C24R2 CPU	–	
	MM-SMART-40	40 I/O FC4A-D40K3 Slim CPU	15W	
	MM-PENTRA-16	16 I/Os FC5A-D16RS1 CPU	30W	
	MM-PENTRA-24	24 I/Os FC5A-C24R2 CPU	–	
	MM-PENTRA-12	12 I/Os FC5A-D12S1E Embedded Ethernet	30W	

MicroSmart Solution Packages



KIT-PENTRA-12-HG3G-AHP shown

Part Numbers	Operator Interface	Controller	Power Supply	Software (Prog. Cables Included)
KIT-PENTRA-24-HG1F	4.6" HG1F Mono	24 I/O FC5A-C24R2C CPU	60W	Automation Organizer Software Suite
KIT-PENTRA-12-HG1F	4.6" HG1F Mono	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-24-HG2G-M	5.7" HG2G Color TFT LCD	24 I/O FC5A-C24R2C CPU	60W	
KIT-PENTRA-12-HG2G-M	5.7" HG2G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-24-HG2G-TE	5.7" HG2G Color TFT LCD	24 I/O FC5A-C24R2C CPU	60W	
KIT-PENTRA-12-HG2G-TE	5.7" HG2G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-24-HG2G-HP	5.7" HG2G Color TFT LCD	24 I/O FC5A-C24R2C CPU	60W	
KIT-PENTRA-16-HG2G-HP	5.7" HG2G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG2G-HP	5.7" HG2G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-16-HG3G-8HP	8.4" HG3G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG3G-8HP	8.4" HG3G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-16-HG3G-AHP	10.4" HG3G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG3G-AHP	10.4" HG3G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-16-HG4G-HP	12.1" HG4G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG4G-HP	12.1" HG4G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	



OI Touchscreens have black bezels. All packages come with Automation Organizer software suite and communication cables.

Automation Organizer Suite

Programming Software



Automation Organizer (AO) is a powerful software suite containing PLC programming software (WindLDR), OI touchscreen configuration software (WindO/I-NV2/NV3) and system configuration software (WindCFG). AO boasts a completely new graphic user interface and redesigned menu icons. AO is a one-stop automation software package for IDEC MicroSmart Pentra PLCs and IDEC OI touchscreens, and is compatible with Windows XP, Vista (32 bit) and Windows 7 and 8 (32 and 64-bit).

WindLDR

All IDEC MicroSmart Pentra PLCs are programmable with WindLDR ladder logic software. This icon-driven programming tool combines logic and intuition with an incredibly easy-to-use interface to allow you to take advantage of MicroSmart features. Even without ladder program experience, you can use the built-in editors, shortcuts and debuggers to configure programs. WindLDR is an excellent, long-term investment for your control solutions.

Simulation Mode

WindLDR allows you to simulate ladder programs with built-in Simulation mode. You can easily test and verify functionality of your ladder program without actual hardware.

Online Editing

Shutting down your PLC for minor changes can be a major hassle, so WindLDR allows you to edit and download programs without interrupting PLC operation. You can write new values to counters, timers and registers at any time without switching between editor mode (for programming) and monitor mode.

Firmware Download

With WindLDR version 6.4 or later, you have the option to upgrade or downgrade your CPU system program. It's as simple as clicking on the checkbox in the Download dialog box. Now you can easily update your PLC system firmware with the click of a button.

FREE Upgrades

The Automation Organizer suite comes with free lifetime upgrades. Once you make the initial purchase, upgrades are absolutely free.

WindO/I-NV2

WindO/I-NV3

WindO/I-NV4

WindO/I-NV2/NV3/NV4 software is the programming tool available for all IDEC OI touchscreens and FT1A Touch. It is used to create projects or programs that can display information from a PLC, process status, or can be used to input data with virtual switches or keypads to make changes to a process. The objects are extremely easy to configure with the help of step-by-step navigation. It lets you quickly create colorful graphical screens in no time using drop-down menus and intuitive drag and drop functionality for the objects. A workspace is available to help you organize and manage projects, objects and screens.

WindCFG

WindCFG is a system layout and configuration tool for IDEC PLCs and OI touchscreens. Using WindCFG, you can create a visual layout of the system design and basic configuration of your PLC and OI touchscreens.

Part Number

Part Number	Description
SW1A-W1C	Automation Organizer software suite

For more information, see page 147.

Specifications

Slim Type

Model	FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D20K3 FC4A-D20S3	FC4A-D20RK1 FC4A-D20RS1	FC4A-D40K3 FC4A-D40S3
Rated Power Voltage	24V DC						
Allowable Voltage Range	20.4 to 26.4V DC (including ripple)						
Maximum Input Current	700 mA (26.4V DC) ¹				560 mA (26.4V DC) ¹	700 mA (26.4V DC) ¹	
Maximum Power Consumption	19W (26.4V DC) ¹				14W (26.4V DC) ¹	17W (26.4V DC) ¹	
Allowable Momentary Power Interruption	10 ms (at 24V DC)						
Dielectric Strength	Between power and ⚡ terminals: 500V AC, 1 minute Between I/O and ⚡ terminals: 500V AC, 1 minute						
Insulation Resistance	Between power and ⚡ terminals: 10 MΩ minimum (500V DC megger) Between I/O and ⚡ terminals: 10 MΩ minimum (500V DC megger)						
Noise Resistance	DC power terminals: 1.0 kV, 50 ns to 1 μs I/O terminals (coupling clamp): 1.5 kV, 50 ns to 1 μs						
Inrush Current	50A maximum (24V DC)						
Power Supply Wire	UL1015, AWG22, UL1007 AWG18						
Operating Temperature	0 to 55°C						
Storage Temperature	−25 to +70°C (no freezing)						
Relative Humidity	Level RH1 (IEC61131-2), 10 to 95% (no condensation)						
Altitude	Operation: 0 to 2,000m, Transport: 0 to 3,000m						
Pollution Degree	2 (IEC60664-1)						
Corrosion Immunity	Free from corrosive gases						
Degree of Protection	IP20 (IEC60529)						
Grounding Wire	UL1015, AWG22, UL1007, AWG18						
Vibration Resistance	When mounted on a DIN rail or panel surface: 5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC61131-2)						
Shock Resistance	147 m/s ² (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes (IEC61131-2)						
Weight	200g		230g	190g	140g	185g	180g



1. CPU module + 7 I/O modules

All-in-One Type

Model		FC5A-C10R2 FC5A-C10R2C FC5A-C10R2D	FC5A-C16R2 FC5A-C16R2C FC5A-C16R2D	FC5A-C24R2 FC5A-C24R2C FC5A-C24R2D	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C
Rated Power Voltage		AC power type: 100 to 240V AC, DC power type: 24V DC, 12V DC					
Allowable Voltage Range		AC power type: 85 to 264V AC, 24V DC power type: 20.4 to 28.8V DC (including ripple), 12V DC type: 10.2 to 18.0V DC					
Rated Power Frequency		AC power type: 50/60 Hz (47 to 63 Hz)					
Maximum Input Current		250 mA (85V AC) 160 mA (24V DC)	300 mA (85V AC) 190 mA (24V DC)	450 mA (85V AC) ¹ 360 mA (24V DC) ²	250 mA (85V AC) 160 mA (24V DC)	300 mA (85V AC) 190 mA (24V DC)	450 mA (85V AC) ¹ 360 mA (24V DC) ²
Maximum Power Consumption	AC Power	FC5A-C10R2/FC4A-C10R2: 30VA (264V AC), 20VA (100V AC) ³ FC5A-C16R2/FC4A-C16R2: 31VA (264 V AC), 22VA (100V AC) ³ FC5A-C24R2/FC4A-C24R2: 40VA (264V AC), 33VA (100V AC) ¹					
	DC Power	FC5A-C10R2C/FC4A-C10R2C: 3.9W (24V DC) *5 FC5A-C10R2D: 2.8W (12V DC) ⁴ FC5A-C16R2C/FC4A-C16R2C: 4.6W (24V DC) *5 FC5A-C16R2D: 3.4W (12V DC) ⁴ FC5A-C24R2C/FC4A-C24R2C: 8.7W (24V DC) *3 FC5A-C24R2D: 4.2W (12V DC) ⁴					
Allowable Momentary Power Interruption		10 ms (rated power voltage)					
Dielectric Strength		Between power and ⊕ or ⊖ terminals: 1,500V AC, 1 minute Between I/O and ⊕ or ⊖ terminals: 1,500V AC, 1 minute					
Insulation Resistance		Between power and ⊕ or ⊖ terminals: 10 MΩ minimum (500V DC megger) Between I/O and ⊕ or ⊖ terminals: 10 MΩ minimum (500V DC megger)					
Noise Resistance		AC power terminals: 1.5 kV, 50 ns to 1 μs DC power terminals: 1.0 kV, 50 ns to 1 μs I/O terminals (coupling clamp): 1.5 kV, 50 ns to 1 μs					
Inrush Current		FC5A-C10R2/FC5A-C10R2C/FC5A-C16R2/ FC5A-C16R2C: 35A FC5A-C10R2D/FC5A-C16R2D: 20A		FC5A-C24R2/ FC5A-C24R2C: 40A FC5A-C24R2D: 20A	35A		40A
Power Supply Wire		UL1015 AWG22, UL1007 AWG18					
Operating Temperature		0 to 55°C					
Storage Temperature		-25 to +70°C (no freezing)					
Relative Humidity		Level RH1 (IEC61131-2), 10 to 95% (no condensation)					
Altitude		Operation: 0 to 2,000m, Transport: 0 to 3,000m					
Pollution Degree		2 (IEC60664-1)					
Corrosion Immunity		Free from corrosive gases					
Degree of Protection		IP20 (IEC60529)					
Ground		Ground resistance 100Ω (max.)					
Grounding Wire		UL1007, AWG16					
Vibration Resistance		When mounted on a DIN rail or panel surface: 5 to 8.4 Hz amplitude 3.5 mm, 8.4 to 150 Hz acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC61131-2)					
Shock Resistance		147 m/s ² (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes (IEC61131-2)					
Weight		AC type: 230g DC type: 240g	AC type: 250g DC type: 260g	AC type: 305g DC type: 310g	AC type: 230g DC type: 240g	AC type: 250g DC type: 260g	AC type: 305g DC type: 310g



1. CPU module (including 250 mA sensor power) + 4 I/O modules
2. CPU module + 4 I/O modules
3. CPU module (including 250 mA sensor power)
4. CPU module

Slim Type Function Specifications

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838		FC5A-D12K1E FC5A-D12S1E		FC5A-D16RK1 FC5A-D16RS1		FC5A-D32K3 FC5A-D32S3		FC4A-D20K3 FC4A-D20S3		FC4A-D20RK1 FC4A-D20RS1		FC4A-D40K3 FC4A-D40S3	
Control System		Stored program system													
Instruction Words		42 basic								35 basic					
		152 advanced				126 advanced		130 advanced		53 advanced		72 advanced			
Program Capacity ¹		127.8 KB (21,300 steps)				62.4 KB (10,400 steps)				27 KB (4,500 steps)		31.2 KB (5,200 steps) ²			
User Program Storage		Flash ROM (10,000 times rewritable)				EEPROM (10,000 times rewritable)									
Processing Time	Basic Instruction	83 μs (1,000 steps) 0.35 ms								1.65 ms (1,000 steps) 0.64 ms					
	END Processing ³														
Expandable I/O Modules		7 modules + additional 8 modules using the expansion interface module													
I/O Points	Input	8	Expansion: 224	8	Expansion: 224	8	Expansion: 224	16	Expansion: 224	12	Expansion: 128	12	Expansion: 224	24	Expansion: 224
	Output	4	Additional: 256	4	Additional: 256	8	Additional: 256	16	Additional: 256	8		8		16	
Internal Relay		2,048 points								1,024 points					
Shift Register		256 points								128 points					
Data Register		42,000 points						42,000 points ⁴				1,300 points			
Expansion Data Register		6,000 points								—		6,000 points			
Counter		256 points								100 points					
Timer (1-sec, 100-ms, 10-ms, 1-ms)		256 points								100 points					
RAM Backup	Backup Data	Non-volatile memory (MRAM)		Internal relay, shift register, counter, data register, expansion data register											
	Backup Method														
	Backup Retension	Approx. 10 yrs without Backup Cycle		Approx. 30 days (typical) at 25°C after backup battery fully charged											
	Battery														
	Charging Time	Approx. 15 hours for charging from 0% to 90% of full charge													
	Battery Life													5 years in cycles of 9-hour charging and 15-hour discharging	
	Replaceability	Not possible to replace battery													
Self-diagnostic Function														Power failure, watchdog timer, data link connection, user program ROM sum check, timer/counter preset value sum check, user program RAM sum check, keep data, user program syntax, user program writing, CPU module, clock IC, I/O bus initialize, user program execution	
Input Filter		Without filter, 3 to 15 ms (selectable in increments of 1 ms)													
Catch Input/Interrupt Input		Four inputs (I2 and I5) Minimum turn on pulse width: 40 μs maximum Minimum turn off pulse width: 150 μs maximum (I3 and I4) Minimum turn on pulse width: 5 μs maximum Minimum turn off pulse width: 5 μs maximum								Four inputs (I2 through I5) Minimum turn on pulse width: 40 μs maximum Minimum turn off pulse width: 150 μs maximum					
High-speed Counter	Maximum Counting Frequency and High-speed Counter Points	Total 4 points Single/two-phase selectable: 100 kHz (2 points) Single-phase: 100 kHz (2 points)								Total 4 points Single/two-phase selectable: 20 kHz (2 points) Single-phase: 5 kHz (2 points)					
	Counting Range	0 to 4,294,967,295 (32 bits)								0 to 65,535 (16 bits)					
	Operation Mode	Rotary encoder mode and adding counter mode													
Analog Potentiometer	Quantity	1 point													
	Data Range	0 to 255													
Analog Voltage Input	Quantity	1 point													
	Input Voltage Range	0 to 10V DC													
	Input Impedance	Approx. 100 kΩ													
	Data Range	0 to 255 (8 bits)													
Pulse Output	Quantity	3 points				2 points		3 points		2 points					
	Maximum Frequency	100 kHz								20 kHz					

Note: The maximum number of relay outputs that can be turned on simultaneously is 54 including those on the CPU module. Modem communication not possible on FC5A-D12K1E/D12S1E modules.

- 1 step equals 6 bytes.
- Expandable up to 62.4 KB when a memory cartridge is used.
- Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
- Extra data registers D10000 through D49999 are enabled using WindLDR Function Area Settings, then run-time program download cannot be used.
- Maintenance communication (change monitor device values, upload/download user programs, download system program)
- Maintenance communication, user communication, modem communication, data link, Modbus ASCII/RTU master/slave communication (FC5A only).

Slim Type Function Specifications (con't)

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D20K3 FC4A-D20S3	FC4A-D20RK1 FC4A-D20RS1	FC4A-D40K3 FC4A-D40S3
Ethernet Port	Ethernet Specifications	Electrical Characteristics: Complies with IEEE802.3 Transmission Speed: 10BASE-T/100BASE-TX						
	Ethernet Interface	RJ45						
	User Web Page Area	1 MB						
	Compliant Browser	Internet Explorer 7 and 8, Firefox 3						
	Protocol	Data Link Layer: IP, ARP Network Layer: UDP, TCP, ICMP Application Layer: SMTP, DHCP, HTTP, NBNS, DNS, SNTP						
	Function (see table next page)	Web server, Send email, PING, Maintenance communication server, Modbus TCP server/client, User communication server/client, SNTP						
Port 1		USB mini-B (CDC class) Maintenance Communication ⁵		RS232C – maintenance communication, user communications, Modbus slave ASCII/RTU communication (FC5A only)				
Port 2 Communication Adapter/Module (option) ⁶				Possible				
Clock Cartridge (option)				Possible				
Memory Cartridge (option)				Possible				
HMI Module (option)				Possible				

-  Note: The maximum number of relay outputs that can be turned on simultaneously is 54 including those on the CPU module. Modem communication not possible on FC5A-D12K1E/D12S1E modules.
1. 1 step equals 6 bytes.
 2. Expandable up to 62.4 KB when a memory cartridge is used.
 3. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
 4. Extra data registers D10000 through D49999 are enabled using WindLDR Function Area Settings, then run-time program download cannot be used.
 5. Maintenance communication (change monitor device values, upload/download user programs, download system program)
 6. Maintenance communication, user communication, modem communication, data link, Modbus ASCII/RTU master/slave communication (FC5A only).

All-in-One Type Function Specifications

Model		FC5A-C10R2 FC5A-C10R2C FC5A-C10R2D	FC5A-C16R2 FC5A-C16R2C FC5A-C16R2D	FC5A-C24R2 FC5A-C24R2C FC5A-C24R2D		FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C	
Control System		Stored program system							
Instruction Words		42 basic				35 basic			
		103 advanced	103 advanced	115 advanced		38 advanced	40 advanced	48 advanced	
Program Capacity ¹		13.8 KB (2,300 steps)	27 KB (4,500 steps)	54 KB (9,000 steps)		4.8 KB (800 steps)	15 KB (2,500 steps)	27 KB (4,500 steps)	
User Program Storage		EEPROM (10,000 times rewritable)							
Processing Time	Basic Instruction	1.16 ms (1,000 steps)				1.65 ms (1,000 steps)			
	END Processing ²	0.64 ms				0.64 ms			
Expandable I/O Module		—		4 modules		—		4 modules	
I/O Points	Input	6	9	14	Expansion: 64 ³	6	9	14	Expansion: 64
	Output	4	7	10		4	7	10	
Internal Relay		2,048 points				256 points	1,024 points		
Shift Register		128 points				64 points	128 points		
Data Register		2,000 points				400 points	1,300 points		
Expansion Data Register		—				—			
Counter		256 points				32 points	100 points		
Timer (1-sec, 100-ms, 10-ms, 1-ms)		256 points				32 points	100 points		
RAM Backup	Backup Data	Internal relay, shift register, counter, data register							
	Backup Duration	Approx. 30 days (typical) at 25°C after backup battery fully charged							
	Battery	Lithium secondary battery							
	Charging Time	Approx. 15 hours for charging from 0% to 90% of full charge							
	Battery Life	5 years in cycles of 9-hours charging and 15-hours discharging							
	Replaceability	Not possible to replace battery							
Self-diagnostic Function		Power failure, watchdog timer, data link connection, user program EPPROM sum check, timer/counter preset value sum check, user program RAM sum check, keep data, user program syntax, user program writing, CPU module, clock IC, I/O bus initialize, user program execution							
Input Filter		Without filter, 3 to 15 ms (selectable in increments of 1 ms)							
Catch Input/Interrupt Input		Four inputs (I2 through I5) Minimum turn on pulse width: 40 μs maximum Minimum turn off pulse width: 150 μs maximum							
High-speed Counter	Maximum Counting Frequency and High-speed Counter Points	Total 4 points Single/two-phase selectable: 50 kHz (1 point) Single-phase: 5 kHz (3 points)				Total 4 points Single/two-phase selectable: 20 kHz (1 point) Single-phase: 5 kHz (3 points)			
	Counting Range	0 to 65,535 (16 bits)							
	Operation Mode	Rotary encoder mode and adding counter mode							
Analog Potentiometer	Quantity	1 point		2 points		1 point		2 points	
	Data Range	0 to 255							
Analog Voltage Input	Quantity								
	Input Voltage Range								
	Input Impedance	—							
Pulse Output	Data Range								
	Quantity								
Sensor Power Supply (AC Power Type Only)	Max. Frequency	—							
	Output Voltage/Current	24V DC (+10% to –15%), 250 mA							
	Overload Detection	Not available							
	Isolation	Isolated from the internal circuit							
Port 1		RS232C – maintenance communication, user communications, Modbus ASCII/RTU slave communication (FC5A only)							
Port 2 Communication Adapter (option) ⁴		Possible	Possible	Possible		—	Possible	Possible	
Clock Cartridge (option)		Possible	Possible	Possible		Possible	Possible	Possible	
Memory Cartridge (option)		Possible	Possible	Possible		Possible	Possible	Possible	
HMI Module (option)		Possible	Possible	Possible		Possible	Possible	Possible	



1. 1 step equals 6 bytes.

2. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.

3. Expansion modules cannot be connected to FC5A-C24R2D.

4. Maintenance communication, user communication, Modem communication, data link, Modbus ASCII/RTU master/slave communication (FC5A only).

Note: The maximum number of relay outputs that can be turned on simultaneously is 33 including those on the CPU module.

Communication Port (Port 1) Specifications

CPU Module	FC5A-D12K1E/D12S1E	Slim CPU	All-in-One CPU
Standards	USB 2.0	EIA RS232C	
Maximum Baud Rate	USB 2.0	FC5A: 57,600 bps (maintenance communication) FC4A: 19,200 bps (maintenance communication)	
Cable	HG9Z-XCM2A	FC2A-KC4C, FC2A-KP1C, FC4A-KC1C, FC4A-KC2C	
Isolation between Internal Circuit and Communication Port	Not isolated	Not isolated	

Slim Type Input Specifications

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC4A-D20K3 FC4A-D20S3	FC5A-D16RK1 FC5A-D16RS1	FC4A-D20RK1 FC4A-D20RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D40K3 FC4A-D40S3
Input Points		8 (8/1 common)	8 (8/1 common)	12 (12/1 common)	8 (8/1 common)	12 (12/1 common)	16 (8/1 common)	24 (12/1 common)
Rated Input Voltage		24V DC sink/source input signal						
Input Voltage Range		20.4 to 26.4V DC						
Rated Input Current		FC5A	I0, I1, I3, I4, I6, I7: I2, I5, I10 to I17:		4.5 mA/point (24V DC) 7 mA/point (24V DC)			
		FC4A	I0, I1, I6, I7: I2 to I5, I10 to I27:		5 mA/point (24V DC) 7 mA/point (24V DC)			
Input Impedance		FC5A	I0, I1, I3, I4, I6, I7: I2, I5, I10 to I17:		4.9 kΩ 3.4 kΩ			
		FC4A	I0, I1, I6, I7: I2 to I5, I10 to I27:		5.7 kΩ 3.4 kΩ			
Turn ON Time		FC5A	I0, I1, I3, I4, I6, I7: I2 and I5: I10 to I17:		5 μs + filter value 35 μs + filter value 40 μs + filter value			
		FC4A	I0, I1, I6, I7: I2 to I5: I10 to I27:		35 μs + filter value 35 μs + filter value 40 μs + filter value			
Turn OFF Time		FC5A	I0, I1, I3, I4, I6, I7: I2 and I5: I10 to I17:		5 μs + filter value 150 μs + filter value 150 μs + filter value			
		FC4A	I0, I1, I6, I7: I2 to I5: I10 to I27:		45 μs + filter value 150 μs + filter value 150 μs + filter value			
Connector	On Mother Board	MC1.5/16-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)	MC1.5/13-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)	
	Insertion Durability	100 times minimum						
Isolation		Between input terminals: Optocoupler isolated Internal circuit: Not isolated						
Input Type		Type 1 (IEC61131-2)						
External Load for I/O Interconnection		Not needed						
Single Determination Method		Static						
Effect of Improper Input Connection		Both sinking and sourcing input signals can be connected, therefore reverse connection does not cause permanent damage. If any input exceeding the rated value is applied, permanent damage may be caused.						
Cable Length		3m in compliance with electromagnetic immunity						

All-in-One Type Input Specifications

Model	FC5A-C10R2 FC5A-C10R2C		FC5A-C16R2 FC5A-C16R2C		FC5A-C24R2 FC5A-C24R2C		FC5A-C10R2D	FC5A-C16R2D	FC5A-C24R2D
	FC4A-C10R2 FC4A-C10R2C		FC4A-C16R2 FC4A-C16R2C		FC4A-C24R2 FC4A-C24R2C		—	—	—
Input Points	6 (6/1 common)		9 (9/1 common)		14 (14/1 common)		6 (6/1 common)	9 (9/1 common)	14 (14/1 common)
Rated Input Voltage	24V DC sink/source input signal						12V DC sink/source input signal		
Input Voltage Range	20.4 to 28.8V DC						10.2 to 18.0V DC		
Rated Input Current	FC5A	I0 and I1:	6.4 mA/point		I0 and I1:		6 mA		
		I2 to I7, I10 to I15:	7 mA/point (24V DC)						
	FC4A	I0 and I1:	11 mA						
		I2 to I7, I10 to I15:	7 mA/point (24V DC)				6 mA		
Input Impedance	FC5A	I0 and I1:	3.7 kΩ		I0 and I1:		1.8 kΩ		
		I2 to I7, I10 to I15:	3.4 kΩ						
	FC4A	I0 and I1:	2.1 kΩ						
		I2 to I7, I10 to I15:	3.4 kΩ						
Turn ON Time	FC5A	I0 and I1:	2 μs + filter value		I0 and I1:		2 μs + filter value		
		I2 to I5:	35 μs + filter value						
		I6, I7, I10 to I15:	40 μs + filter value						
	FC4A	I0 and I1:	35 μs + filter value						
		I2 to I5:	35 μs + filter value						
		I6, I7, I10 to I15:	40 μs + filter value				35 μs + filter value		
		I6, I7, I10 to I15:	40 μs + filter value				I6, I7, I10 to I15: 40 μs + filter value		
Turn OFF Time	FC5A	I0 and I1:	16 μs + filter value		I0 and I1:		16 μs + filter value		
		I2 to I5:	150 μs + filter value						
		I6, I7, I10 to I15:	150 μs + filter value						
	FC4A	I0 and I1:	45 μs + filter value						
		I2 to I5:	150 μs + filter value						
		I6, I7, I10 to I15:	150 μs + filter value						
Isolation	Between input terminals: Optocoupler isolated Internal circuit: Not isolated								
Input Type	Type 1 (IEC61131-2)								
External Load for I/O Interconnection	Not needed								
Single Determination Method	Static						—		
Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected, therefore reverse connection does not cause permanent damage. If any input exceeding the rated value is applied, permanent damage may be caused.								
Cable Length	3m in compliance with electromagnetic immunity								

Transistor Sink and Source Output Specifications

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	—	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3
			—	FC4A-D20RK1 FC4A-D20RS1	—	FC4A-D40K3 FC4A-D40S3
Transistor Output Points		4 (4/1 common)	4 (4/1 common)	2 (2/1 common)	2 (2/1 common)	16 (8/1 common)
Output Type	Transistor Sink	FC5A-D12K1E/D16RK1/D32K3 FC4A-D20K3/D20RK1/D40K3				
	Transistor Source	FC5A-D12S1E/D16RS1/D32S3 FC4A-D20S3/D20RS1/D40S3				
Rated Load Voltage		24V DC				
Operating Load Voltage Range		20.4 to 28.8V DC				
Rated Load Current		0.3A per output point				
Maximum Load Current		1A per common				
Voltage Drop (ON Voltage)		1V maximum (voltage between COM and output terminals when output is on)				
Inrush Current		1A				
Leakage Current		0.1 mA maximum				
Clamping Voltage		39V±1V				
Maximum Lamp Load		8W				
Inductive Load		L/R = 10 ms (28.8V DC, 1 Hz)				
External Current Draw		Sink output: 100 mA maximum, 24V DC (power voltage at the +V terminal) Source output: 100 mA maximum, 24V DC (power voltage at the -V terminal)				
Isolation		Between output terminal and Internal circuit: Photocoupler isolated Between output terminals: Not isolated				
Connector on Mother Board		MC1.5/16-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)	MC1.5/16-G-3.81BK (Phoenix Contact)	FL26A2MA (Oki Electric Cable)
Connector Insertion/ Removal Durability		100 times minimum				
Output Delay	Turn ON Time	FC5A	Q0 to Q2:		5 µs max.	
		FC4A	Q3 to Q7, Q10 to Q17:		300 µs max.	
	Turn OFF Time	FC5A	Q0, Q1:		5 µs max.	
		FC4A	Q2 to Q7, Q10 to Q17:		300 µs max.	

Relay Output Specifications

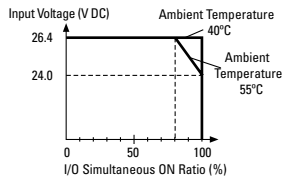
Model	FC5A-C10R2 FC5A-C10R2C FC5A-C10R2D	FC5A-C16R2 FC5A-C16R2C FC5A-C16R2D	FC5A-C24R2 FC5A-C24R2C FC5A-C24R2D	FC5A-D16RK1 FC5A-D16RS1
	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C	FC4A-D20RK1 FC4A-D20RS1
Relay Output Points	4	7	10	6
Output Points per Common Line	COM0	3	4	—
	COM1	1	2	4
	COM2	—	1	1
	COM3	—	1	1
Output Type	1NO			
Maximum Load Current	2A per point 8A per common line			
Minimum Switching Load	1 mA/ 5V DC (reference value)			
Initial Contact Resistance	30 mΩ maximum			
Electrical Life	100,000 operations minimum (rated load 1,800 operations/hour)			
Mechanical Life	20,000,000 operations minimum (no load 18,000 operations/hour)			
Rated Load	240V AC/2A (resistive load, inductive load $\cos \theta = 0.4$) 30V DC/2A (resistive load, inductive load $L/R = 7$ ms)			
Dielectric Strength	Between output and ⏏ terminals:		1,500V AC, 1 minute	
	Between output terminal and internal circuit:		1,500V AC, 1 minute	
	Between output terminals (COMs):		1,500V AC, 1 minute	
Connector on Mother Board	—			*1
Connector Insertion/ Removal Durability	—			100 times minimum



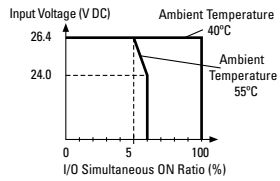
1. MC1.5/16-G-3.81BK (Phoenix Contact)

Input Usage Limits Slim CPU

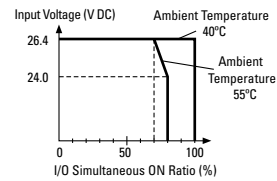
FC5A-D16RK1/D16RS1
FC5A-D12K1E/D12S1E



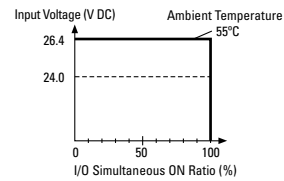
FC5A-D32K3/D32S3
FC4A-D40K3/D40S3



FC4A-D20K3/D20S3



FC4A-D20RK1/D20RS1



All-in-One CPU

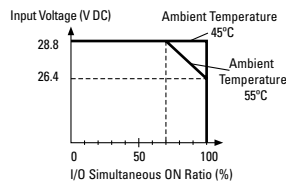
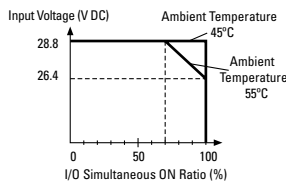
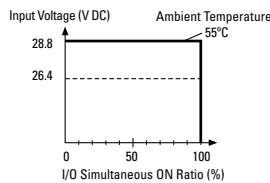
FC5A-C10R2
FC5A-C10R2C
FC4A-C10R2
FC4A-C10R2C

FC5A-C16R2
FC5A-C16R2C
FC4A-C16R2
FC4A-C16R2C

FC5A-C24R2
FC5A-C24R2C
FC4A-C24R2
FC4A-C24R2C

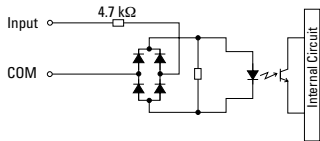


CAUTION: When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

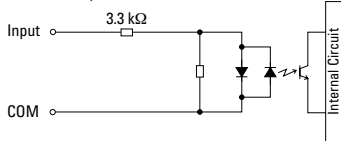


Input Internal Circuit Slim CPU

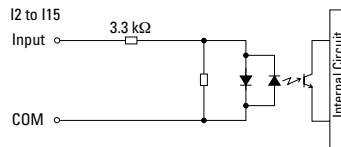
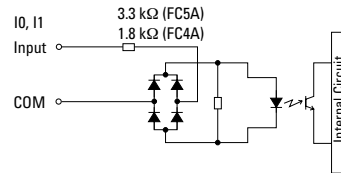
FC5A: I0, I1, I3, I4, I6, I7
FC4A: I0, I1, I6, I7



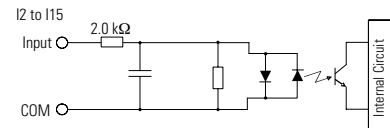
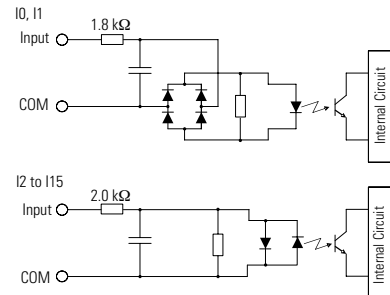
FC5A: I2, I5, I10 to I17
FC4A: I2 to I5, I10 to I27



All-in-One CPU



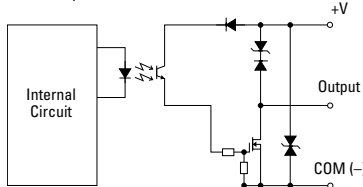
FC5A All-in-One CPU 12V DC Type



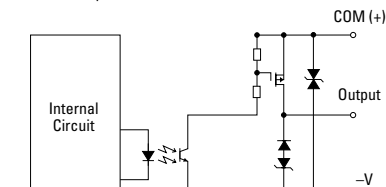
Output Internal Circuit

Slim CPU

Sink Output



Source Output



Communication Adapter/Module Specifications

Model	FC4A-PC1 FC4A-HPC1	FC4A-PC2 FC4A-HPC2	FC4A-PC3 FC4A-HPC3
Standards	EIA RS232C	EIA RS485	EIA RS485
Maximum Baud Rate	FC5A: 57,600 bps ¹ FC4A: 19,200 bps	FC5A: 57,600 bps ¹ FC4A: 19,200 bps	FC5A: 57,600 bps ¹ FC4A: 19,200 bps (38,400 bps ²)
Maintenance Communication	Possible	Possible	Possible
User Communication	Possible	Possible ³	Possible ³
Data Link Communication	—	Possible	Possible
Half-duplex Communication	—	Possible	Possible
Maximum Cable Length	Special cable ⁴	Special cable ⁵	200m
Quantity of Slave Stations	—	31	31
Isolation between Internal Circuit and Communication Port	Not isolated		
RS485 Cable	Cable	—	Twisted-pair shielded cable with a minimum core wire of 0.3 mm ²
	Conductor Resistance		85 Ω/km maximum
	Shield Resistance		20 Ω/km maximum

1. Maximum speed is 115,200 bps for FC5A-D12*1E.
 2. Maximum speed when data link is used.
 3. FC5A (all types), FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, FC4A-D40S3
 4. FC2A-KC4C, FC2A-KM1C, FC4A-KC1C, FC4A-KC2C, FC2A-KP1C
 5. FC2A-KP1C

HMI Module Specifications

Model	FC4A-PH1
Power Voltage	5V DC (supplied from the CPU module)
Weight	20g

Memory Cartridge Specifications

Model	FC4A-PM32	FC4A-PM64 ⁶	FC4A-PM128 ⁶
Memory Type	EEPROM		
Accessible Memory Capacity	32 KB	64 KB	128 KB
Hardware for Storing Data	CPU Module		
Software for Storing Data	WindLDR		
Quantity of Stored Programs	One user program can be stored on one memory cartridge		



6. Even when using a large-capacity memory cartridge, the program capacity of the CPU module takes effect, except when using FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, and FC4A-D40S3 CPU modules, the program capacity expands to 64KB.

Clock Cartridge Specifications

Model	FC4A-PT1
Accuracy	±30 sec/month (typical) at 25°C
Backup Duration	Approx. 30 days (typical) at 25°C after backup battery fully charged
Battery	Lithium secondary battery
Charging Time	Approx. 10 hours for charging from 0% to 90% of full charge
Replaceability	Not possible to replace battery

Expansion Serial Communication Module General Specifications (Expansion RS232C Communication Module)

Model	FC5A-SIF2
No. of Port	1
Synchronization	Synchronization Start-stop synchronization
Electrical Characteristics	Electrical Characteristics EIA RS232C compliant
Maximum Delay in One Scan	Approx. 4 ms
Operating Temperature	0 to 55°C
Relative Humidity	10 to 95% (no condensation)
Recommended Cable Specifications	Shielded multi-core cable: 24AWG x 6 Dielectric strength: 2,000V AC/min Insulation resistance: 100 MΩ/km
Recommended Cable	KIDU-SB 24 AWG×6C (Nihon Electric Wire & Cable)
Connector on Mother Board	MC1.5/10-G-3.81BK (Phoenix Contact) Applicable terminal block: FC4A-PMT10P
Connector Insertion/Removal Durability	100 times minimum
Isolation from Internal Circuit	Transformer isolated
Quantity of Applicable Expansion RS232C Communication Modules	All-in-One 24-I/O type CPU module: 3 maximum ¹ Slim type CPU module: 5 maximum
Internal Current Draw	40 mA (5V/24V DC) ⁵
Weight	100g



Note: FC5A-SIF2 cannot be connected to FC4A CPU modules.

1. FC5A All-in-One 24-I/O CPU module cannot use the FC5A-SIF2/SIF4 module in combination with the function modules listed in the table on the left. When using these modules in combination with the FC5A-SIF2/SIF4 module, use the slim type CPU module.

Function Modules	Type No.
Analog Modules	FC4A-L03A1, FC4A-L03AP1, FC4A-J2A1, FC4A-K1A1, FC4A-J4CN1, FC4A-J8C1, FC4A-J8AT1, FC4A-K2C1, FC4A-K4A1
AS-Interface Master Module	FC4A-AS62M

5. 85 mA (5V DC), 0 mA (24V DC) when the communication module version is lower than V200.

(Expansion RS485 Communication Module)

Model	FC5A-SIF4
No. of Port	1
Synchronization	Synchronization Start-stop synchronization
Electrical Characteristics	Electrical Characteristics EIA RS485 compliant
Maximum Baud Rate	115,200 bps
Operating Temperature	0 to 55°C
Relative Humidity	10 to 95% (no condensation)
Recommended Cable Specifications	Shielded twisted pair cable: 22 AWG (0.3 mm2 x 2P) Conductor Resistance: 67 MΩ/km maximum (at 20°C)
Connector on Mother Board	MC1.5/10-G-3.81BK (Phoenix Contact) Applicable terminal block: FC4A-PMT10P
Connector Insertion/Removal Durability	100 times minimum
Isolation from Internal Circuit	Transformer isolated
Quantity of Applicable Expansion RS485C Communication Modules	All-in-One 24-I/O type CPU module: 3 maximum ¹ Slim type CPU module: 5 maximum
Internal Current Draw	40 mA (5V/24V DC)
Weight	100g

Note: FC5A-SIF4 cannot be connected to FC4A CPU modules.

Communication Specifications

Model	FC5A-SIF2	FC5A-SIF4
Maximum Baud Rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600 ⁴ /115,200 ⁴	
Maintenance Communication	Possible ²	
Modbus Communication	Modbus ASCII master Modbus ASCII slave Modbus RTU master Modbus RTU slave	
Data Link	-	0 ³
Max Cable Length	10m	1,200m
Quantity of Slave Stations	1	31



2. Run-time program download is not possible.
3. Data Link can be used only on one of the communication ports.
4. Can be used when the communication module is version V200 or higher.

Specifications (I/O Modules)

Input Module Specifications

Model		FC4A-N08B1	FC4A-N16B1	FC4A-N16B3		FC4A-N32B3	FC4A-N08A11
Input Points		8 (8/1 common)	16 (16/1 common)			32 (16/1 common)	8 (4/1 common)
Rated Input Voltage		24V DC sink/source input signal					100 to 120V AC (50/60 Hz)
Input Voltage Range		20.4 to 28.8V DC					85 to 132V AC
Rated Input Current		7 mA/point (24V DC)		5 mA/point (24V DC)		17 mA/point (120V AC, 60 Hz)	
Input Impedance		3.4 kΩ		4.4 kΩ		0.8 kΩ (60 Hz)	
ON Voltage		15V minimum					79V minimum
OFF Voltage		5V maximum					20V maximum
ON Current		4.2 mA minimum (at 15V DC)		3.2 mA minimum (at 15V DC)		—	
OFF Current		1.2 mA maximum		0.9 mA maximum		—	
Turn ON Time		4 ms					25 ms
Turn OFF Time		4 ms					30 ms
Isolation		Between input terminals: Not isolated Internal circuit: Photocoupler isolated					Between input terminals in the same common: Not isolated Between input terminals in different commons: Isolated Between input terminals and internal circuits: Photocoupler isolated
External Load for I/O Interconnection		Not needed					Not needed
Single Determination Method		Static					Static
Effect of Improper Input Connection		Both sink and source input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.					If any input exceeding the rated value is applied, permanent damage may be caused.
Cable Length		3m in compliance with electromagnetic immunity					—
Connector on Mother Board		MC1.5/10-G-3.81BK (Phoenix Contact)		FL20A2MA (Oki Electric Cable)		MC1.5/11-G-3.81BK (Phoenix Contact)	
Connector Insertion/Removal Durability		100 times minimum					
Applicable Ferrule		1-wire: AI 0.5-8 WH (Phoenix Contact) 2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact)		—		—	
Internal Current Draw	All Inputs ON	25 mA (5V DC)	40 mA (5V DC)	35 mA (5V DC)	65 mA (5V DC)	60 mA (5V DC), 0 mA (24V DC)	
	All Inputs OFF	5 mA (5V DC)	5 mA (5V DC)	5 mA (5V DC)	10 mA (5V DC)	30 mA (5V DC), 0 mA (24V DC)	
Internal Power Consumption (at 24V DC while all inputs ON)		0.17W	0.27W	0.24W	0.44W	—	
Weight		85g	100g	65g	100g	80g	

Mixed I/O Module Specifications

Model		FC4A-M08BR1	FC4A-M24BR2	
Input Specifications	Input Points	4 (4/1 common)	16 (16/1 common)	
	Rated Input Voltage	24V DC sink/source input signal		
	Input Voltage Range	20.4 to 28.8V DC		
	Rated Input Current	7 mA/point (24V DC)		
	Input Impedance	3.4 kΩ		
	ON Voltage	15V minimum		
	OFF Voltage	5V maximum		
	ON Current	4.2 mA minimum (at 15V DC)		
	OFF Current	1.2 mA maximum		
	Turn ON Time	4 ms (24V DC)		
	Turn OFF Time	4 ms (24V DC)		
	Isolation	Between input terminals: Not isolated Internal circuit: Photocoupler isolated		
	External Load for I/O Interconnection	Not needed		
	Signal Determination Method	Static		
	Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.		
	Cable Length	3m in compliance with electromagnetic immunity		
Output Specifications	Output Points	4 (4/1 common)	8 (4/1 common)	
	Output Type	1NO		
	Maximum Load Current	2A per point 7A per common		
	Minimum Switching Load	1 mA/ 5V DC (reference value)		
	Initial Contact Resistance	30 mΩ maximum		
	Electrical Life	100,000 operations minimum (rated load 1,800 operations/hour)		
	Mechanical Life	20,000,000 operations minimum (no load 18,000 operations/hour)		
	Rated Load	240V AC/2A (resistive load, inductive load cos ϕ = 0.4) 30V DC/2A (resistive load, inductive load L/R = 7 ms)		
	Dielectric Strength	Between output and  or  terminals:	1,500V AC, 1 minute	
		Between output terminal and internal circuit:	1,500V AC, 1 minute	
Between output terminals (COMs):		1,500V AC, 1 minute		
Connector on Mother Board		MC1.5/11-G-3.81BK (Phoenix Contact)	Input: F6018-17P (Fujicon) Output: F6018-11P (Fujicon)	
Connector Insertion/Removal Durability		100 times minimum	Not removable	
Applicable Ferrule		1-wire: AI 0.5-8 WH (Phoenix Contact), 2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact)		
Internal Current Draw	All I/Os ON	25 mA (5V DC), 20 mA (24V DC)	65 mA (5V DC), 45 mA (24V DC)	
	All I/Os OFF	5 mA (5V DC), 0 mA (24V DC)	10 mA (5V DC), 0 mA (24V DC)	
Internal Power Consumption (at 24V DC while all I/Os are ON)		0.65W	1.52W	
Weight		95g	140g	

O Touchscreens

PLCs

Automation Software

Power Supplies

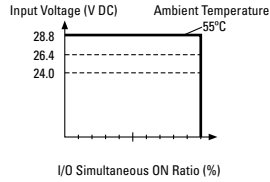
Sensors

Communication

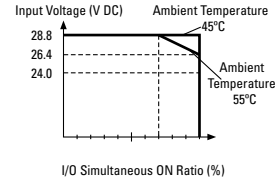
Barriers

Input Usage Limits

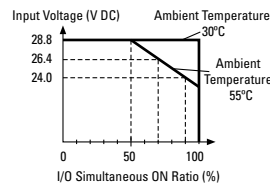
FC4A-N08B1



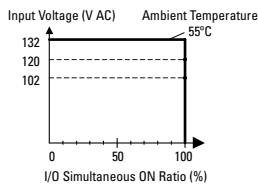
FC4A-N16B1



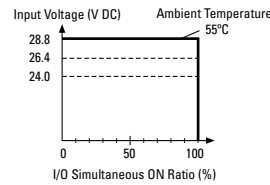
FC4A-N16B3/N32B3



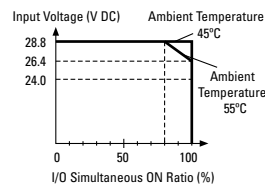
FC4A-N08A11



FC4A-M08BR1



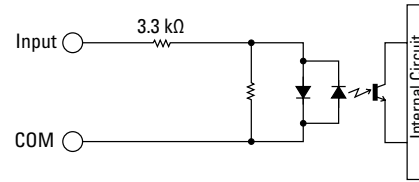
FC4A-M24BR2



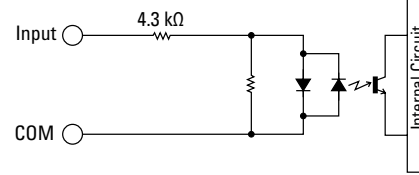
When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

Input Internal Circuit

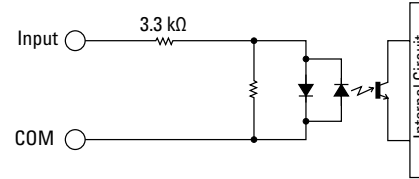
FC4A-N08B1, FC4A-N16B1



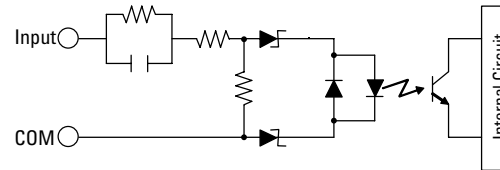
FC4A-N16B3, FC4A-N32B3



FC4A-M08BR1, FC4A-M24BR2

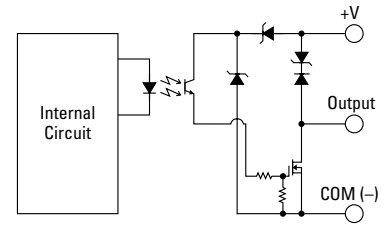


FC4A-N08A11

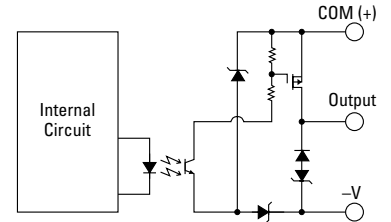


Output Internal Circuit

FC4A-T08K1, FC4A-T16K3, FC4A-T32K3



FC4A-T08S1, FC4A-T16S3, FC4A-T32S3



Specifications (Analog I/O Modules)

Analog I/O Module Specifications

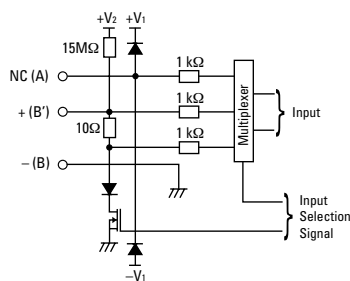
Model	FC4A-L03A1	FC4A-L03AP1	FC4A-J2A1	FC4A-J4CN1	FC4A-J8C1	FC4A-J8AT1	FC4A-K4A1	FC4A-K1A1	FC4A-K2C1
Input Points	2	2	2	4	8	8	—	—	—
Output Points	1	1	—	—	—	—	4	1	2
Power Voltage	24V DC								
Allowable Voltage Range	20.4 to 28.8V DC								
External Current Draw * (24V DC)	45 mA	40 mA	35 mA	55 mA	50 mA	55 mA	130 mA	40 mA	85 mA
Connector on Mother Board	MC1.5/11-G-3.81BK (Phoenix Contact)			MC1.5/10-G-3.81BK (Phoenix Contact)			MC1.5/11-G-3.81BK (Phoenix Contact)		MC1.5/10-G-3.81BK (Phoenix Contact)
Connector Insertion/ Removal Durability	100 times minimum								
Applicable Ferrule	1-wire: AI 0.5-8 WH (Phoenix Contact), 2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact)								
Internal Power Consumption (5V DC)	50 mA	50 mA	50 mA	50 mA	40 mA	45 mA	65 mA	50 mA	60 mA
Internal Power Consumption (at 24V DC while all I/Os are ON)	0.34W	0.34W	0.34W	0.34W	0.27W	0.30W	0.44W	0.34W	0.40W
Weight	85g	85g	85g	140g	140g	125g	100g	85g	110g



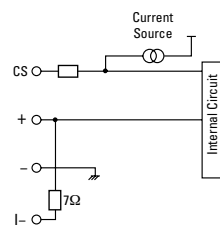
* The external current draw is the value when all the analog inputs are used and the analog output value is at 100%.

Input Circuit

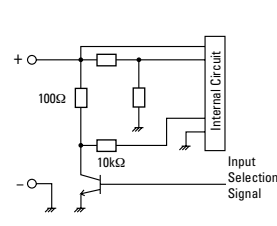
FC4A-L03A1, FC4A-L03AP1
FC4A-J2A1



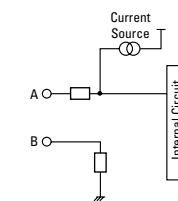
FC4A-J4CN1



FC4A-J8C1



FC4A-J8AT1



Analog Input Specifications (1)

Model		FC4A-L03A1, FC4A-J2A1		FC4A-L03AP1	
Input Signal Type		Voltage Input 0 to 10V DC	Current Input 4 to 20 mA	Resistance Thermometer Pt100 3-wire type (−100 to 500°C)	Thermocouple Type K (0 to 1,300°C) Type J (0 to 1,200°C) Type T (0 to 400°C)
Input Impedance		1 MΩ minimum	10Ω	1 MΩ minimum	1 MΩ minimum
Input Detection Current		—	—	1.0 mA maximum	—
AD Conversion	Sampling Duration Time	10 ms maximum		20 ms maximum	10 ms maximum
	Sampling Repetition Time	20 ms maximum		40 ms maximum	20 ms maximum
	Total Input System Transfer Time	60 ms + 1 scan time		80 ms + 1 scan time	60 ms + 1 scan time
	Type of Input	Single-ended input	Differential input		
	Operating Mode	Self-scan			
	Conversion Method	Σ Δ type ADC			
Input Error	Maximum Error at 25°C	±0.2% of full scale			±0.2% of full scale plus cold junction compensation error (±4°C maximum)
	Temperature Coefficient	±0.006% of full scale /°C			
	Repeatability after Stabilization Time	±0.5% of full scale			
	Non-linearity	±0.2% of full scale			
	Maximum Error	±1% of full scale			
Data	Digital Resolution	4096 increments (12 bits)		6,000 increments (14 bits)	Type K: 13,000 increments (14 bits) Type J: 12,000 increments (14 bits) Type T: 4,000 increments (14 bits)
	Input Value of LSB	2.5 mV	4 μA	0.1°C	Type K: 0.1°C Type J: 0.1°C Type T: 0.1°C
	Data Type in Application Program	Default: 0 to 4,095 Optional: −32,768 to 32,767 (selectable for each channel) ¹			
	Monotonicity	Yes			
	Input Data Out of Range	Detectable ²			
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum when a 500V clamp voltage is applied to the power supply and I/O lines ³			
	Input Filter	No			
	Recommended Cable for Noise Immunity	Twisted pair shielded cable		—	
	Crosstalk	2 LSB maximum			
Isolation		Between input and power circuit: Between input and internal circuit:	Isolated Photocoupler-isolated		
Effect of Improper Input Connection		No damage			
Maximum Permanent Allowed Overload (No Damage)		13V DC	40 mA	—	
Selection of Analog Input Signal Type		Using programming software			
Calibration or Verification to Maintain Rated Accuracy		Impossible			



1: The data processed in the analog I/O module can be linear-converted to a value between -32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

3: The accuracy of the thermocouple input is not guaranteed when noise is applied.

Analog Input Specifications (2)

Model		FC4A-J4CN1, FC4A-J8C1		FC4A-J4CN1		FC4A-J8AT1		
Input Signal Type		Voltage Input	Current Input	Thermocouple	Resistance Thermometer	NTC Thermistor	PTC Thermistor	
Input Range		0 to 10V DC	4 to 20 mA	Type K (0 to 1,300°C) Type J (0 to 1,200°C) Type T (0 to 400°C)	Pt100, Pt1000 3-wire type (–100 to 500°C) Ni100, Ni1000 3-wire type (–60 to 180°C)	–50 to 150°C		
Input Impedance		1 MΩ	7 Ω (FC4A-J4CN1) 100Ω (FC4A-J8C1)	1 MΩ	—	—		
Input Detection Current		—	—	—	0.1 mA	0.1 mA		
AD Conversion	Sampling Duration Time	2 ms maximum						
	Sampling Repetition Time	FC4A-J4CN1: 10 ms maximum		30 ms maximum	10 ms maximum	2 ms × channels		
		FC4A-J8C1: 2 ms maximum						
	Total Input System Transfer Time	FC4A-J4CN1: 50 ms × channels + 1 scan time FC4A-J8C1: 8 ms × channels + 1 scan time		85 ms × channels + 1 scan time	50 ms × channels + 1 scan time	10 ms × channels + 1 scan time		
	Type of Input	Single-ended input						
	Operating Mode	Self-scan						
	Conversion Method	Σ Δ type ADC (FC4A-J4CN1), Successive approximation register method (FC4A-J8C1, FC4A-J8AT1)						
Input Error	Maximum Error at 25°C	±0.2% of full scale		±0.2% of full scale +cold junction compensation error (±3°C maximum)	Pt100, Ni100: ±0.4% of full scale Pt1000, Ni1000: ±0.2% of full scale	±0.2% of full scale		
	Cold Junction Compensation Error	—	—	±3°C maximum	—	—		
	Temperature Coefficient	±0.005% of full scale/°C						
	Repeatability after Stabilization Time	±0.5% of full scale						
	Non-linearity	±0.04% of full scale					Non-linear	
	Maximum Error	±1% of full scale						
Data	Digital Resolution	50,000 increments (16 bits)		Type K: Approx. 24,000 increments (15 bits) Type J: Approx. 33,000 increments (15 bits) Type T: Approx. 10,000 increments (14 bits)	Pt100: Approx. 6,400 increments (13 bits) Pt1000: Approx. 64,000 increments (16 bits) Ni100: Approx. 4,700 increments (13 bits) Ni1000: Approx. 47,000 increments (16 bits)	Approx. 4,000 increments (12 bits)		
	Input Value of LSB	0.2 mV	0.32 μA	Type K: 0.058°C Type J: 0.038°C Type T: 0.042°C	Pt100: 0.086°C Pt1000: 0.0086°C Ni100: 0.037°C Ni1000: 0.0037°C	0.05°C		
	Data Type in Application Program	Default: 0 to 50,000 Optional: –32,768 to 32,767 (selectable for each channel) ¹					Default: 0 to 4,000	
							Optional: –32,768 to 32,767 (selectable for each channel) ¹	
							Resistance: 0 to 10,000	
	Monotonicity	Yes						
Input Data Out of Range	Detectable ²							

 1: The data processed in the analog I/O module can be linear-converted to a value between -32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

Analog Input Specifications (2) con't on next page.

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Analog Input Specifications (2), con't

Model		FC4A-J4CN1, FC4A-J8C1		FC4A-J4CN1	FC4A-J8AT1	
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum (when a 500V clamp voltage is applied to the power supply and I/O lines)			Not assured	±3% maximum (when a 500V clamp voltage is applied to the power supply and I/O lines)
	Input Filter	Software				
	Recommended Cable for Noise Immunity	Twisted pair cable		—		
	Crosstalk	2 LSB maximum				
Isolation		Between input and power circuit:	Isolated			
		Between input and internal circuit:	Optocoupler-isolated			
Effect of Improper Input Connection		No damage				
Maximum Permanent Allowed Overload (No Damage)		11V DC	22 mA DC	—		
Selection of Analog Input Signal Type		Using programming software				
Calibration or Verification to Maintain Rated Accuracy		Impossible				

Analog Output Specifications

Model		FC4A-K4A1	FC4A-L03A1	FC4A-L03AP1	FC4A-K1A1	FC4A-K2C1	
Output Range		Voltage	0 to 10V DC				−10 to 10V DC
		Current	4 to 20 mA				
Load	Impedance		Voltage output: 1 kΩ minimum Current output: 300Ω maximum				
	Load Type		Resistive load				
DA Conversion	Settling Time		2 ms/ch	10 ms	10 ms	10 ms	1 ms/ch
	Total Output System Transfer Time		2 ms/ch + 1 scan time	10 ms + 1 scan time	10 ms + 1 scan time	10 ms + 1 scan time	1 ms × channels + 1 scan time
Output Error	Maximum Error at 25°C		±0.2% of full scale				
	Temperature Coefficient		±0.015% of full scale/°C				±0.005% of full scale/°C
	Repeatability after Stabilization Time		±0.5% of full scale				
	Output Voltage Drop		±1% of full scale				
	Non-linearity		±0.2% of full scale				
	Output Ripple		20 mV maximum				±0.1% of full scale
	Overshoot		0%				
Total Error		±1% of full scale					
Data	Digital Resolution		4096 increments (12 bits)				50,000 increments (16 bits)
	Output Value of LSB	Voltage	2.5 mV				0.4 mV
		Current	4 μA				0.32 μA
	Data Type in Application Program		Default: 0 to 4,095 (voltage, current)				−25,000 to 25,000 (voltage) 0 to 50,000 (current)
			Optional: −32,768 to 32,767 (selected for each channel) ¹				
	Monotonicity		Yes				
Current Loop Open		Undetectable					



¹: The data processed in the analog I/O module can be linear-converted to a value between −32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

Analog Input Specifications con't on next page.

Analog Output Specifications, con't

Model		FC4A-K4A1	FC4A-L03A1	FC4A-L03AP1	FC4A-K1A1	FC4A-K2C1
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum when a 500V clamp voltage is applied to the power and I/O lines				
	Recommended Cable for Noise Immunity	Twisted pair shielded cable				Twisted pair cable
	Crosstalk	2LSB maximum	None			2 LSB maximum
Isolation	Between output and power circuit	Isolated				
	Between output and internal circuit	Photocoupler-isolated				
Effect of Improper Output Connection		No damage				
Selection of Analog Output Signal Type		Using software programming				
Calibration or Verification to Maintain Rated Accuracy		Impossible				

PID Module Specifications

Model		FC5A-F2MR2	FC5A-F2M2
Control Mode	Independent PID Control	Possible	
	Heating/Cooling Control	Possible (overlapping deadband settings available) *	
	Difference Input Temperature Control	Possible *	
	Cascade Control	Possible *	
Input Points		2ch	2ch
Types of Inputs	Thermocouple	K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26) External resistance: 100Ω maximum However, external resistance of B input: 40Ω maximum	
	Resistance Thermometer	Pt100, JPt100, 3-wire type Allowable conductor resistance (per wire): 10Ω maximum	
	Current Input	0 to 20 mA DC, 4 to 20 mA DC Input impedance: 50Ω Maximum permanent allowed overload (no damage): 50 mA maximum	
	Voltage Input	0 to 1V DC Input impedance: 1MΩ minimum Maximum permanent allowed overload (No damage): 5V DC Allowable output impedance: 2 kΩ 0 to 5V DC, 1 to 5V DC, 0 to 10V DC Input impedance: 100kΩ minimum Maximum permanent allowed overload (No damage): 15V DC maximum Allowable output impedance: 100Ω maximum	
AD Conversion	Sampling Duration Time	100 ms	
	Sampling Repetition Time	125 ms	
	Type of Input	Differential input	
	Conversion Method	Σ Δ type ADC	
Maximum Error at 25°C	Thermocouple Input	±0.2% of full scale or ±2°C (4°F), whichever is greater However, R, S inputs: 0 to 200°C (0 to 400°F): ±6°C (12°F) B input: 0 to 300°C (0 to 600°F) Accuracy is not guaranteed. K, J, E, T, N inputs: Less than 0°C (32°F): ±0.4% of full scale	
	Resistance Thermometer Input	±0.1% of full scale or ±1°C (2°F), whichever is greater	
	Voltage/Current Inputs	±0.2% of full scale	
Input Accuracy (at 0 to 55°C)	Thermocouple Input	±0.7% of full scale However, R, S input: 0 to 200°C (0 to 400°F): ±6°C (12°F) B input: 0 to 300°C (0 to 600°F) Accuracy is not guaranteed. K, J, E, T, N inputs: Less than 0°C (32°F): ±0.9% of full scale	
	Resistance Thermometer Input	±0.6% of full scale	
	Voltage/Current Inputs	±0.7% of full scale	



*Dual channel input is required for one loop circuit.

PID Module Specifications con't on next page.

PID Module Specifications, con't

Model		FC5A-F2MR2	FC5A-F2M2
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	Voltage input, current input $\pm 3\%$ maximum when a 500V clamp voltage is applied to the power supply and I/O lines Thermocouple, Resistance Thermometer Not assured	
	Input Filter	None	
	Recommended Cable for Noise Immunity	Twisted pair cable	
	Cross Talk	None	
Isolation		Between input and power circuit: Transformer Isolated Between input and internal circuit: Optocoupler isolated	
Data Accuracy		Maximum error at 25°C $\pm$ Minimum digital resolution of each input range	
Cold Junction Temperature Compensation Accuracy		$\pm 1^\circ\text{C}$ at 0 to 55°C	
Sampling Period		125 ms	
Output Points		2ch	
Output		Relay output 1NO Rated load 5A 250V AC/30V DC (resistive load) 3A 250V AC (inductive load $\cos \phi=0.4$) Minimum open/closed load: 10 mA 5V DC Electrical life: 100,000 cycles (at the maximum rating of resistive load)	Non-contact voltage output (for SSR drive) 12V DC $\pm 15\%$ Maximum 40 mA (short circuit protected) Leakage current: 0.3 mA maximum
			Analog current output 4 to 20 mA DC
			Maximum Error: $\pm 0.5\%$ Full Scale at 25°C $\pm 1.0\%$ Full Scale at 55°C
			Load resistance: 550 Ω maximum Analog output digital resolution: 1,000 LSB input value: 0.016 mA
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	—	$\pm 3\%$ maximum when a 500V clamp voltage is applied to the power supply and I/O lines
	Recommended Cable for Noise Immunity	—	Twisted pair cable
	Cross Talk	—	None
Isolation		Between output and power circuit: Transformer Isolated	Between output and power circuit: Transformer Isolated Between output and internal circuit: Optocoupler isolated
Power Voltage		24V DC (External power), 5V DC (Internal power)	
Allowable Voltage Range		20.4 to 28.8V DC	
External Power Consumption		Approx. 3.5W maximum	
Internal Power Consumption (at 24V DC while all I/Os are on)		65mA (5V DC)	
Connector on Mother Board		Input: F6018-17P (Fujicon)	Output: F6018-11P (Fujicon)
Weight (approx.)		140g	

Input Range

Input		Input Range (Digital Resolution)		Input Value of LSB
Input Type	K	-200 to 1,370°C	-328 to 2,498°F	1°C (°F)
		-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C (°F)
	J	-200 to 1,000°C	-328 to 1,832°F	1°C (°F)
	R	0 to 1,760°C	32 to 3,200°F	1°C (°F)
	S	0 to 1,760°C	32 to 3,200°F	1°C (°F)
	B	0 to 1,820°C	32 to 3,308°F	1°C (°F)
	E	-200 to 800°C	-328 to 1,472°F	1°C (°F)
	T	-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C (°F)
	N	-200 to 1,300°C	-328 to 2,372°F	1°C (°F)
	PL-II	0 to 1,390°C	32 to 2,534°F	1°C (°F)
	C (W/Re5-26)	0 to 2,315°C	32 to 4,199°F	1°C (°F)
	Pt100	-200.0 to 850.0°C	-328.0 to 1,562.0°F	0.1°C (°F)
		-200 to 850°C	-328 to 1,562°F	1°C (°F)
	JPt100	-200.0 to 500.0°C	-328.0 to 932.0°F	0.1°C (°F)
		-200 to 500°C	-328 to 932°F	1°C (°F)
Barriers	4 to 20mA DC	-2,000 to 10,000 (12,000 increments)		1.333 μA
	0 to 20mA DC	-2,000 to 10,000 (12,000 increments)		1.666 μA
	0 to 1V DC	-2,000 to 10,000 (12,000 increments)		0.083 mA
	0 to 5V DC	-2,000 to 10,000 (12,000 increments)		0.416 mA
	1 to 5V DC	-2,000 to 10,000 (12,000 increments)		0.333 mA
	0 to 10V DC	-2,000 to 10,000 (12,000 increments)		0.833 mA

Expansion Interface Module Specifications

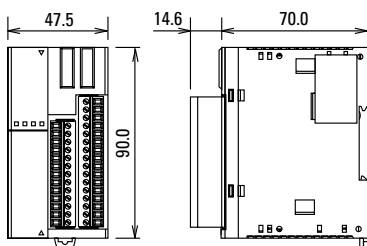
Type No.	FC5A-EXM1M (Expansion Interface Master Module)	FC5A-EXM1S (Expansion Interface Slave Module)	FC5A-EXM2 (Expansion Interface Module)
Rated Power Voltage	—	24V DC (supplied from external power)	24V DC (supplied from external power)
Allowable Voltage Range	—	20.4 to 26.4V DC (including ripple)	20.4 to 26.4V DC (including ripple)
Current Draw (Internal Power/External Power)	Internal power (supplied from CPU module): 90 mA (5V DC) 0 mA (24V DC)	Internal power (supplied from CPU module): 0 mA (5V DC) 0 mA (24V DC) External power: With I/O modules 750 mA (26.4V DC) ¹	Internal power (supplied from CPU module): 50 mA (5V DC) 0 mA (24V DC) External power: With I/O modules 750 mA (26.4V DC) ¹
Maximum Power Consumption (External Power) ¹	—	19W (26.4V DC)	19W (26.4V DC)
Allowable Momentary Power Interruption	—	10 ms minimum (24V DC)	10 ms minimum (24V DC)
I/O Expansion	Between CPU module and expansion interface module Connectable CPU modules: FC5A-D16RK1/D16RS1/D32K3/D32S3/D12K1E/D12S1E Connectable I/O modules: 7 maximum Beyond the expansion interface module Connectable I/O modules: 8 digital I/O modules maximum (AC input modules are not applicable) ²		
Maximum I/O Refresh Time ³	3.6 ms		2.8 ms
Communication between CPU Module and Expansion Interface Module	Asynchronous communication (I/O refresh of I/O modules on both sides of the expansion interface module is asynchronous.)		
Isolation from Internal Circuit	Only communication interface part is isolated		Not isolated
EMC Compliant Cable Length	1m (FC5A-KX1C)		—
Power Supply Connector	Connector on Mother Board	—	MKDSN1.5/3-5.08-BK (Phoenix Contact)
	Connector Insertion/Removal Durability	—	100 times minimum
Expansion Cable Connector	Connector on Mother Board	FCN-365P024-AU (Fujitsu Component)	
	Connector Insertion/Removal Durability	100 times minimum	
Weight	70g	135g	140g



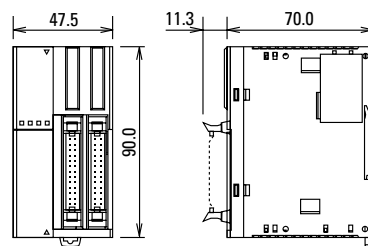
- 1: Power consumption by the expansion interface module and eight I/O modules.
- 2: The maximum number of relay outputs that can be turned on simultaneously is 54 points.
- 3: Maximum I/O refresh time of the expansion interface module. D8252 stores the refresh time.

Dimensions (mm)

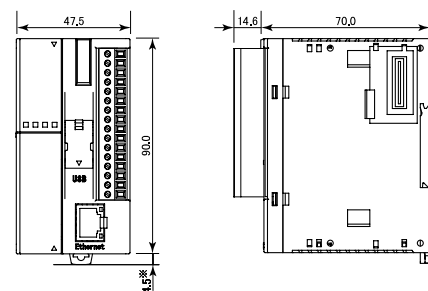
FC5A-D16RK1, FC5A-D16RS1,
FC4A-D20RK1, FC4A-D20RS1



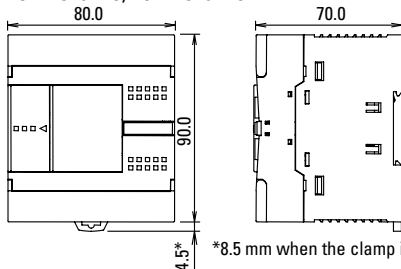
FC5A-D32K3, FC5A-D32S3, FC4A-D40K3,
FC4A-D40S3



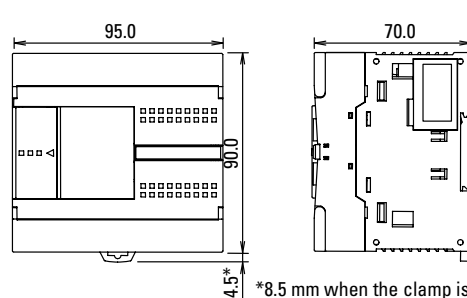
FC5A-D12K1E, FC5A-D12S1E



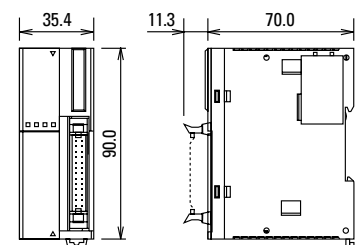
FC5A-C10R2, FC5A-C16R2,
FC5A-C10R2C, FC5A-C16R2C,
FC5A-C10R2D, FC5A-C16R2D,
FC4A-C10R2, FC4A-C16R2,
FC4A-C10R2C, FC4A-C16R2C



FC5A-C24R2, FC5A-C24R2C, FC5A-C24R2D,
FC4A-C24R2, FC4A-C24R2C



FC4A-D20K3, FC4A-D20S3

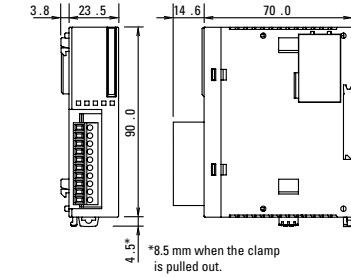


*8.5 mm when the clamp is pulled out.

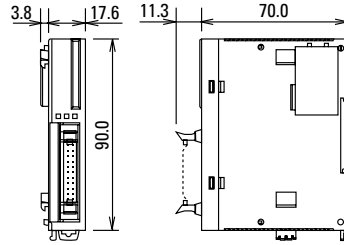
*8.5 mm when the clamp is pulled out.

Dimensions cont. (mm)

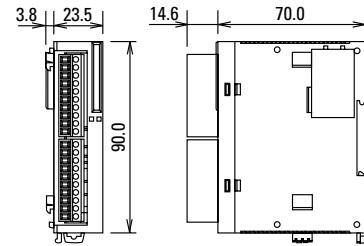
FC5A-SIF2, FC5A-SIF4,
FC4A-AS62M, FC4A-N08A11,
FC4A-J2A1, FC4A-N08B1,
FC4A-K1A1, FC4A-R081,
FC4A-K2C1, FC4A-T08K1,
FC4A-L03A1, FC4A-T08S1,
FC4A-L03AP1, FC4A-K4A1,
FC4A-M08BR1



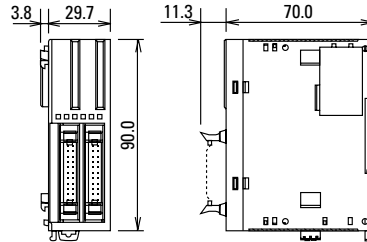
FC4A-N16B3, FC4A-T16K3, FC4A-T16S3



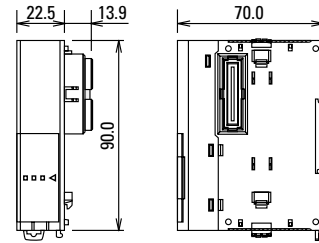
FC4A-N16B1, FC4A-R161, FC4A-J4CN1,
FC4A-J8C1, FC4A-J8AT1



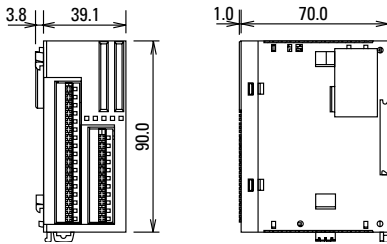
FC4A-N32B3, FC4A-T32K3, FC4A-T32S3



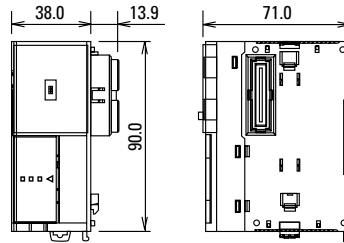
FC4A-HPC1, FC4A-HPC2, FC4A-HPC3



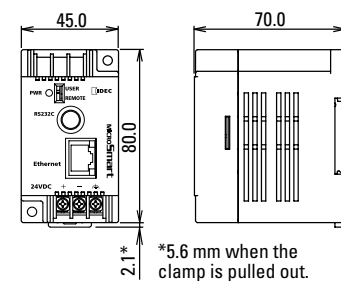
FC5A-F2MR2, FC5A-F2M2, FC4A-M24BR2



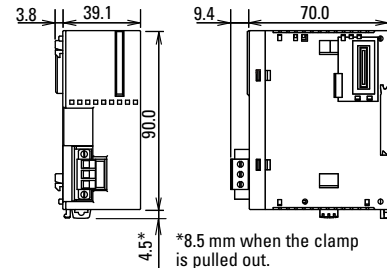
FC4A-HPH1



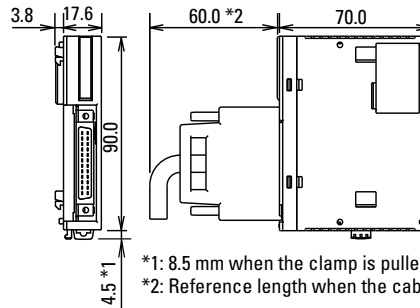
FC4A-SX5ES1E



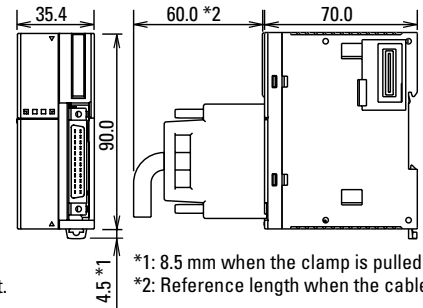
FC5A-EXM2



FC5A-EXM1M

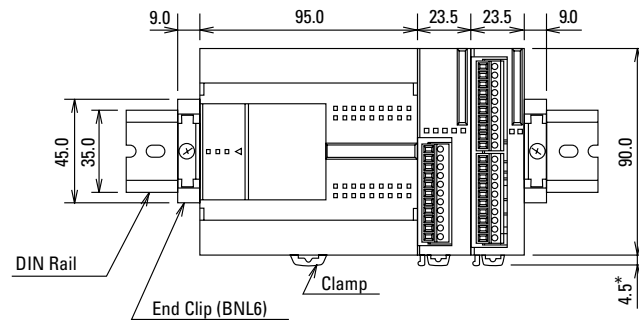


FC5A-EXM1S



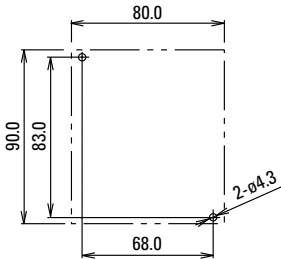
Example

The following figure illustrates a system setup consisting of the all-in-one 24-I/O type CPU module, an 8-point relay output module, and a 16-point DC input module mounted on a 35-mm-wide-DIN rail using BNL6 end clips.

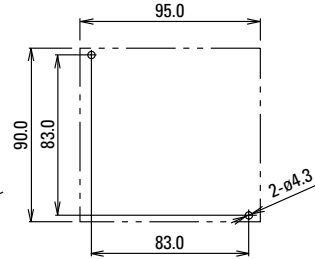


Mounting Hole Layouts

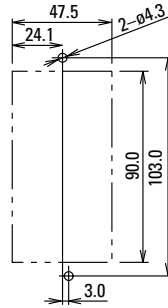
FC5A-C10R2, FC5A-C10R2C,
FC5A-C10R2D, FC5A-C16R2,
FC5A-C16R2C, FC5A-C16R2D
FC4A-C10R2, FC4A-C10R2C
FC4A-C16R2, FC4A-C16R2C



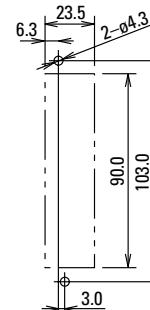
FC5A-C24R2
FC5A-C24R2C
FC5A-C24R2D
FC4A-C24R2
FC4A-C24R2C



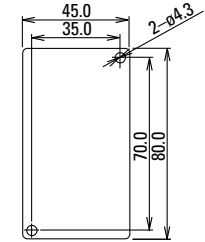
FC5A-D12K1E, FC5A-D12S1E
FC5A-D16R1, FC5A-D16RS1
FC5A-D32K3, FC5A-D32S3
FC4A-D20R1, FC4A-D20RS1
FC4A-D40K3, FC4A-D40S3



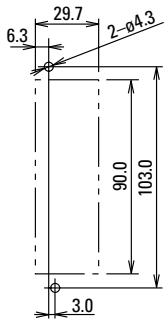
FC5A-SIF2, FC5A-SIF4
FC4A-AS62M, FC4A-N08A11,
FC4A-J2A1, FC4A-N08B1,
FC4A-J4CN1, FC4A-N16B1,
FC4A-J8AT1, FC4A-R081, FC4A-
J8C1, FC4A-R161, FC4A-K1A1,
FC4A-T08K1, FC4A-K2C1, FC4A-
T08S1, FC4A-L03A1, FC4A-K4A1,
FC4A-L03AP1, FC4A-M08BR1



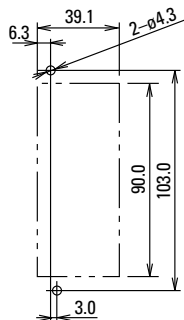
FC4A-SX5ES1E



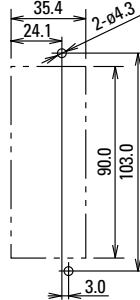
FC4A-N32B3
FC4A-T32K3
FC4A-T32S3



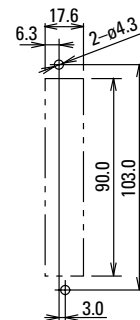
FC5A-F2MR2
FC5A-F2M2
FC5A-EXM2
FC4A-M24BR2



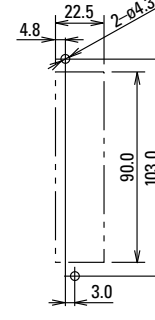
FC5A-EXM1S
FC4A-D20K3
FC4A-D20S3



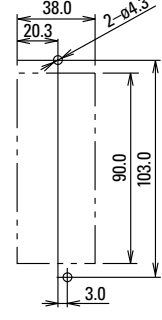
FC5A-EXM1M
FC4A-N16B3
FC4A-T16K3
FC4A-T16S3



FC4A-HPC1
FC4A-HPC2
FC4A-HPC3

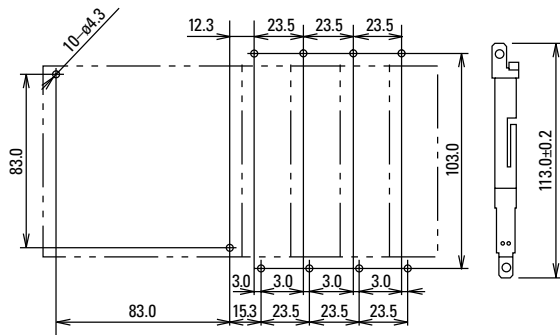


FC4A-HPH1



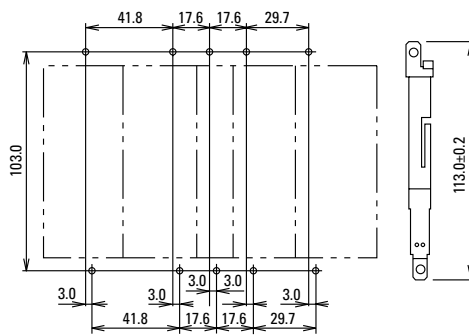
Example

Mounting hole layout for FC5A-C24R2 or FC4A-C24R2 and four 23.5mm-wide I/O modules



Example

Mounting hole layout from left, FC4A-HPH1, FC4A-D20K3, FC4A-N16B3, FC4A-N32B3, and FC4A-M24R2 modules



All dimensions in mm.

FT1A Touch HMI + PLC

A Breed of Its Own

The perfect combination of PLC processing and HMI monitoring and control, the 3.8-inch FT1A Touch is an all-in-one touchscreen interface and logic controller. With a compact body and full complement of features, FT1A Touch is perfect for small systems that require a graphical user interface along with versatile I/O controls at a truly affordable price.

USB-A Port

Embedded USB-A port for data logging and recipe data, as well as for performing program updates.

Analog Expansion Cartridges (Transistor Output Models)

- Up to 2 analog expansion adapters can be configured on the FT1A Touch with 12-bit resolution.
- Maximum combination of 2in/6out, 4in/4out, or 6in/2out analog I/O can be configured.

RS232C and RS485 ports

- Built-in RS232C, RS422/485 interface for serial communication.
- Communication with IEC or other PLCs also supported through this serial port.

Relay or Transistor Outputs

- Relay output type equipped with 10A contact, so no interposing relays required.
- Transistor output type equipped with 300mA per channel.

Analog Outputs (Transistor Output Models)

2 built-in 0-10V DC, 4-20mA analog outputs.

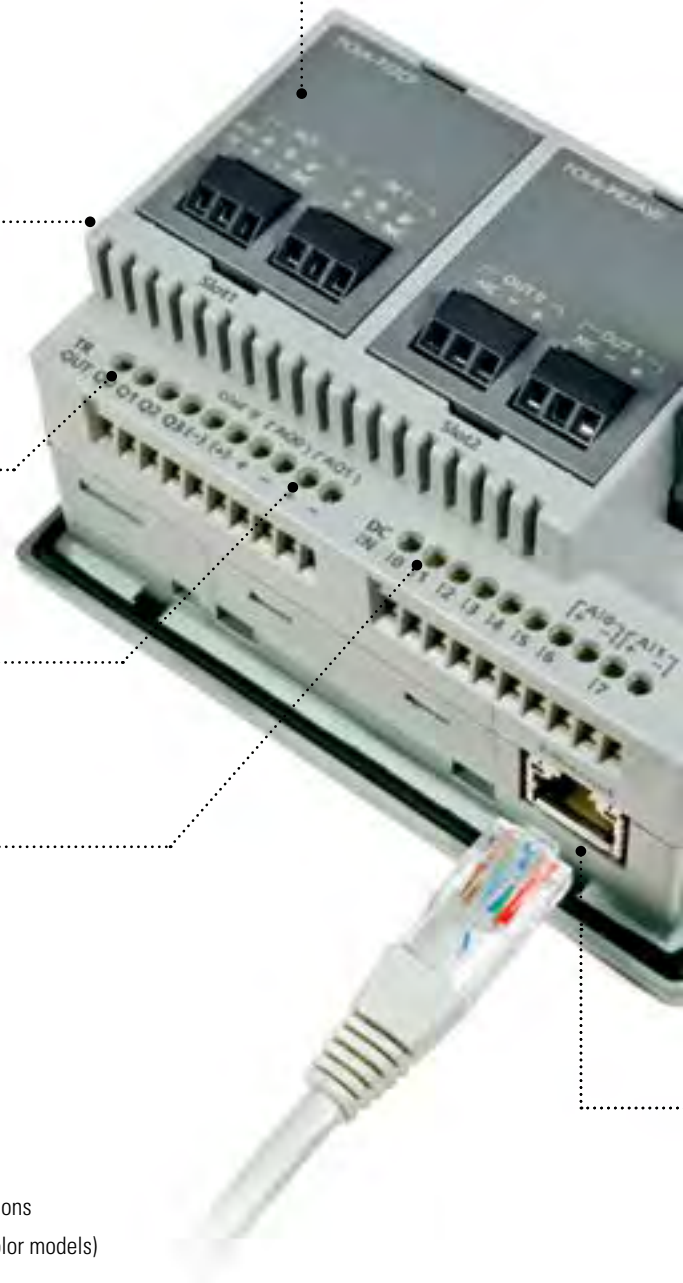
Digital, Analog and High-speed Inputs

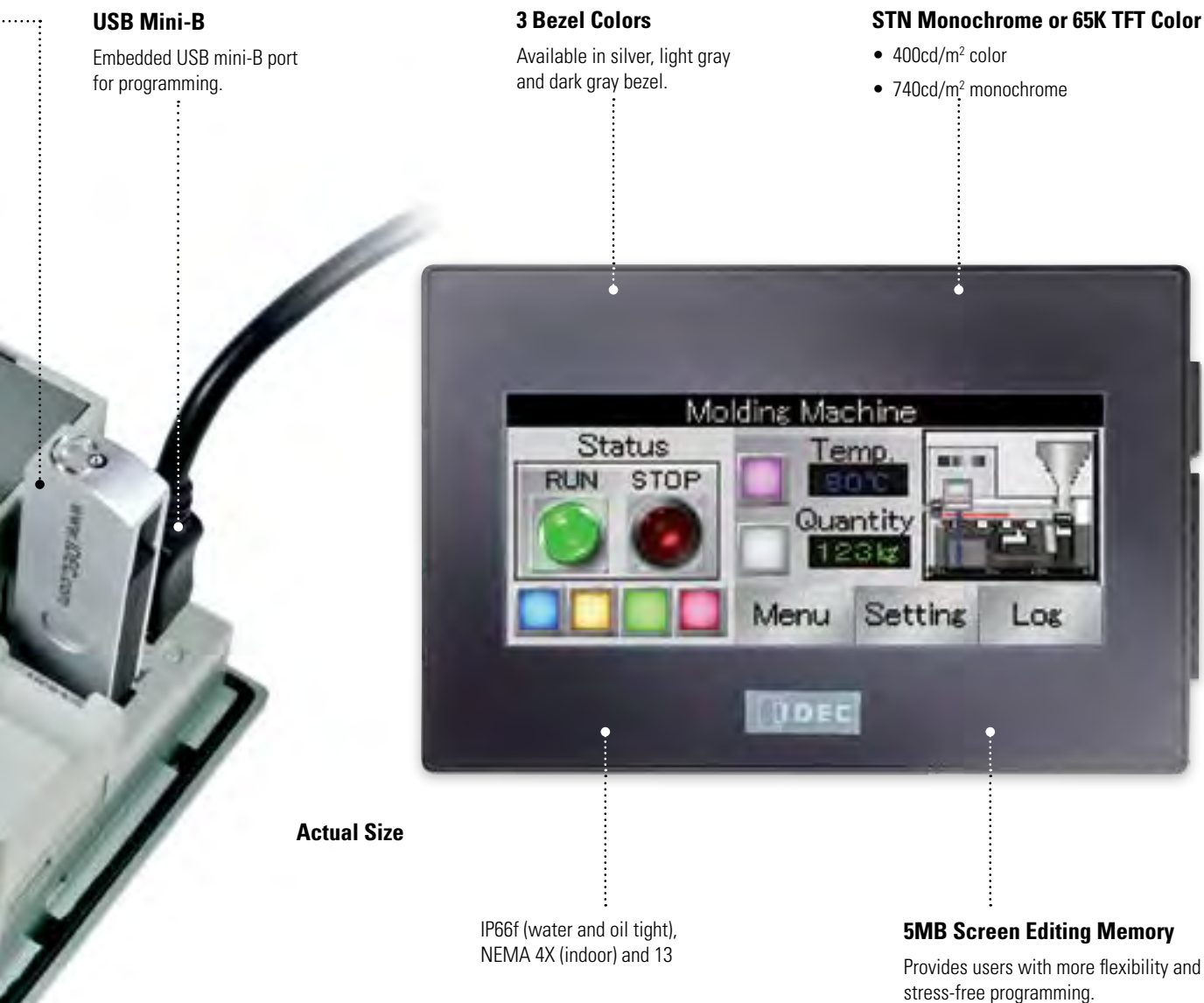
8 built-in DC inputs

- 2 inputs (I6 and I7) can be configured as 0-10V DC or 4-20mA analog inputs (transistor output models)
 - 10-bit resolution
- 4 high-speed counters
 - Up to 10kHz

Harsh Environments

- Class I, Division 2 for hazardous locations
- -20 to 55°C operating temperature (color models)





USB Mini-B

Embedded USB mini-B port for programming.

3 Bezel Colors

Available in silver, light gray and dark gray bezel.

STN Monochrome or 65K TFT Color

- 400cd/m² color
- 740cd/m² monochrome

Actual Size

IP66f (water and oil tight),
NEMA 4X (indoor) and 13

5MB Screen Editing Memory

Provides users with more flexibility and stress-free programming.

RJ45 Ethernet Port

- Supports remote Ethernet communication and Modbus TCP.
- Communication with IDEC or other PLCs also supported through the Ethernet port.

FT1A Controllers

FT1A controllers are designed for a range of applications that demand powerful and abundant features. Available with 12, 24, 40 and 48 I/O with and without embedded LCD/keypad, these controllers enable engineers to design cost-effective solutions.

Smart LCD Screen

The display (24 digits x 4 lines) can provide visual feedback of system status, I/O status, user configurable messages with dynamic data, bar graph, and ladder program monitor and controls.

Non-LCD Model

FT1A controllers are also available without embedded LCD/keypad. It's a cost-effective, tamper-proof solution.

USB mini-B

With the USB mini-B port, communication with FT1A controllers is extremely convenient as standard USB Type A to mini-B cables can be used.

Note: Features available on specific models.
See page 14 for selection guide.

Universal Voltages

24V DC or 100-240V AC



Actual Size

Memory Cartridge

The optional memory cartridge can be used to easily transfer programs from the internal ROM memory of FT1A controllers to a memory cartridge or vice versa. It's a convenient method to update the PLC program in the field.

800.262.4332

www.IDEC.com/FT1A

Digital, Analog and High-speed Inputs

Inputs on the 24V DC power models can be configured as digital, 0-10V DC analog or high-speed counters. Up to 8 analog inputs with 10-bit resolution and up to 6 HSC 100kHz can be configured.



RJ45 Ethernet Port

The embedded Ethernet port on the FT1A controllers provides users with easy access for remote maintenance and communication. It also supports industry standard Modbus TCP protocol. With Ethernet Remote I/O capability, the FT1A controller's I/O can be easily expanded.

Real-Time Clock

Every FT1A controller is equipped with an embedded real-time clock for time-controlled applications. With the built-in, real-time clock, log data can also be tracked and, with just a click, daylight savings time can easily be setup.

RS232C and RS485 Ports

Up to two RS232C and/or RS485 communication cartridges can be plugged into the FT1A controllers to allow the PLC to communicate with other serial devices. It also supports industry standard Modbus RTU protocol.

Large Programming Memory

With up to 47.4KB (11,850 steps) of programming memory, FT1A controllers have enough memory for even complex PLC programming.

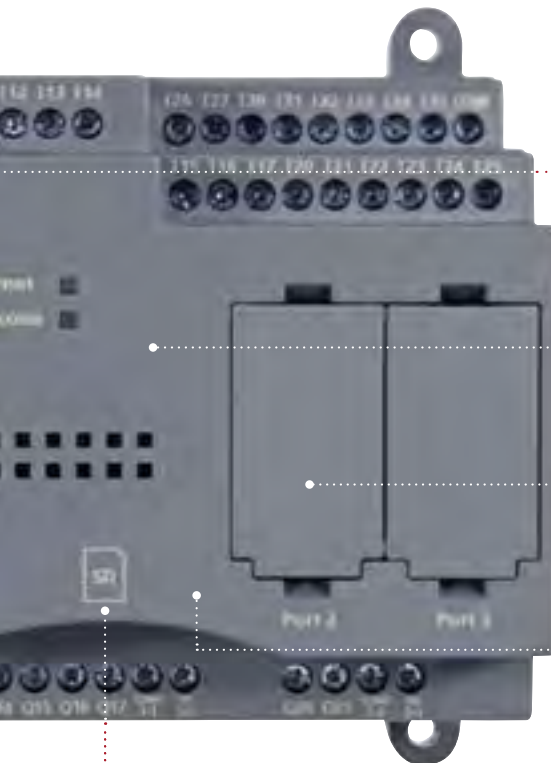
SD Memory Card

With the embedded SD memory slot, critical data can be easily logged and retrieved over Ethernet connections or simply remove the SD card and plug it into your PC.



10A Relay and High-speed Outputs

The FT1A controller with relay outputs is equipped with four 10A relay contacts. The transistor outputs model is also equipped with two 100kHz high-speed outputs for simple positioning controls. With remote I/O capability, additional outputs can easily be added.



Part Numbers

01 Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Touch	Part Number	Screen Type	Total I/O	Input Type	Embedded Analog Inputs	Embedded Analog Outputs	Output Type	Analog Expansion Cartridges	Power Voltage	Remote I/O Master	
	FT1A-M14KA-W	3.7" STN Monochrome (8 shades)	14 I/O (8 in, 6 out)	Source	2pt (0-10V DC, 4-20mA, 10-bit Resolution)	2pt (0-10V DC, 4-20mA, 10-bit Resolution)	Transistor Sink	Yes, up to 2 cartridges - see page page 124 for part number.	24V DC	Yes	
	FT1A-M14KA-B										
	FT1A-M14KA-S										
	FT1A-M14SA-W			Sink							
	FT1A-M14SA-B										
	FT1A-M14SA-S										
	FT1A-C14KA-W	3.8" TFT 65,536 colors		Source			Transistor Source				
	FT1A-C14KA-B										
	FT1A-C14KA-S										
	FT1A-C14SA-W			Sink							
	FT1A-C14SA-B										
	FT1A-C14SA-S										
	FT1A-M12RA-W	3.7" STN Monochrome (8 shades)	12 I/O (8 in, 4 out)	Sink	2pt (0-10V DC, 10-bit Resolution)	—	Relay	—		—	
	FT1A-M12RA-B										
	FT1A-M12RA-S										
	FT1A-C12RA-W	3.8" TFT 65,536 colors									
	FT1A-C12RA-B										
	FT1A-C12RA-S										

12 I/O CPU	Part Number	Power Voltage	Total I/O	Input Type	Output Type	Ethernet Port	Screen Type	Embedded Analog Inputs	High-Speed Counter	SD Memory Slot	RS232C, RS485 Port		
	FT1A-H12RC	100-240V AC	12 I/O (8 in, 4 out)	Contact	Relay	—	2.1" Mono-chrome	—	—	—	—		
	FT1A-H12RA	24V DC		Sink				2pt, 0-10V DC, 10-bit	4 x 100kHz				
		FT1A-B12RC		100-240V AC			Contact	—	—			—	
		FT1A-B12RA		24V DC			Sink		2pt, 0-10V DC, 10-bit			4 x 100kHz	
24 I/O CPU													
	FT1A-H24RC	100-240V AC	24 I/O (16 in, 8 out)	Sink/Source	Relay	Yes	2.1" Mono-chrome	—	—	—	Optional Adapter		
	FT1A-H24RA	24V DC		Sink				4pt, 0-10V DC, 10-bit	6 x 100kHz				
		FT1A-B24RC		100-240V AC			Sink/Source	—	—			—	
		FT1A-B24RA		24V DC			Sink		4pt, 0-10V DC, 10-bit			6 x 100kHz	
40 I/O CPU													
	FT1A-H40RC	100-240V AC	40 I/O (24 in, 16 out)	Sink/Source	Relay	Yes	2.1" Mono-chrome	—	—	Yes	Optional Adapters (x2)		
	FT1A-H40RKA	24V DC		Source	Relay/Trans. Sink			6pt, 0-10V DC, 10-bit	6 x 100kHz				
	FT1A-H40RSA			Sink	Relay/Trans. Source								
		FT1A-B40RC		100-240V AC	Sink/Source		Relay	—	—			—	
		FT1A-B40RKA		24V DC	Source		Relay/Trans. Sink		6pt, 0-10V DC, 10-bit			6 x 100kHz	
		FT1A-B40RSA			Sink		Relay/Trans. Source						

48 I/O CPU	Part Number	Power Voltage	Total I/O	Input Type	Output Type	Ethernet Port	Screen Type	Embedded Analog Inputs	High-Speed Counter	SD Memory Slot	RS232C, RS485 Port			
	FT1A-H48SC	100-240V AC	48 I/O (30 in, 18 out)	Sink/Source	Transistor Source	Yes	2.1" Monochrome	—	—	Yes	Optional Adapters (x2)			
	FT1A-H48SA	24V DC		Sink				8pt, 0-10VDC, 10-bit	6 x 100kHz					
	FT1A-H48KC	100-240V AC		Sink/Source	Transistor Sink			—	—					
	FT1A-H48KA	24V DC		Source				8pt, 0-10VDC, 10-bit	6 x 100kHz					
	FT1A-B48SC	100-240V AC		Sink/Source	Transistor Source		Yes	—	—			—	Yes	Optional Adapters (x2)
	FT1A-B48SA	24V DC		Sink					8pt, 0-10VDC, 10-bit			6 x 100kHz		
	FT1A-B48KC	100-240V AC		Sink/Source	Transistor Sink				—			—		
	FT1A-B48KA	24V DC		Source					8pt, 0-10VDC, 10-bit			6 x 100kHz		

Starter Kits

	Type	Part Number	Description
	Touch	KIT-TOUCH-□KW	FT1A Touch Starter Kit, Transistor sink output type, Light bezel, USB cable, 30W PS and software
		KIT-TOUCH-□KB	FT1A Touch Starter Kit, Transistor sink output type, Dark bezel, USB cable, 30W PS and software
		KIT-TOUCH-□KS	FT1A Touch Starter Kit, Transistor sink output type, Silver bezel, USB cable, 30W PS and software
		KIT-TOUCH-□SW	FT1A Touch Starter Kit, Transistor source output type, Light bezel, USB cable, 30W PS and software
		KIT-TOUCH-□SB	FT1A Touch Starter Kit, Transistor source output type, Dark bezel, USB cable, 30W PS and software
		KIT-TOUCH-□SS	FT1A Touch Starter Kit, Transistor source output type, Silver bezel, USB cable, 30W PS and software
		KIT-TOUCH-□W	FT1A Touch Starter Kit, Relay output type, Light bezel, USB cable, 30W PS and software
		KIT-TOUCH-□B	FT1A Touch Starter Kit, Relay output type, Dark bezel, USB cable, 30W PS and software
		KIT-TOUCH-□S	FT1A Touch Starter Kit, Relay output type, Silver bezel, USB cable, 30W PS and software
In place □ of insert code for display type: C = color, M = monochrome			
	12 I/O CPU	KIT-SMART-12-□AC	SmartAXIS Starter Kit, 12 I/O AC, USB cable and software
		KIT-SMART-12-□DC	SmartAXIS Starter Kit, 12 I/O DC, USB cable, 30W PS and software
	24 I/O CPU	KIT-SMART-24-□AC	SmartAXIS Starter Kit, 24 I/O AC, USB cable and software
		KIT-SMART-24-□DC	SmartAXIS Starter Kit, 24 I/O DC, USB cable, 30W PS and software
	40 I/O CPU	KIT-SMART-40-□AC-R	SmartAXIS Starter Kit, 40 I/O AC, USB cable and software
		KIT-SMART-40-□DC-RK	SmartAXIS Starter Kit, 40 I/O DC, Sink, USB cable, 30W PS and software
		KIT-SMART-40-□DC-RS	SmartAXIS Starter Kit, 40 I/O DC, Source, USB cable, 30W PS and software
	48 I/O CPU	KIT-SMART-48-□AC-K	SmartAXIS Starter Kit, 48 I/O AC, Sink, USB cable and software
		KIT-SMART-48-□AC-S	SmartAXIS Starter Kit, 48 I/O AC, Source, USB cable and software
		KIT-SMART-48-□DC-K	SmartAXIS Starter Kit, 48 I/O DC, Sink, USB cable, 30W PS and software
		KIT-SMART-48-□DC-S	SmartAXIS Starter Kit, 48 I/O DC, Source, USB cable, 30W PS and software

In place of □ insert code: H = includes display/keypad, B = without display/keypad

IO Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Touch Accessories

Part Number	Description
FC6A-PJ2A	2-pt 0-10V, 4-20mA Analog input cartridge
FC6A-PJ2CP	2-pt RTD, Thermocouple cartridge
FC6A-PK2AV	2-pt 0-10V Analog output cartridge
FC6A-PK2AW	2-pt 4-20mA Analog output cartridge
FT9Z-1D3PN05	FT1A Touch screen protective sheet (5 per pack)
FT9Z-1E3PN05	FT1A Touch protective cover (5 per pack)
FT9Z-1A01	FT1A Touch rear mount adapter
FT9Z-1T09	FT1A Touch extra communication terminal block
FT9Z-1X03	FT1A Touch extra power supply terminal block
HG9Z-4K2PN04	FT1A Touch extra mounting brackets (4 per pack)
HG9Z-XU1PN05	USB cable lock-in (5 per pack)
HG9Z-XCM2A	USB programming cable
SW1A-W1C	Automation Organizer Software Suite

Controller Accessories

Part Number	Description
FT1A-PC1	RS232C communication adapter, mini-DIN type
FT1A-PC2	RS485 communication adapter, mini-DIN type
FT1A-PC3	RS485 communication adapter, screw terminal type
FT1A-PM1	Optional memory cartridge
FT9Z-PSP1PN05	Extra direct mounting hook (5 per pack)
SW1A-W1C	Automation Organizer Software Suite
HG9Z-XCM2A	USB programming cable

General Specifications

Part No.	FT1A-*12RA-*	FT1A-*14KA-* / FT1A-*14SA-*
Output	Relay output	Transistor output
Rated Power Voltage/ Power Supply Isolation	24V DC/Not isolated	
Allowable Voltage Range	20.4 to 28.8V DC (including ripple)	
Power Consumption	9.2 W maximum	11W maximum
Allowable Momentary Power Interruption	10 ms maximum	
Dielectric Strength	Between power terminal and FE terminal: 500V AC, 5 mA, 1 minute Between power terminal and output terminal: 2,300V AC, 5 mA, 1 minute	Between power terminal and FE terminal: 500V AC, 5 mA, 1 minute Between power terminal and output terminal: 500V AC, 5 mA, 1 minute
EMC Immunity	IEC/EN 61131-2:2007 compliant	
Inrush Current	50A maximum (5ms maximum)	
Operating Temperature	Color display: -20 to +55°C, Monochrome display: 0 to +55°C (Note 1) (Note 2)	
Storage Temperature	-20 to +60°C (no freezing)	
Relative Humidity	10 to 95% RH (no condensation)	
Pollution Degree	2 (IEC 60664-1)	
Corrosion Immunity	Atmosphere free from corrosive gases	
Degree of Protection	IP66F TYPE 4X TYPE 13 (Panel front) (Note 3), IP20 (Rear)	
Ground	Functional grounding	
Protective grounding conductor	UL1007 AWG16	
Vibration Resistance	5 to 8.4 Hz half amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axis (IEC 61131-2)	
Shock Resistance	147 m/s ² , 11 ms, X, Y, Z directions 3 times (IEC 61131-2)	
Mounting Structure	Panel mount	
Weight (approx.)	300g	250g

Note 1: FT1A-*12RA-* hardware version V130 (indicated on hardware) and earlier is UL, c-UL listed at 50°C (maximum operating temperature).

Note 2: See SmartAXIS Touch User's Manual FT9Y-B1390(2) for I/O derating.

Note 3: Operation not guaranteed when used with certain types of oils.

General Specifications

Part Number		12-I/O Type H12RC H12RA B12RC B12RA	24-I/O Type H24RC H24RA B24RC B24RA	40-I/O Type H40RC H40RKA H40RSA B40RC B40RKA B40RSA	48-I/O Type H48KC H48SC H48KA H48SA B48KC B48SC B48KA B48SA
Rated Power Voltage		AC power: 100 to 240V AC, DC power: 24V DC			
Allowable Voltage Range		AC power: 85 to 264V AC, DC power: 20.4 to 28.8V DC (including ripple)			
Rated Power Frequency		AC power: 50 to 60Hz (47 to 63Hz)			
Power	AC Power	12-I/O: 18VA maximum, 24-I/O: 41VA maximum, 40-I/O: 48VA maximum, 48-I/O: 43VA maximum			
Consumption	DC Power	12-I/O: 4.3W maximum, 24-I/O: 4.8W maximum, 40-I/O: 7.9W maximum, 48-I/O: 6.0W maximum			
Allowable Momentary Power Interruption		AC power: 20ms maximum; DC power: 10ms maximum			
Dielectric Strength		AC power type: Between power/input and PE terminals: 1,500V AC, 1 minute Between transistor output and PE terminals: 1,500V AC, 1 minute Between relay output and PE terminals: 2,300V AC, 1 minute Between power and input terminals: 1,500V AC, 1 minute Between power/input and transistor output terminals: 1,500V AC, 1 minute Between power/input and relay output terminals: 2,300V AC, 1 minute DC power type: Between power/input and FE terminals: 500V AC, 1 minute Between transistor output and FE terminals: 500V AC, 1 minute Between relay output and FE terminals: 2,300V AC, 1 minute Between power/input and transistor output terminals: 500V AC, 1 minute Between power/input and relay output terminals: 2,300V AC, 1 minute			
EMC Immunity		IEC/EN 61131-2:2007 compliant			
Inrush Current		AC power: 35A maximum (Cold start with Ta=25°C, 200V AC); DC power: 30A maximum (5ms maximum)			
Operating Temperature		0 to +55°C ^{Note 1}			
Storage Temperature		-25 to +70°C (no freezing)			
Relative Humidity		10 to 95% RH (no condensation)			
Pollution Degree		2 (IEC 60664-1)			
Corrosion Immunity		Atmosphere free from corrosive gases			
Degree of Protection		IP20 (IEC 60529)			
Ground		D-type ground (Class 3 ground)			
Protective Grounding Conductor		UL1007 AWG16			
Vibration Resistance		5 to 8.4Hz half amplitude 3.5mm, 8.4 to 150Hz, Acceleration 9.8m/s ² (1G) 2 hours per axis on each of three mutually perpendicular axis (IEC 61131-2)			
Shock Resistance		147m/s ² , 11ms, X, Y, Z directions 3 times (IEC 61131-2)			
Mounting Structure		DIN rail or direct mount			
Weight (approx.)	AC Power	12-I/O: 230g, 24-I/O: 400g, 40-I/O: 580g, 48-I/O: 540g			
	DC Power	12-I/O: 190g, 24-I/O: 310g, 40-I/O: 420g, 48-I/O: 380g			

1. FT1A Version V110 are UL, c-UL Listed at 0 to +55°C.

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Function Specifications

			FT1A-※12RA-※	FT1A-※14KA-※	FT1A-※14SA-※
Control System			Stored program system		
Ladder Program	Instruction Words	Basic Instructions	42 types		
		Advanced Instructions	98 types	99 types	
	Program Capacity		Program size: 47.4 kB, Configuration memory capacity: 5 MB		
	Processing Time	Basic Instruction	1850μs/1,000 steps		
		END Processing	5 msec minimum		
FBD	FB		37 types		
	Program Capacity		Program size: 38kB, Configuration memory capacity: 5MB		
			1,000		
	No. of FB	FB (Note 1)	200		
		Timer (T)	200		
		Counter (C)	200		
	Processing Time	Basic Instruction	4ms/100		
		END Processing	5ms minimum		
User Program Storage			Flash ROM (100,000 times)		
I/O Points	Inputs		8 (V3.90 or above: 90 max. can be added with remote I/O master function)	8 (90 additional can be added with remote I/O master function)	
	Outputs		4 (V3.90 or above: 54 max. can be added with remote I/O master function)	4 (54 additional can be added with remote I/O master function)	
Analog Input			2 (V3.90 or above: 24 max. can be added with remote I/O master function)	2 (4 additional can be added with analog cartridge, and 24 max. can be added with remote master function)	
Analog Output			—	2 (4 additional can be added with analog cartridge)	
Internal Relays				1,024	
Shift Registers				128	
Data Registers				2000	
Special Data Registers				200	
Counters				200	
Timer (1ms, 10 ms, 100 ms, 1s)				200	
Clock			Precision: ±30 seconds/month (25°C, typical)		
RAM Backup	Backup Data		Internal relays, shift registers, counters, data registers, clock data		
	Backup Duration		Approximately 30 days (typical) at 25°C after backup battery is fully charged		
	Battery		Lithium secondary battery		
	Charging Time		Approximately 15 hours required to charge from 0 to 90%		
	Replaceability		Not possible		
Self-Diagnostic Functions			Keep data check, power failure check, watchdog timer check,timer/counter preset value change error check, user program syntax check, user program execution check.		
Input Filter			No filter, 3 to 15 ms (selectable in increments of 1 ms)		
Catch Input/Interrupt Input			4/4		
High-speed Counter	Maximum Counting Frequency and Points	Single/two-phase selectable	1 (5 kHz, multiple 2/4, single-phase cannot be used)		
		Single-phase	4 (x 10 kHz)		
	Counting Range		0 to 4,294,967,295 (32 bits)		
	Operation Mode		Rotary encoder mode and adding counter mode		
Analog Voltage Inputs	Built-in Points		2		
	Input Range		0 to 10V DC	0 to 10V DC (voltage input) /4 to 20 mA (current input)	
	Input Impedance		78 kΩ	78 kΩ (voltage input) / 250 Ω (current input)	
	Digital Resolution		0 to 1,000 (10 bits)		
Number of Relay Outputs			10A relay: 4	—	
Number of Transistor Outputs			—	4 (sink)	4 (source)
Analog Output	Built-in Points		—	2	
	Output Range		—	0 to 10V DC (voltage output) /4 to 20 mA (current output)	
	Digital Resolution		—	0 to 1,000 (10 bits)	
USB-mini B (Note 2)			×		
USB-A (Note 2)			×		
RS232C (Note 2)			×		
RS485/422 (Note 2)			×		
Ethernet			×		
Expansion Communication Ports		Port 2	—		
		Port 3	—		
Memory Cartridge			—		
SD Memory Card			—		
Analog Cartridge Interface		Number of Ports	—	2	
		Connectable Cards	—	4 (FC6A-PJ2A, FC6A-PK2AV, FC6A-PK2AW, FC6A-PJ2CP)	

Note 1: Except for timer, counter, input FB, and output FB.

Note 2: Not isolated from internal circuits.

Function Specifications

Part Number			H12RA B12RA	H12RC B12RC	H24RA B24RA	H24RC B24RC	H40RKA H40RSA B40RKA B40RSA	H40RC B40RC	H48KA H48SA B48KA B48SA	H48KC H48SC B48KC B48SC
Control System			Stored program system							
Instruction Words	Basic Instructions									
	Advanced Instructions		99 types		107 types		DC power type: 125 types, AC power type: 111 types			
Program Capacity			12KB		48KB					
User Program Storage			Built-in Flash ROM (10,000 times rewritable)							
Processing Time	Basic Instruction		950μs/1000 steps							
	END Processing		2 ms (Pro) /640 μs (Lite)							
I/O Points	Inputs		8		16		24		30	
	Outputs		4		8		16		18	
Internal Relays			256		1024					
Shift Registers			128		128					
Data Registers			400		2000					
Special Data Registers			200		200					
Adding/Reversible Counters			100		200					
Timer (1ms, 10ms, 10ms, 1s)			100		200					
Clock										
RAM Backup	Backup Data		Internal relays, shift registers, counters, data registers, clock data							
	Backup Duration		Approximately 30 days (typical) at 25°C after backup battery is fully charged							
	Battery		Lithium secondary battery							
	Charging Time		Approximately 15 hours required to charge from 0 to 90%							
	Replaceability		Not possible							
Self-Diagnostic Functions			Keep data check, power failure check, clock error check, watchdog timer check, timer/counter preset value change error check, user program syntax check, user program execution check, system error check, memory cartridge transfer error check (Pro/Lite only)							
Input Filter			No filter, 3 to 15ms (selectable in increments of 1ms)							
Catch Input/Interrupt Input			4/4		6/6					
High-speed Counter	Maximum Counting Frequency & Points	Single/two-phase Selectable	2 (100kHz /50kHz) ^{Note 1}	—	2 (100kHz /50kHz) ^{Note 1}	—	2 (100kHz /50kHz) ^{Note 1}	—	2 (100kHz /50kHz) ^{Note 1}	—
		Single-phase	2 (x 100kHz)	—	4 (x 100kHz)	—	4 (x 100kHz)	—	4 (x 100kHz)	—
	Counting Range		0 to 4,294,967,295 (32 bits)							
	Operation Mode		Rotary encoder mode and adding counter mode							
Analog Voltage Inputs	Points		2	None	4	None	6	None	8	None
	Input Range		0 to 10V DC							
	Input Impedance		78 kΩ							
	Digital Resolution		10-bit (0 to 1000)							
Pulse Outputs	100 kHz	No. of Outputs	—	—	—	—	2	—	2	
		Function	—	—	—	—	PULS, PWM, RAMP, ARAMP, ZRN	—	PULS, PWM, RAMP, ARAMP, ZRN	
	5 kHz	No. of Outputs	—	—	—	—	2	—	2	
		Function	—	—	—	—	PULS, PWM	—	PULS, PWM	
External Output Power Supply for Sensor	Output Voltage		—	—	—	24V DC (+10%, -15%)	—	24V DC (+10%, -15%)	—	24V DC (+10%, -15%)
	Output Current		—	—	—	250mA	—	300mA	—	300mA
	Overload Detection		—	—	—	Not Available	—	Not Available	—	Not Available
	Insulation		—	—	—	Internal Circuit	—	Internal Circuit	—	Internal Circuit
USB-mini B			X		X		X		X	
USB-A			—		—		—		—	
RS232C			—		X ^{Note 2}		X ^{Note 2}		X ^{Note 2}	
RS485/422			—		X ^{Note 2}		X ^{Note 2}		X ^{Note 2}	
Ethernet			—		X		X		X	
Expansion Communication Ports	Port 2		—		X		X		X	
	Port 3		—		—		X		X	
Memory Cartridge			X		X		X		X	
SD Memory Card			—		—		X ^{Note 3}		X ^{Note 3}	

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Display Specifications

O/Touchscreens	PLCs	Touch		Pro (Built-in LCD)
		Display Element	TFT color LCD	STN monochrome LCD
		Colors/Shades	65,536 colors	Monochrome 8 shades
		Effective Display Area	88.92 W x 37.05 H mm	87.59 W x 35.49 H mm
		Display Resolution	240 W x 100 H pixels	192 W x 64 H pixels
		View Angle	Left/right 40°, top 20°, bottom 60°	Left/right/top/bottom: 45°
		Contrast Adjustment	Not Available	32 levels
		Backlight	LED	LED (white, red, pink)
		Backlight Life	50,000 hours ^{Note 1}	LED (green)
		Brightness	400cd/m ² ^{Note 2}	740cd/m ² ^{Note 2}
Automation Software	Power Supplies	Brightness Adjustment	32 levels	Not Available
		Backlight Control	On/off	Not Available
		Backlight Replacement	Not Available	Not Available
		Display Character Size	8 x 8 pixels (Japanese Katakana, JIS 8-bit code, ISO 8859-1 [Latin 1], ANSI 1250 [Central Europe]), ANSI 1257 (Baltic), ANSI 1251 (Cyrillic)	8 x 16 pixels Japanese Katakana, JIS 8-bit code, ISO 8859-1 (Latin 1), ANSI 1251 (Cyrillic)
		1/4 Size	8 x 16 pixels (Japanese Katakana, JIS 8-bit code, ISO 8859-1 [Latin 1], ANSI 1250 [Central Europe]), ANSI 1257 (Baltic), ANSI 1251 (Cyrillic)	16 x 32 pixels, 24 x 48 pixels, 32 x 64 pixels (Western European languages: ISO 8859-1)
		1/2 Size	16 x 16 pixels (Japanese JIS first and second level characters, simplified Chinese, traditional Chinese, Korean)	16 x 16 pixels (Japanese JIS first level characters, Chinese)
		Full Size	32 x 32 pixels (Japanese JIS first level characters, Mincho font)	30 characters x 12 lines/screen
		Double Size	30 characters x 6 lines/screen	24 characters x 4 lines
		No. of Characters	15 characters x 6 lines/screen	12 characters x 4 lines
		1/4 Size	7 characters x 3 lines/screen	—
Sensors	Communication	1/2 Size	—	—
		Full Size	—	—
		Double Size	—	—
		Character Magnification	0.5x, 1x, 2x, 3x, 4x, 5x, 6x, 7x, 8x, vertically and horizontally	—
		Character Attributes	Blink, reverse, bold, shadowed (blink is 1 or 0.5sec)	Blink, reverse
		Graphics	Line, polyline, polygon, rectangle, circle, ellipse, arc, pie, equilateral polygons (3, 4, 5, 6, 8), fill, picture	—
		Window Display	3 pop-up screens + 1 system screen	—
		1. The backlight life refers to the time until the brightness reduces by half after use at 25°C.		
		2. Brightness of LCD only (monochrome LCD: when lit white).		
		Note 1: The backlight life refers to the time until the brightness reduces by half after use at 25°C.		

Note 2: Brightness of LCD only (monochrome LCD: when lit white).

Operation Specifications

Switching Element	Analog resistive membrane (touch panel)
Operating Force	0.2 to 2.5N
Mechanical Life	1 million operations
Acknowledgment Sound	Electric Buzzer
Multiple Press	Not possible

HMI Function Specifications

Functions	Drawings, bit button, word button, goto screen button, key button, multi-button, keypad, selector switch, potentiometer, numerical input, character input, pilot lamp, picture display, message display, message switching display, alarm list display, alarm log display, numerical display, bar chart, line chart, pie chart, meter, calendar, bit write command, word write command, goto screen command, timer, script command, multi-command, system area, start time, Auto Backlight OFF, O/I Link, user communication, maintenance communication, DM Link Communication, PLC Link Communication, alarm log, data log, operation log, data storage area, preventive maintenance, recipe, text group, global script, user account, project data transfer using external memory, downloading logged data in external memory, USB auto-run function
-----------	--

Input Specifications

		12RA-	*14KA-*	*14SA-*	H12RA B12RA	H12RC B12RA	H24RA B24RA	H24RC B24RC	H40RKA B40RKA	H40RSA B40RSA	H40RC B40RC	H48KA B48KA	H48SA B48SA	H48KC B48KC	H48SC B48SC	01 Touchscreens <
--	--	---------	---------	---------	----------------	----------------	----------------	----------------	------------------	------------------	----------------	----------------	----------------	----------------	----------------	--

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

		12RA-	*14KA-*	*14SA-*	H12RA B12RA	H12RC B12RA	H24RA B24RA	H24RC B24RC	H40RKA B40RKA	H40RSA B40RSA	H48KA B48KA	H48SA B48SA	H48KC B48KC	H48SC B48SC
Analog Input	Input Points	2			2	—	4	—	6	—	8	—		
	Input Type	Voltage input	Voltage/Current input		Voltage input		Voltage input		Voltage input					
	Input Range	0 to 10.0V DC	0 to 10.0V DC / 4 to 20 mA		0 to 10.0V DC		0 to 10.0V DC		0 to 10.0V DC					
	Sampling Duration Time	2 ms maximum			2 ms maximum		2 ms maximum		2 ms maximum					
	Total Input System Transfer Time	3 ms + sampling time + scan time	3 ms + sampling time + scan time (voltage input) 12 ms + sampling time + scan time (current input)		2 ms + filtering time + scan time		2 ms + filtering time + scan time		2 ms + filtering time + scan time					
	Digital Resolution	0 to 1,000 (10 bits)			0 to 1,000 (10 bits)		0 to 1,000 (10 bits)		0 to 1,000 (10 bits)					
	Input Error	25°C	±3% of full scale		±1.5% of full scale		±1.5% of full scale		±1.5% of full scale		±1.5% of full scale			
		Total	±5% of full scale		±5% of full scale		±5% of full scale		±5% of full scale		±5% of full scale			
	Isolation	Between input terminals	Not isolated		Not isolated		Not isolated		Not isolated		Not isolated			
		Internal circuit	Not isolated		Not isolated		Not isolated		Not isolated		Not isolated			
When used as digital input	Digital I/O	Type 1 (not conforming to IEC 61131-2 digital I/O type)												
	Operation Level	OFF voltage: 5V maximum												
		ON voltage: 15V minimum												
		OFF current: 0.06 mA maximum												
External Power for Input	Input Voltage Range	—			—	—	20.4 to 26.4V DC	—	20.4 to 26.4V DC	—	20.4 to 26.4V DC	—	20.4 to 26.4V DC	
	Output Current Capacity	—			—	—	250 mA	—	300 mA	—	300 mA			

Output Specifications

Part Number			*12RA*	*14KA*	*14SA*
Transistor Output	Output Points	Transistor Sink Output	—	4	—
		Transistor Source Output		—	4
	Rated Load Voltage			24V DC	
	Input Voltage Range			20.4 to 28.8V DC	
	Maximum Load Current	1 point		0.3A maximum	
		1 common		1A maximum	
	Voltage Drop (ON Voltage)			1V maximum (voltage between COM and output terminals when output is ON)	
	Inrush Current			1A	
	Leakage Current			0.1 mA maximum	
	Clamping Voltage			39V ± 1V	
	Maximum Lamp Load			8 W maximum	
	Inductive Load			L/R = 10 ms (28.8V DC, 1 Hz)	
	External Current Draw			100 mA maximum, 24V DC	
	Isolation	Between output terminal and internal circuit		Photocoupler isolated	
Relay Output Common		Between output terminals		Not isolated	
	Output Delay	OFF □ ON		100µS max.	
		ON □ OFF		200µS max.	
	Electrical Life		100,000 operations minimum (resistive load 1,800 operations/h)	—	—
	Mechanical Life		20 million operations minimum (no load 18,000 operations/h)	—	—
	Dielectric Strength	Between output terminal and internal circuit	2,300V AC, 1 minute	—	—
		Between output terminals (between COMs)	2,300V AC, 1 minute	—	—
Analog Output	Output Points		—	2	
	Analog Output Signal Type			Voltage/Current output (Selectable)	
	Analog Output Range			0 to 10V DC / 4 to 20mA	
	Load Impedance			2kΩ min (voltage input) / 500 Ω max (current input)	
	Applicable Load Type			Resistive Load	
	Maximum Deviation at 25°C			±0.3% of full scale	
	Temperature Coefficient			±0.02%/°C of full scale	
	Repeatability After Stabilization Time			±0.4% of full scale	
	Non-linearity			±0.01% of full scale	
	Output Ripple			30mV max. (spike noise not included)	
	Overshoot			0% (Note 2)	
	Total Error			±1.0% of full scale including ripple	
	Effect of Improper Output Connection			No damage	
	Digital Resolution			0 to 1,000 (10 bits)	
	Output Value of LSB			10mV (0-10V) / 16µA (4-20mA)	
	Monotonicity			Yes	
	Current loop open			Not detectable	

Note 1: High-speed output terminal (100 kHz pulse output terminal): 5 µs max. Normal output terminal (including 5kHz pulse output terminal): 100 µs max.

Note 2: Overshoot may occur under light load conditions. Overshoot can be suppressed by inserting a damping resistor. Damping resistor value: approx. 150Ω including the input impedance.

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Output Specifications

			H12RA B12RA	H12RC B12RC	H24RA B24RA	H24RC B24RC	H40RKA B40RKA	H40RSA B40RSA	H40RC B40RC	H48KC B48KC	H48SC B48SC	H48KA B48KA	H48SA B48SA		
Transistor Output	Output Points	Transistor Sink Output	—	—	—	—	4	—	—	18	—	18	—		
		Transistor Source Output					—	4		—	18	—	18		
	Rated Load Voltage						24V DC			24V DC					
	Input Voltage Range						20.4 to 28.8V DC			20.4 to 28.8V DC					
	Maxi- mum Load Current	1 point					0.3A maximum			0.3A maximum					
		1 common					1A maximum			1A maximum					
	Voltage Drop (ON Voltage)						1V maximum (voltage between COM and output terminals when output is ON)			1V maximum (voltage between COM and output terminals when output is ON)					
	Inrush Current						1A			1A					
	Leakage Current						0.1 mA maximum			0.1 mA maximum					
	Clamping Voltage						39V ± 1V			39V ± 1V					
	Maximum Lamp Load						8 W maximum			8 W maximum					
	Inductive Load						L/R = 10 ms (28.8V DC, 1 Hz)			L/R = 10 ms (28.8V DC, 1 Hz)					
	External Current Draw						100 mA maximum, 24V DC (V terminal supply power)			100 mA maximum, 24V DC (V terminal supply power)					
	Isolation	Between output terminal and internal circuit					Photocoupler isolated			Photocoupler isolated					
		Between output terminals					Same common line: Not isolated Separate common line: isolated			Same common line: Not isolated Separate common line: isolated					
	Output Delay	OFF → ON					(Note)			(Note)					
		ON → OFF					(Note)			(Note)					
10A relay	Output Points		4							—	—	—	—		
	Output Type		1a contact												
	Rated Load Current		240V AC 10A, 30V DC 10A												
	Minimum Switching Load		10 mA/5V DC (reference value)												
	Initial Contact Resistance		100 mΩ maximum (1A, at 6V DC)												
2A relay	Output Points		—	—	4	4	8	8	12	—	—	—	—		
	Output Points per Common Line	COM4			4	4	4	4	4						
		COM5			—	—	4	4	4						
		COM6			—	—	—	—	4						
	Output Type				1a contact										
	Maxi- mum Load Current	1 point			240V AC 2A, 30V DC 2A										
		1 common			8A maximum										
	Minimum Switching Load				1 mA/5V DC (reference value)										
Initial Contact Resistance		30 mΩ maximum (1A, at 6V DC)													
Relay Output Common	Electrical Life		100,000 operations minimum (resistive load 1,800 operations/h)												
	Mechanical Life		20 million operations minimum (no load 18,000 operations/h)												
	Dielec- tric Strength	Between output terminal and internal circuit	2,300V AC, 1 minute												
		Between output terminals (between COMs)	2,300V AC, 1 minute												

Analog Expansion Cartridge Specifications (FC6A-P)

General Specifications

Part No.	FC6A-PJ2A	FC6A-PJ2CP	FC6A-PK2AV	FC6A-PK2AW
Type	Voltage/Current Input	Temperature Input	Voltage Output	Current Output
Number of Input/Output	2	2	2	2
Rated Voltage	5.0V, 3.3V (supplied from the Touch)			
Consumption Current	5.0V: — 3.3V: 30mA		5.0V: 70mA 3.3V: 30mA	5.0V: 185mA 3.3V: 30mA
Weight	15g			

Output Specifications

Part Number		FC6A-PK2AV	FC6A-PK2AW
Output Type	Voltage Output	0 to 10V DC	—
	Current Output	—	4 to 20mA DC
Load	Impedance	2kΩ min.	500 kΩ max.
	Load Type	Resistance Load	
D/A Conversion	Cycle Time	20ms	
	Settling Time	40ms max.	20ms max.
	Total Output System Transfer Type	60ms+1 scan	40ms+1 scan
Output error	Maximum Error at 25°C	±0.3% of full scale	
	Temperature Coefficient	±0.02%/°C of full scale	
	Reproducibility after Stabilization Time	±0.4% of full scale	
	Non-linearity	±0.01% of full scale	
	Output Ripple	30mV max.	
	Overshoot	0%	
	Maximum Error	±1.0% of full scale	
Data	Effect of Improper Output Terminal Connection	No damage	
	Digital Resolution	4096 (12 bits)	
	LSB Output Value	2.44mV (0 to 10V)	3.91μA (4 to 20mA)
	Data Format in Application	0 to 4095 (0 to 10V)	0 to 4095 (4 to 20mA)
	Monotonicity	Yes	
Noise Resistance	Open Current Loop	—	Cannot be detected
	Maximum Temporary Deviation during Electrical Noise Tests	±4.0 of full scale	
	Recommended Cable	Shielded twisted pair	
Isolation	Crosstalk	1 LSB max.	
		None	
Calibration to Maintain Rated Accuracy		Impossible	
Selection of Output Signal Type		Voltage output only	Current output only

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

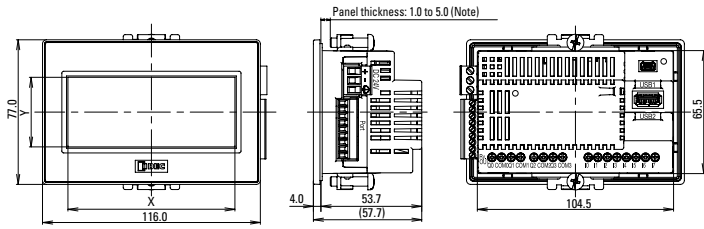
Input Specifications

Part No.		FC6A-PJ2A		FC6A-PJ2CP	
Input Type		Voltage Input	Current Input	Resistance Thermometer	Thermocouple
Input Range		0 to 10V DC	4 to 20mA DC 0 to 20mA DC	Pt100: −200 to +850°C Pt1000: −200 to +600°C Ni100: −60 to +180°C Ni1000: −60 to +180°C 3-wire RTD	K: −200 to 1300°C J: −200 to 1000°C R: 0 to 1760°C S: 0 to 1760°C B: 0 to 1820°C E: −200 to 800°C T: −200 to 400°C N: −200 to 1300°C C: 0 to 2315°C
Input Impedance		1MΩ min.	250Ω max.	1MΩ min.	
Allowable Conductor Resistance		—		10Ω max.	—
Input Detection Current		—		Typ: 0.2mA, 1.0mA max.	—
AD Conversion	Sample Duration Time	10ms		250ms	
	Sample Interval	20ms		500ms	
	Total Input System Transfer Time	20ms + 1 scan		500ms + 1 scan	
	Type of Input	Single-ended input			
	Operating Mode	Self-scan			
	Conversion Method	SAR			
Input Error	Maximum Error at 25°C	±0.1% of full scale		±0.1% of full scale	±0.1% of full scale Cold junction compensation accuracy ±4.0°C or less Exceptions R, S thermocouple error: ±6.0°C (0 to 200 °C range only) B thermocouple error: Not guaranteed (0 to 300 °C range only) K, J, E, T, N thermocouple error: ±0.4% of full scale (0°C or lower range only)
	Temperature Coefficient	±0.02%/°C of full scale			
	Reproducibility After Stabilization Time	±0.5% of full scale			
	Non-linearity	±0.01% of full scale			
	Maximum Error	±1.0% of full scale			
	Data	Digital Resolution	4096 (12 bits)		Pt100: 10,500 (14 bits) Pt1000: 8000 (13 bits) Ni100: 2400 (12 bits) Ni1000: 2400 (12 bits)
Noise Resistance	LSB Input Value	2.44mV (0 to 10V DC)	4.88μA (DC0 to 20mA) 3.91μA (DC4 to 20mA)	0.1°C 0.18°F	
	Data Format in Application	Can be arbitrarily set for each channel in the range of −32,768 to 32,773			
	Monotonicity	Yes			
	Maximum Temporary Deviation during Electrical Noise Tests	±4.0% of full scale			
	Recommended Cable	Shielded twisted pair		Twisted pair	
	Crosstalk	1LSB max.			
Isolation		None			
Effect When Input is Incorrectly Wired		No damage			
Maximum Allowable Constant Load (non-destructive)		13V DC	40mA	13V DC	
Input Type Modification		Software programming			
Calibration to Maintain Rated Accuracy		Impossible			

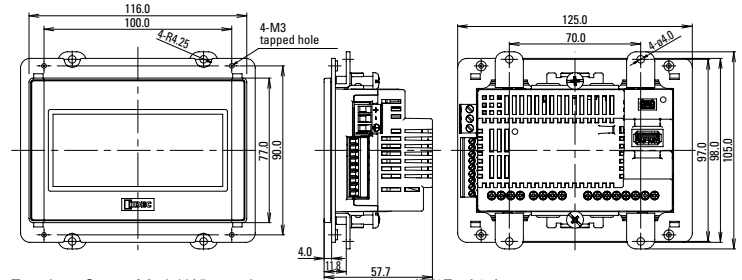
Dimensions (mm)

Touch

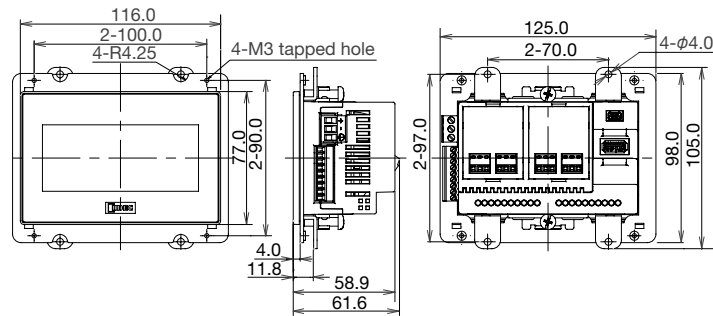
Relay Output Model When using mounting bracket (HG9Z-4K2PN04)



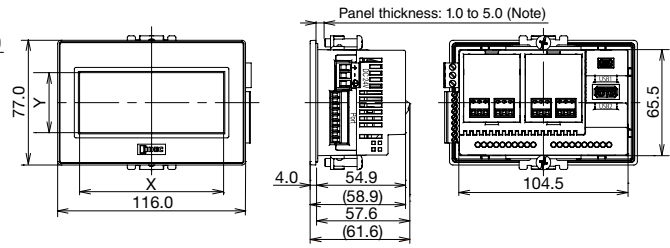
Relay Output Model When using rear mount adapter (FT9Z-1A01)



Transistor Output Model When using mounting bracket HG9Z-4K2PN04



Transistor Output Model When using rear mount adapter (FT9Z-1A01)



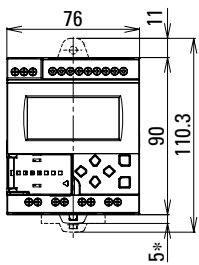
LCD Active Area

LCD Type	X	Y
TFT	88.92	37.05
STN	87.59	35.49

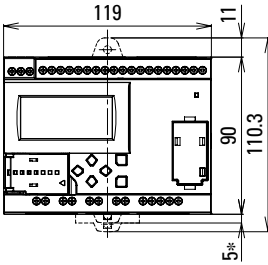
Note: Waterproof characteristics depend on panel material and size.

With LCD

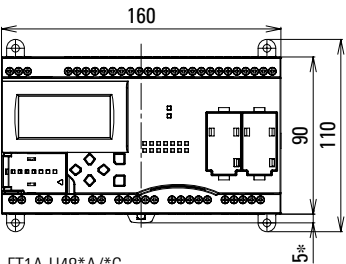
FT1A-H12*A/*C



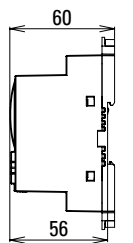
FT1A-H24*A/*C



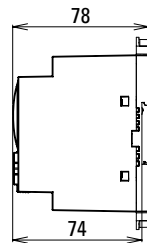
FT1A-H40*A/*C



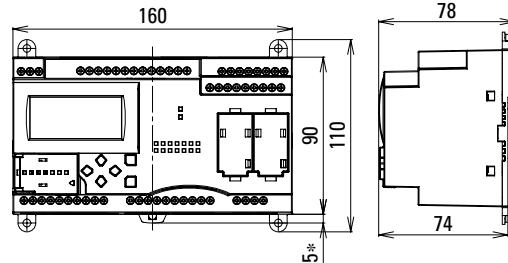
FT1A-H***A



FT1A-H***C

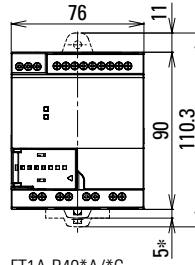


FT1A-H48*A/*C

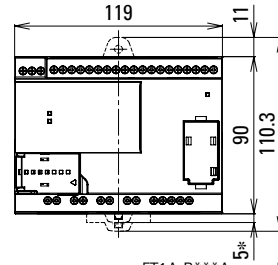


Without LCD

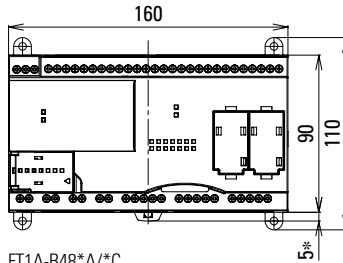
FT1A-B12*A/*C



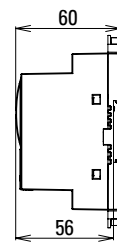
FT1A-B24*A/*C



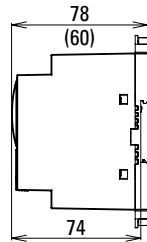
FT1A-B40*A/*C



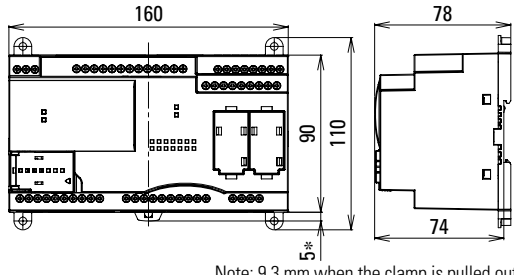
FT1A-B***A



FT1A-B***C



FT1A-B48*A/*C

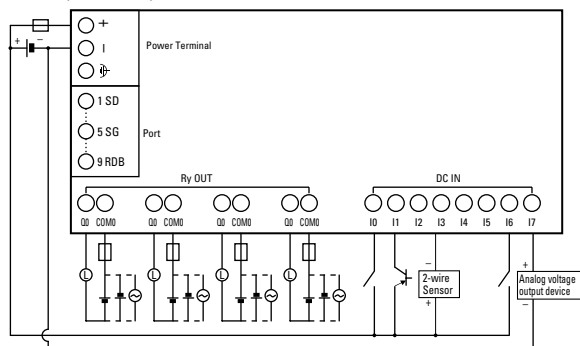


Note: 9.3 mm when the clamp is pulled out.

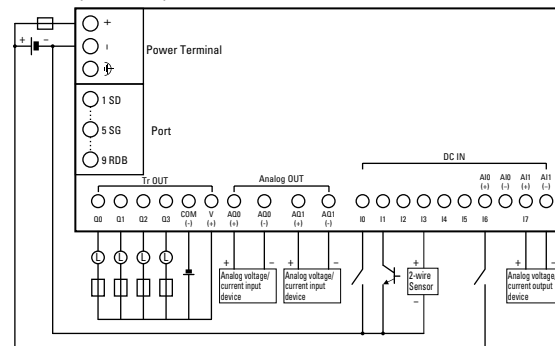
Note: 9.3 mm when the clamp is pulled out.

Terminal Arrangement and I/O Wiring Diagram Examples

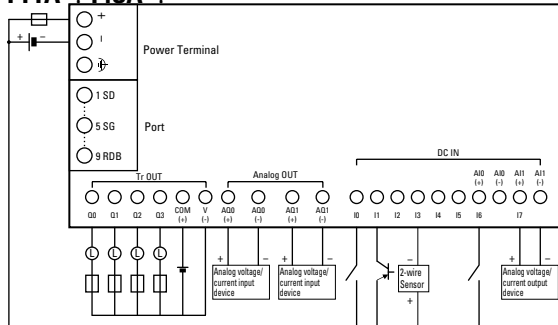
FT1A-*12RA-*



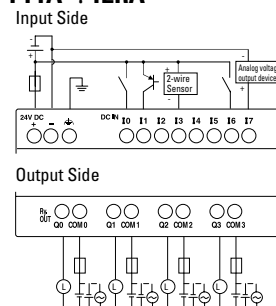
FT1A-*14KA-*



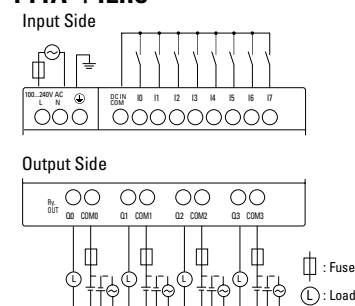
FT1A-*14SA-*



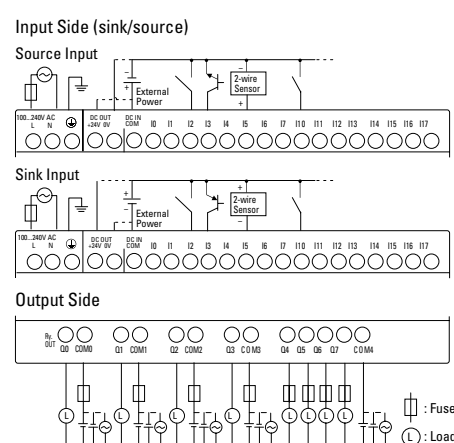
FT1A-*12RA



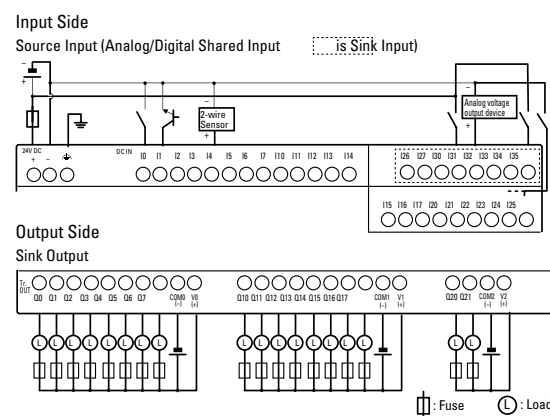
FT1A-*12RC



FT1A-*24RC-①

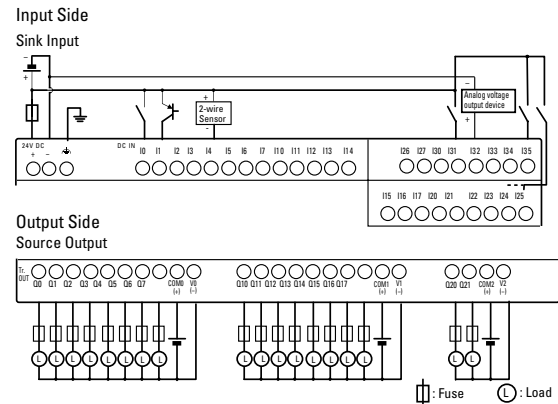


FT1A-*48SA-②



See ① for FT1A-*40RC, ① and ② for FT1A-*40RSA, and ① and ③ for FT1A-*40RKA.

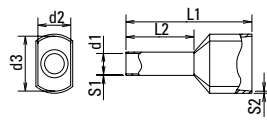
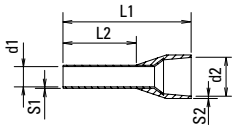
FT1A-*48KA-③



Recommended Ferrules

For 1-wire connection

For 2-wire connection



	Cross Section (mm2)	AWG	Phoenix Contact Part No.	Touch				Pro/Lite		L1	L2	d1	S1	d2	d3	S2
				Power Supply	Serial Interface	I/O		Power Supply	I/O							
						Relay Out- put Model	Transistor Output Model									
1-wire connection	0.25	24	AI0.25-8YE	—				×		12.5	8.0	0.8	0.15	1.8	—	0.25
	0.34	22	AI0.34-8TQ	×	×	×	×			12.5	8.0	0.8	0.15	2.0		0.25
	0.5	20	AI0.5-8WH	×	×	×	×	—		14.0	8.0	1.1	0.15	2.5		0.25
	0.75	18	AI0.75-8GY	×	—	×	—			14.0	8.0	1.3	0.15	2.8		0.25
	1.0		AI1-8RD	×		—		×	×	14.0	8.0	1.5	0.15	3.0		0.3
			AI1-10RD	—		×		—	16.0	10.0	1.5	0.15	3.0	0.3		
	1.5	16	AI1.5-8BK	×		—		×	×	14.0	8.0	1.8	0.15	3.4		0.3
			AI1.5-10BK	—		×		—	18.0	10.0	1.8	0.15	3.4	0.3		
2-wire connection	0.5	20	AI-TWIN2×0.5-8WH	×	×	—	×	—		15.0	8.0	1.5	0.15	2.5	4.6	0.25
	0.75	18	AI-TWIN2×0.75-8GY	×	—		—	×		15.0	8.0	1.8	0.15	2.8	5.2	0.25
			AI-TWIN2×0.75-10GY	—		×	—		17.0	10.0	1.8	0.15	2.8	5.2	0.25	
Screwdriver			SZS 0.6×3.5	×	—	×	—	×								
			SZS 0.4×2.5	—	×	—	×	—								

Note: Crimping pliers - Phoenix Contact part number CRIMPFOX ZA3 (12101882)

01 Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

IDEC SmartRelay – The Intelligent Choice



Look around. IDEC SmartRelays are in everything from lighting controls to ice-making machines and grocery store misters. Proving reliable time after time, these intelligent logic modules are the ideal controller for simple automation tasks. A new sixth-generation of SmartRelays offer functions to give you even more flexibility and convenience.

Advances include embedded Ethernet port with web server functions, micro SD port for data logging and program storage, extended memory, a brighter display with higher LCD contrast, improved analog and high-speed inputs, an external text display, and upgraded programming software.

Industrial Facility Systems



- Conveyor systems
- Elevator controls
- Exhaust and filtering systems
- Automatic food dispensing machines
- Water treatment and irrigation systems
- Motor, pump and valve controls

Housing and Building Management



- Lighting controls (outside and inside)
- Door and gate controls
- Heating and cooling systems
- Shutter, sun blind and awning controls
- Water and sprinkler systems
- Ventilation systems

Unique Solutions



- Solar-electric systems
- Marine systems
- Extreme environmental conditions
- Display panels and traffic light controls
- Energy management

Monitoring Systems



- Access controls
- Alarm systems
- Limit level monitoring
- Parking Lot monitoring
- Baggage control

www.IDEC.com/smartrelay

Universal Supply Voltage

- 12-24V DC, 24V DC, 24V AC/DC and 100-240V AC/DC models

Built-in Analog Inputs

- 4 x 0-10V DC, 10-bit resolution

High Speed Inputs

- Up to 4 inputs can be configured as 5 KHz high speed inputs

Micro SD card

- Every IDEC SmartRelay is now equipped with a micro SD slot for program storage, transfer and data logging
- Special memory cartridge is no longer required

Expansion interface

- Add expansion modules for additional I/O
- Up to 12 expansion modules can be added
- Total maximum I/O: 24 digital inputs, 20 digital outputs, 8 analog inputs, 8 analog outputs



Digital Outputs

- 10A relay or transistor outputs

Operational Control Buttons

- Using built-in LCD screen and buttons, simple program can be created without PC and software
- Change preset values such as Timers and Counters

New and improved LCD display

- 6 lines (16/10 characters per line)
- 3 backlight colors (white, amber, red)

Embedded RJ45 Ethernet Port

- Remote program download, upload and monitor
- Integrated web server for remote monitoring and control
- Easily create, monitor and control web pages with no HTML programming



NK



Class 1, Div 2



Part Numbers

Base Modules – with and without LCD

Style	Part Number	Rated Power Voltage	Input Signal	I/O Points	Output	Display	With Clock	Weight
	FL1F-H12SCD	24V DC	DC I1, I2, I7 and I8 are used for digital/analog inputs	8/4 points	Transistor	Yes	Yes	195g
	FL1F-H12RCE	12/24V DC		8/4 points	Relay	Yes		204g
	FL1F-B12RCE					—		200g
	FL1F-H12RCA	24V AC/DC	AC/DC	8/4 points	Relay	Yes		240g
	FL1F-B12RCA					—		200g
	FL1F-H12RCC	100 to 240V AC/DC	AC/DC	8/4 points	Relay	Yes		240g
	FL1F-B12RCC					—		200g

Text Message Display

Style	Part Number	Rated Voltage	Description	Weight
	FL1F-RD1	12 V DC, 24 V AC/DC	FL1F Text Display Panel	220g

Digital and Analog I/O Expansion Modules

- 8-pt expansion module (4 in/4 out)
- Max. 4 digital expansion modules, 4 analog input modules, and 4 analog output modules

Style	Part Number	Total I/O	Input Power	Input Signal	Output Signal	Weight
	FL1F-M08B1S2	4/4 points	24V DC	DC	Transistor	95g
	FL1F-M08B2R2	4/4 points	12/24V DC	DC	Relay	130g
	FL1F-M08D2R2	4/4 points	24V AC/DC ²	AC/DC ²	Relay	130g
	FL1F-M08C2R2	4/4 points	100 to 240V AC/DC	AC/DC	Relay	130g
	FL1F-J2B2	2/0 points	12/24V DC	Analog	—	95g
	FL1F-K2BM2	0/2 points	24V DC	—	Analog	95g

Starter Kits

IDEC SmartRelay Starter Kit is an economical and ideal solution for first time IDEC SmartRelay users

- Package includes a base module, WindLGC programming software, simulator switch (DC models only) and a 15W power supply (DC models only).

	CPU	LCD Screen	Software	Part Number
	12 I/O, 24V AC/DC, FL1F-B12RCA CPU	–	✓	KIT-SMARTRELAY-BAF
	12 I/O, 100-240V AC/DC, FL1F-B12RCC CPU	–	✓	KIT-SMARTRELAY-BCF
	12 I/O, 12-24V AC/DC, FL1F-B12RCE CPU	–	✓	KIT-SMARTRELAY-BEF
	12 I/O, 24V AC/DC FL1F-H12RCA CPU	✓	✓	KIT-SMARTRELAY-HAF
	12 I/O, 100-240V AC/DC, FL1F-H12RCC CPU	✓	✓	KIT-SMARTRELAY-HCF
	12 I/O, 12/24V DC, FL1F-H12RCE CPU	✓	✓	KIT-SMARTRELAY-HEF
	12 I/O, 24V DC, FL1F-H12SCD CPU	✓	✓	KIT-SMARTRELAY-HDF

Accessories

Description	Part Number	Package Quantity	Remarks
Application Software: WindLGC	FL9Y-LP1CDW	1	DVD-ROM (incl. online help manual)
Mounting Clip for Base Module	FL1F-PSP1PN05	5	Supplied with a module ³
Mounting Clip and Waterproof Gasket for Text Display	FL1F-KW1	1	Supplied with text display ⁴
IDEC SmartRelay User's Manual (English)			Downloadable from: http://www.idec.com/download

³ Supplied with a base module and an expansion module.

⁴ Supplied with a text display, it includes a gasket, four mounting clips, and a power supply connector.

WindLGC

Programming Software

WindLGC is the exclusive programming software for the IDEC SmartRelay using Windows®. Edit, save, and print out your programs.

Key features:

- Ladder programming
- Online Monitor
- Program Comparison
- Time Simulation
- Simplified connection of the functions
- Programs can be saved in PDF or JPG format

Just click the function blocks you need and link function blocks for easy wiring. Devise complicated circuits using the convenient functions of WindLGC.

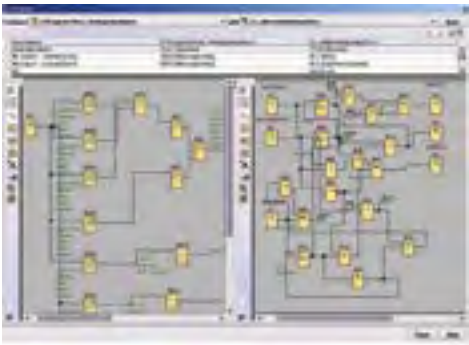
Part Number

Part Number	Description
FL9Y-LP1CDW	WindLGC programming software for IDEC SmartRelay

WindLGC system requirements:

- OS: Windows XP, Vista, 7 and 8.
- CPU recommendation: Pentium 266MHz or higher
- Memory: 64MB or more
- RAM recommendation: 128MB
- Hard disk space: 90MB or more for installing WindLGC software.
- Monitor Recommendation: Display more than 800 x 600 dots and 256 colors

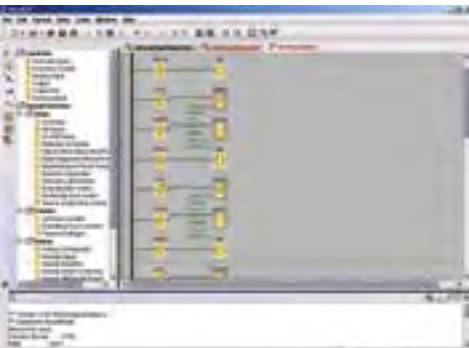
Program Comparison



Simulation Mode/Online Monitor



Ladder Programming



For more information, see the Automation Software section.
Visit www.IDEC.com/downloads for free upgrades or a free demo version.

Specifications

Base Modules

Base Module Type No.		FL1F-H12SCD	FL1F-H12RCE FL1F-B12RCE	FL1F-H12RCA FL1F-B12RCA	FL1F-H12RCC FL1F-B12RCC
Power Supply	Rated Power Voltage	24V DC	12/24V DC	24V AC/DC	100 to 240V AC/DC
	Allowable Voltage Range	20.4 to 28.8V DC	10.8 to 28.8V DC	20.4 to 26.4V AC 20.4 to 28.8V DC	85 to 265V AC 100 to 253V DC
	Rated Frequency	—	—	47 to 63Hz	47 to 63Hz
	Current Draw	15 to 50 mA (24V DC) 1.2A (with max. load on digital output)	30 to 140 mA (12V DC) 15 to 90 mA (24V DC)	15 to 150mA (12V DC) 15 to 130mA (24V DC)	15 to 40mA (100V AC) 5 to 10mA (100V DC) 15 to 25mA (240V AC) 2 to 8mA (240V DC)
	Allowable Momentary Power Interruption	—	2ms Typ. (12V DC) 5ms Typ. (24V DC)	5ms Typ. (24V AC/DC)	10ms Typ. (100V AC/DC) 20ms Typ. (240V AC/DC)
	Power Consumption	1.2 W (24V DC)	1.7W (12V DC) 2.2W (24V DC)	3.6 W (24V AC) 3.2 W (24V DC)	4.6W (100V AC) 1.2W (100V DC) 6.0W (240V AC) 2.0W (240V DC)
	Reverse Polarity Protection	Yes	Yes	—	—
Clock	Backup Duration	20 days	20 days	20 days	20 days
	Clock Accuracy	±2 sec/day (Typ.)	±2 sec/day (Typ.)	±2 sec/day (Typ.)	±2 sec/day (Typ.)
Input	Input Signal	DC	DC	AC/DC	AC/DC
	Input Points	8 (I1 to I8)	8 (I1 to I8)	8 (I1 to I8)	8 (I1 to I8)
	High-speed Input ¹	4 (I3, I4, I5, I6), 5kHz maximum	4 (I3, I4, I5, I6), 5kHz maximum	—	—
	Analog Input Points	4 (I1, I2, I7, I8)	4 (I1, I2, I7, I8)	—	—
	Analog Input Range	0 to 10V DC (max. rated input: 28.8V DC)	0 to 10V DC (max. rated input: 28.8V DC)	—	—
	Analog Input Error	±1.5 (of full scale)	±1.5 (of full scale)	—	—
	Analog Input Resolution	10 bits (0 to 1000)	10 bits (0 to 1000)	—	—
	Cycle time	300ms	300ms	300ms	300ms
	Allowable Voltage Range	0 to 28.8V DC	0 to 28.8V DC	0 to 26.4V AC 0 to 28.8V DC	0 to 265V AC 0 to 253V DC
	Input Impedance	Digital Input	5.8kΩ	4.8kΩ	610kΩ
		Analog Input	72kΩ	—	—
	Isolation	—	—	—	—
	Operating Range	OFF Voltage	< 5V DC	< 5V AC/DC	< 40V AC < 30V DC
		ON Voltage	≥ 12V DC	≥ 8.5 V DC	≥ 79V AC ≥ 79V DC
		OFF Current	< 0.9mA (I3 to I6) < 0.07mA (I1, I2, I7, I8)	< 0.88mA (I3 to I6) < 0.07mA (I1, I2, I7, I8)	< 1.2mA
		ON Current	≥ 2.1mA (I3 to I6) ≥ 0.18mA (I1, I2, I7, I8)	≥ 1.5mA (I3 to I6) ≥ 0.12mA (I1, I2, I7, I8)	≥ 2.6mA
	Turn ON Time	1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	1.5ms (Typ.)	100V AC: 40ms (Typ.), 240V AC: 30ms (Typ.) 100V DC: 25ms (Typ.), 240V DC: 20ms (Typ.)
	Turn OFF Time	1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	15ms (Typ.)	100V AC: 45ms (Typ.), 240V AC: 70ms (Typ.) 100V DC: 60ms (Typ.), 240V DC: 75ms (Typ.)
	Wire Length ²	100m	100m	100m	100m
Output	Output Signal	Transistor source output	Relay output	Relay output	Relay output
	Output Points/ Contact Configuration	4 points (separate)	4NO contacts	4NO contacts	4NO contacts
	Isolation	—	Isolated	Isolated	Isolated
	Dielectric Strength (between power/input terminals and output terminals)	—	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute
	Output Voltage	External power voltage	—	—	—
	Maximum Load Current	0.3A maximum	Resistive load 10A at 12/24V AC/DC, 10A at 100/120V AC, 10A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC Inductive load 2A at 12/24V AC/DC, 3A at 100/120V AC, 3A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC		
	Surge Current	—	30A maximum	30A maximum	30A maximum
	Short-circuit Protection	Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum	External fuse required: 16A maximum	External fuse required: 16A maximum
	Minimum Switching Load	—	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)
	Initial Contact Resistance	—	100mΩ maximum (at 1A, 24V DC)	100mΩ maximum (at 1A, 24V DC)	100mΩ maximum (at 1A, 24V DC)
	Mechanical Life	—	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)
	Electrical Life	—	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour

¹ When selecting frequency trigger function and up/down counter function.

² 10m when connected to analog input (twisted pair cable)

Initialization Time: After power-up, the FL1F takes a maximum of 9 seconds (when using a micro SD card) for initialization. When initialization is complete, the FL1F is automatically set to RUN mode.

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Expansion I/O Module

Expansion I/O Module Type No.		FL1F-M08B1S2	FL1F-M08B2R2	FL1F-M08D2R2	FL1F-M08C2R2	FL1F-J2B2	FL1F-K2BM2	
Power Supply	Rated Power Voltage	24V DC	12/24V DC	24V AC/DC	100 to 240V AC/DC	12/24V DC	24V DC	
	Allowable Voltage Range	20.4 to 28.8V DC	10.8 to 28.8V DC	20.4 to 26.4V AC 20.4 to 28.8V DC	85 to 265V AC 100 to 253V DC	10.8 to 28.8V DC	20.4 to 28.8V DC	
	Rated Frequency	—	—	50/60Hz (47 to 63Hz)	50/60Hz (47 to 63Hz)	—	—	
	Current Draw	15 to 40mA	10 to 80mA (12V DC) 10 to 40mA (24V DC)	20 to 100mA (24V AC) 8 to 50mA (24V DC)	10 to 30mA (100V AC) 10 to 20mA (240V AC) 5 to 15mA (100V DC) 5 to 10mA (240V DC)	15 to 30mA	15 to 82mA	
	Allowable Momentary Power Interruption	—	2 ms (typ.) (12V DC) 5 ms (typ.) (24V DC)	5 ms (typ.) (24V AC/DC)	10ms (typ) (100V AC/DC) 20ms (typ.) (240V AC/DC)	10ms (typ.) (12/24V DC)	10ms (typ.)	
	Power Consumption	1.0W	1.0W (12V DC) 1.0W (24V DC)	2.4W (24V AC) 1.2W (24V DC)	3.5W (100V AC) 1.8W (100V DC) 4.8W (240V AC) 2.4W (240V DC)	0.4W (12V DC) 0.8W (24V DC)	2.0W	
	Reverse Polarity Protection	Yes	Yes	—	—	Yes	Yes	
Input	Input Signal	DC input	DC input	AC/DC input	AC/DC input	Analog input	—	
	Input Points	4	4	4	4	—	—	
	Isolation	—	—	—	—	—	—	
	Allowable Voltage Range	20.4 to 28.8V DC	10.8 to 28.8V DC	20.4 to 26.4V AC 20.4 to 28.8V DC	85 to 265V AC 100 to 253V DC	—	—	
	Operating Range	OFF Voltage	< 5V DC	< 5V DC	< 5V AC/DC	< 40V AC < 30V DC	—	—
		ON Voltage	≥ 12V DC	≥ 8.5V DC	≥ 12V AC/DC	≥ 79V AC ≥ 79V DC	—	—
		OFF Current	< 0.88mA	< 0.88mA	< 1.1mA	< 0.05mA (AC) < 0.06mA (DC)	—	—
		ON Current	≥ 2.1mA	≥ 1.5mA	≥ 2.63mA	≥ 0.08mA (AC) ≥ 0.13mA (DC)	—	—
	Turn ON Time	1.5ms (Typ.)	1.5ms (typ.)	1.5ms (typ.)	100V AC: 40 ms (typ.) 240V AC: 30 ms (typ.) 100V DC: 25 ms (typ.) 240V DC: 20 ms (typ.)	—	—	
	Turn OFF Time	1.5ms (Typ.)	1.5ms (typ.)	15ms (typ.)	100V AC: 45 ms (typ.) 240V AC: 70 ms (typ.) 100V DC: 60 ms (typ.) 240V DC: 75 ms (typ.)	—	—	
	Analog Input Points	—	—	—	—	2	—	
	Analog Input Range	—	—	—	—	0 to 10V (max. rated input: 28.8V) 0 to 20mA (max. rated input: 40mA)	—	
	Digital Resolution	—	—	—	—	10 bits (0 to 1000)	—	
	Input Error	—	—	—	—	±1.5% (of full scale)	—	
	Input Impedance	—	—	—	—	76kΩ (0 to 10V) 250Ω (0 to 20mA)	—	
	Sampling Cycle	—	—	—	—	50ms	—	
Output	Wire Length	100m	100m	100m	100m	10m (twisted-pair shielded cable)	—	
	Output Signal	Transistor source output	Relay output	Relay output	Relay output	—	—	
	Output Points/Contact Configuration	4 points (separate)	4NO contacts	4NO contacts	4NO contacts	—	—	
	Isolation	—	Isolated	Isolated	Isolated	—	—	
	Dielectric Strength (between power/input terminals and output terminals)	—	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	—	—	
	Output Voltage	External power voltage (20.4 to 28.8V DC)	—	—	—	—	—	
	Maximum Load Current	0.3A maximum	Resistive load 5A at 12/24V AC/DC, 5A at 100/120V AC, 5A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC Inductive load 2A at 12/24V AC/DC, 3A at 100/120V AC, 3A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC	—	—	—	—	
	Short-circuit Protection	Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum	External fuse required: 16A maximum	External fuse required: 16A maximum	—	Yes	
	Minimum Switching Load	—	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)	—	—	
	Initial Contact Resistance	—	100mΩ maximum (at 1A, 24V DC)	100mΩ maximum (at 1A, 24V DC)	100 mΩ maximum (at 1A, 24V DC)	—	—	
	Mechanical Life	—	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	—	—	
	Electrical Life	—	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	—	—	
	Analog Output Points	—	—	—	—	—	2	
	Analog Output Range	—	—	—	—	—	Voltage: 0-10V DC Current: 0-20, 4-20 mA	
	Digital Resolution	—	—	—	—	—	10 bits (0 to 1000)	
	Output Error (of full scale)	—	—	—	—	—	Voltage output: ±2.5% Current output: ±3%	
	Output Impedance	—	—	—	—	—	Voltage: 5kΩ min Current: 250Ω max	
	Analog Value Conversion Interval	—	—	—	—	—	50ms (typ.)	
Wire Length	—	—	—	—	—	10m (twisted-pair shielded cable)		

General

Style	Specification	Standard
Operating Temperature	Horizontal Mounting	0 to 55°C (no freezing)
	Vertical Mounting	0 to 55°C (no freezing)
Storage/Transportation Temperature	–40 to +70°C (no freezing)	—
Relative Humidity	10 to 95% RH (no condensation)	IEC60068-2-30
Atmospheric Pressure	795 to 1080 hPa	—
Operating Condition	No corrosive gas	—
Degree of Protection	IP20	—
Vibration Resistance	5 to 8.4Hz, amplitude 3.5mm 8.4 to 150Hz, acceleration 9.8m/s ²	IEC60068-2-6
Shock Resistance	147m/s ²	IEC60068-2-27
Drop Test	0.3m	IEC60068-2-31
Drop Test (packaged)	1m	IEC60068-2-32
Emission	Class B Group 1 ¹	EN55011
Electrostatic Discharge	8kV air discharge, 6kV contact discharge ²	IEC61000-4-2
Radiation Field Immunity	Field Strength: 1V/m and 10V/m	IEC61000-4-3
Burst Pulses	2kV (power line), 1kV (I/O signal line) ³	IEC61000-4-4
Surge Immunity1 (FL1F-H12RCC, FL1F-B12RCC only)	1kV (power line) normal 2kV (power line) common	IEC61000-4-5
Communication Cable	0.5 to 2.5mm ² (one wire), 0.5 to 1.5mm ² (two wires)	—
Terminal Style	Finger-safe type ⁵	—

1: For protection against surge noise on DC power supply types (FL1F-H12RCE/B12RCE, FL1F-H12SCD, FL1F-H12RCA/B12RCA), use surge absorbers, noise cut transformers or noise filters. Use of a surge protection device (DEHN + SÖHNE GmbH + Co, BVT AD 24 Part No. 918 402) is recommended.

2: Tightening torque 0.5 to 0.6N·m

Text Display

Part Number		FL1F-RD1	
Keyboard Display		FSTN graphic display (W × H: 160 × 96 dots) LED backlight (White, Amber, Red)	
Dimensions (W × H × D)		128.2 × 86 × 38.7 mm	
Installation		Panel cut-out using mounting clips	
Font Type		English, Spanish, Russian, Chinese, Italian, Turkish, German, Dutch, French, Japanese	
Keyboard		Membrane keypad with 10 keys	
Power Supply	Input Voltage		24V AC/DC, 12V DC
	Allowable Voltage Range		20.4 to 26.4V AC 10.2 to 28.8V DC
	Rated Frequency		47 to 63Hz
	Current Draw		30 to 55mA (24V DC)
	Power Consumption	12V DC	145mA (Typ.)
		24V DC	70mA (Typ.)
		24V AC	75mA (Typ.)
Data Transmission Rate		10/100M full/half duplex data transmission rate	
LCD Display	Backlight lifetime ¹	20,000 hours	
	Display lifetime ²	50,000 hours	
Weight		220g	

1 For protection against surge noise on DC power supply types (FL1F-H12RCE/B12RCE, FL1F-H12SCD, FL1F-H12RCA/B12RCA), use surge absorbers, noise cut transformers, or noise filters. Use of a surge protection device (DEHN + SÖHNE GmbH + Co, BVT AD 24 Part No. 918 402) is recommended.

2 Tightening torque 0.5 to 0.6N·m

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Selection Guide.....	148
Automation Organizer Suite.....	149
WindO/I-NV2 and NV3 and NV4	150
WindLDR	155
WindCFG	159
WindSRV	161
WindLGC	164

Automation Software



www.IDEC.com/software



Selection Guide

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Series	Automation Organizer Software Suite				WindSRV	WindLGC	WindMSG
	Wind O/I-NV2 and NV4	Wind O/I-NV3	WindLDR	WindCFG			
Appearance							
Page Number	150	150	155	159	161	164	visit www.IDEC.com/software
Application	OI Touchscreens	FTIA Touch	PLCs	System Configuration Tool for OI Touchscreens & PLCs	OPC Server for PLCs	SmartRelay	Character Displays

Automation Organizer Suite

A one-stop automation software package for all IEC PLC and OI Touchscreens

Automation Organizer (AO), the IEC software suite combining our popular PLC programming software (WindLDR), WindO/I-NV3 programming software for FT1A Touch, and OI programming software (WindO/I-NV2 and WindO/I-NV4) with system configuration software (WindCFG), is made to enable you to see the layout of your system design and basic configuration of devices. AO gives you a powerful and easy-to-use tool to design, debug, and document control systems, saving valuable time and money.

FREE Upgrades

The Automation Organizer suite comes with free lifetime upgrades. Once you make the initial purchase, upgrades are absolutely free.



Part Number

Part Number	Description
SW1A-W1C	Automation Organizer software suite



Automation Organizer

WindO/I-NV2



Automation Organizer

WindO/I-NV4



Automation Organizer

WindO/I-NV3

WindO/I-NV2 and NV4 software is the simplest programming tool for all IEC OI Touchscreens. It is used to create projects or programs that can display information from a PLC, process status, or can be used to input data with virtual switches or keypads to make changes to a process. The objects are extremely easy to configure with the help of step-by-step navigation. It lets you quickly create colorful graphical screens in no time using drop-down menus and intuitive drag and drop functionality for the objects. A workspace is available to help you organize and manage projects, objects and screens.

WindO/I-NV3 is our exclusive configuration software for FT1A Touch. Using the same platform as WindO/I-NV2 OI Touchscreen programming software, WindO/I-NV3 provides users with the same intuitive experience. Users can easily display alarm screens, trend and bar graphs, scrolling texts and meters. With thousands of industry-standard bitmap libraries, creating a professional interface is just a click away.



Automation Organizer

WindLDR

All IEC micro controllers are programmable with WindLDR ladder logic software. This icon-driven programming tool combines logic and intuition with an incredibly easy-to-use interface to allow you to take advantage of every MicroSmart feature. Even without ladder program experience, you can use the built-in editors, shortcuts and debuggers to configure programs.



Automation Organizer

WindCFG

WindCFG is a System Configuration tool. You can create a visual layout of your system design and basic configuration of the IEC PLCs, OI Touchscreens, barcode readers, & other peripheral devices for the purpose of creating manuals or other documentation.

Automation Organizer Suite - WindO/I-NV2/NV3/NV4

Programming Software for IDEC OI Touchscreens & FT1A Touch

Key Features

- Built-in Serial and Network Protocols
- Pass-thru function
- Extensive Image Library
- Intuitive Drag & Drop Functionality
- Flexible Screen Display for Efficient Editing
- Workspace – easy to manage projects & screens



Automation Organizer

WindO/I-NV2

Automation Organizer

WindO/I-NV3

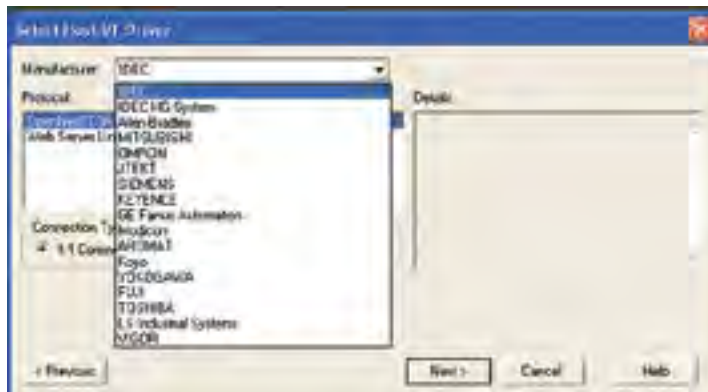
Automation Organizer

WindO/I-NV4

It's as easy as 1, 2, 3!

1 Create

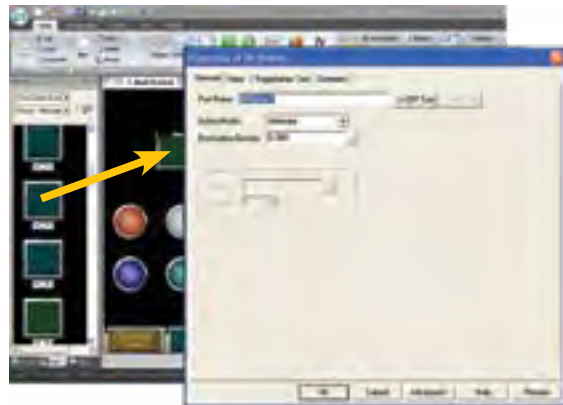
Creating a project is simple! Just name a project file and select your parameters (OI type and model, protocol type, and optional settings).

**2 Configure**

Select a functional part and assign a device address. The other tabs allow you to change image, color, or add more parameters.

**Drag and Drop
Screen Design**

**Easy step-by-step
configuration**

**3 Download**

Once your project is ready to be downloaded to the touchscreen, select "Online" and then "Download." You can now debug or monitor your program as needed. It's as simple as that!

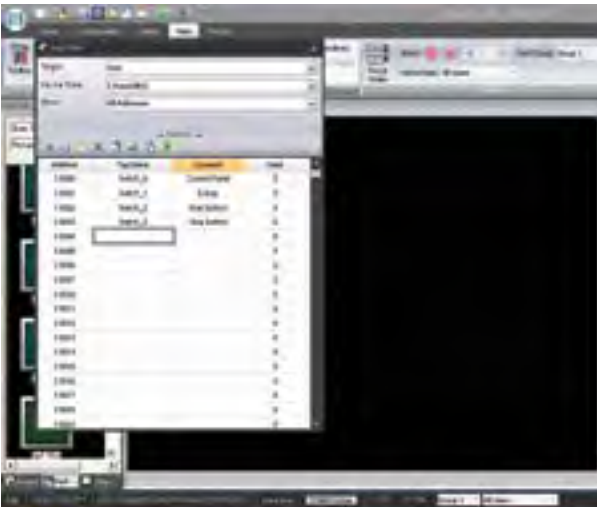


Create a powerful graphical display



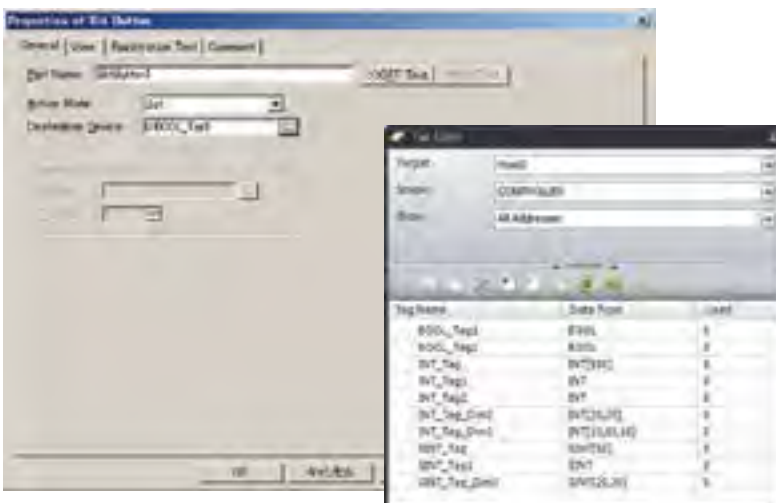
Extensive Image Library

A built-in symbol library provides over 7,000 bitmaps to help you create cutting-edge graphical screens. Image data from BMP and JPG files can also be imported.



Tag Database

You can create a database of device addresses, including Tag Names, which help you label each address to best match your information or documentation. By creating a Tag database, you can choose addresses used to read data from the PLC or Host device, or write data to the PLC or device. Even more convenient, if you have a list of IDEC PLC addresses already made in WindLDR, you can easily import it to the Tag Database.



Allen Bradley Logix Native Tag Import

The High-Performance models support "Allen Bradley Logix Native Tag Import," which means you can easily import any tag database file (L5K or CSV file) created with Allen Bradley PLC software. Once registered in the Tag Editor, you simply select the Tag name for your part.



Supports Standard Windows Fonts

These OI Touchscreens support all fonts used in Windows, including Stroke and 7 Segment Display fonts, making it possible to choose from a variety of text styles to create the look and feel you want to achieve.

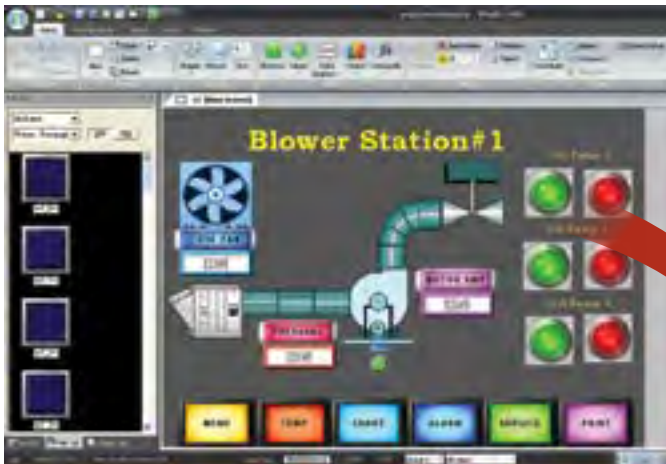
Multilingual Capabilities for Global Applications

The IEC Touchscreen family supports many different languages. Using the Text Group function you can create a text database in Japanese, Chinese, Korean, Taiwanese, as well as Baltic, Cyrillic and other European languages. Plus, you can easily switch text messages from English to Japanese or any other supported language with the touch of a button.



Project Conversion

A Zooming Conversion function makes it easy to convert existing program images and functional parts, created for a small display, to a larger display or vice versa. Don't waste time recreating projects for a different display when you can save time and energy by using this easy-to-use tool!





Security Function

When you have multiple users editing projects or displaying screens and parts, it may be necessary to have different levels of security and restrictions. With the Security Function, you can password protect programs, screens and parts from other users.



Operation and Alarm Log Functions

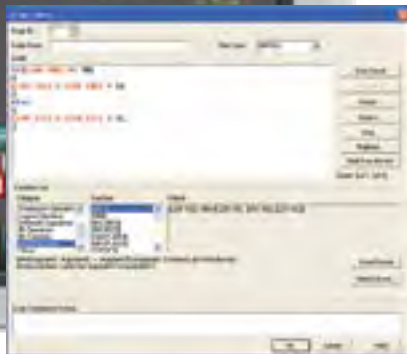
The operating log helps investigate, analyze and solve problems and system errors by checking who, when, what and where operations were performed. Plus, once you setup up the Alarm Log function for messages and alerts, it can monitor alarm conditions from a PLC and store historical events with a date and time stamp on a memory card (in CSV format). The high-performance series also meets ISA standards for visual alarm management.

Target Events for Record	Record Information						
	Sampling Time	User	Screen No.	Event Name	Part Name	Device	Change bit
Power Off	0	0	0	0	0	0	0
Switch to Run Screen	0	0	0	0	0	0	0
Change User	0	0	0	0	0	0	0
Change Operation Mode	0	0	0	0	0	0	0
Force Buttons	0	0	0	0	0	0	0
Write Data any Devices	0	0	0	0	0	0	0



Script Function

Users with basic programming knowledge in "C" can use a Script function to combine conditional statements, mathematical operations and other functions to create simple and complex processes, reducing the programming required in the PLC. A Syntax Check function is also available providing easy program troubleshooting.





Switches, Pilot Lamps, and Meters

Hundreds of colorful pushbuttons, switches and meter images can give your display a realistic appearance mimicking a real panel. Pushbuttons and switches are used to set a bit, move data, switch screens or print screen images, while pilot lamps or multi-state lamps read and display statuses from single or multiple bits on the PLC or device.



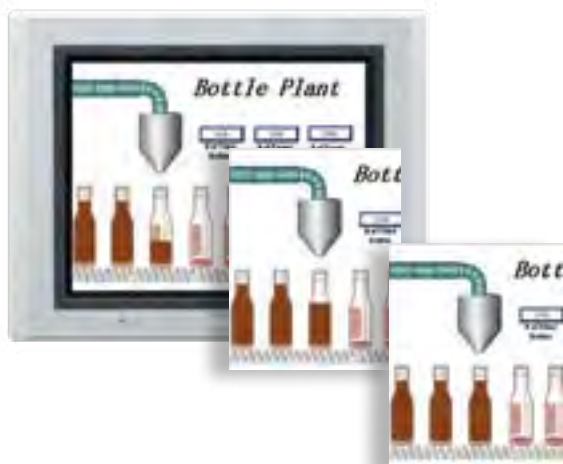
Bar Graphs and Trend Charts

Use the Bar graphs and numerical displays to show range or flow for analog values from your PLC or device, or create Trend Charts to closely monitor critical data points. Display historical data (based on a fixed time period or event) with the option to show date & time on the x-axis or store it (in csv format) on the memory card or internal memory for easy viewing and data manipulation on your PC.



Recipe

A Recipe function allows you to conveniently set operational parameters, which can be individually defined for different processes. There are 1,024 available channels, which can store up to 8,192 parameters per channel. Plus you can easily upload or download parameters to and from your PLC.



Animation

Want to give your screen a "WOW" factor? It's simple to display animation by using the Picture Display function and configuration is a breeze. Simply import a series of images when using the Picture Display Function. Those images will then be displayed depending on the device value or constant time period.

Automation Organizer Suite - WindLDR

Programming Software for IDEC PLCs

Key Features

- Online Edit
- Simulation Mode
- Comment download



Automation Organizer

WindLDR



Single Platform for all IDEC PLCs

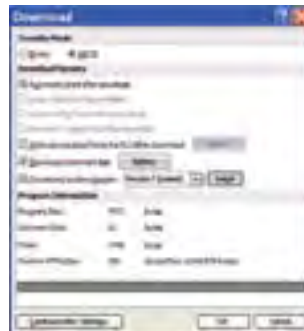
WindLDR is an excellent, long-term investment for your control solutions. It programs every IDEC PLC including the OpenNet Controller, MicroSmart and the fastest micro-controller on the market, MicroSmart Pentra. It's adaptable to whatever hardware you need today and down the road.

Simple-to-use Editors

Use the tag editor to access and edit coil data. Edit comments and rung comments. Simulation mode allows you to test your program in WindLDR to guarantee that it works the way you expected, rather than downloading it to your PLC.

Firmware Download

With WindLDR version 6.4 or later, you have the option to upgrade or downgrade your CPU system program. It's as simple as clicking on the checkbox in the Download dialog box. Now you can easily update your PLC system firmware with the click of a button.



User-friendly Interfaces

Icon-based toolbars and drag-and-drop functionality make basic ladder programming accessible to anyone. But WindLDR also shows you how to display parameters and settings and how to input your parameters, and the built-in shortcuts and tutorials will keep you on the right track.

Free Lifetime Upgrade

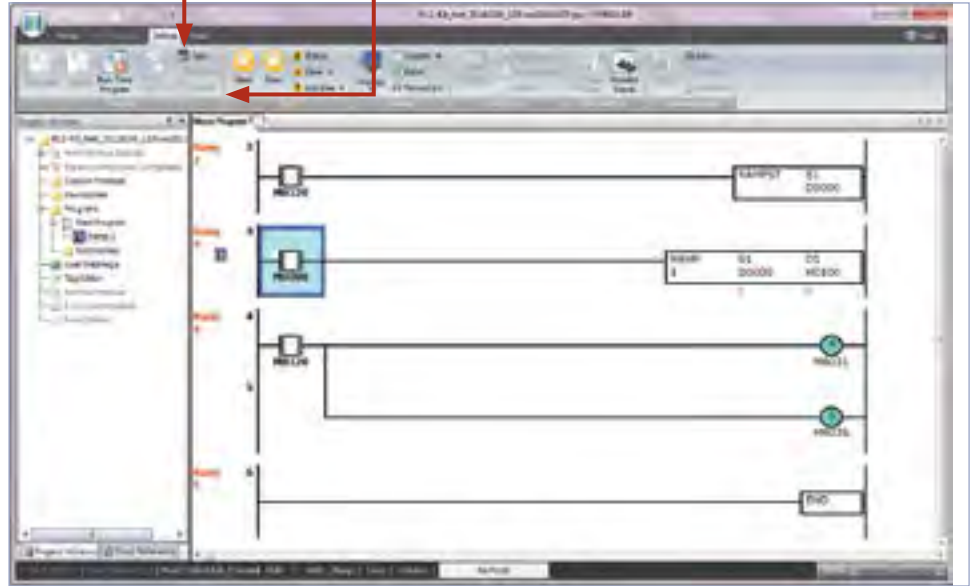
Not only is WindLDR the easiest and most convenient ladder programming software on the market, it also comes with a very special price with no strings attached. Our software comes with a free-lifetime upgrade. That means that you no longer need to spend thousands of dollars for a software that has to be renewed every year costing you additional money. Save yourself money by using an IDEC PLC and WindLDR programming software.

Online Editing

Shutting down for minor changes can be a major hassle, so WindLDR allows you to edit and download programs while the PLC is still in Run mode. You'll be able to make changes to the PLC, verify the results and cancel or accept these changes.

The Confirm and Cancel options allow users to select whether to permanently accept the changes (Confirm) or revert the program back to the original settings (Cancel).

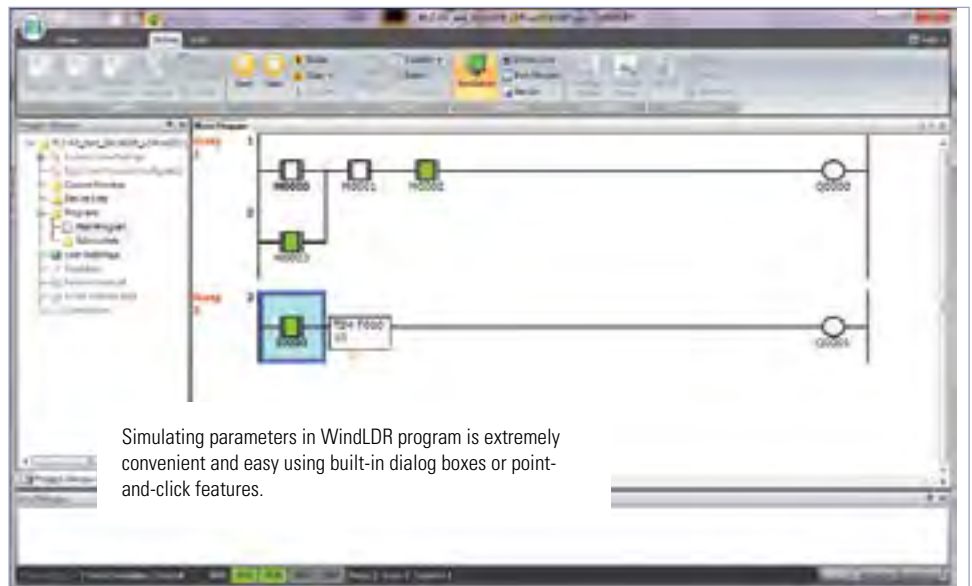
This unique Debug tool allows users to download any changes in the program to a temporary memory location in the PLC. With this option, users can verify the changes they make before selecting whether to accept or cancel them.



Simulation Mode

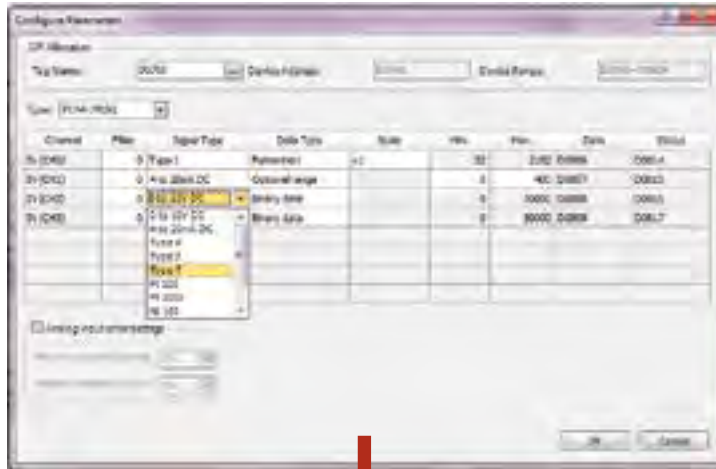
WindLDR has a built-in simulation mode that allows users to write and debug programs without needing a PLC. Test your program in WindLDR to guarantee it works the way you expected, rather than downloading it to your PLC.

Simulating parameters in WindLDR program is extremely convenient and easy using built-in dialog boxes or point-and-click features.



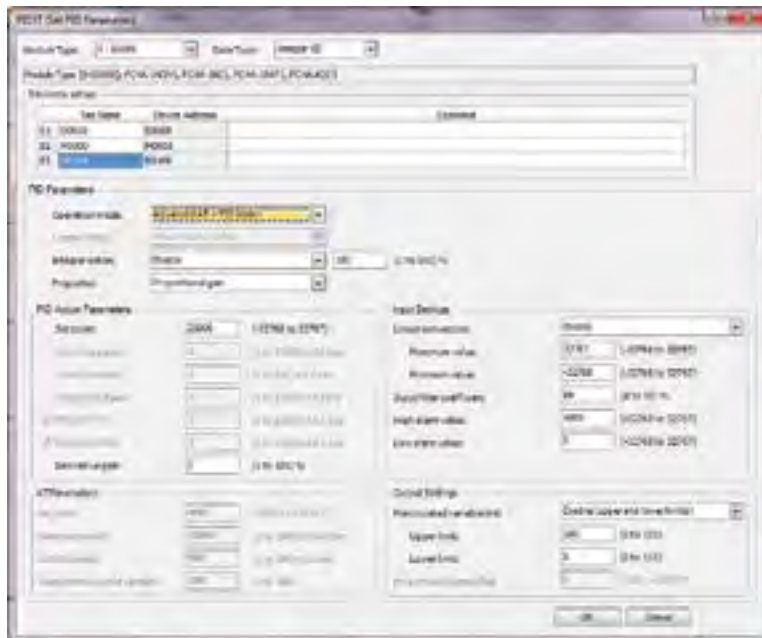
Analog Macro

Setting up analog controls with WindLDR software just got a lot easier. The analog macro instruction allows users to point and select modules, signal and data type in a matter of seconds. And, all of these configurations convert into just one ladder line instruction.



Simple-to-use PID

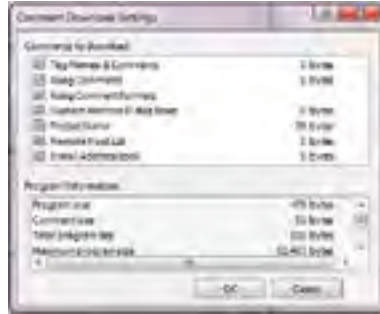
Configuring PID loops with WindLDR software is a snap using the built-in PID dialog box. The PID dialog allows users to quickly select and fine tune the desired controls without needing to remember each and every parameter of a PID algorithm. A maximum of 56 PID loops can be utilized in the MicroSmart Pentra.



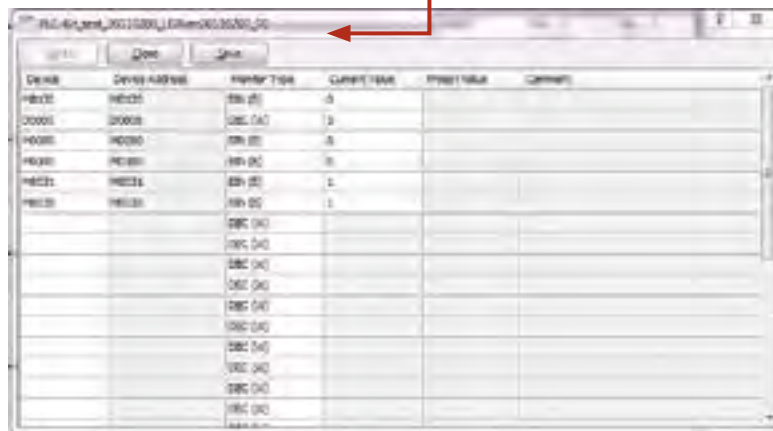
Powerful Debugging Tools

Comment Download Settings

The comment download settings allow users to choose whether to download Tag names, rung comments, custom monitor dialog boxes and file names into the MicroSmart Pentra. The biggest advantage of utilizing these settings is that once a program is retrieved from the PLC, all these important parameters will be available.



Users can create, save and download the custom monitor dialog into the MicroSmart Pentra controller.

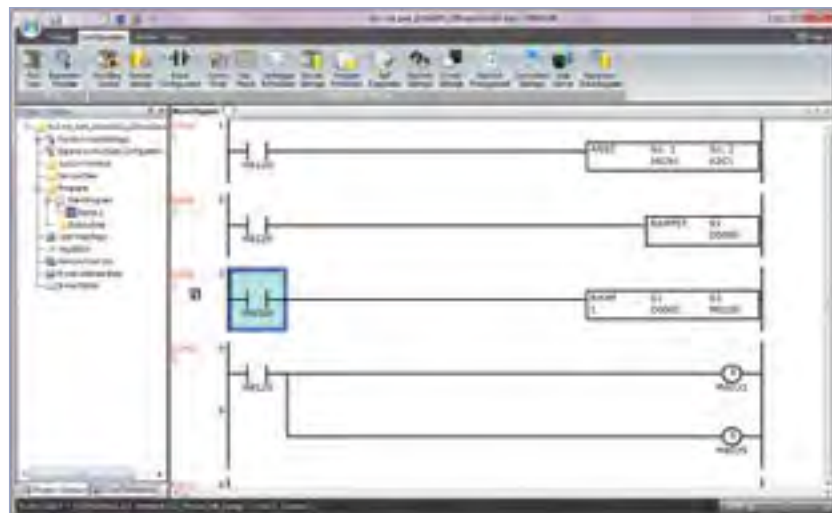


Custom Monitor Dialog Box

Compile and enter a list of parameters you want to monitor, then save it and access it again and again, instead of re-entering your data every time.

Bookmark Functions

Bookmark function is a great debugging tool. It allows users to quickly jump to a bookmarked location in the ladder program allowing for easier program modifications and updates.



Automation Organizer Suite - WindCFG

Configuration Tool for IDEC PLCs and OI Touchscreens

Key Features

- Create a visual layout of your system design for documentation
- Central Database for configuration and information
- Manage one single program file.
- Share Tag database between WindOI-NV2 and WindLDR SOFTWARE
- WindOI-NV2 and WindLDR can be launched directly from the system configuration screen

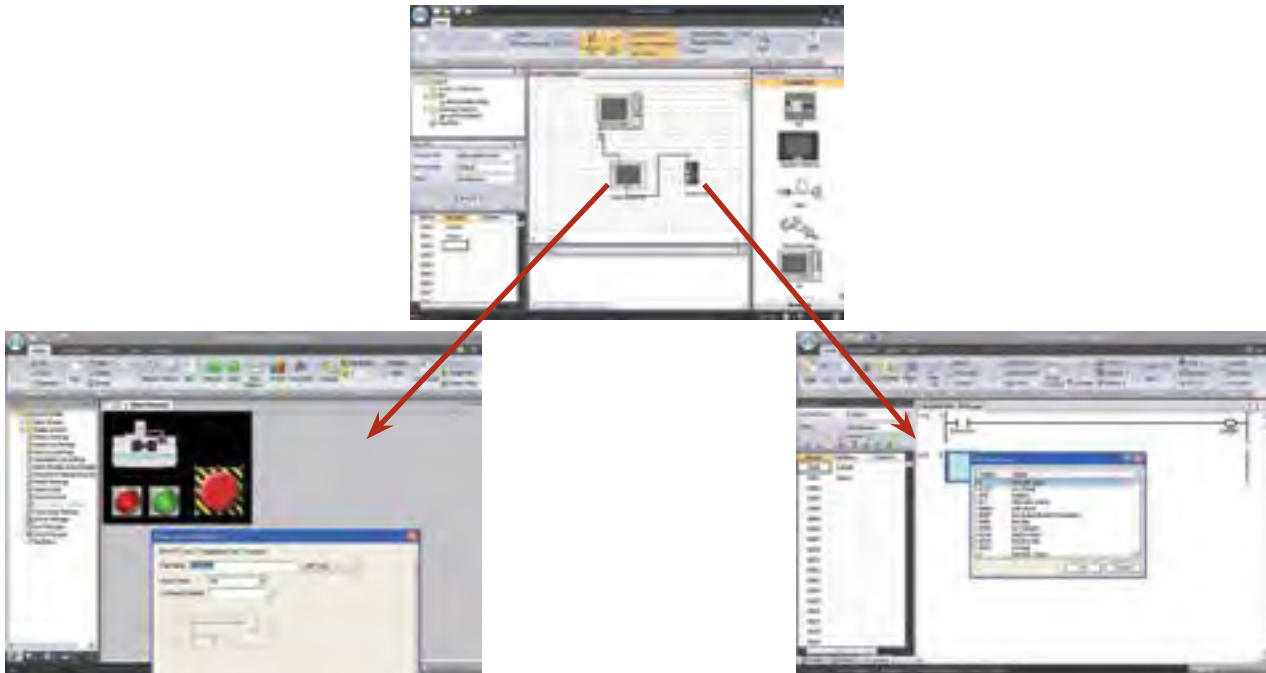


WindCFG is a System Configuration tool. It let's you create a visual layout of your system design and basic configuration of the IDEC PLCs and OI Touchscreens, Barcode Readers, & other peripheral devices for the purpose of manual or documentation.

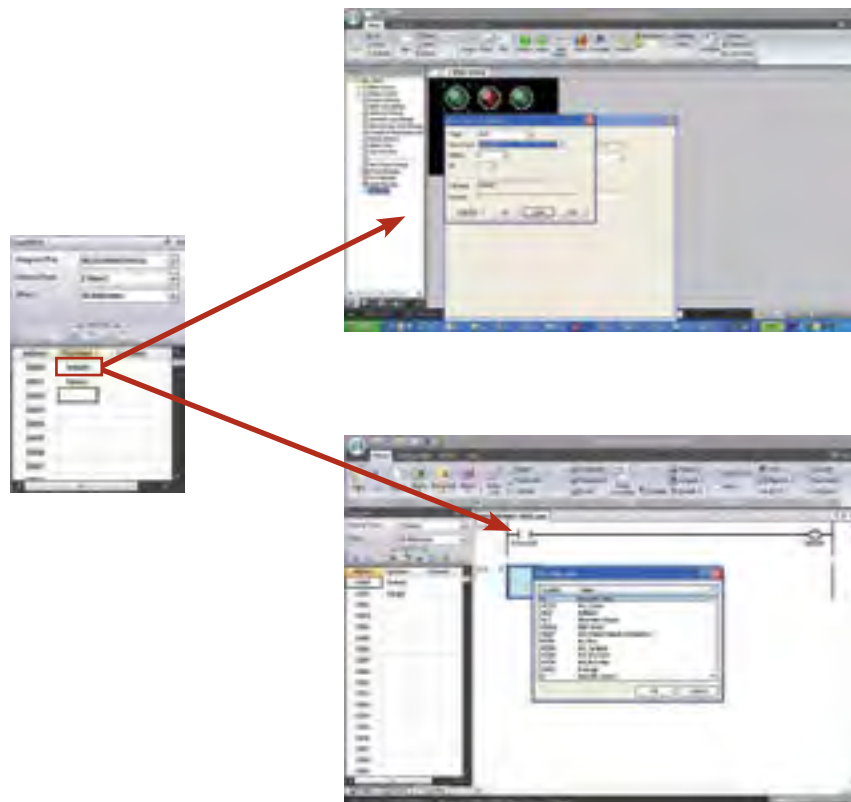


Central Database Configuration & Information :

- In WindCFG, you can manage one single program file!
Create a layout of the IDEC OI & PLC and launch WindOI-NV2 and WindLDR directly from the configuration system to build the program files.

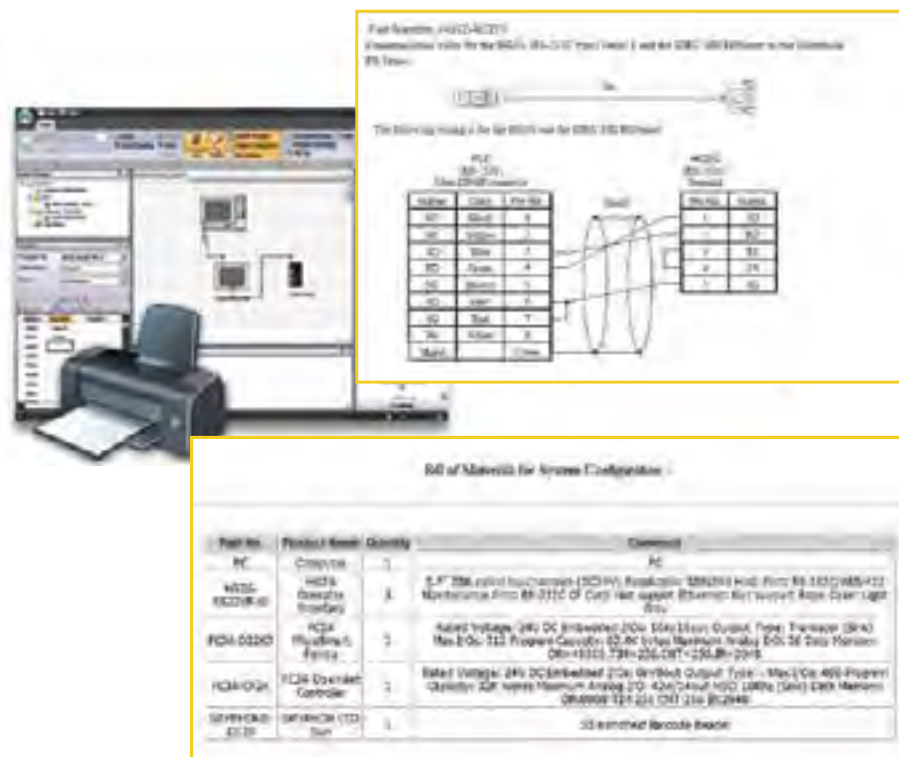


Address, Tag Names, Comments, and other type of data will be easily accessible and shared between WindO/I-NV2 & WindLDR software.



Create a visual layout of your system design for documentation:

- Print configuration of each component used & the option to print BOM (Bill of Material) for documentation purposes.
- View cable part numbers and wiring diagrams for documentation purposes



WindSRV Software

OPC Server for IDEC PLCs

Key Features

- On-line full time
- Support MicroSmart Pentra 32-bit and floating point
- Support Ethernet and modem communications
- Built-in Quick Client interface



A True Plug-and-Play OPC Server

Looking for a fast and flawless controls solution? Want your control systems centralized, easy-to-manage and able to take advantage of all the components you already have? WindSRV, also known as KEPServerEX, is an OPC server that provides direct connectivity between client applications and IDEC PLCs. It's a true plug-and-play OPC Server with effortless data management, acquisition, monitoring and control.

Part Number	Description
WINDSRV-1	Single device connection. One PLC can be connected to the server.
WINDSRV-4	Four device connections. Up to 4 PLCs can be connected to the server.
WINDSRV-U	Unlimited device connections. Up to 100 PLCs can be connected to the server.

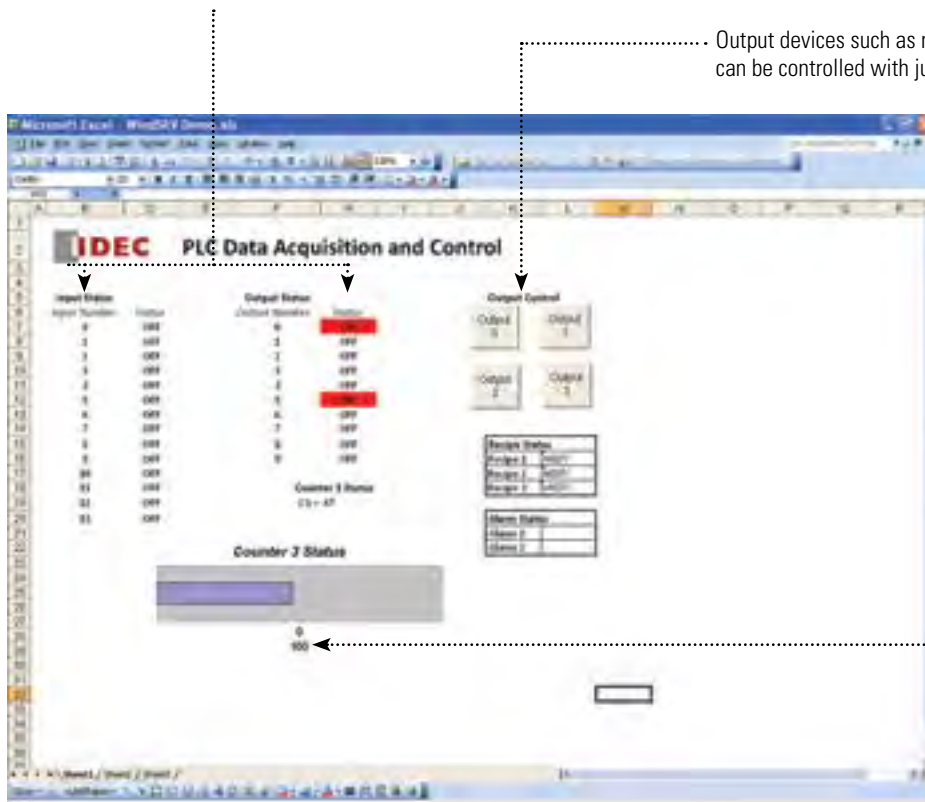
Use Microsoft Excel

Using Microsoft Excel as Client Applications

Using Microsoft Excel, available on most PCs, customers can create a visual central monitoring station quickly and effectively. System status such as sensor inputs, motor outputs, etc. can be monitored and controlled. It's a cost-effective, real-time central monitoring system that can be customized to your needs. With just KEP-ServerEX server and Excel, up to 100 PLCs can be monitored and controlled in real time.

Sample application using Microsoft Excel

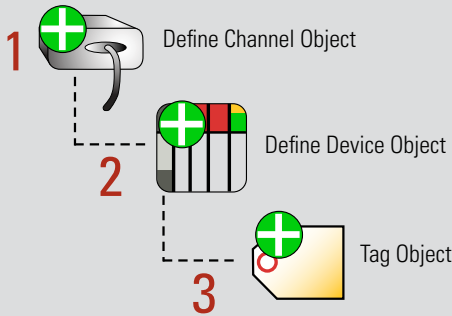
Input and output status such as switches, sensors, flow meters, E-stops, motors, etc. can be monitored in real time.



Easy to use and set up

It's as simple as 1-2-3

KEPServerEX is designed to allow quick and easy configuration of your communications.



Step 1

Select a driver

Each protocol or driver used in the KEPServerEX server and project is referred to as a channel. Channels are specific communication drivers such as RS232C, Ethernet or Dial-up modems. A project can consist of many channels.

Step 2

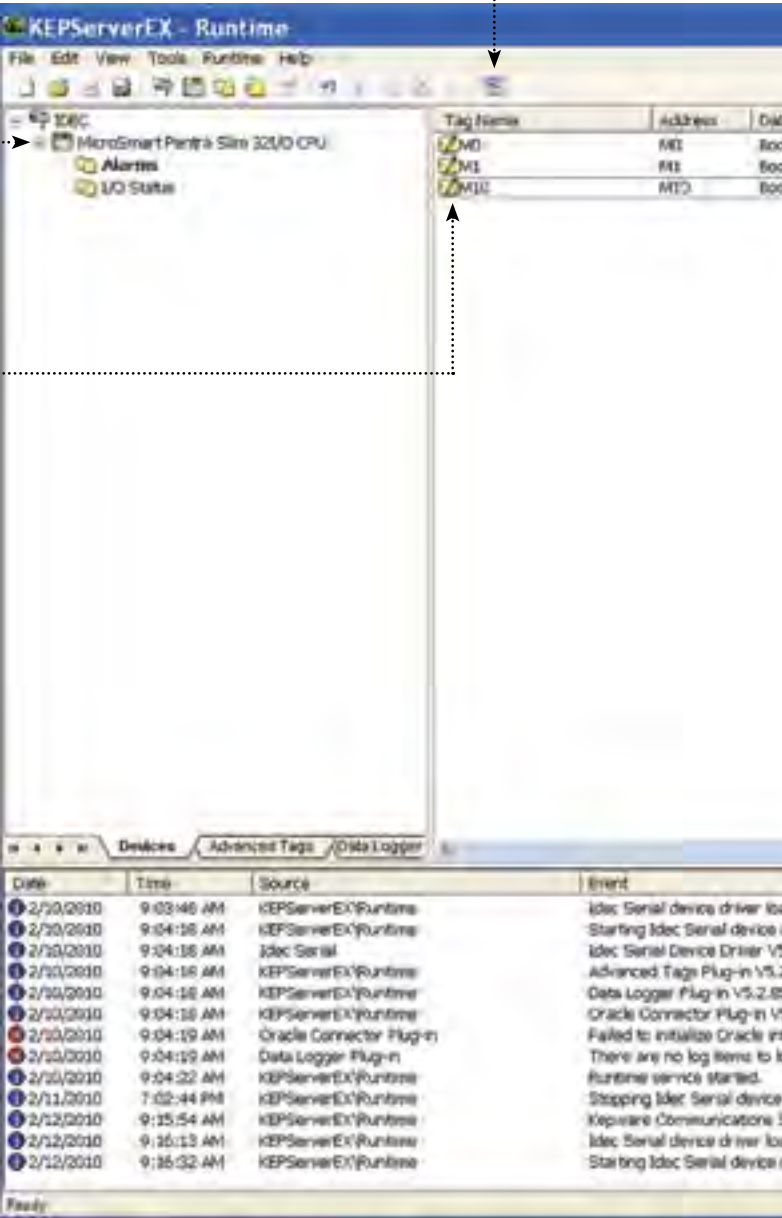
Specify the device

Configure the PLC you want to communicate with the server. KEPServerEX supports MicroSmart Pentra, MicroSmart, OpenNet controllers and even older FA and Micro3 series.

Step 3

Create tags

A tag is memory allocation in the PLC. You can monitor input, outputs, internal relays and data registers. You can also create a Tag Group that allows you to monitor each set of PLC parameters such as I/O status, alarm conditions, etc.



Quick Client

Once tags or tag groups are created in your project, click on the Quick Client icon to start monitoring these parameters. Quick Client is a quick way to determine if the server is connected to the PLCs.



Auto Demotion

This device allows a driver to temporarily place a KEPServerEX device off-line in the event that a physical device is not responding. By placing a non-responsive device off-line, the driver can continue to optimize communication with the device.

Tag Creation and Management

Tag Grouping, Drag and Drop editing and CSV Import/Export are basic features to make it easier for you to organize your next project. Another feature that you will find useful is Automatic Tag Database Generation. KEPServerEX supports automatic regeneration of tags for select communication drivers. Drivers that support this feature can either read tag information directly from a device or generate tags from stored tag data. You no longer need to enter OPC tags into the server.

On-Line Full-time

KEPServerEX is on-line all the time, allowing your application to be modified while the server is communicating with client applications. Almost all parameters can be changed while the server is running, including com port and baud rate configuration, along with tag editing and additions.

Supports MicroSmart Pentra 32-bit registers and floating point data

KEPServerEX version 5 now supports MicroSmart Pentra complete addressing, including 32-bit data and floating point data.

WindLGC Software

Programming Software for IDEC SmartRelay

Key Features

- Function Block or Ladder programming
- Online Test features
- Program Simulation

Create

Create, simulate, test and save your program using drag and drop functions. Eight basic functions make it easy to create a simple switching program in just a matter of seconds, while 31 additional special functions make it just as uncomplicated to create complex programs. Choose function block diagrams or ladder programming; you can always convert from one to the other with the click of an icon.

Simulate

Offline program simulation (without the need for an actual SmartRelay) enables testing of the entire program from a PC.

Test

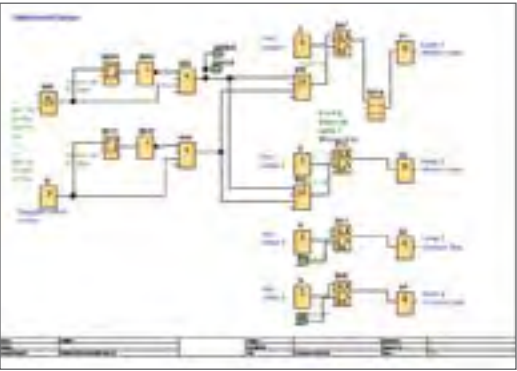
Once you verify your control program works in Simulation Mode, WindLGC allows you to directly monitor your IDEC SmartRelay during operation using an Online Test mode.

Document

You can create and save your WindLGC program as a PDF, BMP or JPG file. Professional documentation is included with all the necessary configuration information, such as comments and program settings.



Part Number	Description
FL9Y-LP1CDW	SmartRelay programming software



Visit IDEC at www.IDEC.com/smartrelay for additional information on FREE software upgrades, demo software, FAQs, manuals and brochures.

Selection Guide.....	166
PS6R Standard Series	167
Part Numbers	167
Specifications.....	168
Dimensions	170
PS5R-V Series	174
Part Numbers	174
Specifications.....	175
Dimensions	178
PS5R Slim Line Series.....	182
Part Numbers	183
Specifications.....	184
Dimensions and Terminal Markings	186
PS5R Standard Series	188
Part Numbers	188
Specifications.....	189
Dimensions	192
PS3X Series.....	193
Part Numbers	193
Specifications.....	194
Dimensions	196
Safety Precautions	198



www.IDEC.com/powersupply



Power Supplies

Selection Guide

Series		PS6R	PS5R-V	PS5R Slim Line	PS5R	PS3X	PS3L
Appearance							
Page		167	174	182	188	193	Visit www.IDEC.com/powersupply
Housing		Metal	Plastic			Metal	Metal
Mounting		DIN Rail	DIN Rail or surface mount; 6 direction	DIN Rail or surface mount		Direct or DIN Rail mount	Panel or bracket mount
Wattage Range		120W to 480W	7.5W to 240W	10W to 240W	7.5W to 480W	15W to 100W	10W to 300W
Input Voltage		100 to 240 V A, 110 to 350V DC	85 to 264V AC, 100 to 370V DC	85 to 264 V AC, 100-370 V DC (100-350V DC, 120W & 240W)	85 to 264V AC, 105 to 370V DC	85 to 264V AC, 120 to 375V DC	85 to 264V AC, 105 to 370V DC
Output Current Ratings	5V DC	2A	1.5A, 2.0A	2.0A	1.5A, 2.5A	3A, 5A, 12A, 16A	2A, 3A, 6A
	12V DC	1A	0.6A, 1.3A, 2.5A	1.2A, 2.5A	0.6A, 1.2A, 2.5A	1.3A, 2.1A, 4.2A, 6A, 8.5A	0.90A, 1.4A, 2.5A, 4.3A, 8.5A, 13A
	24VDC	5A, 10A, 20A	0.3A, 0.65A, 1.3A, 2.5A, 3.75A, 5.0A, 10.0A	0.65A, 1.3A, 2.5A, 3.75A, 5A, 10A	0.30A, 0.60A, 1.3A, 2.1A, 3.1A, 4.2A, 5A, 10A, 20A	0.63A, 1.1A, 2.2A, 3.2A, 4.5A	0.50A, 0.70A, 1.3A, 2.2A, 4.5A, 6.5A, 12.5A
Typical Efficiency	5V DC	up to 93%	up to 77%	69%	69%	77%	70-75%
	12V DC		up to 85%	75%, 78%	73% to 75%	81% to 82%	74% to 80%
	24V DC		up to 90%	80% to 84%	75% to 91%	82% to 84%	78% to 82%
Voltage Adjustments		+/-10%	+/-10% (+/- 5% for 90W)	+/-10% (V.ADJ control on front)			
Ripple Voltage		1.5%peak to peak max (including noise)	-	2% peak to peak max (including noise)		—	160mV maximum
Overvoltage Protection (input)		120%	-	120% or more, auto reset	120% typical	115% typical	120% typical
Overcurrent Protection (output)		105 to 120% (auto reset)	105% minimum (101% for 90W), auto reset	105% min shutdown	105% minimum (Zener or auto reset)		
Operating Temperature		-10° to +70°C (14° to 140°F)	-25°C to +75°C	-10° to +70°C (14° to 140°F)		-10° to +85°C	-10° to +60°C (14° to 140°F)
Termination		M3.5 phillip/slotted, spring loaded, captive (fingersafe)				M3 or M3.5	IEC Style screw terminals (fingersafe)
Approvals		  ANSI/ISA-12.12.01-2011 Listed File#E234997   	  ANSI/ISA-12.12.01-2011 Listed File#E234997   	  ANSI/ISA-12.12.01-2011 Listed File#E234997    (SEMI F47 120W & 240W only)	  UL508 Listed File #E177168  Cert No. BL980213332392	    	  UL508 Listed File #E177168 

PS6R Series Switching Power Supplies

Expandable and space-saving switching power supplies. High efficiency reduces operation costs.

- 93% efficiency
- Plug-in output modules for additional output voltages
- Plug-in branch terminal module for additional terminals
- Power Range: 120W, 240W, 480W
- Input voltage: 100 to 240V AC
(voltage range: 85 to 264V AC/110 to 350V DC)
- Up to 70°C (158°F) operating temperature
- DC low LED indicator and output contact
- The terminals are captive spring-up screws. Ring or fork terminals can be used.
- Finger-safe construction prevents electric shocks.
- Panel mount bracket and side-mount panel mounting bracket. Can be attached to a DIN rail or directly to a panel surface.
- RoHS compliant
- UL listed for Class 1, Division 2 Hazardous Locations
- Meets SEMI F47 Sag Immunity
- ABS Certified for maritime use



Applicable Standards	Mark	File No. or Organization
UL508 CSA C22.2 No. 107.1		UL/c-UL Listed File No. E177168
EN60950-1 EN50178 EN61204-3	 	TÜV SÜD EU Low Voltage Directive EMCD

Part Numbers

PS6R

Output Capacity*	Part No.	Input Voltage	Output Voltage	Output Current
120W	PS6R-F24	85 to 264V AC	21.6 to 26.4V	5A
240W	PS6R-G24			10A
480W	PS6R-J24			20A

*Output voltage × output current = output capacity



120W shown with Branch Terminal module attached.

Accessories

Item	Part No.	Note
Output Voltage Expansion Module Note 1	PS9Z-6RM1	Output: +5V, 2A, 10W
	PS9Z-6RM2	Output: +12V, 1A, 12W
	PS9Z-6RM3	Output: +5V, 1A/-5V, 1A, 10W
	PS9Z-6RM4	Output: +15V, 0.4A/-15V, 0.4A, 12W
	PS9Z-6RM5	Output: +5V, 1A/+12V, 0.5A, 11W
	PS9Z-6RM6	Output: +12V, 0.5A/-12V, 0.5A, 12W
Branch Terminal Module Note 2	PS9Z-6RS1	Additional screw terminals for wiring: 2 + terminals / 2 - terminals
Panel Mounting Bracket	PS9Z-6R1F	
Side-mount Panel Mounting Bracket	PS9Z-6R2F	Supplied with M3 × 6 countersunk mounting screws
DIN Rail	BNDN1000	1,000mm
DIN Rail End Clip	BNL6	

1. When using an output voltage expansion module, reduce 1A from the output current of PS6R.
2. When using a branch terminal module, the total voltage/current of PS6R and the branch terminal module should not exceed the rated current/voltage of PS6R

Specifications

PS6R

Part No.			PS6R-F24	PS6R-G24	PS6R-J24
Input	Input Voltage		100 to 240V AC (Voltage range: 85 to 264V AC/110 to 350V DC) (Load ≤ 80% at 85 to 100V AC, 110 to 140V DC) ^{Note 1}		
	Frequency		50/60Hz		
	Input Current	100V AC	1.4A typ	2.7A typ	5.5A typ.
		230V AC	0.7A typ	1.2A typ	2.3A typ.
	Inrush Current	100V AC	9A max. (Ta=25°C, 100V AC cold start)		
		230V AC	20A max. (Ta=25°C, 230V AC cold start)		
	Leakage Current	120V AC	0.5mA max.		
		230V AC	1mA max.		
	Efficiency (Typical)	100V AC	90%	90%	91%
230V AC		90%	91%	93%	
Power Factor (Typical)	100V AC	0.99	0.99	0.98	
	230V AC	0.96	0.97	0.97	
Output	Rated Voltage/Current		24V/5A	24V/10A	24V/20A
	Adjustable Voltage Range		±10%		
	Output Holding Time		20ms min. (at rated input and output)		
	Start Time		800ms max. (at rated input and output)		
	Rise Time		200ms max. (at rated input and output)		
	Regulation	Total Fluctuation	±5% max.		
		Input Fluctuation	0.4% max.		
		Load Fluctuation	0.6% max.		
		Temperature Change	0.05%/oC max. (−10 to +60°C)		
		Ripple (including noise)	1% p-p max. (0 to +60°C)		
			1.5% p-p max. (−10 to 0°C)		
	Supplementary Functions	Overcurrent Protection		105 to 120% (auto reset) (output current when voltage drops by 5%)	
Overvoltage Protection		Output off at 120% ^{Note 2}			
Operation Indicator		LED (green)			
Voltage Low Indication		LED (amber)			
Dielectric Strength	Between input and output terminals		3000V AC, 1 minute		
	Between input and ground terminals		2000V AC, 1 minute		
	Between output and ground terminals		500V AC, 1 minute		
Insulation Resistance			100MΩ min. 500V DC megger (between input and output terminals/between input and ground terminals) (at room temperature and normal humidity)		
Operating Temperature			−10 to +70°C (no freezing) ^{Note 3}		
Operating Humidity			20 to 90% RH (no condensation)		
Storage Temperature			−25 to +75°C (no freezing)		
Storage Humidity			20 to 90% RH (no condensation)		
Vibration Resistance			10 to 55 Hz, amplitude 0.375 mm (0.187mm using PS9Z-6R1F) 2 hours each in 3 axes, 6 directions		
Shock Resistance			300 m/s ² (150 m/s ² when using a PS9Z-6R1F panel mounting bracket)		
EMC	EMI		EN61204-3 (Class B)		
	EMS		EN61204-3 (industrial)		
Degree of Protection			IP20 (IEC 60529)		
Weight (approx.)			630g	960g	1400g
Terminal Screw			M3.5 (See last page for wire sizes)		

1. DC input voltage is not subjected to safety standards.

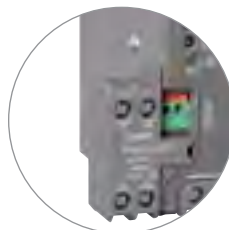
3. See the output derating curves.

2. One minute after the output has been turned off, turn on the input again.

Easily Expandable



Output Voltage Expansion Module
In addition to the standard 24V output, additional 5, 12, and 15V outputs can be added.



Branch Terminal Module
Two terminals can be added. No wiring is required, reducing installation space.

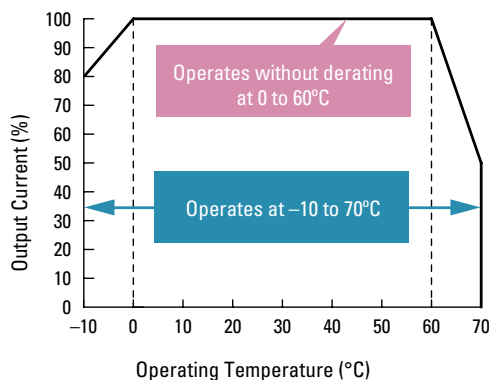
Accessories (For use with PS6R)

Part No.		Output Voltage Expansion Module						Branch Terminal Module	
		PS9Z-6RM1	PS9Z-6RM2	PS9Z-6RM3	PS9Z-6RM4	PS9Z-6RM5	PS9Z-6RM6	PS9Z-6RS1	
Input Voltage		24V DC							
Output Capacity		10W max.	12W max.	10W max.	12W max.	11W max.	12W max.	—	
Output	Rated Voltage/Current	5V/2A	12V/1A	±5V 2A	±15V 0.4A	5V/1A, 12V/0.5A	±12V 0.5A	24V/10A max. ^{Note 1}	
	Adjustable Voltage Range	Not available							
	Voltage Accuracy	±5% max.						—	
	Start Time	200 ms max. (at rated input and output)						—	
	Regulation	Input Fluctuation	0.5% max.						—
		Load Fluctuation	1.0% max.						
		Temperature Change	0.05%/max. (–10 to +60°C)						
		Ripple (including noise)	100mV max.	150mV max.		100mV max., 150mV max.			
Supplementary Functions	Overcurrent Protection	105% (auto reset)						—	
	Overvoltage Protection	Output off at 120%							
Operating Temperature		–10 to +70°C (no freezing) ^{Note 2}							
Operating Humidity		20 to 90%RH (no condensation)							
Storage Temperature		–25 to +75°C (no freezing)							
Storage Humidity		20 to 90% RH (no condensation)							
Vibration Resistance		10 to 55 Hz, amplitude 0.375 mm, 2 hours each in 3 axes, 6 directions (in combination with PS6R-J24)							
Shock Resistance		300 m/s ² (150 m/s ² when using a PS9Z-6R1F panel mounting bracket), 3 shocks each in 6 axes (in combination with PS6R-J24)							
EMC	EMI	EN61204-3 (Class B) (in combination with PS6R-□24)						—	
	EMS	EN61204-3 (industrial) (in combination with PS6R-□24)							
Safety Standards		UL508 (Listing), CSA C22.2 No.107.1, IEC/EN60950-1, EN50178 (in combination with PS6R-□24)							
Degree of Protection		IP20 (IEC 60529)							
Weight (approx.)		90g						30g	
Terminal Screw		M3.5 (See last page for wire sizes.)							

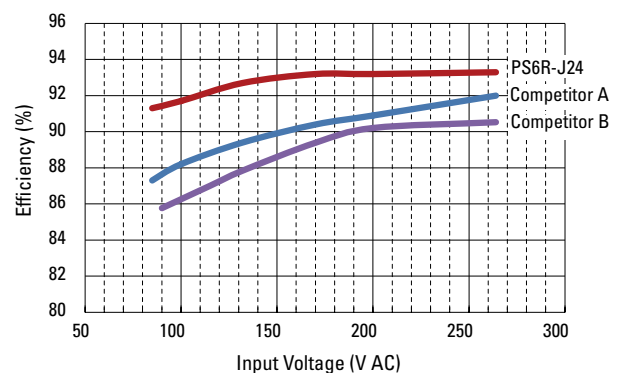
1. Ensure that the current does not exceed the rated current of the PS6R.

2. See the output derating curves.

Wide Operating Temperature Range



Energy-saving 93% Efficiency (480W)



Easy Maintenance - LED Indicator

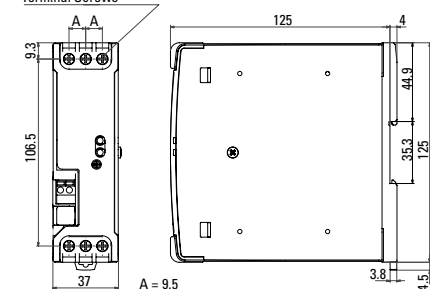
Status	Normal	Overload or Input Voltage Low*	Output short-circuit	Output OFF
DC ON (green LED)				
DC Low (amber LED)				

*The LEDs turn on when the input voltage drops.

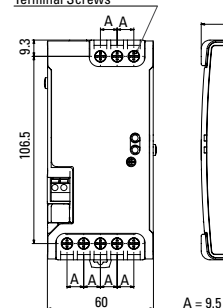
Dimensions (mm)

PS6R-F24

6 - M3.5
Terminal Screws

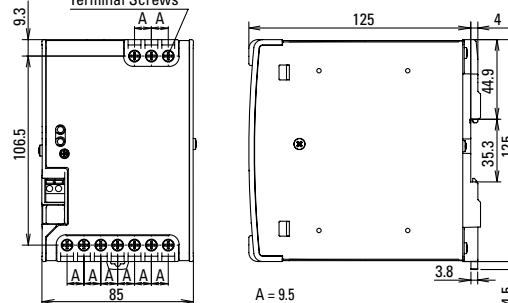
**PS6R-G24**

8 - M3.5
Terminal Screws

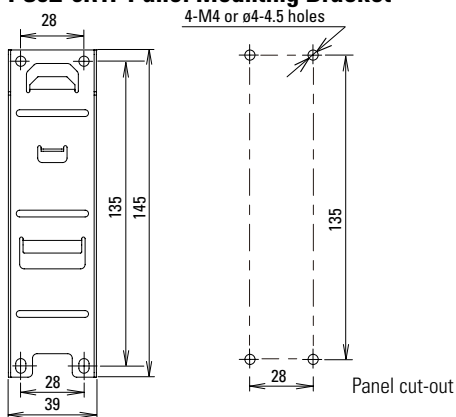


PS6R-J24

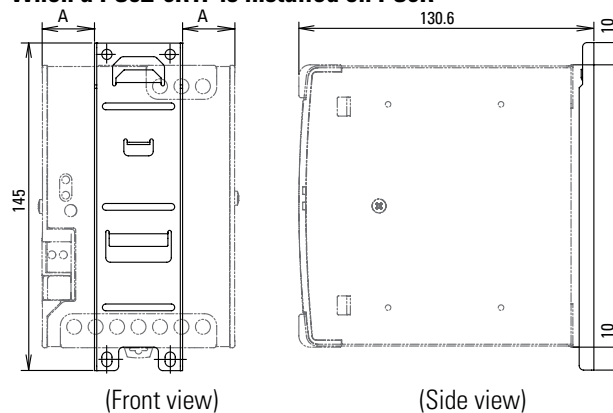
10-M3.5
Terminal Screws



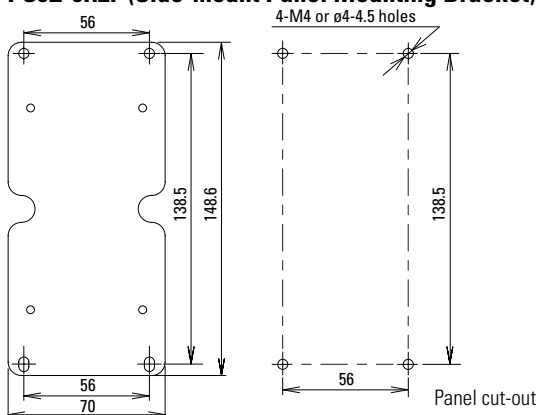
PS9Z-6R1F Panel Mounting Bracket



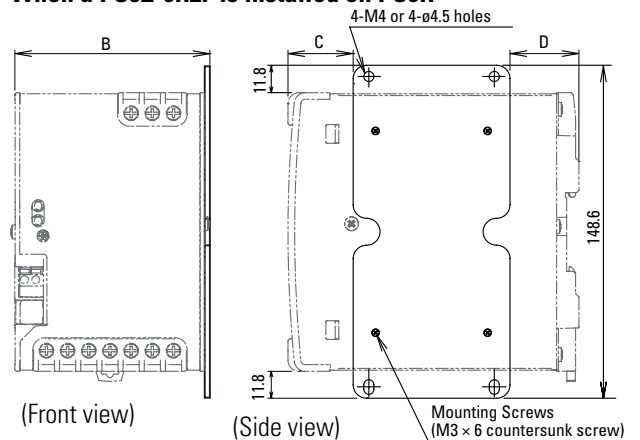
When a PS9Z-6R1F is installed on PS6R



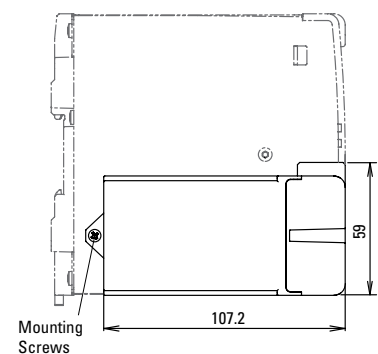
PS9Z-6R2F (Side-mount Panel Mounting Bracket)



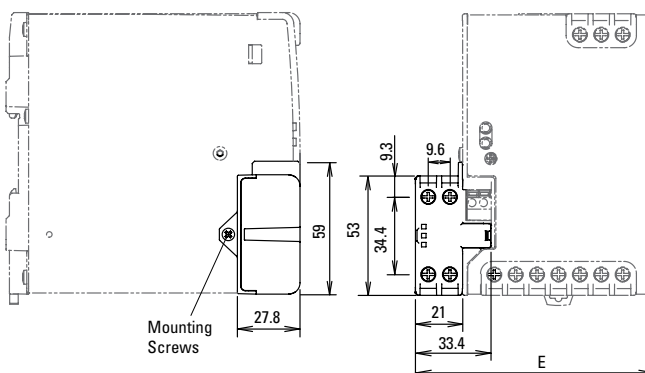
When a PS9Z-6R2F is installed on PS6R



When using a PS9Z-6RM* Output Voltage Expansion Module



When using a PS9Z-6RS1 Branch Terminal Module



Dimension Table

	A	B	C	D	E
PS6R-F24	—	39.3	29.5	29.5	58
PS6R-G24	10.5	62.3	29.5	31	81
PS6R-J24	23	87.3	29.5	31	106

Operating Instructions

The PS6R should be placed in a proper enclosure. It is designed to be used with general electrical equipment and industrial electric devices.

Operation Notes

1. Output interruption may indicate blown fuses. Contact IDEC.
2. The PS6R contains an internal fuse for AC input. When using DC input, install an external fuse or DC input. To avoid blown fuses, select a fuse in consideration of the rated current of the internal fuse.

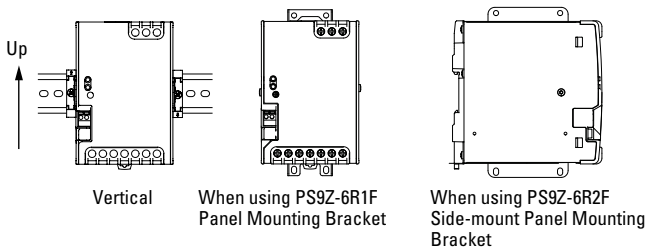
Rated Current of Internal Fuses

Part No.	Internal Fuse Rated Current
PS6R-F24	4A
PS6R-G24	6.3A
PS6R-J24	10A

- Avoid overload and short-circuit for a long period of time, otherwise internal elements may be damaged.
- DC input operation is not subjected to safety standards.

Installation Notes

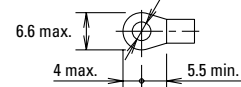
- The PS6R can be installed in the direction shown below only.



- Do not close the top and bottom openings of the PS6R to allow for heat radiation by convection.
- Maintain a minimum of 20mm clearance around the PS6R, except for the top and bottom openings.
- When derating of the output does not work, provide forced air-cooling.
- Make sure to wire the ground terminal correctly.
- For wiring, use wires with heat resistance of 60°C or higher. Use copper wire of the following sizes. Wires of the following sizes must be used to comply with UL508, CSA C22.2 No. 107.1.

Model	Terminal	Wire Size/No. of Wire	Wire Type	Torque, in-lbs (N·m)
PS6R-F24 PS6R-G24	Input	18-14 AWG, 1-wire	Copper Solid/Stranded	7.0 (0.8)
	Output	18-14 AWG, 1-wire, (18 AWG - 7A, 16 AWG - 10A, 14 AWG - 15A)		
	DC OK Output	22-14 AWG, 1-wire (stripped wire length: 6 to 7mm)		
PS6R-J24	Input	18-14 AWG, 1-wire	Copper Solid/Stranded	7.0 (0.8)
	Output	18-14 AWG, 2-wire Use the same size wire for each terminal (18 AWG - 7A, 16 AWG - 10A, 14 AWG - 15A)		
		12 AWG, 1-wire Use with UL-listed ring/fork crimp terminal.		
	DC OK Output	22-14 AWG, 1-wire (stripped wire length: 6 to 7mm)	Copper Solid/Stranded	—
PS9Z-6R□	Output	18-14 AWG, 1-wire (18 AWG - 7A, 16 AWG - 10A, 14 AWG - 15A)	Copper Solid/Stranded	7.0 (0.8)

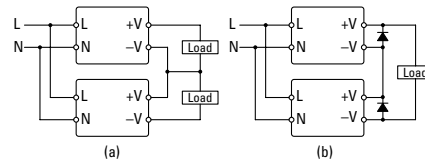
Applicable Crimp Terminal (reference)



- Recommended tightening torque of the input and output terminals is 0.8N·m.
- The output voltage can be adjusted within $\pm 10\%$ of the rated output voltage by using the V.ADJ control. Note that overvoltage protection may work when increasing the output voltage.
- When large shocks or heavy vibrations on the PS6R are expected, the use of DIN rail or PS9Z-6R2F side-mount panel mounting bracket is recommended.

Series Operation

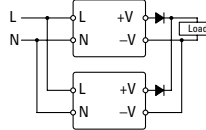
The following series operation is allowed. Connect Schottky barrier diodes as shown below. Output voltage expansion modules cannot be connected in series.



Select a Schottky diode in consideration of the rated current. The diode's reverse voltage must be higher than the PS6R's output voltage.

Parallel Operation

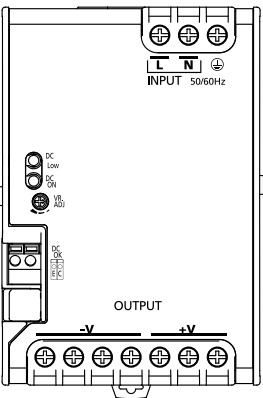
Parallel operation is possible to increase the output capacity. Output voltage expansion modules cannot be connected in series.



When increasing the capacity, observe the following.

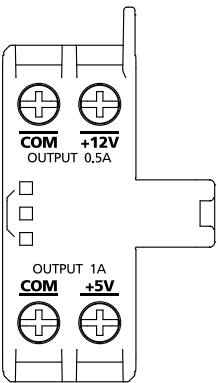
1. Maintain the operating temperature below 40°C.
2. Output cannot be connected directly in parallel operation. Connect a diode to the output of each PS6R.
3. Output terminal voltage of both power supplies must be the same. Also, maintain the voltage difference between the power supplies below 30mV.
4. Use load lines of the same diameter and length.
5. Set the output voltage higher for the amount of diode forward voltage drop.
6. Turn on the inputs at the same time.
7. Select a diode in consideration of:
Diode's reverse voltage must be higher than the PS6R's output voltage.
Diode's current must be three times the PS6R's output current. Provide a heat sink for heat dissipation.

PS6R-J24



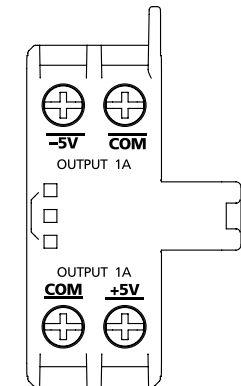
PS6R-6RM1/M2/M3

Output Voltage Expansion Module



PS9Z-6RM3/M4/M6

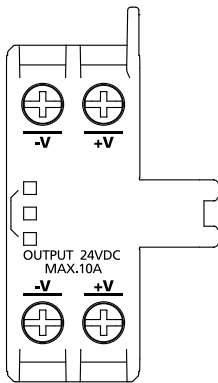
Output Voltage Expansion Module



(PS6R-6RM5 shown)

PS6R-6RS1

Branch Terminal Module



PS6R-□24/PS9Z-6RS1

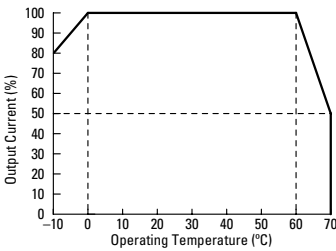
Marking	Name	Description
L, N	Input Terminal	Voltage range: 85 to 264V AC/110 to 350V DC
	Ground Terminal	Be sure to connect this terminal to a proper ground.
+V, -V	DC Output Terminals	+V: Positive output terminal -V: Negative output terminal
VR.ADJ	Output Voltage Adjustment	Allows adjustment within ±10%. Turning clockwise increases the output voltage.
DC ON	Operation Indicator (green)	Lights on when the output voltage is on.
DC LOW	Output Low Indicator (Amber)	Lights on when the output voltage drops approximately 80% of the rated value.
DC OK	DC OK Output	Lights on when the output voltage is more than 80% of the rated value. NPN transistor output (50V DC max., 50 mA max.)

PS9Z-6RM

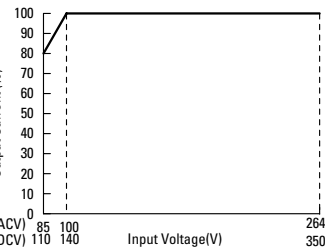
Marking	Name	Description
+5V, +12V, +15V	DC Output Terminal	+5V side, +12V side, +15V side
-5V, -12V, -15V	DC Output Terminal	-5V side, -12V side, -15V side
COM	DC Output Terminal	0V side (wired internally to -V of PR6R-J24)

Characteristics

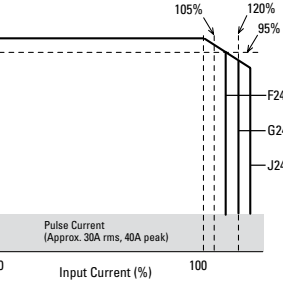
Operating Temperature vs.
Output Current (Derating Curves)



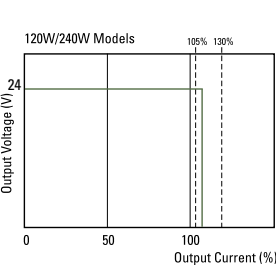
Output Current vs. Input Voltage
(Derating Curves) (Ta=25°C)



Overcurrent Protection Characteristics PS6R-□24



Overcurrent Protection Characteristics PS9Z-6RM*

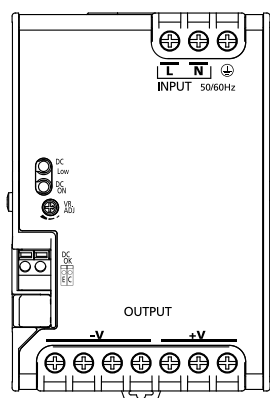


Operating Temperature approved by Safety Standards

Part No.	UL508, CSA C22.2 No. 107.1	EN60950-1, EN50178
PS6R-F24	60°C	60°C
PS6R-G24	60°C	60°C
PS6R-J24	55°C	60°C
PS9Z-6R□□	55°C	60°C

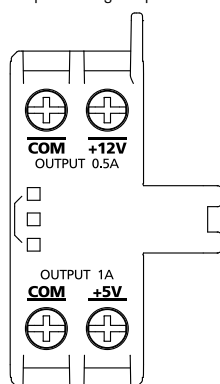
Parts Description

PS6R-J24



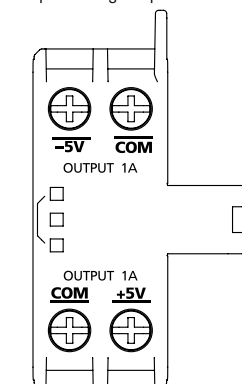
PS6R-6RM1/M2/M3

Output Voltage Expansion Module



PS9Z-6RM3/M4/M6

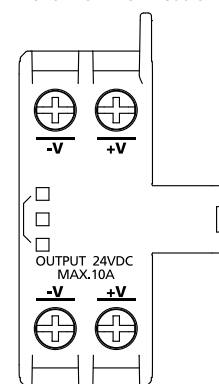
Output Voltage Expansion Module



(PS6R-6RM5 shown)

PS6R-6RS1

Branch Terminal Module



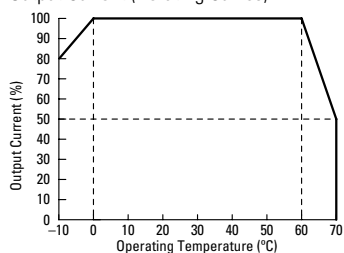
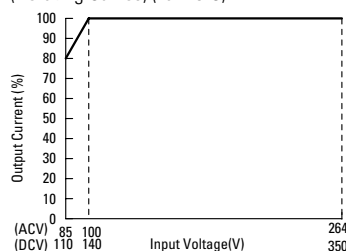
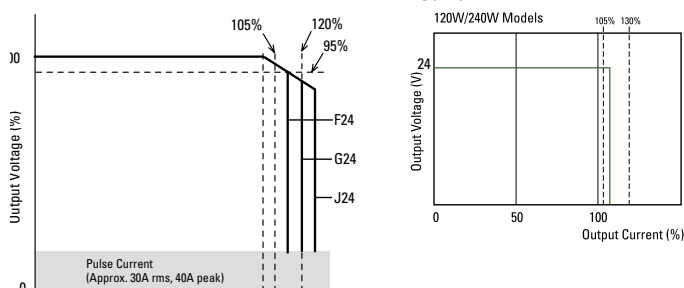
PS6R-□24/PS9Z-6RS1

Marking	Name	Description
L, N	Input Terminal	Voltage range: 85 to 264V AC/110 to 350V DC
⏏	Ground Terminal	Be sure to connect this terminal to a proper ground.
+V, -V	DC Output Terminals	+V: Positive output terminal -V: Negative output terminal
VR.ADJ	Output Voltage Adjustment	Allows adjustment within ±10%. Turning clockwise increases the output voltage.
DC ON	Operation Indicator (green)	Lights on when the output voltage is on.
DC LOW	Output Low Indicator (Amber)	Lights on when the output voltage drops approximately 80% of the rated value.
DC OK	DC OK Output	Lights on when the output voltage is more than 80% of the rated value. NPN transistor output (50V DC max., 50 mA max.)

PS9Z-6RM□

Marking	Name	Description
+5V, +12V, +15V	DC Output Terminal	+5V side, +12V side, +15V side
-5V, -12V, -15V	DC Output Terminal	-5V side, -12V side, -15V side
COM	DC Output Terminal	0V side (wired internally to -V of PR6R-J24)

Characteristics

Operating Temperature vs.
Output Current (Derating Curves)Output Current vs. Input Voltage
(Derating Curves) (Ta=25°C)Overcurrent Protection Characteristics PS6R-□24
Overcurrent Protection Characteristics PS9Z-6RM*

Operating Temperature approved by Safety Standards

Part No.	UL508, CSA C22.2 No. 107. 1	EN60950-1, EN50178
PS6R-F24	60°C	60°C
PS6R-G24	60°C	60°C
PS6R-J24	55°C	60°C
PS9Z-6RM□□	55°C	60°C

PS5R-V Series Switching Power Supplies



DIN-rail mount switching power supplies with global approvals for both industrial and hazardous locations

Key Features

- Compact size preserves panel space
- Slim size (width):
22.5mm (10W/15W/30W)
36mm (60W/90W)
45mm (7.5W)
46mm (120W)
60mm (240W)
- Universal Voltage Input:
85-264V AC/100-370V DC
- Wide operating temperature range
- Spring-up terminals accept ring & fork terminals
- Approved for use in Class I Division 2 hazardous locations
- Can be installed in 6 directions
- 7.5W ~ 90W meet NEC Class 2 output ratings
- Overcurrent protection with auto-reset
- Meets SEMI F47 Sag Immunity (208V AC input)
- RoHS compliant
- Five-year factory warranty



Standards Compliance

Applicable Standards	Mark	File No. or Organization
UL508 UL1310 ¹ ANSI/ISA 12.12.01 CSA C22.2 No.107.1 CSA C22.2 No.213 CSA C22.2 No.223 ¹		UL/c-UL Listed File No. E467154, E177168
EN60950-1 EN50178 EN61204-3 EN50581		TÜV SÜD ² EU Low Voltage Directive, EMC Directive RoHS Directive
SEMI F47	—	EPRI

Note 1: PS5R-VA/VB/VC/VD/VE only

Note 2: EN60950-1, EN50178 only

Part Numbers

Output Capacity	Part Number	Input Voltage	Output Voltage	Output Current
7.5W	PS5R-VA05	100 to 240V AC (Voltage range: 85 to 264V AC / 100 to 370V DC)	5V	1.5A
	PS5R-VA12		12V	0.6A
	PS5R-VA24		24V	0.3A
10W	PS5R-VB05		5V	2.0A
15W	PS5R-VB12		12V	1.3A
	PS5R-VB24		24V	0.65A
30W	PS5R-VC12		12V	2.5A
	PS5R-VC24		24V	1.3A
60W	PS5R-VD24		24V	2.5A
90W	PS5R-VE24		24V	3.75A
120W	PS5R-VF24		24V	5.0A
240W	PS5R-VG24		24V	10.0A

Part Number Structure

PS5R - V

Output Capacity

A: 7.5W
B: 10W/15W
C: 30W
D: 60W
E: 90W
F: 120W
G: 240W

Output Voltage

05: 5V³
12: 12V⁴
24: 24V

Note 3: PS5R-VA/VB only

Note 4: PS5R-VA/VB/VC only

Use only for interpreting part numbers.

Do not use for developing part numbers.

Specifications

Model		5V DC output	PS5R-VA05	PS5R-VB05	-	-	-	-										
		12V DC output	PS5R-VA12	PS5R-VB12	PS5R-VC12	-	-	-										
		24V DC output	PS5R-VA24	PS5R-VB24	PS5R-VC24	PS5R-VD24	PS5R-VE24	PS5R-VF24	PS5R-VG24									
Output Capacity		7.5W		15W (5V Model is 10W)		30W		60W		90W		120W		240W				
Input		Rated Input Voltage (Single-phase two-wire) ¹		100 to 240V AC (Voltage range: 85 to 264V AC/100 to 370V DC) (Load ≤ 80% at 100-105V DC)														
		Frequency		50/60 Hz														
		Input Current (Typ.)	100V AC	5V: 0.20A 12V, 24V: 0.18A		5V: 0.25A 12V, 24V: 0.35A		0.7A		1.3A		1.1A		1.4A		2.7A		
			230V AC	5V: 0.12A 12V, 24V: 0.10A		5V: 0.14A 12V, 24V: 0.19A		0.3A		0.8A		0.6A		0.7A		1.2A		
		Inrush Current (Typ.) (Ta=25°C, cold start)	100V AC	15A		18A										14A		
			230V AC	36A		45A										41A		30A
		Leakage Current	120V AC	0.5mA max.														
			230V AC	1.0mA max.														
		Efficiency (Typ.) (at rated output) ²	100V AC	5V: 74%, 12V: 79%, 24V: 80%		5V: 77%, 12V: 82%, 24V: 84%		12V: 83%, 24V: 85%		86%		88% 89%		89%				
			230V AC	5V: 73%, 12V: 77%, 24V: 76%		5V: 73%, 12V: 80%, 24V: 81%		12V: 85%, 24V: 87%		86%						90%		
Power Factor (Typ.)	100V AC	—		—		—		—		0.99		0.99						
	230V AC	—		—		—		—		0.86		0.92		0.96				
Rated Voltage/Current		5V/1.5A, 12V/0.6A, 24V/0.3A		5V/2.0A ³ , 12V/1.3A, 24V/0.65A		12V/2.5A, 24V/1.3A		24V/2.5A		24V/3.75A		24V/5A		24V/10A				
Adjustable Voltage Range		±10%										±5%		±10%				
Output Holding Time (Typ.) (at rated output)	100V AC	45ms		5V: 53ms, 12V: 34ms, 24V: 36ms		12V: 13ms, 24V: 15ms		13ms		20ms		30ms		40ms				
	230V AC	285ms		5V: 330ms 12V: 215ms 24V: 230ms		12V: 110ms 24V: 110ms		105ms		30ms		33ms		80ms				
Start Time (at rated input and output)		500ms max.		500ms max.		600ms max.		800ms max.		700ms max.		800ms max.						
Output	Rise Time (at rated input and output)		5V, 12V: 200ms max 24V: 250ms max		5V, 12V: 200ms max. 24V: 250ms max.		200ms max.											
	Regulation	Input Fluctuation		0.4% max.														
		Load Fluctuation		5V: 2.5% max. 12V, 24V: 1.0% max.				1.0% max.										
		Temperature Change		0.04%/°C max. (-10 to +65°C)		0.05%/°C max. (-10 to +65°C)		12V: 0.05%/°C max. (-10 to +50°C) 24V: 0.05%/°C max. (-10 to +55°C)		0.05%/°C max. (-10 to +55°C)		0.05%/°C max. (-10 to +50°C)		0.05%/°C max. (-25 to +55°C)				
		Ripple (including noise)		5V: 8% p-p max. (-25 to -10°C) 12V: 6% p-p max. (-25 to -10°C) 24V: 4% p-p max. (-25 to -10°C)		5V: 8% p-p max. (-25 to -10°C) 12V: 6% p-p max. (-25 to -10°C) 24V: 4% p-p max. (-25 to -10°C)		12V: 6% p-p max. (-25 to -10°C) 24V: 4% p-p max. (-25 to -10°C)		4% p-p max. (-25 to -10°C)								
				5V: 5% p-p max. (-10 to +0°C) 12V: 2.5% p-p max. (-10 to +0°C) 24V: 1.5% p-p max. (-10 to +0°C)		5V: 5% p-p max. (-10 to +0°C) 12V: 2.5% p-p max. (-10 to +0°C) 24V: 1.5% p-p max. (-10 to +0°C)		12V: 2.5% p-p max. (-10 to +0°C) 24V: 1.5% p-p max. (-10 to +0°C)		1.5% p-p max. (-10 to +0°C)								
				5V: 2.5% p-p max. (0 to +65°C) 12V: 1.5% p-p max. (0 to +65°C) 24V: 1% p-p max. (0 to +65°C)		5V: 2.5% p-p max. (0 to +65°C) 12V: 1.5% p-p max. (0 to +65°C) 24V: 1% p-p max. (0 to +65°C)		12V: 1.5% p-p max. (0 to +50°C) 24V: 1% p-p max. (0 to +55°C)		1% p-p max. (0 to +55°C)		1% p-p max. (0 to +50°C)		1% p-p max. (0 to +55°C)				
	Overcurrent Protection			105% min. (auto reset)						101% min. (auto reset)		105% min. (auto reset)						
	Operation Indicator		LED (green)															
	Dielectric Strength	Between input and output terminals		3,000V AC, 1 minute														
Between input and ground terminals		2,000V AC, 1 minute																
Between output and ground terminals		500V AC, 1 minute																
Insulation Resistance		Between input and output terminals: 100MΩ min. (500V DC megger) Between input and ground terminals: 100MΩ min. (500V DC megger)																
Operating Temperature ⁴ (No freezing)		-25 to +75°C				-25 to +70°C				-25 to +65°C								
Operating Humidity (no condensation)		20 to 90% RH																
Storage Temperature (No freezing)		-25 to +75°C																
Storage Humidity (no condensation)		20 to 90% RH																
Vibration Resistance		10 to 55Hz, amplitude 0.375mm, 2 hours each in 3 axes (when used with BNL6 end clips)				10 to 55Hz, amplitude 0.33mm, 2 hours each in 3 axes (when used with BNL6 end clips) 10 to 55Hz, amplitude 0.375mm, 2 hours each in 3 axes (when used with BNL8 end clips)				10 to 55Hz, amplitude 0.21mm, 2 hours each in 3 axes (when used with BNL6 end clips) 10 to 55Hz, amplitude 0.375mm, 2 hours each in 3 axes (when used with BNL8 end clips)				10 to 55 Hz, amplitude 0.375mm, 2 hours each in 3 axes (when used with part no. BNL6 mounting clips)				
Shock Resistance		300 m/s ² (30G), 3 times each in 6 directions																
Expected Life ⁵		8 years minimum (at the rated input, 50% load, operating temperature +40°C, standard mounting direction)																
EMC	EMI	EN61204-3 (Class B)																
	EMS	EN61204-3 (industrial)																
Safety Standards		UL508 (Listing), UL1310 Class 2, ANSI/ISA-12.12.01 CSA C22.2 No. 107.1, 213, 223 EN60950-1, EN50178										UL508 (Listing) ANSI/ISA-12.12.01 CSA C22.2 No. 107.1, 213 EN60950-1, EN50178						
Other Standard		SEMI F47 (at 208V AC input only)																
Degree of Protection		IP20 (EN60529)																
Dimensions (mm)		75H × 45W × 70D		90H × 22.5W × 95D				95H × 36W × 108D				115H × 46W × 121D		125H × 60W × 125D				
Weight (approx.)		130g		140g		150g		260g		310g		470g		960g				
Terminal Screw		M3.5																

*At normal temperature and humidity unless otherwise specified.

Note 1: DC input voltage is not subject to safety standards. When using on DC input, connect a fuse to the input terminal for DC input protection.

Note 2: Under stable state.

Note 3: PS5R-VB05 (5V DC/2.0A) is 10W (Up to 3.0A at Ta = 0 to 40°C. Not subject to safety standards above 2.0A.)

Note 4: See the output derating curves.

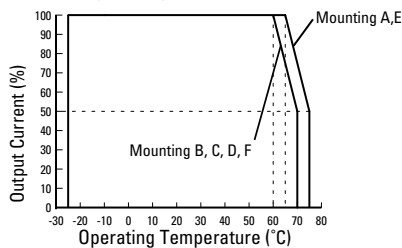
Note 5: Calculation of the expected life is based on the actual life of the aluminum electrolytic capacitor. The expected life depends on operating conditions.

Characteristics

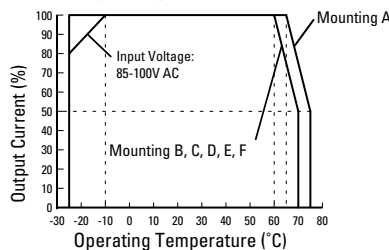
Operating Temperature vs. Output Current (Derating Curves)

Conditions: Natural air cooling (Operating temperature is the temperature around the switching power supply.)

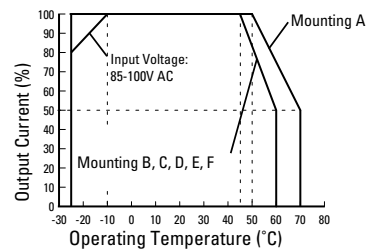
PS5R-VA05, -VA12, -VA24



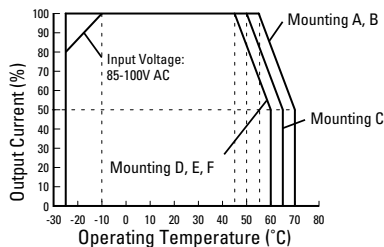
PS5R-VB05, -VB12, -VB24



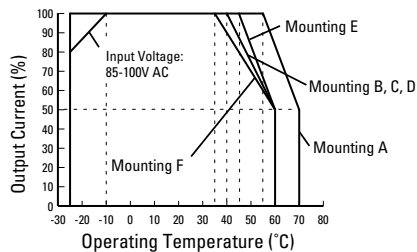
PS5R-VC12



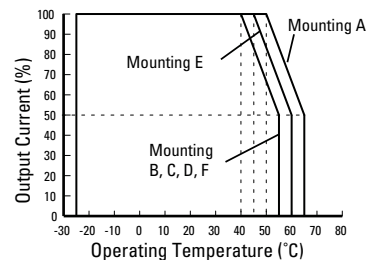
PS5R-VC24



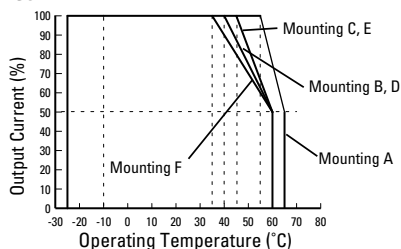
PS5R-VD24



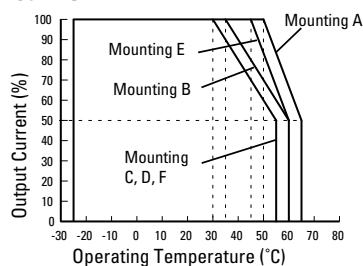
PS5R-VE24



PS5R-VF24

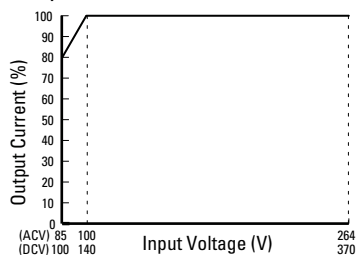


PS5R-VG24

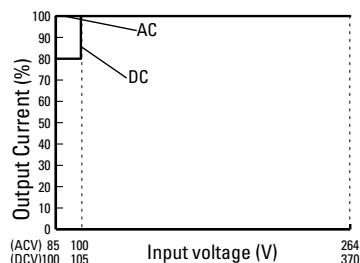


Input Voltage vs. Output Current (Derating Curves) Ta=25°C

PS5R-VB05, -VB12, -VB24, -VC12, -VC24, -VD24, -VE24, -VF24

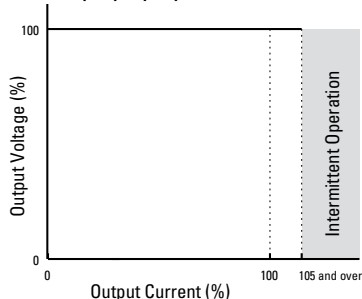


PS5R-VA05, -VA12, -VA24, -VG24

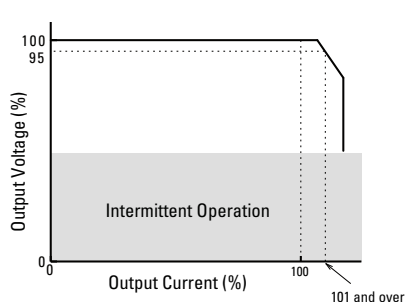


Overcurrent Protection Characteristics

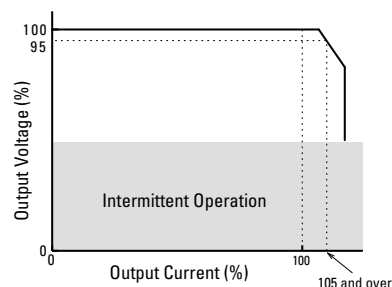
PS5R-VA/VB/VC/VD/VF



PS5R-VE24



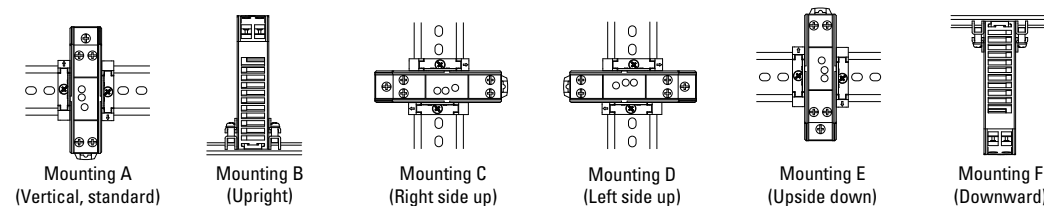
PS5R-VG24



Operating Temperature Approved by Safety Standards

Part Number	UL508, CSA C22.2 No.107.1, ANSI/ISA12.12.01, EN60950-1, EN50178					
	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
PS5R-VA05, -VA12, -VA24	65	60	60	60	65	60
PS5R-VB05, -VB12, -VB24	65	60	60	60	60	60
PS5R-VC12	50	45	45	45	45	45
PS5R-VC24	55	55	50	45	45	45
PS5R-VD24	55	40	40	40	45	35
PS5R-VE24	50	40	40	40	45	40
PS5R-VF24	55	40	45	40	45	35
PS5R-VG24	50	35	30	30	45	30

Mounting Style

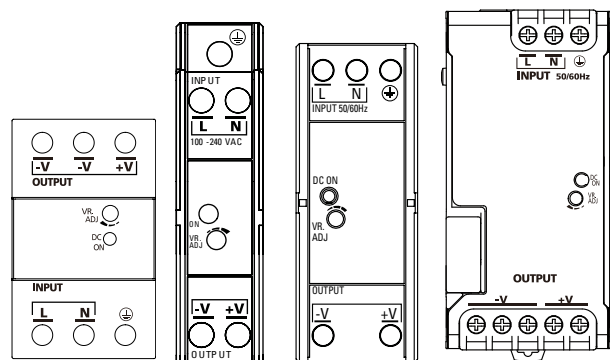


Front Panel

PS5R-VA

PS5R-VB/VC
PS5R-VD/VE/VF

PS5R-VG



Marking	Name	Description
L, N	AC Input Terminal	Voltage range: 85 to 264V AC/100 to 370V DC
⊕	Ground Terminal	Be sure to connect this terminal to a proper ground.
+V, -V	DC Output Terminals	+V: Positive output terminal -V: Negative output terminal
VR.ADJ	Output Voltage Adjustment	Allows adjustment within $\pm 10\%$. (VE = $\pm 5\%$) Turning clockwise increases the output voltage. Turning counterclockwise decreases the output voltage.
DC ON	Operation Indicator (green)	Illuminates when the output voltage is on.

Accessories

Panel Mounting Bracket²

Applicable Switching Power Supply	Part Number	Remarks
PS5R-VB	PS9Z-5R1B	—
PS5R-VC	PS9Z-5R2B	For side mounting
PS5R-VD	PS9Z-5R1C	—
PS5R-VE	PS9Z-5R1E	—
PS5R-VF	PS9Z-5R1E	—
PS5R-VG	PS9Z-6R1F	—
	PS9Z-6R2F	For side mounting

Note 2: Used when installing on a panel directly, PS5R-VA model does not require panel mounting bracket.

DIN Rail (35mm-wide)

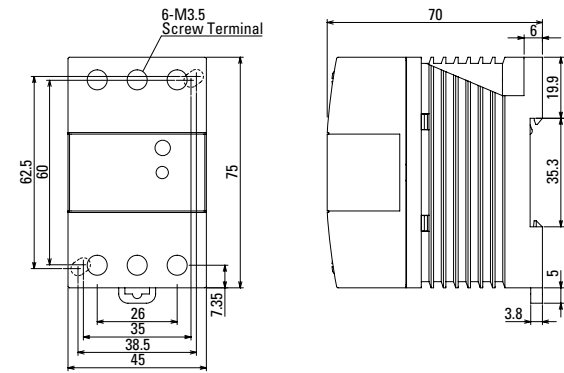
1000mm	BNDN1000	Aluminum
--------	----------	----------

End Clip

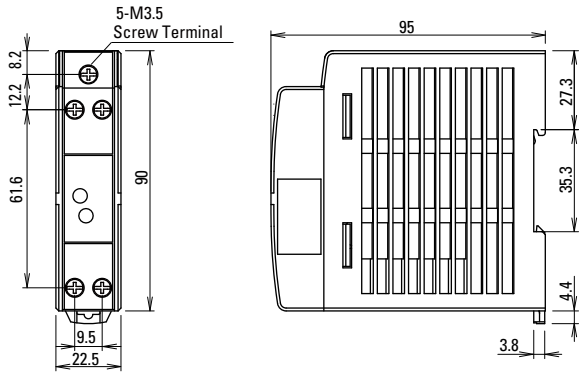
Part Number
BNL6
BNL8

Dimensions (mm)

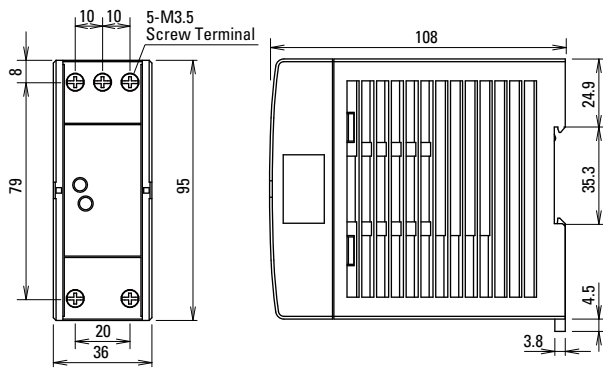
PS5R-VA



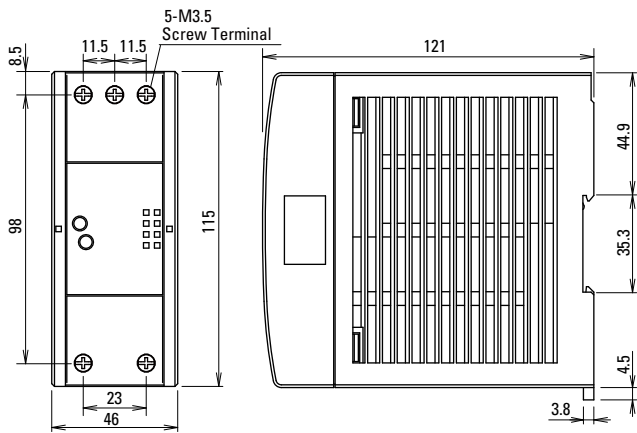
PS5R-VB/VC



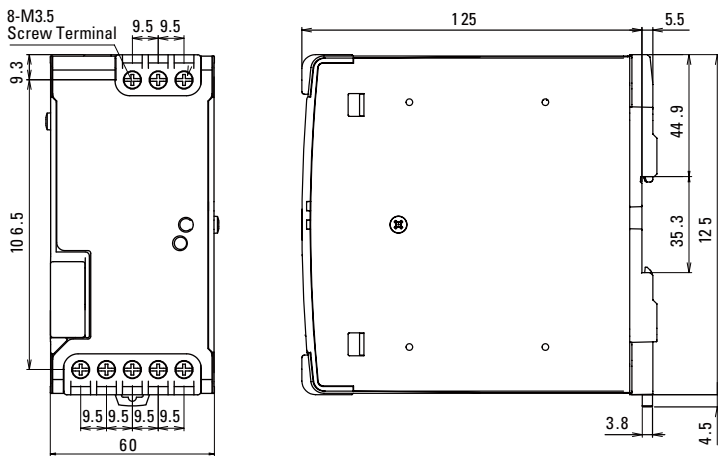
PS5R-VD/VE



PS5R-VF



PS5R-VG



MTBF*

PS5R-VA:	1,150,000H minimum
PS5R-VB:	900,000H minimum
PS5R-VC:	650,000H minimum
PS5R-VD:	450,000H minimum
PS5R-VE:	380,000H minimum
PS5R-VF:	350,000H minimum
PS5R-VG:	290,000H minimum

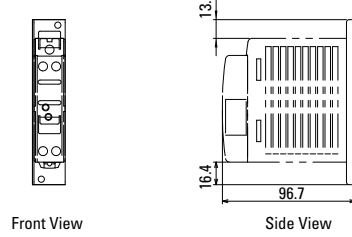
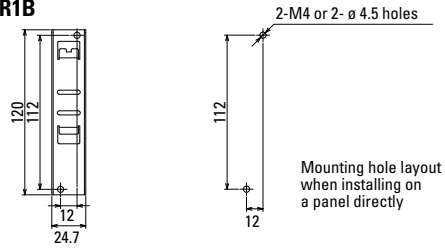
MIL-HDBK-217FN2
(GB, 30°C)

*MTBF stands for Mean Time Between Failure, which is calculated according to statistical device failures, and indicates reliability of a device. It is the statistical representation of the likelihood of the unit to fail and does not necessarily represent the expected life of a product.

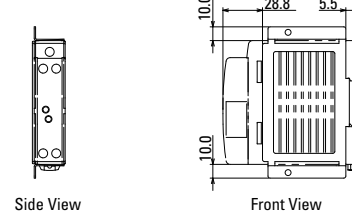
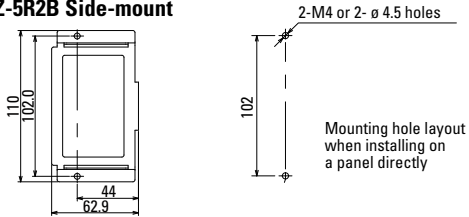
* 3-Phase

Panel Mounting Bracket

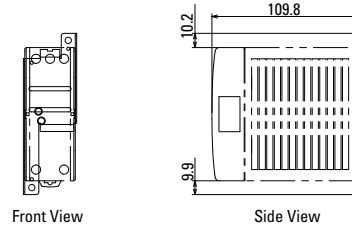
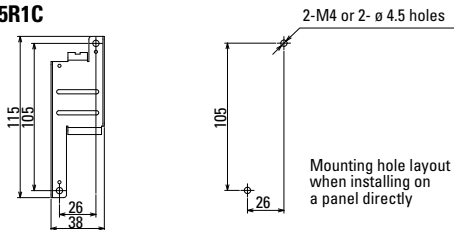
PS9Z-5R1B



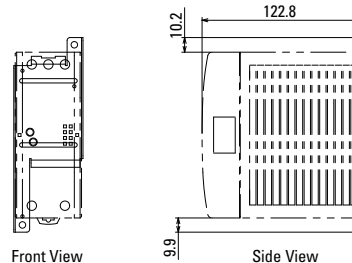
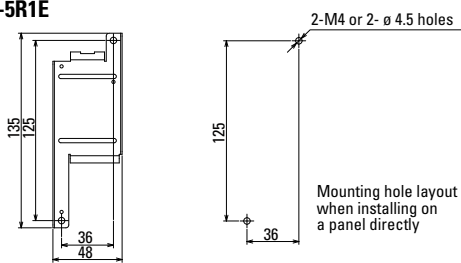
PS9Z-5R2B Side-mount



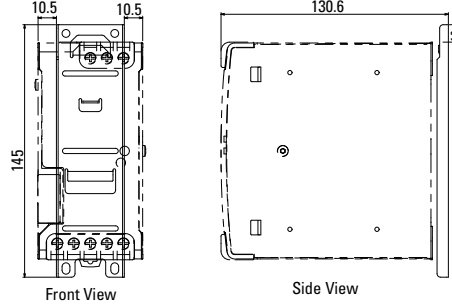
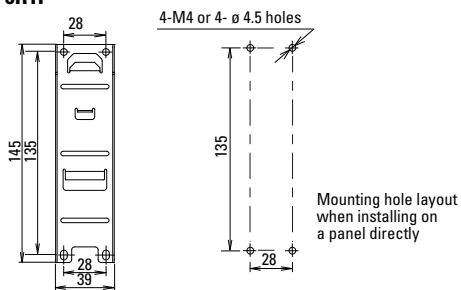
PS9Z-5R1C



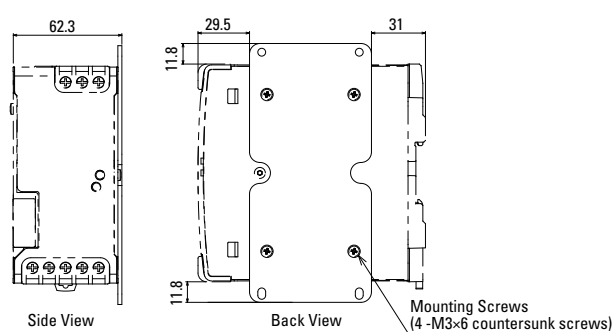
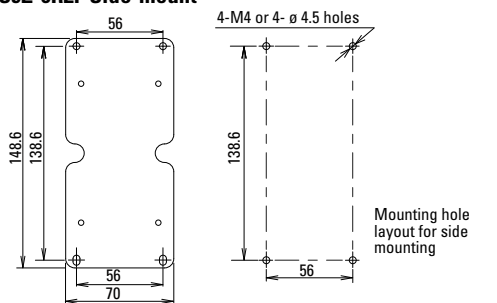
PS9Z-5R1E



PS9Z-6R1F



PS9Z-6R2F Side-mount



OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Safety Precautions

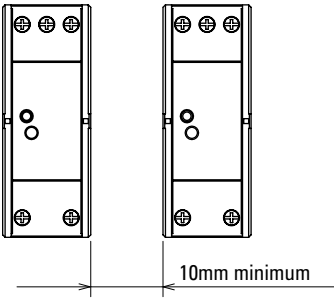
The PS5R-V should be placed in a proper enclosure. It is designed to be used with general electrical equipment and industrial electric devices

- Do not use switching power supplies with electric equipment whose malfunction or inadvertent operation may damage the human body or life directly.
- Make sure that the input voltage and output current do not exceed the ratings. If the input voltage and output current exceed the ratings, electric shock, fire, or malfunction may occur.
- Do not touch the terminals of the switching power supply while input voltage is applied, otherwise electric shock may occur.
- Provide the final product with protection against malfunction or damage that may be caused by malfunction of the switching power supply.
- Operating temperatures should not exceed the ratings. Be sure to note the derating characteristics. If the operating temperature exceeds the ratings, electric shock, fire, or malfunction may occur.
- Blown fuses indicate that the internal circuits are damaged. Contact IDEC for repair. Do not just replace the fuse and reoperate, otherwise electric shock, fire, or malfunction may occur.
- Do not use the switching power supplies to charge rechargeable batteries.
- Do not overload or short-circuit the switching power supply for a long period of time, otherwise the internal elements may be damaged.
- Do not disassemble, repair, or modify the power supplies, otherwise the high voltage internal part may cause electric shock, fire, or malfunction.
- The fuse inside the PS5R-V switching power supply is for AC input. Use an external fuse for DC input.

Operating Instructions

Notes for installation

- Do not close the top or bottom openings of the PS5R-V to allow for heat radiation by convection.
- When mounting multiple PS5R-V switching power supplies side by side, maintain a minimum of 10 mm clearance. Observe the derating curves in consideration of the ambient temperature.

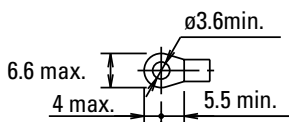


- When the derating voltage may exceed the recommended value, provide forced air-cooling.
- Make sure to wire the ground terminal correctly.
- For wiring, use wires of heat resistance of 60°C or higher (PS5R-VB: 80°C or higher). Use copper wire of the following sizes, according to the rated current.

Terminal	Wire Size (allowable current)	Wire Type
Input	AWG 18 to 14	Copper Solid/Stranded
Output	AWG18 to 14 (AWG18: 7A, AWG16: 10A, AWG14: 15A)	

Cross-Sectional are AWG18: 0.82mm², AWG16: 1.31mm², AWG14: 2.0mm²

Applicable crimp terminal (reference)



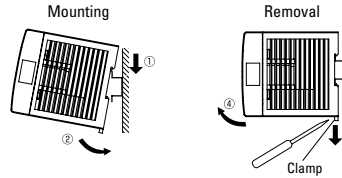
- Recommended tightening torque of the input and output terminals is 1.0 to 1.3Nm (0.8N·m for UL).

Mounting on DIN Rails

- Use a 35mm-wide DIN rail.
- Place the PS5R-V on the DIN rail as shown with input terminal side up (①), and press the PS5R-V towards the DIN rail (②). Make sure that the PS5R-V is installed firmly.
- Use BNL6 end clips to ensure power supplies do not slide off the end of the DIN rail. Use of BNL8 end clips is recommended when excessive vibration or shock is anticipated.

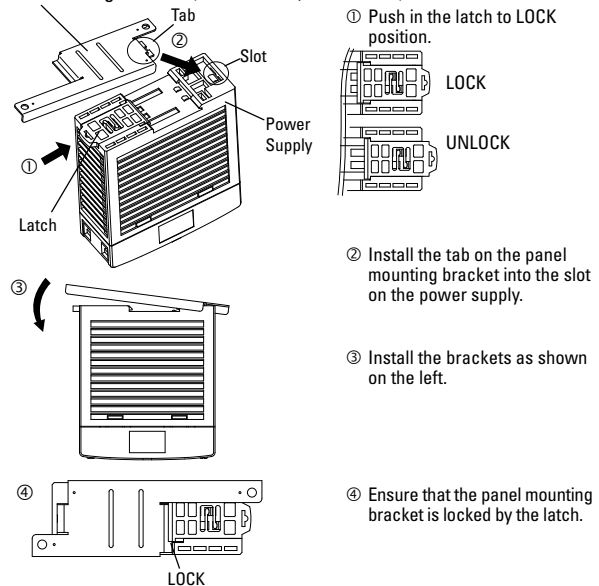
Removal

- Insert a flat screwdriver into the slot in the clamp, and pull out until it clicks (①). The lock mechanism is released and the PS5R-V can be removed (②). When mounting the PS5R-V again, push in the latch first.

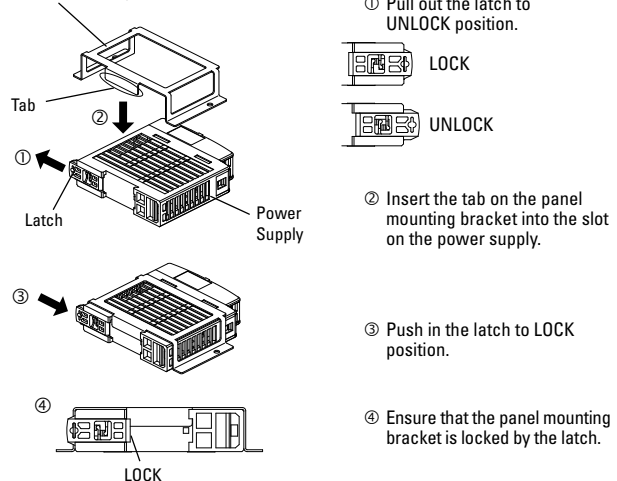


Installing a Panel Mounting Bracket

Panel Mounting Bracket (PS9Z-5R1□, PS9Z-6R1F)

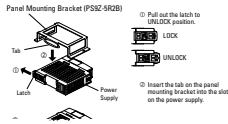
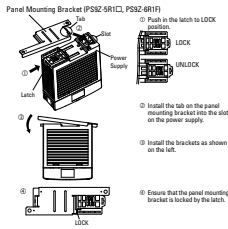


Panel Mounting Bracket (PS9Z-5R2B)



Installing PS9Z-6R2F Side-mount Panel Mounting Bracket

Install the bracket on the switching power supply using four M3 × 6 countersunk screws supplied with the bracket. Recommended tightening torque is 0.5 to 0.6N.m (should be in the center positions)



Adjustment of Output Voltage

The output voltage can be adjusted within $\pm 10\%$ (VE: $\pm 5\%$) of the rated output voltage by using the VR.ADJ control on the front. Turning the VR.ADJ clockwise increases the output voltage. Turning the VR.ADJ counterclockwise decreases the output voltage.

Overcurrent Protection

The output voltage drops automatically when an overcurrent flows due to an overload or short circuit. Normal voltage is automatically restored when the load returns to normal conditions.

Insulation/Dielectric Test

When performing an insulation/dielectric test, short-circuit the input (between L and N) and output (between +V and -V). Do not apply or interrupt the voltage quickly, otherwise surge voltages may be generated and the PS5R-V may be damaged.

Notes for Operation

- Output interruption may indicate blown fuses. Contact IDEC.
- The PS5R-V switching power supply contains an internal fuse for AC input. When using DC input, install an external fuse. To avoid blown fuses, select a fuse in consideration of the rated current of the internal fuse.

Rated Current of Internal Fuses

Part Number	Internal Fuse Rated Current
PS5R-VB/VC	2A
PS5R-VD/VE/VF	4A
PS5R-VG	6.3A

- Avoid overload and short-circuit for a long period of time, otherwise the internal elements may be damaged.
- DC input operation is not subject to safety standards.

Rust and Scratches on Metal parts

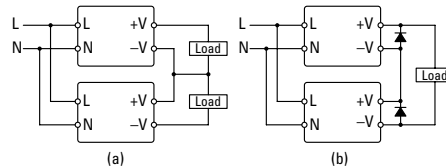
Bonded metal parts are used for the PS5R-V. Rust on the edge and scratches on the surfaces may be developed depending on the storage condition, but the performance of the PS5R-V is not affected.

Noise

Small acoustic noise inside the PS5R-V may be heard depending on the input voltage and load, but the performance of the PS5R-V is not affected.

Series Operation

Series operation is allowed. Connect Schottky barrier diodes D as shown below. Select a Schottky diode in consideration of the rated current. The diode's reverse voltage must be higher than the PS5R-V's output voltage.

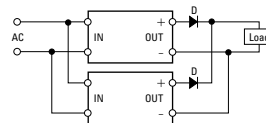


Parallel Operation

Parallel operation is not possible to increase the output capacity, because the internal elements and load may be damaged.

Backup Operation

Backup operation is a connection method of two switching power supplies in parallel for emergency. Normally one switching power supply has a sufficient output. If one switching power supply fails, another one operates to continue the output. Make sure that the sum of power consumption by load and diode is not greater than the rated wattage (rated voltage × rated current) of one switching power supply.



Select a diode in consideration of:

Diode's current must be more than double the PS5R-V's output current. Take heat dissipation into consideration.

Warranty

IDEC warrants the PS5R-V switching power supply for a period of five years from the date of shipment.

Scope

IDEC agrees to repair or replace the PS5R-V switching power supply if the product has been operated under the following conditions. The maximum value of output capacity is within the range shown in "Operating Temperature vs. Output Current on page 3.

1. Average operating temperature (ambient temperature of switching power supply) is 40°C maximum.
2. The load is 80% maximum.
3. Input voltage is the rated input voltage.
4. Standard mounting style

IDEC shall not be liable for other damages including consequential, contingent or incidental damages. Warranty does not apply if the PS5R-V switching power supply was subject to:

1. Inappropriate handling, or operation beyond specifications.
2. Modification or repair by other than IDEC.
3. Failure caused by other than the PS5R-V switching power supply.
4. Failure caused by natural disasters.

PS5R Slim Line Series Switching Power Supplies

Key features:

- Lightweight and compact in size
- Wide power range: 10W-240W
- Universal input:
10W to 90W: 85-264V AC/100-370V DC
120W and 240W: 85-264V AC/100-350V DC
- Power Factor Correction for 60W to 240W (EN61000-3-2)
- Meets SEMI F47 Sag Immunity (120W & 240W only)
- UL Listed for Class 1, Div. 2 Hazardous Locations
- Overcurrent protection, auto-reset
- Overvoltage protection, shut down
- Spring-up screw terminal type, IP20
- DIN rail or panel surface mount
- Approvals:
CE Marked
TÜV
c-UL, UL508
UL1310 (PS5R-SB, -SC, -SD)

ANSI/ISA-12.12.01-2011 (Hazardous locations)
EN50178:1997

LVD: EN60950:2000

EMC: Directive EN61204-3:2000 (EMI: Class B, EMS: Industrial)



File #E234997



(SEMI F47 120W & 240W only)

Designed with Accessibility & Convenience in Mind

DC Low Indicator (15W, 120W & 240W Slim Line Only)

The indicator turns on when the output voltage drops below 80% of the rated value. This assists in troubleshooting power supply problems.

DC ON Indicator

The indicator turns on when the unit is powered up. This is a convenient way to know when the power supply is receiving power.

Output Voltage Adjustment

The output voltage can be easily adjusted within $\pm 10\%$ of the rated voltage.



Fingersafe, Spring-up Screw Terminals

Terminals are captive spring-up screws, which makes using them as easy as pushing a screw down and tightening it. They are shock and vibration resistant, and work with ring lugs, fork connectors or stripped wire connections. The terminals are rated IP20 (when tightened) meaning they are recessed to keep fingers and objects from touching the input contacts.

Universal Input Power

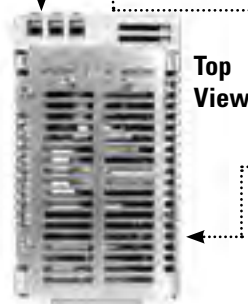
The applied input power has a range of 85-264V AC (100-350V DC) without the use of jumpers or slide switches. This makes IDEC power supplies suitable for use anywhere in the world.

Long Life Expectancy

IDEC power supplies are very reliable, with a life expectancy of 70,000 hrs. (minimum) or longer, depending on usage. Power factor correction has also been included to minimize harmonic distortion, resulting in a longer operating life and increased reliability.

Output Channel

With very low output ripples of less than 1% peak to peak, the 120W and 240W power supplies are some of the best in the industry. The output comes with overload protection that avoids damaging the power supply and the spring-up, fingersafe, screw terminals add a level of safety and ease for the user. The 240W power supply also has the convenience of two output terminals.



Top View



Ventilation Grill

Provides cooling for the power supply and prevents small objects from falling into the power supply circuitry.

Part Numbers

Style	Output Capacity	Input Voltage	Output Voltage	Rated Current	Part Number
	10	85 to 264V AC	5V DC	2.0A	PS5R-SB05
	15		12V DC	1.2A	PS5R-SB12
			24V DC	0.65A	PS5R-SB24
	30		12V DC	2.5A	PS5R-SC12
			24V DC	1.3A	PS5R-SC24
	60		24V DC	2.5A	PS5R-SD24
	90	85 to 264V AC	24V DC	3.75A	PS5R-SE24
	120		24V DC	5A	PS5R-SF24
	240		24V DC	10A	PS5R-SG24

Accessories

	Panel Mounting Bracket for PS5R-SB	PS9Z-5R1B
	Panel Mounting Bracket for PS5R-SB (flat side mounting)	PS9Z-5R2B
	Panel Mounting Bracket for PS5R-SC and PS5R-SD	PS9Z-5R1C
	Panel Mounting Bracket for PS5R-SE	PS9Z-5R1E
	Panel Mounting Bracket for PS5R-SF & PS5R-SG	PS9Z-5R1G
	DIN rail (1000mm)	BNDN1000
	DIN rail end clip	BNL5

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Specifications

Model		5V DC output	PS5R-SB05	—		—	—	—	
		12V DC output	PS5R-SB12	PS5R-SC12	—	—	—	—	
		24V DC output	PS5R-SB24	PS5R-SC24	PS5R-SD24	PS5R-SE24	PS5R-SF24	PS5R-SG24	
Output Capacity			15W (5V Model is 10W)	30W	60W	90W	120W	240W	
Input	Input Voltage (single-phase, 2-wire)		85 to 264V AC, 100 to 370V DC				85 to 264V AC, 100 to 350V DC		
	Input Current (maximum)	100VAC	0.45A	0.9A	1.7A	2.3A	1.8A	3.5A	
		200VAC	0.3A	0.6A	1.0A	1.4A	1.0A	1.7A	
	Internal Fuse Rating		2A	3.15A		4A		6.3A	
	Inrush Current (cold start)		50A maximum (at 200V AC)						
	Leakage Current (at no load)		132V AC: 0.38 mA maximum 264V AC: 0.75 mA maximum	0.75mA maximum			1mA maximum		
	Typical Efficiency	5V DC	69%	—	—	—	—	—	
		12V DC	75%	78%	—	—	—	—	
		24V DC	79%	80%	83%	82%	84%		
	Output Current Ratings	5V DC	2.0A	—	—	—	—	—	
12V DC		1.2A	2.5A	—	—	—	—		
24V DC		0.65A	1.3A	2.5A	3.75A	5A	10A		
Output	Voltage Adjustment		±10% (V. ADJ control on front)						
	Output Holding Time		20ms minimum (at rated input and output)						
	Starting Time		200ms maximum	—	—	—	650ms maximum	500ms maximum	
	Rise Time		100ms maximum (at rated input and output)				200ms maximum		
	Line Regulation		0.4% maximum						
	Load Regulation		1.5% maximum					0.8% max	
	Temperature Regulation		0.05% degree C maximum						
	Ripple Voltage		2% peak to peak maximum (including noise)				1% peak to peak maximum (including noise)		
	Overcurrent Protection		105% or more, auto reset			105 to 130%, auto reset	103 to 110%, auto reset		
	Overvoltage Protection		120% min. SHUTDOWN						
	Operation Indicator		LED (green)						
	Voltage Low Indication		LED (amber)	—	—	—	LED (amber)		
	Dielectric Strength			Between Input and Ground: 2000 V AC, 1 minute Between input and output: 3000V AC, 1 minute; Between output and ground: 500V AC, 1 minute.					
	Insulation Resistance			Between Input & Output Terminals: 100 MΩ Min					
	Operating Temperature			−10 to +65°C (14 to 149°F)	-10 to 60°C (14 to 140°F)				
Storage Temperature			-25 to 75°C (-13 to +167°F)						
Operating Humidity			20 to 90% relative humidity (no condensation)						
Vibration Resistance			Frequency 10 to 55Hz, Amplitude 0.375mm						
Shock Resistance			300m/s ² (30G) 3 times each in 6 axes						
Approvals			EMC: EN61204-3 (EMI: Class B, EMS: Industrial), c-UL (CSA 22.2 No. 14), ANSI/ISA-12.12.01-2011, UL508, LVD: EN60950, EN50178						
			UL1310 Class 2, c-UL (CSA 22.2 No. 213 and 223)			—		SEMI F47	
Harmonic Directive			N/A			EN61000-3-2 A14 class A			
Weight (approx.)			160g	250g	285g	440g	630g	1000g	
Terminal Screw			M3.5 slotted-Phillips head screw (screw terminal type)						
IP protection			IP20 fingersafe						
Dimensions H x W x D (mm)			90 x 22.5 x 95	95 x 36 x 108		115 x 46 x 121	115 x 50 x 129	125 x 80 x 149.5	
Dimensions H x W x D (inches)			3.54 x 0.89 x 3.74	3.74 x 1.42 x 4.25		4.53 x 1.81 x 4.76	4.53 x 1.97 x 5.08	4.92 x 3.15 x 5.89	

1. For dimensions, see page 186.

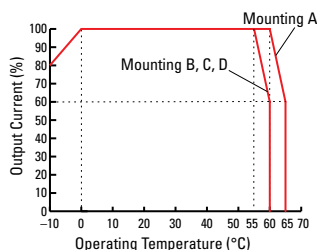


Temperature Derating Curves

All IDEC Slim Line power supplies are listed to UL508, which allows operation at 100% capacity inside a panel. This eliminates the need to use oversize power supplies or utilize two power supplies derated at 50% of their rated output.

The charts below show that the PS5R Slim 10W (at 60°C) and 15W (at 60°C), 30W/60W/90W (at 55°C), 120W (at 40°C), and 240W (at 45°C) meet the elevated, operating temperature required by UL508 and EN60950 standards to operate at an output current of 100%. The output current starts to derate beyond the required temperature.

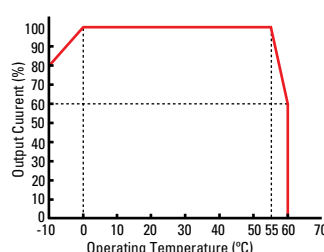
PS5R-SB



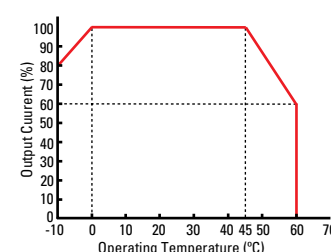
Derating curve for PS5R-SB varies depending on mounting method (see right).

Mounting A
(standard)Mounting B
(upright)Mounting C
(left side up)Mounting D
(right side up)

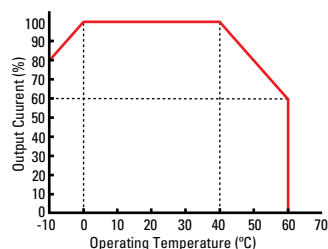
PS5R-SC



PS5R-SG

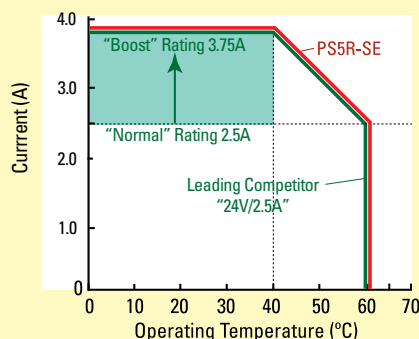


PS5R-SD, -SE, -SF



PS5R-SE 90W/3.75A/24V DC versus a Leading Competitor

Standard derating curve (operating temperature vs. output current)

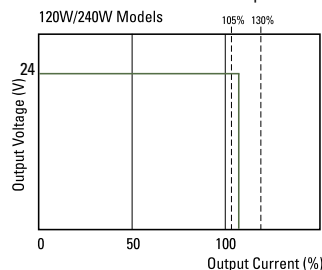


Don't Believe the Hype

Other companies use slick marketing to sell you 60W power supplies with a "BOOST," but what they don't tell you is that these are merely 90W power supplies that have been renamed to fool you into thinking they have a unique feature. IDEC 90W power supplies are just what they claim, 90W power supplies. The truth is IDEC led the market by incorporating UL508 DIN rail mount power supplies as a standard product. Don't let the other guys pull a fast one on you by claiming to provide features that just aren't true, or even possible. See what IDEC has to offer, no strings attached.

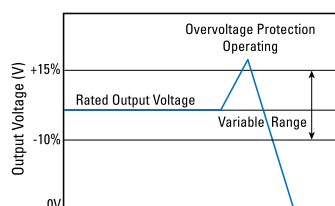
Overload Protection

Overload protection prevents the power supply from being damaged when an overload occurs. There are two kinds of protection.

Overcurrent Protection
PS5R-SF, -SG

Overcurrent Protection

When the output current exceeds 105% of the rated current, overload protection is triggered, and the output voltage starts decreasing. When the output current returns within the rated range, the overload protection function is automatically cleared.



Overvoltage Protection

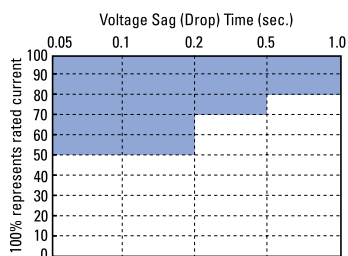
Overvoltage Protection

When the output voltage of the power supply rises to 120% or more of the rated value, the output will shut off. To restore power, only manual reset is available which is an advantage in troubleshooting.

SEMI-F47 Approved

The SEMI F47 (Semiconductor Processing Equipment Voltage Sag Immunity) defines the minimum voltage sag ride-through requirements for semiconductor processing, automated test equipment and other equipment. It requires that the equipment be able to tolerate voltage sags on an AC power line without interrupting operations. This avoids the loss of production and money.

The graph shows how the equipment must tolerate sags to 50% for 200ms, sags to 70% for up to 0.5 seconds and sags to 80% for up to 1 second.

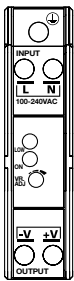


Voltage Sag Sliding Scale PS5R-SF, -SG

Dimensions and Terminal Markings

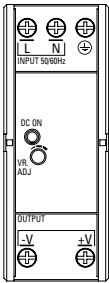
PS5R-SB

Height 90mm
Width 22.5mm
Depth 95mm



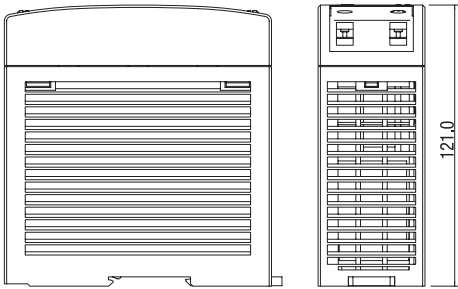
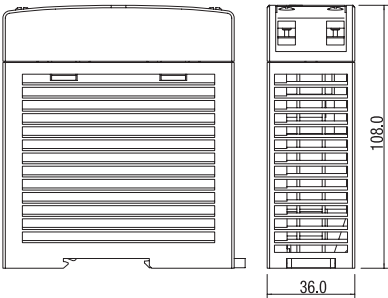
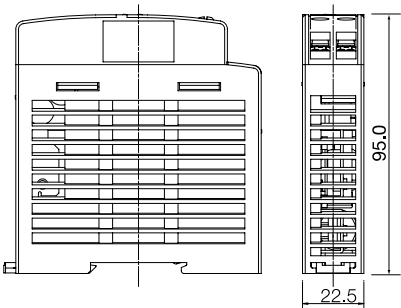
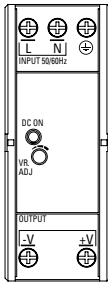
PS5R-SC
PS5R-SD

Height 95.0mm
Width 36.0mm
Depth 108.0mm



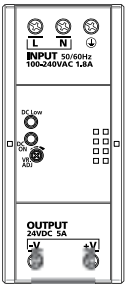
PS5R-SE

Height 115.0mm
Width 46.0mm
Depth 121.0mm



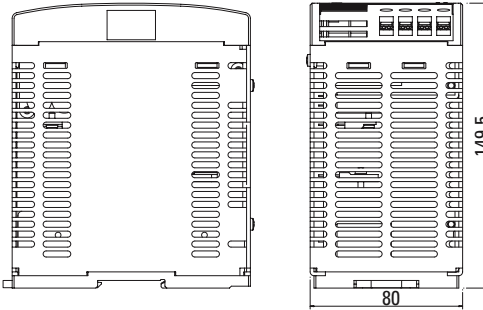
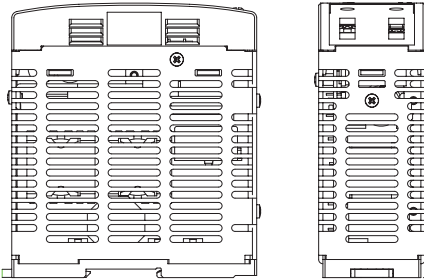
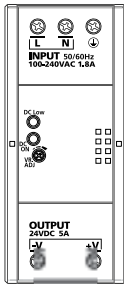
PS5R-SF

Height 115.0mm
Width 50.0mm
Depth 129.0mm



PS5R-SG

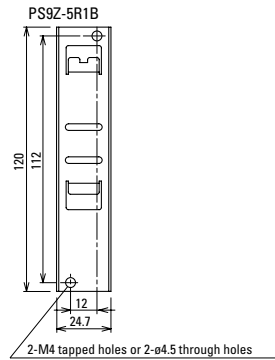
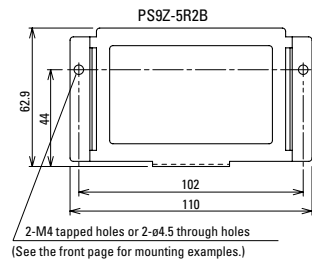
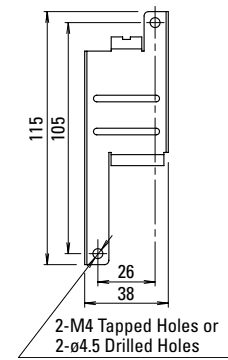
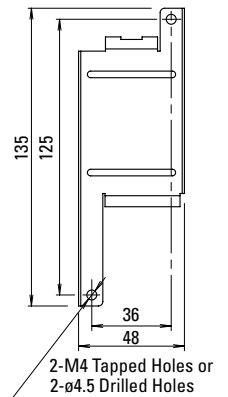
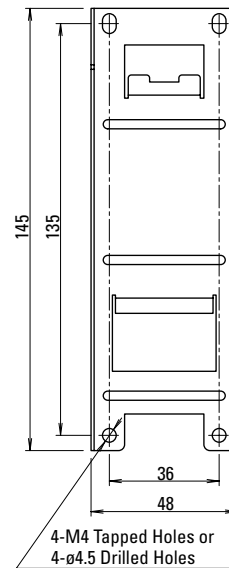
Height 125.0 mm
Width 80.0 mm
Depth 149.5 mm



Front Panel (terminals)

Markings	Name	Description
V. ADJ	Voltage adjustment	Adjusts within $\pm 10\%$; turn clockwise to increase output voltage.
DC ON	Operation indicator	Green LED is lit when output voltage is on.
DC Low	Output indicator	Amber LED is lit when output voltage drops below 80% of rated voltage.
+V, -V	DC output terminals	+V: Positive output Terminal -V: Negative output terminal
	Frame ground	Ground this terminal to reduce high-frequency noise caused by switching power supply.
L, N	Input terminals	Accept a wide range of voltages and frequencies (no polarity at DC input).

Mounting Bracket Dimensions (mm)

PS9Z-5R1B (for PS5R-SB)**PS9Z-5R2B** (for PS5R-SB)**PS9Z-5R1C** (for PS5R-SC & PS5R-SD)**PS9Z-5R1E** (for PS5R-SE)**PS9Z-5R1G** (for PS5R-SF & PS5R-SG)

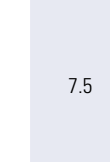
PS5R Standard Series
Switching Power Supplies

Key features:

- Wide power range: 7.5W-480W
 - Universal input :
7.5W-50W: 85-264V AC/105-370V DC
100W: 85-132V AC/170-264V AC
240-370V DC (selectable)
75W, 120W, 240W: 85-264V AC/110-350V DC
480W: 3 phase: 320- 575V AC
3 phase: 360- 575V AC
 - Overcurrent/overvoltage protection
 - Power Factor Correction (75W, 120W, 240W models)
EN61000-3-3
EN61000-3-2
 - Voltage adjustment +10%
 - Spring-up screw terminal, IP20 (finger-safe)
 - DIN rail or panel surface mount
 - Approvals:
CE marked
UL 508 Listed
c-UL
TÜV approved
LVD EN60950:2000
- EMC Directives:
EN50081-2
EN50082-2
EN61000-6-2



Part Numbers

Style	Output Capacity	Input Voltage	Output Voltage	Rated Current	Part Number
	7.5	85 to 264V AC	5V DC	1.5A	PS5R-A05
			12V DC	0.6A	PS5R-A12
			24V DC	0.3A	PS5R-A24
	15	85 to 264V AC	5V DC	2.5A	PS5R-B05
			12V DC	1.2A	PS5R-B12
			24V DC	0.6A	PS5R-B24
	30	100 to 240V AC	12V DC	2.5A	PS5R-C12
			24V DC	1.3A	PS5R-C24
			24V DC	2.1A	PS5R-D24
	50	320 to 575V AC (3 phase) 360 to 575V AC (2 phase)	24V DC	10A	PS5R-E24
			24V DC	5A	PS5R-F24
			24V DC	20A	PS5R-G24
	480	320 to 575V AC (3 phase) 360 to 575V AC (2 phase)	24V DC	20A	PS5R-TJ24*

Specifications

Model		PS5R-A05	PS5R-B05*	—	—	—	—	—	—		
		PS5R-A12	PS5R-B12	PS5R-C12	—	—	—	—	—		
		PS5R-A24	PS5R-B24	PS5R-C24	PS5R-D24	PS5R-Q24	PS5R-E24	PS5R-F24	PS5R-G24	PS5R-TJ24	
Output Capacity		7.5W	15W	30W	50W	75W	100W	120W	240W	480W	
Input	Input Voltage (single-phase, 2-wire)	100 to 240V AC nominal (85 to 264V AC), 50/60Hz (47 to 63Hz) 110 to 340V DC nominal (105 to 370V DC)					100 to 120V AC, 50/60Hz 200 to 240V AC, 50/60Hz (jumper selectable) 240 to 370V DC	100 to 240V AC, 50/60Hz, 110 to 340V DC		3 phase: 320 to 575V AC 2 phase: 360 to 575V AC	
	Input Current (typical)	0.17A at 100V AC	0.3A at 100V AC	0.68A at 100V AC	1.15A at 100V AC	1.1A at 100V AC	2.5A at 100V AC 1.5A at 200V AC	1.8A at 100V AC	4A at 100V AC	3 x 1.1A 3 x 0.8A	
	Internal Fuse Rating	2A	2A	3.15A	3.15A	3.15A	4A	4A	6.3A		
	Inrush Current	50A maximum (at cold start at 200V AC)					70A maximum (at cold start at 230V AC)	50A maximum (at cold start at 200V AC)	70A maximum (at cold start at 230V AC)		21A na
	Leakage Current (at no load)	0.75mA maximum (60Hz, measured in conformance with UL, CSA, VDE)									<3.5ml
	Typical Efficiency	69% at 5V 75% at 12V 79% at 24V		75% at 12V 75% at 24V	79% at 24V	83% at 24V	85% at 24V	83% at 24V		91%	
	Overvoltage Protection	Outputs turns off at 105% (typical)									
Output	Voltage and Current Ratings	5V, 1.5A 12V, 0.6A 24V, 0.3A	5V, 2.5A 12V, 1.2A 24V, 0.6A	12V, 2.5A 24V, 1.3A	24V, 2.1A	24V, 3.1A	24V, 4.2A	24V, 5A	24V, 10A	24V, 20A	
	Voltage Adjustments	±10% (V.ADJ screw on top)									
	Output Holding Time	20ms minimum (at full rated input and output)									10ms typical
	Rise Time	200ms maximum (at full rated input and output)							150ms max.	?	
	Line Regulation	0.4% maximum									1.0% max
	Load Regulation	1.5% maximum									2.0% max
	Fluctuation due to Ambient Temperature Change	0.05% maximum									
	Ripple Voltage	2% peak to peak maximum (including noise)									< 10mVpp
	Overload Protection	120% typical (Zener-limiting)			120% typical, auto reset						125% typical, auto reset
Operation Indicator		LED (green)									
Parallel Operation Allowed		PS5R-A	PS5R-B	PS5R-C	PS5R-D	PS5R-Q	PS5R-E	PS5R-F	PS5R-G		
		No				Yes	No	Yes		Yes	
Dielectric Strength		Between input and output terminals: 3,000V AC, 1 minute Between input terminals and housing: 2,000V AC, 1 minute Between output terminal and housing: 500V AC, 1 minute									
Insulation Resistance		Between input and output terminals/input terminals and housing: 100MΩ minimum (500V DC megger)									2kV AC, 500V DG
Operating Temperature		−10° to +60°C (14° to 140°F) (see derating curves)									-25 to +70 C
Storage Temperature		−30° to +85°C (-22° to 185°F)									-40 to +85 C
Operating Humidity		20 to 90% relative humidity (no condensation)									95% max (at 25 C, no condensation)
Vibration Resistance		45m/s ² , 10 to 55Hz, 2 hours on each of 3 axes				10 to 50Hz, 0.75mm p-p, 2 hrs on each of 3 axes					<15Hz amplitude +/- 2.5mm in accordance with IEC 60068-2-6 15 to 150Hz, 2.3g, 90 min.
Shock Resistance		300m/s ² (30G), 3 shocks in each of 6 directions									30g in all directions in accordance with IEC 60068-2-27
Approvals		Conforms to EMC Directives EN50081-2 & EN50082-2. LVD Directive EN60529 — Certified to EN60950. UL508 listed. c-UL, TUV approved. CE marked. EN61000-3-2									
Weight		150g	170g	360g	390g	800g	600g	1200g	2000g	2000g	
Termination		Spring-up, fingersafe terminals with captive M3.5 screws									
IP protection		IP20 (finger safe)									
Dimensions H x W x D (mm)		75 x 45 x 70	75 x 45 x95	75 x 90 x 95	75 x 90 x 95	120 x 85 x 140	75 x 145 x 95	120 x 115 x140	120 x 200x 140	130 x 115 x 152.5	
Dimensions H x W x D (inches)		2.95 x 1.77 x 2.76	2.95 x 1.77 x 3.74	2.95 x 3.54 x 3.74	2.95 x 3.54 x 3.74	4.72 x 3.35 x 5.52	2.95 x 5.71 x 3.74	4.72 x 4.53 x 5.52	4.72 x 7.87 x 5.51	5.12 x 4.53 x 6.00	



1. For dimensions, see page 192.
2. For usage instructions, see page 191.

3. *12.5W for 5VDC model.

Temperature Derating Curves

01 Touchscreens

PLCs

Automation Software

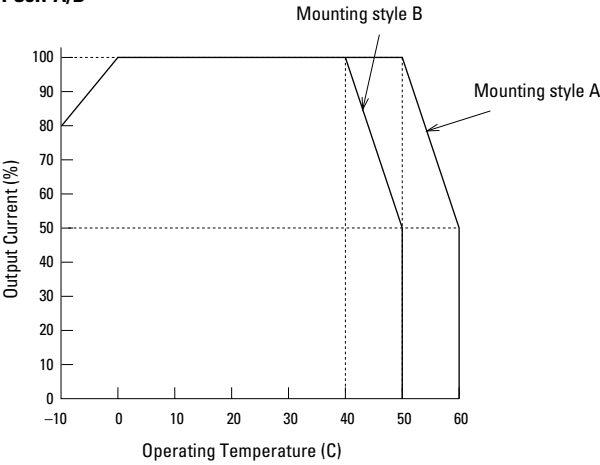
Power Supplies

Sensors

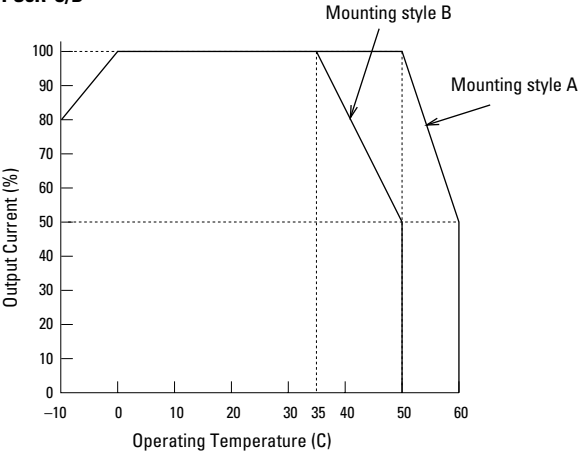
Communication

Barriers

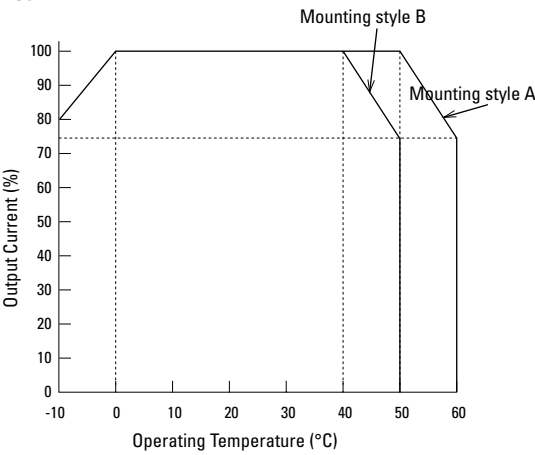
PS5R-A/B



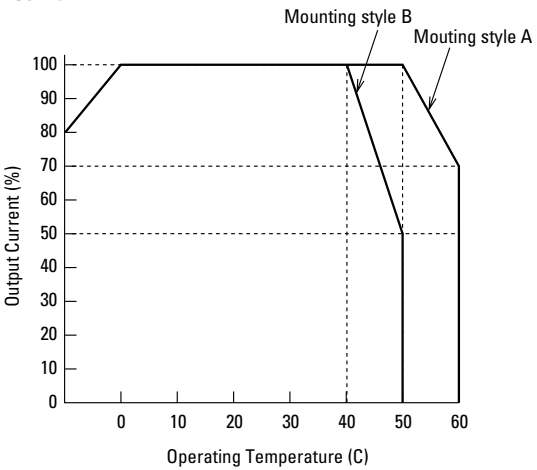
PS5R-C/D



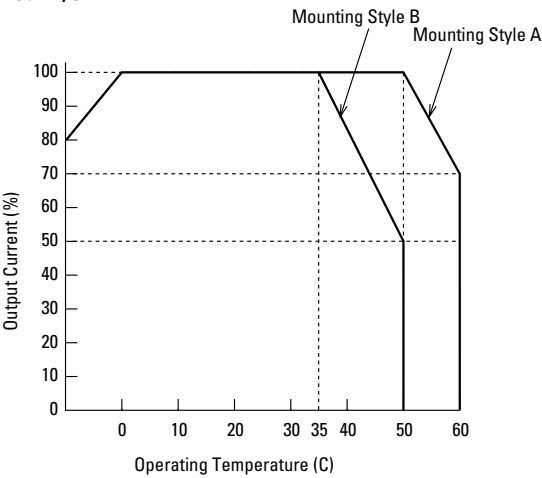
PS5R-E



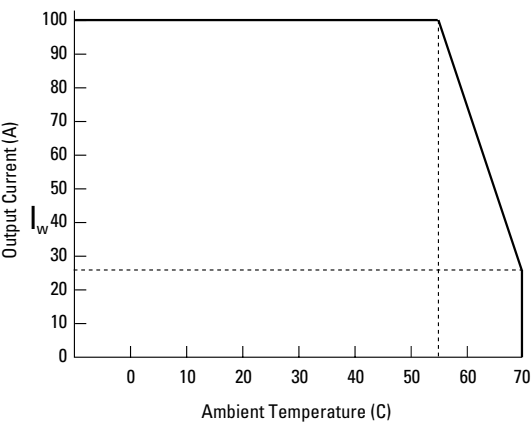
PS5R-Q



PS5R-F/G

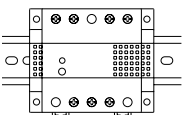


PS5R-TJ

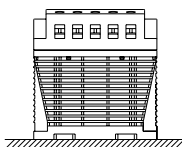


A Mounting (standard)

B Mounting (Facing Upward)



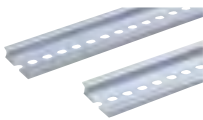
Vertical



Vertical

Accessories

Part Numbers: PS5R Accessories

Appearance	Description	Part Number
	DIN rail (1000mm)	BNDN1000
	DIN rail end clip	BNL5

Installation Instructions

Time-Saving Spring-up Terminals

The innovative terminals on the PS5R series use a spring-loaded screw. This makes installation as easy as pushing down and turning with a screwdriver. Installation time is cut in half since the screws do not need to be backed out to install wiring. The screws are held captive once installed and are 100% finger-safe. Screw terminals accept bare wire or ring or fork connectors.

1. Insert the wire connector into the slot on the side of the power supply.



2. Using a flat head or Phillips screwdriver, push down and turn the screw.

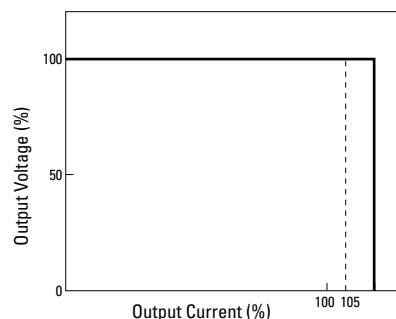
The wire is now connected, and the screw terminal is fingersafe!

Front Panel (terminals)

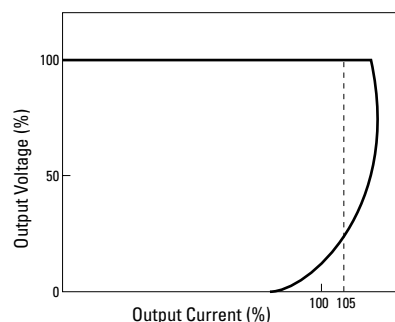
V. ADJ	Voltage adjustment	Adjusts within $\pm 10\%$; turn clockwise to increase output voltage
DC ON	Operation indicator	Green LED is lit when output voltage is on
+V, -V	DC output terminals	+V: Positive output Terminal -V: Negative output terminal
	Frame ground	Ground this terminal to reduce high-frequency currents caused by switching
L, N	Input terminals	Accept a wide range of voltages and frequencies (no polarity at DC input)
NC	No connection	Do not insert wires here, as this may damage the power supply

Overcurrent Protection Characteristics

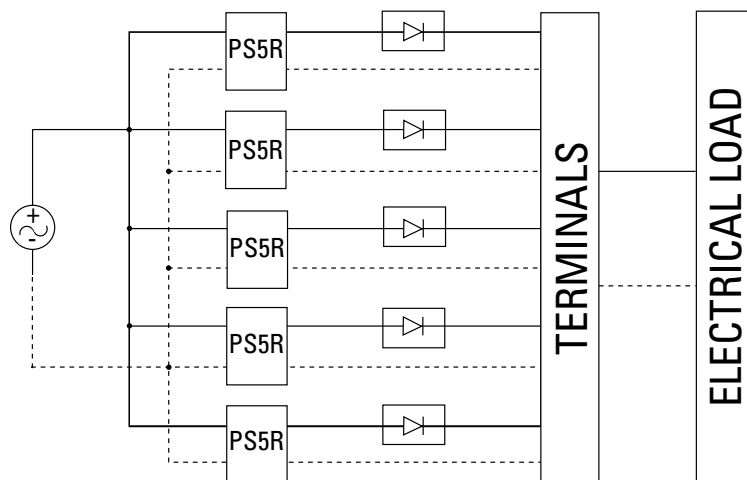
PS5R-A/B



PS5R-C/D/E



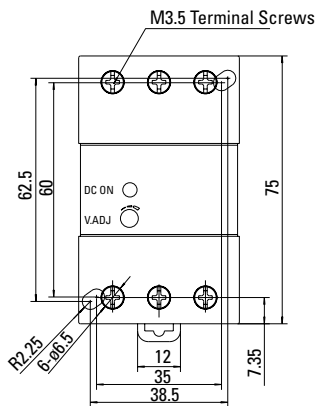
Parallel Operation



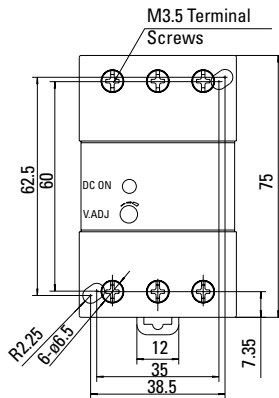
1. Parallel operation only recommended for PS5R-Q24, PS5R-F24 and PS5R-G24.
2. Factory recommended diode ST Microelectronics BYV54V-50, BYV54V-100, BYV54V-200, BYV541V-200 or with equivalent electrical specifications.
3. Using the voltage adjustment make sure out-voltage is the same for all power supplies.

Dimensions

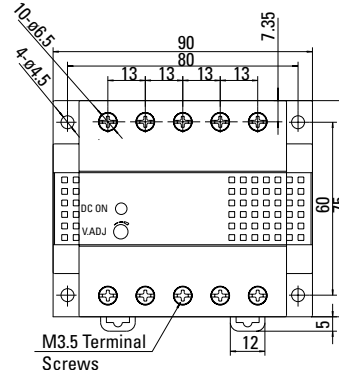
PS5R-A (7.5W)



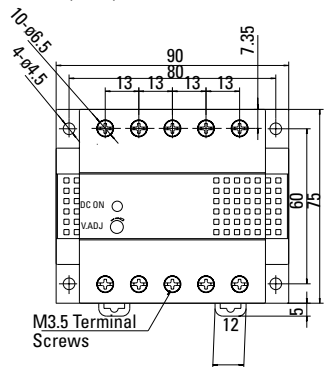
PS5R-B (15W)



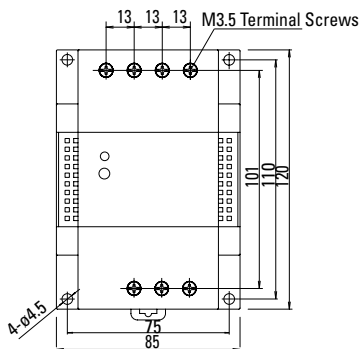
PS5R-C (30W)



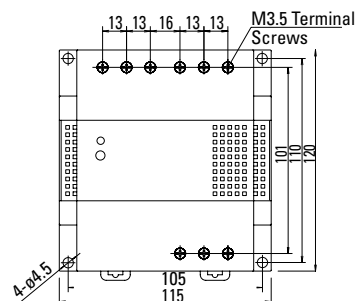
PS5R-D (50W)



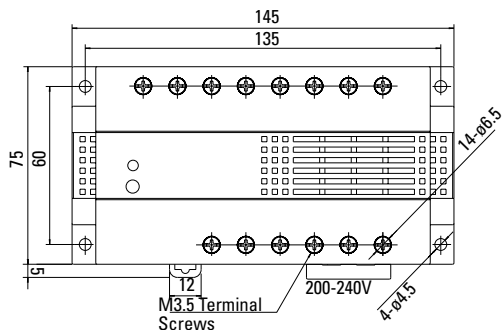
PS5R-Q (75W)



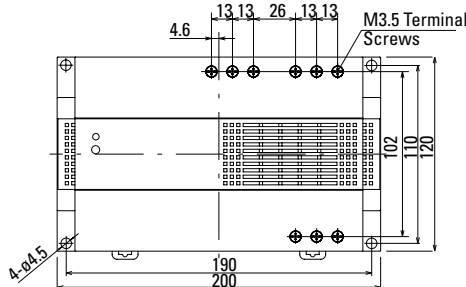
PS5R-F (120W)



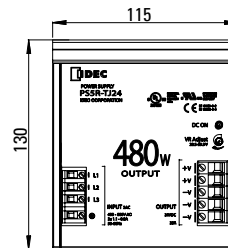
PS5R-E (100W)



PS5R-G (240W)

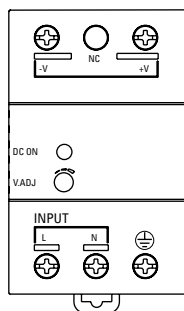


PS5R-TJ24

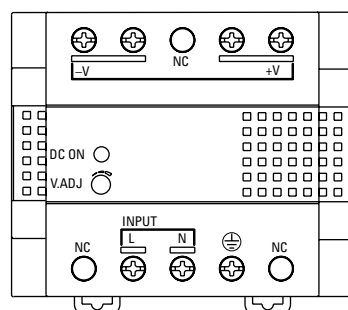


Terminal Markings

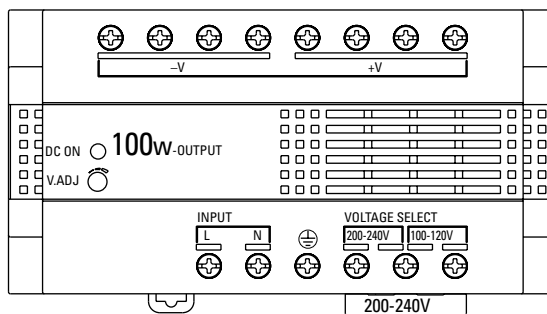
PS5R-A/B



PS5R-C/D/Q/F/G



PS5R-E



PS3X Series

Key features:

- Compact size
- Universal AC input voltage
- 5V, 12V and 24V DC outputs
- Available with mounting brackets for direct or DIN rail mounting
- Overcurrent/overvoltage protection
- EMC, EN55022 Class B compliant
- UL/c-UL recognized, TUV



Part Numbers

Power Supply

Style	Output Capacity	Part Number	Input Voltage	Output Voltage	Output Current
	15W	PS3X-B05AFC PS3X-B12AFC PS3X-B24AFC	100 to 240V AC	5V	3.0A
	25W	PS3X-C05AFC PS3X-C12AFC PS3X-C24AFC		12V	1.3A
	50W	PS3X-D12AFG PS3X-D24AFG		24V	0.63A
	75W	PS3X-Q05AFG PS3X-Q12AFG PS3X-Q24AFG		5V	5.0A
	100W	PS3X-E05AFG PS3X-E12AFG PS3X-E24AFG		12V	2.1A
				24V	1.1A
				12V	4.2A
				24V	2.2A
				5V	12.0A
				12V	6.0A
				24V	3.2A
				5V	16.0A
				12V	8.5A
				24V	4.5A

L-shaped Mounting Bracket (optional)

Applicable Power Supply	Part Number
PS3X-B	PS9Z-3N3A
PS3X-C	PS9Z-3N3B
PS3X-D	PS9Z-3E3B
PS3X-Q	PS9Z-3N3E
PS3X-E	

DIN-rail Mounting Bracket (optional)

Applicable Power Supply	Part Number
PS3X-B	PS9Z-3N4B
PS3X-C	
PS3X-D	PS9Z-3E4C
PS3X-Q	
PS3X-E	PS9Z-3E4D

DIN Rail

Appearance	Part Number	Length	Material	Weight (g)
	BNDN1000	1000mm	Aluminum	200

End Clips

Appearance	Part Number	Description
	BNL5	small DIN rail end clip
	BNL6	medium DIN rail end clip (the BNL6 has a higher profile than BNL5)

Part Number Configuration

PS3X - B 05 AF C

Output Capacity	Cover and Terminal Style
B: 15W	C: w/Standard cover, Horizontal terminal block (PS3X-B/C models)
C: 25W	G: w/Standard cover, Vertical terminal block (PS3X-D/Q/E models)
D: 50W	
Q: 75W	
E: 100W	
Output Voltage	Input Voltage
05: 5V DC (15W, 25W, 75W, 100W)	AF: 100 to 240V AC
12: 12V DC	
24: 24V DC	

Specifications

Model			[15W] PS3X-B05/B12/B24	[25W] PS3X-C05/C12/C24	[50W] PS3X-D12/D24	[75W] PS3X-Q05/Q12/Q24	[100W] PS3X-E05/E12/E24	
Input	Rated Input Voltage		100 to 240V AC					
	Voltage Range (Note 1)		85 to 264V AC/ 120 to 375V DC	88 to 264V AC / 125 to 375V DC				
	Frequency		47 to 63 Hz					
	Input Current		0.5A max.	0.65A max.	1.3A max.	1.8A max.	2.5A max.	
	Inrush Current (Ta = −25°C, ACV cold start)	at 115V AC	40A max.	30A max.	30A max.	30A max.	35A max.	
		at 230V AC	60A max.	50A max.	50A max.	50A max.	70A max.	
	Leakage Current		0.5mA max.	1.5mA max.	1.5mA max.	1.5mA max.	1.5mA max.	
	Efficiency (Typ.) (230V AC at input/ rated output)	5V	77%	77%	—	77%	77%	
12V		81%	81%	81%	82%	81%		
24V		82%	84%	84%	84%	84%		
Output	Rated Voltage/Current		5V, 3A	5V, 5A	—	5V, 12A	5V, 16A	
			12V, 1.3A	12V, 2.1A	12V, 4.2A	12V, 6A	12V, 8.5A	
			24V, 0.63A	24V, 1.1A	24V, 2.2A	24V, 3.2A	24V, 4.5A	
	Adjustable Voltage Range		±10%					
	Output Holding Time		13 ms typ. (100V AC) 60 ms minimum (230V AC)	10 ms typ. (100V AC) 60 ms minimum (230V AC)	23 ms typ. (100V AC) 60 ms minimum (230V AC)	14 ms typ. (100V AC) 60 ms minimum (230V AC)	17 ms typ. (100V AC) 80 ms minimum (230V AC)	
	Start Time		1000 ms max. (230V AC input, rated output)					
	Rise Time		50 ms max. (230V AC input, rated output)	30 ms max. (230V AC input, rated output)	30 ms max. (230V AC input, rated output)	30 ms max. (230V AC input, rated output)	30 ms max. (230V AC input, rated output)	
	Regulation	Input Fluctuation		0.5% max.				
		Overvoltage Fluctuation		5V: ±2% max. 12V, 24V: ±1% max.				
		Temperature Fluctuation		0.04% / °C max. (−20 to +50°C)			0.04% / °C max. (−10 to +45°C)	
		Ripple (including noise)	−20 to −10°C	5V: 200mV max. 12V/24V: 200mV max.	5V: 140mV max. 12V: 240mV max. 24V: 300mV max.	—	—	—
			−10 to 0°C	5V: 160mV max. 12V/24V: 200mV max.	5V: 140mV max. 12V: 240mV max. 24V: 300mV max.	12V: 240mV max. 24V: 300mV max.	5V: 140mV max. 12V: 240mV max. 24V: 300mV max.	5V: 160mV max. 12V: 240mV max. 24V: 300mV max.
			PS3X-B, C: 0 to +50°C PS3X-D, Q, E: 0 to +45°C	5V: 100mV max. 12V/24V: 150mV max.	5V: 70mV max. 12V: 120mV max. 24V: 150mV max.	12V: 120mV max. 24V: 150mV max.	5V: 70mV max. 12V: 120mV max. 24V: 150mV max.	5V: 100mV max. 12V: 120mV max. 24V: 150mV max.
		Supplementary Functions	Overcurrent Protection		105% min. (auto reset) ²			
	Overvoltage Protection		Voltage limitation at 115% min.			Intermittent operation or output off at 115% min. ³		
Operation Indicator			green LED					
Dielectric Strength	Between input and output terminals		3000V AC, 1 minute					
	Between input and ground terminals		2000V AC, 1 minute					
	Between output and ground terminals		500V DC, 1 minute					
Insulation Resistance			100MΩ minimum, 500V DC megger (between input and output terminals, between input and ground terminals)					
Operating Temperature			−20 to +70°C (no freezing, see output derating)			−10 to +70°C (no freezing, see output derating)		
Operating Humidity			20 to 85% RH (no condensation)					
Storage Temperature			−40 to +85°C (no freezing)					
Storage Humidity			10 to 95% RH (no condensation)					
Vibration Resistance			10 to 55 Hz, 20m/s ² constant, 2 hours each in 3 axes					
Shock Resistance			200m/s ² , 1 shock each in 3 axes					
EMC	EMI	EN55022 Class B						
	EMS	EN55024						
Safety Standards			IEC/EN60950-1, UL60950-1, CSA C22.2 No. 60950-1					
Dimensions (H × W × D) (mm)			50.8H × 28W × 62D	50.8H × 28.5W × 79D	82H × 35W × 99D	95H × 38W × 129D	95H × 38W × 159D	
Weight (approx.)			130g	180g	340g	500g	700g	
Terminal Screw			M3			M3.5		



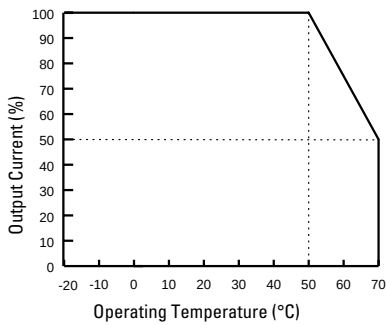
- See "Output Current vs. Input Voltage" characteristics next page. Not subject to safety standards. When using DC input, connect a fuse to the input terminal for DC input protection.
- Overload for 30 seconds or longer may damage the internal elements.
- One minute after the output has been turned off, turn on the AC input again.

Characteristics

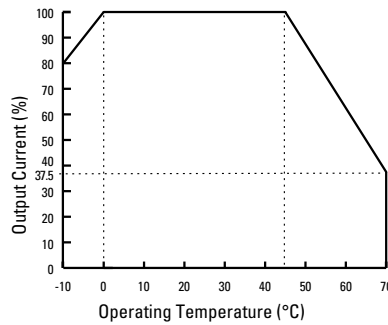
Operating Temperature vs. Output Current (Derating Curves)

Conditions: Natural air cooling (operating temperature is the temperature around the power supply)

PS3X-B/C

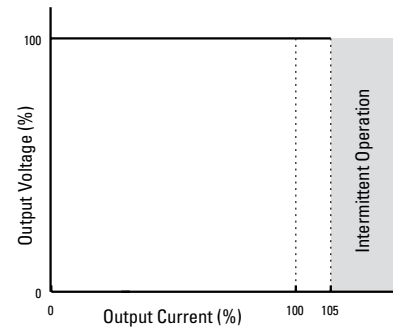


PS3X-D/Q/E



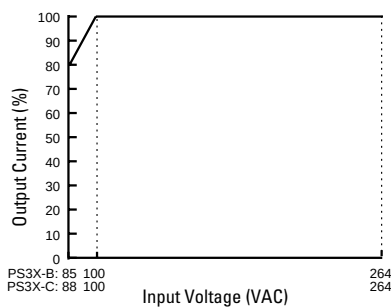
Overcurrent Protection Characteristics

PS3X

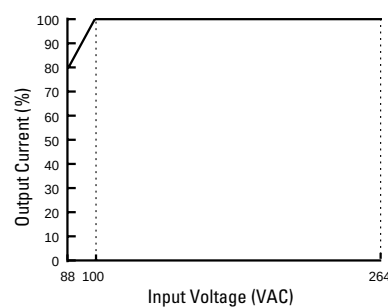


Output Current vs. Input Voltage (TA = 25°C)

PS3X-B/C

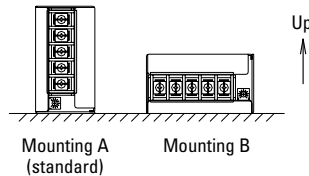


PS3X-D/Q/E



Operating Temperature by Safety Standards

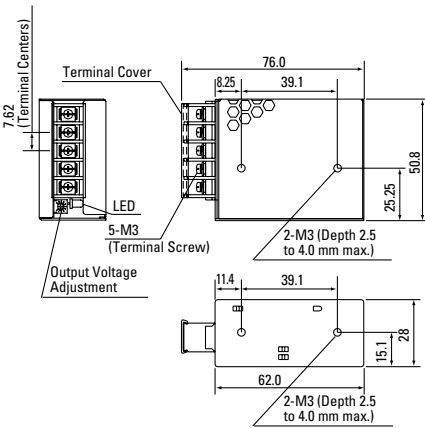
Power Supplies	UL/EN60950-1
	Mounting A, B
PS3X-B05, -B12, -B24 PS3X-C05, -C12, -C24	50°C
PS3X-D12, -D24 PS3X-Q05, -Q12, -Q24 PS3X-E05, -E12, -E24	45°C



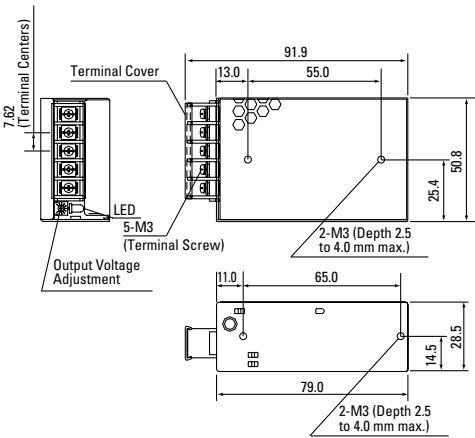
Note: Observe the derating curves when operating PS3X power supplies.

Dimensions

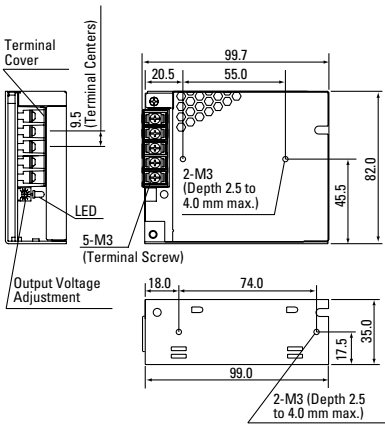
PS3X-B



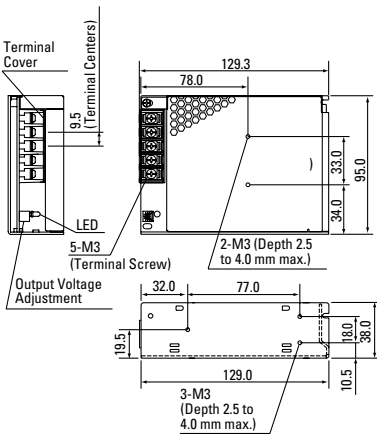
PS3X-C



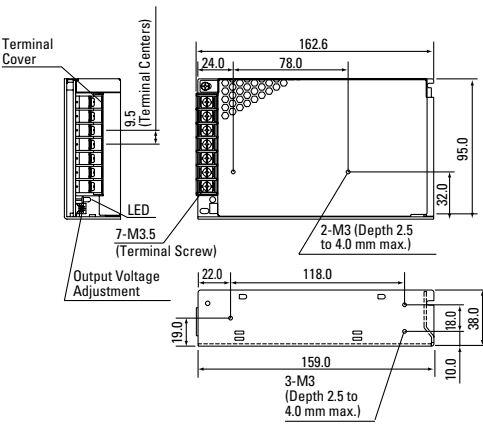
PS3X-D



PS3X-Q

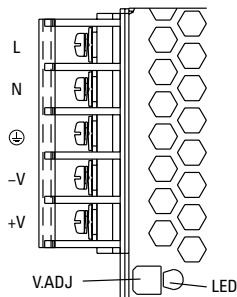


PS3X-E

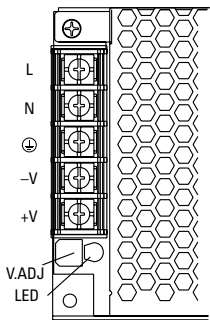


Terminal Markings

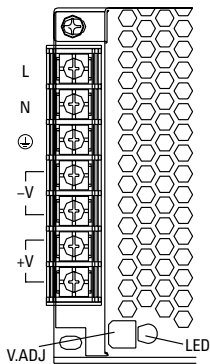
PS3X-B/C



PS3X-D/Q



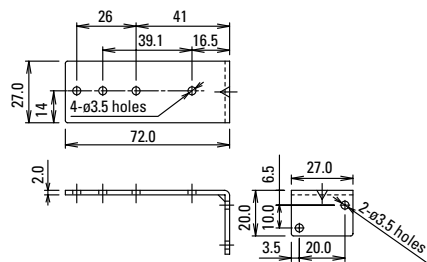
PS3X-E



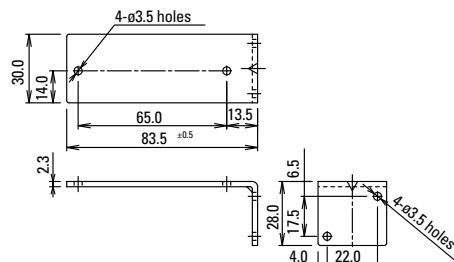
Marking	Name	Description
L, N	AC Input Terminal	Accepts a wide range of voltage and frequency. Polarity does not matter when using DC input.
⊕	Ground Terminal	Be sure to connect this terminal to a proper ground.
+V, -V	DC Output Terminals	Positive and negative output terminals
V.ADJ	Output Voltage Adjustment	Allows adjustment within $\pm 10\%$. Turning clockwise increases the output voltage.
LED	Power status	Illuminates (green) when input power is applied.

L-shaped Mounting Bracket

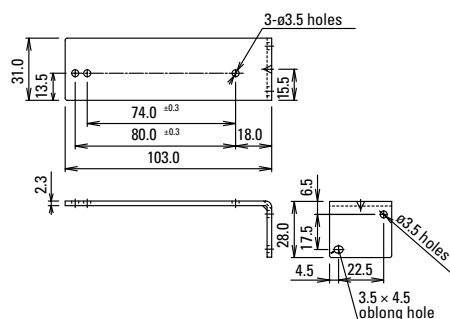
PS9Z-3N3A (for 15W)



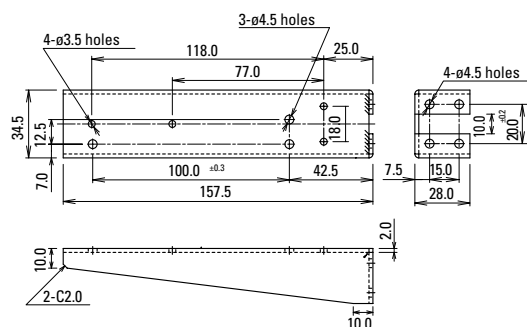
PS9Z-3N3B (for 25W)



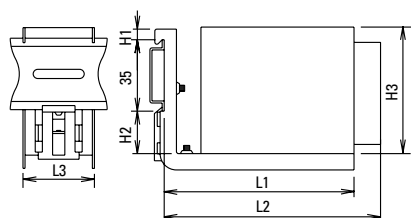
PS9Z-3E3B (for 50W)



PS9Z-3N3E (for 75W/100W)



DIN-rail Mounting Bracket



Part Number	Applicable Power Supply	L1	L2	L3	H1	H2	H3
PS9Z-3N4B	PS3X-B	95	105.5	35	5.2	20.5	50.8
	PS3X-C	95	113	35	5.2	20.5	50.8
PS9Z-3E4C	PS3X-D	136	117*	35	5.2	20.5	82
PS9Z-3E4D	PS3X-Q	188	141*	39.5	5.2	19.7	95
	PS3X-E	188	173*	39.5	5.2	19.7	95

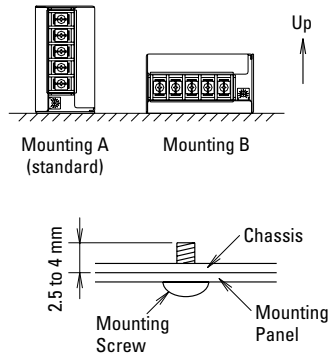


* Note that L2 is shorter than L1.

Instructions

Installation Notes

1. When mounting the PS3X switching power supply, see the figure on the right.
2. See dimension drawings for mounting hole layouts.
3. Use M3 screws for mounting. Choose screws that protrude 2.5 to 4mm from the surface of the switching power supply.
4. Do not cover the openings of the switching power supply. Ensure proper heat dissipation by convection.
5. Maintain a minimum of 20mm clearance around the power supply.
6. When derating of the output does not work, provide forced air-cooling.
7. Make sure to wire the ground terminal correctly.
8. For wiring, use wires with heat resistance of 60°C or higher. Use copper wire.
9. Recommended tightening torque of terminal screws: 0.8 N·m



Adjustment of Output Voltage

The output voltage can be adjusted within $\pm 10\%$ of the rated output voltage by using the V.ADJ control. Turning the V.ADJ clockwise increases the output voltage. Turning counterclockwise decreases the output voltage. Note that overvoltage protection may work when increasing the output voltage.

Overcurrent Protection

The output voltage drops automatically when an overcurrent flows, resulting in intermittent operation. Normal voltage is automatically restored when the load returns to normal conditions. However, overcurrent for a prolonged period of time or short-circuit causes the internal elements to deteriorate or break down.

Overvoltage Protection

PS3X-B/C: Voltage limit and auto-recovery method. The switching power supplies operate normally when voltage returns to normal.

PS3X-D/Q/E: The output is turned off when an overvoltage is applied. When the output voltage has dropped due to an overvoltage, turn the input off, and after one minute, turn the input on again.

Series Operation

When connecting two switching power supplies in a series, insert a Schottky diode to each output.

Parallel Operation

Parallel operation is not possible.

Insulation/Dielectric Test

When performing an insulation/dielectric test, short the input (between AC) and output (between + and -). Do not apply or interrupt the voltage suddenly, otherwise surge voltage may be generated and the power supply may be damaged.

Safety Precautions

- Do not use switching power supplies with equipment where failure or inadvertent operation may harm anyone, such as medical, aerospace, railway, nuclear, etc. PS3X switching power supplies are designed for use in general electric equipment such as office, communication, measuring, and industrial electric devices.
- Do not disassemble, repair, or modify the power supplies, otherwise electric shock, fire, or failure may occur.
- Do not install the switching power supply in places where someone will touch it when input voltage is applied. Do not touch the switching power supply while input voltage is applied and right after the power is turned off, because high temperature and high voltage may cause burns and electric shocks.
- Do not short circuit the output terminals or output lead wires, otherwise fire or damage may occur.
- Provide the final product with protection against failure or damage that may be caused by malfunction of the switching power supply. Damaged switching power supply may cause overvoltage on the output terminals, or may cause voltage drop.
- Turn off power before wiring. Also, make sure to wire correctly. Improper wiring may cause electric fire or damage.
- Do not use switching power supplies to charge rechargeable batteries.
- Make sure that the input voltage does not exceed the rating. Note polarity of input and output terminals and wire correctly. Incorrect wiring may cause blown fuses (AC input power), smoke or fire.
- Do not touch the inside of the switching power supply, and make sure that foreign objects do not enter the switching power supply, otherwise an accident or failure may occur.
- Observe the temperature derating curves. Operating temperature refers to the temperature around the lower part of the switching power supply. Failure to observe the derating curves could result in an internal temperature rise and possible failure of the switching power supply.
- The fuse inside the switching power supply is for AC input. When using with DC input, install an external fuse.
- Do not set the V. ADJ control over the setting range, otherwise performance deterioration or failure may occur.
- When failure or error occurs, shut down the input to the switching power supply, and contact IDEC.
- Do not use or store the switching power supply in a place subject to extreme vibration or shocks, otherwise failure will result.
- Do not use the switching power supply where it is subject to or near:
 - Direct sunlight, heat or high temperatures
 - Metal powder, oil, chemicals or hydrogen sulfide
 - Highly humid areas, such as a basement or conservatory
 - Inside freezers or refrigerators, near cooler exhaust, or other cold environments

Selection Guide..... 200

Datalogic Sensors Selection Guide 201

SA1E Miniature Photoelectric..... 210

SA1U Heavy Duty Photoelectric 226

Sensors



www.IDEC.com/sensors



IDEC Sensors Selection Guide



		Page	210	226
		Series	SA1E	SA1U
Optic Function	Through-beam (SA1E Class 1 Laser models available)		0 - 15m	0 - 50m
	Polarized Retro-reflective (on R2 reflector)		0.05 - 4m	0.2 - 7m
	Diffuse Proximity (SA1E Class 1 Laser models available)		0 - 700mm 50 - 150mm	0 - 1m
	Small-beam reflective		50 - 150mm	—
	Background Suppression (SA1E Class 1 Laser models available)		50 - 250mm	0.2 - 2m
	Convergent		5 - 35mm	—
	Transparent		2m	—
	Power Supply	V DC	10 - 30	10 - 30
		V AC/V DC		21.6 - 264 V AC 10.8 - 264 V DC
	Output	PNP	√	√
		NPN	√	√
Specifications	Connection	cable	√	
		connector	√	
		terminal block		√
	Dimensions		11 x 31 x 19	25 x 67.5 x 90
	Housing Material		PC/PBT	PBT
	Mechanical Protection		IP67	IP67
	Approvals			
			  	  

Datalogic Vision Sensor

Series	DATAVS1	DATAVS2
Appearance		
Page	visit www.IDEC.com/sensors	
Highlights	• Immediate Setup without PC • VSC Configurator with 3.5" LCD display • Completely embedded sensor • Stand-alone functioning • Real time monitoring • Object Recognition tools and OCV	• Versatile PC setup • Wizard-based software • Ethernet communication • Object recognition or identification tools • 360° pattern match • Monitoring and tuning via VSM monitor • Multiple controls • IP discovery function
Tools		
360° Pattern Match		√
Object Recognition (Brightness, Contrast, Width, Position, Contour Match, Pattern Match, Edge Count)	√	√
Barcode and Datamatrix		√
Optical Character Verification	√	√

For more information, visit www.IDEC.com/sensors

Datalogic M18 Tubular Photoelectric

Series		S5	S10	S15	S50	S51
Appearance						
Page		visit www.IDEC.com/sensors				
Operating Distances	Through-beam	0 - 12m	0 - 18m	0 - 20m	0 - 20m, 0 - 60m class 1 laser	0 - 20m
	Retro-reflective	0.1 - 4m	0.1 - 4m	0.1 - 4m	0.1 - 4m	0.1 - 4m
	Polarized Retro-reflective	0.1 - 3m	0.1 - 3m	0.1 - 3m	0.1 - 4m, 0.1 - 16m class 1 laser	0.1 - 3m
	Transparent	0.1 - 0.8m	0.1 - 0.8m	—	0.1 - 1.3m	—
	Diffuse	1 - 100mm, 1 - 350mm, 0 - 600mm	1 - 100mm, 1 - 350mm, 0 - 600mm	1 - 100mm, 1 - 350mm	0 - 100mm, 0 - 350mm, 0 - 700mm, 0 - 350mm class 1 laser	0 - 100mm
	Fixed focus	15mm	14mm	—	100mm	1 - 450mm
	Background suppression	—	—	—	5 - 100mm	—
	Foreground suppression	—	—	—	4 - 100mm	—
	Distance sensor	—	—	—	5 - 100mm	—
	Through-beam with fiber optic	0 - 85mm	—	—	0 - 100mm	—
Technical	Diffuse with fiber optic	0 - 22mm	—	—	0 - 30mm	—
	Power supply	10 - 30VDC, 15 - 264VAC	10 - 30VDC	12 - 30VDC	10 - 30VDC	10 - 30VDC
	Approximate dimensions (mm)	M18 x 55/68	M18 x 55/67	M18 x 40	M18 x 55/68	M18 x 55/68
	Housing material	ABS	NI plated brass, AISI-316L stainless steel	ABS	PBT, NI plated brass	PBT, NI plated brass
Highlights	Mechanical protection	IP67	IP69K	IP69K	IP67	IP67
		Varied optic functions can be chosen from fixed focus or diffuse proximity models with short, medium or long operating distances. A red LED indicates the output status, while versions with trimmer adjustment present also have a green LED signaling switching stability.	Suitable for applications in the mechanical or food industries, IP69K mechanical protection guarantees resistance to wash down at high temperatures and pressure. AISI-316L stainless steel versions are available for resistance to chemical agents.	A housing length of only 40mm is perfect for applications with reduced space. Available optic functions include: polarized retro-reflective, non-polarized retro-reflective, diffuse proximity and through beam. These sensors are ideal for critical applications with harsh environmental conditions.	With universal sensing functions of proximity, polarized retro-reflective and through beam, as well as more advanced functions of background suppression, background/foreground suppression, analog displacement, contrast and luminescence, the S50 is one housing for all applications.	The S51 series offers a cost-effective solution, with a wide range of operating distances from 10cm fixed operating distance with the diffuse proximity models up to 4m with the standard retro-reflective models. The emitter and receiver models, used for longer operating distances, reach 18 meters.

For more information, visit www.IDEC.com/sensors

Datalogic Miniature and Fiber Optic Photoelectric

Series	SMall	S40	S41	S8	S7
Appearance					
Page	visit www.IDEC.com/sensors				
Operating Distances	Through-beam	0 - 2m	0.1 - 6m	0.1 - 6m	—
	Retro-reflective	50 - 1500mm	0.1 - 3m	—	—
	Polarized Retro-reflective	0.1 - 1m	0.1 - 2.5m, 0.1 - 6m class 2 laser	0.1 - 2.5m	0 - 10m class 2 laser, 0.1 - 5m
	Transparent	—	0.1 - 0.7m	0.1 - 0.7m	0 - 0.8m
	Diffuse	—	50 - 300mm, 40 - 150mm class 2 laser	2 - 350mm	0 - 500mm
	Fixed focus	3 - 15mm, 3 - 20mm, 3 - 30mm, 3 - 50mm	15 - 100mm, 20 - 600mm class 2 laser	110mm	—
	Background suppression	—	—	—	20 - 200mm class 2 laser, 50 - 300mm
	Through-beam with fiber optic	—	—	—	0 - 300mm, 0 - 150mm, 0 - 75mm
Technical	Diffuse with fiber optic	—	—	—	0 - 100mm, 0 - 50mm, 0 - 25mm
	Power supply	10 - 30VDC	10 - 30VDC	10 - 30VDC	12 - 30VDC
	Approximate dimensions (mm)	8 x 23 x 12	12 x 32 x 20	12 x 32 x 20	14 x 42 x 25
	Housing material	polycarbonate	ABS	ABS	ABS
Highlights	Mechanical protection	IP67	IP67	IP67	IP65
		This subminiature series, suitable for applications with reduced space, offers through beam, retro-reflective polarized and accurate fixed focus proximity models to guarantee precise detection. A red LED emission simplifies installation procedures.	With innovative miniature housing, these sensors offer all the main optic functions with the advantages of microprocessor control and automatic Teach-in, as well as Remote setting with EASYtouch™ procedure.	A basic line of photoelectric sensors in miniature housing, these sensors are ideal for applications that require reduced dimensions and costs.	This series offers excellent detection performances, usually associated with sensors that have larger dimensions and a higher price. The S8 series is a solution for packaging lines, food and beverage industries, automotive, test and assembling machines and electronic plants.

For more information, visit www.IDEC.com/sensors

Datalogic Compact Photoelectric

Series	S6	S60	S62	S90
Appearance				
Page	visit www.IDEC.com/sensors			
Operating Distances	Through-beam	0 - 20m	0 - 20m, 0 - 60 class 1 laser	0 - 20m, 0 - 60m class 1 laser
	Retro-reflective	0.1 - 6m	—	—
	Polarized Retro-reflective	0.1 - 5m	0 - 3.2m, 0.1 - 6.5m, 0.1 - 20m class 1 laser	0 - 3.2m, 0.1 - 6.5m, 0.1 - 20m class 1 laser
	Transparent	0.1 - 1m	0 - 1.7m	0 - 1.7m
	Diffuse	10 - 900mm, 50 - 2000mm	10 - 1000mm, 50 - 2000mm, 0 - 600mm class 1 laser	10 - 1000mm, 50 - 2000mm, 0 - 600mm class 1 laser
	Background suppression	1 - 100mm, 30 - 250mm, 100 - 500mm	70 - 200mm, 50 - 100mm class 1 laser	70 - 200mm, 50 - 100mm class 1 laser
	Foreground suppression	50 - 200mm	70 - 200mm	70 - 200mm
Technical	Distance sensor	—	50 - 150mm	80 +/- 40mm class 2 laser
	Power supply	10 - 30VDC, 15 - 264VAC	10 - 30VDC	10 - 30VDC
	Approximate dimensions (mm)	18 x 50 x 50	15 x 50 x 50	18 x 50 x 50
	Housing material	ABS	ABS	zinc plated aluminum
Highlights	Mechanical protection	IP65	IP67	IP67
		The S6 series, thanks to the excellent detection performances and the variety of power supply and connection possibilities, offers the most complete universal sensor range in a compact 50x50 mm housing.	A sensitivity adjustment provides quick and precise setting of the switching threshold. These sensors also have an M12 connection that can be used straight or rotated to a right-angle position.	These sensors allow the operating distance to be adjusted to obtain the maximum immunity against color differences of the detected object or of the background, even if very reflective.

For more information, visit www.IDEC.com/sensors

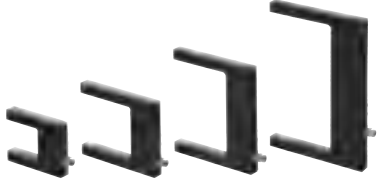
Datalogic Maxi Photoelectric

Series		S20
Appearance		
Page	visit www.IDEC.com/sensors	
Operating Distances	Through-beam	0.1 - 50m
	Retro-reflective	-
	Polarized Retro-reflective	0.1 - 8m
	Diffuse	0.1 - 2m
	Background suppression	10 - 50cm
Technical	Power supply	12 - 24VDC, 12 - 240VAC/DC
	Approximate dimensions (mm)	26 x 65 x 55
	Housing material	ABS
	Mechanical protection	IP66

Datalogic Proximity

Series	M4	M5	M8	M12	M18	M30
Appearance						
Page	visit www.IDEC.com/sensors					
Operating Distance	0.8mm	0.8mm	2mm shielded models, 3mm unshielded models	2mm shielded models, 4mm unshielded models	5mm shielded models, 8mm unshielded models	10mm shielded models, 15mm unshielded models
Repeatability	≤ 1%	≤ 1%	≤ 3%	≤ 3%	≤ 3%	≤ 3%
Hysteresis	< 10%	< 10%	< 10%	< 10%	< 10%	< 10%
Ripple	≥ 10%	≥ 10%	≥ 10%	≥ 10%	≥ 10%	≥ 10%
Switching Frequency	2000 Hz	2000 Hz	1000 Hz	1000 Hz	1000 Hz	300 Hz
Indicators	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
Power supply	10 - 30VDC	10 - 30VDC	10 - 30VDC	10 - 30VDC	10 - 30VDC	10 - 30VDC
Output	2 wires NO/NC	2 wires NO/NC	2 wires NO/NC	2 wires NO/NC, 3 wires NPN/PNP NO/NC, 4 wires NPN/PNP NO/NC, 4 wires programmable	2 wires NO/NC, 3 wires NPN/PNP NO/NC, 4 wires NPN/PNP NO/NC, 4 wires programmable	2 wires NO/NC, 3 wires NPN/PNP NO/NC, 4 wires NPN/PNP NO/NC, 4 wires programmable
Connections	cable, M8 connector	cable, M8 connector	cable, M8 connector, M12 connector	cable, M8 connector, M12 connector	cable, M8 connector, M12 connector	cable, M8 connector, M12 connector
Housing	standard	standard	standard, short	standard, short	standard, short	standard, short
Housing material	AISI-316L stainless steel	AISI-316L stainless steel	NI plated brass	NI plated brass, AISI-316L stainless steel	NI plated brass, AISI-316L stainless steel	NI plated brass
Mechanical protection	IP67	IP67	IP67	IP67	IP67	IP67

Datalogic Slot Sensors

Series	SR21	SR22	SRF
Appearance			
Page	visit www.IDEC.com/sensors		
Slot Sensor	2mm	2mm	30mm, 50mm, 80mm, 120mm
Slot depth	50mm	40mm	34mm, 54mm
Switching Frequency	25 kHz	10 kHz	1.5 kHz, 3 kHz
Light emission	IR LED, red/green LED	IR LED	red LED, class 2 red Laser
Setting	AUTO-SET push button	trimmer	trimmer
Power supply	10 - 30VDC	24VDC	10 - 30VDC
Output	PNP, NPN	PNP, NPN	PNP, NPN
Connections	connector	connector	connector
Approximate dimensions (mm)	20 x 90 x 26	14 x 68 x 37	10x50x59, 10x70x79, 10x100x79, 10x140x84
Housing material	zinc plated aluminum	aluminum	aluminum
Mechanical protection	IP65	IP60	IP65

Datalogic Contrast Sensors

Series	TL46	TLμ	TL50
Appearance			
Page	visit www.IDEC.com/sensors		
Distance	6 - 60mm	6 - 60mm, fiber optic: 0 - 3mm, 0 - 10mm	9mm
Switching Frequency	15 kHz, 20 kHz, 30 kHz	10 kHz, 20 kHz	15 kHz
Light emission	RGB LED	red/green LED, white LED	RGB LED
Setting	+/- SET pushbutton	MARK and BACKGROUND pushbuttons	MARK and BACKGROUND pushbuttons
Power Supply	10 - 30VDC	10 - 30VDC	10 - 30VDC
Output	PNP/NPN	PNP, NPN	NPN/PNP
Connection	cable, connector	cable, connector	connector
Approximate dimensions (mm)	31 x 81 x 58	31 x 81 x 58	31 x 81 x 53
Housing material	aluminum	zama	ABS
Mechanical protection	IP67	IP67	IP67

For more information, visit www.IDEC.com/sensors

Datalogic Luminescence Sensors

Series	LD46	LDμ	LD50
Appearance			
Page	visit www.IDEC.com/sensors		
Distance	10 - 100mm	10 - 100mm, fiber optic: 0 - 30mm	0 - 60mm
Switching Frequency	2 kHz	2 kHz	2 kHz
Light emission	UV-HP LED	UV LED	UV-HP LED
Setting	+/- SET pushbuttons	MARK and BACKGROUND pushbuttons	+/- SET pushbuttons
Power Supply	15 - 30VDC	10 - 30VDC	15 - 30VDC
Output	NPN/PNP, 0-5V	PNP, NPN, 0 - 7V	NPN/PNP
Connection	cable, connector	cable, connector	connector
Approximate dimensions (mm)	31 x 81 x 58	31 x 81 x 58	31 x 81 x 53
Housing material	aluminum	zama	ABS
Mechanical protection	IP67	IP67	IP67

Datalogic Color Sensors

Series	S65-V
Appearance	
Page	visit www.IDEC.com/sensors
Distance	5 - 45mm
Switching Frequency	1.5 kHz (V09 version), 500 Hz (V19 version)
Light emission	RGB LED
Serial Interface	RS485
Setting	SET and SEL pushbuttons
Power Supply	10 - 30VDC
Output	PNP, NPN
Connection	connector
Approximate dimensions (mm)	50 x 50 x 25
Housing material	ABS
Mechanical protection	IP67

For more information, visit www.IDEC.com/sensors

Datalogic Distance Sensors

Series	S80	S81
Appearance		
Page	visit www.IDEC.com/sensors	
Distance	0.3 - 4m, 0.3 - 7m, 0.3 - 20.3m, 0.3 - 100.3m	0.3 - 4m
Digital Resolution	0.9mm, 0.4mm, 0.6mm, 6mm	0.9mm
Linearity	0.3%, 0.25%, 0.15%	—
Switching Frequency	100 Hz (Normal), 500 Hz (Fast)	80 Hz
Light Emission	Class 2 red laser	Class 2 red laser
Response time	5 ms (Normal), 1ms (Fast)	6 ms
Serial Interface	RS485	—
Setting	Teach-in	Teach-in
Hysteresis	—	30 mm
Power supply	15 - 30VDC	15 - 30VDC
Output	PNP, 4-20mA	PNP, NPN, 0 - 10V
Connection	M12 connector	M12 connector
Approximate dimensions (mm)	34 x 90 x 73	58 x 31 x 31
Housing material	aluminum	ABS
Mechanical protection	IP67	IP67

**For more information,
visit www.IDEC.com/sensors**

Datalogic Area Sensors

Series	AS1-HR	AS1-SR
Appearance		
Page	visit www.IDEC.com/sensors	
Height	100 mm	100 mm
Resolution	0.2 x 75mm, ø 6 mm	0.2 x 200mm, ø 18 mm
Switching Frequency	500 Hz	500 Hz
Light Emission	IR LED	IR LED
Operating Distance	0.3 - 1.9m, 0.8 - 3m	0.3 - 1.9m, 0.8 - 3m
Power supply	10 - 30VDC	10 - 30VDC
Output	PNP	PNP
Connection	connector	connector
Approximate dimensions (mm)	20 x 41 x 150	20 x 41 x 150
Housing material	aluminum	aluminum
Mechanical protection	IP67	IP67

Datalogic Measurement Light Arrays

Series	DS1	DS2	DS3
Appearance			
Page	visit www.IDEC.com/sensors		
Controlled Height	100 - 300mm	150 - 1650mm	150 - 600mm
Resolution	4 - 10mm	Digital resolution : 12/35mm, Absolute measure precision: 6/22.5mm	0.5/0.8mm (crossed beams), 6mm (parallel beams)
Number of beams	16 - 48	21 - 231 (res=12mm), 1 - 36 (res=35mm)	24 - 96
Light emission	IR	IR	IR
Response time	1 - 2.75ms	5 - 90ms	3 - 12ms (crossed beams), 23 - 92 ms (parallel beams)
Serial Interface	—	RS485, Ethernet	—
Setting	Trimmer	Dip-switch, Graphic interface	Teach-in
Operating Distance	0.15 - 0.8m, 0.15 - 2.1m, 0.2 - 4m	0.3 - 5m (res=12mm), 0.3 - 10m (res=35mm)	0.2 - 2m
Power Supply	24VDC	24VDC	24VDC
Output	PNP, 0 - 10VDC	PNP, 0 - 10VDC	PNP, 0 - 10VDC
Approximate dimensions (mm)	20 x 41	35 x 40	35 x 40
Housing material	aluminum	aluminum	aluminum
Mechanical protection	IP65	IP66	IP66

For more information, visit www.IDEC.com/sensors

SA1E Miniature Photoelectric Switches

Key features:

- Seven sensing methods: through-beam, polarized retroreflective, small beam reflective, diffuse, background suppression, convergent, and transparent.
- 2m cable type and M8 connector.
- NPN output, PNP output, light ON, dark ON can be selected.
- Coaxial polarized retro-reflective type (SA1E-X) available for sensing transparent objects.
- Background suppression (SA1E-B) type detects objects only, ignoring the background.
- Red LED available for easy alignment in long distance applications (SA1E-T, -P, -N, and -B)
- Convergent reflective type (SA1E-G) is ideal for detecting objects at a short distance with a background.
- Also available without sensitivity adjustment (SA1E-T, -P)
- Air blower mounting block for installing an air blower to clean the lens surface. Ideal to maintain a clean lens surface and sensor performance.
- UL Listed and CE marked
- IP67



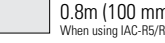
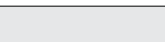
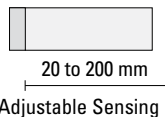
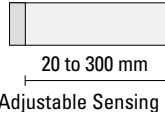
Part Numbers



Photoelectric Switches

Sensing Method				Sensing Range	Connection	Cable Length	Operation Mode	Part No.	
								NPN Output	PNP Output
Through-beam	Infrared LED	w/Sensitivity Adjustment			Cable	2m	Light ON	SA1E-TN1-2M	SA1E-TP1-2M
							Dark ON	SA1E-TN2-2M	SA1E-TP2-2M
		w/o Sensitivity Adjustment			Connector	-	Light ON	SA1E-TN1C	SA1E-TP1C
							Dark ON	SA1E-TN2C	SA1E-TP2C
	Red LED	w/Sensitivity Adjustment			Cable	2m	Light ON	SA1E-TN1-NA-2M	SA1E-TP1-NA-2M
							Dark ON	SA1E-TN2-NA-2M	SA1E-TP2-NA-2M
		w/o Sensitivity Adjustment			Connector	-	Light ON	SA1E-TN1C-NA	SA1E-TP1C-NA
							Dark ON	SA1E-TN2C-NA	SA1E-TP2C-NA
	Class 1 Laser	w/Sensitivity Adjustment			Cable	2m	Light ON/ Dark ON	SA1E-LTN3-2M	SA1E-LTP3-2M
							Light ON/ Dark ON	SA1E-LTN3C	SA1E-LTP3C

Photoelectric Switches

Sensing Method			Sensing Range	Connection	Cable Length	Operation Mode	Part No.	
							NPN Output	PNP Output
Polarized Retroreflective	Red LED	w/Sensitivity Adjustment	 2.5m (100 mm) When using IAC-R5/R8	Cable	2m	Light ON	SA1E-PN1-2M	SA1E-PP1-2M
			 1.5m (100 mm) When using IAC-R6			Dark ON	SA1E-PN2-2M	SA1E-PP2-2M
			 1.3m (150 mm) When using IAC-RS2	Connector	-	Light ON	SA1E-PN1C	SA1E-PP1C
			 1.0m (150 mm) When using IAC-RS1			Dark ON	SA1E-PN2C	SA1E-PP2C
			 0.8m (100 mm) When using IAC-R5/R8					
	w/o Sensitivity Adjustment	(Note)	 3.0m (100 mm) When using IAC-R5/R8	Cable	2m	Light ON	SA1E-PN1-NA-2M	SA1E-PP1-NA-2M
			 2.0m (100 mm) When using IAC-R6			Dark ON	SA1E-PN2-NA-2M	SA1E-PP2-NA-2M
			 1.4m (150 mm) When using IAC-RS2	Connector	-	Light ON	SA1E-PN1C-NA	SA1E-PP1C-NA
			 1.1m (150 mm) When using IAC-RS1			Dark ON	SA1E-PN2C-NA	SA1E-PP2C-NA
			 1.0m (100 mm) When using IAC-R7					
	Class 1 Laser	w/Sensitivity Adjustment	 10m	Cable	2m	Light ON/ Dark ON	SA1E-LPN3-2M	SA1E-LPP3-2M
				Connector	-	Light ON/ Dark ON	SA1E-LPN3C	SA1E-LPP3C
Diffuse-reflective	Infrared LED	w/Sensitivity Adjustment	 700 mm	Cable	2m	Light ON	SA1E-DN1-2M	SA1E-DP1-2M
						Dark ON	SA1E-DN2-2M	SA1E-DP2-2M
	w/Sensitivity Adjustment			Connector	-	Light ON	SA1E-DN1C	SA1E-DP1C
						Dark ON	SA1E-DN2C	SA1E-DP2C
Small-beam Reflective	Red LED	w/Sensitivity Adjustment	 50 to 150 mm	Cable	2m	Light ON	SA1E-NN1-2M	SA1E-NP1-2M
						Dark ON	SA1E-NN2-2M	SA1E-NP2-2M
	w/Sensitivity Adjustment			Connector	-	Light ON	SA1E-NN1C	SA1E-NP1C
						Dark ON	SA1E-NN2C	SA1E-NP2C
Background Suppression	Red LED	w/Sensing Range Adjustment	 20 to 200 mm Adjustable Sensing Range	Cable	2m	Light ON	SA1E-BN1-2M	SA1E-BP1-2M
						Dark ON	SA1E-BN2-2M	SA1E-BP2-2M
				Connector	-	Light ON	SA1E-BN1C	SA1E-BP1C
	Class 1 Laser	w/Sensitivity Adjustment	 20 to 300 mm Adjustable Sensing Range	Cable	2m	Light ON/ Dark ON	SA1E-LBN3-2M	SA1E-LBP3-2M
						Light ON/ Dark ON	SA1E-LBN3C	SA1E-LBP3C
				Connector	-	Light ON/ Dark ON	SA1E-LBN3C	SA1E-LBP3C

OI Touchscreens

PLCs

Automation Software

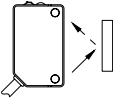
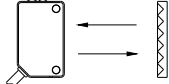
Power Supplies

Sensors

Communication

Barriers

Photoelectric Switches

Sensing Method				Sensing Range	Connection	Cable Length	Operation Mode	Part No.	
								NPN Output	PNP Output
Convergent Reflective	Infrared LED	w/Sensitivity Adjustment		 5 to 35 mm	Cable	2m	Light ON	SA1E-GN1-2M	SA1E-GP1-2M
							Dark ON	SA1E-GN2-2M	SA1E-GP2-2M
					Connector	—	Light ON	SA1E-GN1C	SA1E-GP1C
							Dark ON	SA1E-GN2C	SA1E-GP2C
Coaxial Polarized Retro-reflective	Red LED	w/Sensitivity Adjustment	 Note: Reflector is not supplied and must be ordered separately. See characteristics diagrams on page 219.	 2.0m (when using IAC-R9)  1.0m [100 mm] (when using IAC-R10)  1.0m [100 mm] (when using IAC-R11)	Cable	2m	Light ON	SA1E-XN1-2M	SA1E-XP1-2M
							Dark ON	SA1E-XN2-2M	SA1E-XP2-2M
					Connector	—	Light ON	SA1E-XN1C	SA1E-XP1C
							Dark ON	SA1E-XN2C	SA1E-XP2C

For more information, visit www.IDEC.com/sensors

Specifications

Sensing Method	Through-beam	Polarized Retroreflective	Diffuse-reflective	Small-beam Reflective	Background Suppression (BGS)	Convergent Reflective	Transparent
Part No.	SA1E-□T	SA1E-□P	SA1E-D	SA1E-N	SA1E-□B	SA1E-G	SA1E-X
Power Voltage	12 to 24V DC (Operating range: 10 to 30V DC) Equipped with reverse-polarity protection						
Current Draw	Projector: 15 mA Receiver: 20 mA Laser Receiver: 30 mA	30 mA with laser: 35 mA					20 mA maximum
Sensing Range	With sensitivity adjustment: 10m Laser models: 30m	With sensitivity adjustment: 2.5m (IAC-R5/R8) 1.5m (IAC-R6) 1.3m (IAC-RS2) 1.0m (IAC-RS1) 0.8m (IAC-R7□) ¹ Laser models 0.3-10m	700 mm (using 200 × 200 mm white mat paper)	50 to 150 mm (using 100 × 100 mm white mat paper)	20 mm to preset (using 200 × 200 mm white mat paper) with laser: 20 - 300mm	5 to 35 mm (using 100 × 100 mm white mat paper)	2m (when using IAC-R9)
	Without sensitivity adjustment: 15m	Without sensitivity adjustment: 3.0m (IAC-R5/R8) 2.0m (IAC-R6) 1.4m (IAC-RS2) 1.1m (IAC-RS1) 1.0m (IAC-R7□) ¹					
Adjustable Sensing Range	—				40 to 200 mm with laser: 40-300mm	—	—
Detectable Object	Opaque		Opaque/Transparent		Opaque	Opaque/ Transparent	Opaque, transparent and mirror-like objects
Hysteresis	—		20% maximum		10% maximum	20% maximum	—
Response Time	1 ms maximum with laser: 250us						500 μs maximum
Sensitivity Adjustment	Adjustable using a potentiometer (approx. 260°) Through-beam type and polarized retroreflective type are also available without sensitivity adjustment. Laser models: 2 turn adjustment				—	Adjustable using a potentiometer (approx. 260°)	Adjustable using a potentiometer (approx. 240°)
Sensing Range Adjustment	—				6-turn control knob	—	—
Light Source Element	Infrared LED Red LED Red laser diode	Red LED Red laser diode	Infrared LED	Red LED	Red LED Red laser diode	Infrared LED	Red LED
Operation Mode	Light ON/Dark ON						
Control Output	NPN open collector or PNP open collector 30V DC, 100 mA maximum Voltage drop: 1.2V maximum (BGS type: 2V maximum) Short-circuit protection						
LED Indicators	Operation LED: Yellow Stable LED: Green Power LED: Green (Through-beam type projector)				Operation LED: Yellow Stable LED: None	Operation LED: Yellow Stable LED: Green	Operation LED: Yellow Stable LED: None
Interference Prevention	—	Two units can be mounted in close proximity.					
Degree of Protection	IP67 (IEC 60529)						
Extraneous Light Immunity	Sunlight: 10,000 lux maximum, Incandescent lamp: 5,000 lux maximum (at receiver)						
Operating Temperature	−25 to +55°C (no freezing)						
Operating Humidity	35 to 85% RH (no condensation)						
Storage Temperature	−40 to +70°C (no freezing)						
Insulation Resistance	Between live part and mounting bracket: 20 MΩ maximum (500V DC megger)						

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Specifications, con't

Sensing Method	Through-beam	Polarized Retroreflective	Diffuse-reflective	Small-beam Reflective	Background Suppression (BGS)	Convergent Reflective	Transparent
Part No.	SA1E-T	SA1E-P	SA1E-D	SA1E-N	SA1E-B	SA1E-G	SA1E-X
Dielectric Strength	Between live part and mounting bracket: 1000V AC, 50/60 Hz, 1 minute						
Vibration Resistance	Damage limits: 10 to 55 Hz, Amplitude 0.75 mm, 20 cycles in each of 3 axes						
Shock Resistance	Damage limits: 500 m/s ² , 10 shocks in each of 3 axes						
Material	Housing: PC/PBT, Lens: PC (Polarized retroreflective / coaxial polarized retro-reflective: PMMA), Indicator cover: PC						
Attachments	Instruction sheet						
Weight (approx.)	Cable Model	Projector: 30g Laser Projector: 35g Receiver: 30g ² Laser Receiver: 35g			35g ³	30g ²	35g ³
	Connector Model	Projector: 10g Laser Projector: 20g Receiver: 10g Laser Receiver: 20g			20g	10g	20g
Connection Method	Cable Model	ø3.5 mm, 3-core, 0.2 mm ² , 1-m vinyl cabtyre cable (2-core for the projector of through-beam type)					
	Connector Model	M8 connector (4-pin)					



- Maintain at least the distance shown below between the SA1E photoelectric switch and reflector.
IAC-R5/R6/R7□/R8: 100 mm
IAC-RS1/RS2: 150 mm
The detection distance cannot be guaranteed if the reflector is deformed or the tape type reflector is applied on uneven surface.
- Cable length: 1m (50g when the cable length is 2m, 55g for laser models. 110g when the cable length is 5m, 120g for laser models.)
- Cable length: 1m (55g when the cable length is 2m. 120g when the cable length is 5m.)
- For laser models insert L in place of □.

Slit and Sensing Range

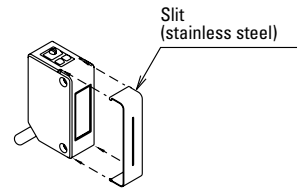
A slit, which changes the beam size of through-beam sensors, can easily be attached to the sensing side of the through-beam projector and receiver. Three different slit widths are available.

Slit		w/Sensitivity Adjustment				w/o Sensitivity Adjustment			
		Sensing Range (m)		Minimum Detectable Object Width (mm)		Sensing Range (m)		Minimum Detectable Object Width (mm)	
Part No.	Slit Width: A	Used on one side	Used on both sides	Used on one side	Used on both sides	Used on one side	Used on both sides	Used on one side	Used on both sides
SA9Z-S06	0.5 mm	2.5	1.0	7.0	0.5	5.0	1.5	7.0	0.5
SA9Z-S07	1.0 mm	3.5	1.5	7.0	1.0	7.0	3.0	7.0	1.0
SA9Z-S08	2.0 mm	6.0	3.5	7.0	2.0	9.0	5.5	7.0	2.0
SA9Z-S09	0.5 mm	2.0	0.7	7.0	0.4	4.0	1.5	7.0	0.5
SA9Z-S10	1.0 mm	3.0	1.5	7.0	0.7	7.0	2.5	7.0	0.8
SA9Z-S11	2.0 mm	5.5	3.0	7.0	1.5	9.0	5.0	7.0	1.5
SA9Z-S12	0.5 mm	0.8	0.08	5.0	0.3	1.3	0.1	5.0	0.5
SA9Z-S13	1.0 mm	1.5	0.3	5.0	0.6	2.5	0.3	5.0	0.6
SA9Z-S14	2.0 mm	2.5	1.2	5.0	1.5	5.5	1.6	5.0	1.7



Used on one side: Slit is attached to the receiver only.

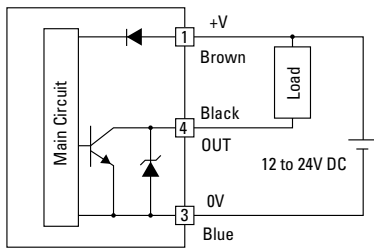
The slit can be pressed to snap onto the front easily.



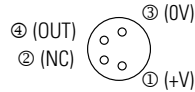
Horizontal slits and round slits have an orientation. Make sure that the TOP marking comes on top of the sensor (LED side).

Output Circuit & Wiring Diagram

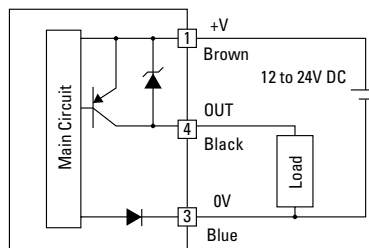
NPN Output



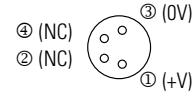
(Connector Pin Assignment)



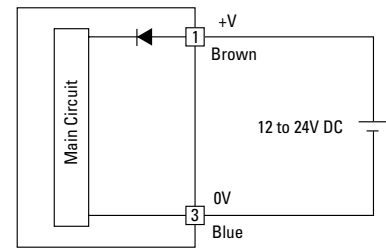
PNP Output



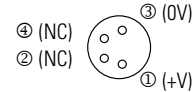
(Connector Pin Assignment)



Through-beam Type Projector



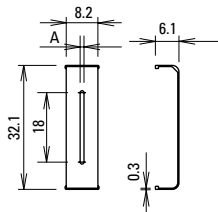
(Connector Pin Assignment)



Dimensions (mm)

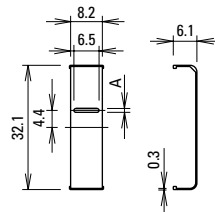
Vertical Slit

SA9Z-S06
SA9Z-S07
SA9Z-S08



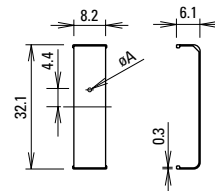
Horizontal Slit

SA9Z-S09
SA9Z-S10
SA9Z-S11



Round Slit

SA9Z-S12
SA9Z-S13
SA9Z-S14



Material: Stainless Steel

Cable Model

Through-beam

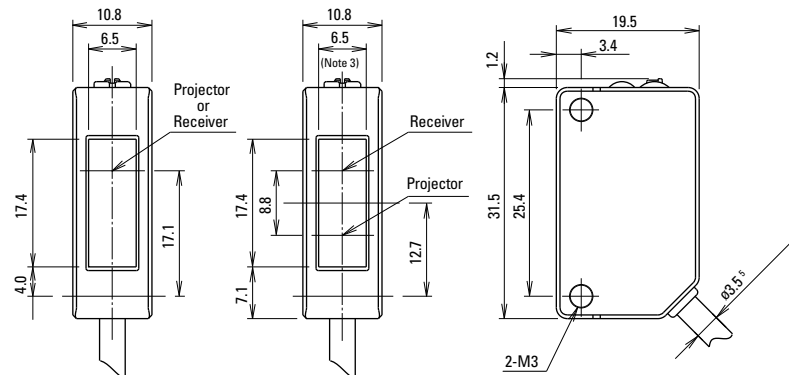
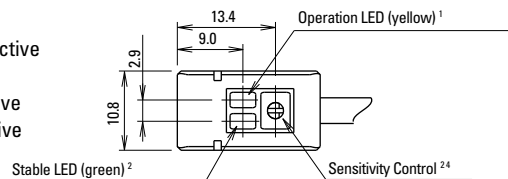


Polarized retroreflective
Diffuse-reflective
Small-beam reflective
Convergent reflective



• Through-beam

- Polarized retroreflective
- Diffuse-reflective
- Small-beam reflective
- Convergent Reflective



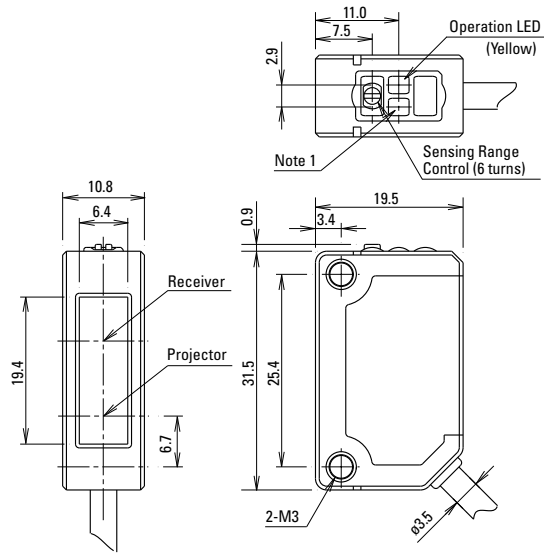
1. Power ON LED (green) for through-beam projector
2. No sensitivity control and stable LED are attached on the through-beam projector.
3. 5.2 mm for polarized retroreflective type
4. No sensitivity control is installed on the type without sensitivity adjustment.

Cable Model

Background Suppression (BGS)



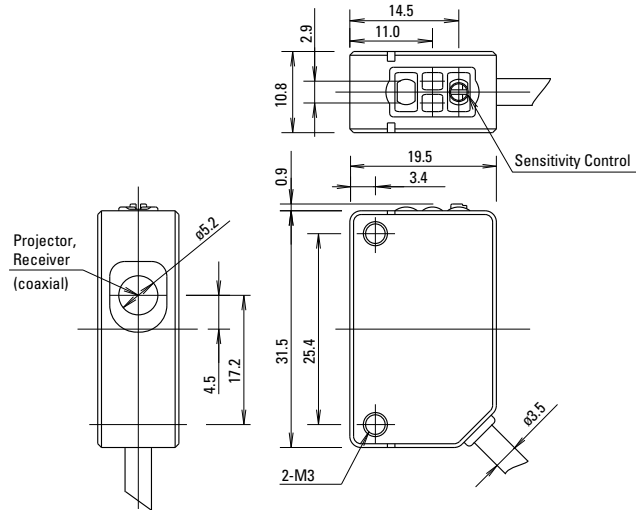
1. Stable LED is not provided on the background suppression type.

**Cable Model**

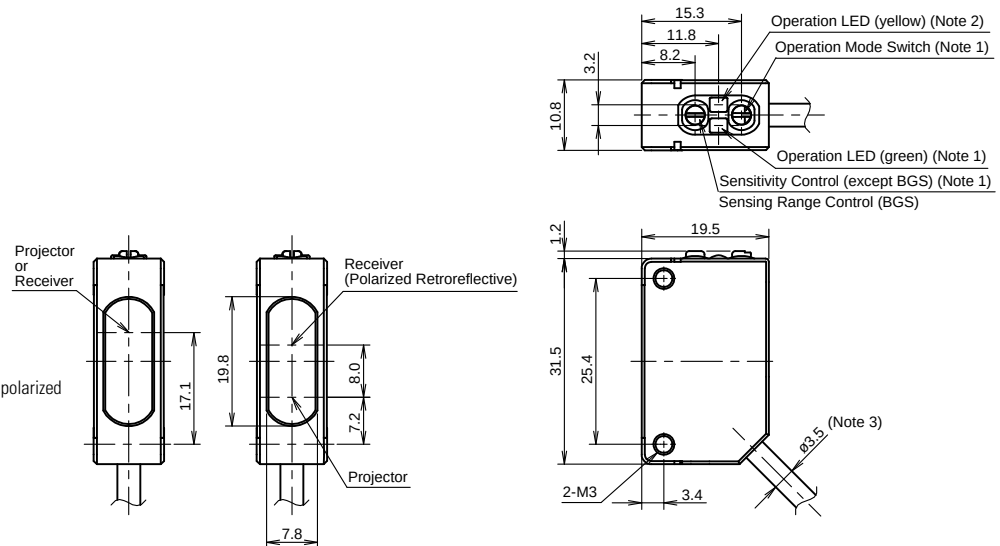
Coaxial Polarized Retro-reflective



1. Stable LED is not provided on the coaxial polarized retro-reflective type.

**Cable Model (Laser)**Through-beam
Polarized Retroreflective
Background Suppression

1. Stable LED is not provided on the coaxial polarized retro-reflective type.



Connector Model

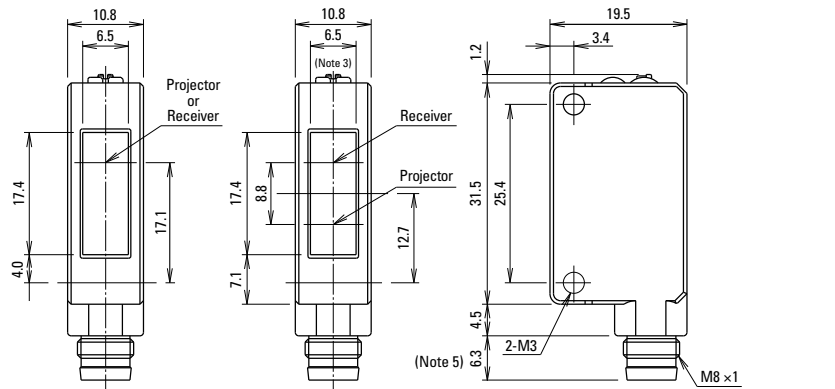
Through-beam



Polarized retroreflective
Diffuse-reflective
Small-beam reflective
Convergent reflective



- Through-beam
- Polarized retroreflective
- Diffuse-reflective
- Small-beam reflective
- Convergent Reflective



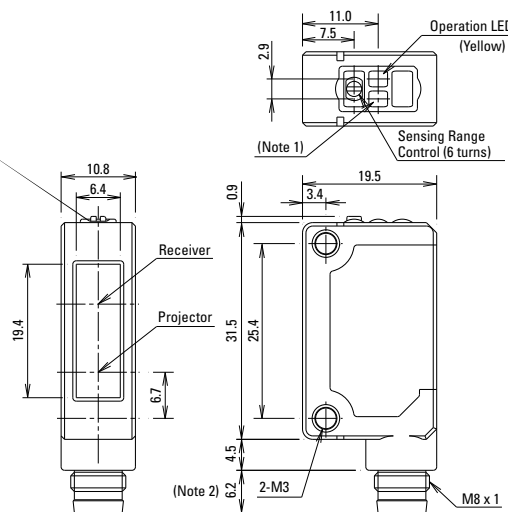
1. Power ON LED (green) for through-beam projector
2. No sensitivity control and stable LED are attached on the through-beam projector.
3. 5.2 mm for polarized retroreflective type
4. No sensitivity control is installed on the type without sensitivity adjustment.

Connector Model

Background Suppression (BGS)



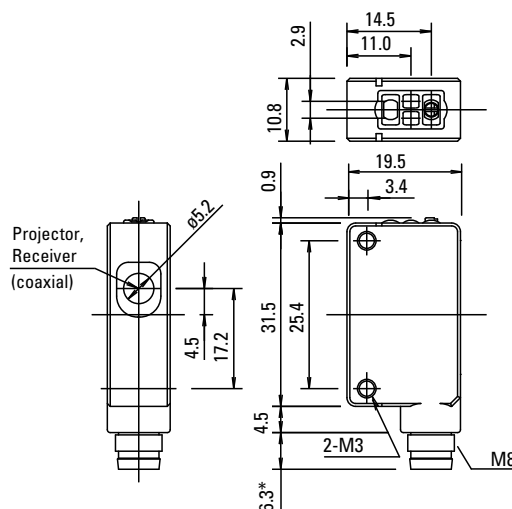
1. Stable LED is not provided on the background suppression type.
2. The connector length is 18 mm when a right-angle connector cable.

**Connector Model**

Coaxial Polarized Retro-reflective

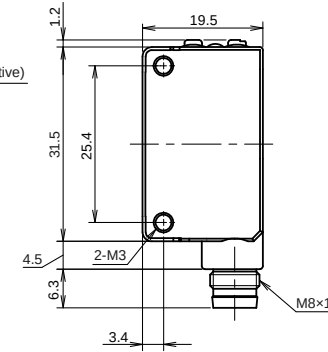
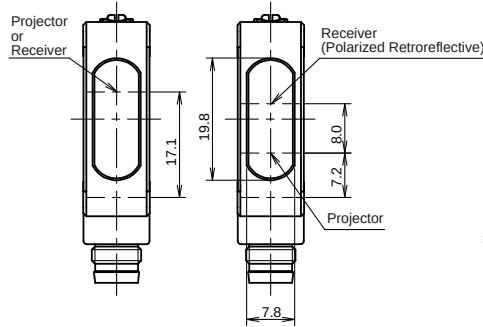
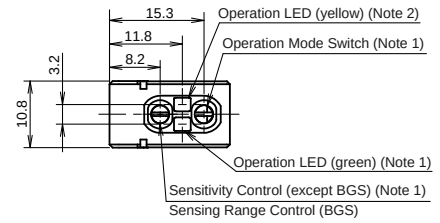


1. Stable LED is not provided on the coaxial polarized retro-reflective type.



Connector Model (Laser)

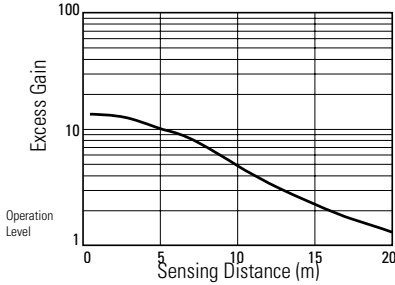
Through-beam
Polarized Retroreflective
Background Suppression



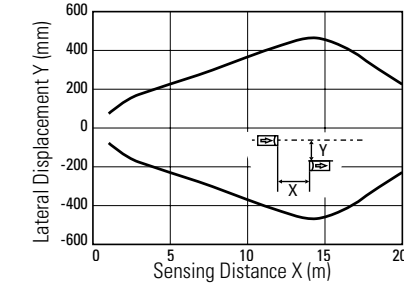
1. Stable LED is not provided on the coaxial polarized retro-reflective type.

1-1. Through-beam SA1E-T (Infrared LED w/sensitivity adjustment)
SA1E-TA (Red LED) w/sensitivity adjustment

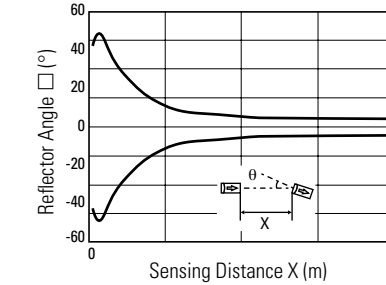
Excess Gain (Without slit)



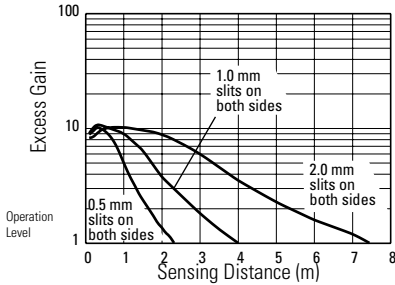
Lateral Displacement (Without slit)



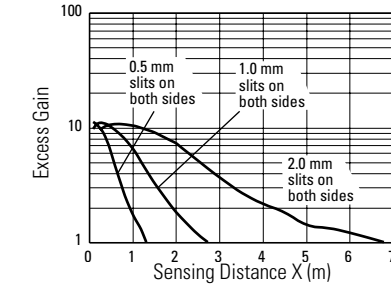
Angle (Without slit)



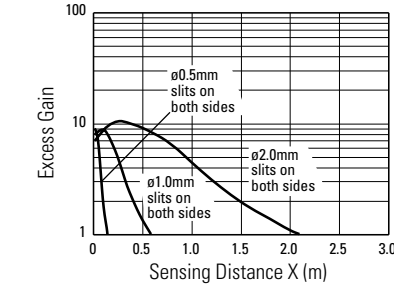
Excess Gain (With vertical slit)



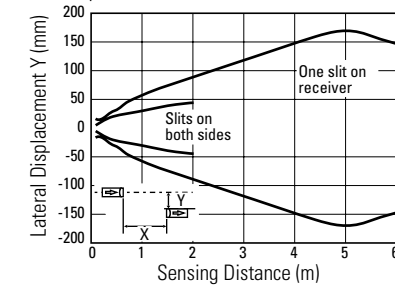
Excess Gain (With horizontal slit)



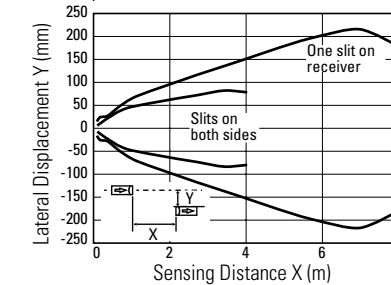
Excess Gain (With round slit)



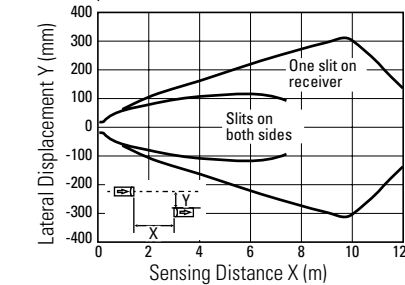
Lateral Displacement (With 0.5-mm vertical slit)



Lateral Displacement (With 1.0-mm vertical slit)

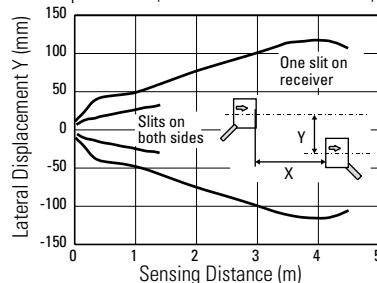


Lateral Displacement (With 2.0-mm vertical slit)

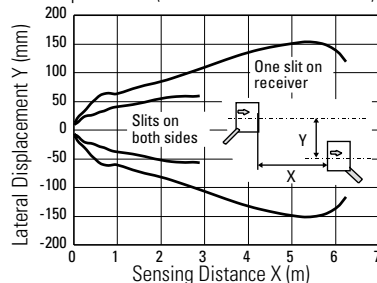


Characteristics (Typical)

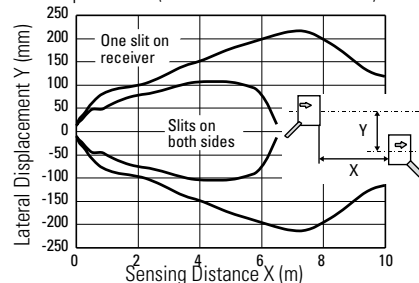
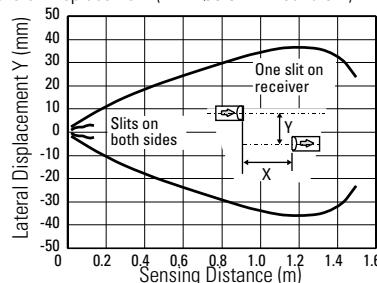
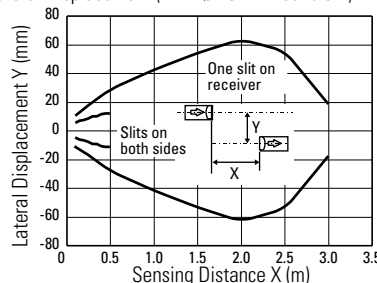
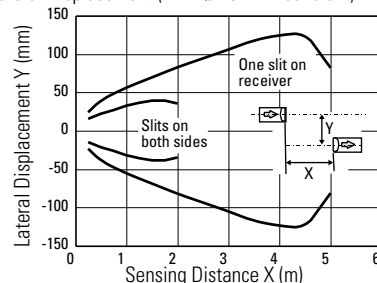
Lateral Displacement (With 0.5-mm horizontal slit)



Lateral Displacement (With 1.0-mm horizontal slit)

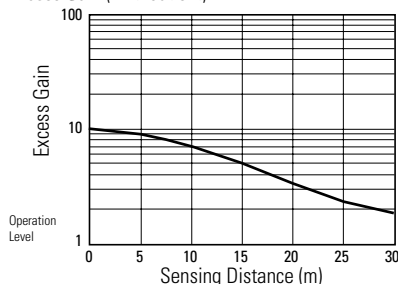


Lateral Displacement (With 2.0-mm horizontal slit)

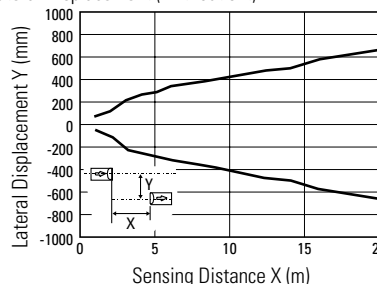
Lateral Displacement (With $\phi 0.5$ -mm round slit)Lateral Displacement (With $\phi 1.0$ -mm round slit)Lateral Displacement (With $\phi 2.0$ -mm round slit)

1-2. Through-beam SA1E-T□-NA (Infrared LED w/o sensitivity adjustment)

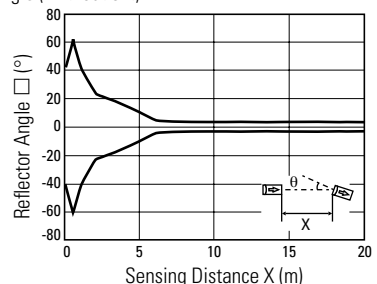
Excess Gain (Without slit)



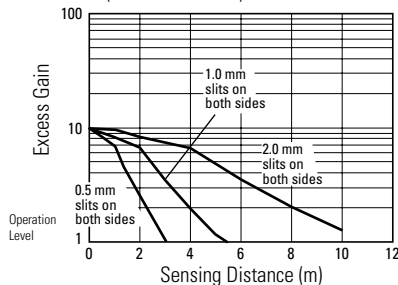
Lateral Displacement (Without slit)



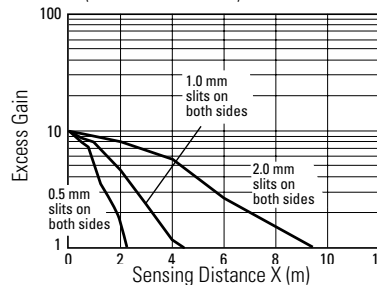
Angle (Without slit)



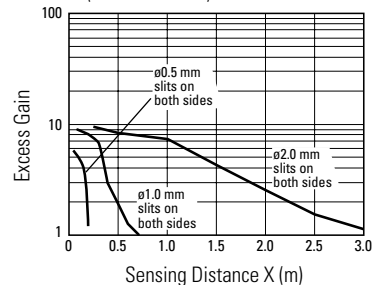
Excess Gain (With vertical slit)



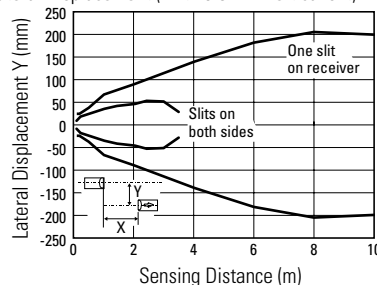
Excess Gain (With horizontal slit)



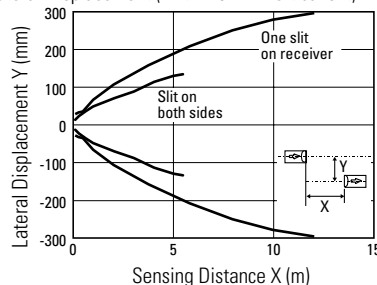
Excess Gain (With round slit)



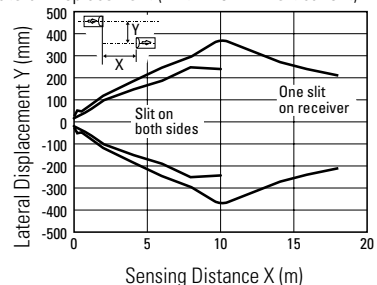
Lateral Displacement (With 0.5-mm vertical slit)



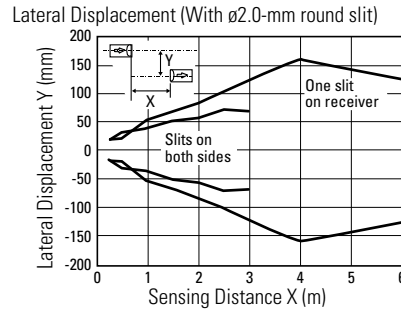
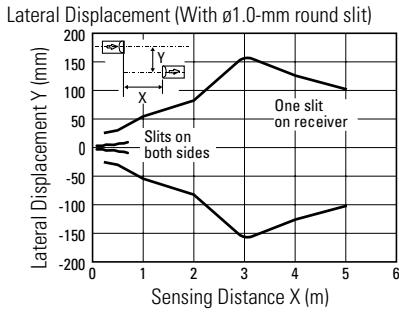
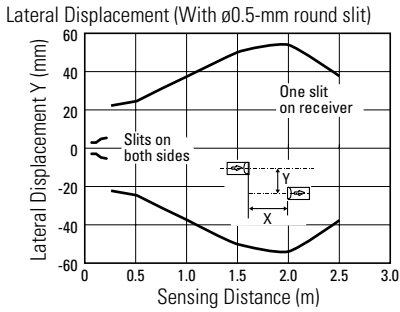
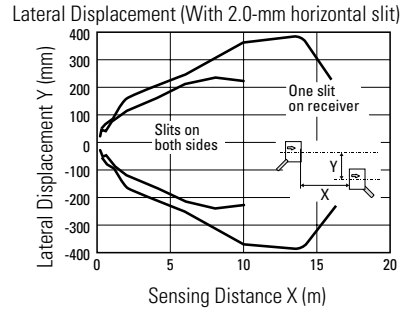
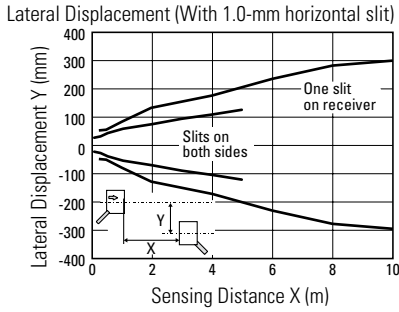
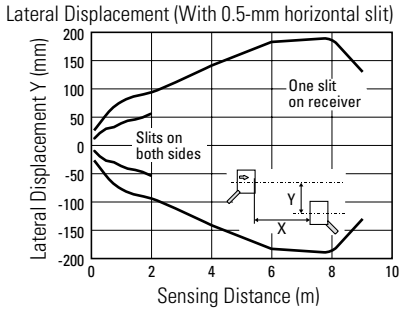
Lateral Displacement (With 1.0-mm vertical slit)



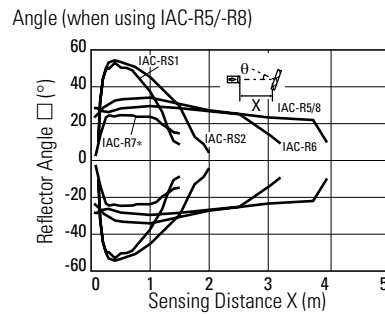
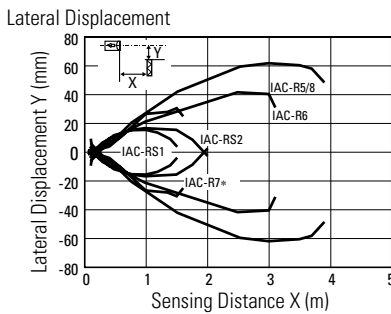
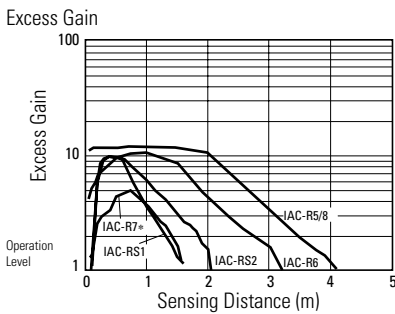
Lateral Displacement (With 2.0-mm vertical slit)



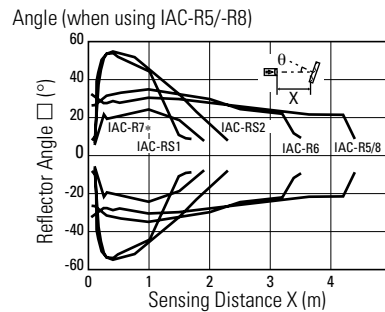
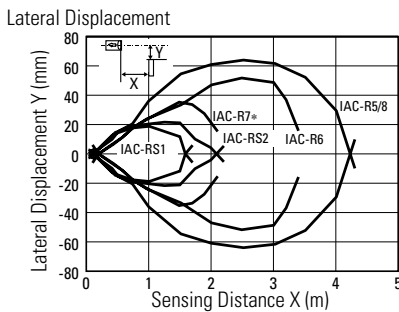
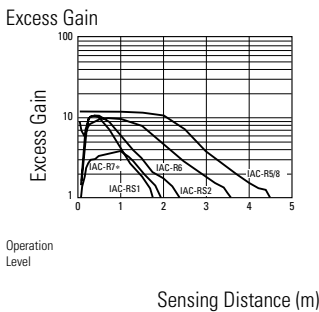
Characteristics (Typical)



2-1. Polarized Retroreflective SA1E-P (Red LED w/sensitivity adjustment)

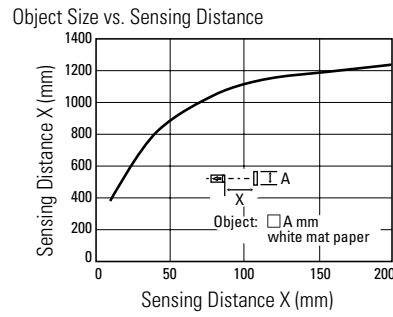
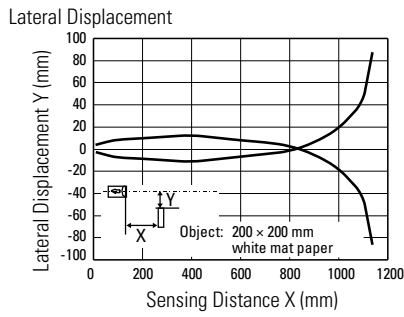
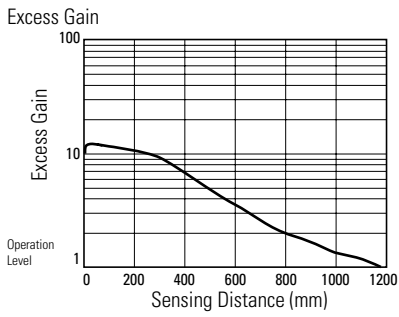


2-2. Polarized Retroreflective SA1E-PC-NA (Red LED w/o sensitivity adjustment)

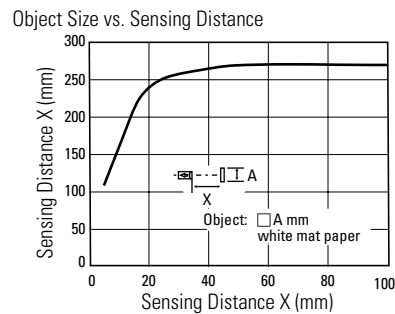
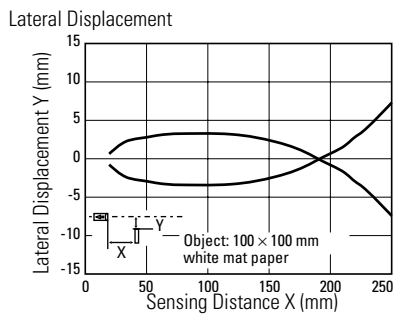
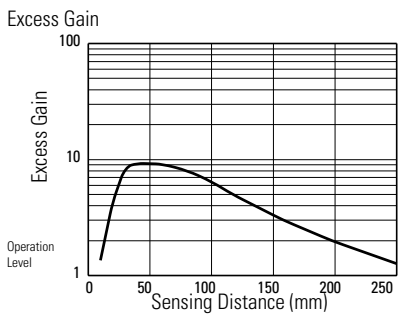


Characteristics (Typical)

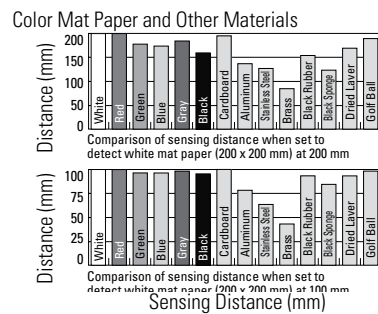
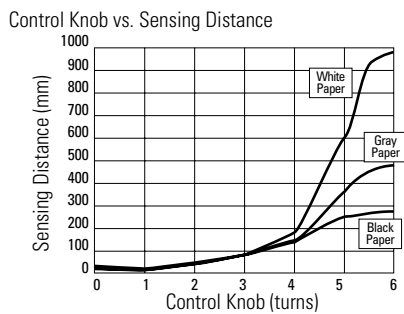
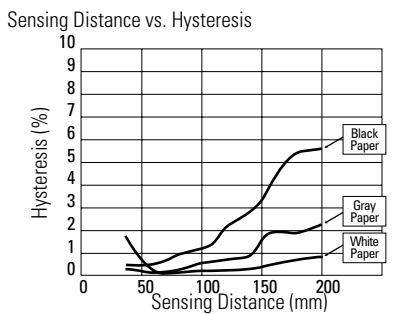
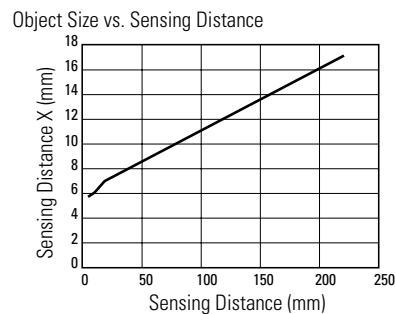
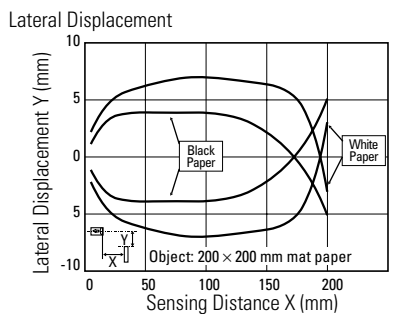
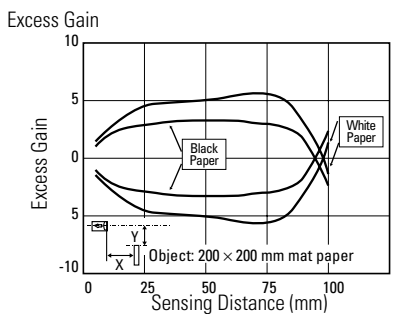
3. Diffuse-Reflective SA1E-D (Infrared LED w/sensitivity adjustment)



4. Small-beam Reflective SA1E-N (Red LED w/sensitivity adjustment)

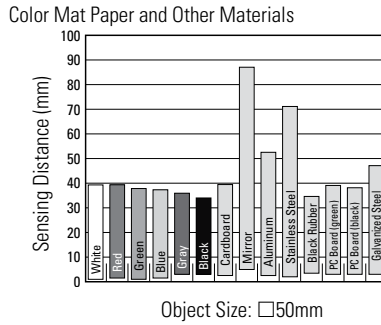
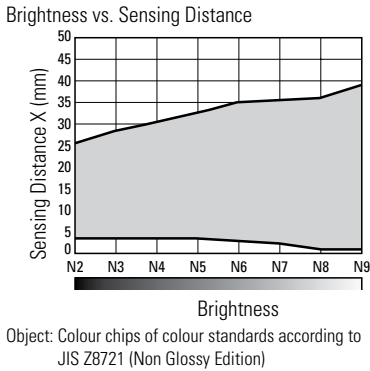
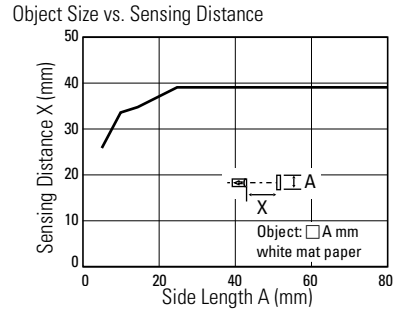
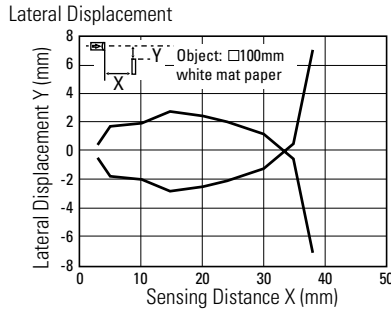
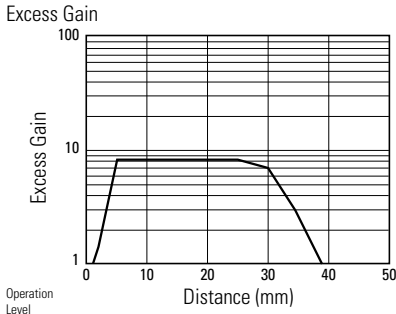


5. Background Suppression SA1E-B (Red LED w/sensitivity adjustment)



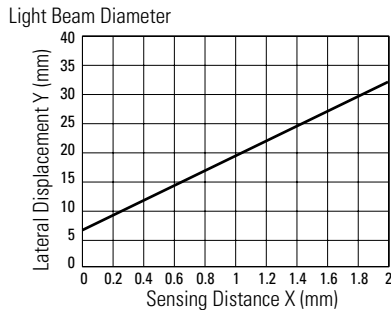
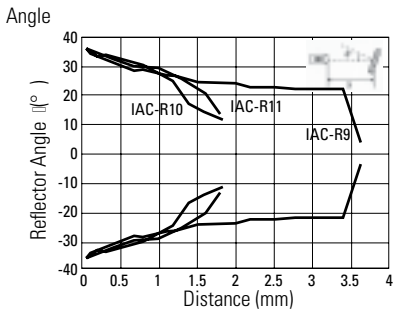
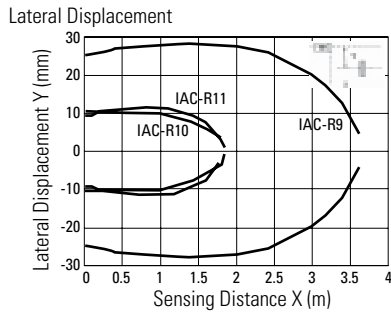
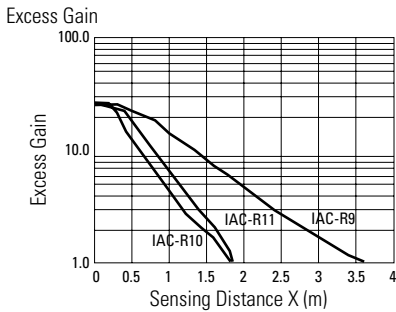
Characteristics (Typical)

6. Convergent Reflective SA1E-G (Infrared LED w/sensitivity adjustment)



- The graph on the left shows the sensing distances for different colors and materials and can be used as a reference when setting the distance. Because sensing distance depends on the object's size and surface condition, provide a sufficient distance.
- Note that sensing may be affected by reflective object behind the sensing object.
- Referring to the graph on the left, provide a sufficient distance between the photoelectric switch and background.

7. Coaxial Polarized Retro-reflective SA1E-X



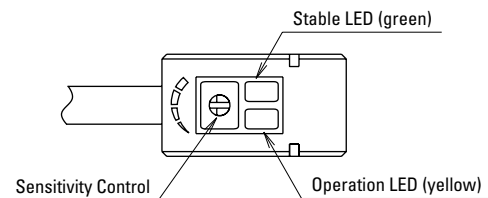
Safety Precautions

Turn off power to the SA1E Miniature Photoelectric Switches before installation, removal, wiring, maintenance, and inspection. Failure to turn power off may cause electrical shock or fire hazard.

Instructions

1. Indicator and Output Operation

(except for background suppression type)



- The operation LED turns on (yellow) when the control output is on.
- The stable LED turns on (green) either at stable incident or stable interruption. Make sure to use the photoelectric switch after the stable operation is ensured.
- In the light ON operation, the output turns on when the receiving light intensity level is 1.0 or over as shown on the right.
- In the dark-ON operation, the output turns on when the receiving light intensity level is 1.0 or less as shown on the right.

2. Optical Axis Alignment (Light ON)

Through-beam

Fasten the receiver temporarily. Place the projector to face the receiver. Move the projector up, down, right and left to find the range where the operation LED turns on. Fasten the projector in the middle of the range. Next, move the receiver up, down, right and left in the same manner and fasten in the middle of the range where the operation LED turns on. Make sure that stable LED turns on at stable incident and stable interruption.

Polarized retroreflective

Install the reflector perpendicularly to the optical axis. Move the SA1E photoelectric switch up, down, right and left to find the range where the operation LED turns on. Fasten the switch in the middle of the range. Polarized retroreflective type can be installed also by finding the position where the reflection of projected red light is most intense, while observing the reflection on the reflector from behind the switch. Make sure that stable LED turns on at stable incident and stable interruption.

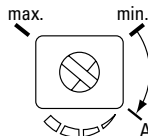
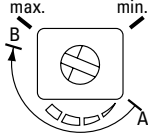
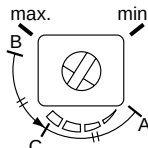
Operation Level	1.2 and over	Stable Incident	ON	ON	OFF
	1.0	Unstable Incident	OFF	OFF	ON
		Unstable Interruption			
	0.8 and below	Stable Interruption	ON		

Diffuse-reflective/Small-beam reflective/Convergent reflective

Place the SA1E photoelectric switch where the switch can detect the object. Move the switch up, down, right and left to find the range where the operation LED turns on. Fasten the switch in the middle of the range. Make sure that stable LED turns on at stable incident and stable interruption. Because the light source element of small-beam reflective type is a red LED, visual inspection is possible as well.

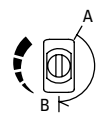
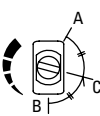
3. Sensitivity Adjustment

- Referring to the table to the right, adjust the sensitivity of the SA1E photoelectric switch when necessary, in such cases as the through-beam type is used to detect small or translucent objects or the reflective type is affected by background. The table explains the status of operation LED when the operation mode is set to light ON.
- After adjusting the sensitivity, make sure that stable LED turns on at stable incident and stable interruption. For detecting objects too small to turn on the stable LED, use an optional slit.
- Sensitivity is set to the maximum at the factory before shipment. When adjusting the sensitivity, use the screwdriver supplied with the SA1E photoelectric switch to turn the control as shown below, to a torque of 0.05 N·m maximum.

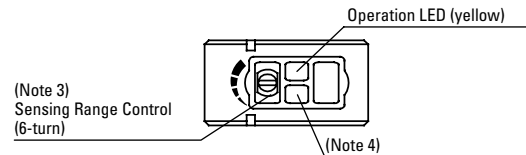
Step	Photoelectric Switch Status	Sensitivity Control	Adjusting Procedure
1	Receiving light • Through-beam, polarized reflective: No object detected • Diffuse reflective, small-beam reflective, convergent reflective: Object detected		Turn the control counter-clockwise to the minimum. Then turn clockwise until the operation LED turns on (turns off with dark ON type) (point A).
2	Light is interrupted • Through-beam, polarized reflective: Object detected • Diffuse reflective, small-beam reflective, convergent reflective: No object detected		At interruption status, turn the control clockwise from point A, until the operation LED turns on (turns off with dark ON type) (point B). If the operation LED does not turn on (turn off with dark ON type) even though the control has reached the maximum, set the maximum position as point B.
3	—		Set the middle point between point A and B as point C.

4. Adjustment of Sensing Range for Background Suppression (BGS) Type

- When adjusting the sensing range, follow the instructions below.

Step	Distance Control	Adjusting Procedure
1		Turn the control counter-clockwise to the minimum. Then turn clockwise until the operation LED turns on (turns off with dark ON type) (point A).
2		At interruption status, turn the control clockwise from point A, until the operation LED turns on (turns off with dark ON type) (point B). If the operation LED does not turn on (turn off with dark ON type) even though the control has reached the maximum, set the maximum position as point B.
3		Set the middle point between point A and B as point C.

- When the background is far off and not detected, turn the control 360°, and set the point as point C.
- Because the control is multi-turn, it may take more than one turn to move from point A to point B.



- Turning the control clockwise lengthens the sensing distance.
- Background suppression (BGS) type is not provided with a stable LED.

5. Power Supply and Wiring

- Do not use the SA1E photoelectric switch at the transient status immediately after turning on the power (approx. 100 ms, background suppression type: 200 ms). When the load and switch use different power supplies, make sure to power up the switch first.
- Use a power supply with little noise and inrush current, and use the photoelectric switch within the rated voltage range. Make sure that ripple factor is within the allowable limit. Do not apply AC voltage, otherwise the switch may blow out or burn.
- When using a switching power supply, make sure to ground the FG (frame ground) terminal, otherwise high-frequency noise may affect the photoelectric switch.
- Turn power off before inserting/removing the connector on photoelectric switch. Make sure that excessive mechanical force is not applied to the connector. Connect the connector cable to a tightening torque of 0.5 N·m maximum.
- To ensure the degree of protection, use the applicable connector cable for the connector type. Connector cables are ordered separately.
- Avoid parallel wiring with high-voltage or power lines in the same conduit, otherwise noise may cause malfunction and damage. When wiring is long, use a separate conduit for wiring.
- Use a cable of 0.3 mm² minimum core wires, then the cable can be extended up to 100m.

6. Installation

Installing the Photoelectric Switch

- Do not install the SA1E photoelectric switches in an area where the switches are subject to the following conditions, otherwise malfunction and damage may be caused.
Inductive devices or heat source
Extreme vibration or shock
Large amount of dust
Toxic gases
Water, oil, chemicals
Outdoor
- Make sure to prevent sunlight, fluorescent light, and especially the fluorescent light of inverters from entering the receiver of the photoelectric switch directly. Keep the through-beam type receiver away from intense extraneous light.
- Interference prevention allows two SA1E switches to be mounted in close proximity. However, the through-beam type is not equipped with interference prevention. Maintain appropriate distance between the switches referring to the lateral displacement characteristics on pages 218, 219, and 220.
- Because the SA1E photoelectric switches are IP67 waterproof, the SA1E can be exposed to water. However, wipe water drops and smears from the lens and slit using a soft cloth to make sure of the best detecting performance.
- Polycarbonate or acrylic resins are used for optical elements. Do not use ammonia or caustic soda for cleaning, otherwise optical elements will be dissolved. To remove dust and moisture build-up, use soft dry cloth.
- Tighten the mounting screws (M3) to a torque of 0.5 N-m. Do not tighten the mounting screws excessively or hit the switch with a hammer, otherwise the protection degree cannot be maintained.

Installing the Reflector

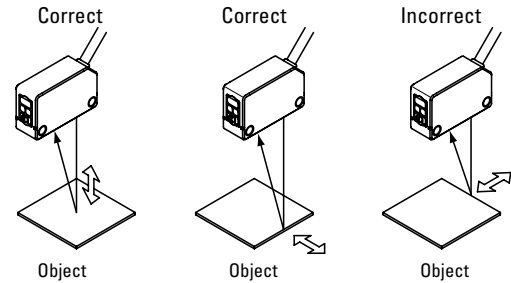
- Use M4 mounting screws for the IAC-R5 reflector and M5 mounting screws for the IAC-R6 reflector. Tighten the mounting screws to a tightening torque of 0.5 N-m maximum. Mounting screws are not supplied with the switch.
- Use the M3 self-tapping screw, flat washer, and spring washer to tighten the IAC-R7 reflector to a torque of 0.5 to 0.6 N-m.
- While optional reflector mounting bracket IAC-L2 is not supplied with mounting screws or nuts, the IAC-L3 and IAC-L5 are supplied with mounting screws for mounting the reflector on the bracket.
- Reflector IAC-RS1 and IAC-RS2 can be installed directly on a flat surface using the adhesive tape attached to the back of the reflector. Before attaching the reflector, clean the board surface to ensure secure attachment.

Installing the air blower mounting block SA9Z-A02

- When installing the SA9Z-A02 on the SA1E photoelectric switch, use the attached M3 × 20 mounting screws and tighten to a torque of 0.5 N-m maximum.
- Do not use the mounting screw (M3 × 12) supplied with the mounting bracket (SA9Z-K01) to mount the SA1E photoelectric switches.
- The SA9Z-A02 cannot be used with the through-beam slits (SA9Z-S06 to S14).
- The air tube fitting (M5) can be installed to either the top or side. The air tube is not supplied.
- Close the unused port using the supplied air supply port plugging screw and gasket to a tightening torque of 1 to 2 N-m maximum. The recommended air pressure is 0.1 to 0.3 MPa.

Installing the background suppression (BGS) type

- This sensor can detect objects correctly when the sensor head is installed perpendicular to the moving object. Install the sensor head as shown below to minimize sensing errors.



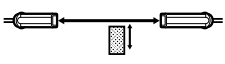
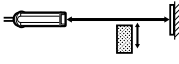
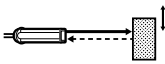
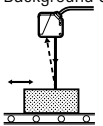
SA1U Heavy Duty Photoelectric Sensors

Key features:

- Universal voltage
AC Universal Type: 24 to 240V AC and 12 to 240V DC.
DC Type: 12 to 24V DC.
- IP67 rated
- Four sensing methods: through-beam, polarized retro-reflective, diffuse-reflective, and background suppression.
- Mounting hole centers: 40, 50 to 55 mm
- Operation and stable LED indicators.
- SPDT contact for relay output type.
- Transistor output type has NPN and PNP open collector dual outputs.
- Interference prevention allows two units to be mounted in close proximity (except through-beam type).
- Spring-up terminal block structure enables easy wiring. Wiring can be extended to up to 100m using $\varnothing 8$ to $\varnothing 10$ mm round cables.



Part Numbers

Sensing Method	Detectable Object	Sensing Range	Power Voltage	Control Output	Time Delay Functions	Part No.
Through-Beam 	Opaque	50m max.	24 to 240V AC (50/60Hz) 12 to 240V DC	Relay contact SPDT 250V AC/3A, 30V DC/3A (resistive load)	Without	SA1U-T50M
					With	SA1U-T50MT
			12 to 24V DC	NPN/PNP open collector	Without	SA1U-T50MW
					With	SA1U-T50MWT
Polarized Retroreflective 	Opaque Mirror surface	7m max.	24 to 240V AC (50/60Hz) 12 to 240V DC	Relay contact SPDT 250V AC/3A, 30V DC/3A (resistive load)	Without	SA1U-P07M
					With	SA1U-P07MT
			12 to 24V DC	NPN/PNP open collector	Without	SA1U-P07MW
					With	SA1U-P07MWT
Diffuse 	Opaque Transparent	1m max.	24 to 240V AC (50/60Hz) 12 to 240V DC	Relay contact SPDT 250V AC/3A, 30V DC/3A (resistive load)	Without	SA1U-D01M
					With	SA1U-D01MT
			12 to 24V DC	NPN/PNP open collector	Without	SA1U-D01MW
					With	SA1U-D01MWT
Background Suppression 	Opaque	2m max.	24 to 240V AC (50/60Hz) 12 to 240V DC	Relay contact SPDT 250V AC/3A, 30V DC/3A (resistive load)	Without	SA1U-B02M
					With	SA1U-B02MT
			12 to 24V DC	NPN/PNP open collector	Without	SA1U-B02MW
					With	SA1U-B02MWT

Specifications

Universal Voltage Models

Sensing Method	Through-Beam	Polarized Retroreflective	Diffuse	Background Suppression
Part Number	SA1U-T50M SA1U-T50MT	SA1U-P07M SA1U-P07MT	SA1U-D01M SA1U-D01MT	SA1U-B02M SA1U-B02MT
Power Voltage	24 to 240V AC (21.6 to 264V AC) 50/60Hz, 12 to 240V DC (10.8 to 264V DC) compatible			
Power Consumption	Projector: 3 VA maximum Receiver: 3 VA maximum	3 VA maximum		
Control Output	Relay contact SPDT, switching capacity: 250V AC/3A (resistive load), 30V DC/3A (resistive load) Electrical life (minimum operations): 100,000 (NO contact), 50,000 (NC contact) Mechanical life (minimum operations): 50,000,000			
Minimum Applicable Load	5V DC, 10 mA minimum (reference value)			
Response Time	20 ms maximum			
Insulation Resistance	Between power and output terminals: 20 MΩ minimum (500V DC megger)			
Dielectric Strength	Between power and output terminals: 1500V AC, 1 minute, Between output terminals: 750V AC, 1 minute			
Weight (approx.)	Projector: 115g, Receiver: 130g	130g		

DC Power Models

Sensing Method		Through-Beam	Polarized Retroreflective	Diffuse-Reflective	Background Suppression
Part Number		SA1U-T50MW SA1U-T50MWT	SA1U-P07MW SA1U-P07MWT	SA1U-D01MW SA1U-D01MWT	SA1U-B02MW SA1U-B02MWT
Power Voltage		12 to 24V DC (10 to 30V DC) ripple rate 10% p-p maximum			
Current Draw		Projector: 20 mA maximum Receiver: 25 mA maximum	30 mA maximum		
Control Output	Type	NPN, PNP open collector (dual output)			
	Load Current	NPN: 100 mA maximum, PNP: 100 mA maximum			
	Applied Voltage	30V DC maximum			
	Voltage Drop	NPN: 2.4V maximum, PNP: 2.4V maximum			
Response Time		1 ms maximum			
Insulation Resistance		Between live and dead parts: 20 MΩ minimum (500V DC megger)			
Dielectric Strength		Between live and dead parts: 1000V AC, 1 minute			
Weight (approx.)		Projector: 105g, Receiver: 110g	110g		

Common Specifications

Sensing Method	Through-Beam	Polarized Retroreflective	Diffuse	Background Suppression
Sensing Distance	50m maximum	0.2 to 7m (when using supplied reflector IAC-R5)	1m maximum (200 × 200 mm white mat paper)	0.2 to 2m (200 × 200 mm white mat paper)
Preset Distance	—			0.4 to 2m (200 × 200 mm white mat paper)
Detectable Object	Opaque	Opaque/Mirror surface	Opaque/Transparent	Opaque
Hysteresis	—	—	20% of sensing distance max.	15% of sensing distance max.
Operation Mode	Light ON or Dark ON (mode selector)			
Control Output	[Projector] Power LED: Green [Receiver] Operation LED: Yellow Stable LED: Green			Operation LED: Yellow
Light Emitting Element	Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (870 nm)	
Sensitivity Adjustment	1-turn control knob			8-turn control knob
Extraneous Light Immunity	Sunlight: 10,000 lux maximum, Incandescent lamp: 5,000 lux maximum			
Vibration Resistance	Damage limits: 10 to 55 Hz, amplitude 1.5 mm, 30 minutes in each axis			
Shock Resistance	Damage limits: 500 m/s ² , 3 shocks each in 6 axes 3 consecutive times			
Operating Temperature	-25 to +60°C (no freezing), storage temperature: -40 to +70°C			
Operating Humidity	35 to 85% RH (no condensation), storage humidity: 35 to 85% RH			
Connection Method	Terminal block with M3 spring-up screws			
Applicable Cable	Outside diameter ø8 to ø10 mm (core 0.3 to 0.75 mm ²)			
Cable Extension	Extendable up to 100m with a cabtyre cable of 0.3 mm ² minimum			
Housing Material	PBT (indicator cover: PC)			
Lens Material	PC/PET	PMMA	PC/PET	
Degree of Protection	IP67 (IEC/EN60529)			

Time Delay Specifications

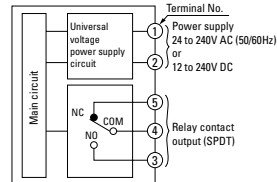
Sensing Method	Through-Beam	Polarized Retroreflective	Diffuse	Background Suppression
Type No.	SA1U-T50MT SA1U-T50MWT	SA1U-P07MT SA1U-P07MWT	SA1U-D01MT SA1U-D01MWT	SA1U-B02MT SA1U-B02MWT
Time Range	0.1 to 5.0 sec (adjusted with the 1-turn control knob)			
Time Delay Function	One shot, ON delay, OFF delay, and normal (no delay limit operation) modes			
Temperature Effect of Time Delay	±10% maximum of the time delay for 20°C temperature rise within the operating temperature range			
Repetitive Accuracy of Time Delay	±1.0% maximum of the time delay for repetitive inputs at 10 seconds or more			

Descriptions

Output Circuit / Connection Diagram

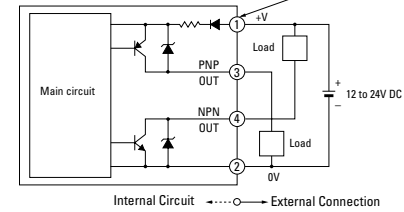
[Universal Voltage Type]

All models except though-beam projector

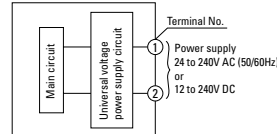


[DC Power Type]

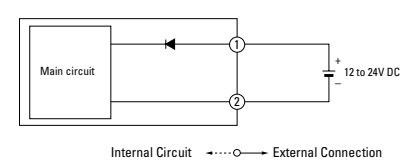
All models except though-beam projector



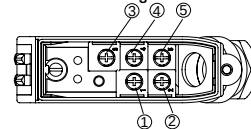
Though-beam projector



Though-beam projector

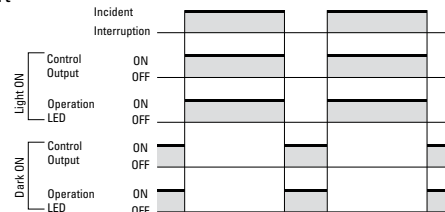


Terminal Arrangement



*Terminal ⑤ not available on DC power types.

Operation Chart



Part Numbers

SA1U-T50M*
SA1U-P07M*
SA1U-D01M*Operation LED (yellow) (Note 2)
Sensitivity Control (Note 2)
Mode Selector (Light ON / Dark ON) *2

Stable LED (green) (Note 1)

SA1U-B02M*

Operation LED (yellow)
Sensing Range Control
Mode Selector (Light ON / Dark ON)

1. Power LED for through-beam projector
2. Not available on through-beam projector

Output Circuit / Connection Diagram

See the "Output Circuit / Connection Diagram" diagram above.

Terminal Arrangement

See the "Terminal Arrangement" diagram above.

Operation Chart

Operation Mode	Mode Selector Position	Incident Interruption	Control Output	Operation LED
Light ON	OFF delay 0	ON OFF	ON OFF	ON OFF
	Normal 1	ON OFF	ON OFF	ON OFF
	One shot 2	ON OFF	ON OFF	ON OFF
	ON delay 3	ON OFF	ON OFF	ON OFF
Dark ON	OFF delay 4	ON OFF	ON OFF	ON OFF
	Normal 5	ON OFF	ON OFF	ON OFF
	One shot 6	ON OFF	ON OFF	ON OFF
	ON delay 7	ON OFF	ON OFF	ON OFF
Light ON	Normal 8	ON OFF	ON OFF	ON OFF
	9	ON OFF	ON OFF	ON OFF

Part Numbers

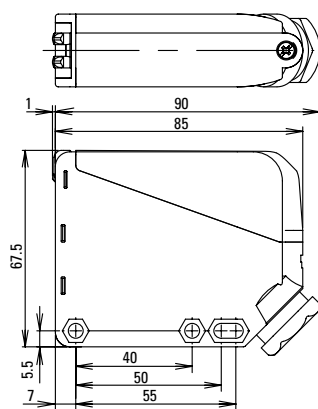
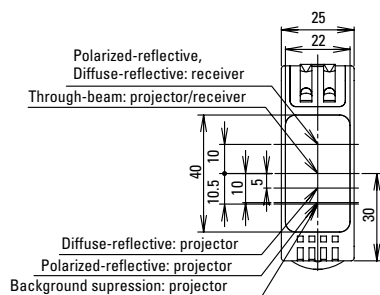
SA1U-T50M*T
SA1U-P07M*T
SA1U-D01M*TOperation LED (yellow) *2
Timer Control *2Mode Selector *2
(Light ON / Dark ON, time delay mode)
Sensitivity Control *2
Stable LED (green) *1

SA1U-B02M*T

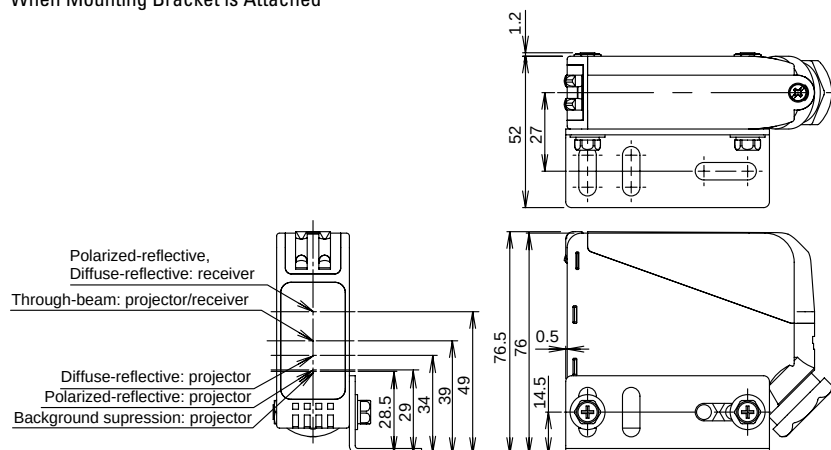
Operation LED (yellow)
Timer ControlMode Selector
(Light ON / Dark ON, time delay mode)
Sensing Range Control

1. Power LED for through-beam projector
2. Not available on through-beam projector

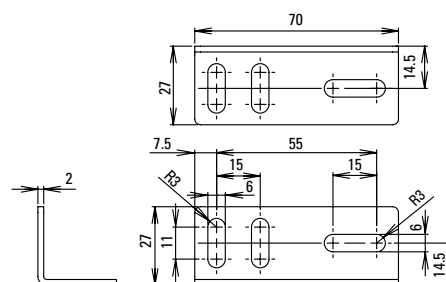
Dimensions (mm)



When Mounting Bracket is Attached

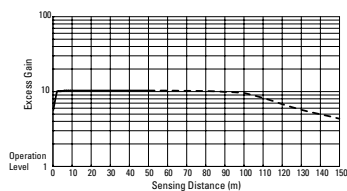


Mounting Bracket

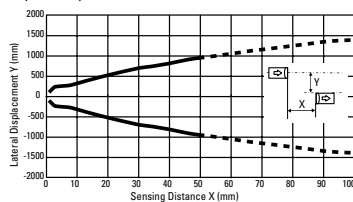


Through-beam SA1U-T50M

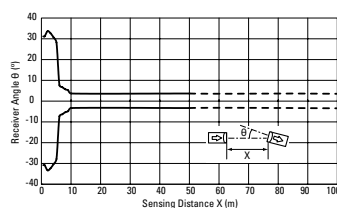
Excess Gain
(transparency 1% ND filter is used)



Lateral Displacement
(transparency 2.8% ND filter is used)

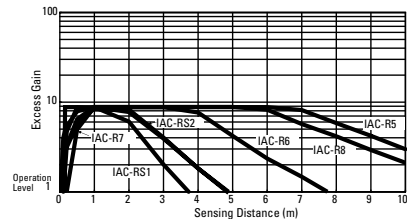


Angle

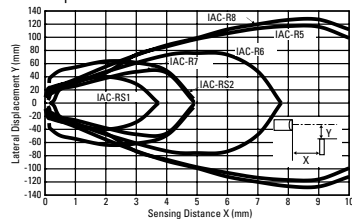


Polarized Retroreflective SA1U-P07M*

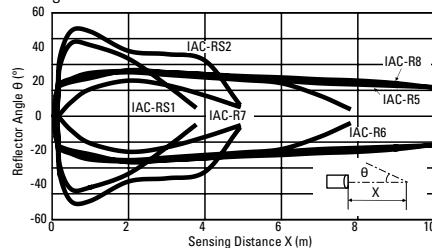
Excess Gain



Lateral Displacement



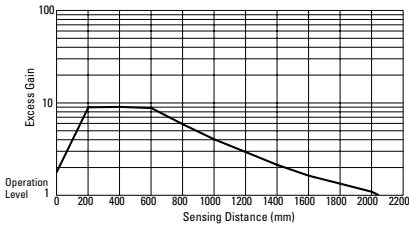
Angle



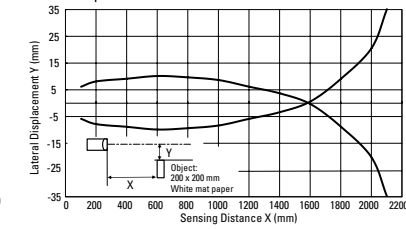
Characteristics (Typical)

Diffuse SA1U-D01M*

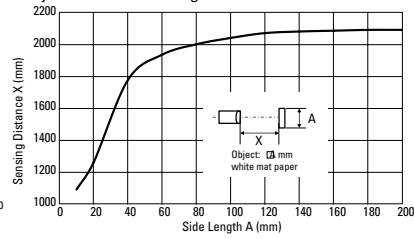
Excess Gain



Lateral Displacement



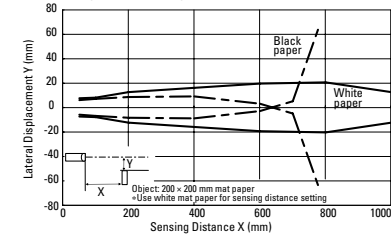
Object Size vs. Sensing Distance



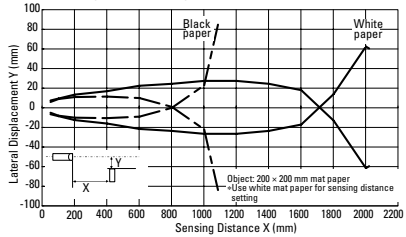
Background Suppression

SA1U-B02M*

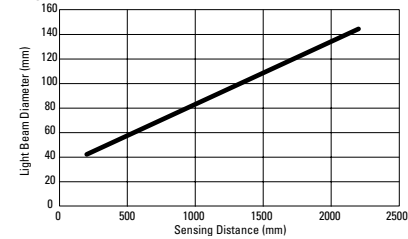
Lateral Displacement (preset 1m)



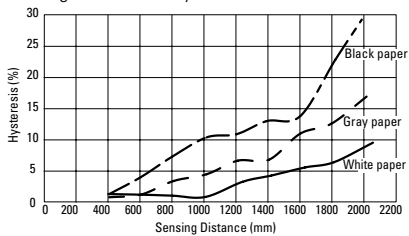
Lateral Displacement (preset 2m)



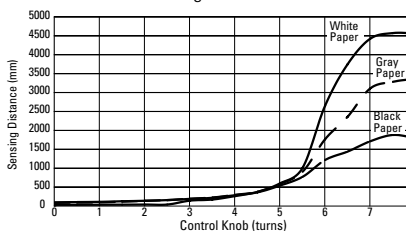
Light Beam Diameter



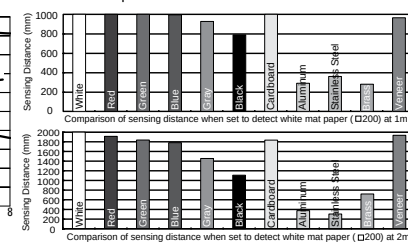
Sensing Distance vs. Hysteresis



Control Knob vs. Sensing Distance

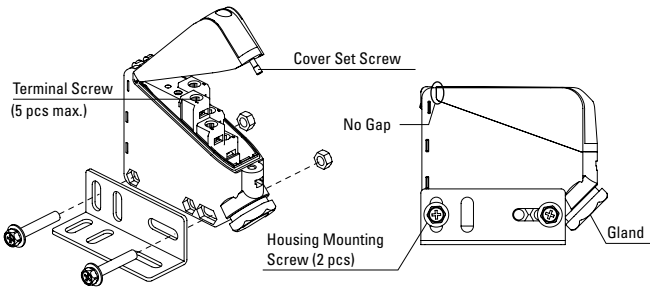


Color Mat Paper and Other Materials



Installation

Make sure that there are no gaps between the cover and the housing as shown in the diagram below.



To maintain waterproof characteristics, tighten the screws within the range of the recommended tightening torque.

Excessive tightening may cause damage.

Screw Tightening Torque

Screw	Recommended Tightening Torque (N·m)
Terminal screw	0.6 to 1.0
Gland	4.0 to 6.0
Cover set screw	0.5 to 0.8
Housing mounting screw	0.8 to 1.2

Notes

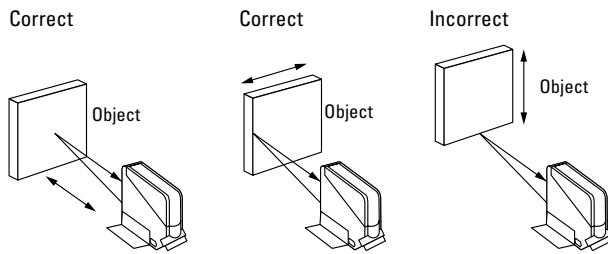
- When installing photoelectric switches, take into consideration the reflecting light from the floor or walls as it may affect sensing of through-beam and background suppression types.
- Make sure to prevent sunlight, fluorescent light, and fluorescent light of inverters from entering the receiver of the photoelectric switch directly. Keep the through-beam type receiver away from intense extraneous light.

Instructions

- When installing SA1U photoelectric switches, do not tighten the mounting screws excessively or hit the switch with a hammer, otherwise the protection degree cannot be maintained.
- Make sure that the supply voltage is within the rated values.
- When using a switching regulator, be sure to ground the FG (frame ground) terminal.
- To suppress a transient state at start-up, a circuit to turn off the output is installed (universal voltage type: 50 ms, DC power type: 100 ms). The timer will start after resetting the off output.
- To meet European Union Low Voltage Directives, install an EN approved fuse on the outside of the power terminal or output terminal of the universal voltage type SA1U photoelectric switches.
- Attach the cover properly to maintain waterproof characteristics.
- Interference prevention allows two SA1U photoelectric switches to be mounted in close proximity. However, the through-beam type is not equipped with interference prevention. Maintain appropriate distance between the switches referring to the lateral displacement characteristics on pages 230 and 231.
- Polycarbonate or acrylic resins are used for optical elements. Do not use ammonia or caustic soda for cleaning, otherwise optical elements will dissolve. To remove dust and moisture build-up, use soft dry cloth.
- When mounting the reflector, do not tighten the mounting screws excessively, otherwise the screw hole of the reflector may be damaged.
- Use M4 mounting screws for the IAC-R5 and IAC-R8 reflectors and M3 mounting screws for the IAC-R6 reflector. Tighten the mounting screws to a tightening torque of 0.5 N·m maximum.
- Use the M3 self-tapping screw, flat washer, and spring washer to tighten the IAC-R7 reflector to a torque of 0.5 to 0.6 N·m. While optional reflector mounting bracket IAC-L2 is not supplied with mounting screws or nuts, the IAC-L3 and IAC-L5 are supplied with mounting screws for mounting the reflector on the bracket.
- IAC-RS1 and IAC-RS2 reflectors can be installed directly on a flat surface using the adhesive tape attached to the back of the reflector. Before attaching the reflector, clean the surface to ensure secure attachment.

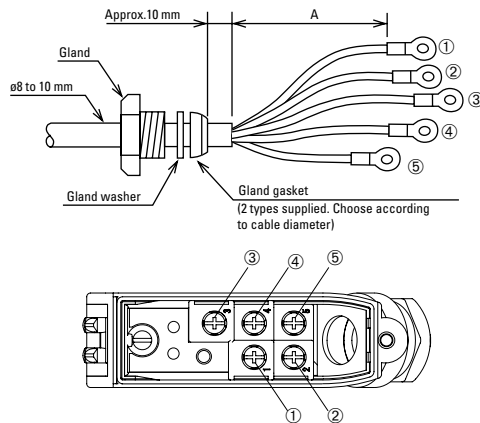
Installing the Background Suppression (BGS) Model

Install the sensor head as shown below to minimize sensing errors.



Wiring

Connecting Cables

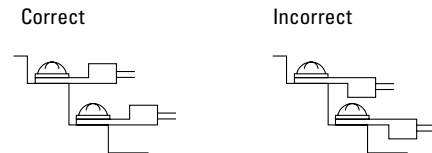


Recommended insulation length (A)

Terminal No.	①	②	③	④	⑤
Length "A" (mm)	45	30	55	40	25

- Connect the cables to the correct terminal number. Connect the lower terminal screws first.
- Attach the cover and secure with the set screw.
To maintain waterproof and dustproof characteristics, use cable glands (do not use soft cables as they may fall out) with $\phi 8$ to $\phi 10$ mm diameter. Install the attached gland gasket and washer and tighten the gland securely. For the small gland gasket, use a cable with $\phi 8$ to $\phi 10$ mm diameter. For the large gland gasket, use a cable with $\phi 9$ to $\phi 10$ mm diameter. The cable sheath should be 10 mm approx. Make sure that the gland washer fits in the groove of the gasket.
- When wiring, make sure that the power is turned off.
- Incorrect wiring may cause damage to the internal circuit.
- Avoid parallel wiring with high-voltage or power lines (especially inverters) in the same conduit, otherwise noise may cause malfunction and damage.
- When wiring is long or may be affected by power lines, use a separate conduit for wiring.
- Use a cable of 0.3 mm² minimum core wires. The cable can be extended up to 100m. For DC power types, voltage drop due to resistance of the cable lead wire should be taken into consideration.

- When using crimp terminals, make sure that the terminals do not come into contact with adjacent terminals. For correct installation, see the figure below.



Dimension of Applicable Crimping Terminals

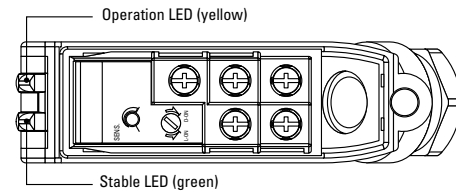
Ring Terminal	Spade Terminal



Dimensions in mm.

- When using insulation for ring terminals, use an insulating sheath.
- Install the insulation sheath to the crimp part before wiring.
- Only one crimp terminal can be connected per terminal.

Indicator and Output Operation



The operation LED turns on (yellow) when the control output is on. The stable LED turns on (green) either at stable incident or stable interruption. Make sure to use the SA1U photoelectric switch after the stable LED is on.

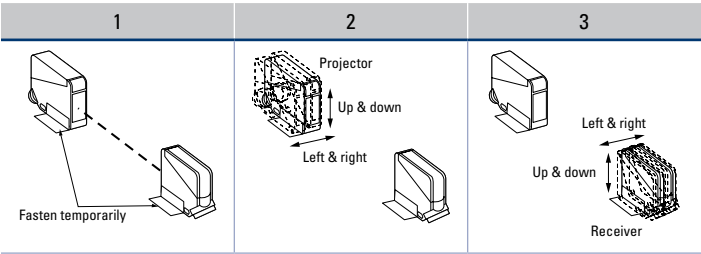
See the table below.

Light Receiving Status	Stable LED (green)	Operation LED (yellow)/ Control Output	
		Light ON	Dark ON
Stable Incident	ON	ON	OFF
Unstable Incident	OFF		
Unstable Interruption	ON	OFF	ON
Stable Interruption			

Optical Axis Alignment (Light ON)

1. Through-Beam Type

Fasten the receiver temporarily. Place the projector facing the receiver. Move the projector up, down, right and left to find the range where the operation LED turns on. Fasten the projector in the middle of the range. Next, move the receiver up, down, right, and left in the same manner and fasten in the middle of the range where the operation LED turns on. Make sure that stable LED turns on at stable incident and stable interruption.



Sensitivity Adjustment (except Background Suppression)

- Referring to the table below, adjust the sensitivity of the SA1U photoelectric switch when necessary, such as when the through-beam type is used to detect small or translucent objects or the reflective type is affected by background. The table explains the status of operation LED when the operation mode is set to light ON.
- After adjusting the sensitivity, make sure that stable LED turns on at stable incident and stable interruption.
- Sensitivity is set to the maximum at the factory before shipment. When adjusting the sensitivity, use the screwdriver supplied with the SA1U photoelectric switch to turn the control as shown below, to a torque of 0.03 N·m maximum.

Step	Photoelectric Switch Status	Sensitivity Control	Adjusting Procedure
1	Receiving light Through-beam, polarized reflective: No object detected Diffuse reflective: Object detected		Turn the control counterclockwise to the minimum. Then turn clockwise until the operation LED turns on (turns off with dark ON type) (point A).
2	Light is interrupted Through-beam, polarized reflective: Object detected Diffuse reflective: No object detected		At interruption status, turn the control clockwise from point A, until the operation LED turns on (turns off with dark ON type) (point B). If the operation LED does not turn on (turn off with dark ON type) even though the control has reached the maximum, set the maximum position as point B.
3	—		Set the middle point between point A and B as point C.

2. Polarized Retroreflective

Install the reflector perpendicularly to the optical axis. Move the SA1U photoelectric switch up, down, right, and left to find the range where the operation LED turns on. Fasten the switch in the middle of the range. Polarized retroreflective type can be installed also by finding the position where the reflection of projected red light is most intense, while observing the reflection on the reflector from behind the switch. Make sure that stable LED turns on at stable incident and stable interruption.

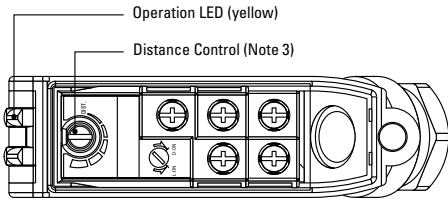
3. Diffuse-Reflective

Place the SA1U photoelectric switch where the switch can detect an object. Move the switch up, down, right, and left to find the range where the operation LED turns on. Fasten the switch in the middle of the range. Make sure that stable LED turns on at stable incident and stable interruption.

Adjustment of Sensing Range for Background Suppression

When adjusting the sensing range, follow the instruction below.

Step	Distance Control	Adjusting Procedure
1		Install the photoelectric switch and the object firmly. Turn the control counterclockwise until the operation LED turns off (turns on with dark ON type). From this point, turn the control clockwise until the operation LED turns on (turns off with dark ON type) (point A).
2		Remove the object, and confirm that the operation LED turns off (turns on with dark ON type). Turn the control clockwise until the operation LED turns on (detecting the background) (turns off with dark ON type) (point B). ¹
3		Set the middle point between point A and B as point C. ²



- 1. When the background distance is too far and not detected, turn the control 360°, and set the point as point C.
- 2. Because the control is multi-turn, it may take more than one turn to move from point A to point B.
- 3. Turning the control clockwise lengthens the sensing distance.
- 4. Background suppression (BGS) type is not provided with a stable LED.

AS Interface Overview 236

Communication & Networking



www.IDEC.com/communication





AS-Interface Overview (Actuator Sensor Interface)

MicroSmart
Pentra



See PLC section for more information.



73W

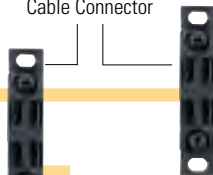
145W

Visit www.IDEC.com/powersupply



SX5A AS-Interface Safety
Contact IDEC for more information.

AS-Interface Flat
Cable Connector



SX5A AS-Interface I/O modules



4 inputs
2 inputs/2 outputs



4 inputs/3 outputs



4 inputs
4 inputs/3 outputs

Contact IDEC for more information

SX5A AS-Interface Safety Communication
Terminal (Safety Slave)



Safety Interlock Switches
Contact IDEC for more information



Emergency Stop
Switch Box



IDEC SmartRelay
(See PLC section for more
information)

Link to the world and reduce wiring at the same time!

SwitchNet Control Units directly connect to an AS-Interface network

Panels can be built with substantially less wiring at a lower total cost.

- Signals and power are carried through two wires.
- A maximum of 62 switches and pilot lights can be connected. The wire length can be extended to 300m by using two repeaters.
- Spring clamp terminals save wiring time.

Each control switch or pilot light contains a communication chip (AS-Interface Ver. 2.1).



T-branch Connector

FB Enclosures

XA & XW E-Stops

Contact IDEC for more information.



Contact IDEC for more information.

Pilot lights & Illuminated Pushbuttons Brightness Control

Illumination can be controlled at four levels according to a command from the AS-Interface master. Dynamic displays and energy savings are possible.

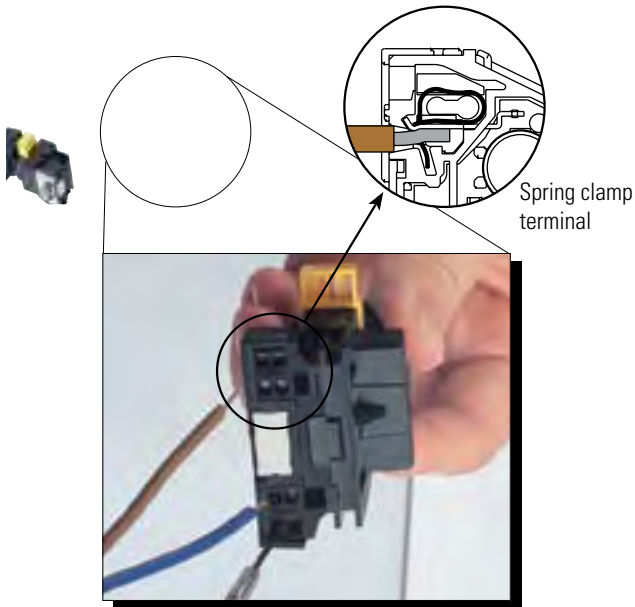


L6 Pilot Lights

See Switch & Pilot Light section.

Easy & Flexible

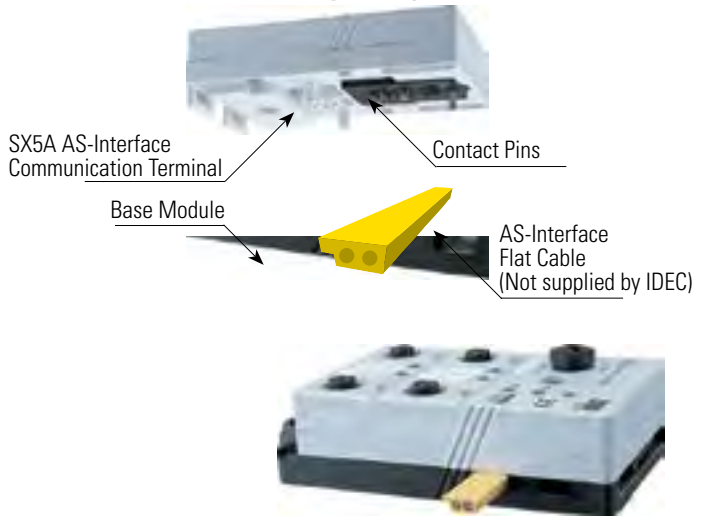
Quick & Secure Connection



Spring clamp reduces wiring time

SwitchNet control units feature spring clamp terminals, eliminating the need for tightening screws.

Easy Wiring

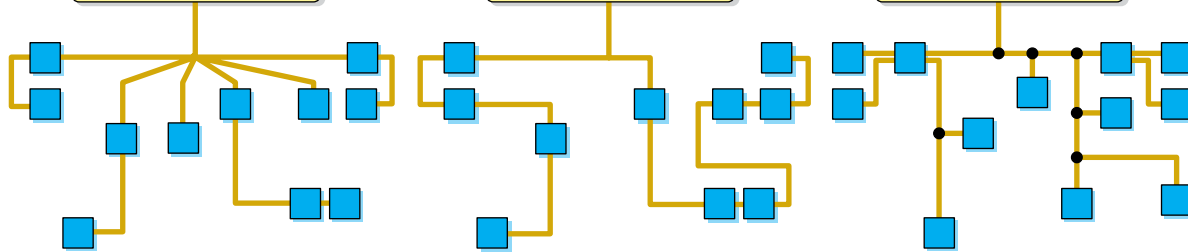


Contact pins pierce through the cable's insulation and make secure contact with the copper conductor. After disconnecting the AS-Interface communication terminal, the elasticity of the sheath closes the pierced holes and maintains insulation.

AS-Interface Master

AS-Interface Master

AS-Interface Master



Tree Structure

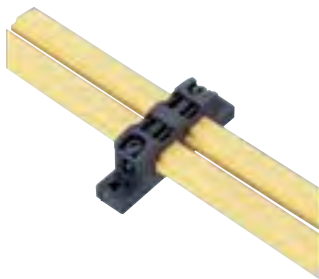
Line Structure

Star Structure

■ = AS-Interface slave
AS-Interface power supply can be connected at any place. No terminator is needed.

Connectors

Three types of connectors are available for designing the panel layout.



AS-Interface Flat Cable Branch Connector (IP65)

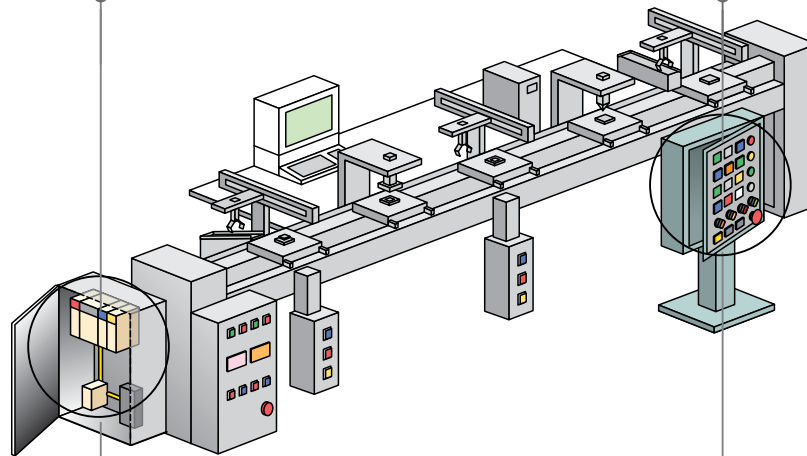
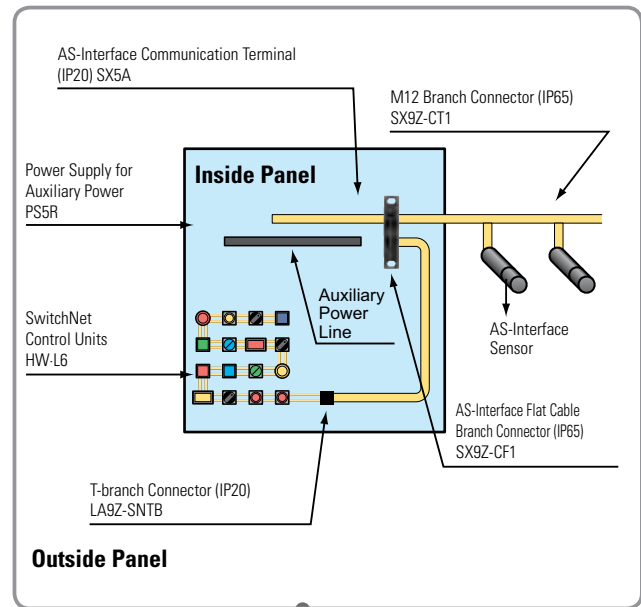
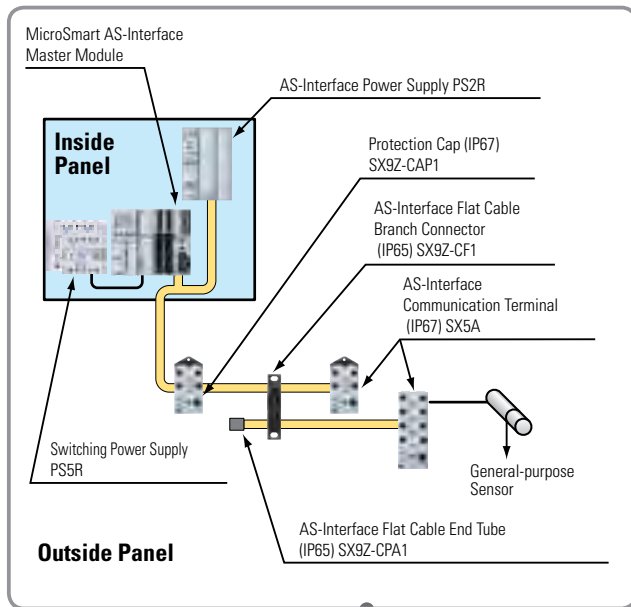


M12 Branch Connector (IP65)

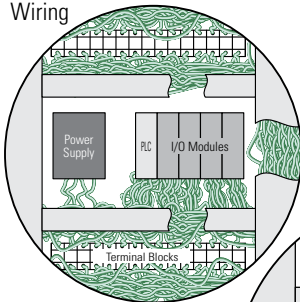


T-branch Connector (IP20)

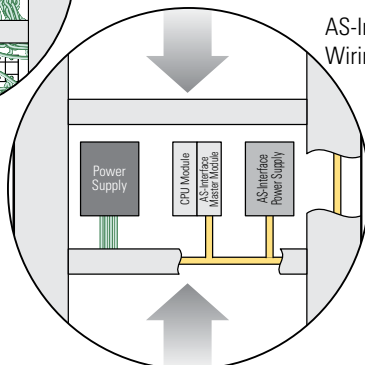
Space & Wire Savings



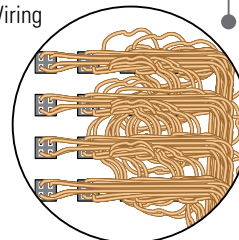
Conventional Wiring



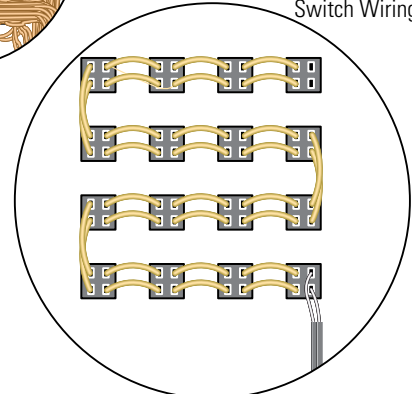
AS-Interface Wiring



Conventional Switch Wiring

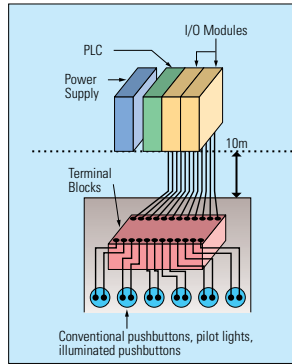


AS-Interface Switch Wiring

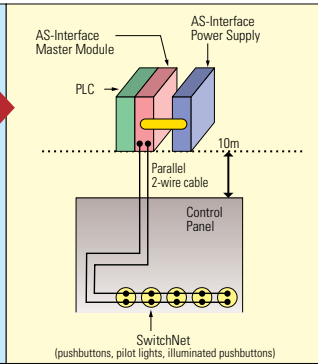


Cost Savings

Inside-Panel Wiring Example: Cost Savings Approximately 25%

Wiring Comparison
Conventional Wiring

AS-Interface & SwitchNet Wiring

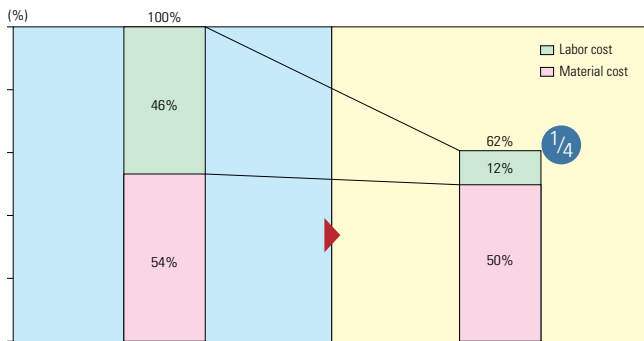


Conventional Wiring

When using conventional wiring that involves a PLC and terminal blocks, the inside of the control panel is filled with wires for switches, pilot lights and other devices. Approximately half of the total panel cost is attributable to labor costs for wiring.

AS-Interface & SwitchNet Wiring

All SwitchNet units are connected to the AS-Interface master module using 2-wire cables. Wiring time is reduced to approximately 1/4 of the time needed for the conventional method and the total cost can be reduced up to 40%. In addition, maintenance is much easier.

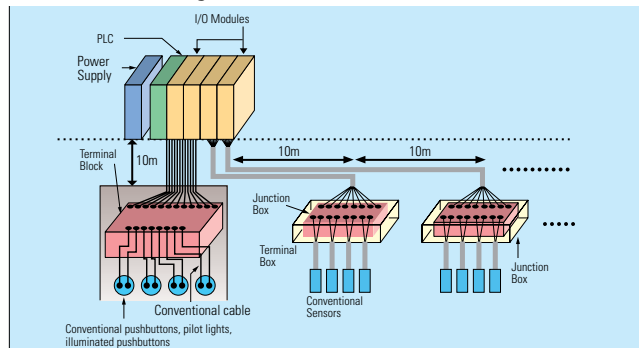
Cost Comparison
Conventional Wiring

AS-Interface & SwitchNet Wiring

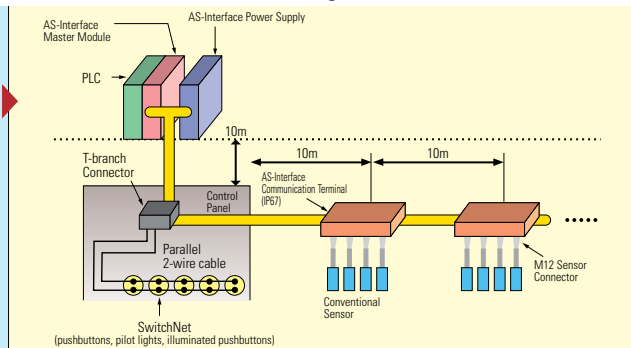
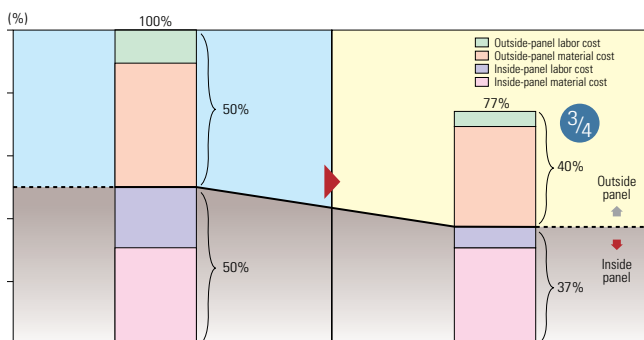


1. Comparisons were made using IDEC products.
2. Cost comparison is based on control panel configuration using 60 buttons and lights.

Inside & Outside-Panel Wiring Example: Cost Savings Approximately 25%

Wiring Comparison
Conventional Wiring

AS-Interface & SwitchNet Wiring

Cost Comparison
Conventional Wiring

AS-Interface & SwitchNet Wiring

Conventional Wiring

A large amount of space and cost is required by wiring to and inside junction boxes.

AS-Interface & SwitchNet Wiring

SwitchNet wiring reduces costs for inside-panel wiring resulting in a total cost reduction of approximately 25%.



1. Comparisons were made using IDEC products.
2. Cost comparison is based on control panel configuration using 60 buttons and lights.

Selection Guide	242
Discrete Input Barriers	244
EB3C Discrete Input Barriers	244
EB3N Discrete Input Barrier	254
Discrete Output Barriers	259
EB3L Discrete Output Barriers	259
Switches and Pilot Devices	267
General Information	273

Barriers



www.IDEC.com/barriers



Selection Guide

Discrete Input Barrier

Model	EB3C-**-AN	EB3C-**-DN	EB3N-**-D
Appearance			
Page	244		254
Ratings	UL: Class I, II, III Div1 / Group A, B, C, D, E, F, and G Class I, Zone 0 / [AExia] II C FM: Class I, II, III Div1 / Group A, B, C, D, E, F, and G Class I, Zone 0 / [AExia] II C PTB (ATEX): II(1)G [Exia] IIC: Gas vapor II(1) D[Exia] IIC: Dust PTB (IECEX): [Exia] IIC IEC Ex: [Exia] II C CQST: [Ex ia Ga] IIC TIIS: Discrete input barrier [Exia] IIC Switch (EB9Z-A) Exia IIC T6 Switch (EB9Z-A1) Exia IIB T6 NK: [Exia] II C KCs: [Exia] II C, [Exia D] KR: [Exia] IIC, [Exia] III C (pending)		UL: Class I, II, III, Div. 1, Groups A, B, C, D, E, F and G Class I, Zone 0, [AExia] II C PTB (IECEX): [Exia] II C PTB (ATEX): II (1) G [Exia] II C II (1) D [Exia D] CQST: [Exia] II C TIIS: [Exia] II C
Degree of Protection	IP20	IP20	IP20
Number of Channels	Relay Output: 1,2,3,5,6,8,10 Transistor Output: 1,2,3,5,6,8,10,16	Relay Output: 1,2,3,5,6,8,10 Transistor Output: 1,2,3,5,6,8,10,16	EB3N-□2ND: 2 safety circuits EB3N-□2R5D: 2 safety circuits, 5 auxiliary circuits
Power Voltage	100 to 240V AC (UL rating: 100- 120VAC)	24V DC	24V DC
Output	Relay Transistor (Sink/Source)	Relay Transistor (Sink/Source)	Relay
Connection	Screw Terminal	Screw Terminal, Connector	Screw Terminal
Mounting	35-mm-wide DIN rail Panel mounting	35-mm-wide DIN rail Panel mounting	35-mm-wide DIN rail / Panel mounting
Size (excluding projections)	42W×75H×77.5D (1 channel) 65W×75H×77.5D (2, 3 channels) 110.5W×75H×77.5D (5, 6, 8 channels (common)) 171.5W×75H×77.5D (8, 10 channels)	42W×75H×77.5D (1 channel) 65W×75H×77.5D (2, 3 channels) 110.5W×75H×77.5D (5, 6, 8 channels (common)) 171.5W×75H×77.5D (8, 10, 16 channels (common))	65.0W×75.0H×77.5D (EB3N-□2ND) 110.5W×75.0H×77.5D (EB3N-□2R5D)
Weight (approx.)	380g (EB3C-R10AN)	390g (EB3C-R16CDN)	220g (EB3N-□2ND) 300g (EB3N-□2R5D)

Discrete Output Barrier

Model	EB3L-**-AN	EB3L-**-DN
Appearance		
Page	259	
Ratings	UL: Class I, II, III Div1 / Group A, B, C, D, E, F, and G Class I, Zone 0 / [AExia] II C FM: Class I, II, III Div1 / Group A, B, C, D, E, F, and G Class I, Zone 0 / [AExia] II C PTB (ATEX): II(1)G [Exia] IIC: Gas vapor II(1)D [Exia] IIIC: Dust PTB (IEC-Ex) [Exia] IIC [Exia] IIIC CQST: Ex ia Ga IEC Ex: [Exia] II C TIIS: Discrete output barrier [Exia] II C NK: [Exia] II C KCS: [Exia] II C, [Exia D] KR: [Exia] IIC, [Exia] III C (pending)	
Degree of Protection	IP20	IP20
Number of Channels	1, 2, 3, 5, 6, 8, 10	1, 2, 3, 5, 6, 8, 10, 16
Power Voltage	100 to 240V AC (UL rating: 100 ~ 120V AC)	24V DC
Input	Transistor input (sink) Transistor input (source)	Transistor input (sink) Transistor input (source)
Connection	Screw Terminal	Screw Terminal, Connector
Mounting	35-mm-wide DIN rail Panel mounting	35-mm-wide DIN rail Panel mounting
Size (excluding projections)	42W×75H×77.5D (1 channel) 65W×75H×77.5D (2, 3 channels) 110.5W×75H×77.5D (5, 6, 8 channels) 171.5W×75H×77.5D (8, 10 channels)	42W×75H×77.5D (1 channel) 65W×75H×77.5D (2, 3 channels) 110.5W×75H×77.5D (5, 6, 8 channels) 171.5W×75H×77.5D (8, 10, 16 channels (common))
Weight (approx.)	360g (EB3L-S10SAN)	360g (EB3L-S16CSDN)

Switches and Pilot Lights



Page 267

Pilot Light and Miniature Pilot Light
 IP65 (IEC60529) (except for terminals)
 EB3P-LU/IPL1: IP40

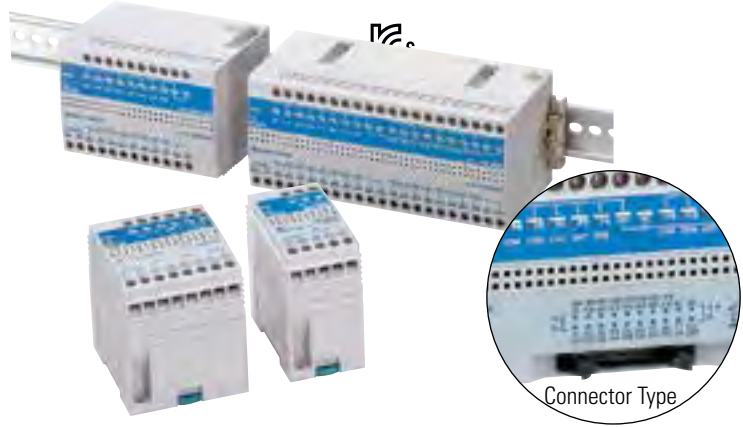
Illuminated Switch
 IP65 (IEC60529) (except for terminals)
 EB3P-LSAW*: IP54

Buzzer
 IP20 (IEC60529) (except for terminals)

Intrinsically Safe: EB3C Discrete Input Barriers

Key features:

- Applicable Standards
IEC60079 compliant
Dry-contact switches can be connected to the EB3C
- 8- and 16-circuit types are available in common wiring types, ideal for connection to PLCs (DC voltage only)
- Universal AC power voltage (100 to 240V AC) or 24V DC power (UL rating: 100 ~ 120V AC)
- No grounding required
- IDEC's original spring-up terminals minimize wiring time
- Installation: 35-mm-wide DIN rail mounting or direct screw mounting
- Global usage
USA: UL/FM
Europe: CE marking,
Global: IECEx ATEX
Japan: TIIS
China: CQST
Korea: KCs
Ship class: NK (Japan), KR (Korea pending)



Entity Barrier Parameters

Ta= 60°C, Um= 250V, (Um=125V UL only), Uo=13.2V, Io= 14.2mA, Po= 46.9mW at each channel
Pn-Nn Io=227.2mA, Po= 750mW at max 16 channels Pn-Nn

Io(mA)	14.2	28.4	42.6	56.8	71.0	85.2	99.4	113.6	127.8	142.0	156.2	170.4	184.6	198.8	213.0	227.2	Combined Lo(mH)	
Po(mW)	46.9	93.8	140.6	187.5	234.3	281.2	328.1	375.9	421.8	468.7	515.5	562.4	609.2	656.1	702.9	750		
Co(μF)	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.53	0.51	0.49	0.47	0.44	0.42	0.39	-	-	1.0	
	0.79	0.77	0.76	0.75	0.73	0.72	0.70	0.69	0.67	0.66	0.64	0.62	0.61	0.59	0.57	0.55	0.5	
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.92	0.91	0.90	0.88	0.87	0.86	0.85	0.84	0.2	
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.1	
Note 1 Added to above table, the next values combined Lo and Co are allowable;																		
Io(mA)	14.2						28.4						227.2					
Lo(mH)	175*	87.5	30.0	2.5	0.55	0.25	43.5*	21.5	20.0	3.5	0.43	0.25	0.68*	0.34	0.68	0.6	0.22	0.13
Co(μF)	0.90*	0.45	0.33	0.54	0.77	0.90	0.90*	0.45	0.30	0.48	0.80	0.90	0.90*	0.45	0.45	0.49	0.80	0.90

Note 2 The intrinsic safe apparatus and wirings shall be accordance to following formulas; for example: $U_i \geq U_o$ $I_i \geq I_o$ $P_i \geq P_o$ $C_i + C_c \leq C_o$ $L_i + L_c \leq L_o$

*: Therefore, the values are allowable only at $L_i \leq 1\%L_o$ and $C_i \leq 1\%C_o$ of the intrinsic safe apparatus. (In the case of 50% of C_o and L_o parameters are applicable, the maximum capacitance allowed shall not be more than $C_o = 1 \mu F$ for IIB and $C_o = 600 nF$ for IIC.)

TIIS, NK only
Ta=60°C, Um=250V

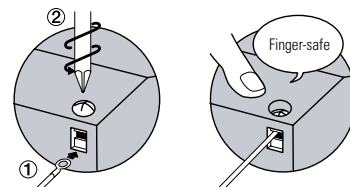
	1 ch Seperate	16 ch Common 16
Uo	13.2V	13.2V
Io	14.2mA	227.2mA
Po	46.9mW	750mW
Co	0.47μF	0.365μF
Lo	87.5mH	0.425mH

Dry Contact Switches

Dry-contact switches can be connected to the EB3C.



Spring-up Fingersafe Terminals Reduce Wiring Time



Connector Type

MIL connector on the non-hazardous side

- Easy connection to PLCs
- Wiring reduced
- Various 20-pin MIL connectors can be connected

Common Wiring for PLC Inputs

8- and 16-circuit types are available in common wiring types, ideal for connection to PLCs (DC voltage only).

Specifications

EB3C Electrical Specifications

Ratings		See Certification Numbers table below	
Degree of Protection		IP20 (IEC60529)	
Installation Location	Discrete Input Barrier	Safe indoor place (non-hazardous area)	
Non-intrinsically Safe Circuit Maximum Voltage (Um)		250V AC 50/60Hz, 250V DC 125V AC 50/60Hz, 125V DC (UL rating)	
Intrinsically Safe Circuits	Wiring Method	1-channel Separate Wiring	16-channel Common Wiring
	Rated Operating Voltage	12V DC $\pm 10\%$	
	Rated Operating Current	10 mA DC $\pm 20\%$	
Non-intrinsically Safe Circuits	Relay Output	Contact Configuration	1NO
		Rated Insulation Voltage (Ui)	250V AC (UL rating: 125V AC), 125V DC
		Thermal Current (Ith)	3A (common terminal: 8A)
		Contact Allowable Power	Resistive Load AC: 750 VA, DC: 72W
			Inductive Load AC: 750 VA ($\cos \phi = 0.3$ to 0.4) DC: 48W (L/R = 7 ms)
		Rated Load	Resistive Load 250V AC 3A, 24V DC 3A
			Inductive Load 250V AC 3A ($\cos \phi = 0.3$ to 0.4) 24V DC 2A (L/R = 7 ms)
		Minimum Applicable Load	0.1V DC, 0.1 mA (reference value)
		Contact Resistance	50 m Ω maximum (initial value)
		ON Time	12 ms maximum (rated voltage)
		OFF Time	10 ms maximum (rated voltage)
		Mechanical Life	20,000,000 operations minimum (at 18,000 operations/hour, without load)
		Electrical Life	100,000 operations minimum (at 1,800 operations/hour, rated load)
		Short-circuit Protection	None
	Transistor Output	Rated Voltage	24V DC
		Maximum Voltage	30V DC
		Maximum Current	100 mA (connector type: 15 mA)
		Leakage Current	0.1 mA maximum
		Voltage Drop	1.5V maximum
		Clamping Voltage	33V (1W)
		Inrush Current	0.5A maximum (1 sec)
		ON Time	0.1 ms maximum (resistive load)
		OFF Time	0.4 ms (typical) (resistive load)
		Short-circuit Protection	None

EB3C General Specifications

	AC	DC
Rated Voltage	100 to 240V AC (UL rating: 100 ~ 120V AC)	24V DC
Allowable Voltage Range	85 to 264V AC (UL rating: 85 ~ 125V AC)	21.6 to 26.4V DC
Rated Frequency	50/60 Hz (allowable range: 47 to 63 Hz)	—
Inrush Current	10A (100V AC) 20A (200V AC)	10A

Dielectric Strength (1 minute, 1 mA)		Between intrinsically safe circuit and non-intrinsically safe circuit: 1526.4V AC Between AC power and output terminal: 1500V AC Between DC power and transistor output terminal: 1000V AC
Operating Temperature		-20 to +60°C (no freezing)
Storage Temperature		-20 to +60°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Atmosphere		800 to 1100 hPa
Pollution Degree		2 (IEC60664)
Insulation Resistance		10 M Ω minimum (500V DC megger, between the same poles as the dielectric strength)
Vibration Resistance	Damage Limits	Panel mounting: 10 to 55 Hz, amplitude 0.75 mm DIN rail mounting: 10 to 55 Hz, amplitude 0.35 mm
	Operation Extremes (relay output only)	Panel mounting: 10 to 55 Hz, amplitude 0.5 mm DIN rail mounting: 10 to 55 Hz, amplitude 0.35 mm
Shock Resistance	Damage Limits	Panel mounting: 500 m/s ² (3 times each on X, Y, Z) DIN rail mounting: 300 m/s ² (3 times each on X, Y, Z)
	Terminal Style	M3 screw terminal
Mounting		35-mm-wide DIN rail or panel mounting (M4 screw)
Power Consumption (approx.)		9.6 VA (EB3C-R10AN at 200V AC) 4.8 W (EB3C-R16CDN at 24V DC)
Weight (approx.)		390g (EB3C-R16CDN)

EB3C Certification Numbers

Certification Organization	Ratings	Certification Number
UL	Class I, II, III Div. 1 Group A, B, C, D, E, F, and G Class I, Zone 0 / [AExia] II C	E234997
FM	Class I, II, III Div. 1 Group A, B, C, D, E, F, and G Class I, Zone 0 / [AExia] II C	3047250
PTB (ATEX)	II(1)G [Exia] II C: Gas Vapour, II(1)D [Exia] III C: Dust	PTB09 ATEX2046
PTB (IEC-EX)	[Exia] II C: Gas, Vapour [Exia] III C: Dust	IECEx PTB10.0015
TIIS Japan	Relay barrier: [Exia] II C Switch (EB9Z-A) : Exia II C T6 Switch (EB9Z-A1) : Exia II B T6	TC 20541 TC15758 TC15961
Class NK	[Exia] II C	TYPE TEST No. 13T606
CQST	[Exia Ga] II C	CNEx 14.0047
KCs	Relay Barrier : [Exia] II C	14-AV4B0-0373
KR	[Exia] IIC	Pending

Class NK is Japan Shipping agency approval, Class KR is Korean shipping agency approval.

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Part Numbers

OI Touchscreens
PLCs
Automation Software
Power Supplies
Sensors
Communication

Discrete Input Barriers

Power Voltage	Connection to Non-intrinsically Safe Circuit	Input Wiring Method	Output		Number of Channels	Part Number	Weight (approx) g
100 to 240V AC (UL rating: 100 ~ 120V AC)	Screw Terminal	Separate/Common Wiring Compatible	Relay		1	EB3C-R01AN	150
					2	EB3C-R02AN	180
					3	EB3C-R03AN	190
					5	EB3C-R05AN	260
					6	EB3C-R06AN	270
					8	EB3C-R08AN	300
					10	EB3C-R10AN	380
					8	EB3C-R08CAN	280
		Separate/Common Wiring Compatible	Transistor (Sink/Source)		1	EB3C-T01AN	140
					2	EB3C-T02AN	170
					3	EB3C-T03AN	180
					5	EB3C-T05AN	250
					6	EB3C-T06AN	260
					8	EB3C-T08AN	320
					10	EB3C-T10AN	340
					8	EB3C-T08CKAN	260
24V DC	Screw Terminal	Separate/Common Wiring Compatible	Relay		16	EB3C-T16CKAN	260
					8	EB3C-T08CSAN	260
					16	EB3C-T16CSAN	260
		Common Wiring Only	Transistor	Sink	8	EB3C-T08CKDN	250
				Source	16	EB3C-T16CKDN	350
			Transistor	Sink	8	EB3C-T08CSDN	250
				Source	16	EB3C-T16CSDN	350
		Separate/Common Wiring Compatible	Transistor (Sink/Source)		1	EB3C-T01DN	120
					2	EB3C-T02DN	160
					3	EB3C-T03DN	170
					5	EB3C-T05DN	240
					6	EB3C-T06DN	250
					8	EB3C-T08DN	250
					10	EB3C-T10DN	320
					8	EB3C-T08CKDN	250
		Common Wiring Only	Transistor	Sink	16	EB3C-T16CKDN	350
				Source	8	EB3C-T08CSDN	250
			Transistor	Sink	16	EB3C-T16CSDN	350
				Source	16	EB3C-T16CSDN	350
	Connector	Common Wiring		Sink	16	EB3C-T16CKD-CN	330
				Source	16	EB3C-T16CSD-CN	330

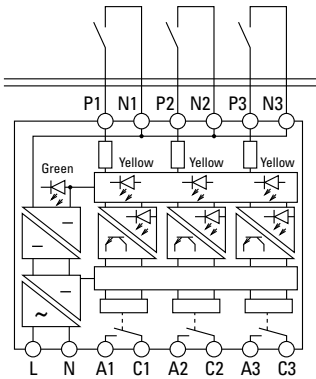
Accessories

Item	Part Number	Description
DIN Rail	BAP1000	Steel (1m long, 7.5mm high)
	BAA1000	Aluminum (1m long, 10.5mm high)
End Clip	BNL6	Medium DIN rail end clip
Static Electricity Caution Plate	EB9Z-N1	Polyester 20 (W) x 6 (H) mm

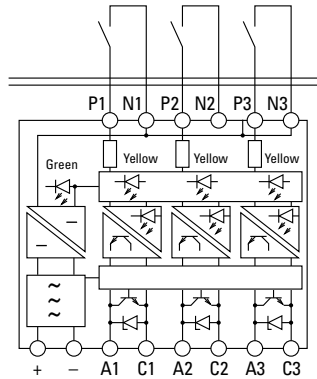
Circuit Diagrams

Internal Circuit Block Diagrams

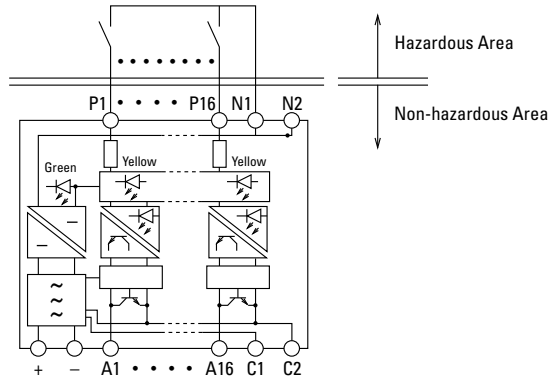
AC Power, Relay Output Type



DC Power, Transistor Output Type



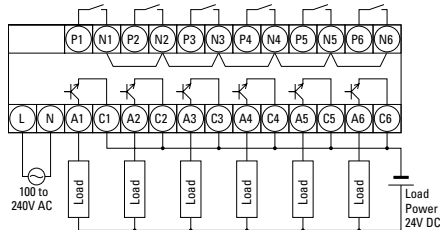
Connector Wiring, Sink Output Type



Wiring Examples

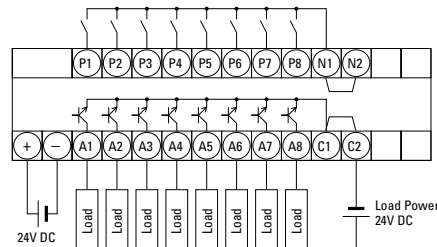
External Wiring Examples

Transistor Output Type (Ex.: EB3C-T06AN)

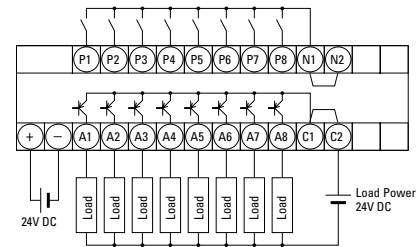


Note: On the sink/source transistor output type, terminals A can be used as a positive common line.

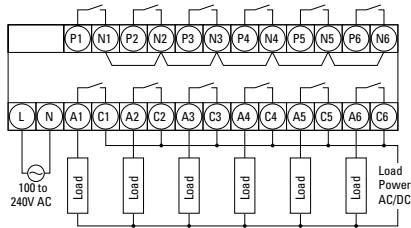
Transistor Sink Output Type (Ex.: EB3C-T08CKDN)



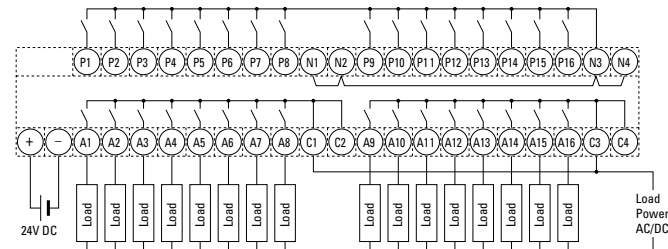
Transistor Source Output Type (Ex.: EB3C-T08CSDN)



Relay Output Type (Ex.: EB3C-R06AN)

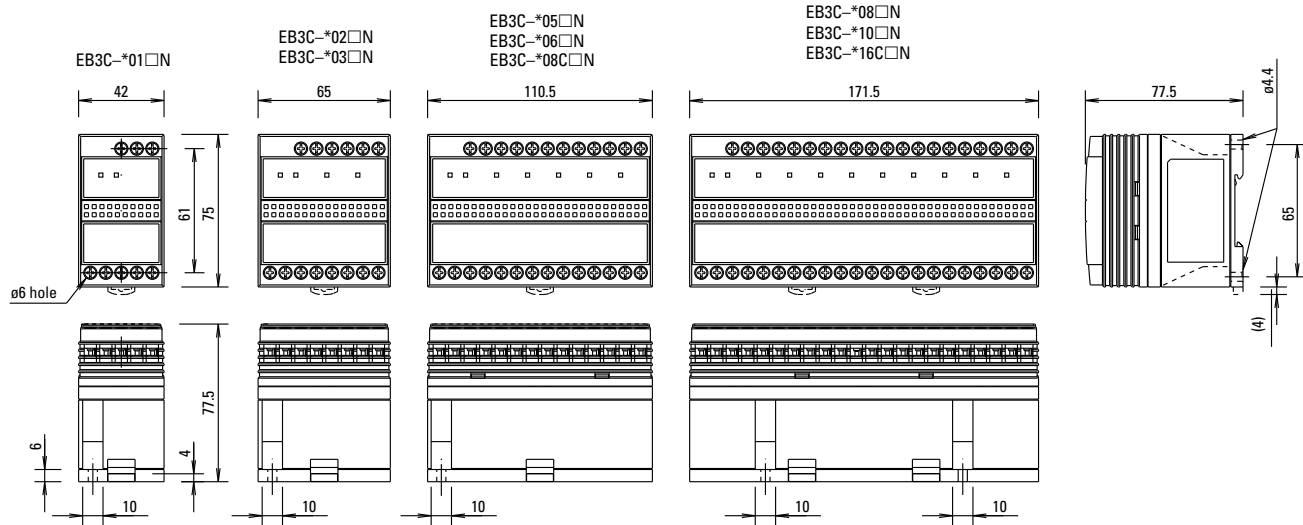


Relay Output Common Wiring Type (Ex.: EB3C-R016CDN)

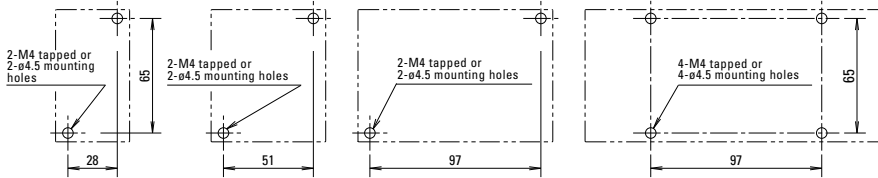


Dimensions (mm)

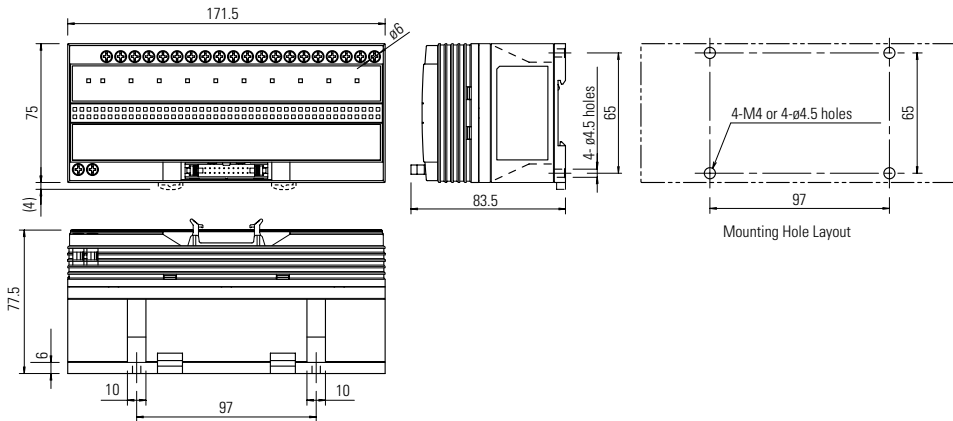
Screw Terminal



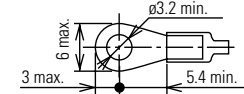
Mounting Hole Layout (Screw Mounting)



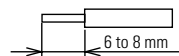
Connector Type



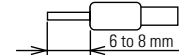
Applicable Crimping Terminal



Solid Wire - Strip wire end

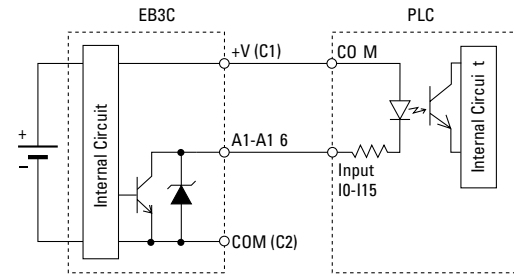
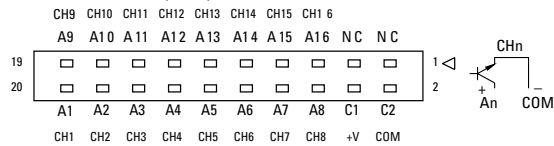


Stranded Wire - use a ferrule

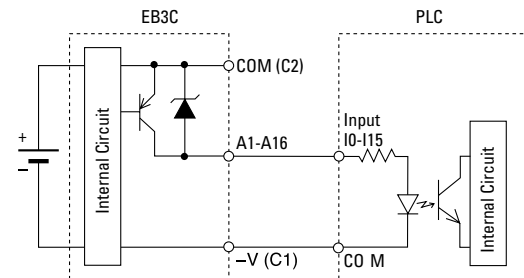
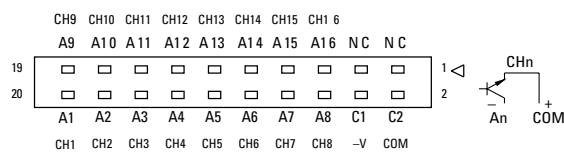


Connector Wiring Terminal Arrangement

EB3C-T16CKD-CN (Sink)



EB3C-T16CSD-CN (Source)



EB3C-T16CKD-CN

FC4A-N16B3

EB3C-T16CSD-CN

FC4A-N16B3

Terminal	Output	Input	Terminal	Terminal	Output	Input	Terminal
20	A1	I0	20	20	A1	I0	20
19	A9	I10	19	19	A9	I10	19
18	A2	I1	18	18	A2	I1	18
17	A10	I11	17	17	A10	I11	17
16	A3	I2	16	16	A3	I2	16
15	A11	I12	15	15	A11	I12	15
14	A4	I3	14	14	A4	I3	14
13	A12	I13	13	13	A12	I13	13
12	A5	I4	12	12	A5	I4	12
11	A13	I14	11	11	A13	I14	11
10	A6	I5	10	10	A6	I5	10
9	A14	I15	9	9	A14	I15	9
8	A7	I6	8	8	A7	I6	8
7	A15	I16	7	7	A15	I16	7
6	A8	I7	6	6	A8	I7	6
5	A16	I17	5	5	A16	I17	5
4	+V	COM	4	4	-V	COM	4
3	NC	COM	3	3	NC	COM	3
2	COM	NC	2	2	COM	NC	2
1	NC	NC	1	1	NC	NC	1



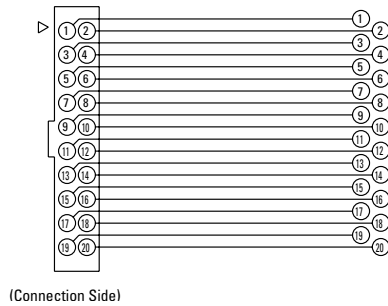
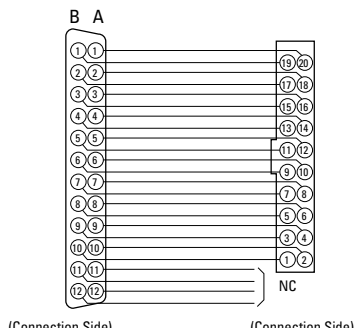
Note: The wiring in dashed line does not affect the operation of the EB3C.

Applicable connector is IDEC JE1S-201.

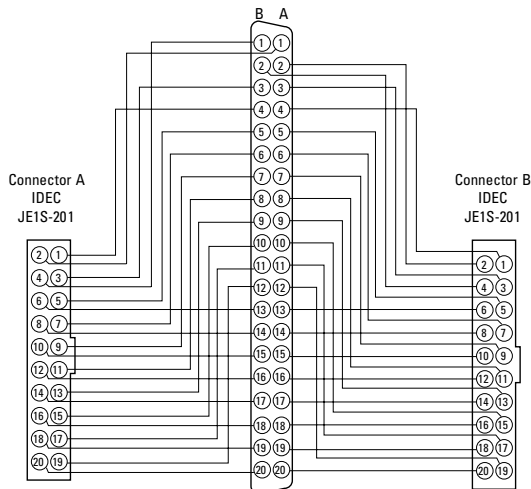
Output power for PLC outputs is supplied by the EB3C, therefore the PLC output does not need an external power supply.

Recommended Connector Cable for Connector Types

Description	No. of Poles	Length (m)	Part Number	Shape	Applicable Type
I/O Terminal Cable	With Shield	0.5	FC9Z-H050A20		IDEC MicroSmart I/O Module
		1	FC9Z-H100A20		
		2	FC9Z-H200A20		
	Without Shield	0.5	FC9Z-H050B20		IDEC MicroSmart I/O Module
		1	FC9Z-H100B20		
		2	FC9Z-H200B20		
Cable with Crimping Terminal	20	3	FC9Z-H300A20		Screw Terminal
		0.5	FC9Z-H050B20		
		1	FC9Z-H100B20		
40-pin Cable for PLC	20	2	FC9Z-H200B20		Screw Terminal
		3	FC9Z-H300B20		
		1	BX9Z-H100E4		Mitsubishi A Series Input Module (positive common) ↓ EB3C-T16CKD-CN
	20	2	BX9Z-H200E4		
		3	BX9Z-H300E4		
	20	1	BX9Z-H100B		Mitsubishi A Series Input Module (positive common) ↓ EB3C-T16CKD-CN
		2	BX9Z-H200B		
		3	BX9Z-H300B		

FC9Z-H□□□A, FC9Z-H□□□B
Internal ConnectionFujitsu Connector
FCN-367J024-AU/FIDEC Connector
JE1S-201IDEC Connector
JE1S-201Y-shaped Compression
Terminal
(Marking Tube No.)

BX9Z-H□□□B Internal Connection

Fujitsu Connector
FCN-367J040-AU/F

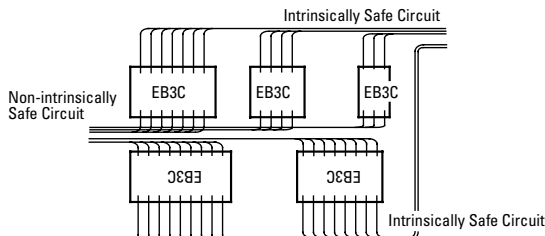
Installing the EB3C Intrinsically Safe Barriers

1. The EB3C can be installed in any direction.
2. Install the EB3C intrinsically safe barrier in a safe area (non-hazardous area) in accordance with intrinsic safety ratings and parameters. To avoid mechanical shocks, install the EB3C in an enclosure which suppresses shocks.
3. When installing or wiring the EB3C, prevent electromagnetic and electrostatic inductions in the intrinsically safe circuit. Also prevent the intrinsically safe circuits from contacting with another intrinsically safe circuit and any other circuits.

Maintain at least 50mm clearance, or provide a metallic separating board between the intrinsically safe circuit and non-intrinsically safe circuit. When providing a metallic separating board, make sure that the board fits closely to the enclosure (top, bottom, and both sides). Allowable clearance between the enclosure and board is 1.5mm at the maximum.

The clearance of 50mm between the intrinsically safe circuit and non-intrinsically safe circuit may not be sufficient when a motor circuit or high-voltage circuit is installed nearby. In this case, provide a wider clearance between the circuits referring to 5 (3) "Minimum Parallel Distance between the Intrinsically Safe Circuit and Other Circuits."

4. In order to prevent contact between intrinsically safe circuits and non-intrinsically safe circuits, mount EB3C units with terminals arranged in the same direction.



5. Maintain at least 6mm (or 3mm according to IEC60079-11: 1999) clearance between the terminal of an intrinsically safe circuit and the grounded metal part of a metal enclosure, and between the relay terminal block of an intrinsically safe circuit and the grounded metal part of a metal enclosure.
6. For installing the EB3C, mount on a 35mm-wide DIN rail or directly on a panel using screws. Make sure to install securely to withstand vibration. When mounting on a DIN rail, push in the clamp completely. Use the BNL6 end clips on both sides of the EB3C to prevent from moving sideways.
7. Excessive extraneous noise may cause malfunction and damage to the EB3C. When extraneous noise activates the voltage limiting circuit (thyristor), remove the noise source and restore the power.

Terminal Wiring

1. Using a $\phi 5.5\text{mm}$ or smaller screw driver, tighten the terminal screws (including unused terminal screws) to a torque of 0.6 to 1.0N·m (recommended value).
2. Make sure that IP20 is achieved when wiring. Use insulation tubes on bare crimping terminals.
3. To prevent disengaged wires from contacting with other intrinsically safe circuits, bind together the wires of one intrinsically safe circuit.
4. When the adjacent terminal is connected to another intrinsically safe circuit, provide an insulation distance of at least 6mm.

Switches in the Hazardous Area

1. A switch contains the switch contact, enclosure, and internal wiring. A switch contact refers to an ordinary switching device which consists of contacts only, such as a pushbutton switch. See below.

Applicable Switches

Control Switches	Push-pull Switches	Pushbutton, Foot, Trigger, Rocker, Grip
	Twisting Switches	Rotary, Selector, Cam, Drum, Thumb wheel
	Lever and Slide Switches	Toggle, Multidirectional, Wobble stick, Lever, Slide switch
Sensing Switches	Displacement Switches	Microswitch, Limit, Magnetic proximity, Door, Reed, Mercury
	Level Switches	Liquid level
	Others	Pressure, Temperature

Note: For installation in hazardous areas and connection to the EB3C, use switches which are certified, approved, or considered to be simple apparatus in relevant standards in each country.

2. When the switch has internal wiring or lead wire, make sure that the values of internal inductance (Li) and capacitance (Ci) are within the certified values.
3. Enclose the switch contact's bare, live part in an enclosure of IP20 or higher protection.
4. Depending on the explosion-protection specifications according to TIIS, the exposed area of the plastic switch operator is limited as follows:
 Exia II CT6 (EB9Z-A): 20cm² maximum
 Exia II BT6 (EB9Z-A1): 100cm² maximum
5. Attach the certification mark supplied with the EB3C on the EB9Z-A or EB9Z-A1 switch (for Japanese applications).
6. When the switch operator of the plastic enclosure has a wider exposed area than the following limits, attach a caution label.

- II C: 20 cm² maximum
 II B: 100 cm² maximum

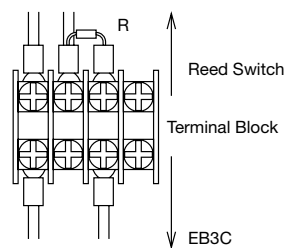
Caution
 To prevent electrostatic charges, do not rub the switch surface during operation.
 Use a soft cloth dipped with water for cleaning.

Caution Label Example

7. For the 1-circuit separate wiring, a resistor to prevent reed switch contact welding and an LED miniature pilot light can be connected in series with the contact. See below. Use the terminal screw of M3 or larger.

Applicable Resistor Ratings

Resistance	100Ω maximum
Rated Wattage	0.5 to 3W
Type	Metal (oxide) film resistors



IPL1 series LED miniature pilot lights Output Specifications

1. When wiring the output from the EB3C, connect the non-intrinsically safe circuit to terminals A and C. The EB3C output circuit is not equipped with short-circuit protection. If required, provide a protection in the external circuit.
2. Relay Output

Some types of loads generate reverse emf (such as solenoids) or cause a large inrush current (incandescent lamps), resulting in a shorter operation life of output relay contacts. The operation life of contacts can be extended by preventing the reverse emf using a diode, RC, or varistor, or by suppressing the inrush current using a resistor or RL.

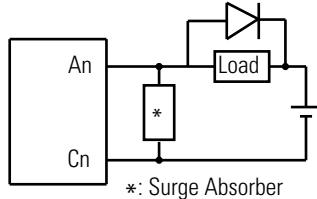
Contacts are made of gold-clad silver. When using at a small current and a low voltage (reference value: 0.1mA, 0.1V), test the contact on the actual circuit in advance.

3. Transistor Output

When connecting a small load, the load may not turn off because of a leakage current, even though the transistor output is turned off. If this is the case, connect a resistor in parallel with the load to bypass the leakage current.

When an excessively high voltage (clamps at 33V, 1W) or a reverse voltage is applied to the output terminals, the clamping circuit or output transistor may be damaged.

When driving an inductive load, be sure to connect a diode across the load to absorb reverse emf.



*: Surge Absorber

Example of Overvoltage Absorption Circuit

4. In the common wiring only types, the output terminals are not isolated from each other.
5. When connecting the connector type EB3C's in parallel, use one power supply to power the EB3C's. Do not connect any wiring to the C1 and C2 terminals.

Wiring for Intrinsic Safety

1. The voltage applied on the general circuit connected to the non-intrinsically safe circuit terminals of the EB3C relay barrier must be 250V AC, 50/60Hz, or 250V DC at the maximum under any conditions, including the voltage of the input power and the internal circuit.
2. When wiring, take into consideration the prevention of electromagnetic and electrostatic charges on intrinsically safe circuits. Also, prevent intrinsically safe circuits from contacting with other circuits.
3. The intrinsically safe circuits must be separated from non-intrinsically safe circuits. Contain intrinsically safe circuits in a metallic tube or duct, or separate the intrinsically safe circuits referring to the table below.

Note: Cables with a magnetic shield, such as a metallic sheath, prevent electromagnetic induction and electrostatic induction, however, a non-magnetic shield prevents electrostatic induction only. For non-magnetic shields, take a preventive measure against electromagnetic induction.

Finely twisted pair cables prevent electromagnetic induction. Adding shields to the twisted pair cables provides protection against electrostatic induction.

Minimum Parallel Distance between the Intrinsically Safe Circuit and Other Circuits (mm)

Voltage and Current of Other Circuits	Over 100A	100A or less	50A or less	10A or less
Over 440V	2000	2000	2000	2000
440V or less	2000	600	600	600
220V or less	2000	600	600	500
110V or less	2000	600	500	300
60V or less	2000	500	300	150

4. When identifying intrinsically safe circuits by color, use light blue terminal blocks and cables.
5. When using two or more EB3C's to set up one intrinsically safe circuit in the common wiring configuration, interconnect two neutral terminals (N1 through N10) on each EB3C between adjacent EB3C's in parallel.
6. Make sure that the power of the EB3C and contact are turned off before starting inspection or replacement.
7. When wiring the intrinsically safe circuit, determine the distance to satisfy the wiring parameters shown below. Note that parameters are different

between separate wiring and common wiring.

- a. Wiring capacitance $C_w \leq C_o - (C_i + N \times 2 \text{ nF})$
 C_o : Maximum external capacitance of the EB3C
 C_i : Internal capacitance of the switch
 N : The number of switches connected in series or parallel (the number is infinite)
- b. Wiring inductance $L_w \leq L_o - (L_i + N \times 5 \text{ } \mu\text{H})$
 L_o : Maximum external inductance of the EB3C
 L_i : Internal inductance of the switch
 N : The number of switches connected in series or parallel (the number is infinite)
- c. Wiring resistance $\leq R_w$
 R_w : Allowable wiring resistance
- d. Allowable wiring distance D (km) is the smallest value of those calculated from the capacitance, inductance, and resistance.

$D \leq C_w/C$
 $D \leq L_w/L$
 $D \leq R_w/2R$

C (nF/km): Capacitance of cable per km
 L (mH/km): Inductance of cable per km
 R (Ω /km): Resistance of cable per km

Note: For the details of wiring the intrinsically safe circuits, refer to a relevant test guideline for explosion-proof electric equipment in each country.

8) Applicable Wire Size

0.5 to 2.0mm² (AWG20 to AWG14): two wires

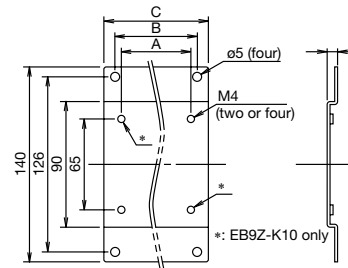
However, one wire for 2.0 mm² (AWG14)

Mounting Bracket

The following mounting brackets can be used to install the EB3C relay barriers and EB3L lamp barriers on the mounting holes of IBRC contact signal transducer, IBPL pilot relay barrier, and IBZ buzzer.

No. of Channels	Part No.	Dimension (mm)		
		A	B	C
1	EB9Z-K01	28.0	44.0	61.0
2	EB9Z-K02	51.0	59.5	76.0
3	EB9Z-K03	51.0	75.0	91.5
5	EB9Z-K05	97.0	105.0	122.0
6	EB9Z-K06	97.0	120.0	137.0
10	EB9Z-K10	97.0	181.0	198.0

Dimensions



All dimensions in mm.

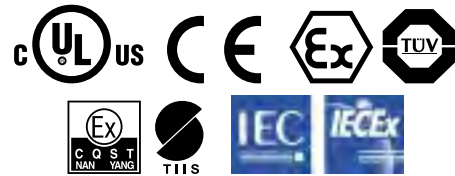
EB3N Discrete Input Barrier with Redundant Output

Build a safety system in an explosive atmosphere.

Key features:

Safety Performance Performance level e Category 4

- [Exia] II C
- Ensures safety and machine safety in an explosive atmosphere
- Machine safety system can be built in compliance with ISO13849-1 Category 4, Performance level e.
- Safety input devices applicable in any explosive gas and hazardous areas are available.
- Available with auxiliary inputs (5 points) used to monitor the operating status of safety input devices
- Global usage
USA (UL),
Global IEC-Ex,
Europe (ATEX),
Japan (TIS),
China (CQST)
Machine safety: TÜV Rheinland
- No grounding required



Entity Barrier Parameters

Ta= 60°C, Um= 250V, (Um=125V UL only), Uo=13.2V, Io= 14.2mA, Po= 46.9mW at each channel
Pn-Nn Io=227.2mA, Po= 750mW at max 16 channels Pn-Nn

Io(mA)	14.2	28.4	42.6	56.8	71.0	85.2	99.4	113.6	127.8	142.0	156.2	170.4	184.6	198.8	213.0	227.2	Combined
Po(mW)	46.9	93.8	140.6	187.5	234.3	281.2	328.1	375.9	421.8	468.7	515.5	562.4	609.2	656.1	702.9	750	Lo(mH)
Co(μF)	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.53	0.51	0.49	0.47	0.44	0.42	0.39	-	-	1.0
	0.79	0.77	0.76	0.75	0.73	0.72	0.70	0.69	0.67	0.66	0.64	0.62	0.61	0.59	0.57	0.55	0.5
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.92	0.91	0.90	0.88	0.87	0.86	0.85	0.84	0.2
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.1
Note 1 Added to above table, the next values combined Lo and Co are allowable;																	
Io(mA)	14.2				28.4				227.2								
Lo(mH)	175*	87.5	30.0	2.5	0.55	0.25	43.5*	21.5	20.0	3.5	0.43	0.25	0.68*	0.34	0.68	0.6	0.22 0.13
Co(μF)	0.90*	0.45	0.33	0.54	0.77	0.90	0.90*	0.45	0.30	0.48	0.80	0.90	0.90*	0.45	0.45	0.49	0.80 0.90

Note 2 The intrinsic safe apparatus and wirings shall be accordance to following formulas; for example: $U_i \geq U_o$ $I_i \geq I_o$ $P_i \geq P_o$ $C_i + C_c \leq C_o$ $L_i + L_c \leq L_o$

*: Therefore, the values are allowable only at $L_i \leq 1\%L_o$ and $C_i \leq 1\%C_o$ of the intrinsic safe apparatus. (In the case of 50% of C_o and L_o parameters are applicable, the maximum capacitance allowed shall not be more than $C_o = 1 \mu F$ for IIB and $C_o = 600 nF$ for IIC.)

TiISI only
Ta=60°C, Um=250V

	1 ch Seperate	5 ch Common
Uo	13.2V	13.2V
Io	14.2mA	227.2mA
Po	46.9mW	750mW
Co	0.47μF	0.28μF
Lo	87.5mH	0.56mH

Discrete Input Barrier with Redundant Output

2	2NO	Without	Without	Auto reset (Auto start)	EB3N-A2ND
				Manual reset (Manual start)	EB3N-M2ND
2	2NO	5 (1 common)	5NO (1 common)	Auto reset (Auto start)	EB3N-A2R5D
				Manual reset (Manual start)	EB3N-M2R5D

1. A maximum of five monitor contacts from safety input devices can be connected to the auxiliary input terminals. In addition, non-safety input devices can also be connected to the auxiliary input terminals.
2. On auto reset (auto start) models, when the safety condition is met (two safety inputs are both on), safety outputs are turned on automatically.
Connect the reset (start) input terminals Y1 and Y2 together except for the following cases:
When connecting a contactor or force guided relay to the safety output of the EB3N, connect the NC contacts of the contactor or force guided relay to the reset (start) input terminals Y1 and Y2 of the EB3N for use as a backcheck input signal.
3. On manual reset (manual start) models, while the safety condition is met (two safety inputs are both on), safety outputs are turned on at the falling edge of the reset switch (start switch) signal (OFF → ON → OFF) (start off check).
Manual reset (manual start) models have a monitoring function of reset switch contacts (detection of welded contacts). Use NO contacts of a momentary switch for the reset (start) input.
When connecting a contactor or force guided relay to the safety output of the EB3N, connect the NC contacts of the contactor or force guided relay to the reset (start) input terminals Y1 and Y2 of the EB3N for use as a backcheck input signal.

Selection Guide

1. Selecting the reset (start) function

Auto reset (auto start): Select this model when connecting safety control devices, such as safety relay modules or safety controllers, to the EB3N safety outputs to set up a safety system, using the reset (start) function of the safety control device.

Select this model when connecting contactors or force guided relays to the EB3N safety outputs to set up a safety system, and a risk assessment on the entire system has not found any safety problem in using auto reset (auto start).

Manual reset (manual start): Select this model when connecting contactors or force guided relays to the EB3N safety outputs to set up a safety system, and a risk assessment on the entire system has found that manual reset (manual start) is necessary.

2. Selecting the auxiliary outputs

Without auxiliary outputs: Select this model when the operating status of safety input devices are not monitored.

With auxiliary outputs: Select this model when the operating status of safety input devices are monitored or when non-safety input devices are also connected.

Specifications

EB3N General Specifications

Rated Power Voltage			24V DC
Power Voltage Range			20.4 to 26.4V DC
Operating Temperature			−20 to +60°C (no freezing) UL: −20 to +40°C (no freezing)
Operating Humidity			45 to 85% RH (no condensation)
Power Consumption	Without auxiliary output		5.5W maximum
	With auxiliary output		7.0W maximum
Safety Output	Contacts	13-14, 23-24	2NO
	Rated Load	Resistive	30V DC, 1A
		Inductive	DC-13, 24V, 1A
	Response (rated voltage)	Turn on	100 ms maximum
		Turn off	20 ms maximum
Auxiliary Output	Contacts	A* - C1	5NO/1 common
	Rated Load	Resistive	24V DC, 3A, common terminal 5A max.
	Response (rated voltage)	Turn on	15 ms maximum
		Turn off	10 ms maximum
Mounting			DIN rail or panel mounting

 *: Channel Numbers: 1 to 5

EB3N Safety Specifications

Category	4
Performance Level (PL)	e
Mean Time to Dangerous Failure (MTTFd)	100 years
Diagnostic Range	99% minimum



Calculation conditions for MTTFd

t_{cycle} : Mean operation cycle = 1 hour

h_{op} : Mean operation hours per day = 24 hours

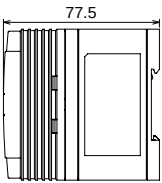
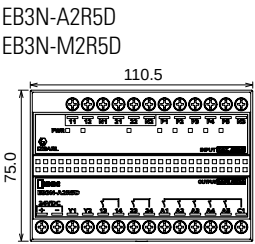
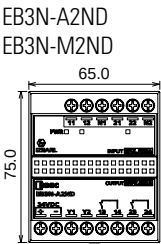
d_{op} : Mean operation days per year = 365 days

Note: When t_{cycle} is shorter than 1 hour, MTTFd will decrease

EB3N Certifications

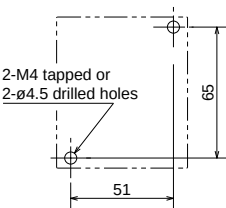
Certification Organization	Ratings	Certification Number
UL	Class I, Zone 0, [AExia] II C Class I, II, III, Div. 1, Groups A, B, C, D, E, F and G	E234997
PTB (IEC-Ex)	[Exia] II C, [Exia D]	IEC Ex PTB 10.0015
PTB (ATEX)	II (1) G [Exia] II C II (1) D [Exia D]	PTB 09 ATEX 2046
TIIS	Discrete Input Barriers with Redundant Output [Exia] II C Switch (EB9Z-A) Exia II CT6 Switch (EB9Z-A1) Exia II BT6	TC18753 TC15758 TC15961
CQST	[Exia] IIC	CNEx11.0038

Dimensions (mm)

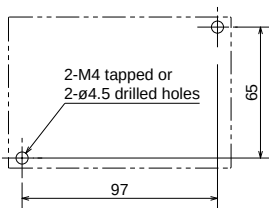


Mounting Hole Layout

EB3N-A2ND
EB3N-M2ND



EB3N-A2R5D
EB3N-M2R5D



Terminal Functions

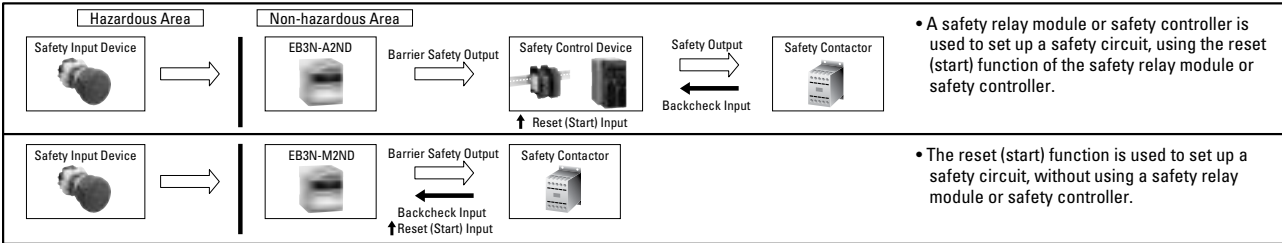
24V DC	Power
Y1-Y2	Reset input (Start input)
11-12	Safety input 1
21-22	Safety input 2
N1, N2	Signal ground
P*-N3	Auxiliary input
13-14	Safety output 1
23-24	Safety output 2
A*-C1	Auxiliary output



*: 1 to 5

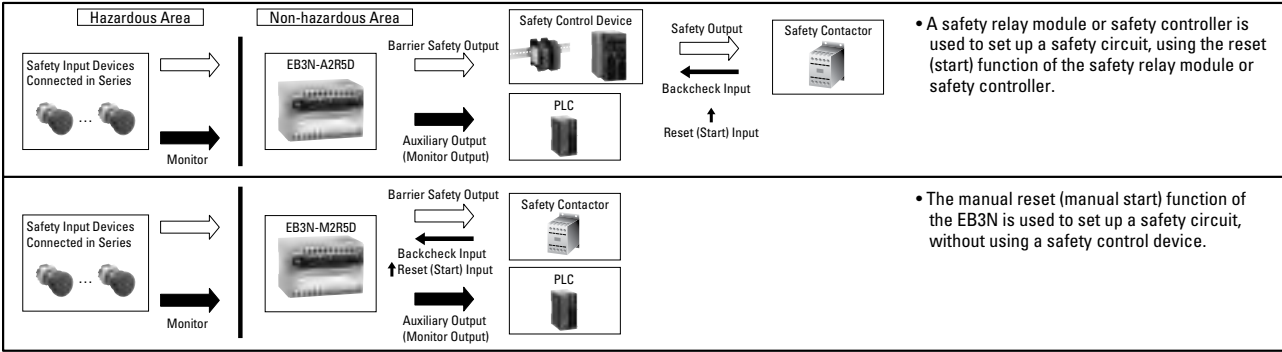
EB3N System Configuration Examples

1:1 connection with a safety input device, compliant with Category 4

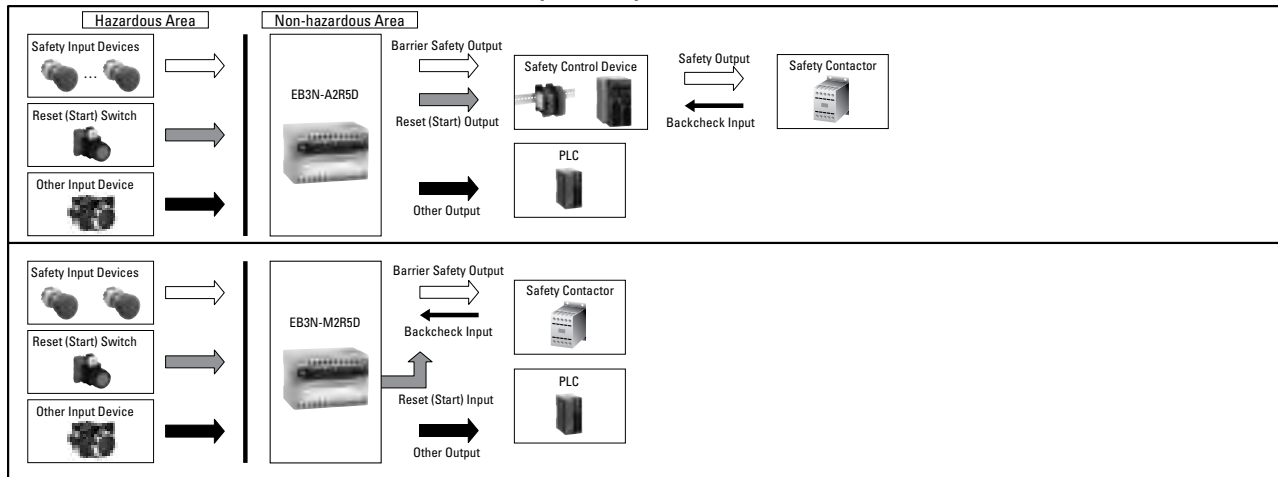


Connection with multiple safety input devices, capable of monitoring up to 5 contact operations, compliant with Category 3

For monitoring operating statuses of safety input devices located in a non-hazardous area



Installing a reset switch in a hazardous area, using auxiliary input and output



Safety Input Devices Connectable to Safety Input Terminals (Examples)

Emergency stop switch: (Non-illuminated) XW1E-BV402M-R, XN4E-BL412MRH
 Safety switch: HS6B-02B05, HS1B-02R

Instructions

Notes for Operation

1. Do not disassemble, repair, or modify the EB3N discrete input barrier with redundant output, otherwise the safety characteristics may be impaired.
2. Use the EB3N within its specification values.
3. The EB3N can be mounted in any direction.
4. Mount the EB3N on a 35-mm-wide DIN rail or directly on a panel surface using screws. When mounting on a DIN rail, push in the clamp and use end clips to secure the EB3N. When mounting on a panel surface, tighten the screws firmly.
5. Excessive noise may cause malfunction or damage to the EB3N. When the internal voltage limiting circuit (thyristor) has shut down the power due to noise, remove the cause of the noise before powering up again.
6. The internal power circuit contains an electronic fuse to suppress overcurrents. When the electronic fuse has tripped, shut down the power, remove the cause of the overcurrent before powering up again.
7. Use crimping terminals with insulation sheath for wiring. Tighten the terminal screws, including unused terminal screws, to a recommended tightening torque of 0.6 to N·m using a screwdriver of $\phi 5.5$ mm in diameter.
8. Before inspecting or replacing the EB3N, turn off the power.

Notes for Machine Safety

1. Operate the safety input device to check the EB3N functionality everyday.
2. For safety input devices, such as safety switches or emergency stop switches, connected to the EB3N, use safety standard-compliant devices with direct opening action and 2NC contacts.
3. Do not use the auxiliary input as a safety input.
4. For safety control devices connected with the EB3N, use machine safety standard-compliant devices with a disparity detection function.
5. Use safety inputs and safety outputs in a circuit configuration compliant with safety requirements.
6. To calculate the safety distance, take into consideration the response time of all devices comprising the system, such as the EB3N and safety devices connected to the EB3N.
7. Separate the input and output wiring from power lines and motor lines.
8. When using multiple EB3N discrete input barriers with redundant output, do not connect one switch to more than one EB3N. Use separate switches for each EB3N.
9. To ensure EMC, use shielded cables for safety inputs and auxiliary inputs. Connect the shield to the FG of the control panel on which the EB3N is mounted.
10. For protection against overcurrents, connect an IEC60127-2-compliant 2A fast-blow fuse (5×20 mm).
11. Evaluate the ISO 13849-1 category and performance level in consideration of the entire system.

Safety Notes

1. Install the EB3N in an enclosure capable of protecting against mechanical shocks at a hazardous location in accordance with intrinsic safety ratings and parameters.
2. Install and wire the EB3N so that the EB3N is not subject to electromagnetic and electrostatic induction and does not contact with other circuits. For example, keep a minimum spacing of 50 mm between intrinsically safe and non-intrinsically safe circuits, or provide a metallic separating board between the intrinsically safe circuit and non-intrinsically safe circuit. When providing a metallic separating board, make sure that the board fits closely to the enclosure (top, bottom, and both sides). Allowable clearance between the board and the enclosure is 1.5 mm at the maximum.
When a motor circuit or high-voltage circuit is installed nearby, keep a wider spacing than 50 mm between intrinsically safe and non-intrinsically safe circuits.
3. Keep a minimum spacing of 3 mm between the terminal or relay terminal block of the intrinsically safe circuit and the grounded metal parts of the metal enclosure.
4. Connect the terminals so that IP20 is ensured.
5. To prevent disengaged wires from contacting with other intrinsically safe circuits, bind together the end of wires.
6. Make sure that the voltage of the power supply for the devices connected to the non-intrinsically safe circuit or the internal voltage of such devices does not exceed 250V AC/DC 50/60 Hz (UL rating: 125V AC 50/60 Hz) or 250V DC (UL rating: 200V DC) under any normal and abnormal conditions.
7. Make sure that the wiring of intrinsically safe circuits does not contact with other circuits or is not subject to electromagnetic and electrostatic inductions, otherwise protection from hazards is not ensured.
8. When identifying intrinsically safe circuits by color, use light blue terminal blocks and cables.
9. When wiring the intrinsically safe circuit, determine the distance to satisfy the wiring parameters shown below.
 - a) Wiring capacitance $C_w \leq C_o - C_i$
 - C_o : Intrinsically safe circuit allowable capacitance
 - C_i : Internal capacitance of switches
 - b) Wiring inductance $L_w \leq L_o - L_i$
 - L_o : Intrinsically safe circuit allowable inductance
 - L_i : Internal inductance of switches
 - c) Wiring resistance $\leq R_w$
 - R_w : Allowable wiring resistance

Switches in the Hazardous Area

1. A switch contains the switch contact, enclosure, and internal wiring. A switch contact refers to an ordinary switching device which consists of contacts only.
2. When the switch has internal wiring or lead wire, make sure that the values of internal capacitance (C_i) and inductance (L_i) are within the certified values.
3. Enclose the bare live part of the switch contact in an enclosure of IP20 or higher protection.

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

EB3L Discrete Output Barriers

126 types of pilot lights and buzzers can be connected. Illuminated pushbuttons and illuminated selector switches can be connected by combining with the EB3C discrete input barrier. No grounding required.

Key features:

Ratings	
Discrete Output Barrier	[Exia] II C
Pilot Light (separate wiring)	Exia II CT6
Pilot Light (common wiring)	Exia II CT4
Illuminated Pushbutton	Exia II CT4
Illuminated Selector Switch	Exia II CT4
Buzzer (separate wiring)	Exiab II CT6

- IEC60079 compliant
- Compact and lightweight
- 8- and 16-channel types are available in common wiring types, ideal for connection to PLCs. 16-circuit types are also available with a connector.
- Universal AC power voltage (100 to 240V AC or 24V DC power [UL rating: 100 ~ 120V AC])
- No grounding required
- IDEC's original spring-up terminal minimizes wiring time.
- Installation, 35-mm-wide DIN rail mounting or direct screw mounting
- $\phi 6$, $\phi 8$, $\phi 10$, $\phi 22$ and $\phi 30$ pilot lights available
- Illuminated pushbuttons and illuminated selector switches can be connected by combining with the EB3C discrete input barrier. Illumination colors: Amber, blue, green, red, white, and yellow (pushlock turn reset type: red only)
- Continuous and intermittent sound types are available for buzzers ($\phi 30$).
- Global usage
 - USA: UL/FM
 - Europe: CE marking
 - Global: IECEx, ATEX
 - Japan: TIIS
 - China: CQST
 - Korea: KCs
- Ship class: NK (Japan), KR (Korea)

Entity Barrier Parameters

$T_a = 60^\circ\text{C}$, $U_m = 250\text{V}$, ($U_m = 125\text{V}$ UL only), $U_o = 13.2\text{V}$, $I_o = 14.2\text{mA}$, $P_o = 46.9\text{mW}$ at each channel
 $P_n - N_n I_o = 227.2\text{mA}$, $P_o = 750\text{mW}$ at max 16 channels $P_n - N_n$

Io(mA)	14.2	28.4	42.6	56.8	71.0	85.2	99.4	113.6	127.8	142.0	156.2	170.4	184.6	198.8	213.0	227.2	Combined	
Po(mW)	46.9	93.8	140.6	187.5	234.3	281.2	328.1	375.9	421.8	468.7	515.5	562.4	609.2	656.1	702.9	750	Lo(mH)	
Co(μF)	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.53	0.51	0.49	0.47	0.44	0.42	0.39	-	-	1.0	
	0.79	0.77	0.76	0.75	0.73	0.72	0.70	0.69	0.67	0.66	0.64	0.62	0.61	0.59	0.57	0.55	0.5	
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.92	0.91	0.90	0.88	0.87	0.86	0.85	0.84	0.2	
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.1	
Note 1 Added to above table, the next values combined Lo and Co are allowable;																		
Io(mA)	14.2						28.4						227.2					
Lo(mH)	175*	87.5	30.0	2.5	0.55	0.25	43.5*	21.5	20.0	3.5	0.43	0.25	0.68*	0.34	0.68	0.6	0.22	0.13
Co(μF)	0.90*	0.45	0.33	0.54	0.77	0.90	0.90*	0.45	0.30	0.48	0.80	0.90	0.90*	0.45	0.45	0.49	0.80	0.90

Note 2 The intrinsic safe apparatus and wirings shall be accordance to following formulas; for example: $U_i \geq U_o$ $I_i \geq I_o$ $P_i \geq P_o$ $C_i + C_c \leq C_o$ $L_i + L_c \leq L_o$

*: Therefore, the values are allowable only at $L_i \leq 1\%L_o$ and $C_i \leq 1\%C_o$ of the intrinsic safe apparatus. (In the case of 50% of C_o and L_o parameters are applicable, the maximum capacitance allowed shall not be more than $C_o = 1 \mu\text{F}$ for IIB and $C_o = 600 \text{ nF}$ for IIC.)

Common Wiring for PLC Inputs

8- and 16-circuit types are available in common wiring types, ideal for connection to PLCs (DC voltage only).

Connector Type

MIL connector on the non-hazardous side

- Easy connection to PLCs
- Wiring is reduced by 90%
- Various 20-pin MIL connectors can be connected.

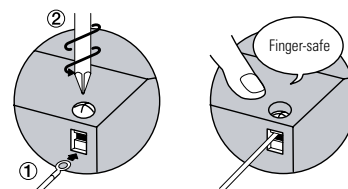


Illuminated Pushbutton/Selector Switches

Illuminated pushbutton/selector switches can be used with the combination of EB3C and EB3L.



Spring-up Fingersafe Terminals Reduce Wiring Time



TIIS, NK only
 $T_a = 60^\circ\text{C}$, $U_m = 250\text{V}$

	1 ch Separate	16 ch Common 16
U_o	13.2V	13.2V
I_o	14.2mA	227.2mA
P_o	46.9mW	750mW
C_o	0.47 μF	0.365 μF
L_o	87.5mH	0.425mH

Specifications

Electrical Specifications

Ratings		Intrinsic safety type (IEC compliant) [Exia] II C
Degree of Protection		IP20 (IEC60529)
Installation Location	Discrete Output Barrier	Safe indoor place (non-hazardous area)
	Pilot Light, Illuminated Switch,	For zone 0, 1, 2 hazardous areas
	Buzzer	For zone 1 and 2 hazardous areas
Non-intrinsically Safe Circuit Maximum Voltage (Um)		250V AC 50/60Hz, 250V DC UL value: 125V AC
Operation		Input ON, Output ON (1:1)

Certifications

Certification Organization	Ratings	Certification No.
UL	Class I, II, III Div. 1 Group A, B, C, D, E, F, and G Class I, Zone 0 [AExia] II C	E234997
FM	Class I, II, III Div. 1 Group A, B, C, D, E, F, and G Class I, Zone 0 [AExia] II C	3047250
PTB (IEC-Ex)	[Exia] IIC: Gas vapor	IECEX PTB 10.0015
PTB (ATEX)	II(1)G [Exia] IIC: Gas vapor II(1)D [Exia] IIC: Dust	PTB09 ATEX2046
TIIS	Discrete output barrier: [Exia] II C	TC20541
	Pilot light/miniature pilot light: (separate wiring): Exia II CT6	TC16361
	Pilot light/miniature pilot light: (common wiring): Exia II CT4	TC16360
	Illuminated switch: Exia II CT4	TC16362
	Buzzer: Exib II CT6	TC20797
NK	Discrete output barrier: [Exia] II C Buzzer: Exib II CT6	Type Test No. 13T606 pending
CQST	[Exia Ga] IIC	CNEx 14.0047
KCs	Discrete output barrier: [Exia] II C Buzzer: Exib II CT6	KCS14-AV4B0-0375 pending
KR	[Exia] IIC	pending



Note: Illuminated switches, pilot lights, and miniature pilot lights are certified by TIIS and NK only. Other certification organizations, such as UL, regard these units as simple apparatus, and require no certification.

General Specifications

Power Voltage Type	AC Power	DC Power
Rated Power Voltage	100 to 240V AC (UL rating: 100 ~ 120V AC)	24V DC
Allowable Voltage Range	85 to 264V AC (UL rating: 85 ~ 125V AC)	21.6 to 26.4V DC
Rated Frequency	50/60 Hz (allowable range: 47 to 63 Hz)	—
Inrush Current	10A (100V AC) 20A (200V AC)	10A
Dielectric Strength (1 minute, 1 mA)	Between intrinsically safe circuit and non-intrinsically safe circuit: 1526.4V AC Between AC power and signal input: 1500V AC	
Operating Temperature	-20 to +60°C (no freezing)	
Storage Temperature	-20 to +60°C (no freezing)	
Operating Humidity	45 to 85% RH (no condensation)	
Atmosphere	800 to 1100 hPa	
Pollution Degree	2 (IEC60664)	
Insulation Resistance	10 MΩ minimum (500V DC megger, between the same poles as the dielectric strength)	
Vibration Resistance (damage limits)	Panel mounting: 10 to 55 Hz, amplitude 0.75 mm (2 hours each on X, Y, Z)	
	DIN rail mounting: 10 to 55 Hz, amplitude 0.35 mm (2 hours each on X, Y, Z)	
Shock Resistance (damage limits)	Panel mounting: 500 m/s ² (3 times each on X, Y, Z)	
	DIN rail mounting: 300 m/s ² (3 times each on X, Y, Z)	
Terminal Style	M3 screw terminal	
Mounting	35-mm-wide DIN rail or panel mounting (M4 screw)	
Power Consumption (approx.)	8.8 VA (EB3L-S10SAN at 200V AC) 5.2 W (EB3L-S16CSDN at 24V DC)	

Part Numbers

Discrete Output Barriers

Power Voltage	Connection to Non-intrinsically Safe Circuit	Input	Input Wiring Method	Number of Channels	Part Number	Weight (g)
100 to 240V AC (UL rating: 100 ~ 120V AC)	Screw Terminal	Source	Separate/Common Wiring Compatible	1	EB3L-S01SAN	150
				2	EB3L-S02SAN	180
				3	EB3L-S03SAN	190
				5	EB3L-S05SAN	250
				6	EB3L-S06SAN	260
				8	EB3L-S08SAN	330
				10	EB3L-S10SAN	360
			Common Wiring Only	8	EB3L-S08CSAN	260
		Sink	Separate/Common Wiring Compatible	1	EB3L-S01KAN	150
				2	EB3L-S02KAN	180
				3	EB3L-S03KAN	190
				5	EB3L-S05KAN	250
				6	EB3L-S06KAN	260
				8	EB3L-S08KAN	330
				10	EB3L-S10KAN	360
			Common Wiring Only	8	EB3L-S08CKAN	260
24V DC	Screw Terminal	Source	Separate/Common Wiring Compatible	1	EB3L-S01SDN	130
				2	EB3L-S02SDN	160
				3	EB3L-S03SDN	170
				5	EB3L-S05SDN	240
				6	EB3L-S06SDN	250
				8	EB3L-S08SDN	310
				10	EB3L-S10SDN	250
			Common Wiring Only	8	EB3L-S08CSDN	340
				16	EB3L-S16CSDN	350
		Sink	Separate/Common Wiring Compatible	1	EB3L-S01KDN	130
				2	EB3L-S02KDN	160
				3	EB3L-S03KDN	170
				5	EB3L-S05KDN	240
				6	EB3L-S06KDN	250
				8	EB3L-S08KDN	310
				10	EB3L-S10KDN	340
			Common Wiring Only	8	EB3L-S08CKDN	250
				16	EB3L-S16CKDN	350
	Connector	Source	Common Wiring Only	16	EB3L-S16CSD-CN	350
		Sink		16	EB3L-S16CKD-CN	350

Accessories

Name	Part Number	Description
DIN Rail	BAA1000	Aluminum (1m long, 10.5mm high)
	BAP1000	Steel (1m long, 7.5mm high)
End Clip	BNL6	Medium DIN rail end clip

01 Touchscreens

PLCs

Automation Software

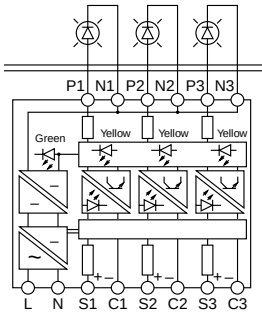
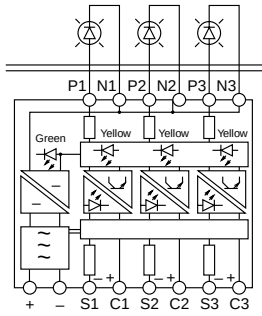
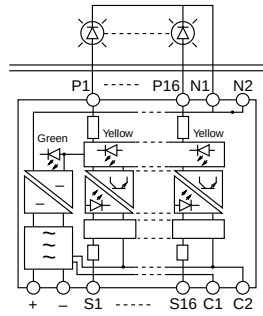
Power Supplies

Sensors

Communication

Barriers

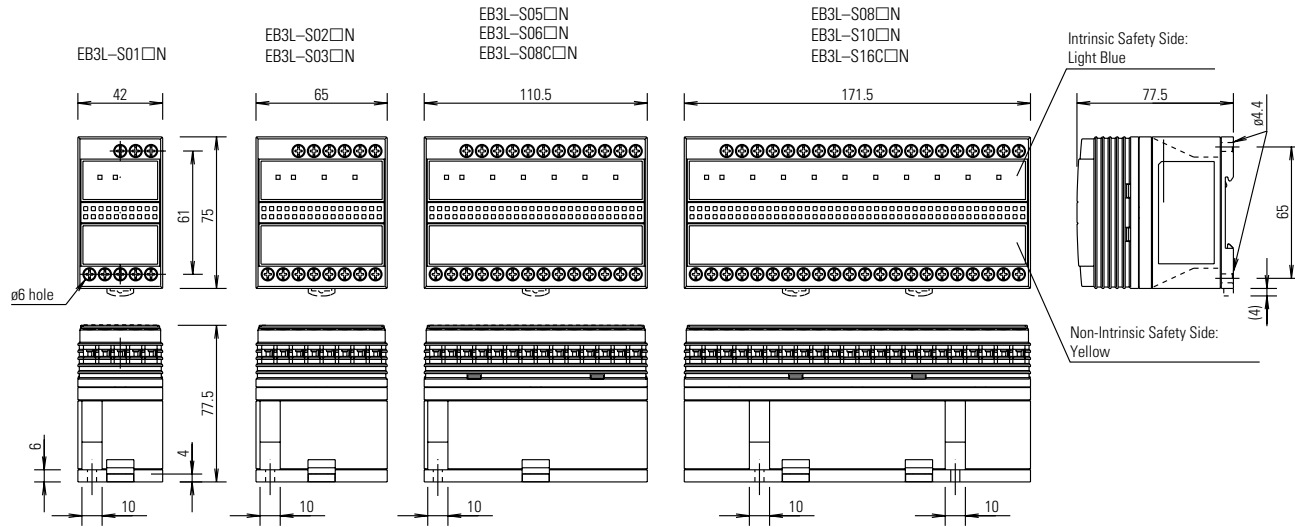
Internal Circuit Block Diagram

AC Power
Source InputDC Power
Sink InputConnector Wiring
Source Input

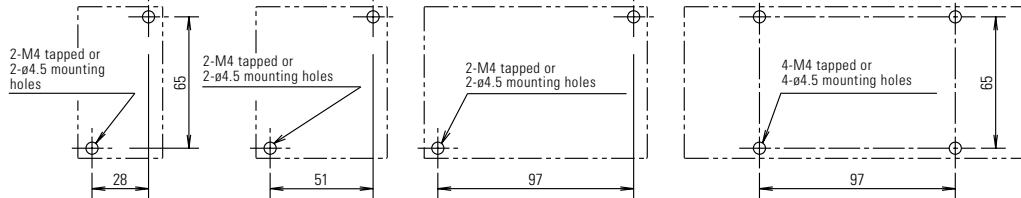
Hazardous Area
Non-hazardous Area

Dimensions (mm)

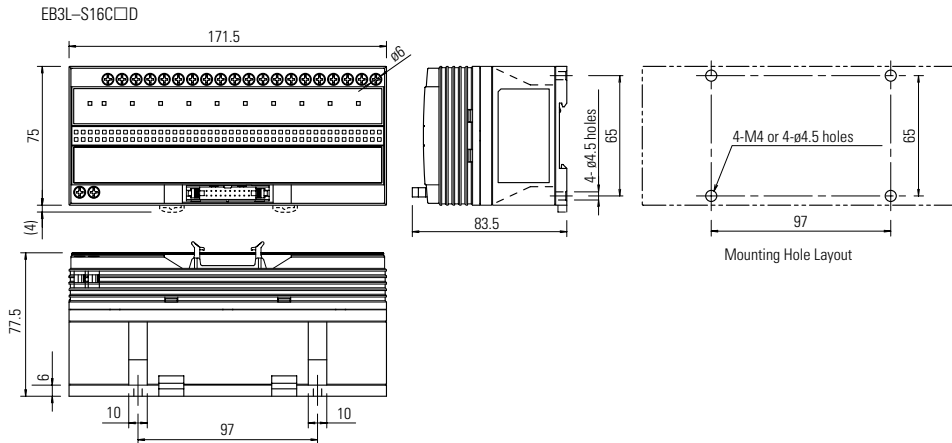
Terminal



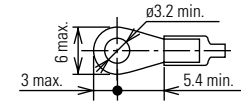
Mounting Hole Layout (Screw Mounting)



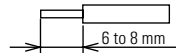
Connector



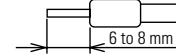
Applicable Crimping Terminal



Solid Wire - Strip wire end

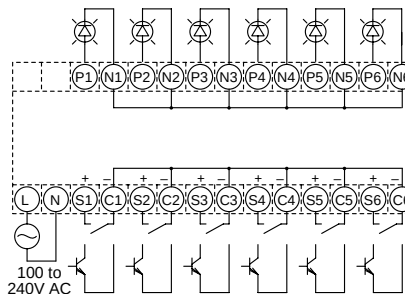


Stranded Wire - use a ferrule

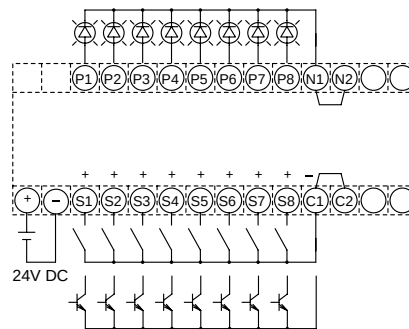


Non-intrinsically Safe External Input Wiring Examples

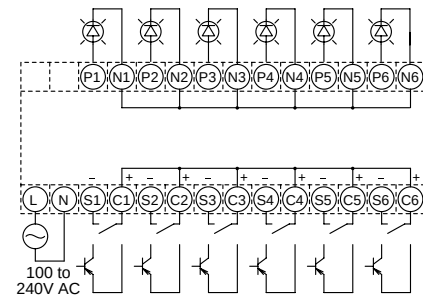
6-channel Source
(Ex.: EB3L-S06SAN)



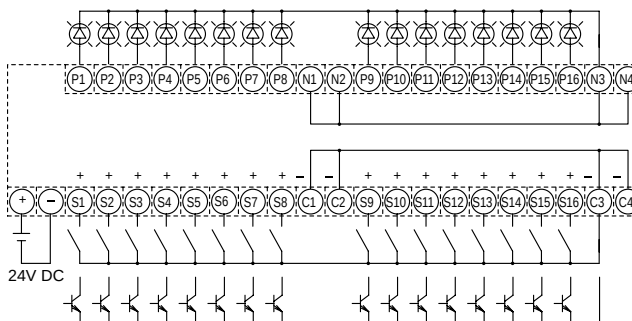
8-channel Common Wiring, Source
(Ex.: EB3L-S08CSDN)



6-channel Sink
(Ex. EB3L-S06KAN)

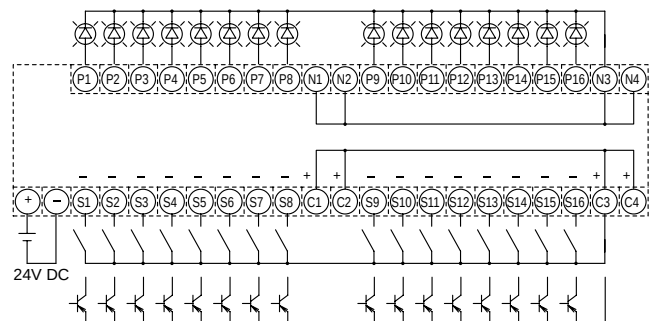


16-channel Common Wiring, Source
(Ex.: EB3L-S16CSDN)



Note: Source input type can be connected to PLC sink output type C terminal is the negative common line.

16-channel Common Wiring, Sink
(Ex.: EB3L-S16CKDN)



Note: Sink input type can be connected to PLC source output type C terminal is the positive common line.

All dimensions are in mm

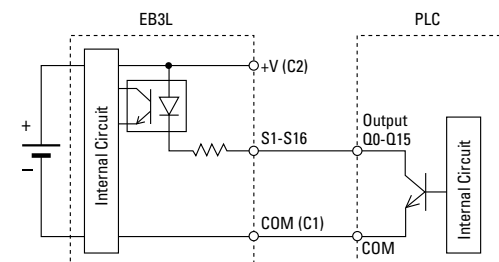
Wiring Example with IDEC's MicroSmart PLC Output Modules

FC4A-T16K3

EB3L-S16CSD-CN

FC4A-T16S3

EB3L-S16CKD-CN



Terminal	Output
----------	--------

Invest	Training
--------	----------

Terminal	Output
----------	--------

Invest	Training
--------	----------

terminal	Output	Input	terminal	terminal	Output	Input	terminal
20	Q0	S1	20	20	Q0	S1	20
19	Q10	S9	19	19	Q10	S9	19
18	Q1	S2	18	18	Q1	S2	18
17	Q11	S10	17	17	Q11	S10	17
16	Q2	S3	16	16	Q2	S3	16
15	Q12	S11	15	15	Q12	S11	15
14	Q3	S4	14	14	Q3	S4	14
13	Q13	S12	13	13	Q13	S12	13
12	Q4	S5	12	12	Q4	S5	12
11	Q14	S13	11	11	Q14	S13	11
10	Q5	S6	10	10	Q5	S6	10
9	Q15	S14	9	9	Q15	S14	9
8	Q6	S7	8	8	Q6	S7	8
7	Q16	S15	7	7	Q16	S15	7
6	Q7	S8	6	6	Q7	S8	6
5	Q17	S16	5	5	Q17	S16	5
4	COM	COM	4	4	COM	COM	4
3	COM	NC	3	3	COM	NC	3
2	+V	+V	2	2	-V	-V	2
1	+V	NC	1	1	-V	NC	1



Note: The wiring in dashed line does not affect the operation of the EB3L.

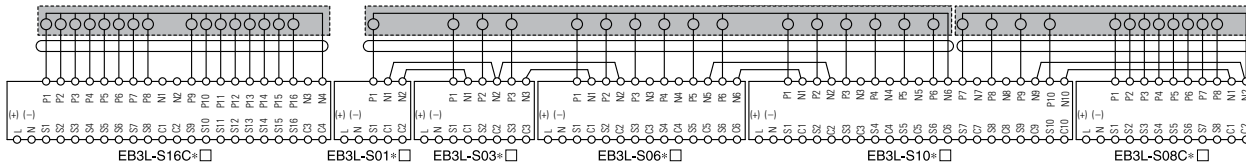
Applicable connector is IDEC's JE1S-201.

Output power for PLC outputs is supplied by the EB3L, therefore the PLC output does not need an external power supply.

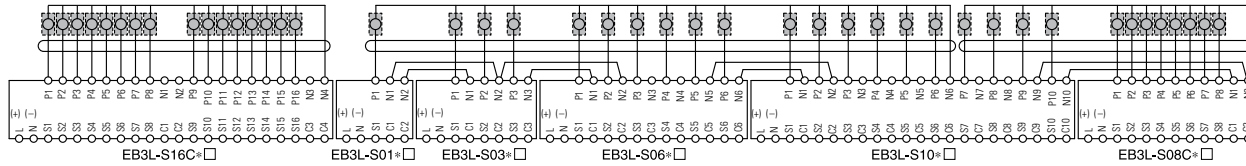
Wiring Example of Intrinsically Safe External Outputs

1. Common Wiring (Maximum 16 circuits) (Buzzers cannot be wired in a common line.)*

All output lines are wired to a common line inside the intrinsically safe equipment (one common line per intrinsically safe circuit) - DC input models only.

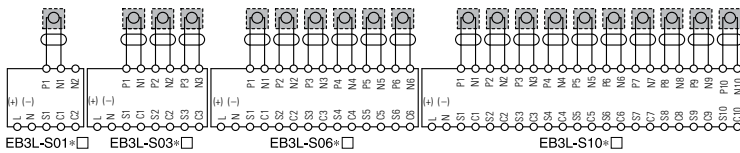


All input lines are wired to a common line outside the intrinsically safe equipment (one common line per intrinsically safe circuit).



2. Separate Wiring

Each output line of the EB3L makes up one independent intrinsically safe circuit of a pilot light or buzzer.



When using two or more EB3L's to set up one intrinsically safe circuit in the common wiring configuration, interconnect two neutral terminals (N1 through N10) on each EB3L between adjacent EB3L's in a parallel.

3. Wiring Illuminated Pushbuttons and Illuminated Selector Switches

(A maximum of 16 channels of EB3L and EB3C can be wired to a common line.)

The following example illustrates the wiring for a total of 10 contacts used by three illuminated pushbuttons (LB1 to LB3) and three illuminated selector switches (LS1 to LS3).

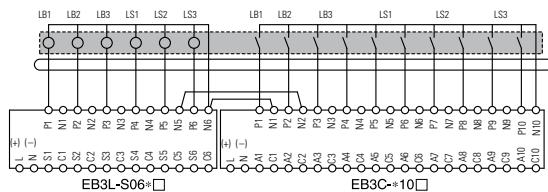
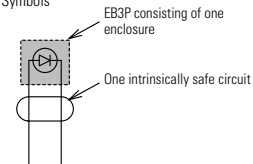


Diagram Symbols

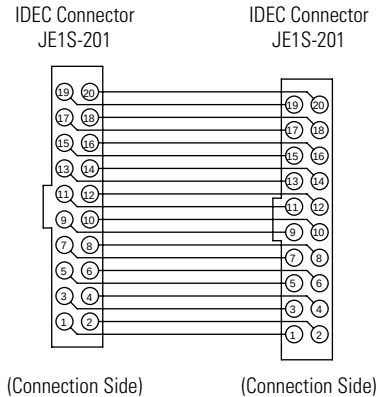


*This is permitted under TIS approvals

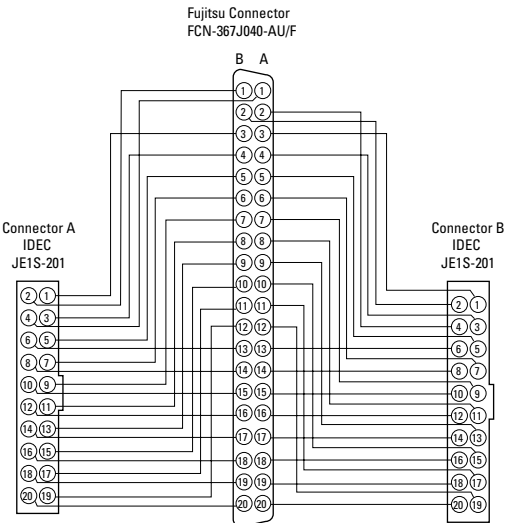
Recommended Connector Cable for Connector Types

Description		No. of Poles	Length (m)	Part Number	Shape	Applicable Type
I/O Terminal Cable	With Shield	20	0.5	FC9Z-H050A20		IDEC MicroSmart I/O Module
			1	FC9Z-H100A20		
			2	FC9Z-H200A20		
			3	FC9Z-H300A20		
	Without Shield		0.5	FC9Z-H050B20		IDEC MicroSmart I/O Module
			1	FC9Z-H100B20		
			2	FC9Z-H200B20		
			3	FC9Z-H300B20		
Cable with Crimping Terminal			1	BX9Z-H100E4		Screw Terminal
			2	BX9Z-H200E4		
			3	BX9Z-H300E4		
40-pin Cable for PLC			1	BX9Z-H100B		Mitsubishi A Series Output Module (sink) ↓ EB3L-S16CSD-CN
			2	BX9Z-H200B		
			3	BX9Z-H300B		

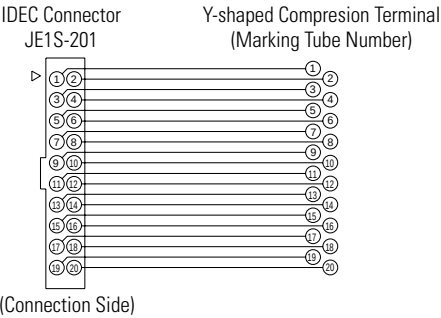
FC9Z-H□□□A, FC9Z-H□□□B Internal Connection



BX9Z-H□□□B Internal Connection



FC9Z-H□□□E4 Internal Connection



Switches and Pilot Devices

General Specifications for Pilot Light, Illuminated Pushbutton, Illuminated Selector Switch, and Buzzer

Operating Temperature	-20 to +60°C (no freezing)		
Operating Humidity	45 to 85% RH (no condensation)		
Dielectric Strength (1 mA, 1 minute)	EB3P: 1000V AC IPL1: 500V AC (between intrinsically safe circuit and dead parts)		
Insulation Resistance	10 MΩ minimum (500V DC megger, between the same poles as the dielectric strength)		
Pilot Light and Miniature Pilot Light	Degree of Protection	IP65 (IEC60529) (except for terminals) EB3P-LU/IPL1: IP40	
	Lens/Illumination Color	Pilot light: Amber, blue, green, red, white, yellow Miniature pilot light: Amber, green, red, white, yellow	
	Intrinsic Safety Ratings and Parameters	1-channel Separate Wiring	
		Maximum input voltage (Ui):	13.2V
Pilot Light and Miniature Pilot Light	Intrinsic Safety Ratings and Parameters	Maximum input current (Ii):	14.2 mA
		Maximum input power (Pi):	46.9 mW
		Internal capacitance (Ci):	≤ 2 nF
		Internal inductance (Li):	≤ 5 μH
		16-channel Common Wiring	
		Maximum input voltage (Ui):	13.2V
		Maximum input current (Ii):	227.2 mA
		Maximum input power (Pi):	750 mW
		Internal capacitance (Ci):	≤ 32 nF
		Internal inductance (Li):	≤ 80 μH

Illuminated Switch	Degree of Protection	IP65 (IEC60529) (except for terminals) EB3P-LSAW**: IP54	
	Illumination Color	Amber, blue, green, red, white, yellow	
	Contact Voltage/Current	12V DC ±10%, 10 mA ±20% (when connecting to the EB3C)	
	Intrinsic Safety Ratings and Parameters	16-channel Common Wiring	
Buzzer	Intrinsic Safety Ratings and Parameters	Maximum input voltage (Ui):	13.2V
		Maximum input current (Ii):	227.2 mA
		Maximum input power (Pi):	750 mW
		Internal capacitance (Ci):	≤ 32 nF
		Internal inductance (Li):	≤ 80 μH
		Degree of Protection	IP20 (IEC60529) (except for terminals)
		Sound Volume	75 dB minimum (at 1 m)
		Sound Source	Piezoelectric oscillator (continuous or intermittent)
		1-channel Separate Wiring	
		Maximum input voltage (Ui):	13.2V
Buzzer	Intrinsic Safety Ratings and Parameters	Maximum input current (Ii):	14.2 mA
		Maximum input power (Pi):	46.9 mW
		Internal capacitance (Ci):	≤ 260 nF
		Internal inductance (Li):	≤ 80 mH
		Weight	100g



Note: Connect buzzers in separate wiring. Buzzers cannot be used in common wiring.

Part Numbers for Pilot Lights, Illuminated Pushbuttons, Illuminated Selector Switches, and Buzzers

Unit	Size	Series ¹	Shape	Operation Mode	Contact	Ordering Number	Lens Color/ Illumination Color Code*	Operation
Pilot Light	ø30	N	Dome	—	—	EB3P-LAN1-*	A: Amber G: Green R: Red S: Blue W: White ⁱY: Yellow	—
			Square	—	—	EB3P-LUN3B-*		
			Rectangular w/Metal Bezel	—	—	EB3P-LUN4-*		
			Dome w/Diecast Sleeve	—	—	EB3P-LAD1-*		
	ø22	TW	Flush	—	—	EB3P-LAW1-*		
			Flush(Marking Type)	—	—	EB3P-LAW1B-*		
			Dome	—	—	EB3P-LAW2-*		
			Square Flush (Marking Type)	—	—	EB3P-LUW1B-*		
		HW	Round Flush	—	—	EB3P-LHW1-*		
			Dome	—	—	EB3P-LHW2-*		
			Square Flush	—	—	EB3P-LHW4-*		
		LW	Round	—	—	EB3P-LLW1-*		
			Square	—	—	EB3P-LLW2-*		
			Round w/ Square Bezel	—	—	EB3P-LLW3-*		
Miniature Pilot Light	ø10	UP	Extended	—	—	IPL1-18-*	A: Amber G: Green R: Red W: White ⁱY: Yellow	—
			Dome	—	—	IPL1-19-*		
	ø8		Flush	—	—	IPL1-87-*		
			Extended	—	—	IPL1-88-*		
	ø6		Dome	—	—	IPL1-89-*		
			Flush	—	—	IPL1-67-*		
			Extended	—	—	IPL1-68-*		
			Dome	—	—	IPL1-69-*		

Part Numbers for Pilot Lights, Illuminated Pushbuttons, Illuminated Selector Switches, and Buzzers, con't

Unit	Size	Series ¹	Shape	Operation Mode	Contact	Ordering Number ²	Lens Color/ Illumination Color Code*	Operation			
Illuminated Pushbutton	ø30	N	Extended	Momentary	1NO-1NC	EB3P-LBAN211-*	A: Amber G: Green R: Red S: Blue W: White ⁵Y: Yellow	—			
				Maintained	1NO-1NC	EB3P-LBAON211-*					
			Mushroom	Pushlock Turn Reset	1NO-1NC	EB3P-LBAVN311-R			Red only		
	ø22	TW	Extended	Momentary	1NO-1NC	EB3P-LBAW211-*	A: Amber G: Green R: Red S: Blue W: White ⁵Y: Yellow				
				Maintained	1NO-1NC	EB3P-LBAOW211-*					
			Mushroom	Pushlock Turn Reset	1NO-1NC	EB3P-LBAVW411-R			Red only		
		HW	Round	Momentary	1NO	EB3P-LBH1W110-*					
				Maintained	1NO	EB3P-LBHA1W110-*					
		LW	Round	Momentary	DPDT	EB3P-LBL1W1C2-*					
				Maintained	DPDT	EB3P-LBLA1W1C2-*					
			Square	Momentary	DPDT	EB3P-LBL2W1C2-*					
				Maintained	DPDT	EB3P-LBLA2W1C2-*					
		Illuminated Selector Switch ³	ø30	N	Round	2-position	1NO-1NC		EB3P-LSAN211-*	A: Amber G: Green R: Red S: Blue W: White ⁵Y: Yellow	Maintained
						3-position	2NO		EB3P-LSAN320-*		Maintained
			ø22	TW	Round	2-position	1NO-1NC		EB3P-LSAW211-*		Maintained
2-position, return from right	1NO-1NC					EB3P-LSAW2111-*	Spring return from right				
3-position	2NO					EB3P-LSAW320-*	Maintained				
3-position, return from right	2NO					EB3P-LSAW3120-*	Spring return from right				
3-position,return from left	2NO					EB3P-LSAW3220-*	Spring return from left				
3-position,2-way return	2NO					EB3P-LSAW3320-*	2-way spring return				
HW	Round					2-position	1NO-1NC	EB3P-LSHW211-*	Maintained		
				3-position	2NO	EB3P-LSHW320-*	Maintained				
	LW			Round	2-position	DPDT	EB3P-LSL1W2C2-*	Maintained			
Round w/Square Bezel				3-position	DPDT	EB3P-LSL3W3C2-*	Maintained				
Buzzer	ø30		—	—	Continuous sound	—	EB3P-ZUN12CN	—	Approx. 3 Hz		
					Intermittent sound	—	EB3P-ZUN12FN	—			

1. Codes N, TW, HW, LW, and UP are the series names of IDEC's control units.

2. Specify a color code in place of *.

3. Above parts are recommended for EB3L barriers. However, none of these parts are UL recognized.

4. Buzzers are not rated for Zone 0, but only Zones 1 and 2.

5. Use PW (pure white) LED for yellow lenses



Accessory

Name	Ordering Number	Package Quantity	Remarks
LED Lamp	EB9Z-LDS1-*	1	Specify a color code in place of * in the ordering number. A: amber, G: green, R: red, S: blue, W: white, PW: pure white (for yellow use PW with yellow lens) Use PW (pure white) LED for yellow lenses
Static Electricity Caution Plate	EB9Z-N1PN10	10	Polyester 20(W) x 6(H) mm

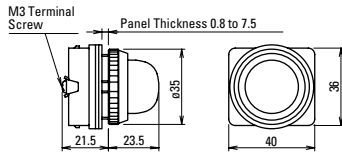


Above part is recommended for EB3L barriers. However, this part is not UL recognized.

Pilot Lights

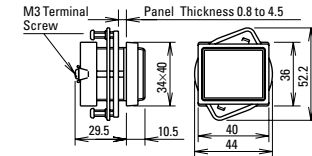
ø30 EB3P-LAN1

Terminal Cover: APN-PVL
(sold separately)



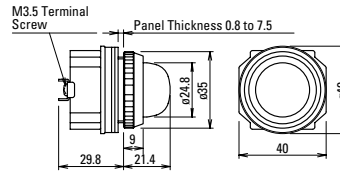
ø30 EB3P-LUN4

Terminal Cover: APN-PVL
(sold separately)



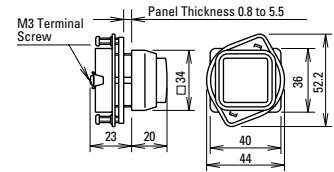
ø30 EB3P-LAD

Terminal Cover: APD-PVL
(sold separately)

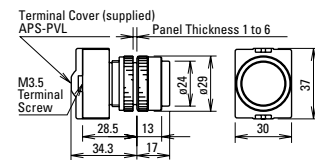


ø30 EB3P-LUN3B

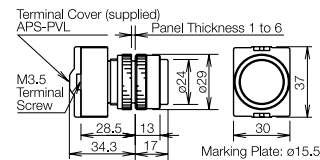
Terminal Cover: APN-PVL
(sold separately)



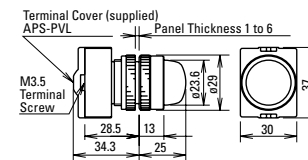
ø22 EB3P-LAW1



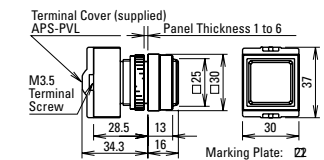
ø22 EB3P-LAW1B



ø22 EB3P-LAW2

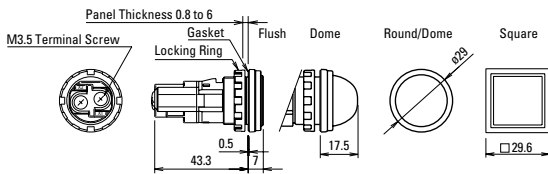


ø22 EB3P-LUW1B



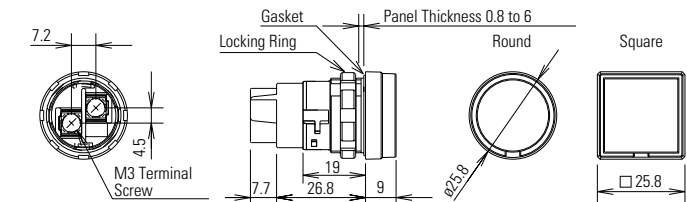
ø22 EB3P-LHW1/EB3P-LHW2/EB3P-LHW4

Terminal cover attached.



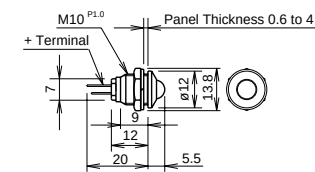
ø22 EB3P-LLW1/EB3P-LLW2/EB3P-LLW3

Terminal cover attached.

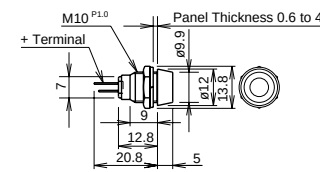


Miniature Pilot Lights (Terminal cover not available)

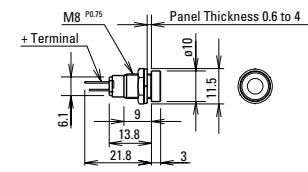
ø10 IPL1-18



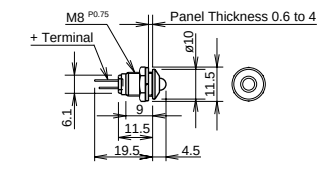
ø10 IPL1-19



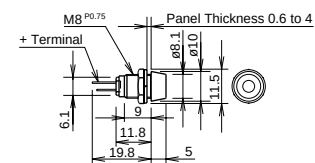
ø8 IPL1-87



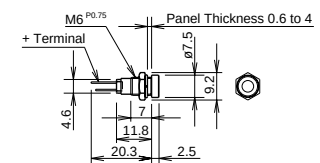
ø8 IPL1-88



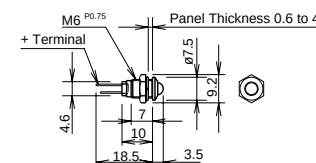
ø8 IPL1-89



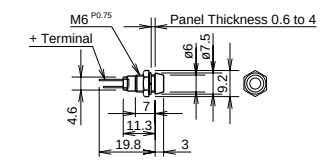
ø6 IPL1-67



ø6 IPL1-68



ø6 IPL1-69



OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

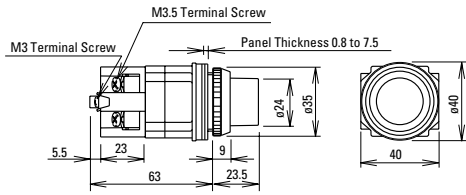
Communication

Barriers

Illuminated Pushbuttons

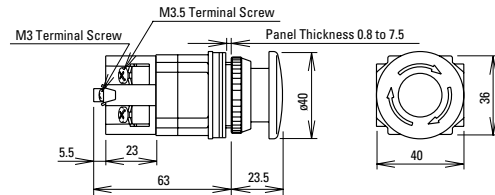
ø30 EB3P-LBAN211/LBA0N211

Terminal cover: N-VL4 (2 pcs.) (sold separately)



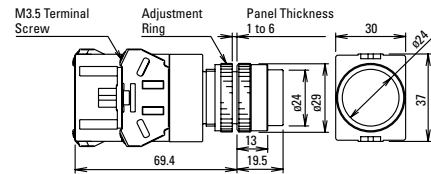
ø30 EB3P-LBAVN311-R

Terminal cover: N-VL4 (2 pcs.) (sold separately)



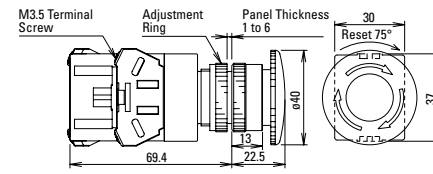
ø22 EB3P-LBAW211/LBA0W211

Terminal cover attached.



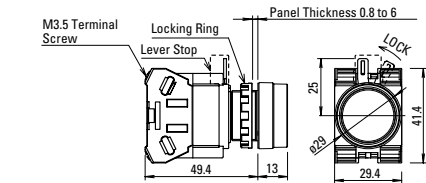
ø22 EB3P-LBAVW411-R

Terminal cover attached.



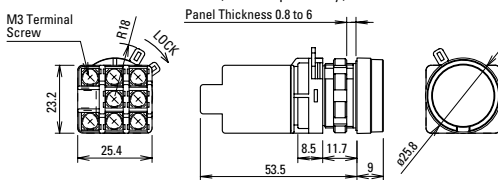
ø22 EB3P-LBH1W110/LBHA1W110

Terminal cover attached.



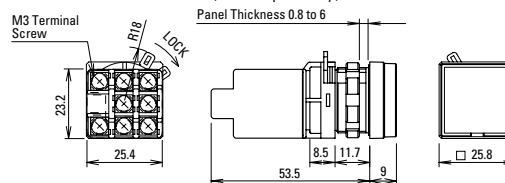
ø22 EB3P-LBL1W1C2/LBLA1W1C2

Terminal cover: LW-VL2M (sold separately)



ø22 EB3P-LBL2W1C2/LBLA2W1C2

Terminal cover: LW-VL2M (sold separately)

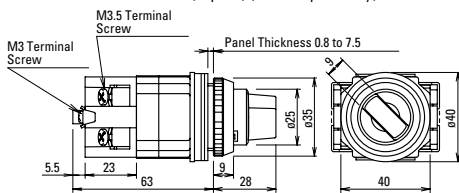


All dimensions in mm.

Illuminated Selector Switches

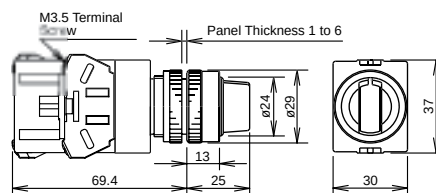
ø30 EB3P-LSAN211/EB3P-LSAN320

Terminal cover: N-VL4 (2 pcs.) (sold separately)



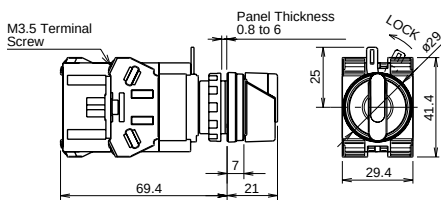
ø22 EB3P-LSAW***

Terminal cover attached



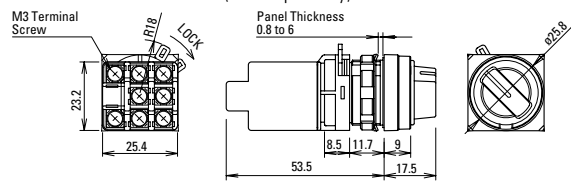
ø22 EB3P-LSHW211/EB3P-LSHW320

Terminal cover attached



ø22 EB3P-LSL1W2C2/EB3P-LSL3W3C2

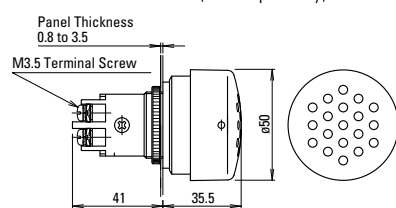
Terminal cover: LW-VL2M (sold separately)



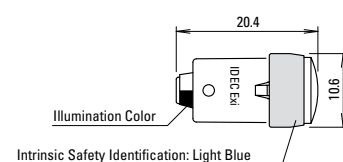
Buzzer

ø30 EB3P-ZUN12CN/ZUN12FN

Terminal cover: AZ-VL5 (sold separately)



EB9Z-LDS1



Illumination color is marked on the terminal.

Polarity Identification

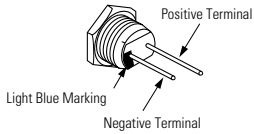
Pilot Lights/Illuminated Pushbuttons/Illuminated Selector Switches

Positive terminal: X1
Negative terminal: X2

Miniature Pilot Lights

Positive terminal: Long pin terminal
Negative terminal: Short pin terminal

Pin Terminals

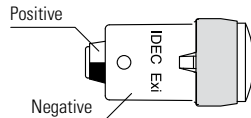


A light blue marking is indicated on the negative terminal side to identify intrinsically safe usage.

Buzzer

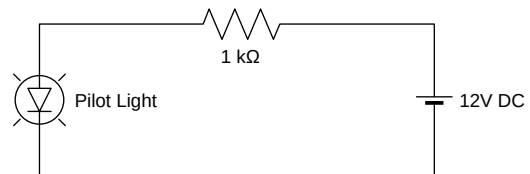
Positive terminal: +
Negative terminal: -

LED Lamp



Lamp Test

When checking the lamp lighting without using the EB3L discrete output barrier, first make sure that the atmosphere is free from explosive gases. Connect a 12V DC power supply and a protection resistor of 1 kΩ in series to turn on the pilot light.



Precautions for Operation

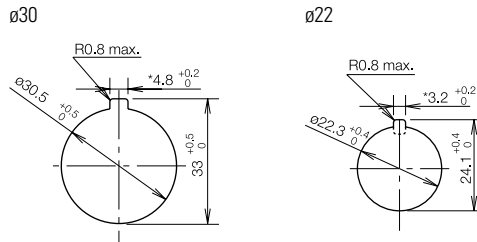
Installation of EB3L Discrete Output Barriers

1. The EB3L can be installed in any direction.
2. Install the EB3L discrete output barrier in a safe area (non-hazardous area) in accordance with intrinsic safety ratings and parameters. To avoid mechanical shocks, install the EB3L in an enclosure which suppresses shocks.
3. When installing or wiring the EB3L, prevent electromagnetic and electrostatic inductions in the intrinsically safe circuit. Also prevent the intrinsically safe circuits from contacting with another intrinsically safe circuit and any other circuits.

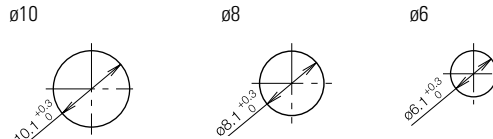
Maintain at least 50 mm clearance, or provide a metallic separating board between the intrinsically safe circuit and non-intrinsically safety circuit. When providing a metallic separating board, make sure that the board fits closely to the enclosure (top, bottom, and both sides). Allowable clearance between the enclosure and board is 1.5 mm at the maximum.

The clearance of 50 mm between the intrinsically safe circuit and non-intrinsically safe circuit may not be sufficient when a motor circuit or high-voltage circuit is installed nearby. In this case, provide a wider clearance between the circuits referring to 6. (3) "Minimum Parallel Distance between the Intrinsically Safe Circuit and Other Circuits."

Panel Cut-out Pilot Lights/Illuminated Pushbuttons/Illuminated Selector Switches/Buzzers



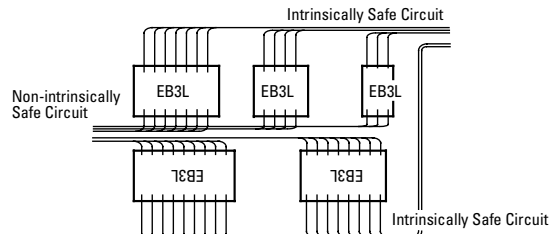
Miniature Pilot Lights



* The 4.8 or 3.2 recess is needed only when using an anti-rotation ring or a nameplate with an anti-rotation projection.
EB3P-LHW does not have an anti-rotation groove.

All dimensions in mm.

4. In order to prevent contact between intrinsically safe circuits and non-intrinsically safe circuits, mount EB3L units with terminals arranged in the same direction.



5. Maintain at least 6 mm (or 3 mm according to IEC60079-11: 1999) clearance between the terminal of intrinsically safe circuit and the grounded metal part of a metal enclosure, and between the relay terminal block of an intrinsically safe circuit and the grounded metal part of a metal enclosure.
6. For installing the EB3L, mount on a 35-mm-wide DIN rail or directly on a panel using screws. The EB3L can be installed in any direction. Make sure to install securely to withstand vibration. When mounting on a DIN rail, push in the clamp completely. Use the BNL6 end clips on both sides of the EB3L to prevent from moving sideways.
7. Excessive extraneous noise may cause malfunction and damage to the EB3L. When extraneous noise activates the voltage limiting circuit (thyristor), remove the noise source and restore the power.

Terminal Wiring

1. Using a $\phi 5.5$ mm or smaller screw driver, tighten the terminal screws (including unused terminal screws) to a torque of 0.6 to 1.0 N·m (recommended value).
2. Make sure that IP20 is achieved when wiring. Use insulation tubes on bare crimping terminals.
3. To prevent disengaged wires from contacting with other intrinsically safe circuits, bind together the wires of one intrinsically safe circuit.
4. When the adjacent terminal is connected to another intrinsically safe circuit, provide an insulation distance of at least 6 mm.

Signal Input

1. Connect the EB3L to the switches or output equipment which have a low leakage current (0.1 mA maximum).
2. The EB3L is equipped with power supply. Do not apply external power to the EB3L.
3. When connecting the EB3L's of connector type in parallel, make sure that the same power supply is used. When using C1 and C2 terminals to supply power to outside equipment, maintain the current at 50 mA maximum.

Power Voltage

1. Do not apply an excessive power voltage, otherwise the EB3L may be damaged.
2. The EB3L of AC power type may operate at a low voltage (approx. 20V).

Pilot Lights, Illuminated Switches, and Buzzers in the Hazardous Area

1. EB3P and IPL1 units shown on page 267 can be used with the EB3L. Buzzers cannot be connected in common wiring.
2. Install the EB3P and IPL1 units on enclosures of IP20 or higher protection. Use a metallic enclosure with magnesium content of 7.5% or less (steel and aluminum are acceptable).
3. When wiring, make sure of correct polarities of the EB3P and IPL1.
4. Certification mark is supplied with the units. Attach it on the visible area of the EB3P or IPL1 (for Japan application).
5. EB3P (except for buzzers) and IPL1 illuminated units, which are simple apparatuses in accordance with relevant standards of each country, can be installed in the hazardous area and connected to the EB3L located in the safe area.
6. When connecting illuminated switches to the EB3L discrete output barrier and the EB3C discrete input barrier, a maximum of 16 channels can be connected in common wiring.

Wiring for Intrinsic Safety

1. The voltage applied on the general circuit connected to the non-intrinsically safe circuit terminals of the EB3L discrete output barrier must be 250V AC, 50/60Hz (UL rating: 125V AC 50/60Hz), or 250V DC (UL rating: 125V DC) at the maximum under any conditions, including the voltage of the power line and the internal circuit.
2. When wiring, take into consideration the prevention of electromagnetic and electrostatic charges on intrinsically safe circuits. Also, prevent intrinsically

safe circuits from contacting with other circuits.

3. The intrinsically safe circuits must be separated from non-intrinsically safe circuits. Contain intrinsically safe circuits in a metallic tube or duct, or separate the intrinsically safe circuits referring to the table at right.

Note: Cables with a magnetic shield, such as a metallic sheath, prevent electromagnetic induction and electrostatic induction, however, a non-magnetic shield prevents electrostatic induction only. For non-magnetic shields, take a preventive measure against electromagnetic induction.

Finely twisted pair cables prevent electromagnetic induction. Adding shields to the twisted pair cables provides protection against electrostatic induction.

Voltage and Current of Other Circuits	Over 100A	100A or less	50A or less	10A or less
Over 440V	2000	2000	2000	2000
440V or less	2000	600	600	600
220V or less	2000	600	600	500
110V or less	2000	600	500	300
60V or less	2000	500	300	150

Note: Above chart is applicable under TIS standards only.

Minimum Parallel Distance between the Intrinsically Safe Circuit and Other Circuits (mm)

1. When identifying intrinsically safe circuits by color, use light blue terminal blocks and cables.
2. When using two or more EB3L's to set up one intrinsically safe circuit in the common wiring configuration, interconnect two neutral terminals (N1 through N10) on each EB3L between adjacent EB3L's in parallel.
3. Make sure that the power of the EB3L, pilot lights, and other connected units are turned off before starting inspection or replacement.
4. When wiring the intrinsically safe circuit, determine the distance to satisfy the wiring parameters shown below. Note that parameters are different between separate wiring and common wiring and depend on the connected units, such as pilot lights, illuminated pushbuttons, and buzzers.
 - a) Wiring capacitance $C_w \leq C_o - C_i$
 C_o : Maximum external capacitance of the EB3L
 C_i : Internal capacitance of the connected unit
 - b) Wiring inductance $L_w \leq L_o - L_i$
 L_o : Maximum external inductance of the EB3L
 L_i : Internal inductance of the connected unit
 - c) Wiring resistance $\leq R_w$
 R_w : Allowable wiring resistance
 - d) Allowable wiring distance D (km) is the smallest value of those calculated from the capacitance, inductance, and resistance.

$D \leq C_w/C$ C (nF/km): Capacitance of cable per km
 $D \leq L_w/L$ L (mH/km): Inductance of cable per km
 $D \leq R_w/2R$ R (Ω /km): Resistance of cable per km

Note: For the details of wiring the intrinsically safe circuits, refer to a relevant test guideline for explosion-proof electric equipment in each country.

Safety Precautions

Do not use the EB3C Discrete Input Barrier and EB3L Discrete Output Barrier for other than explosion protection purposes.

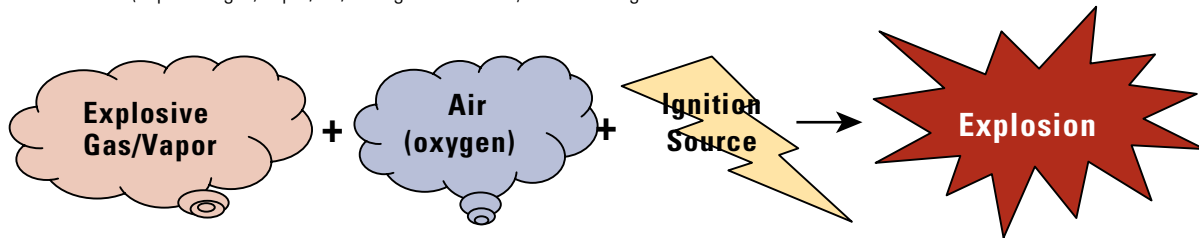
Read the user's manual to make sure of correct operation before starting installation, wiring, operation, maintenance, and inspection of the EB3C Discrete Input Barrier and EB3L Discrete Output Barrier.

General Information

What is Explosion Protection?

Explosion Mechanism

For an explosion to occur, both hazardous atmosphere (mixture of explosive gas/vapor and air) and ignition source from electrical equipment must exist. The first step for explosion prevention is to prevent the three factors (explosive gas/vapor, air, and ignition source) from existing at the same time.



Ignition source: Electrical equipment which originates electrical sparks or has a high temperature, capable of causing ignition in a hazardous atmosphere.

Explosion protection types:

1. Separation of explosive gas/vapor and ignition source
 - Flameproof explosion protection
 - Pressurized explosion protection
2. Low power on ignition source → Intrinsically safe explosion protection

Classification of Hazardous Areas

- Required when selecting explosion protection electrical equipment and wiring methods.
- Determined by user.
- Hazardous areas are classified depending on the frequency of the occurrence of hazardous atmosphere.

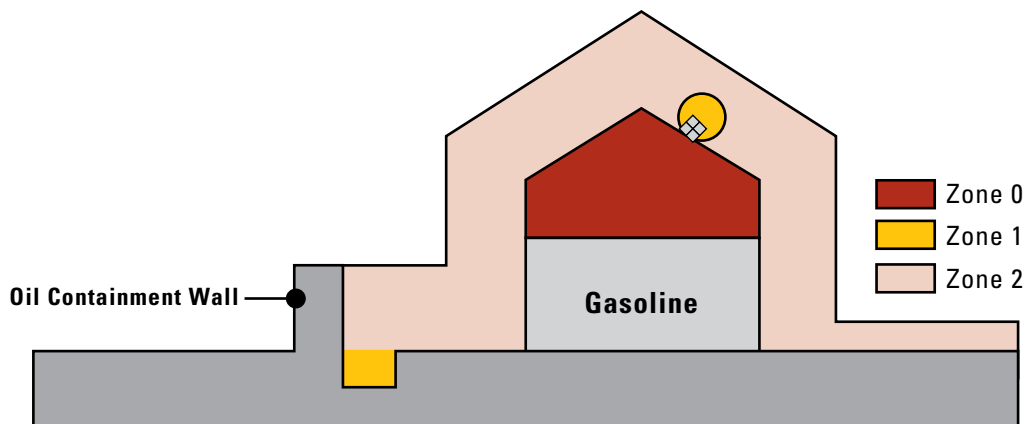
IEC Classification

Zone 0: Where hazardous atmosphere may exist for 1,000 hours or longer per year.

Zone 1: Where hazardous atmosphere may exist for 10 to 1,000 hours per year.

Zone 2: Where hazardous atmosphere may exist for less than 1 hour per year.

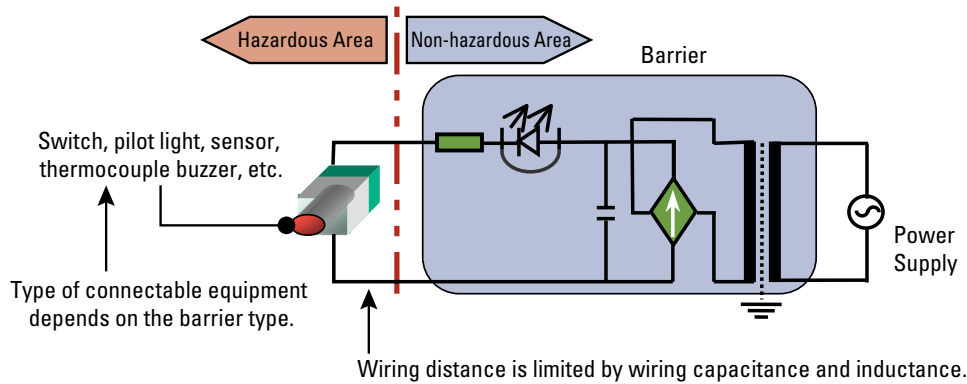
Gasoline Tank Example



Explosion Protection Types

Intrinsically Safe Structure

- Structure in which voltage and current are limited so that no sparks, arc, and thermal effect produced by electric equipment (switch, pilot light, etc) in hazardous areas are capable of causing ignition of explosive gas/vapor.



Features:

- Barrier is installed in non-hazardous area, and is connected to the switches or pilot lights in hazardous area.
- The intrinsically safe system can be used in zone 0.
- Because voltage and current to the electric equipment are limited, the variety of devices that can be connected to the barrier is restricted.
- Wiring is required between hazardous and non-hazardous areas.
- Grounding (grounding resistance 10Ω max.) may be required (EB3C, EB3L do not require grounding).

Grounding - The procedure to achieve required resistance value by inserting a grounding wire into a hole in the ground and furnishing the surrounding with material of superior electrical conductivity.

Non-insulated barrier (Zener barrier): grounding resistance 10Ω max.

- While the voltage difference between the circuits is limited in Zener barriers, the voltage difference between the circuits and grounding is unlimited. When a short-circuit occurs between the circuits and ground, high voltage/current may be generated in the circuits, causing a possible explosion. The OV line of circuits, therefore, must be provided with grounding (resistance 10Ω max.) so that the voltage/current can be shunted to the ground.

Insulated barrier: grounding resistance 100Ω max.

- Intrinsically safe and non-intrinsically safe parts are electrically isolated by an isolation transformer. If a sufficient isolation distance is not provided on the isolation transformer, however, the transformer may short-circuit between primary and secondary when an abnormal voltage occurs. This may generate high voltage/current in the intrinsically safe circuit, causing a possible explosion. A transformer with metallic isolator must be used between primary and secondary, and grounding (resistance 100Ω max.) must be provided.

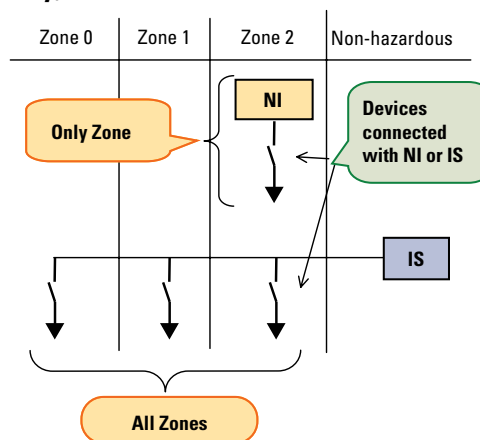
Difference between NI (Non-incendive) & IS (Intrinsic Safety)

Standard

- NI: Installed in areas that are Zone 2 hazardous locations.
- IS: Installed in areas that are non-hazardous.

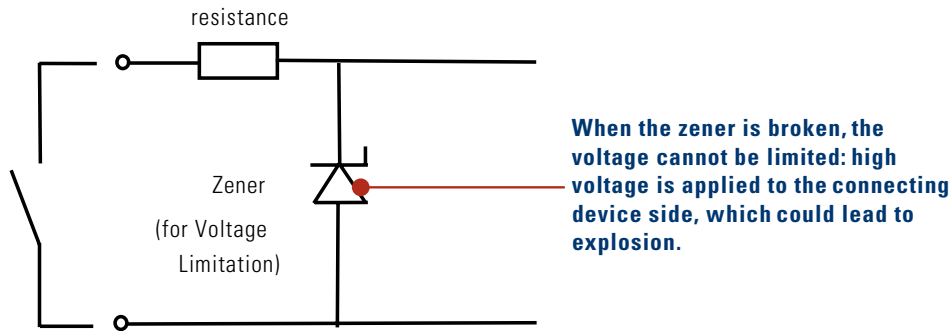
Advantages & Disadvantages

- NI: Small and inexpensive. Devices connected with NI are also installed only in the Zone 2 area.
- IS: Small but more expensive. Devices connected with IS can be used in the Zone 0, 1 and 2 areas (all zones).

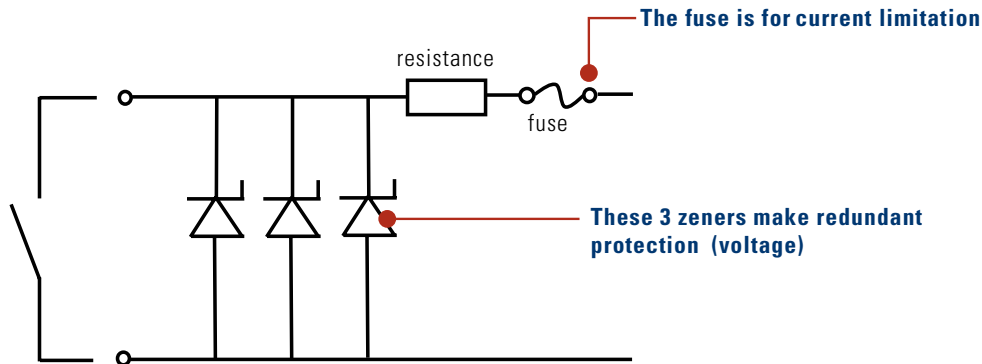


Structure

NI Structure



IS Structure

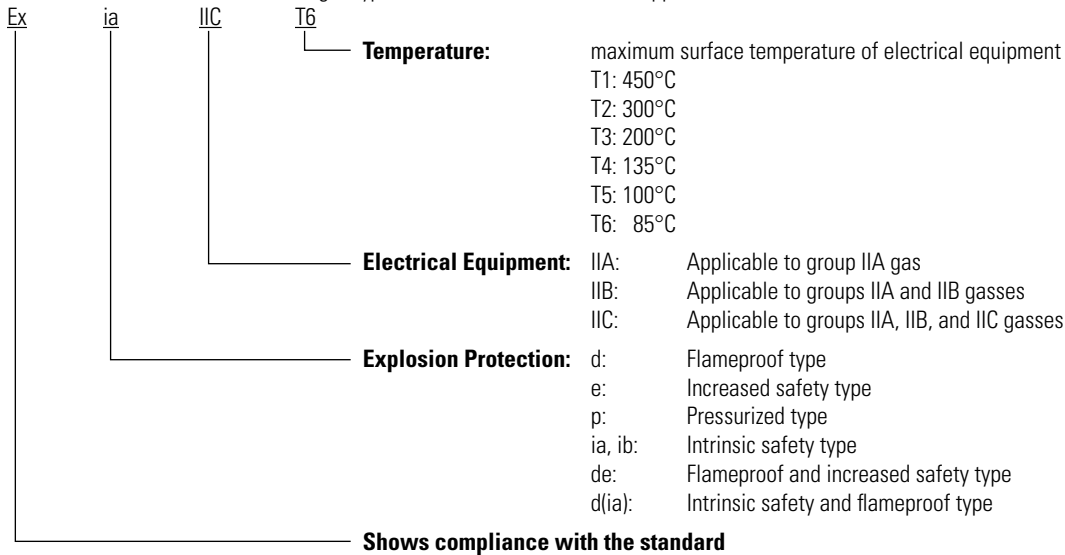


Note : Instead of zeners, thyristors are used in EB3C for better energy efficiency.

Explosion Protection Marking

Gas is categorized into groups by explosiveness and ignition temperature.

Technical standard: Determines the gas type which can be used with the apparatus.



Examples: ExdIIBT4, EXeIICT4, ExpIIBT4, ExiaIICT5

EB3C/EB3L Features

OT Touchscreens

Small and lightweight

EB3C (10-circuit)	Weight: 380g Dimensions: 171.5 L × 75 W × 77.5 H (mm)	• Plastic housing • Small system design
EB3L (10-circuit)	Weight: 360g Dimensions: 171.5 L × 75 W × 77.5 H (mm)	

PLCs

No grounding required: less labor, less cost

No explosion protection grounding.

Isolation transformer is used. All isolations – not only between primary and secondary, but also cores and bobbins – are reinforced.

↓

No isolator = No grounding

Automation Software

No electrical equipment grounding.

Power supply part: Electric shock is prevented with reinforced isolation. Conforms to IEC standard.

Output part: The small power & EMC design requires no grounding. Conforms to IEC switch output standard.

Power Supplies

Shield wire treatment
Shield wires of intrinsically safe circuits are grounded to the panel in non-hazardous area, and not connected to the N terminal on the barrier.

Common Type and Connector Type

- 1. Common type → For 8 and 16 circuits. Easy connection to PLC.
- 2. Connector type
 - Flat cable connection between non-intrinsically safe part and PLC.
 - Connectable to IDEC's FC5A, and FC4A.

Sensors

Communication

Barriers

Standards

1. CE
Conforms to EMC directive and LVD.
EMC directive:
Electromagnetism generated by the barrier does not affect other communication equipment. Also, electromagnetism generated by other communication equipment does not affect the barrier.
LVD (Low Voltage Directive):
For rated voltages 50 to 1000V AC, 75 to 1500V DC.
2. ATEX
Adopted by EU, this directive covers electrical and mechanical equipment and protective systems, which may be used in potentially explosive atmospheres (Europe). EN50014 series is adopted.
3. FM (Factory Mutual Approval)
A private US certification organization for waterproof and intrinsic safety. Widely recognized for more intrinsic safety than UL.
4. CSA (Canadian Standards Association)
A Canadian certification organization for electrical equipment.
5. NK: Class NK (Nippon Kaiji Kyokai)
Required for ships with Japanese ship registration.
6. Underwriters Laboratories (UL) - A US certification agency for all electrical and hazardous location products.

Less labor

1. Finger-safe spring-up terminal
The finger-safe, captive spring-up terminals prevent electric shock (IP20), and make installation easy. No screw loss.
2. Universal voltage
100 to 240V AC (UL rating 100 ~ 120VAC).
3. Installation
Direct and DIN-rail mountable.

EB3 series: Screws cannot be touched by fingers even when loosened.

Switches connectable to EB3C

Switches which are configured only with mechanical contacts (dry contacts) can be connected to the EB3C.

Pushbutton, selector, cam, toggle, limit, micro, reed, foot, pressure, and temperature switches can be used.



Note: Contact rating must be 13.2V, 14.2 mA minimum. Contact material such as silver oxide cadmium and silver tungsten may cause conduction failure at 10 mA due to the film generated on the surface.

Equipment connectable to EB3L

Common wiring: Only EB3P-L type pilot lights, which have been approved, can be connected to the EB3L discrete output barrier.

Separate wiring: No approval is required for pilot lights and buzzers to be connected to the EB3L discrete output barrier. However, users must make sure that the temperature rise of the equipment is below the rated value with the current and voltage supplied from the discrete input barrier. Also take the ratings of intrinsically safe circuit into consideration. IDEC's EB3P-L type pilot light lights and EB3P-Z type buzzers satisfy the ratings.

EB3P-L Pilot light: ø22 and ø30, a total of 78 types

- Super LED installed
- Lens colors: amber, blue, green, red, white, and yellow
- Accessories and maintenance parts are the same as standard control units. See IDEC's control units catalogs.

IPL1 Miniature pilot light: ø6, ø8, and ø10, a total of 40 types

- Low price
- Illumination colors: amber, green, red, white, and yellow

EB3P-Z buzzer: Continuous and intermittent sound, ø30 mounting hole, terminal block type

- Degree of protection: IP20
- Common wiring is not available due to high inductance value.
- Approved by TIIS only

ø30: APN, UPQN equivalent
ø22: APW, HW,LW,UPQW equivalent



When connecting one buzzer and 15 pilot lights to EB3L-S16CSD, do not connect the negative lines of buzzer and pilot lights in common. Connect the buzzer and pilot lights to the barrier using separate lines (15 pilot lights can be wired with one common line).

OT Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Connecting Illuminated Switches

Made possible with the combination of EB3L and EB3C.

User benefits

- Flexibility of control panel design
Explosion protected panels can be designed in a similar manner to non-explosion protected panels (non-explosion protected panels can be used as explosion protected panels without any changes).
- Control panel becomes smaller.

Connectable illuminated switch: 134 types

EB3P-LB
Illuminated Pushbutton Switch

{

ø30: ALN2 equivalent

ø22: ALW2, HW, LW equivalent

}

EB3P-LS
Illuminated Selector Switch

{

ø30: ASLN equivalent

ø22: ASLW, HW, LW equivalent

}

Super LED installed.
Lens color: amber, blue, green, red, white, yellow

Connection Method

1. Difference between EB3C and EB3L

EB3C: ON/OFF output signals to other equipment.

EB3L: ON/OFF input signals to pilot lights and buzzers.

Connection to PLC's inputs.

Connection from PLC's outputs.

2. Sink and Source

Available combination: Sink Output + Source Input or Source Output + Sink Input. Sink output (source input) is mainly adopted in Japan (Europe: source output).

Other information

- Up to 16 channels, including both pilot lights and contacts, can be connected in common wiring.
- Connect the common wires of pilot lights and contacts separately to the N terminals of each barrier.
- Use two wires to connect the common terminals (N terminals) EB3C and EB3L barriers.
- Accessories and maintenance parts are the same as the standard control units. See IDEC's control units catalogs for details.

Safety Precautions

Electrostatic protection: Prevention of fire ignition and explosion caused by electrostatic charges.

- As required by IEC60079-11, limit the exposed surface of plastic equipment (switch, pilot light) installed in hazardous areas.
- 20 cm² max. for IIC gas atmosphere.
- 100 cm² max. for IIB and IIA gas atmosphere.
- When the surface area of other than operating parts exceeds the limit, attach a caution plate.
- Pushbutton, knob, or other parts which are frequently touched by operators.

EB3C Separate and Common Types

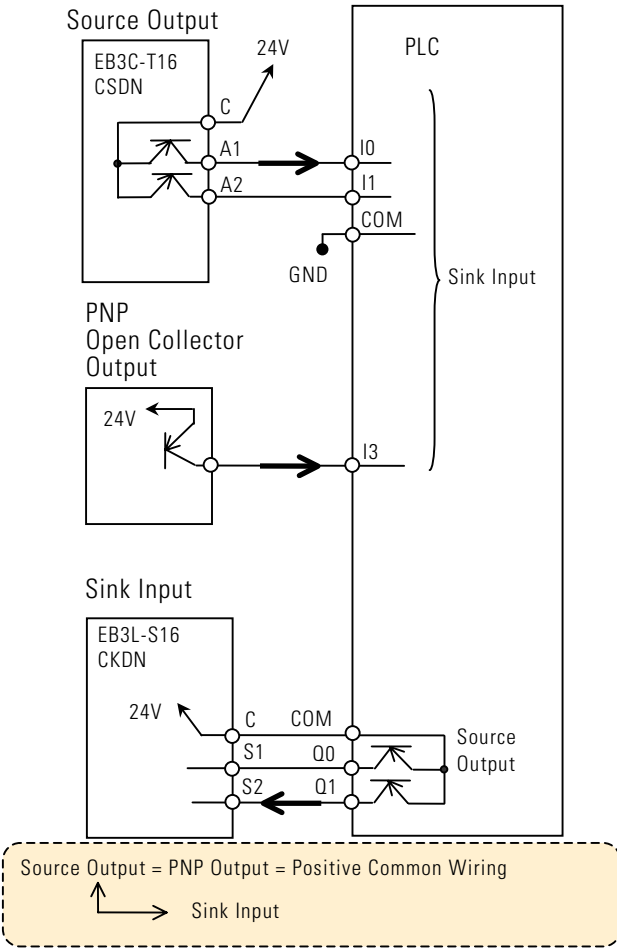
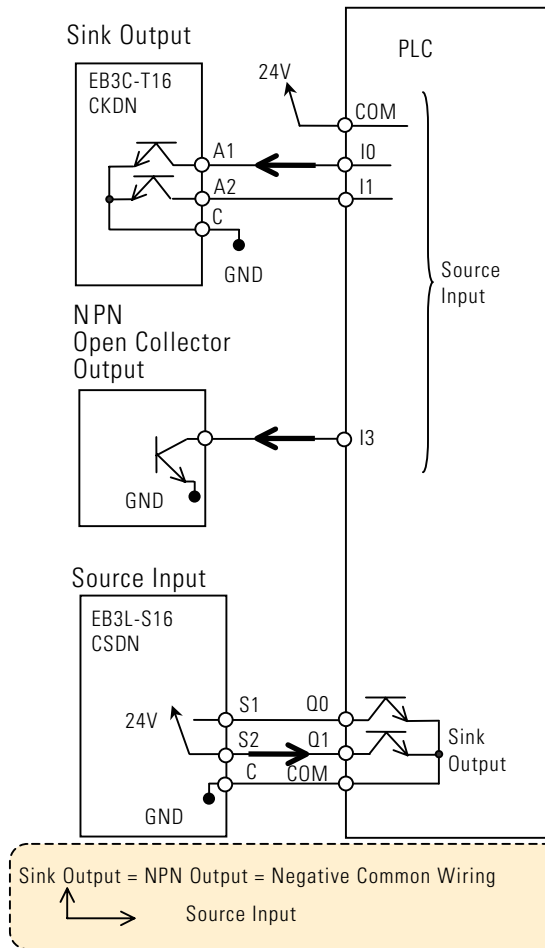
1. Separate Wiring Type

The output circuit is isolated for each channel. Both sink and source outputs can be connected.

2. Common Wiring Type

The output circuit is not isolated from each other and uses common terminal C. Sink and source outputs are available on different modules.

Sink/Source Definition



Relay Terminal Block

When connecting a discrete input barrier to the switches and pilot lights installed in hazardous area, use a relay terminal block.



A relay terminal block can be eliminated when using EB3C and EB3L, as these barriers are considered as relay terminal blocks.

Cable Extension and Intrinsic Safety Parameter

- For wiring between the barrier and the switches and pilot lights installed in hazardous area, use a cable of 2.0 mm². The cable can be extended up to approximately 1 km.
- For EB3L of common wiring type, use a cable of 2.0 mm². The cable can be extended up to approximately 600 m. Longer cables cause dim LED lighting.



Make sure that wiring parameters (inductance, capacitance, resistance) do not exceed the maximum limit.

Noise Countermeasure

- The LED connected to the EB3L may blink due to noises.
- Check the wiring so that noise is not imposed on the EB3L (eg. separation from power line).
- Noise can be avoided also by inserting a noise filter for AC line into the barrier's power input part.

Recommended noise filters:

TDK-Lambda			Schaffner
RSEL-2002W	RSEL-2002A	ZCB2203-11 => RSEL-2003A	FN670-3/06
RSEL-2003W	RSEL-2003A	ZCB2206-11 => RSEL-2006A	
RSEL-2006W	RSEL-2006		

OI Touchscreens

PLCs

Automation Software

Power Supplies

Sensors

Communication

Barriers

Safety Overview..... 282

Safety Components..... 284

Safety Overview

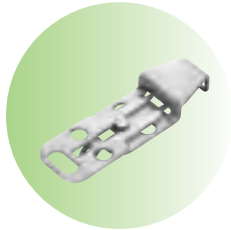


www.IDEC.com/safety



Safety Overview

Safety Product Accessories



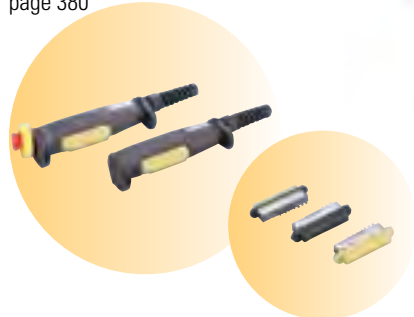
Teaching Pendant



For information on the Teaching Pendant visit www.IDEC.com/oi/pendant

Grip Switch / Enabling Switch

Safety devices are intended to help the operator avoid dangers of unexpected machine operation during work within hazardous areas.



Emergency Stop Switch

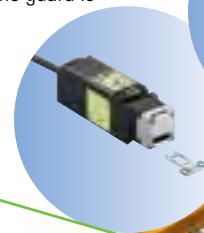
page 654



Padlockable type

Solenoid Interlock Switch

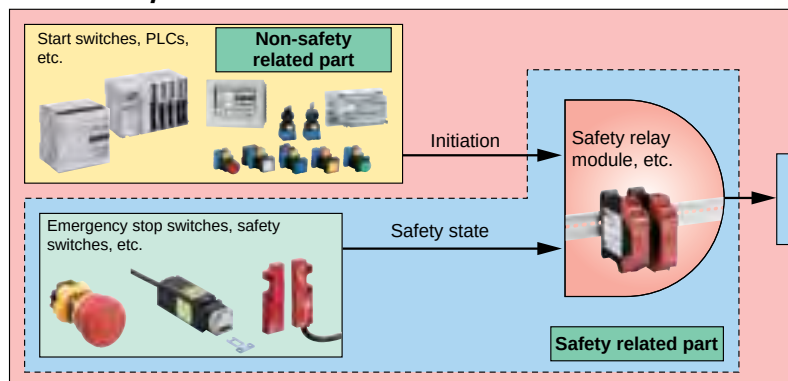
This safety switch serves as an interlock that enables the machine to start only when the guard is closed and locked. The guard is unlocked by the solenoid.



Signalight Tower

page 704

Production System



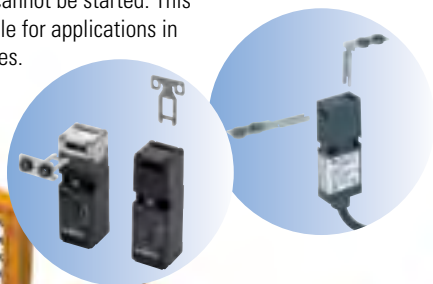
Safety Relay Module

This device is intended to start the machine only when the safety control system is functioning normally and safety information from safety devices (safety switch, emergency stop switch, etc.) is relayed to the machine.



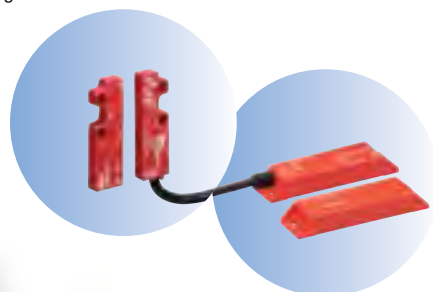
Interlock Switch

This safety switch serves as an interlock that enables the machine to start only when the guard is closed. Once the guard is opened, the machine stops or cannot be started. This safety switch is suitable for applications in limited mounting spaces.



Non-contact Safety Interlock Switch

This safety switch is an interlock switch that can detect the open/close status of the door without mechanical contact. Taking advantage of dust-proof and water-proof construction as well as miniature size, the non-contact safety switch is suitable for semiconductor manufacturing systems, food processing systems, and assembly lines.



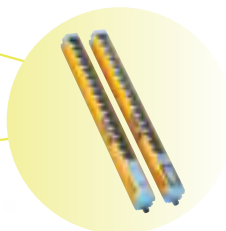
Emergency Stop Switch

To avoid accidents in an emergency, this switch is used to stop the machine. This switch provides a safety lock mechanism to prevent accidental startup of the machine.



Safety Light Curtain

This device detects the entry of a person or object into the hazardous area by the interruption of light beams.



Emergency Stop Control Box

This control box can be mounted separate from the control panel wherever required to ensure safety.

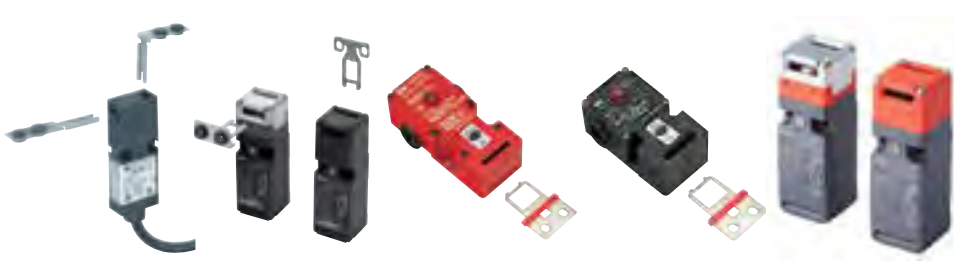


Safety Components

Emergency Stop Switches pages 285, 275, 478, 497, 501, 603, 634, 646, 603 & 739



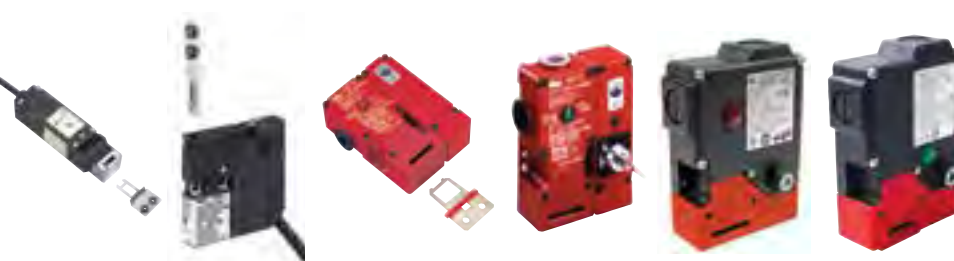
Safety Interlock Switches page 297



Key Locking Safety Switches page 355



Solenoid Safety Interlock Switches page 316



Door Handle Gate System page 380



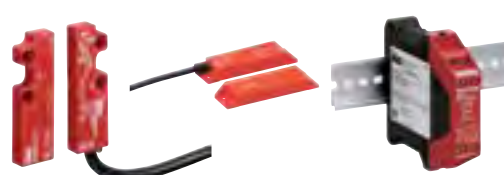
Enabling Switches / Grip Switches page 389



Safety Control Modules page 419



Non-contact Safety Switches page 368



Safety Light Curtains page 457



Selection Guide..... 288

ø22mm XW E-Stops 289

XW Series E-Stops



www.IDEC.com/usa/estop



Revolutionary “Safe Break Action” Design

The IDEC Emergency Stop switches, the X6, XA, XW, and XN series, include revolutionary new technology that have changed the way E-Stop switches are designed. This “safe break action” concept provides greater levels of human safety and is the first of its kind in the world!

Innovative Design

Conventional E-Stop switches are designed with spring pressure on the Normally Closed (NC) contacts, keeping them in the closed position and allowing the machine to operate. Improper installation or excessive force to the stop button in an emergency may break or dislodge a vital part, causing the spring loaded contact to stay closed. This situation renders the E-Stop incapable of stopping the machine, and can lead to catastrophic events, personal injury and possible loss of life.

Safe Break Action Design

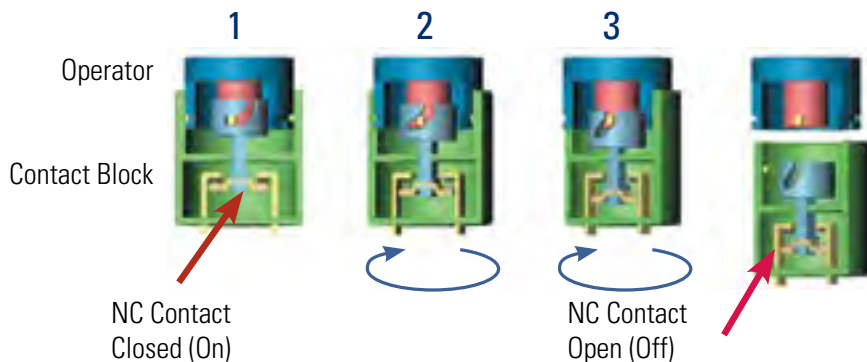


This one-of-a-kind “safe break action” design, found only in the IDEC XA, XW, and XN series, reverses the energy direction and uses the spring-pressure to assure that the NC contacts will open if the emergency switch is damaged or the contact blocks separate due to excessive force. The NC contacts will reliably open, even if they are welded, and stop the machine. Combined with IDEC quality, this is the E-Stop switch you want in a life threatening situation.

Level 4 Safety

X6, XA, XW & XN Series, The Safe Break Action E-Stops!

Internal view while removing the contact block



Reach for the “Safe Break Action”

When the contact block is removed from the operator the main contact (NC) is forced to open (OFF). When removing the contact block, the cam provides a direct opening action to open the contact.

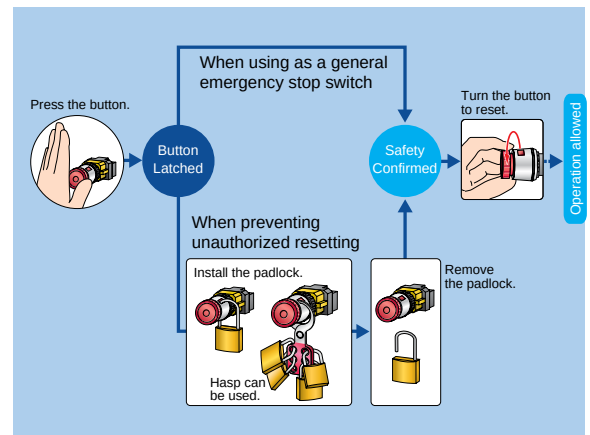
Padlock E-Stops

As shown in the diagram, upon latching a traditional E-stop, it is up to the technician to verify and confirm that the machine area is clear and there are no other technicians working before resetting the E-stop and turning on the machine. There is always a chance that the technician might miss someone in the work area before resetting the E-stop, potentially causing injury to that person.

The solution is XN4E series padlock E-Stops, which allow technicians to install their personal padlocks at the spot of actuation of the E-Stop ensuring their own safety. The diagram shows how personal padlocks can be installed. Each one blocks the resetting of the E-stop until all the padlocks are removed. This provides added safety and prevents unauthorized or accidental resetting of the E-stops. A maximum of 20 padlocks can be installed by using lockout hasps.

The X Series of E-Stop switches include up to four contacts in a very compact package. In today's automated world, more customers are requiring E-Stop switches with at least three contacts. (Two of the contacts trip the power and the third contact is used to alert a safety-monitoring relay.) Both the XA and XW series switches offer up to four “safe-break” contacts with a depth behind the panel that is half the size of conventional E-Stop switches. This means that there is an additional contact available and the **switches can be used in Level 4 safety category applications.**

IDEC's new E-Stop switches are secured from the rear of the control panel so that the E-Stop cannot be removed from the front. Another unique feature of the XA & XW E-Stop switches is that either a push-turn or push-pull reset method can be used to reset the switches. This eliminates any possible confusion for operators when resetting the switch. The durability and quality of these new E-Stop switches make them extremely reliable. They can withstand the increased high stress caused by panic or a reaction to an emergency situation.



Important Safety Information

Reverse Energy Structure

With X Series E-Stops, the potential energy level of the latched status is lower than that of the normal status. When the switch is damaged due to excessive shocks, the NC contacts will turn off, thus stopping the machine (patented design).

Direct Opening Action

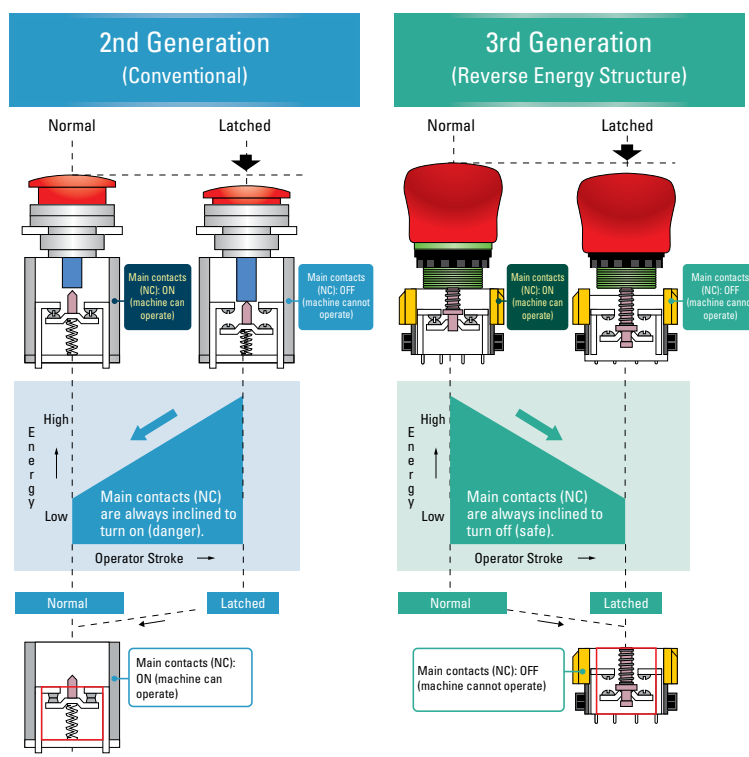
Even if the contacts are welded, the force applied on the button directly opens the contact.

Rated Insulation Voltage: 250V

Rated Thermal Current: 2.5A

Safety Interlock Mechanism

Contacts are opened when the operator is locked, and remain opened until the operator is unlocked intentionally. (IEC60947-5; 6:2)



Two E-Stops in One

Pushlock Pull or Turn Reset

The X Series E-Stops can be reset either by pulling or turning the button. This ensures that the reset action will always be different from the make action. With traditional E-Stops, you need to choose between Push-Pull or Pushlock Turn Reset. With the IDEC X Series E-Stops you get both in one switch.



XN4E, padlock type is Turn Reset only.

Pull Reset

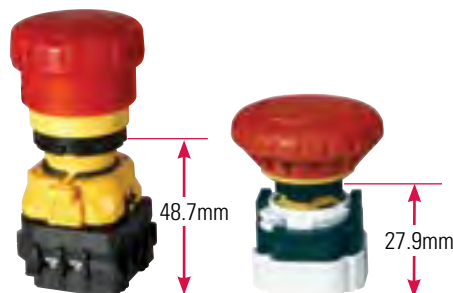


Turn Reset

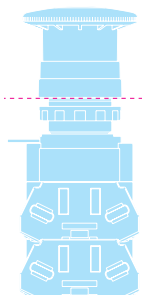


Compact

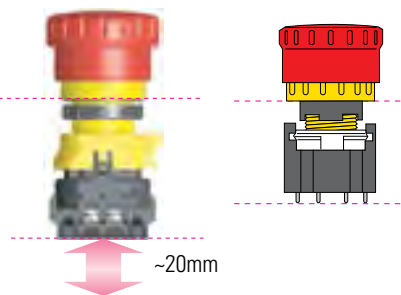
Compact Body with Four Contacts



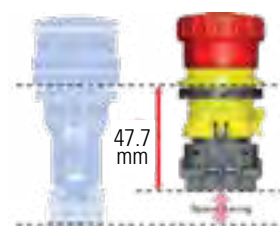
Traditional E-Stop



22mm XW and 16mm XA Series



XN Series



Selection Guide

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Series	X6	XA	XW	XN
Appearance				
Page	see Switches & Pilot Devices section	see Switches & Pilot Devices section	289	see Switches & Pilot Devices section
Mounting Hole	16mm	16mm	22mm	30mm
Operator Type	Non-Illuminated E-Stops: Pushlock Pull/Turn Reset	Illuminated & Non-Illuminated E-Stops: Pushlock/Turn Reset, Push-Pull		
Reset Action	Pushlock Pull or Turn Reset (both actions available in each switch, except XN4E)			
Contact Configuration	1NC, 2NC	1NO - 1NC, 2NC, 1NO-3NC, 4NC		
Electrical Life	100,000 Minimum			
Mechanical Life	100,000 Minimum	250,000 Minimum		
Termination	Solder/Tab Terminals	PCB & Solder Terminals	Screw Terminals	
Degree of Protection	IP65 (IEC 60529)	IP65 (IEC60529)	Operator: IP65 (IEC60529) Terminal: IP20 (when XW9Z-VL2MF is installed)	
Approvals				

 X6 and XA series UL recognized.

22mm XW E-Stops

Key features:

- The depth behind the panel can be as little as 46.4 mm for 1 to 4 contacts (with terminal cover) for illuminated and non-illuminated units.
- IDEC's original "Safe break action" ensures that the NC contacts open when the contact block is detached from the operator.
- 1 to 4NC main contacts and 1 or 2NO monitor contacts
- Push-to-lock, Pull or Turn-to-reset operator
- Models with mechanical indicator on the operator body show the normal/latched status (green: normal).
- Safety lock mechanism (IEC60947-5-5, 6.2)
- Degree of protection IP65 (IEC60529)
- Fingersafe (IP20) terminals
- Three button sizes: ø38, ø40 and ø60 mm
- Push-ON illumination type available (40mm mushroom head)
- Direct opening action mechanism (IEC60947-5-5, 5.2, IEC60947-5-1, Annex K)
- RoHS compliant (EU directive 2002/95/EC).
- UL c-UL listed. EN compliant
- UL NISD category emergency stop device (File# E305148)



UL File #E68961



CCC No. 2005010305150897



Specifications

Applicable Standards	IEC60947-5-5, EN60947-5-5, JIS C8201-5-1, UL508, UL991, NFPA79, CSA C22.2 No. 14, GB14048.5
Operating Temperature	Non-illuminated: -25 to +60°C (no freezing), Illuminated: -25 to +55°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Storage Temperature	-45 to +80°C
Operating Force	Push-to-lock: 32N Pull-to-reset: 21N Turn-to-reset: 0.27N·m
Minimum Force Required for Direct Opening Action	80N
Min Operator Stroke Required for Direct Opening Action	4mm
Maximum Operator Stroke	4.5mm
Contact Resistance	50mΩ maximum (initial value)
Contact Material	Gold plated silver
Insulation Resistance	100MΩ minimum (500V DC megger)
Impulse Withstand Voltage	2.5kV
Pollution Degree	3
Operation Frequency	900 operations/hour
Shock Resistance	Operating extremes: 150m/s ² (15G), Damage limits: 1000m/s ² (100G)
Vibration Resistance	Operating extremes: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ² Damage limits: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ²
Mechanical Life	250,000 operations minimum
Electrical Life	100,000 operations minimum, (250,000 operations minimum @ 24V AC/DC, 100mA)
Degree of Protection	Operator: IP65 (IEC60529) Terminal: IP20 (when XW9Z-VL2MF is installed)
Terminal Style	M3.0 screw terminal
Recommended Tightening Torque for Locking Ring	2.0N·m
Wire Size	16 AWG max
Weight	ø40mm: 72g ø60mm: 81g

Part Numbers

Standard Button Without Mechanical Indicator

Style	Operator Type	Monitor Contact	Main Contact	Part Number
Non-Illuminated		1NO	1NC	XW1E-BV411M-R
		—	2NC	XW1E-BV402M-R
		2NO	2NC	XW1E-BV422M-R
		1NO	3NC	XW1E-BV413M-R
		—	4NC	XW1E-BV404M-R
	60mm Mushroom	1NO	1NC	XW1E-BV511M-R
		—	2NC	XW1E-BV502M-R
		2NO	2NC	XW1E-BV522M-R
		1NO	3NC	XW1E-BV513M-R
		—	4NC	XW1E-BV504M-R
Illuminated ¹		1NO	1NC	XW1E-LV411Q4M-R
		—	2NC	XW1E-LV402Q4M-R
		2NO	2NC	XW1E-LV422Q4M-R
		1NO	3NC	XW1E-LV413Q4M-R
	40mm Mushroom Push-ON LED ²	—	4NC	XW1E-LV404Q4M-R
		1NO	2NC	XW1E-TV412Q4M-R
		1NO	2NC	XW1E-TV412Q4M-R

Smooth Button With Mechanical Indicator

Style	Operator Type	Monitor Contact	Main Contact	Part Number
Non-Illuminated		—	1NC	XW1E-BV4TG01MR
		—	2NC	XW1E-BV4TG02MR
		—	3NC	XW1E-BV4TG03MR
		—	4NC	XW1E-BV4TG04MR
		1NO	1NC	XW1E-BV4TG11MR
Illuminated	38mm Mushroom	1NO	2NC	XW1E-BV4TG12MR
		1NO	3NC	XW1E-BV4TG13MR
		2NO	4NC	XW1E-BV4TG22MR
	38mm Mushroom with built-in 24V AC/DC LED ¹	—	1NC	XW1E-LV4TG01Q4MR
		—	2NC	XW1E-LV4TG02Q4MR
		—	3NC	XW1E-LV4TG03Q4MR
		—	4NC	XW1E-LV4TG04Q4MR
		1NO	1NC	XW1E-LV4TG11Q4MR
		1NO	2NC	XW1E-LV4TG12Q4MR
		1NO	3NC	XW1E-LV4TG13Q4MR
		2NO	2NC	XW1E-LV4TG22Q4MR

-  1. The light is independent of the position of the switch, except for push-on LED type.
 2. The light only operates when the switch is pressed as it is internally wired.

-  Note: Pushlock pull/turn reset switches are locked when pressed, and reset when pulled or turned clockwise.
 1. LED lamp is not removable.

XW Series EMO Switches

Style	NC Main Contact	NO Monitor Contact	Part Number
	1NC	-	XW1E-BV401M-RH-EMO
	2NC	-	XW1E-BV402M-RH-EMO
	3NC	-	XW1E-BV403M-RH-EMO
	4NC	-	XW1E-BV404M-RH-EMO
	1NC	1NO	XW1E-BV411M-RH-EMO
	2NC	1NO	XW1E-BV412M-RH-EMO
	3NC	1NO	XW1E-BV413M-RH-EMO
	2NC	2NO	XW1E-BV422M-RH-EMO

FB Enclosures with XW E-Stops

	40mm Push-lock Turn/Pull Reset Non-Illuminated	2NC	—	FB1W-XW1E-BV402MR
		1NC	1NO	FB1W-XW1E-BV411MR
		2NC	2NO	FB1W-XW1E-BV422MR
		3NC	1NO	FB1W-XW1E-BV413MR
		4NC	—	FB1W-XW1E-BV404MR
	40mm Push-lock Turn/Pull Reset Illuminated*	2NC	—	FB1W-XW1E-LV402MR
		1NC	1NO	FB1W-XW1E-LV411MR
		2NC	2NO	FB1W-XW1E-LV422MR
		3NC	1NO	FB1W-XW1E-LV413MR
	60mm Push-lock Turn/Pull Reset Non-Illuminated	4NC	—	FB1W-XW1E-LV404MR
		2NC	—	FB1W-XW1E-BV502MR
		1NC	1NO	FB1W-XW1E-BV511MR
		2NC	2NO	FB1W-XW1E-BV522MR
		3NC	1NO	FB1W-XW1E-BV513MR
		4NC	—	FB1W-XW1E-BV504MR



For added safety, Switch Guards and Nameplates can be used with E-Stop Enclosures



*LED illumination voltage: 24V AC/DC

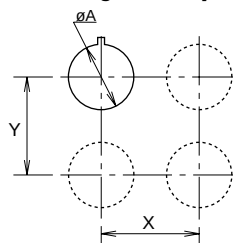
Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Rated Current (Ith)				5A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current	Main Contacts (NC)	AC 50/60Hz	Resistive Load (AC-12)	—	5A	3A
			Inductive Load (AC-15)	—	3A	1.5A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Monitor Contacts (NO)	AC 50/60Hz	Resistive Load (AC-12)	—	1.2A	0.6A
			Inductive Load (AC-14)	—	0.6A	0.3A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A



Minimum applicable load: 5V AC/DC, 1mA (reference value).
The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.

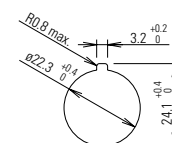
Mounting Hole Layout



Measurements

Size	ØA	X & Y
40mm	22.3 ^{+0.4}	70mm min

Panel Cutout



Illuminated Unit LED Ratings

Operating Voltage	Current
24V AC/DC ±10%	15mA

Depth Behind the Panel

Depth (mm)	Description
46.4	with indicator, 1 - 4 contacts, both illuminated and non-illuminated
48.7	w/o indicator, 1 - 4 contacts, both illuminated and non-illuminated

Part Number Key

XW1E - L V 4 TG 11 Q4MR

Illumination

B: Non-Illuminated
L: Illuminated LED
T: Illuminated Push-ON LED

Indicator

TG: w/green mechanical indicator
blank: w/o indicator

Contact Configuration

11: 1NO - 1NC
02: 2NC
13: 1NO - 3NC
04: 4NC
22: 2NO-2NC
12: 1NO-2NC (Push-ON LED only)
01: 1NC (EMO switch only)
03: 3NC (EMO switch only)

Color

R: red with indicator
-R: red w/o indicator
-RH-EMO: red w/o indicator with EMO engraving

Voltage Code

Blank: Non-illuminated
Q4: Illuminated 24V AC/DC

Mushroom Size

4: Ø40mm
5: Ø60mm (non-illuminated only)

Terminal Arrangements (Bottom View)

4NC

1NO-3NC

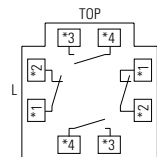
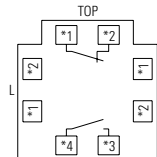
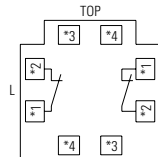
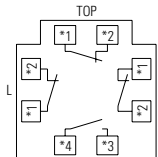
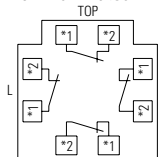
2NC

1NO-1NC

2NO-2NC

1NO-2NC

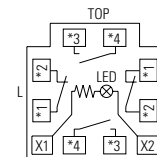
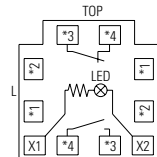
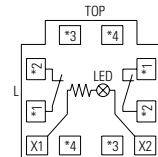
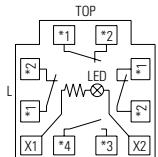
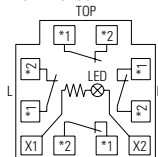
Non-Illuminated



Push-ON

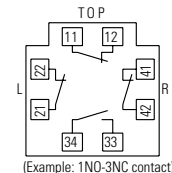


Illuminated



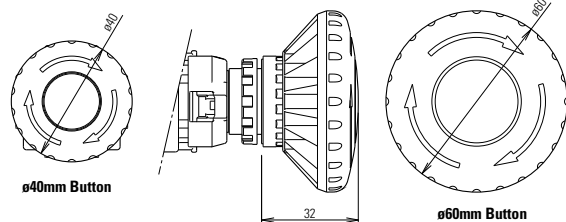
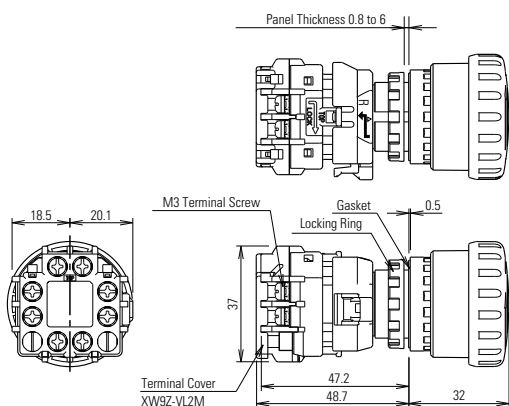
Terminal Marking Description

- Contact Type
1-2: NC main contact
3-4: NO monitor contact
- Contact Number (1-4)
Starting with the contact on TOP in a counterclockwise direction.
Note:
1: contact on the TOP
2: contact on the Left
3: contact on the Bottom
4: contact on the Right

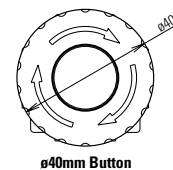
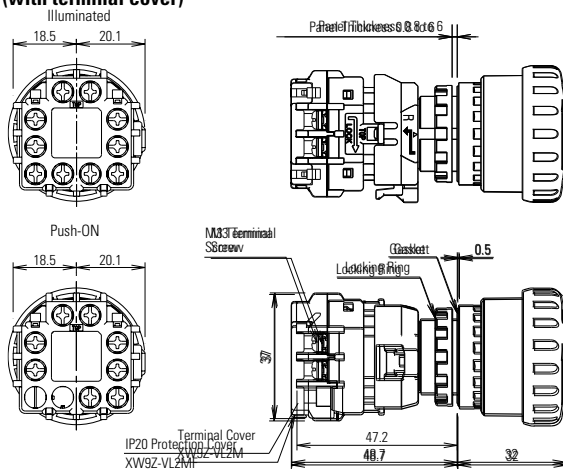


Dimensions (mm)

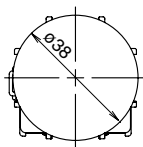
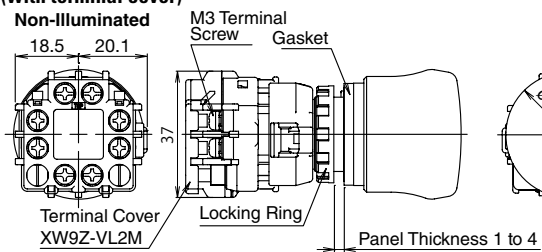
**XW Standard Button Non-Illuminated Without Indicator
(with terminal cover)**



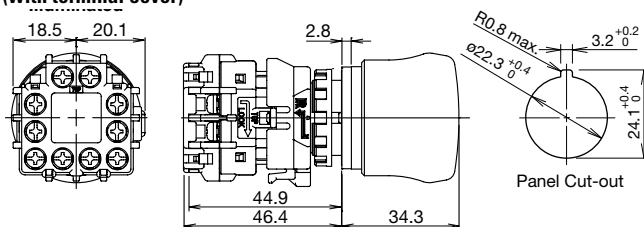
**XW Standard Button LED Illuminated/Push-ON Without Indicator
(with terminal cover)**



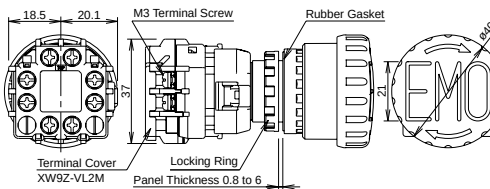
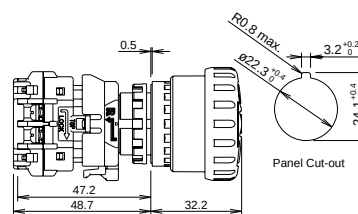
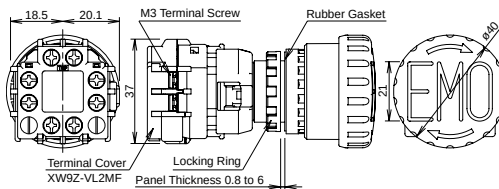
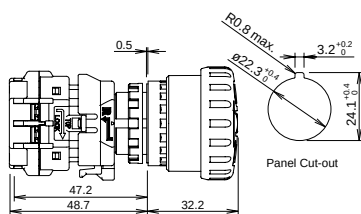
**XW Smooth Button Non-Illuminated With Indicator
(with terminal cover)**



**XW Smooth Button LED Illuminated/Push-ON With Indicator
(with terminal cover)**



EMO



Accessories: Terminal Covers

Appearance	Description	Part Numbers
	Terminal Cover for contact block	XW9Z-VL2M
	IP20 Fingersafe Cover	XW9Z-VL2MF

Accessories: Nameplates

Appearance	Legend	Part Number	Inner Ø	Outer Ø
	(blank)	HWAV-0	22mm	60mm
	"Emergency Stop"	HWAV-27	22mm	60mm
	(blank)	HWAV5-0	22mm	80mm
	"Emergency Stop"	HWAV5-27	22mm	80mm



Use 60mm nameplates for 39mm and 40mm mushroom buttons and 80mm nameplates for 60mm mushroom buttons.

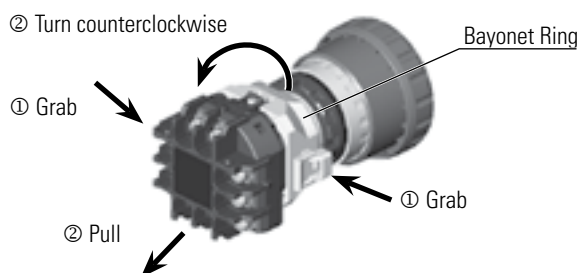
Accessories: Shrouds

Appearance	Part Numbers	E-Stop Types	Applicable Standards
	HW9Z-KG1	38mm, 40mm Mushroom Head	SEMI S2-0703, 12.5.1 Compliant
	HW9Z-KG2	38mm, 40mm, and 60mm Mushroom Head	SEMI S2-0703, 12.5.1 & SEMATECH Compliant
	HW9Z-KG3	38mm, 40mm Mushroom Head	SEMI S2 Compliant (Approved by TUV)
	HW9Z-KG4	38mm, 40mm Mushroom Head	SEMI S2 Compliant (Approved by TUV) & SEMATECH

Operating Instructions

Removing the Contact Block

First unlock the operator button. Grab the bayonet ring ① and pull back the bayonet ring until the latch pin clicks ②, then turn the contact block counterclockwise and pull out ③.

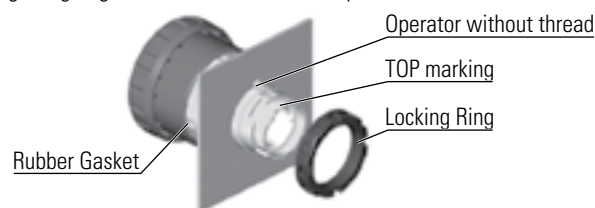


Notes for removing the contact block

- When the contact block is removed, the monitor contact (NO contact) is closed.
- While removing the contact block, do not exert excessive force, otherwise the switch may be damaged.
- An LED lamp is built into the contact block for illuminated pushbuttons. When removing the contact block, pull the contact block straight to prevent damage to the LED lamp. If excessive force is exerted, the LED lamp may be damaged and fail to light.

Panel Mounting

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side without thread on the operator with TOP marking upward, and tighten the locking ring using ring wrench MW9Z-T1 to a torque of 2.0 N·m maximum.

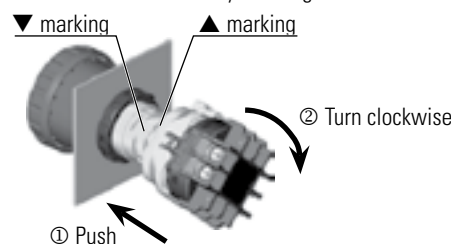


Notes for Panel Mounting

To prevent the XW emergency stop switch from rotating when resetting from the latched position, use of an anti-rotation ring (HW9Z-RL) or a nameplate is recommended.

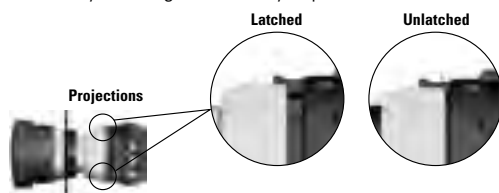
Installing the Contact Block

First unlock the operator button. Align the small ▼ marking on the edge of the operator with the small ▲ marking on the yellow bayonet ring. Hold the contact block, not the bayonet ring. Press the contact block onto the operator and turn the contact block clockwise until the bayonet ring clicks.



Notes for installing the contact block

Make sure that the bayonet ring is in the locked position. Check that the two projections on the bayonet ring are securely in place.

**Wiring**

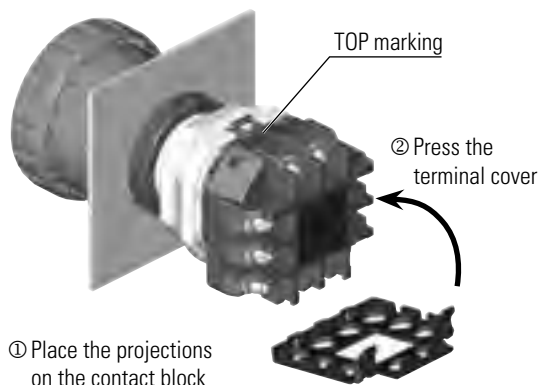
The applicable wire size is 16 AWG maximum.

Screw Terminal

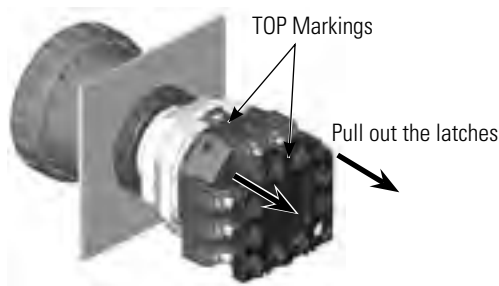
1. Wire thickness: AWG18 to 16
2. Tighten the M3 terminal screw to a tightening torque of 0.6 to 1.0 N·m.

Installing and Removing Terminal Covers**XW9Z-VL2M**

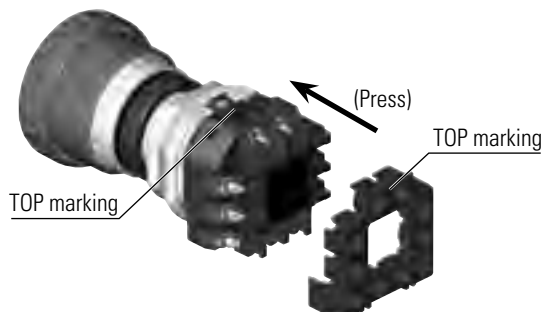
To install the terminal cover, align the TOP marking on the terminal cover with the TOP marking on the contact block. Place the two projections on the bottom side of the contact block into the slots in the terminal cover. Press the terminal cover toward the contact block.



To remove the terminal cover, pull out the two latches on the top side of the terminal cover. Do not exert excessive force to the latches, otherwise the latches may break.

**IP20 Protection Terminal Cover
XW9Z-VL2MF**

To install the IP20 protection cover, align the TOP marking on the cover with the TOP marking on the contact block, and press the cover toward the contact block.



1. Once installed, the XW9Z-VL2MF cannot be removed.
2. The XW9Z-VL2MF cannot be installed after wiring.
3. With the XW9Z-VL2MF installed, crimping terminals cannot be used.
4. Make sure that the XW9Z-VL2MF is securely installed. IP20 protection cannot be achieved when installed loosely, and electric shocks may occur.

Contact Bounce

When the button is reset by pulling or turning, the NC main contacts will bounce. When pressing the button, the NO monitor contacts will bounce.

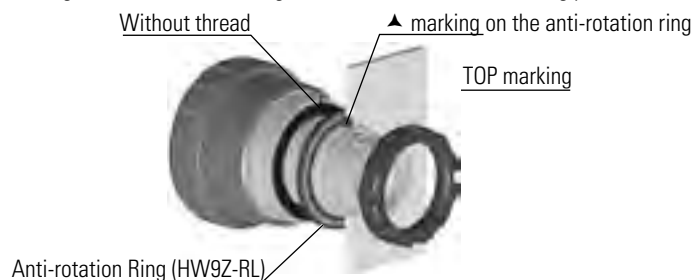
When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms).

LED Illuminated Switches

LED lamp is built into the contact block and cannot be replaced.

**Installing the Anti-rotation Ring
HW9Z-RL**

Align the side without thread on the operator with TOP marking, the small marking on the anti-rotation ring, and the recess on the mounting panel.



Selection Guide..... 296

HS6B Subminiature..... 297

HS5D Miniature 302

HS2B Full Size 309

HS1B Full Size 313

HS6E Subminiature with Solenoid..... 316

HS5E Miniature with Solenoid 325

HS1E Full Size Solenoid Locking..... 341

HS1C Full Size Solenoid Locking..... 347

HS1L Interlock Switches with Solenoid 352

HS5E-K Key Locking 355

ø22 HW Key Switch..... 364

HS7A-DMC Non-Contact Magnetic..... 368

HS7A-DMP Non-Contact Magnetic..... 372

HS3A Non-contact RFID 376

HS5B/HS5E Door Handle Actuator 380

Interlock
Switches



www.IDEC.com/safety



Selection Guide

Standard Interlock Safety Switches

Series	Subminiature	Miniature		Full Size	
	HS6B	HS5B	HS5D	HS2B	HS1B
Appearance					
Page	297	www.IDEC.com/safety		309	313
Size (mm)	30 x 15 x 78mm	91 x 30 x 30mm	30 x 30 x 90mm	52 x 35 x 98mm	52 x 35 x 125mm
Contacts	2 or 3	2	2 or 3	2	2
Termination	Integrated cable	Screw	Screw	Screw	Screw
Material	Plastic body	Plastic body	Metal or plastic head	Plastic head	Die-cast aluminum body

Solenoid Locking Safety Switches

Series	Subminiature	Miniature	Full Size		
	HS6E	HS5E	HS1E	HS1C	HS1L
Appearance					
Page	316	325	341	347	352
Size (mm)	75 x 15 x 75mm 500N	35 x 40 x 146mm 1400N	104 x 35 x 129mm 1500N	106 x 35 x 125mm 1500N	104 x 35 x 129mm 3000N
Contacts	5	4	3 or 4	3 or 4	6
Termination	Integrated cable	Integrated cable	Screw	Screw	Screw
Material	Plastic body	Metal head, plastic body	Plastic body	Die-cast aluminum body	Plastic body

Key Locking Safety Switch

Series	HS5E-K
Appearance	
Page	355
Size (mm)	35 x 40 x 146
Contacts	4
Termination	Integrated cable
Material	Metal head, plastic body

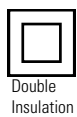
Non-contact Safety Switch

Series	HS7A-DMC	HS7A-DMP	HS3A
Appearance			
Page	368	372	376
Size (mm)	7 x 16 x 51	13 x 25 x 88	40 x 47 x 70mm
Contacts	2	3	3
Termination	Integrated cable	Integrated cable	M12
Material	PBT	PBT	PBT

HS6B Subminiature Interlock Switches

Key features:

- Only 78 x 30 x 15mm
- Two actuator entrances provide flexibility for installation options
- Integrated molded cable reduces wiring time
- IP67 (IEC60529)
- Direct Opening Action
- Actuators comply with ISO14119 and EN1088



Part Numbers

Contact Configuration	Cable Length	Part Number
1NC-1NO 	1m	HS6B-11B01
	3m	HS6B-11B03
	5m	HS6B-11B05
2NC 	1m	HS6B-02B01
	3m	HS6B-02B03
	5m	HS6B-02B05
2NC-1NO 	1m	HS6B-12B01
	3m	HS6B-12B03
	5m	HS6B-12B05
3NC 	1m	HS6B-03B01
	3m	HS6B-03B03
	5m	HS6B-03B05

Actuator Keys (order separately)

Appearance	Part Number	Shape
	HS9Z-A61	Straight
	HS9Z-A62	Right-angle
	HS9Z-A65	Adjustable actuator 90° angle
	HS9Z-A66	Adjustable actuator 180° angle

Actuators are not included and must be ordered separately.

Contact Configuration & Operation Chart

Type	Contact Configuration	Contact Operation Chart	
HS6B-11	1NC-1NO 	0.8 (Actuator Mounting Reference Position) 0 5.5 5.8 28.2 (Travel: mm)	
		11-12 33-34	
HS6B-02	2NC 	0.8 (Actuator Mounting Reference Position) 0 5.5 5.8 28.2 (Travel: mm)	
		11-12 31-32	
HS6B-12	2NC-1NO 	0.8 (Actuator Mounting Reference Position) 0 5.5 5.8 28.2 (Travel: mm)	
		11-12 21-22 33-34	
HS6B-03	3NC 	0.8 (Actuator Mounting Reference Position) 0 5.5 5.8 28.2 (Travel: mm)	
		11-12 21-22 31-32	

Actuator inserted completely

Actuator removed completely

: Contact ON (closed)
 : Contact OFF (open)

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Specifications

Conforming to Standards		EN1088, IEC60947-5-1, EN60947-5-1, GS-ET-15, IEC60664-1, IEC60204-1, EN60204-1, UL508, CSA C22.2 No. 14
Operating Temperature		−25 to +70°C (no freezing)
Storage Temperature		−40 to +80°C (no freezing)
Relative Humidity		45 to 85% RH (no condensation)
Storage Humidity		95% maximum (no condensation)
Altitude		2,000m maximum
Pollution Degree		3
Rated Insulation Voltage (U _i)		300V
Impulse Withstand Voltage (U _{imp})		4kv
Insulation Resistance		Between live & dead metal parts: 100MΩ maximum
		Between positive & negative live parts: 100MΩ minimum
Electric Shock Protection Class		Class II
Degree of Protection		IP67 (IEC60529)
Vibration Resistance	Operating Extremes	5 to 55 Hz, half amplitude 0.5 mm
	Damage Limits	30Hz, half amplitude 1.5mm
Contact Resistance		300mΩ maximum
Shock Resistance	Operating Extremes	300m/s ² (30G)
	Damage Limits	1000m/s ² (100G)
Direct Opening Travel		8mm minimum
Direct Opening Force		60N minimum
Thermal Current (I _{th})		2.5A
Operating Frequency		1200 operations/hour
Mechanical Life		1,000,000 operations (GS-ET-15)
Recommended Actuation Speed		0.05 to 1.0m/s
Wire Tensile Strength		50N minimum
Electrical Life		100,000 operations (at full rated load)
Conditional Short-Circuit Current		50A 250V (IEC60947-5-1, IEC60269-1, -2)
Weight		120g

Contact Ratings

Rated Operating Current (I _e)	Operating Voltage (U _e)		30V	125V	250V
	AC	Resistive load (AC-12)	–	2.5A	1.5A
		Inductive load (AC-15)	–	1.5A	0.75A
	DC	Resistive load (DC-12)	2.5A	1.1A	0.55A
			(2A)	(0.4)A	(0.2A)
		Inductive load (DC-13)	2.3A	0.55A	0.27A
			(1A)	(0.22A)	(0.1A)

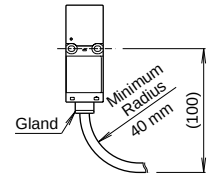
Installation Notes

Recommended Screw Torque

- Safety switch body installation (M4 screw): 1.0~1.5N-m
- Actuator installation (M4 screw): 1.0~1.5N-m

Handling Cables

- Do not tighten or loosen the fastened cable conduit of the safety switch
- Minimum bend radius of installed cable: 40mm

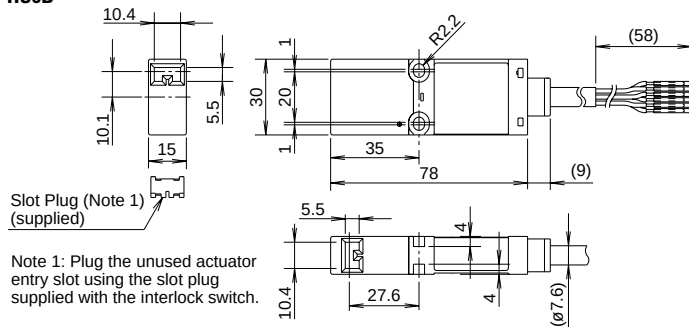


Wiring Designations

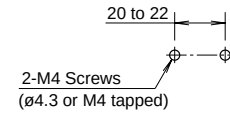
Part Number	Contact	Terminal #	Color
HS6B-12B01 (2NC-1NO)	NC	11-12	blue-blue/white
	NC	21-22	brown-brown/white
	NO	33-34	orange-orange/white
HS6B-03B01 (3NC)	NC	11-12	blue-blue/white
	NC	21-22	brown-brown/white
	NC	31-32	orange-orange/white
HS6B-11B01 (1NC-1NO)	NC	11-12	blue-blue/white
	NO	33-34	orange-orange/white
HS6B-02B01 (2NC)	NC	11-12	blue-blue/white
	NC	31-32	orange-orange/white

Dimensions (mm)

HS6B

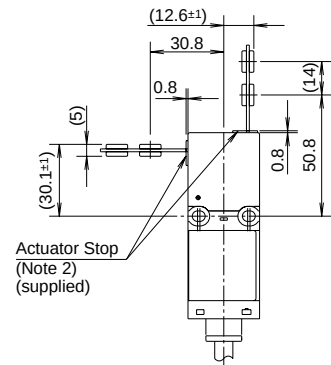


Installation

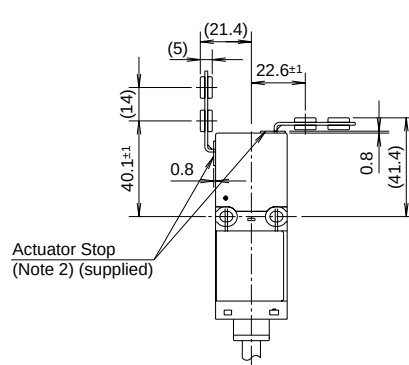


The interlock switch can be mounted in two directions.

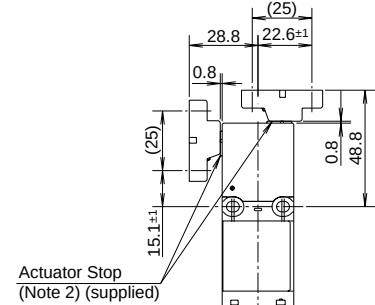
Using straight actuator (HS9Z-A61)



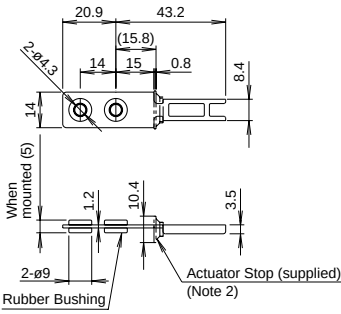
Using Right-angle actuator (HS9Z-A62)



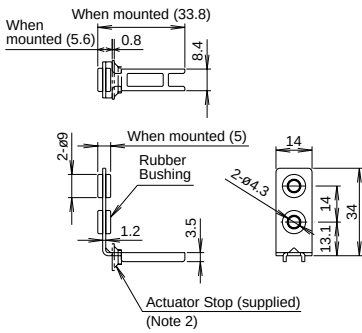
Using Angle Adjustable Actuator (HS9Z-A65/A66)



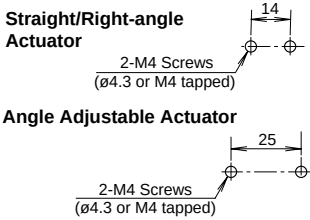
Straight actuator (HS9Z-A61)



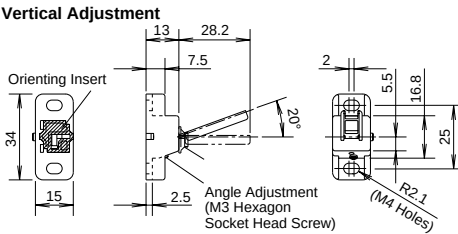
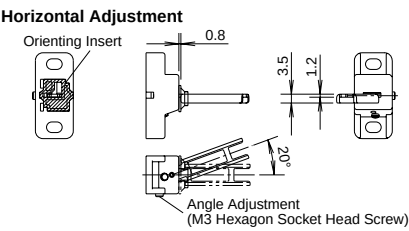
Right-angle actuator (HS9Z-A62)



Actuator Installation



Adjustable Actuator (HS9Z-A65)



The orientation of actuator adjustment (horizontal/vertical) can be changed using the orienting insert (white plastic) installed on the back of the actuator.

The base is made of glass-reinforced PA66 (66 nylon). Angle adjustment screws are stainless steel. When using adhesive on screws, take material compatibility into consideration.

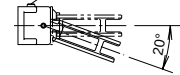
Note 2: After mounting the actuator, remove the actuator stop from the interlock switch.

Adjustable Actuator (HS9Z-A66)

The HS9Z-A65 and HS9Z-A66 have the metal key inserted in opposite directions.

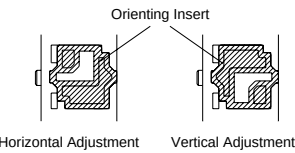
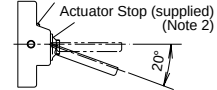
Horizontal Adjustment

Angle Adjustment
(M3 Hexagon Socket Head Screw)



Vertical Adjustment

Angle Adjustment
(M3 Hexagon Socket Head Screw)



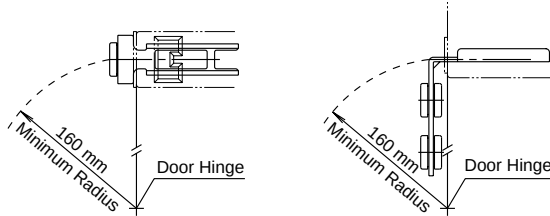
Minimum Radius of Hinged Door

- When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For doors with small minimum radius, use angle adjustable actuators (HS9Z-A65 or HS9Z-A66).

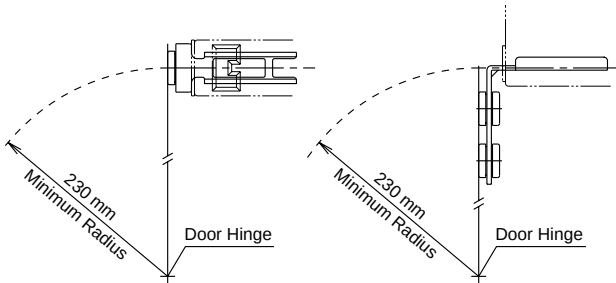
Note: Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

HS9Z-A62 Actuator

- When the door hinge is on the extension line of the interlock switch surface:

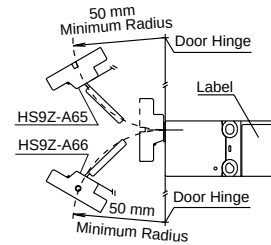
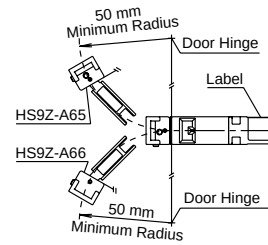


- When the door hinge is on the extension line of the actuator mounting surface:

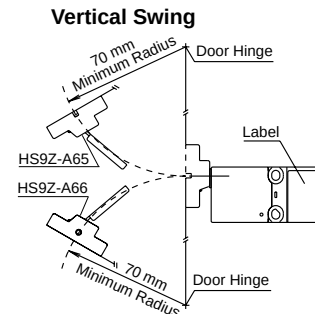
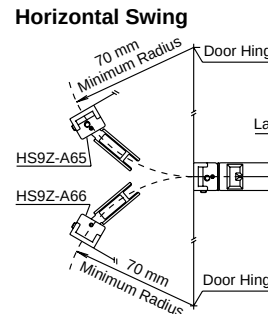


When using the HS9Z-A65/HS9Z-A66 Angle Adjustable (vertical) Actuator

- When the door hinge is on the extension line of the interlock switch surface:



- When the door hinge is on extension line of the actuator mounting surface:



Actuator Angle Adjustment for the HS9Z-A65/HS9Z-A66

- Using the angle adjustment screw, the actuator angle can be adjusted (see figures on page 370).
- Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.
- After installing the actuator, open the door. Then adjust the actuator so that its edge can enter properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not become loose.

HS5D Miniature Interlock Switches

Key features:

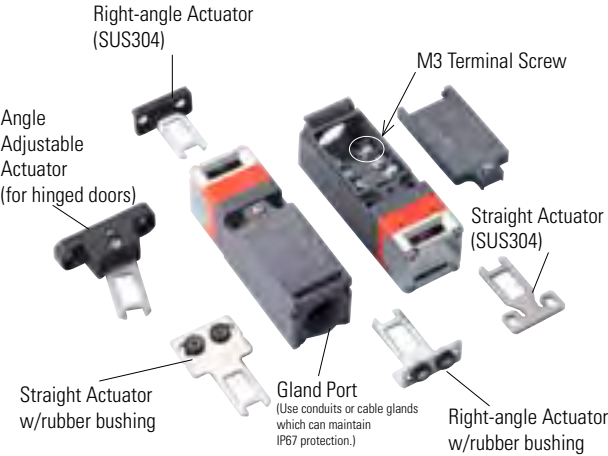
- Detects detachment of head for enhanced safety
- Compact dimensions with up to three contacts
- The head orientation can be rotated, allowing 8 different actuator entries
- NC contacts with direct opening action (IEC/EN60947-5-1)
- M3 terminal screws for easy wiring
- Gold-plated contacts suitable for small loads



Part Numbers

Contact Configuration	Gland Port Size	Plastic Head Type	Metal Head Type
1NC-1NO Main Circuit ⊖ 11 12 Monitor Circuit 23 24	G1/2 PG13.5 M20	HS5D-11RN HS5D-11RNP HS5D-11RNM	HS5D-11ZRN HS5D-11ZRNP HS5D-11ZRNM
2NC Main Circuit ⊖ 11 12 Monitor Circuit ⊖ 21 22	G1/2 PG13.5 M20	HS5D-02RN HS5D-02RNP HS5D-02RNM	HS5D-02ZRN HS5D-02ZRNP HS5D-02ZRNM
2NC-1NO Main Circuit ⊖ 11 12 Main Circuit ⊖ 21 22 Monitor Circuit 33 34	G1/2 PG13.5 M20	HS5D-12RN HS5D-12RNP HS5D-12RNM	HS5D-12ZRN HS5D-12ZRNP HS5D-12ZRNM
3NC Main Circuit ⊖ 11 12 Main Circuit ⊖ 21 22 Monitor Circuit ⊖ 31 32	G1/2 PG13.5 M20	HS5D-03RN HS5D-03RNP HS5D-03RNM	HS5D-03ZRN HS5D-03ZRNP HS5D-03ZRNM

Parts Description



Actuator Keys (order separately)

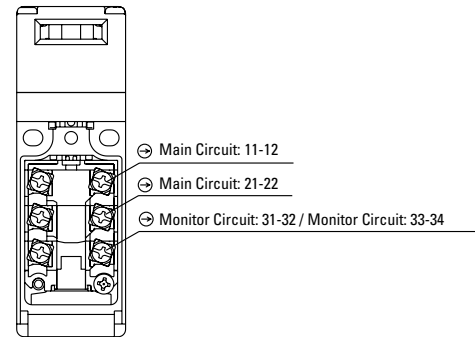
Item	Part Number	Description
	HS9Z-A51	Straight
	HS9Z-A51A	Straight w/rubber bushings
	HS9Z-A52	Right-angle
	HS9Z-A52A	Right-angle w/rubber bushings
	HS9Z-A55	Angle Adjustable (vertical/horizontal)
	HS9Z-A5P	Plug Actuator
	HS9Z-SH5	Sliding Actuator
	HS9Z-PH5	Padlock Hasp

Actuators are not included and must be ordered separately.

Contact Configuration & Operation Chart

Type	Contact Configuration	Contact Operation Chart (reference)												
		0 (Actuator Mounting Reference Position) Approx. 4.6 Approx. 6.7 Approx. 26.4 (Travel: mm) : Contact ON (closed) : Contact OFF (open)												
HS5D-11*	Main Circuit ⊕ 11 12 Monitor Circuit 23 24	<table><tr><td>11-12</td><td></td><td></td><td></td></tr><tr><td>23-24</td><td></td><td></td><td></td></tr></table>	11-12				23-24							
11-12														
23-24														
HS5D-02*	Main Circuit ⊕ 11 12 Main Circuit ⊕ 21 22	<table><tr><td>11-12</td><td></td><td></td><td></td></tr><tr><td>21-22</td><td></td><td></td><td></td></tr></table>	11-12				21-22							
11-12														
21-22														
HS5D-12*	Main Circuit ⊕ 11 12 Main Circuit ⊕ 21 22 Monitor Circuit 33 34	<table><tr><td>11-12</td><td></td><td></td><td></td></tr><tr><td>21-22</td><td></td><td></td><td></td></tr><tr><td>33-34</td><td></td><td></td><td></td></tr></table>	11-12				21-22				33-34			
11-12														
21-22														
33-34														
HS5D-03*	Main Circuit ⊕ 11 12 Main Circuit ⊕ 21 22 Monitor Circuit ⊕	<table><tr><td>11 - 12</td><td></td><td></td><td></td></tr><tr><td>21-22</td><td></td><td></td><td></td></tr><tr><td>31-32</td><td></td><td></td><td></td></tr></table> Actuator removed completely Actuator inserted completely	11 - 12				21-22				31-32			
11 - 12														
21-22														
31-32														

Terminal Arrangement



The operation characteristics shown in the chart above are for the HS9Z-A51. For other actuator types, add 1.3 mm.
The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch

Specifications

Applicable Standards	ISO14119, EN1088, IEC60947-5-1, EN60947-5-1 (TÜV approval), GS-ET-15 (TÜV approval), UL508, CSA C22.2 No. 14, GB14048.5 (CCC approval), IEC60204-1/EN60204-1 (applicable standards for use)	
Operating Temperature	-30 to +70°C (no freezing)	
Relative Humidity	45 to 85% (no condensation)	
Storage Temperature	-40 to +80°C (no freezing)	
Pollution Degree	3	
Impulse Withstand Voltage	4 kV	
Contact Resistance	50 mΩ maximum (initial value)	
Insulation Resistance (500V DC megger)	Between live and dead metal parts: 100 MΩ minimum Between terminals of different poles: 100 MΩ minimum	
Electric Shock Protection Class	Class II (IEC61140)	
Degree of Protection	IP67 (IEC60529)	
Shock Resistance	Damage limits: 1000 m/s ²	
Vibration Resistance	Operating extremes: 10 to 55 Hz, amplitude 0.5 mm Damage limits: 30 Hz, amplitude 1.5 mm	
Actuator Operating Speed	0.05 to 1.0 m/s	
Direct Opening Travel	10 mm minimum	
Direct Opening Force	50N minimum	
Operating Frequency	900 operations per hour	
Mechanical Durability	1,000,000 operations minimum (GS-ET-15)	
Electrical Durability	100,000 operations minimum (AC-12 250V, 6A) 1,000,000 operations minimum (24V AC/DC, 100 mA) (operation frequency: 900 operations per hour)	
Performance of Terminals 11-12 of Removed Head Unit	Mechanical damage limits: 10 operations min. Insulation resistance: 100 MΩ (initial value) Dielectric strength: 1000V, 1 minute (initial value)	
Conditional Short-circuit Current	100A (250V) (note)	
Weight (approx.)	Plastic head: 80g Metal head: 110g	

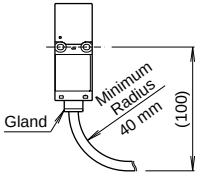
Contact Ratings

Rated Operating Current (I _e)	Operating Voltage (U _e)		30V	125V	250V
	AC	Resistive load (AC-12)	–	2.5A	1.5A
		Inductive load (AC-15)	–	1.5A	0.75A
	DC	Resistive load (DC-12)	2.5A (1A)	1.1A (0.22A)	0.55A (0.1A)

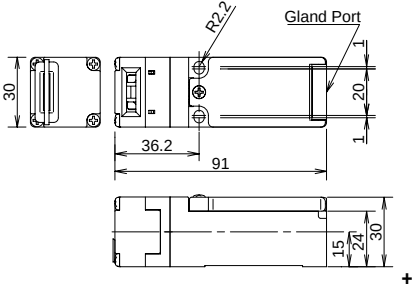
Installation Notes

Recommended Screw Torque

- Safety switch body installation (M4 screw): 1.0~1.5N·m
- Actuator installation (M4 screw): 1.0~1.5N·m

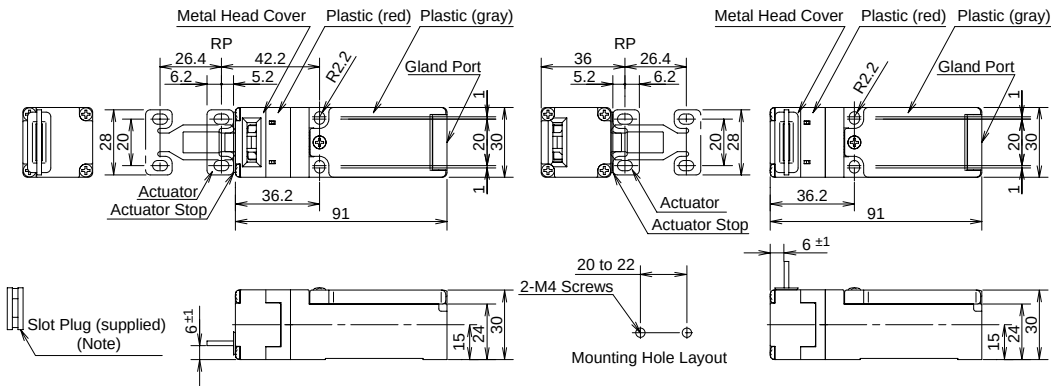


Dimensions and Mounting Hole Layouts

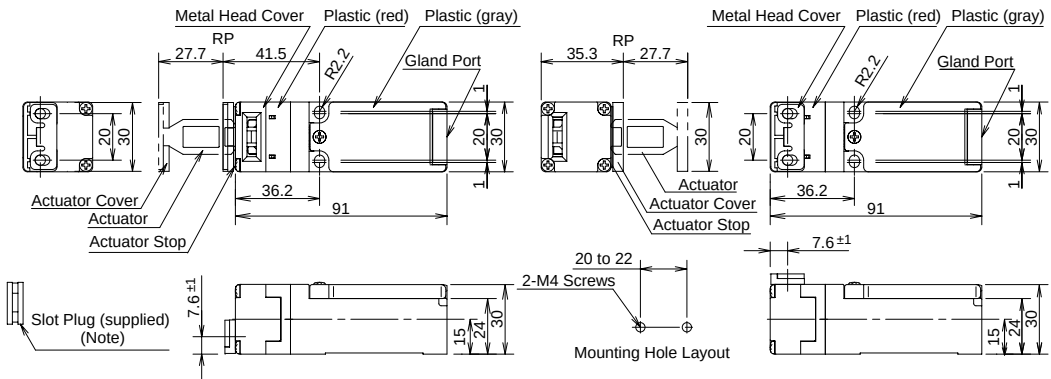


HS5D-□□ZRN□ (Metal Head)
With HS9Z-A51 Straight Actuator

RP: Reference mounting position.

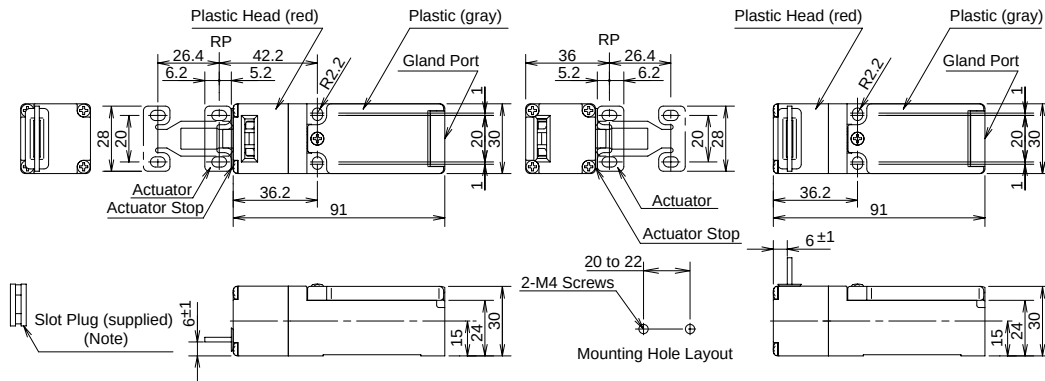


With HS9Z-A52 Right-angle Actuator

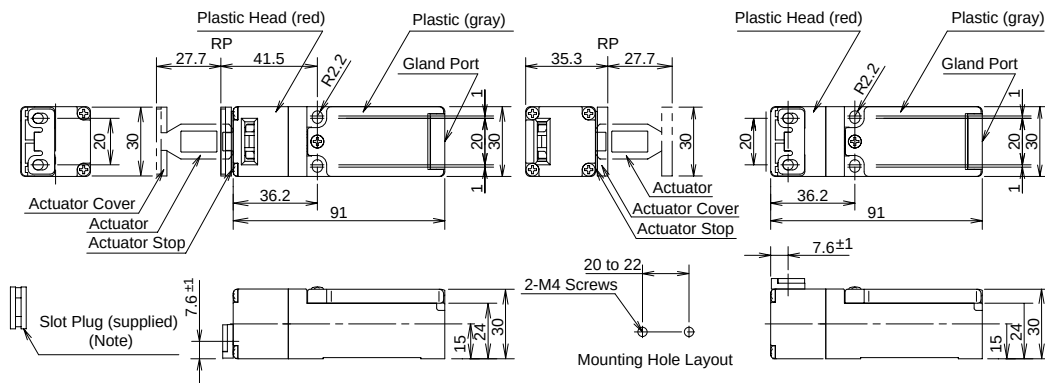


All dimensions in mm.

HS5D-□□RN□ (Plastic Head) With HS9Z-A51 Straight Actuator



With HS9Z-A52 Right-angle Actuator

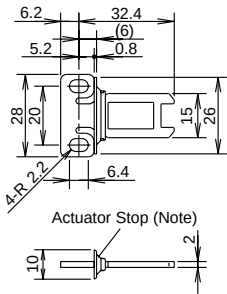


Note: Plug the unused actuator insertion slot using the slot plug supplied with the safety interlock switch.

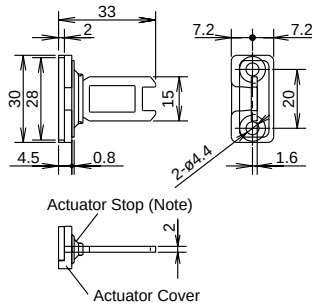
All dimensions in mm.

Actuator Dimensions

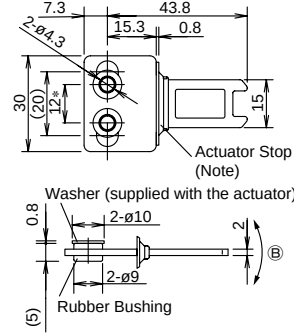
Straight (HS9Z-A51)



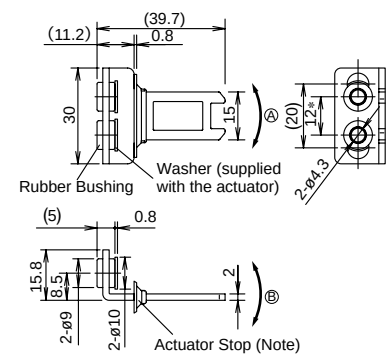
Right-angle (HS9Z-A52)



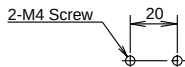
Straight w/rubber bushing (HS9Z-A51A)



Right-angle w/rubber bushing (HS9Z-A52A)



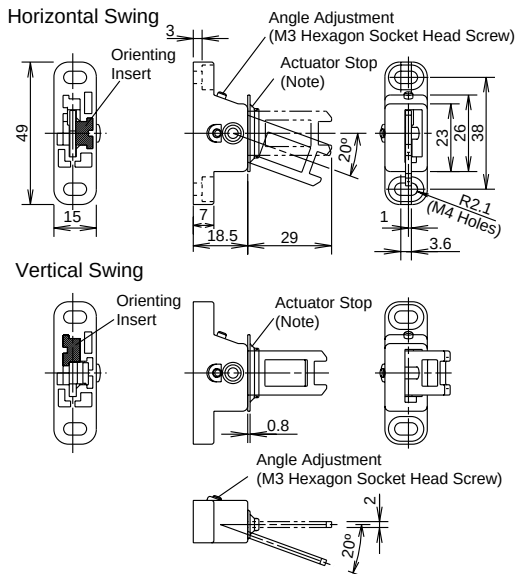
Actuator Mounting Hole Layout (Straight, Right-angle)



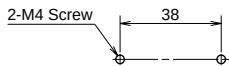
The mounting center distance is set to 12 mm at factory. When 20-mm distance is required, adjust the distance by moving the rubber bushings.

(A)(B) The actuator has flexibility to the directions indicated by the arrows. When 20-mm distance is selected, the actuator swings vertically.

Angle Adjustable (HS9Z-A55)



Actuator Mounting Hole Layout (Straight, Right-angle)

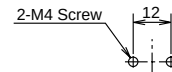


Note: The actuator stop is supplied with the actuator and used when adjusting the actuator position. Remove the actuator stop after the actuator position is determined.

Actuator Orientation (Angle Adjustable)

The angle of actuator swing can be changed using the orienting insert (white plastic) installed on the back of the actuator. Do not lose the orienting insert, otherwise the actuator will not operate properly.

Actuator Mounting Hole Layout (Straight w/rubber bushing) (Right-angle w/rubber bushing)

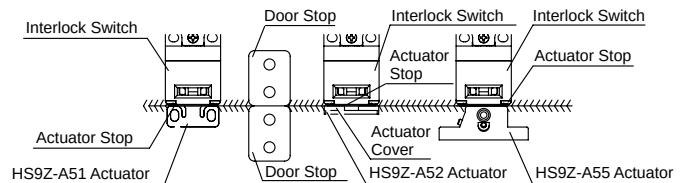


*Mounting centers can be widened to 20 mm by moving the rubber cushions.

Actuator Mounting Reference Position

As shown in the figure below, the mounting reference position of the actuator when inserted in the interlock switch is where the actuator stop placed on the actuator lightly touches the interlock switch.

Note: After mounting the actuator, remove the actuator stop from the actuator.



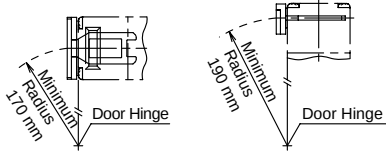
Minimum Radius of Hinged Door

- When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For the doors with small minimum radius, use angle adjustable actuators (HS9Z-A55).

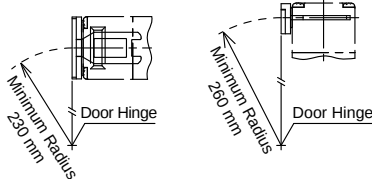
Note: Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

HS9Z-A52 Actuator

- When the door hinge is on the extension line of the interlock switch surface:

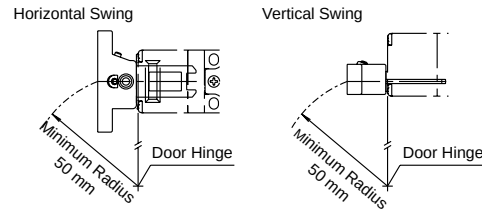


- When the door hinge is on the extension line of the actuator mounting surface:

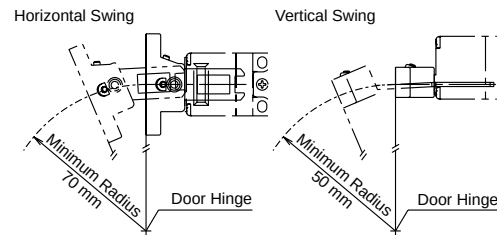


When using the HS9Z-A55 Angle Adjustable Actuator

- When the door hinge is on the extension line of the interlock switch surface:



- When the door hinge is on extension line of the actuator mounting surface:



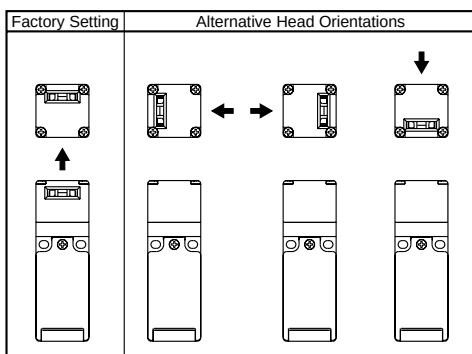
Actuator Angle Adjustment for the HS9Z-A55

- Using the angle adjustment screw, the actuator angle can be adjusted (see figures "Actuator Dimensions" on page 13). Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening. After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not loosen.

Instructions

Rotating the Head

- The head of the HS5D can be rotated by removing the four screws from the corners of the HS5D head and reinstalling the head in the desired orientation. When reinstalling the head, make sure that no foreign object enters the interlock switch. Tighten the screws tightly, because loose tightening may cause malfunction.
- Recommended screw tightening torque: 0.9 to 1.1 N·m



Head Removal Detection Function

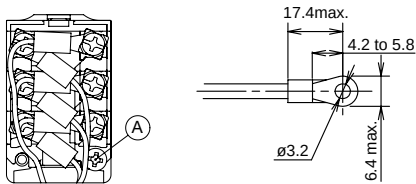
Only the NC contact of the main circuit (11-12) turns OFF (open) when the head is removed, such as when rotating the head. Because NC contacts of other than the main circuit (11-12) turn ON (closed), be sure to connect the main circuit (11-12) to the safety circuit.

Recommended Tightening Torque

- Interlock Switch Mounting Screw: 1.8 ± 2.2 N·m (two M4 screws)
- Housing Lid Screw: 0.2 to 0.4 N·m (M3 screw)
- Terminal Screw: 0.6 to 0.8 N·m (M3 screw)
- Connector: 2.7 to 3.3 N·m
- Actuators
 - HS9Z-A51: 1.8 ± 2.2 N·m (two M4 screws)
 - HS9Z-A52: 0.8 ± 1.2 N·m (two M4 Phillips screws)
 - HS9Z-A51A/A52A: 1.0 to 1.5 N·m (two M4 screws)
 - HS9Z-A55: 1.0 to 1.5 N·m (two M4 screws)
- The above recommended tightening torques of the mounting screws are the values confirmed with hex socket head bolts. When other screws are used and tightened to a smaller torque, make sure that the screws do not come loose after mounting.
- Mounting bolts must be provided by the user.
- To avoid unauthorized or unintended removal of the interlock switch and the actuator, it is recommended that the interlock switch and the actuator be installed in an unremovable manner, for example using special screws or welding the screws.

Applicable Crimping Terminal

When using crimping terminals, be sure to install insulation tubes on the crimping terminals to prevent electric shocks. When using stranded wires, make sure that loose wires do not cause short circuit. Also do not solder the terminal to prevent loose wires.



Applicable wire size (with insulation tube): 0.2 to 0.5 mm² (20 ~ 24 AWG)

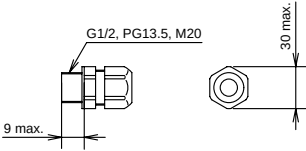
Note: Do not remove screw A during wiring. Removing the screw may cause malfunction or damage.

Applicable Wire Size

0.5 to 1.5 mm² (16 ~ 20 AWG)

Applicable Cable Glands

Use a cable gland with a degree of protection IP67.



HS2B Full Size Interlock Switches

Key features:

- Direct Opening Action: If the door is forced open, the contacts are disconnected even if they are welded or stuck
- Available with or without an indicator (red or green)
- Flexible Installation: Two actuator entries and three conduit ports are provided
- 1NC-1NO contacts
- Compact and lightweight plastic housing
- Degree of Contact Protection: IP67



GS-ET-15
BG standard in Germany



Direct Opening Action



Double Insulation

Part Numbers
Body

Model	Contact Configuration	Pilot Light	Part Number
 HS2B (plastic housing)	1NC-1NO	Without	HS2B-11NB
		With red LED	HS2B-114NB-R
		With green LED	HS2B-114NB-G



Order the actuators separately (not supplied with the switch).
Standard stock items in bold.

Actuator Keys & Accessories (order separately)

Appearance	Part Number	Description
	HS9Z-A1	Straight Actuator (Mainly for sliding doors)
	HS9Z-A2	Right-angle Actuator (Mainly for rotating doors)
	HS9Z-A3	Adjustable Actuator
	HS9Z-P1	Conduit Opening Plug

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

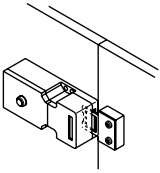
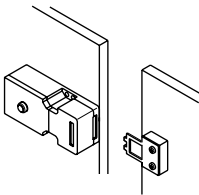
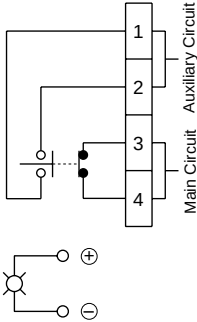
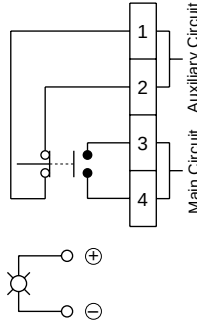
Specifications

Conforming to Standards		IEC60947-5-1, EN60947-5-1, GS-ET-15, UL508
Operating Temperature		−25 to +70°C (no freezing)
Storage Temperature		−40 to +80°C
Operating Humidity		85% RH maximum (no condensation)
Altitude		2,000m maximum
Rated Insulation Voltage (Ui)		300V (between LED and ground: 60V)
Impulse Withstand Voltage (Uimp)		4 kV (between LED and ground: 2.5 kV)
Insulation Resistance		Between live and dead metal parts: 100 MΩ minimum Between live metal part and ground: 100 MΩ minimum Between live metal parts: 100 MΩ minimum Between terminals of the same pole: 100 MΩ minimum
Electric Shock Protection Class		Class II (IEC61140)
Pollution Degree		3 (IEC60947-5-1)
Degree of Protection		IP67 (IEC60529)
Vibration Resistance	Operating Extremes	10 to 55 Hz, amplitude 0.5mm
	Damage Limits	60 m/sec ² (approx. 6G)
Shock Resistance		1,000 m/sec ² (approx. 100G)
Actuator Operating Speed		1 m/sec maximum
Positive Opening Travel		11 mm minimum
Positive Opening Force		36N minimum
Thermal Current (Ith)		10A
Operating Frequency		900 operations/hour
Mechanical Life		1,000,000 operations
Electrical Life		100,000 operations (rated load)
Conditional Short-circuit Current		100A (IEC60947-5-1)
Recommended Short Circuit Protection		250V, 10A fuse (Type D01 based on IEC60269-1, 60269-2)
Indicator	Operating Voltage	24V DC
	Current	10 mA
	Light Source	LED lamp
	Lens Color	Red or Green (12 mm dia. Lens)
Weight		Approx. 130g

Contact Ratings

		Operating Voltage (Ue)	30V	125V	250V
Rated Operating Current (Ie)	AC	Resistive load (AC12)	10A	10A	6A
		Inductive load (AC15)	10A	5A	3A
	DC	Resistive load (DC12)	8A	2.2A	1.1A
		Inductive load (DC13)	4A	1.1A	0.6A

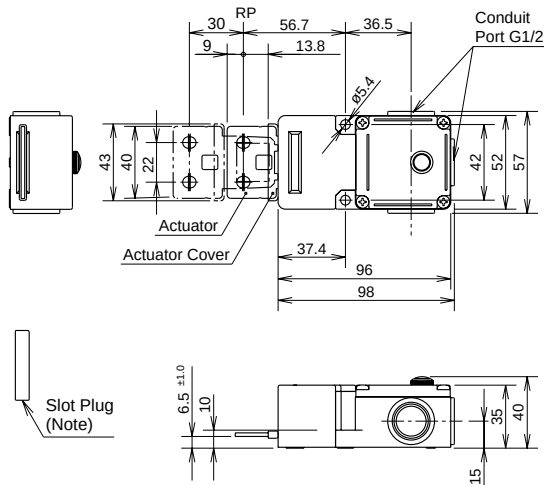
Application Examples and Circuit Diagrams

	Status 1	Status 2		Status 1	Status 2
Door/ Switch Status	Door Closed Machine ready to operate	Door opened Machine cannot be started	Door/ Switch Status	Door Closed Machine ready to operate	Door opened Machine cannot be started
Door			HS2B-11 (1NO-1NC) Circuit Diagram		
Main Circuit	3-4: Closed	3-4: Open	Main Circuit	3-4: Closed	3-4: Open
Aux. Circuit	1-2: Open	1-2: Closed	Aux. Circuit	1-2: Open	1-2: Closed

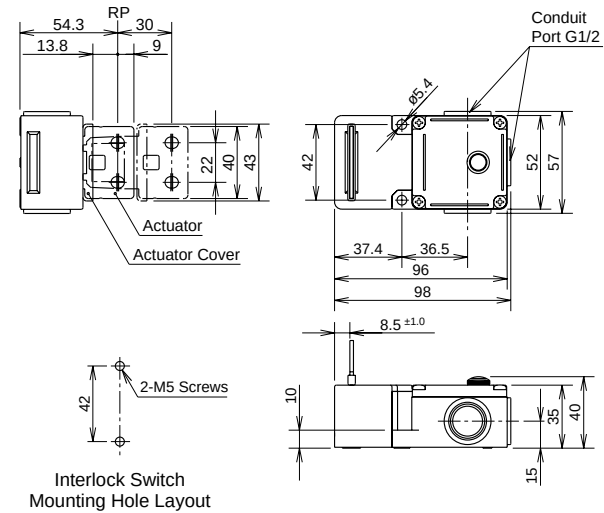
-  1. Main Circuit: used to enable the machine to start only when the main circuit is closed. Auxiliary Circuit: used to indicate whether the main circuit or door is open or closed.
2. Terminals + and - are used for the LED indicator, and are isolated from door status.

Dimensions (mm) Using the straight actuator (HS9Z-A1)

(Horizontal Mounting)



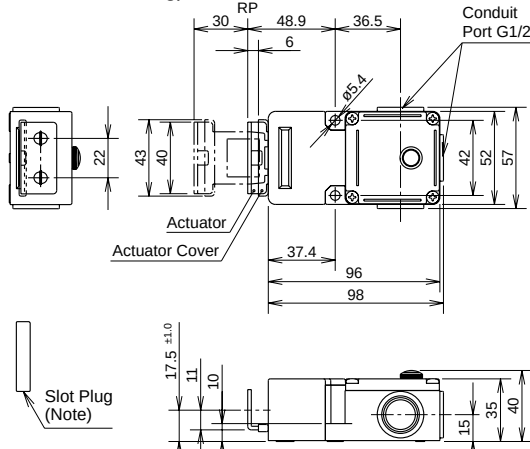
(Vertical Mounting)



Dimensions (mm), continued

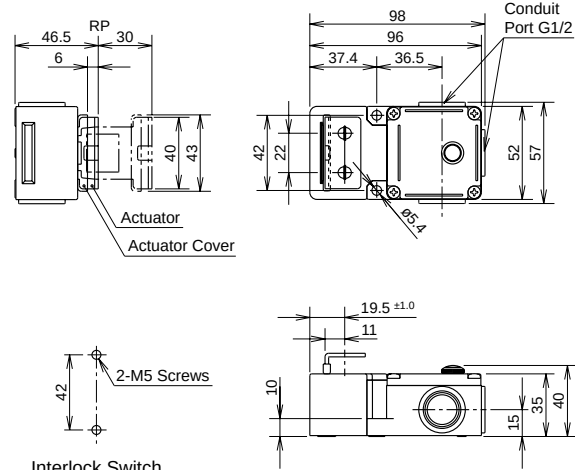
Using the Right-angle actuator (HS9Z-A2)

(Horizontal Mounting)



Plug the unused actuator insertion slot using the slot plug supplied with the interlock switch.

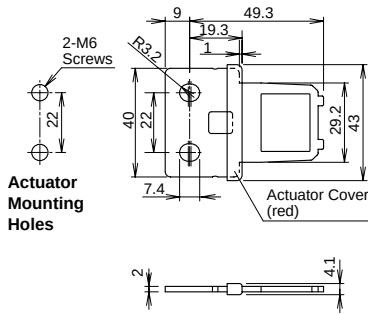
(Vertical Mounting)



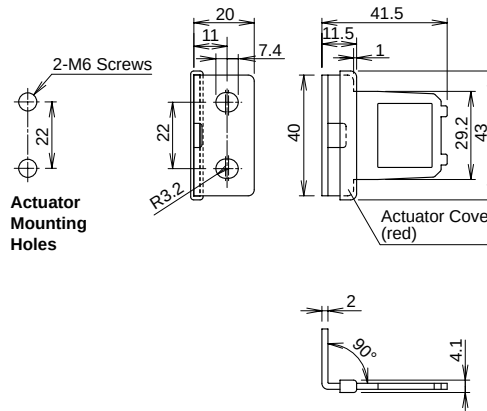
Interlock Switch Mounting Hole Layout

Actuator Dimensions

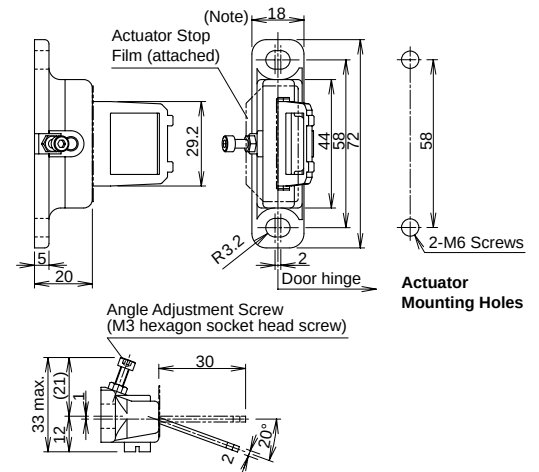
Straight Actuator HS9Z-A1



Right-angle Actuator HS9Z-A2



Angle-adjustable Actuator HS9Z-A3



Adjustable Actuator

The actuator angle is adjustable (0° to 20°) for hinged doors.

The minimum radius of the door opening can be as small as 100mm.

Actuator Angle Adjustment

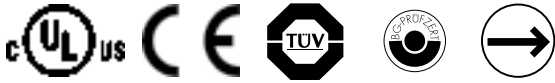
- Using the screw (M3 hex socket head screw), the actuator angle can be adjusted (refer to the dimensional drawing). Adjustable angle: (0°) to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.

- After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the entry slot of the safety switch.
- Recommended tightening torque: 0.8 N-m (approx. 8.0 kgf-cm)
- After adjusting the actuator angle, apply loctite or the like to the adjustment screw to prevent it from loosening.

HS1B Full Size Interlock Switches

Key features:

- Rugged aluminum die-cast housing
- Direct Opening Action
- Available with or without an indicator (red or green)
- Flexible Installation: Two actuator entries and three conduit ports are provided
- Select from two circuit configurations (1NO-1NC or 2NC).
- IP67

Part Numbers
Body

Model	Contact Configuration	Pilot Light	Part Number
	1NC-1NO	Without	HS1B-11R
		Red LED	HS1B-114R-R
		Green LED	HS1B-114R-G
	2NC	Without	HS1B-02R
		Red LED	HS1B-024R-R
		Green LED	HS1B-024R-G



Standard stock items in bold.

Actuator Keys and Accessories (order separately)

Appearance	Part Number	Description
	HS9Z-A1	Straight Actuator (Mainly for sliding doors)
	HS9Z-A2	Right-angle Actuator (Mainly for rotating doors)
	HS9Z-A3	Adjustable Actuator
	HS9Z-T1	Key Wrench (included with switch)
	HS9Z-P1	Conduit Opening Plug



Actuators are not included and must be ordered separately.

Specifications

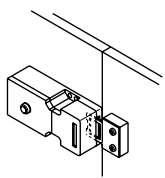
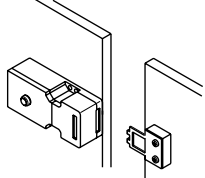
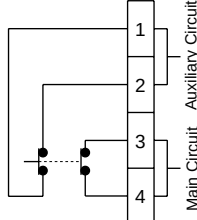
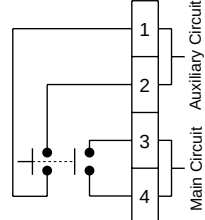
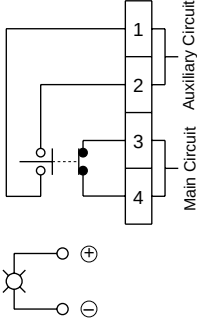
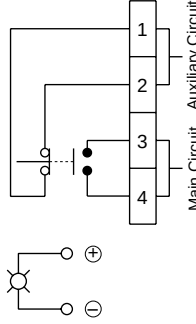
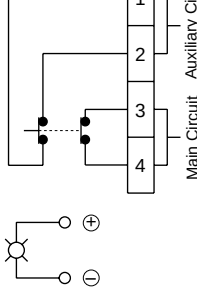
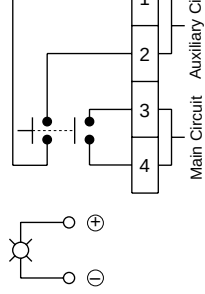
Conforming to Standards	IEC60947-5-1, EN60947-5-1, GS-ET-15, UL508, CSA C22.2 No. 14
Operating Temperature	-20 to +70°C (no freezing)
Storage Temperature	-40 to +80°C
Relative Humidity	45 to 85% (no condensation)
Altitude	2,000m maximum
Rated Insulation Voltage (U _i)	300V (between LED and ground: 60V)
Impulse Withstand Voltage (U _{imp})	4 kV (between LED and ground: 2.5 kV)
Insulation Resistance	Between live and dead metal parts: 100 MΩ minimum Between live metal part and ground: 100 MΩ minimum Between live metal parts: 100 MΩ minimum Between terminals of the same pole: 100 MΩ minimum
Electric Shock Protection Class	Class I (IEC61140)
Pollution Degree	3 (IEC60947-5-1)
Degree of Protection	IP67 (IEC60529)
Vibration Resistance	Operating Extremes: 10 to 55 Hz, amplitude 0.5mm p-p Damage Limits: 60 m/sec ² (approx. 6G)

Shock Resistance		1,000 m/sec ² (approx. 100G)
Actuator Operating Speed		0.05 to 1.0m/s
Direct Opening Travel		11 mm minimum
Direct Opening Force		20N minimum
Thermal Current (I _{th})		10A
Operating Frequency		900 operations/hour
Mechanical Life		1,000,000 operations
Electrical Life		100,000 operations (rated load)
Conditional Short-circuit Current		100A (IEC60947-5-1)
Recommended Short Circuit Protection		250V, 10A fuse (Type D01 based on IEC60269-1, 60269-2)
Indicator	Operating Voltage	24V DC
	Current	10 mA
	Light Source	LED lamp
	Lens Color	Red or Green (12 mm dia. Lens)
Weight		Approx. 280g

Contact Ratings

		Operating Voltage (U _e)	30V	125V	250V
Rated Operating Current (I _e)	AC	Resistive load (AC12)	10A	10A	6A
		Inductive load (AC15)	10A	5A	3A
	DC	Resistive load (DC12)	8A	2.2A	1.1A
		Inductive load (DC13)	4A	1.1A	0.6A

Application Examples and Circuit Diagrams

		Status 1	Status 2			Status 1	Status 2
Door/ Switch Status		Door Closed Machine ready to operate	Door opened Machine cannot be started	Door/ Switch Status		Door Closed Machine ready to operate	Door opened Machine cannot be started
Door							
HS1B-11 (1NO-1NC) Circuit Diagram				HS1B-02 (2NC) Circuit Diagram			
Main Circuit		3-4: Closed	3-4: Open	Main Circuit		3-4: Closed	3-4: Open
Aux. Circuit		1-2: Open	1-2: Closed	Aux. Circuit		1-2: Closed	1-2: Open

- 
1.

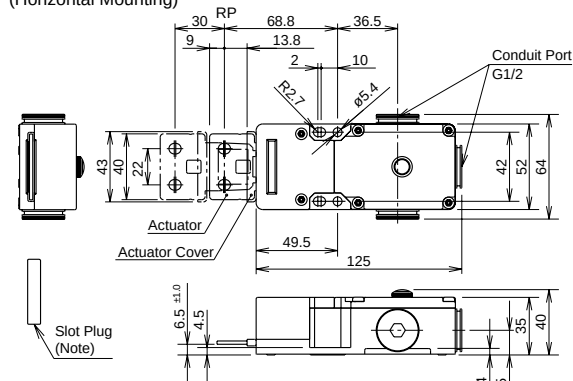
Main Circuit: used to enable the machine to start only when the main circuit is closed. Auxiliary Circuit: used to indicate whether the main circuit or door is open or closed.
2.

Terminals + and - are used for the LED indicator, and are isolated from door status. Wire the terminals only when needed.

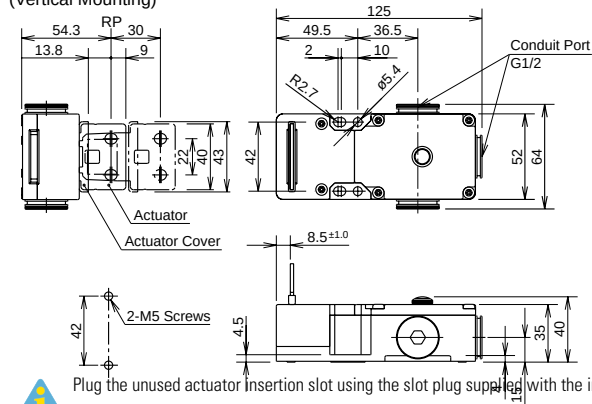
Dimensions (mm)

Using the straight actuator (HS9Z-A1)

(Horizontal Mounting)

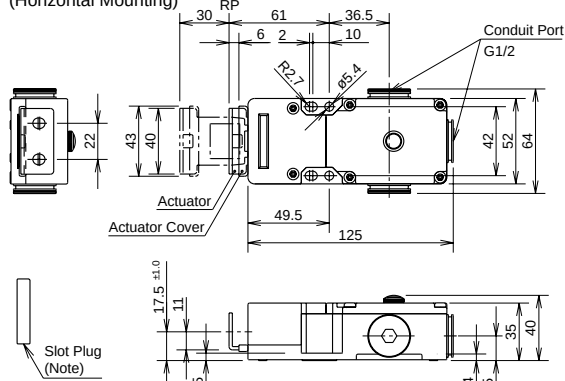


(Vertical Mounting)

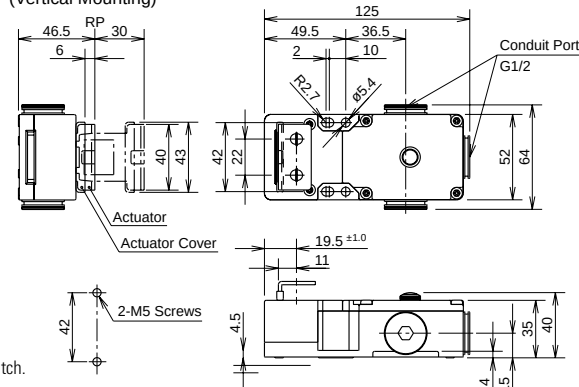


Using the Right-angle actuator (HS9Z-A2)

(Horizontal Mounting)

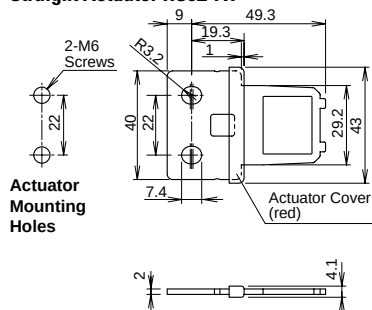


(Vertical Mounting)

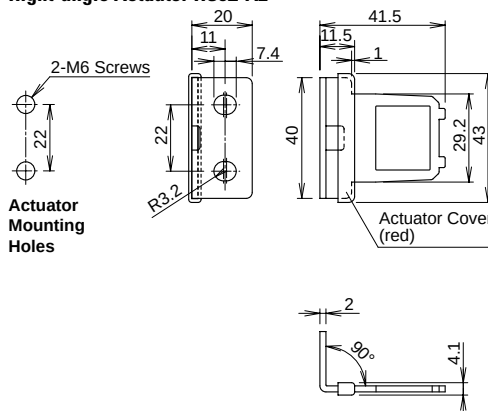


Actuator Dimensions

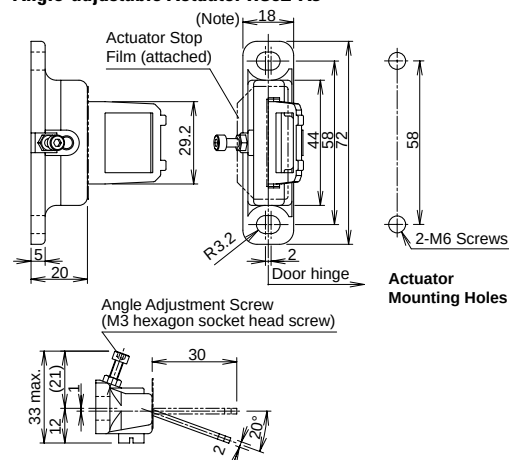
Straight Actuator HS9Z-A1



Right-angle Actuator HS9Z-A2



Angle-adjustable Actuator HS9Z-A3



Adjustable Actuator

The actuator angle is adjustable (0° to 20°) for hinged doors.

The minimum radius of the door opening can be as small as 100mm.

Actuator Angle Adjustment

- Using the screw (M3 hex socket head screw), the actuator angle can be adjusted (refer to the dimensional drawing). Adjustable angle: (0°) to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable

radius of the door opening.

- After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the entry slot of the safety switch.
- Recommended tightening torque: 0.8 N-m (approx. 8.0 kgf-cm)
- After adjusting the actuator angle, apply loctite or the like to the adjustment screw to prevent it from loosening.

HS6E Subminiature Interlock Switches with Solenoid

Key features:

- Compact body: 75 × 15 × 75mm
15mm wide, thinnest solenoid interlock switch in the world
- Reversible mounting and angled cable allow four actuator insertion directions
- Energy saving: 24V DC, 110mA (solenoid: 100mA, LED: 10mA)
- Manual unlocking possible on three sides
- LED indicator shows solenoid operation
- 500N locking retention force



Part Numbers

Mechanical Spring Lock (power solenoid to unlock)		
Contact Configuration	Cable Length	Part Number
(Actuator inserted) (Solenoid OFF)		
Main Circuit: 11 12 41 42	1m	HS6E-L44B01-G
Monitor Circuit: 21 22 53 54	3m	HS6E-L44B03-G
Monitor Circuit: 31 32	5m	HS6E-L44B05-G
Main Circuit: 11 12 41 42	1m	HS6E-M44B01-G
Monitor Circuit: 21 22 51 52	3m	HS6E-M44B03-G
Monitor Circuit: 31 32	5m	HS6E-M44B05-G
Main Circuit: 11 12 41 42	1m	HS6E-N44B01-G
Monitor Circuit: 21 22 53 54	3m	HS6E-N44B03-G
Monitor Circuit: 33 34	5m	HS6E-N44B05-G
Main Circuit: 11 12 41 42	1m	HS6E-P44B01-G
Monitor Circuit: 21 22 51 52	3m	HS6E-P44B03-G
Monitor Circuit: 33 34	5m	HS6E-P44B05-G

Solenoid Lock (remove power to solenoid to unlock)		
Contact Configuration	Cable Length	Part Number
(Actuator inserted) (Solenoid ON)		
Main Circuit: 11 12 41 42	1m	HS6E-L7Y4B01-G
Monitor Circuit: 21 22 53 54	3m	HS6E-L7Y4B03-G
Monitor Circuit: 31 32	5m	HS6E-L7Y4B05-G
Main Circuit: 11 12 41 42	1m	HS6E-M7Y4B01-G
Monitor Circuit: 21 22 51 52	3m	HS6E-M7Y4B03-G
Monitor Circuit: 31 32	5m	HS6E-M7Y4B05-G
Main Circuit: 11 12 41 42	1m	HS6E-N7Y4B01-G
Monitor Circuit: 21 22 53 54	3m	HS6E-N7Y4B03-G
Monitor Circuit: 33 34	5m	HS6E-N7Y4B05-G
Main Circuit: 11 12 41 42	1m	HS6E-P7Y4B01-G
Monitor Circuit: 21 22 51 52	3m	HS6E-P7Y4B03-G
Monitor Circuit: 33 34	5m	HS6E-P7Y4B05-G

1. Contact configuration shows the contact status when actuator is inserted and solenoid off for spring lock.
2. Contact configuration shows the contact status when actuator is inserted and solenoid on for solenoid lock.
3. Indicator LED color is green.
4. Actuator keys are not supplied with the interlock switch and must be ordered separately.
5. Manual unlock key is included with the interlock switch.
6. Standard stock items in bold.

Actuator Keys

Appearance	Item	Ordering Part Number	Remarks
	Straight Actuator	HS9Z-A61	The retention force of HS9Z-A61 actuator is 500N maximum. Do not apply excessive load.
	Right-angle Actuator	HS9Z-A62	The retention force of HS9Z-A62 actuator is 100N maximum. Do not apply excessive load. When retention force of 100N or more is required, use the HS9Z-A62S actuator.
	Right-angle Actuator with Mounting Plate	HS9Z-A62S	The retention force of HS9Z-A62S actuator is 500N maximum. Do not apply excessive load.
	Horizontal/Vertical Angle Adjustable Actuator	HS9Z-A65	The HS9Z-A65 and HS9Z-A66 have their metal actuator installed in opposite directions. Select actuator by determining the required moving direction in consideration of the door and interlock switch. See page 320 for more information. The retention force of HS9Z-A65 and HS9Z-A66 500N maximum.
	Horizontal/Vertical Angle Adjustable Actuator	HS9Z-A66	

Specifications

Conforming to Standards		UL 508 (UL listed), CSA C22.2, No. 14 (c-UL listed), ISO 14119 IEC 60947-5-1, EN 60947-5-1 (TÜV approval), EN 1088 (TÜV approval), GS-ET-19 IEC 60204-1/EN 60204-1 (applicable standards for use)
Operating Temperature		−25 to +50°C (no freezing)
Storage Temperature		−40 to +80°C (no freezing)
Operating Humidity		45 to 85% (no condensation)
Rated Insulation Voltage (U _i)		300V (between LED and ground: 60V)
Impulse Withstand Voltage (U _{imp})		Main & lock monitor circuits: 1.5 kV Door monitor circuit: 2.5 kV Between solenoid/LED and ground: 0.5 kV
Insulation Resistance (500V DC megger)		Between live and dead metal parts: 100 MΩ minimum Between terminals of different poles: 100 MΩ minimum.
Contact Resistance		300 mΩ maximum (initial value, 1m cable) 500 mΩ maximum (initial value, 3m cable) 700 mΩ maximum (initial value, 5m cable)
Electric Shock Protection Class		Class II (IEC 61140)
Pollution Degree		3
Degree of Protection		IP67 (IEC 60529)
Vibration Resistance	Operating Extremes	10 to 55 Hz, amplitude 0.35mm
	Damage Limits	30 Hz, amplitude 1.5 mm
Shock Resistance	Operating Extremes	100 m/s ² (10G)
	Damage Limits	1000 m/s ² (100G)
Actuator Operating Speed		0.05 to 1.0 m/s
Direct Opening Travel		8.0 mm minimum
Direct Opening Force		60N minimum
Actuator Retention Force		500N maximum (GS-ET-19)
Operating Frequency		900 operations/hour
Mechanical Life		1,000,000 operations minimum (GS-ET-19)

Electrical Life	100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA) (operating frequency 900 operations/hr)
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast-blow fuse for short-circuit protection.)
Cable	22 AWG (12-core: 0.3 mm ² or equivalent/core)
Cable Diameter	ø7.6 mm
Weight	Approx. 200g

- 
1. UL, c-UL rating: Main/Lock monitor circuit: 125V AC, 1A Pilot duty, 125V DC, 0.22A Pilot duty
Door monitor circuit:240V AC, 0.75A Pilot duty250V DC, 0.27A Pilot duty

2. TÜV rating: Main/Lock monitor circuit: AC-15 125V/1A, DC-13 125V/0.22A
Door monitor circuit: AC-15 240V/0.75A, DC-13 250V/0.27A

Solenoid/Indicator

Locking Mechanism		Spring Lock Type or Solenoid Lock Type
Rated Voltage		24V DC
Current		110 mA (solenoid 100 mA, LED 10 mA)
Solenoid	Coil Resistance	240Ω (at 20°C)
	Pickup Voltage	Rated voltage × 85% maximum (at 20°C)
	Dropout Voltage	Rated voltage × 10% minimum (at 20°C)
	Maximum Continuous Applicable Voltage	Rated voltage × 110%
	Maximum Continuous Applicable Time	Continuous
	Insulation Class	Class F
Indicator	Light Source	LED
	Illumination Color	Green

Contact Ratings

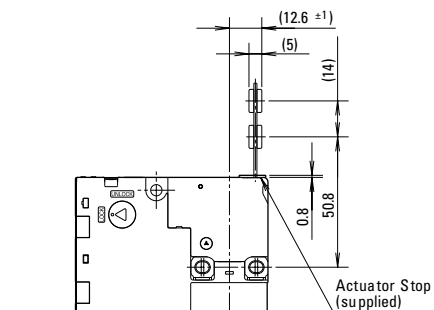
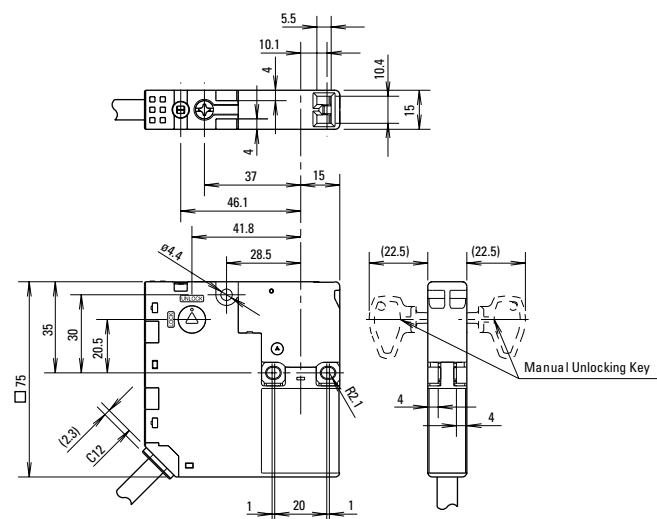
		Operating Voltage (U _e)		30V	125V	250V
Rated Operating Current (I _e)	Main and Lock Monitor Circuits	AC	Resistive load (AC-12)	—	2A 1A	—
			Inductive load (AC-15)			
		DC	Resistive load (DC-12)	2A 1A	0.4A 0.22A	—
			Inductive load (DC-13)			
	Door Monitor Circuit	AC	Resistive load (AC-12)	—	2.5A 1.5A	1.5A 0.75A
			Inductive load (AC-15)			
		DC	Resistive load (DC-12)	2.5A 2.3A	1.1A 0.55A	0.55A 0.27A
			Inductive load (DC-13)			

- 
1. UL, c-UL rating: Main/Lock monitor circuit: 125V AC, 1A Pilot duty, 125V DC, 0.22A Pilot duty
Door monitor circuit:240V AC, 0.75A Pilot duty250V DC, 0.27A Pilot duty

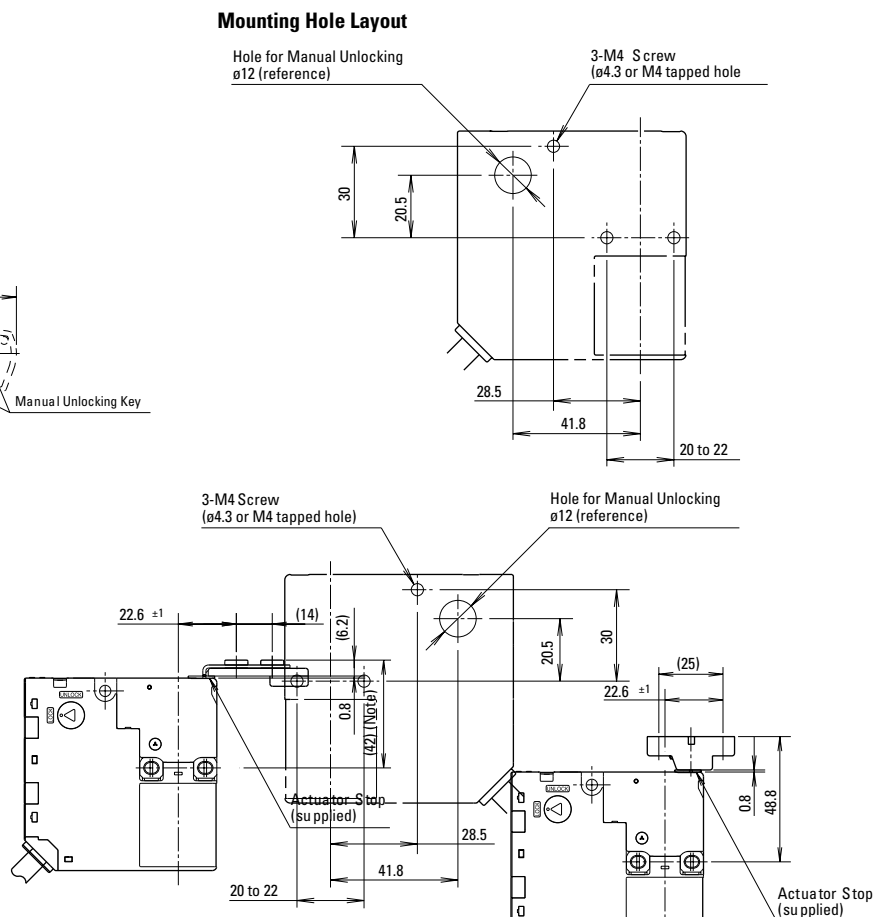
2. TÜV rating: Main/Lock monitor circuit: AC-15 125V/1A, DC-13 125V/0.22A
Door monitor circuit: AC-15 240V/0.75A, DC-13 250V/0.27A

Dimensions (mm)

Interlock Switch



When using straight actuator (HS9Z-A61)



When using right-angle actuator (HS9Z-A62)

When using horizontal/vertical angle adjustable actuator (HS9Z-A65/A66)

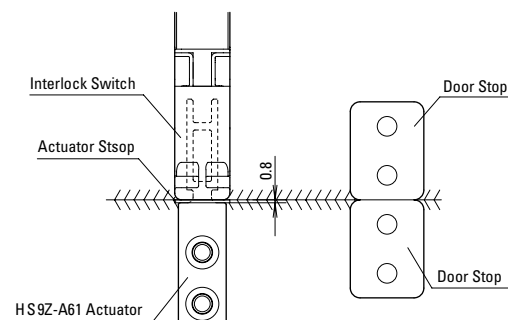
Actuator Mounting Reference Position

As shown in the figure on the right, the mounting reference position of the actuator key when inserted in the interlock switch is:

The actuator stop on the actuator lightly touches the interlock switch.

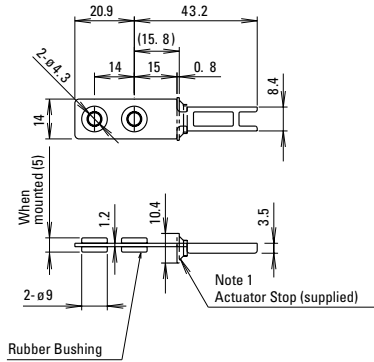


After mounting the actuator, remove the actuator stop from the actuator.



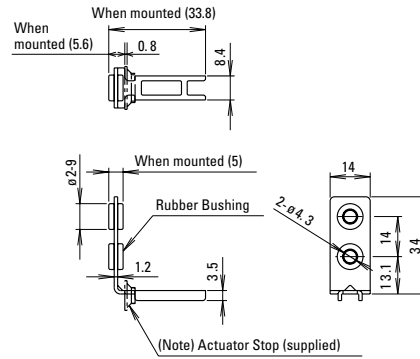
Actuator Key Dimensions (mm)

Straight Actuator (HS9Z-A61)



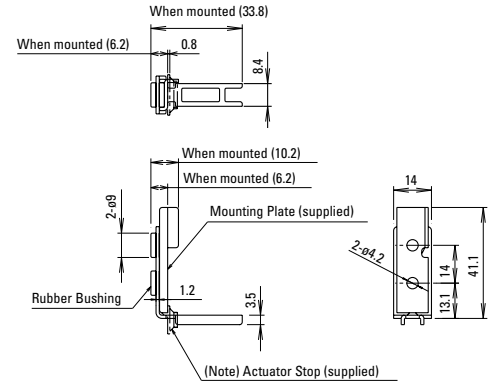
Straight Actuator (HS9Z-A61) Right-angle Actuator (HS9Z-A62)

The retention force of the HS9Z-A62 actuator is 100N. When tensile force exceeding 100N is expected, use the HS9Z-A62S actuator.



Right-angle Actuator with Mounting Plate (HS9Z-A62S)

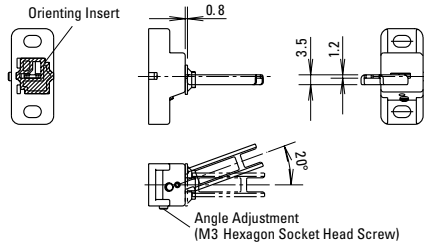
Note: See page 323 for actuator installation.



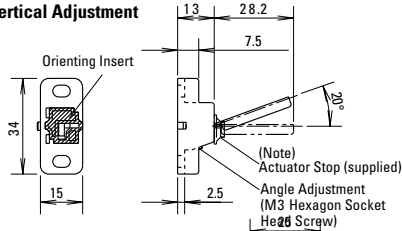
The actuator stop is used to adjust the actuator position. Remove after the actuator position is mounted.

Angle Adjustable Actuator (HS9Z-A65)

Horizontal Adjustment



Vertical Adjustment



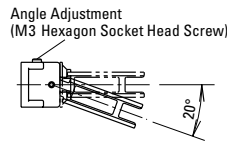
Angle Adjustable Actuator (HS9Z-A66)

(M3 or M4 tapping screw)

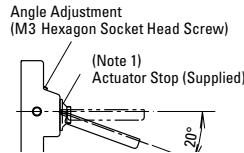
Angle Adjustable Actuator (HS9Z-A66)

The HS9Z-A65 and HS9Z-A66 have the metal actuator inserted in opposite directions.

Horizontal Adjustment

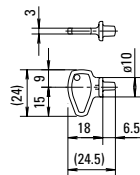


Vertical Adjustment



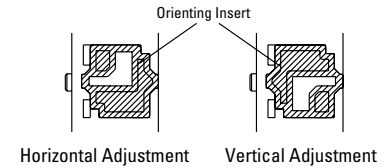
Manual Unlock Key (plastic)

(supplied with switch, not replaceable)

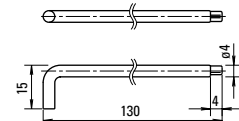


Actuator Adjustment Orientation

The orientation of actuator adjustment (horizontal/vertical) can be changed using the orienting insert (white plastic) installed on the back of the actuator.



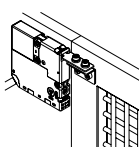
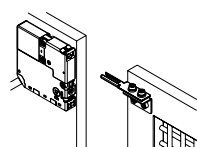
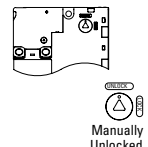
Manual Unlock Key, HS9Z-T3 (metal)

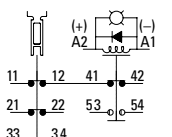
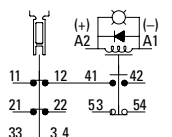
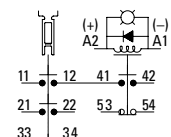
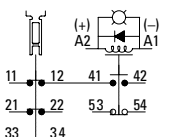


Circuit Diagrams and Operating Characteristics

Spring Lock Type

	Status 1	Status 2	Status 3	Status 4	Unlocking Using Manual Unlock Key
Interlock Switch Status	Door closed Machine ready to operate Solenoid de-energized	Door opened Machine cannot be operated Solenoid energized	Door open Machine cannot be operated Solenoid energized	Door open Machine cannot be operated Solenoid de-energized	Door closed Machine cannot be operated Solenoid de-energized

Door Status			
-------------	---	---	---

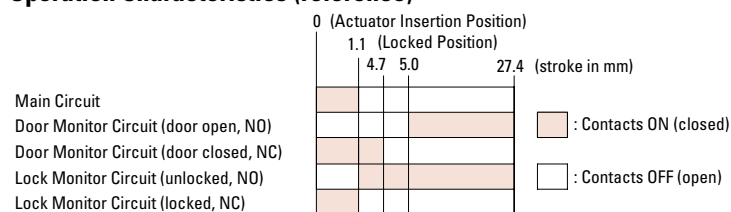
Circuit Diagram (Example: HS6E-N4)				
------------------------------------	---	---	---	---

Door		Closed (locked)	Closed (unlocked)	Open	Open	Closed (unlocked)
HS6E-L4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door closed) 31-32	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Lock Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
HS6E-M4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door closed) 31-32	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Lock Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
HS6E-N4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door open) 33-34	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
	Lock Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
HS6E-P4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door open) 33-34	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
	Lock Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
Solenoid Power A1-A2 (all types)		OFF (de-energized)	ON (energized)	ON (energized)	OFF (de-energized)	OFF (de-energized)

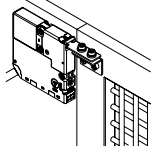
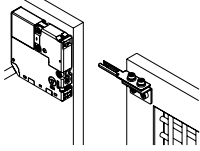
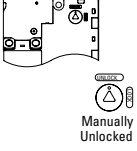
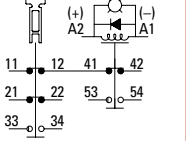
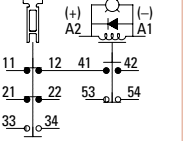
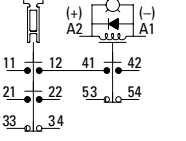
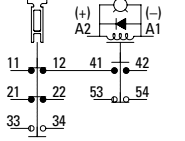
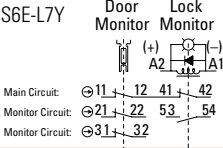
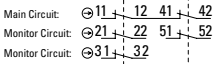
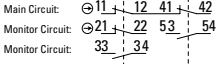
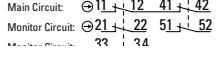


Main circuit: Connected to the machine drive control circuit, sending the interlock signals of the protective door.
Monitor circuit: Sends the monitoring signals of open/closed and lock/unlocked statuses of the protective door.

Operation Characteristics (reference)



The characteristics shown in the chart above are of the HS9Z-A61, -A62, -A65, and -A66 actuators. For the HS9Z-A62S actuator, subtract 0.6 mm. The characteristics show the contact status when the actuator enters an entry slot of an interlock switch.

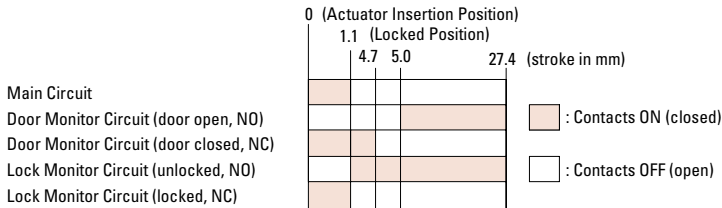
Solenoid Lock Type		Status 1	Status 2	Status 3	Status 4	Unlocking Using Manual Unlock Key
Interlock Switch Status		Door closed Machine ready to operate Solenoid energized	Door closed Machine cannot be operated Solenoid de-energized	Door open Machine cannot be operated Solenoid de-energized	Door open Machine cannot be operated Solenoid de-energized	Door open Machine cannot be operated Solenoid de-energized
Door Status						
Circuit Diagram (Example: HS6E-N7Y)						
Door		Closed (locked)	Closed (unlocked)	Open	Open	Closed (unlocked)
HS6E-L7Y 	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door closed) 31-32	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Lock Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
HS6E-M7Y 	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door closed) 31-32	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Lock Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
HS6E-N7Y 	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door open) 33-34	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
	Lock Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
HS6E-P7Y 	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Door Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	Door Monitor Circuit (door open) 33-34	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
	Lock Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
Solenoid Power A1-A2 (all types)		ON (energized)	OFF (de-energized)	OFF (de-energized)	ON (energized) (Note 2)	OFF (de-energized) to ON (re-energized) (Note 1) (Note 2)



Main circuit: Connected to the machine drive control circuit, sending the interlock signals of the protective door.
Monitor circuit: Sends the monitoring signals of open/closed and lock/unlocked statuses of the protective door.

Note 1: Do not attempt manual unlocking while the solenoid is energized.
Note 2: Do not energize the solenoid for a long period of time while the door is open or while the door is unlocked manually using the manual unlock key.

Operation Characteristics (reference)



The characteristics shown in the chart above are of the HS9Z-A61, -A62, -A65, and -A66 actuators. For the HS9Z-A62S actuator, subtract 0.6 mm.
The characteristics show the contact status when the actuator enters an entry slot of an interlock switch.

Operating Instructions

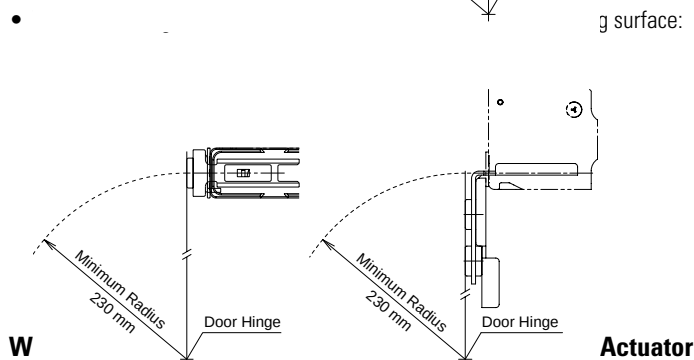
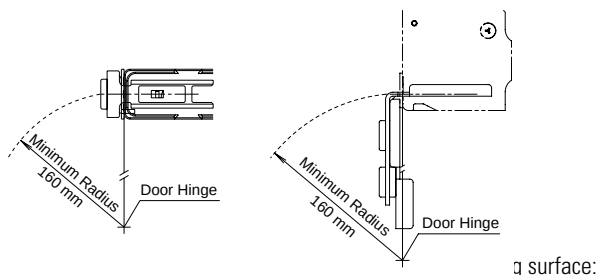
Minimum Radius of Hinged Door

- When using the interlock switch on hinged doors, refer to the minimum radius of doors shown below. When using on doors with small minimum radius, use the angle adjustable actuator (HS9Z-A65 and HS9Z-A66).

Note: Because deviation or dislocation of hinged doors may occur in actual applications, make sure of the correct operation before installation.

When Using the HS9Z-A62/A62S Right-angle Actuator

- When door hinge is on the extension line of the interlock switch surface:

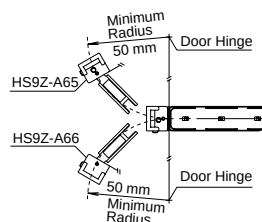


W

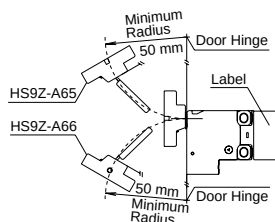
Actuator

- When door hinge is on the extension line of the interlock switch surface

Horizontal Adjustment

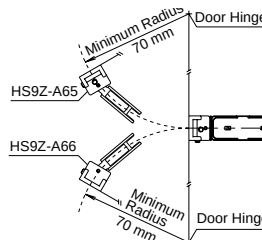


Vertical Adjustment

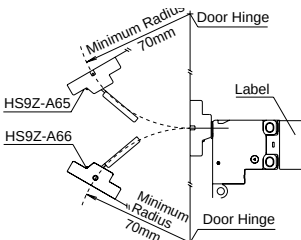


- When door hinge is on the extension line of the actuator mounting surface

Horizontal Adjustment



Vertical Adjustment

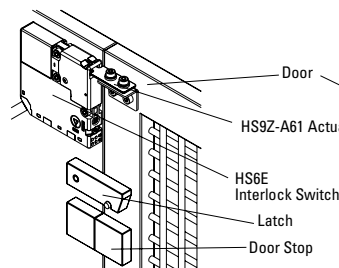


Actuator Angle Adjustment for the HS9Z-A65/HS9Z-A66

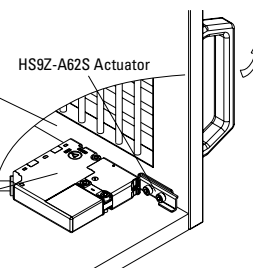
- Using the angle adjustment screw, the actuator angle can be adjusted (see figures on page 370).
Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.
- After installing the actuator, open the door. Then adjust the actuator so that its edge can enter properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not become loose.

Mounting Examples

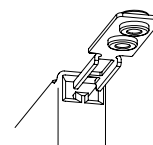
Application on Sliding Doors



Application on Hinged Doors

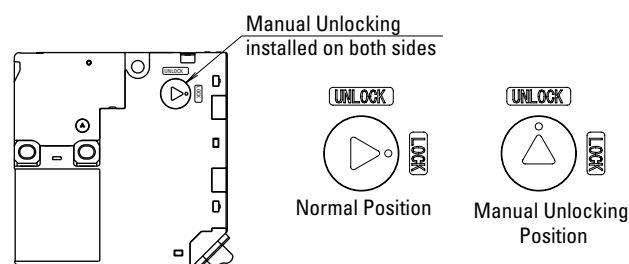


Note: When mounting the actuator, make sure that the actuator enters the slot in the correct direction, as shown on the right.

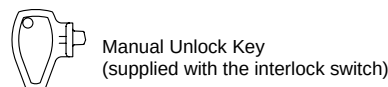


For Manual Unlocking

When using the manual unlock key



- Using the interlock switch with the actuator not fully turned (less than 90°) may cause damage to the interlock switch or operation failures (when manually unlocked, the switch will keep the main circuit disconnected and the door unlocked).
- Do not apply excessive force (0.45 N·m or more) to the manual unlock part, otherwise the manual unlock part will become damaged.



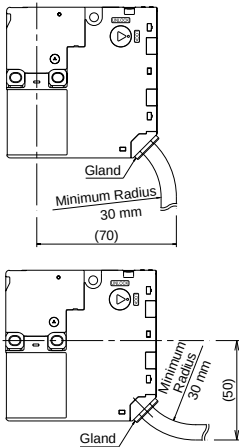
See instruction manual for full details.

Recommended Tightening Torque of Mounting Screws

- Interlock switch: 1.0 to 1.5 N·m (three M4 screws)
- Actuators: 1.0 to 1.5 N·m (two M4 screws)

Cables

- Do not fasten or loosen the gland at the bottom of the interlock switch.
- When bending the cable during wiring, make sure that the cable radius is kept at 30 mm minimum.
- When wiring, make sure that water or oil does not enter from the end of the cable.
- Do not open the lid of the interlock switch. Otherwise the interlock switch will be damaged.
- The solenoid has polarity. Make sure of the correct polarity when wiring.



Wire Identification

- Wires can be identified by color and or a white line printed on the wire.

No.	Insulation Color	No.	Insulation Color
1	Blue/White	7	White
2	Gray	8	Black
3	Pink	9	Pink/White
4	Orange	10	Brown/White
5	Orange/White	11	Brown
6	Gray/White	12	Blue

Terminal Number Identification

- When wiring, identify the terminal number of each contact by the color of the insulation.
- The following table shows the identification of terminal numbers.
- When wiring, cut unused wires to avoid incorrect wiring.

Type	Contact Arrangement	
	Door Monitor	Lock Monitor
HS6E-L	Main circuit: Blue → 11 → 12 Monitor circuit: Brown → 21 → 22 Monitor circuit: Orange → 31 → 32	41 → 42 Blue/White Pink 53 → 54 Pink/White Orange/White
HS6E-M	Main circuit: Blue → 11 → 12 Monitor circuit: Brown → 21 → 22 Monitor circuit: Orange → 31 → 32	41 → 42 Blue/White Pink 51 → 52 Pink/White Orange/White
HS6E-N	Main circuit: Blue → 11 → 12 Monitor circuit: Brown → 21 → 22 Monitor circuit: Orange → 33 → 34	41 → 42 Blue/White Pink 53 → 54 Pink/White Orange/White
HS6E-P	Main circuit: Blue → 11 → 12 Monitor circuit: Brown → 21 → 22 Monitor circuit: Orange → 33 → 34	41 → 42 Blue/White Pink 51 → 52 Pink/White Orange/White

Note: The contact arrangements show the contact status when the actuator is inserted and locked.

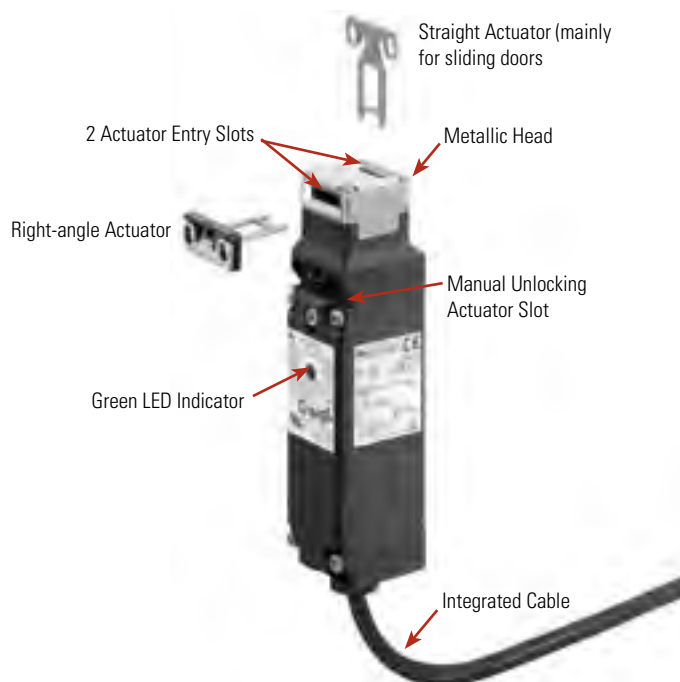
HS5E Miniature Interlock Switches with Solenoid

Spring Lock Type Features:

- Automatically locks the actuator without power applied to the solenoid
- After the machine stops, unlocking is completed by the solenoid, providing high safety features
- Manual unlocking is possible in the event of power failure or maintenance
- Gold-plated contacts

Solenoid Lock Type Features:

- The actuator is locked when energized
- The actuator is unlocked when de-energized
- Flexible locking function can be achieved for an application where locking is not required and sudden stopping of machine must be prevented
- Gold-plated contacts



Overview

XW Series E-Stops

Interlock Switches

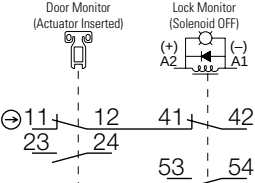
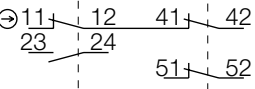
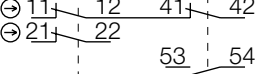
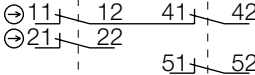
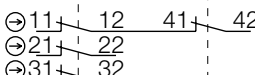
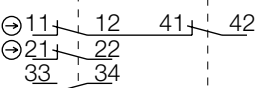
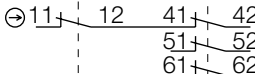
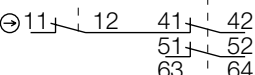
Enabling Switches

Safety Control Relays

Light Curtains

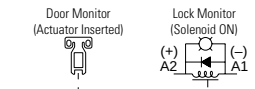
AS-Interface Safety at Work

Part Numbers
Spring Lock Type (Power Solenoid to Unlock)

Circuit Code	Contact Configuration	Cable Length	Part Number		
			Without LED	With LED	With LED and Rear Unlock Button
A		1m	HS5E-A4001	HS5E-A4401-G	HS5E-A44L01-G
		3m	HS5E-A4003	HS5E-A4403-G	HS5E-A44L03-G
		5m	HS5E-A4005	HS5E-A4405-G	HS5E-A44L05-G
B		1m	HS5E-B4001	HS5E-B4401-G	
		3m	HS5E-B4003	HS5E-B4403-G	
		5m	HS5E-B4005	HS5E-B4405-G	
C		1m	HS5E-C4001	HS5E-C4401-G	HS5E-C44L01-G
		3m	HS5E-C4003	HS5E-C4403-G	HS5E-C44L03-G
		5m	HS5E-C4005	HS5E-C4405-G	HS5E-C44L05-G
D		1m	HS5E-D4001	HS5E-D4401-G	HS5E-D44L01-G
		3m	HS5E-D4003	HS5E-D4403-G	HS5E-D44L03-G
		5m	HS5E-D4005	HS5E-D4405-G	HS5E-D44L05-G
F		1m	HS5E-F4001	HS5E-F4401-G	HS5E-F44L01-G
		3m	HS5E-F4003	HS5E-F4403-G	HS5E-F44L03-G
		5m	HS5E-F4005	HS5E-F4405-G	HS5E-F44L05-G
G		1m	HS5E-G4001	HS5E-G4401-G	HS5E-G44L01-G
		3m	HS5E-G4003	HS5E-G4403-G	HS5E-G44L03-G
		5m	HS5E-G4005	HS5E-G4405-G	HS5E-G44L05-G
H		1m	HS5E-H4001	HS5E-H4401-G	
		3m	HS5E-H4003	HS5E-H4403-G	
		5m	HS5E-H4005	HS5E-H4405-G	
J		1m	HS5E-J4001	HS5E-J4401-G	
		3m	HS5E-J4003	HS5E-J4403-G	
		5m	HS5E-J4005	HS5E-J4405-G	

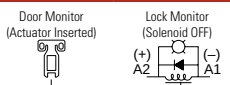
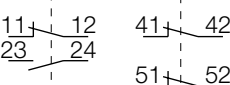
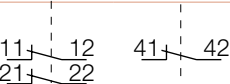
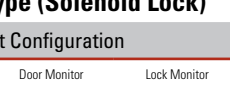
 The contact configuration shows the status when the actuator is inserted and the switch is locked.
The contact configuration shows the status when the indicator is installed.
Actuators are not supplied with the interlock switch and must be ordered separately.
Standard stock items in bold

Dual Safety Circuit type

Circuit Code	Contact Configuration	Cable Length	Part Number
DD		1m	HS5E-DD4401-G
		3m	HS5E-DD4403-G
		5m	HS5E-DD4405-G

-  1. The contact configuration shows the status when the actuator is inserted and the switch is locked.
2. Manual unlock key is included with the interlock switch.
3. Actuators are not supplied with the interlock switch and must be ordered separately.
4. Standard stock items in bold

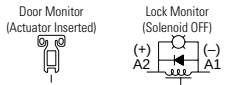
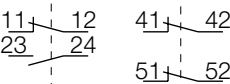
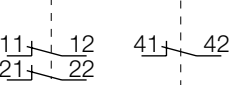
Four-circuit Independent Output Type (Spring Lock)

Circuit Code	Contact Configuration	Cable Length	Part Number
VA			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VA4401-G
Door Monitor Circuit: 1NC, 1NO	23 24 53 54	3m	HS5E-VA4403-G
Lock Monitor Circuit: 1NC, 1NO		5m	HS5E-VA4405-G
VB			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VB4401-G
Door Monitor Circuit: 1NC, 1NO	23 24 51 52	3m	HS5E-VB4403-G
Lock Monitor Circuit: 2NC		5m	HS5E-VB4405-G
VC			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VC4401-G
Door Monitor Circuit: 2NC	⊕ 21 22 53 54	3m	HS5E-VC4403-G
Lock Monitor Circuit: 1NC, 1NO		5m	HS5E-VC4405-G
VD			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VD4401-G
Door Monitor Circuit: 2NC	⊕ 21 22 51 52	3m	HS5E-VD4403-G
Lock Monitor Circuit: 2NC		5m	HS5E-VD4405-G



The contact configuration shows the status when the actuator is inserted and the switch is locked.
 Actuators are not supplied with the interlock switch and must be ordered separately.
 Standard stock items in bold.

Four-circuit Independent Output Type (Solenoid Lock)

Circuit Code	Contact Configuration	Cable Length	Part Number
VA			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VA7Y401-G
Door Monitor Circuit: 1NC, 1NO	23 24 53 54	3m	HS5E-VA7Y403-G
Lock Monitor Circuit: 1NC, 1NO		5m	HS5E-VA7Y405-G
VB			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VB7Y401-G
Door Monitor Circuit: 1NC, 1NO	23 24 51 52	3m	HS5E-VB7Y403-G
Lock Monitor Circuit: 2NC		5m	HS5E-VB7Y405-G
VC			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VC7Y401-G
Door Monitor Circuit: 2NC	⊕ 21 22 53 54	3m	HS5E-VC7Y403-G
Lock Monitor Circuit: 1NC, 1NO		5m	HS5E-VC7Y405-G
VD			
Monitor Circuit:	⊕ 11 12 41 42	1m	HS5E-VD7Y401-G
Door Monitor Circuit: 2NC	⊕ 21 22 51 52	3m	HS5E-VD7Y403-G
Lock Monitor Circuit: 2NC		5m	HS5E-VD7Y405-G



The contact configuration shows the status when the actuator is inserted and the switch is locked.
 Actuators are not supplied with the interlock switch and must be ordered separately.
 Standard stock items in bold.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Solenoid Lock Type (Remove Power to Unlock)

Circuit Code	Contact Configuration	Cable Length	Part Number	
			Without LED	With LED
A	Door Monitor (Actuator Inserted) Lock Monitor (Solenoid OFF)	1m	HS5E-A7Y001	HS5E-A7Y401-G
		3m	HS5E-A7Y003	HS5E-A7Y403-G
		5m	HS5E-A7Y005	HS5E-A7Y405-G
B		1m	HS5E-B7Y001	HS5E-B7Y401-G
		3m	HS5E-B7Y003	HS5E-B7Y403-G
		5m	HS5E-B7Y005	HS5E-B7Y405-G
C		1m	HS5E-C7Y001	HS5E-C7Y401-G
		3m	HS5E-C7Y003	HS5E-C7Y403-G
		5m	HS5E-C7Y005	HS5E-C7Y405-G
D		1m	HS5E-D7Y001	HS5E-D7Y401-G
		3m	HS5E-D7Y003	HS5E-D7Y403-G
		5m	HS5E-D7Y005	HS5E-D7Y405-G
F		1m	HS5E-F7Y001	HS5E-F7Y401-G
		3m	HS5E-F7Y003	HS5E-F7Y403-G
		5m	HS5E-F7Y005	HS5E-F7Y405-G
G		1m	HS5E-G7Y001	HS5E-G7Y401-G
		3m	HS5E-G7Y003	HS5E-G7Y403-G
		5m	HS5E-G7Y005	HS5E-G7Y405-G
H		1m	HS5E-H7Y001	HS5E-H7Y401-G
		3m	HS5E-H7Y003	HS5E-H7Y403-G
		5m	HS5E-H7Y005	HS5E-H7Y405-G
J		1m	HS5E-J7Y001	HS5E-J7Y401-G
		3m	HS5E-J7Y003	HS5E-J7Y403-G
		5m	HS5E-J7Y005	HS5E-J7Y405-G

 The contact configuration shows the status when the actuator is inserted and the switch is locked.
The contact configuration shows the status when the indicator is installed.
Actuators are not supplied with the interlock switch and must be ordered separately.
Standard stock items in bold

Actuator Keys & Accessories (order separately)

Appearance	Part Number	Description	Item	Part Number	Description
	HS9Z-A51	Straight		HS9Z-PH5	Padlock Hasp (prevents unauthorized insertion of actuator)
	HS9Z-A52	Right-angle		HS9Z-SP51	Mounting Plate (allows easy mounting to aluminum frames)
	HS9Z-A53	Angle adjustable vertical operation		HS9Z-T3	Manual unlock key (long type - metal)
	HS9Z-A55	Angle adjustable horizontal/vertical operation ¹		HS9Z-SH5	Sliding Actuator
	HS9Z-A5P	Plug Actuator (allows switch to be used as interlock plug unit)		1. The actuator tensile strength is 500N minimum. 2. Actuators are not included and must be included separately.	

Specifications

Conforming Standards	ISO14119, IEC60947-5-1, EN60947-5-1 (TÜV approval), EN1088, GS-ET-19 (BG approval), UL508, CSA C22.2, No. 14, GB 140485.5 (CCC approval) IEC60204-1/EN60204-1
Application Standards	IEC60204-1/EN60204-1
Operating Temperature	-25 to 50°C (no freezing)
Relative Humidity	45 to 85% (no condensation)
Storage Temperature	-40 to +80°C (no freezing)
Operating Environment	Degree of pollution: 3
Impulse Withstand Voltage	2.5 kV (between LED, solenoid and grounding: 0.5 kV)
Insulation Resistance (DC megger)	Between live and dead metal parts: 100 MΩ minimum Between live metal part and ground: 100 MΩ minimum Between live metal parts: 100 MΩ minimum Between Terminals of the same pole: 100 MΩ minimum
Electric Shock Protection Class	Class II (IEC61140)
Degree of Protection	IP67 (IEC60529)
Shock Resistance	Operating extremes: 100 m/s ² (10 G) Damage limits: 1000 m/s ² (100 G)
Vibration Resistance	Operating extremes: 10 to 55 H, amplitude 0.35 mm minimum Damage limits: 30 Hz, amplitude 1.5 mm minimum
Actuator Operating Speed	0.05 to 1.0m/s
Direct Opening Travel	Actuator HS9Z-A51: 11mm minimum Actuator HS9Z-A52/A53/A55: 12mm minimum
Direct Opening Force	80N minimum
Actuator Retention Force	1400N minimum (GS-ET-19)
Operating Frequency	900 operations per hour
Mechanical Life	1,000,000 operations minimum (GS-ET-19)
Electrical Life	100,000 operations minimum (operating frequency 900 operations per hour, rated load AC-12, 250V, 1A)
Conditional Short-circuit Current	50A (250V) (Note: Use 250V/10A fast acting type fuse for short circuit protection.)
Cable	21AWG - 8-core: 0.5mm ² or equivalent/core (HS5E-V types: No. 22AWG - 12-core :0.3mm ² on equivalent/ core)
Cable Diameter	ø7.6 mm
Weight (approx.)	400g - 1m cable type, 580g - 3m cable type, 760g - 5m cable type

Specifications

Rated Voltage	24V DC
Current	266 mA
Coil Resistance	90Ω (at 20°C)
Operating Voltage	Rated voltage x 85% or less (at 20°C)
Return Voltage	Rated voltage x 10% or more (at 20°C)
Maximum Continuous Applying Voltage	Rated voltage x 110%
Insulation Class	Class F

Current Ratings

Rated Insulation Voltage (U) ²		250V (between LED, solenoid and grounding: 30V)		
Thermal Current (I _{th})		2.5A		
Rated Voltage (U _e)		30V	125V	250V
Rated Current (I _e) ³	AC	Resistive load (AC12)	—	2.5A
		Inductive Load (AC15)	—	1.5A
	DC	Resistive load (DC12)	2.5A	1.1A
		Inductive Load (DC13)	2.3A	0.55A



1. Minimum applicable load (reference value): 3V AC/DC, 5 mA
2. UL rating: 125V
3. TUV, BG rating: AC-15, 0.5A/250V, DC-13, 0.22A/125V
UL, c-UL rating: Pilot duty AC 0.5A/125V, Pilot duty DC 0.22A/125V

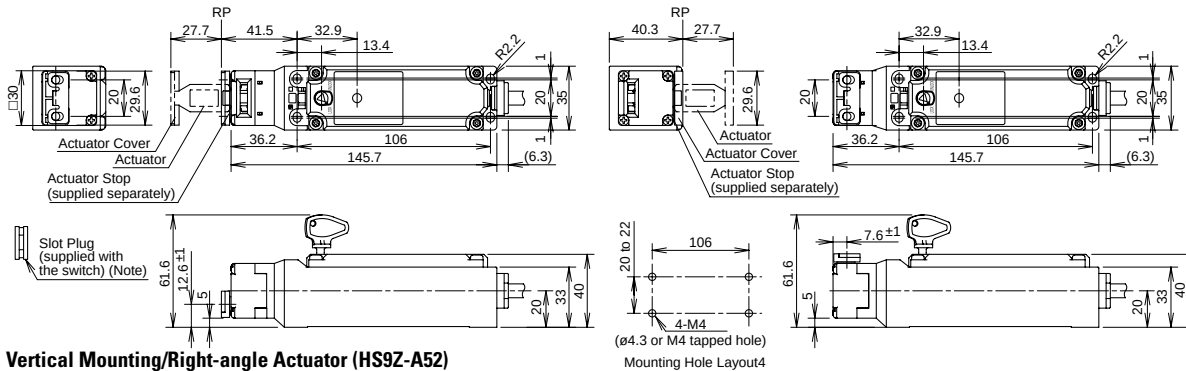
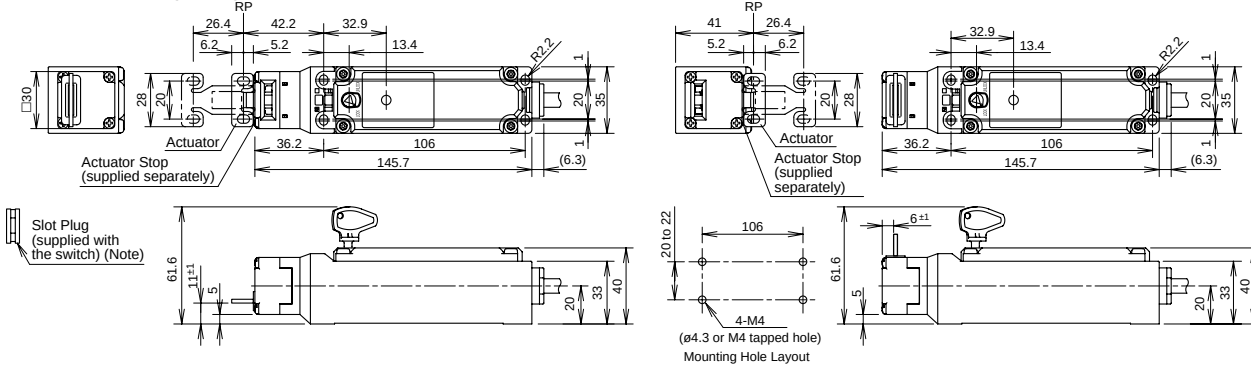
Pilot Light

Rated Voltage	24V DC
Current	10mA
Light Source	LED
Light Color	Green

Dimensions (mm) and Mounting Hole Layouts

HS5E-□□4□-G (with indicator)

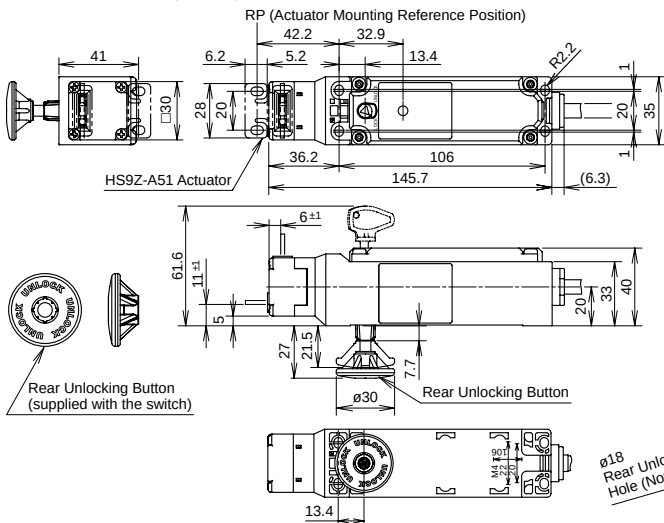
Horizontal Mounting/Straight Actuator (HS9Z-A51)



Vertical Mounting/Right-angle Actuator (HS9Z-A52)

HS5E-□44L□-G (rear unlocking button type)

Horizontal Mounting/Straight Actuator (HS9Z-A51)



Rear unlocking button mounting

- $X \leq 6$ Panel mounting
- $6 < X < 23$ Not mountable
- $23 \leq X \leq 33$ Use HS9Z-FL53 rear unlocking button kit (Note)
- $33 < X \leq 43$ Use HS9Z-FL54 rear unlocking button kit (Note)

X = Panel thickness

(including panel, mounting frame, and mounting plate)

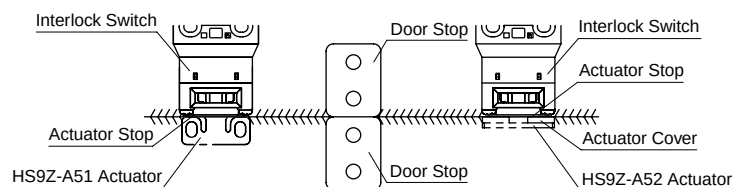
Note: See page 332 for details.

Note: With the mounting hole dimension, the rear unlocking button rod does not touch the hole even when the interlock switch moves sideways.

Actuator Mounting Reference Position

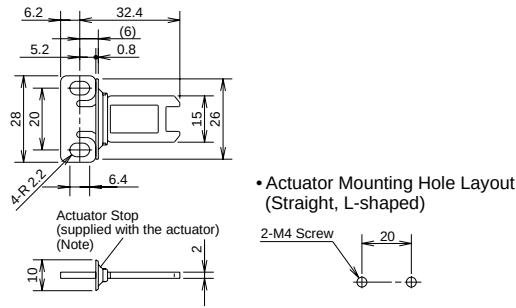
As shown in the figure on the right, the mounting reference position of the actuator when inserted in the interlock switch is where the actuator stop placed on the actuator lightly touches the interlock switch.

Note: After mounting the actuator, remove the actuator stop from the actuator.

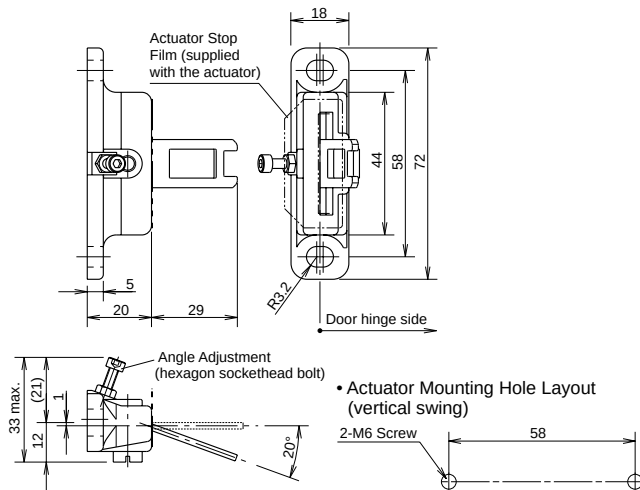
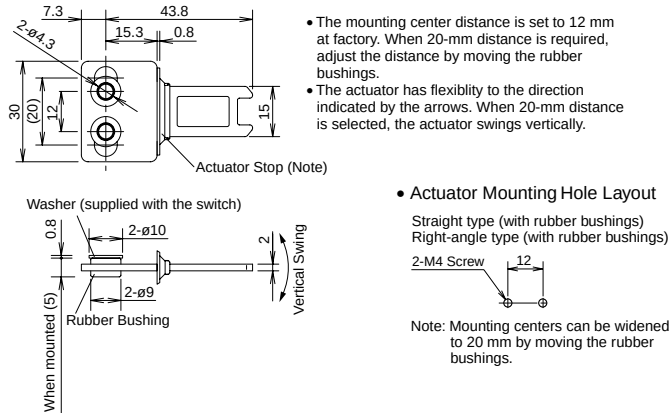


Dimensions and Mounting Hole Layouts, continued

Straight Actuator (HS9Z-A51)



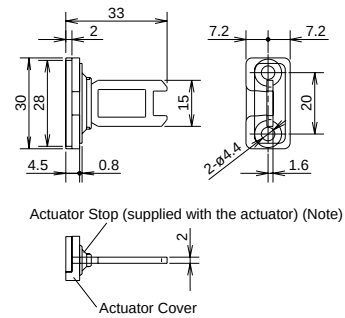
Straight Actuator w/Rubber Bushings (HS9Z-A51A)



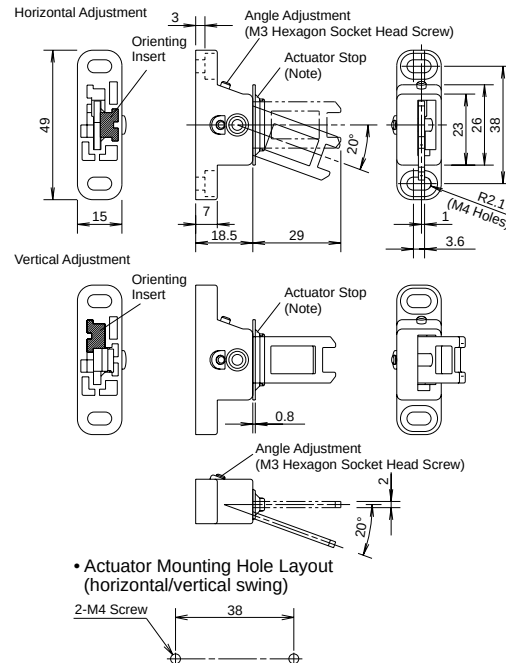
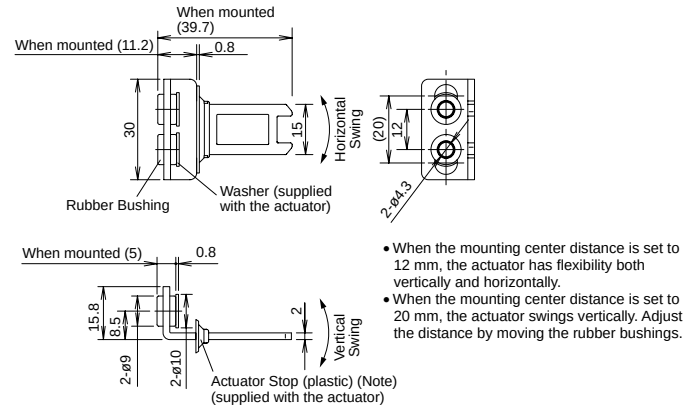
Actuator Orientation

The orientation of actuator swing (horizontal/vertical) can be changed using the orienting insert (white plastic) installed on the back of the actuator. Do not lose the orientating insert, otherwise the actuator will not swing properly.

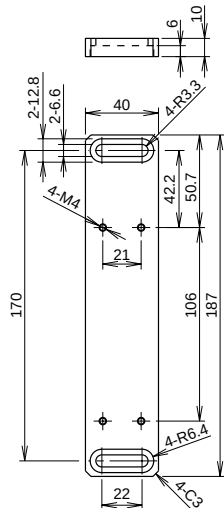
Right-angle Actuator (HS9Z-A52)



Right-angle Actuator w/Rubber Bushings (HS9Z-A52A)



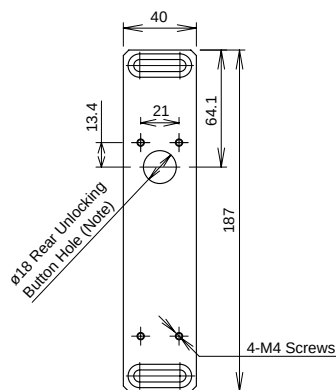
Mounting Plate (HS9Z-SP51)



Weight: Approx. 180g

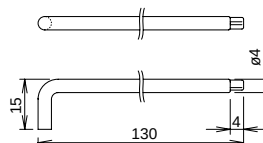
Rear Unlocking Button Kit (HS9Z-FL5□)

Drilling Rear Unlocking Button Hole

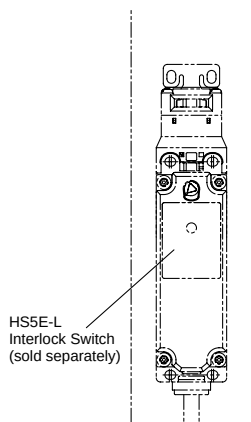
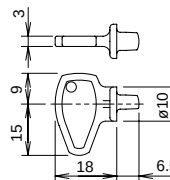


When installing the HS5E-□44□-G (rear unlocking button type), provide a rear unlocking button hole on the HS9Z-SP51.

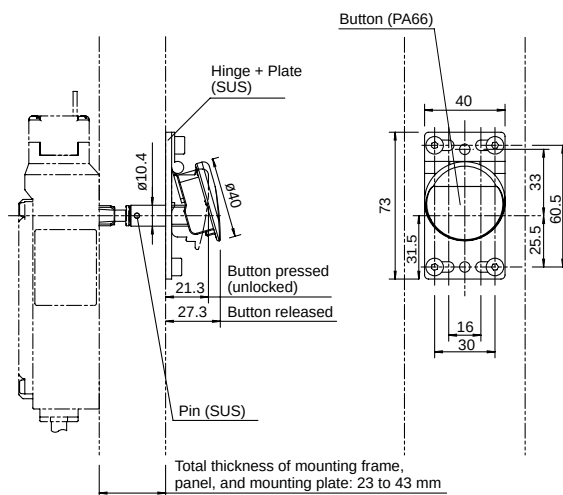
Manual Unlocking Key (Metal) (HS9Z-T3)



Manual Unlocking Key (plastic)

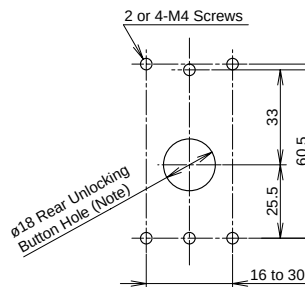


HS5E-L /
Interlock Switch
(sold separately)

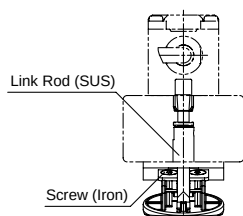


Total thickness of mounting frame,
panel, and mounting plate: 23 to 43 mm

Rear Unlocking Button Kit Mounting Hole Layout



Note: With the mounting hole dimension, the rear unlocking button rod does not touch the hole even when the interlock switch moves sideways.

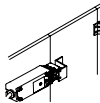
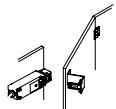
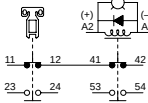
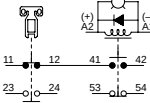
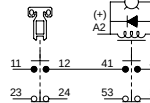
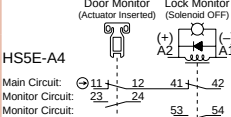


Link Rod (SUS)

Screw (Iron)

Circuit Diagrams and Operating Characteristics

Standard and Rear Unlocking Type - Spring Lock Type

		Status 1	Status 2	Status 3	Status 4	Manual Unlock	
Interlock Switch Status		- Door Closed - Machine ready to operate - Solenoid de-energized	- Door Closed - Machine cannot be operated - Solenoid de-energized	- Door Open - Machine cannot be operated - Solenoid de-energized	- Door Open - Machine cannot be operated - Solenoid energized	- Door Closed - Machine cannot be operated - Solenoid de-energized → energized	
Door Status							
Circuit Diagram (HS5E-A4)							
Door		Closed (locked)	Closed (unlocked)	Open	Open	Closed (unlocked)	
Contact Configuration	 HS5E-A4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
	HS5E-B4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	HS5E-C4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
	HS5E-D4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	HS5E-F4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door closed) 31-32	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
	HS5E-G4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
Monitor Circuit (door closed) 21-22		ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)	
Monitor Circuit (door open) 33-34		OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)	
HS5E-H4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)	
	Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)	
	Monitor Circuit (locked) 61-62	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)	
HS5E-J4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)	
	Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)	
	Monitor Circuit (unlocked) 63-64	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)	
Solenoid Power A1-A2 (all types)		OFF (de-energized)	ON (energized)	ON (energized)	OFF (de-energized)	OFF (de-energized)	

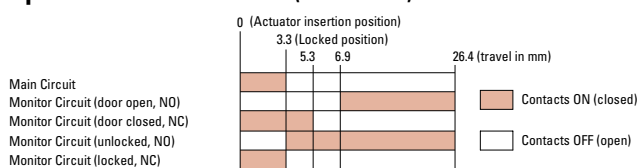


The above contact configuration shows the status when the actuator is inserted and locked.

Main Circuit: Connected to the control circuit of machine drive part, sending interlock signals of the protective door.

Monitor Circuit: Sends monitoring signals of protective door open/closed status or protective door lock/unlock status.

Operation Characteristics (reference)



The operation characteristics shown in the chart above are of the HS9Z-A51. For other actuator types, add 1.3 mm.

The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch.

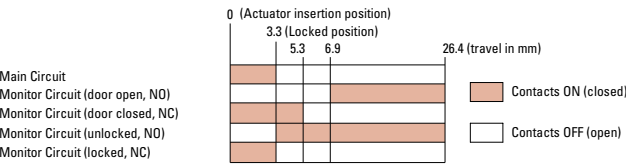
Standard Type - Solenoid Lock Type

Interlock Switch Status		Status 1		Status 2		Status 3		Status 4		Manual Unlock	
		• Door Closed • Machine ready to operate • Solenoid de-energized		• Door Closed • Machine cannot be operated • Solenoid de-energized		• Door Open • Machine cannot be operated • Solenoid de-energized		• Door Open • Machine cannot be operated • Solenoid energized		• Door Closed • Machine cannot be operated • Solenoid de-energized → energized	
Door Status											
Circuit Diagram (HS5E-A7Y)											
Door		Closed (locked)		Closed (unlocked)		Open		Open		Closed (unlocked)	
Contact Configuration	Door Monitor (Actuator inserted) Lock Monitor (Solenoid ON) HS5E-A7Y Main Circuit: Monitor Circuit (door open): Monitor Circuit (door closed):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)				
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)				
	HS5E-B7Y Main Circuit: Monitor Circuit (door open): Monitor Circuit (door closed):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)				
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
	HS5E-C7Y Main Circuit: Monitor Circuit (door closed): Monitor Circuit (unlocked):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)				
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)				
	HS5E-D7Y Main Circuit: Monitor Circuit (door closed): Monitor Circuit (locked):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)				
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
	HS5E-F7Y Main Circuit: Monitor Circuit (door closed): Monitor Circuit (door closed):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)				
		Monitor Circuit (door closed) 31-32	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)				
	HS5E-G7Y Main Circuit: Monitor Circuit (door closed): Monitor Circuit (door open):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)				
		Monitor Circuit (door open) 33-34	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)				
	HS5E-H7Y Main Circuit: Monitor Circuit (locked): Monitor Circuit (locked):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (locked) 61-62	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
	HS5E-J7Y Main Circuit: Monitor Circuit (unlocked): Monitor Circuit (unlocked):	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (unlocked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)				
		Monitor Circuit (unlocked) 63-64	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)				
Solenoid Power A1-A2 (all types)		ON (energized)	OFF (de-energized)	OFF (de-energized)	ON (energized) ²	OFF to ON ^{1, 2}					

The above contact configuration shows the status when the actuator is inserted and locked.
Main Circuit: Connected to the control circuit of machine drive part, sending interlock signals of the protective door.
Monitor Circuit: Sends monitoring signals of protective door open/closed status or protective door lock/unlock status.

- 1: Actuator can be unlocked manually for confirming the door movement before wiring and energizing, and also for emergency situation such as power failure.
- 2: When the operator is confined in a hazardous zone, the actuator can be unlocked manually by pressing the rear unlocking button.

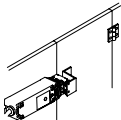
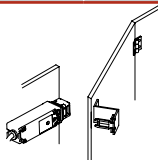
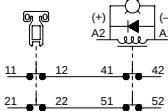
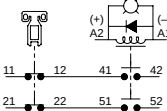
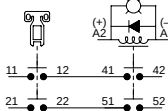
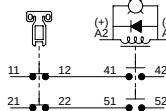
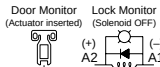
Operation Characteristics (reference)



The operation characteristics shown in the chart above are of the HS9Z-A51. For other actuator types, add 1.3 mm.

The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch.

Dual Safety Circuit Type

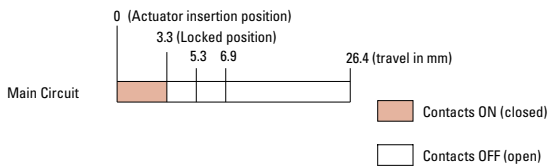
Interlock Switch Status		Status 1	Status 2	Status 3	Status 4	Manual Unlock	
		- Door Closed - Machine ready to operate - Solenoid de-energized	- Door Closed - Machine cannot be operated - Solenoid energized	- Door Open - Machine cannot be operated - Solenoid energized	- Door Open - Machine cannot be operated - Solenoid de-energized	- Door Closed - Machine cannot be operated - Solenoid de-energized	
Door Status							
Circuit Diagram (HS5E-A7Y)							
Door		Closed (locked)	Closed (unlocked)	Open	Open	Closed (unlocked)	
Contact Configuration	 HS5E-DD4	Main Circuit 11-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Main Circuit 21-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	Solenoid Power A1-A2 (all types)		OFF (de-energized)	ON (energized)	ON (energized)	OFF (de-energized)	OFF (de-energized)



The above contact configuration shows the status when the actuator is inserted and locked.
 Main Circuit: Connected to the control circuit of machine drive part, sending interlock signals of the protective door.

Note: Actuator can be unlocked manually for confirming the door movement before wiring and energizing, and also for emergency situation such as power failure.

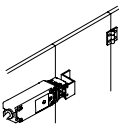
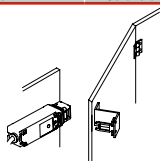
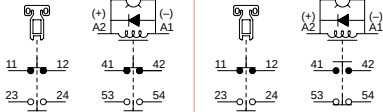
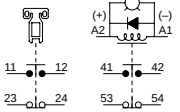
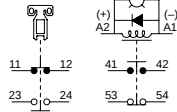
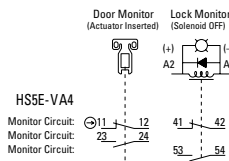
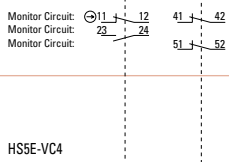
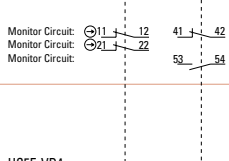
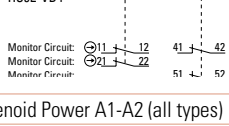
Operation Characteristics (reference)



The operation characteristics shown in the chart above are of the HS9Z-A51.
 For other actuator types, add 1.3 mm.

The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch.

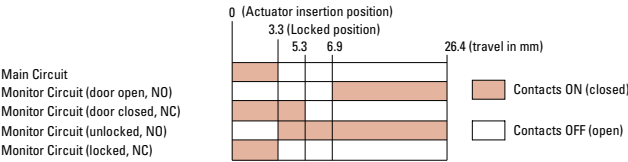
Standard Type - Solenoid Lock Type

Interlock Switch Status		Status 1	Status 2	Status 3	Status 4	Manual Unlock	
		- Door Closed - Machine ready to operate - Solenoid de-energized	- Door Closed - Machine cannot be operated - Solenoid energized	- Door Open - Machine cannot be operated - Solenoid energized	- Door Open - Machine cannot be operated - Solenoid de-energized	- Door Closed - Machine cannot be operated - Solenoid de-energized	
Door Status							
Circuit Diagram (HS5E-VA4)							
Door		Closed (locked)	Closed (unlocked)	Open	Open	Closed (unlocked)	
Contact Configuration	 HS5E-VA4 Monitor Circuit: 11-12, 23-24 Monitor Circuit: 41-42, 53-54	Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
		Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
	 HS5E-VB4 Monitor Circuit: 11-12, 23-24 Monitor Circuit: 41-42, 51-52	Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
		Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	 HS5E-VC4 Monitor Circuit: 11-12, 21-22 Monitor Circuit: 41-42, 53-54	Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
	 HS5E-VD4 Monitor Circuit: 11-12, 21-22 Monitor Circuit: 41-42, 51-52	Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
Solenoid Power A1-A2 (all types)		OFF (de-energized)	ON (energized)	ON (energized)	OFF (de-energized)	OFF (de-energized)	

 The above contact configuration shows the status when the actuator is inserted and locked.
Monitor Circuit: Sends monitoring signals of protective door open/closed status or protective door lock/unlock status.

Note: Actuator can be unlocked manually for confirming the door movement before wiring and energizing, and also for emergency situation such as power failure.

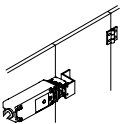
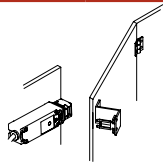
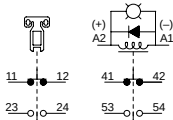
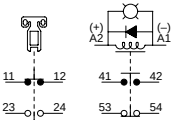
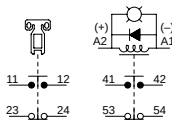
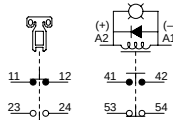
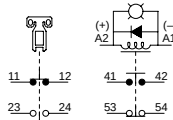
Operation Characteristics (reference)



The operation characteristics shown in the chart above are of the HS9Z-A51. For other actuator types, add 1.3 mm.

The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch.

Standard Type - Solenoid Lock Type

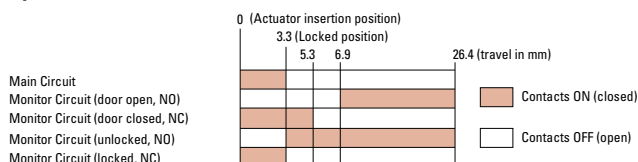
Interlock Switch Status			Status 1	Status 2	Status 3	Status 4	Manual Unlock
			- Door Closed - Machine ready to operate - Solenoid energized	- Door Closed - Machine cannot be operated - Solenoid de-energized	- Door Open - Machine cannot be operated - Solenoid de-energized	- Door Open - Machine cannot be operated - Solenoid energized	- Door Closed - Machine cannot be operated - Solenoid de-energized → energized
Door Status							
Circuit Diagram (HS5E-VA4)							
Door			Closed (locked)	Closed (unlocked)	Open	Open	Closed (unlocked)
Contact Configuration	HS5E-VA7Y	 Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
		Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
	HS5E-VB7Y	Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
		Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	ON (closed)	OFF (open)
	HS5E-VC7Y	Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (locked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)	ON (closed)
	HS5E-VD7Y	Main Circuit 11-42	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door closed) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)
Monitor Circuit (locked) 51-52		ON (closed)	OFF (open)	OFF (open)	OFF (open)	OFF (open)	
Solenoid Power A1-A2 (all types)			OFF (de-energized)	ON (energized)	ON (energized)	OFF (de-energized)	OFF (de-energized)



The above contact configuration shows the status when the actuator is inserted and locked.
 Monitor Circuit: Sends monitoring signals of protective door open/closed status or protective door lock/unlock status.

Note: Actuator can be unlocked manually for confirming the door movement before wiring and energizing, and also for emergency situation such as power failure.

Operation Characteristics (reference)



The operation characteristics shown in the chart above are of the HS9Z-A51. For other actuator types, add 1.3 mm.

The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch.

Operating Instructions

Minimum Radius of Hinged Door

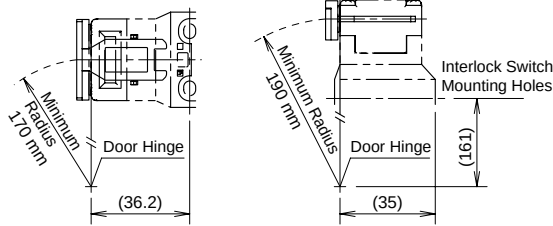
- When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For the doors with small minimum radius, use angle adjustable actuators (HS9Z-A53 or HS9Z-A55).



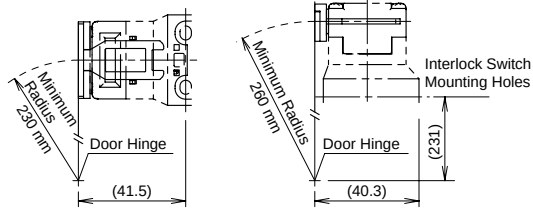
Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

HS9Z-A52 Actuator

When the door hinge is on the extension line of the interlock switch surface:

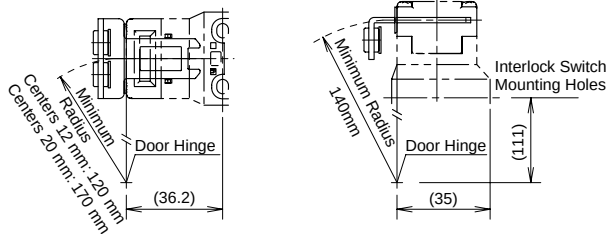


When the door hinge is on the extension line of the actuator mounting surface:

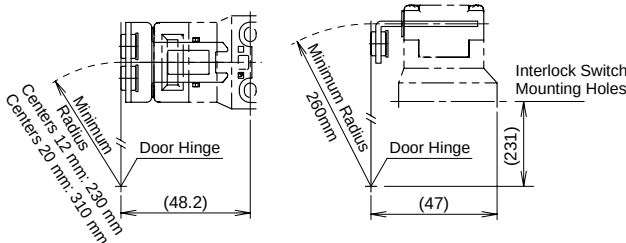


HS9Z-A52 Actuator (w/rubber bushings)

When the door hinge is on the extension line of the interlock switch surface:



When the door hinge is on the extension line of the actuator mounting surface:



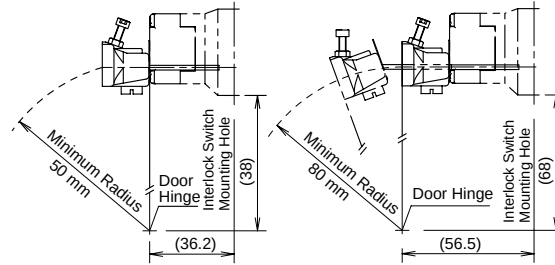
Actuator Angle Adjustment

- Using the angle adjustment screw, the actuator angle can be adjusted (refer to the dimensional drawing on page 330).
Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.
- After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not move.

When using the HS9Z-A53 Angle Adjustable (vertical) Actuator

When the door hinge is on the extension line of the interlock switch surface: 50 mm

When the door hinge is on the extension line of the actuator mounting surface: 80 mm

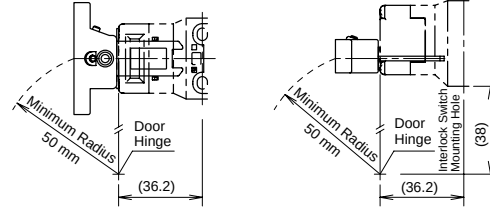


When using the HS9Z-A55 Angle Adjustable (vertical/horizontal) Actuator

When the door hinge is on the extension line of the interlock switch surface: 50 mm

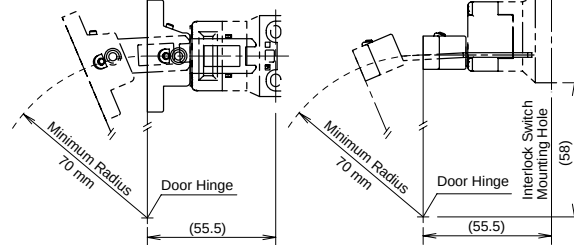
Horizontal Swing

Vertical Swing



Horizontal Swing

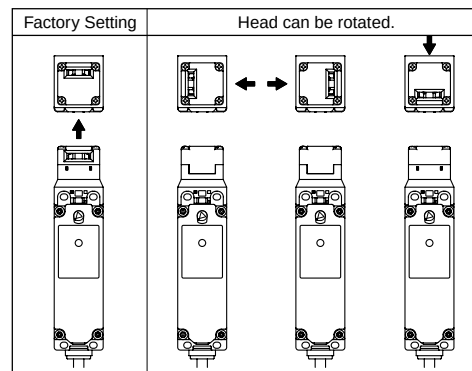
Vertical Swing



When the door hinge is on the extension line of the actuator mounting surface: 70 mm

Rotating the Head

The head of the HS5E can be rotated by removing the four screws from the corners of the HS5E head and reinstalling the head in the desired orientation. Before wiring the HS5E, replace the head if necessary. Before replacing the head, turn the manual unlock to the UNLOCK position using the manual unlock key. When reinstalling the head, make sure that no foreign object enters the interlock switch. Tighten the screws tightly, without leaving space between the head and body, otherwise the interlock switch may malfunction. Recommended tightening torque: 0.9 to 1.1 N·m.



Instructions, continued

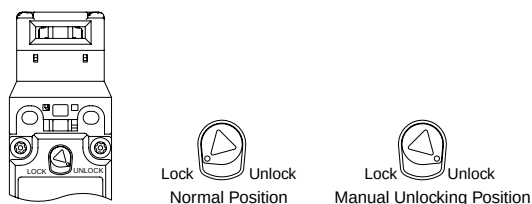
For Manual Unlocking

Spring lock type

The HS5E allows manual unlocking of the actuator to pre-check proper door movement before wiring or turning power on, as well as for emergency use such as a power failure.

Solenoid lock type

The solenoid lock type interlock switch normally does not need the manual unlock. However, only when the interlock switch would not release the actuator even though the solenoid is de-energized, the interlock switch can be unlocked manually. Unlock the interlock switch manually only when the solenoid is de-energized. Do not unlock the interlock switch manually when the solenoid is energized.

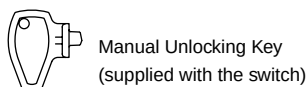


When locking or unlocking the interlock switch manually, turn the key fully using the manual unlock key supplied with the interlock switch.

Using the interlock switch with the key not fully turned (less than 90°) may cause damage to the interlock switch or operation failures (when manually unlocked, the interlock switch will keep the main circuit disconnected and the door unlocked).

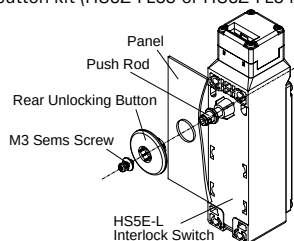
Do not apply excessive force to the manual unlock, otherwise the manual unlock will become damaged.

Do not leave the manual unlock key attached to the interlock switch during operation. This is dangerous because the interlock switch can always be unlocked while the machine is in operation.



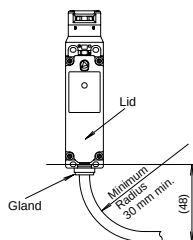
Installing the Rear Unlocking Button

After installing the interlock switch on the panel, place the rear unlocking button (supplied with the switch) on the push rod on the back of the interlock switch, and fasten the button using the M3 sems screw. Rear unlocking button can be installed alone when the total thickness of mounting frame and panel is 6 mm or less. When the total thickness of mounting frame, panel, and mounting plate is 23 to 43 mm, use the rear unlocking button kit (HS9Z-FL53 or HS9Z-FL54) sold separately.



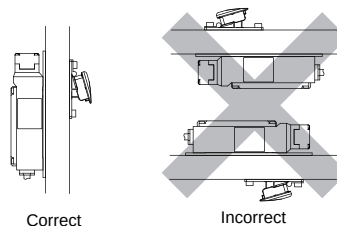
Cables

- When bending the cable during wiring, make sure that the cable radius is kept at 30 mm minimum.
- Solenoid has polarity. Be sure of the correct polarity when wiring.



Safety Precautions

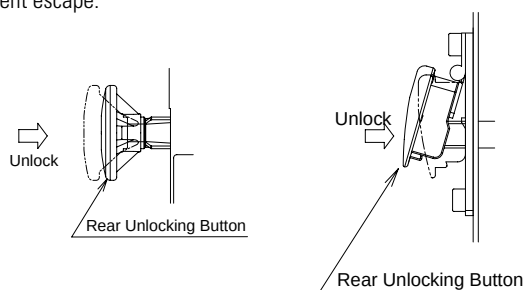
Install the rear unlocking button kit in the correct direction as shown below. Do not install the kit in incorrect directions, otherwise malfunction will be caused.



Do not apply strong force exceeding 100 m/s² to the interlock switch while the rear unlocking button is not pressed, otherwise malfunction will be caused.

Manual Unlocking using the Rear Unlocking Button

The rear unlocking button is used by the operator confined in a hazardous area for emergent escape.



How to operate

When the rear unlocking button is pressed, the interlock switch is unlocked and the door can be opened.

To lock the interlock switch, pull back the button.

When the button remains pressed, the interlock switch cannot be locked even if the door is closed, and the main circuit remains open.

Recommended Tightening Torque

- HS5E interlock switch: 1.8 to 2.2 N·m (four M4 screws) (Note)
- Rear unlocking button: 0.5 to 0.7 N·m
- Rear unlocking button kit: 4.8 to 5.2 N·m (M5 screw)
- Actuators
 - HS9Z-A51: 1.8 to 2.2 N·m (two M4 screws)
 - HS9Z-A52: 0.8 to 1.2 N·m (two M4 Phillips screws)
 - HS9Z-A51A/A52A: 1.0 to 1.5 N·m (two M4 screws)
 - HS9Z-A53: 4.5 to 5.5 N·m (two M6 screws)
 - HS9Z-A55: 1.0 to 1.5 N·m (two M4 screws)

Note: The above recommended tightening torque of the mounting screws are the values with hex socket head bolts. When other screws are used and tightened to a smaller torque, make sure that the screws do not become loose after mounting.

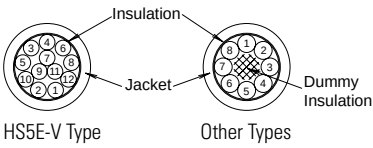
Instructions, continued

Wire Identification

Wires can be identified by color and a white line printed on the wire.

- HS5E-V: Wires of gray and gray/white insulation cannot be used.
- HS5E-DD: Wires of brown and brown/white insulation cannot be used.

No.	Insulation	No.	Insulation	No.	Insulation	No.	Insulation
1	White	4	Blue	7	Blue/White	10	Pink/White
2	Black	5	Brown/White	8	Orange/White	11	Gray
3	Brown	6	Orange	9	Pink	12	Gray/White



Terminal Number Identification

- When wiring, the terminal number of each contact can be identified by wire color.
- The following table shows the identification of terminal numbers.

Type	Circuit Diagram	
HS5E-A		
HS5E-B		
HS5E-C		
HS5E-D		
HS5E-F		
HS5E-G		
HS5E-H		
HS5E-J		
HS5E-DD		

Type	Circuit Diagram	
HS5E-VA		
HS5E-VB		
HS5E-VC		
HS5E-VD		



The above contact configuration shows the status when the actuator is inserted and locked.



When wiring, cut unnecessary wires such as the dummy insulation (white) and any unused wires.

HS1E Full Size Solenoid Locking Switches

Key features:

- Plastic Housing: Lightweight
- 1500N locking retention force
- Available with a red or green indicator
- Choose from 4 circuit configurations
- Flexible Installation: The actuator can be accessed from two directions
- Ease of Wiring: M3.5 termination screws



Part Numbers (Mechanical Spring Lock Only)

Contact Configuration		LED	Standard	Manual Unlock Key
Main circuit: 1NC + 1NC Monitor circuit: 1NO/1NO		None	HS1E-40R	HS1E-40KR
		Green	HS1E-44R-G	HS1E-44KR-G
		Red	HS1E-44R-R	HS1E-44KR-R
Main circuit: 1NC + 1NC Monitor circuit: 1NO		None	HS1E-140R	HS1E-140KR
		Green	HS1E-144R-G	HS1E-144KR-G
		Red	HS1E-144R-R	HS1E-144KR-R
Main circuit: 1NC + 1NC Monitor circuit: 1NC + 1NC		None	HS1E-240R	HS1E-240KR
		Green	HS1E-244R-G	HS1E-244KR-G
		Red	HS1E-244R-R	HS1E-244KR-R
Main circuit: 1NC + 1NC Monitor circuit: 1NC		None	HS1E-340R	HS1E-340KR
		Green	HS1E-344R-G	HS1E-344KR-G
		Red	HS1E-344R-R	HS1E-344KR-R

Actuator Keys & Accessories

Appearance	Part Number	Description
	HS9Z-A1	Straight Actuator
	HS9Z-A2	Right-angle Actuator
	HS9Z-A3	Adjustable Actuator
	HS9Z-T1	Key Wrench (included with switch)
	HS9Z-P1	Conduit Opening Plug (G1/2)



1. Key wrench for TORX screws (HS9Z-T1) is supplied with the interlock switch.
2. Actuator is not supplied with the interlock switch, and must be ordered separately.
3. Manual unlock key is included with the interlock switch.
4. TORX is a registered trademark of Camcar Textron.

Specifications

Conforming to Standards		EN1088, IEC60947-5-1, EN60947-5-1(TUV), ISO14119, GS-ET-19 (BG), UL508, CSA C22.2 No. 14, GB14048.5 (CCC approval), IEC60204-1, EN60204-1 (applicable standards for use)
Operating Temperature		−20 to +40°C (no freezing)
Storage Temperature		−40 to +80°C
Relative Humidity		40 - 85% RH (no condensation)
Altitude		2,000m maximum
Rated Insulation Voltage (Ui)		300V (between LED or solenoid and ground: 60V)
Impulse Withstand Voltage (Uimp)		4 kV (between LED or solenoid and ground: 2.5 kV)
Insulation Resistance (measured with 500V DC megger)		Between live and dead metal parts: 100 MΩ minimum Between live metal part and ground: 100 MΩ minimum Between live metal parts: 100 MΩ minimum Between terminals of the same pole: 100 MΩ minimum
Electric Shock Protection		Class II (according to IEC61140)
Pollution Degree		3 (IEC60947-5-1)
Degree of Protection		IP67 (IEC60529)
Vibration Resistance	Operating Extremes	10 to 55 Hz, minimum (amplitude 0.35 mm)
	Damage Limits	50 m/sec ² (approx. 5G)
Shock Resistance		1,000 m/sec ² (approx. 100G)
Actuator Retention Force		1,500N minimum (per GS-ET-19)
Actuator Operating Speed		0.05 to 1.0m/s
Direct Opening Travel		11mm minimum
Direct Opening Force		20N minimum
Thermal Current (I _{th})		Main circuit: 10A, Auxiliary circuit: 3A
Contact Gap		Main circuit: 1.7 mm min., Auxiliary circuit: 1.2 mm min.
Operating Frequency		900 operations/hour max.
Mechanical Life		1,000,000 operations min. (at full rated load) 900 ops/hr (AC-12/250V, 6A)
Electrical Life		100,000 operations (rated load)
Conditional Short-circuit Current		100A (per IEC60947-5-1)
Recommended Short Circuit Protection		250V, 10A fuse (Type D01 based on IEC60269-1, 60269-2)
Solenoid Unit	Operating Voltage	24V DC
	Current	292mA (initial value)
	Coil Resistance	102Ω (at 20°C)
	Pickup Voltage	20.4V maximum (at 20°C)
	Drop Out Voltage	2.4V minimum (at 20°C)
	Allowable Voltage	26.4V max (continuous)
	Insulation Class	Class F
Indicator	Operating Voltage	24V DC
	Current	10mA
	Light Source	LED lamp
	Lens Color	Red or Green
Weight (approx.)		500g

Contact Ratings

			Operating Voltage (Ue)		
			30V	125V	250V
Rated Operating Current (Ie)	Main Circuit	AC	Resistive load (AC12)	10A	10A
			Inductive load (AC15)	10A	5A
		DC	Resistive load (DC12)	6A	–
			Inductive load (DC13)	3A	0.9A
	Auxiliary Circuit	AC	Resistive load (AC12)	–	3A
			Inductive load (AC15)	–	3A
		DC	Resistive load (DC12)	3A	–
			Inductive load (DC13)	–	0.9A

Application Examples and Circuit Diagrams

HS1E-4 (Main Circuit: 1NC-1NC, Auxiliary Circuit: 1NO/1NO)

	Status 1	Status 2	Status 3	Status 4	Unlocked Manually
Switch/Door Status	Door Closed Machine ready to operate Solenoid de-energized	Door Closed Machine cannot be started Solenoid de-energized	Door Opened Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid de-energized	Door Closed Machine cannot be started Solenoid de-energized
Door					
Circuit Diagram					
Main Circuit	3-4: Closed	3-4: Open	3-4: Open	3-4: Closed	3-4: Open
Aux. Circuit	1-2: Open	1-2: Closed	1-2: Closed	1-2: Closed	1-2: Closed
Solenoid	5-6: Power OFF	5-6: Power ON	5-6: Power ON	5-6: Power OFF	5-6: Power OFF

HS1E-14 (Main Circuit: 1NC-1NC, Auxiliary Circuit: 1NO)

	Status 1	Status 2	Status 3	Status 4	Unlocked Manually
Switch/Door Status	Door Closed Machine ready to operate Solenoid de-energized	Door Closed Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid de-energized	Door Closed Machine cannot be started Solenoid de-energized
Door					
Circuit Diagram					
Main Circuit	3-4: Closed	3-4: Open	3-4: Open	3-4: Open	3-4: Open
Aux. Circuit	1-2: Open	1-2: Open	1-2: Closed	1-2: Closed	1-2: Open
Solenoid	5-6: Power OFF	5-6: Power ON	5-6: Power ON	5-6: Power OFF	5-6: Power OFF



1. Main Circuit: used to enable the machine to start only when the main circuit is closed.
2. Auxiliary Circuit: used to indicate whether the machine circuit or door is open or closed.
3. Terminals 7 and 8 are used for the LED indicator, and are isolated from solenoid and door status.

Application Examples and Circuit Diagrams, continued

HS1E-24 (Main Circuit: 1NC+1NC, Auxiliary Circuit: 1NC+NC)

	Status 1	Status 2	Status 3	Status 4	Unlocked Manually
Switch/Door Status	Door Closed Machine ready to operate Solenoid de-energized	Door Closed Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid de-energized	Door Closed Machine cannot be started Solenoid de-energized
Door					
Circuit Diagram					
Main Circuit	3-4: Closed	3-4: Open	3-4: Open	3-4: Open	3-4: Open
Aux. Circuit	1-2: Closed	1-2: Open	1-2: Open	1-2: Open	1-2: Open
Solenoid	5-6: Power OFF	5-6: Power ON	5-6: Power ON	5-6: Power OFF	5-6: Power OFF

HS1E-34 (Main Circuit: 1NC+1NC, Auxiliary Circuit: 1NC)

	Status 1	Status 2	Status 3	Status 4	Unlocked Manually
Switch/Door Status	Door Closed Machine ready to operate Solenoid de-energized	Door Closed Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid energized	Door Opened Machine cannot be started Solenoid de-energized	Door Closed Machine cannot be started Solenoid de-energized
Door					
Circuit Diagram					
Main Circuit	3-4: Closed	3-4: Open	3-4: Open	3-4: Open	3-4: Open
Aux. Circuit	1-2: Closed	1-2: Closed	1-2: Open	1-2: Open	1-2: Closed
Solenoid	5-6: Power OFF	5-6: Power ON	5-6: Power ON	5-6: Power OFF	5-6: Power OFF

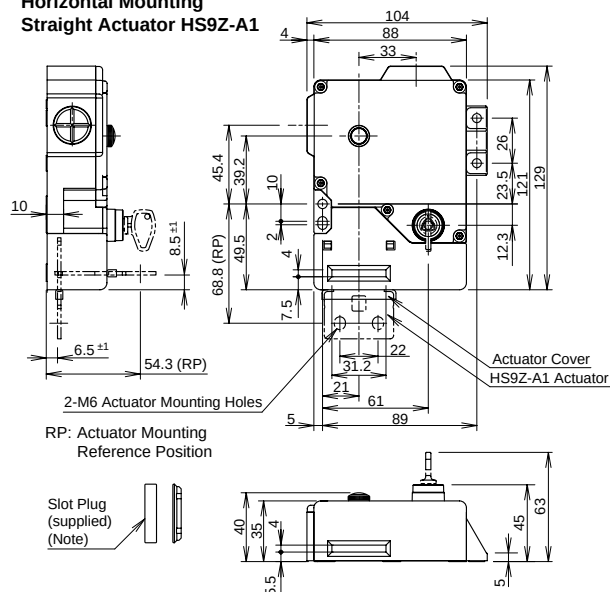


1. Main Circuit: used to enable the machine to start only when the main circuit is closed.
2. Auxiliary Circuit: used to indicate whether the machine circuit or door is open or closed.
3. Terminals 7 and 8 are used for the LED indicator, and are isolated from solenoid or door status.

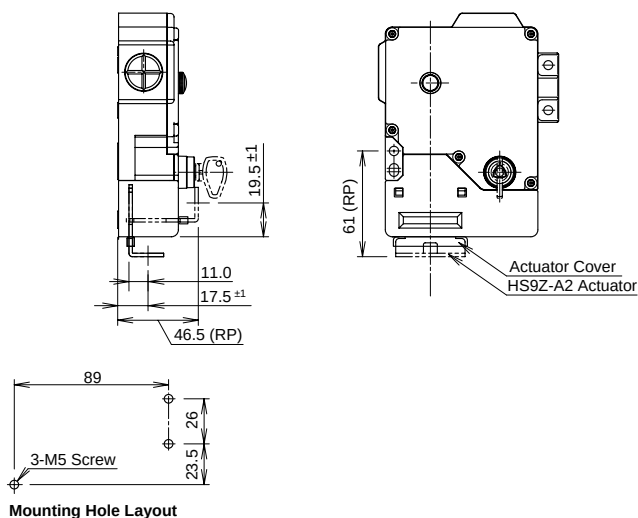
Dimensions (mm)

HS1E with indicator - using 1500N operating force

Horizontal Mounting Straight Actuator HS9Z-A1



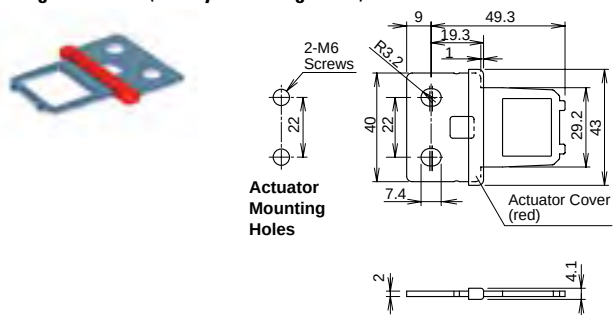
Vertical Mounting Right-angle Actuator HS9Z-A2



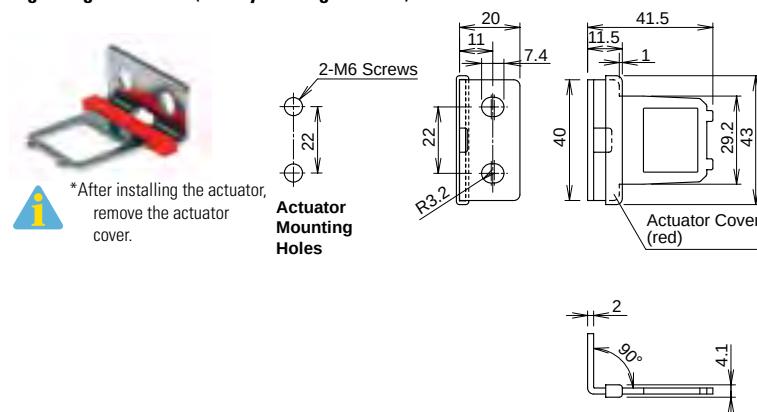
Note: Plug the unused actuator entry slot using the slot plug supplied with the interlock switch.

Accessories

Straight Actuator (mainly for sliding doors) HS9Z-A1



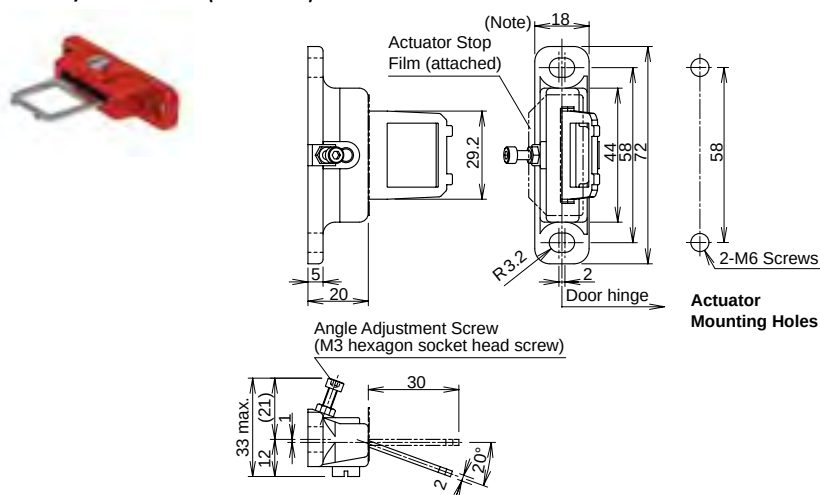
Right-angle Actuator (mainly for hinged doors) HS9Z-A2



Adjustable Actuator

- The actuator angle is adjustable (0° to 20°) for hinged doors.
- The minimum radius of the door opening can be as small as 100mm.

For HS1/HS2 Series (HS9Z-A3)



All dimensions in mm.

Accessories, continued

Minimum Radius of Hinged Door

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

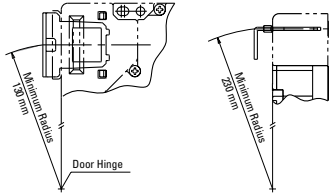
AS-Interface Safety at Work

- When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For the doors with small minimum radius, use angle adjustable actuators (HS9ZA3 or HS9Z-A3S).

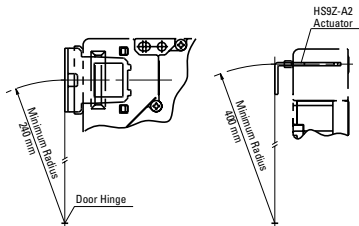
Note: Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

HS9Z-A2 Actuator

- When the door hinge is on the extension line of the interlock switch surface:

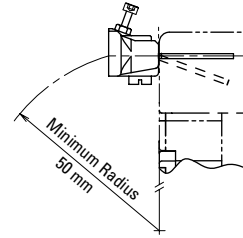


- When the door hinge is on the extension line of the actuator mounting surface:

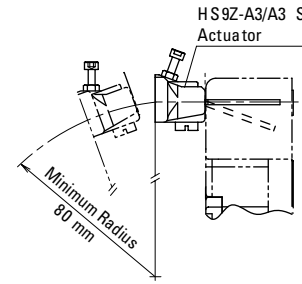


When using the HS9Z-A3 Angle Adjustable (vertical) Actuator

- When the door hinge is on the extension line of the interlock switch surface:



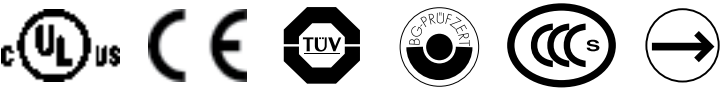
- When the door hinge is on the extension line of the actuator mounting surface:



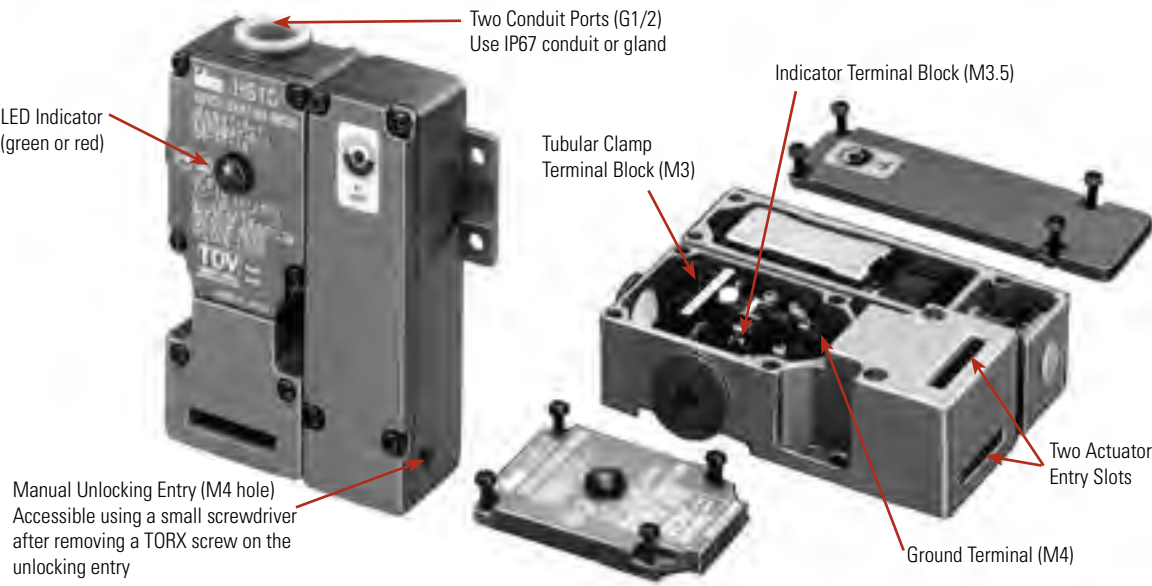
HS1C Full Size Solenoid Locking Switches

Key features:

- Rugged aluminum die-cast housing
- 1500N locking retention force
- Flexible Installation: The actuator can be accessed from two directions
- Select from four different circuit configurations
- IP67

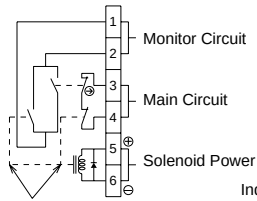
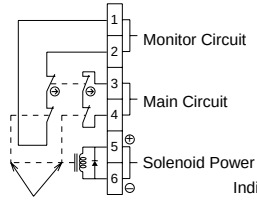
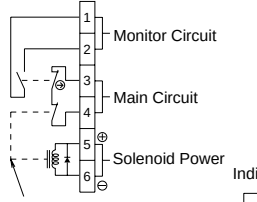
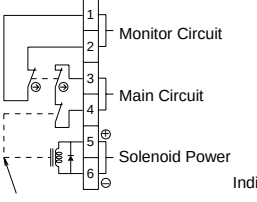


HS1C Series Functionality



 TORX is a registered trademark of Camcar Textron.

Part Numbers (Mechanical Spring Lock Only)

Contact Configuration	Indicator LED	Part Number	Contact Configuration	Indicator LED	Part Number
	Green	HS1C-R44R-G		Green	HS1C-R244R-G
	Red	HS1C-R44R-R		Red	HS1C-R244R-R
	Green	HS1C-R144R-G		Green	HS1C-R344R-G
	Red	HS1C-R144R-R		Red	HS1C-R344R-R

 Standard stock items in bold

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Actuator Keys & Accessories

Appearance	Part Number	Description	Appearance	Part Number	Description
	HS9Z-A1	Straight Actuator		HS9Z-T1	Key Wrench (included with switch)
	HS9Z-A2	Right-angle Actuator		HS9Z-P1	Conduit Opening Plug (G1/2)
	HS9Z-A3	Adjustable Actuator			

Specifications

Conforming to Standards		EN1088, IEC60947-5-1, EN60947-5-1, GS-ET-19, UL508, GB 140485.5 (CCC approval), CSA C22.2 No. 14
Operating Temperature		−20 to +40°C (no freezing)
Storage Temperature		−40 to +80°C
Relative Humidity		40 to 85% (no condensation)
Altitude		2,000m maximum
Rated Insulation Voltage (U _i)		300V (between LED or solenoid and ground: 60V)
Impulse Withstand Voltage (U _{imp})		4 kV (between LED or solenoid and ground: 2.5 kV)
Insulation Resistance		Between live and dead metal parts: 100 MΩ minimum Between live metal part and ground: 100 MΩ minimum Between live metal parts: 100 MΩ minimum Between terminals of the same pole: 100 MΩ minimum
Electric Shock Protection Class		Class 1 (IEC61140)
Pollution Degree		3 (IEC60947-5-1)
Degree of Protection		IP67 (IEC60529)
Vibration Resistance	Operating Extremes	10 to 55 Hz, amplitude 0.5 mm
	Damage Limits	60 m/sec ² (approx. 6G)
Shock Resistance		1,000 m/s ² (approx. 100G)
Actuator Retention Force		1,500N minimum
Actuator Operating Speed		0.05 to 1.0m/s
Direct Opening Travel		11mm minimum
Direct Opening Force		20N minimum
Thermal Current (I _{th})		Main circuit: 10A, Auxiliary circuit: 3A
Contact Opening Distance		Main circuit: 1.7 mm max., Auxiliary circuit: 1.2 mm min.
Operating Frequency		900 operations/hour max.
Mechanical Life		1,000,000 operations
Electrical Life		100,000 operations (rated load)
Conditional Short-circuit Current		100A (IEC60947-5-1)
Recommended Short Circuit Protection		250V, 10A fuse (Type D01 based on IEC60269-1, 60269-2)

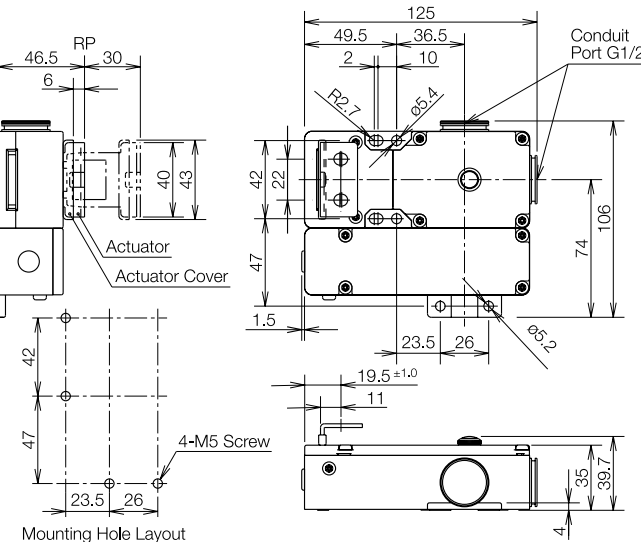
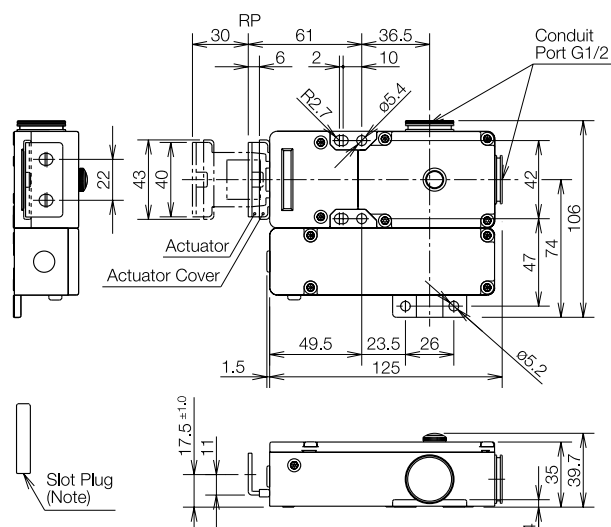
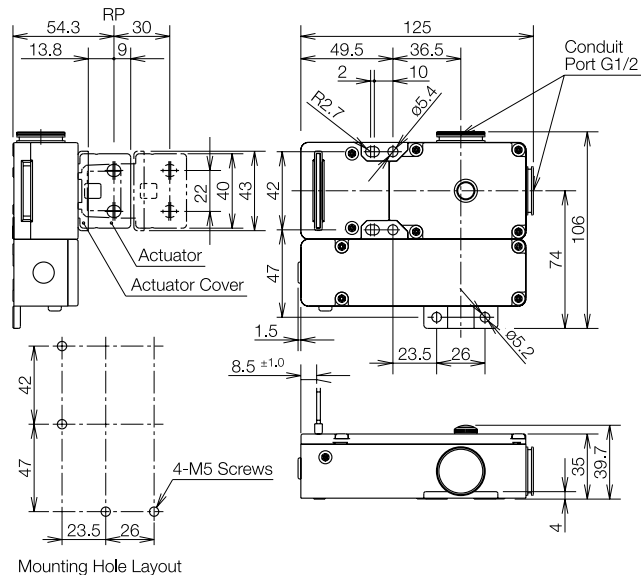
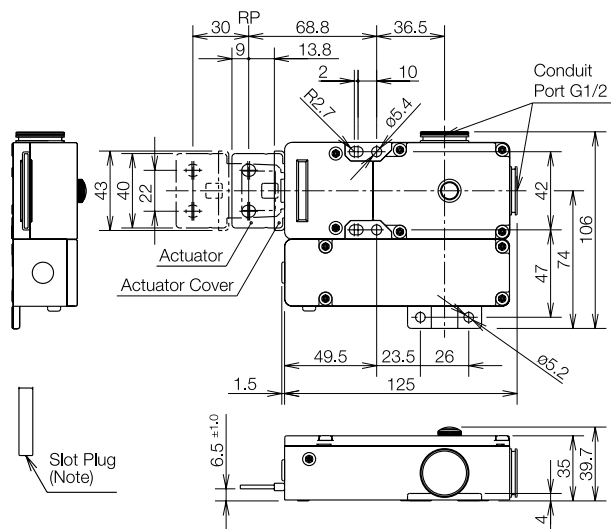
Specifications, con't

Solenoid Unit	Operating Voltage	24V DC (100% duty cycle)
	Current	415mA (initial value)
	Coil Resistance	58Ω (at 20°C)
	Energizing Voltage	Rated voltage x 85% maximum (at 20°C)
	De-energizing Voltage	Rated voltage x 10% minimum (at 20°C)
	Continuous Applicable Voltage	Rated voltage x 110%
	Insulation Class	Class B
Indicator	Operating Voltage	24V DC
	Current	10 mA
	Light Source	LED lamp
	Lens Color	Red or Green
Weight (approx.)		660g

Contact Ratings

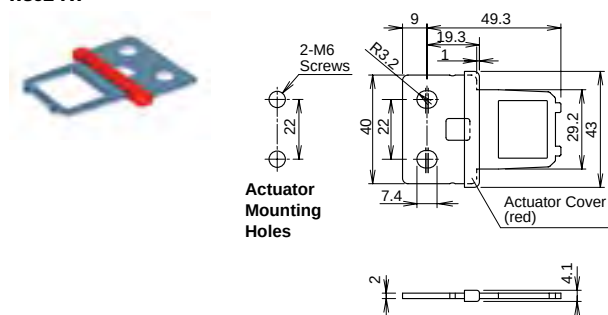
Rated Operating Current (Ie)	Operating Voltage (Ue)			30V	125V	250V
	Main Circuit	AC	Resistive load (AC12)	10A	10A	6A
			Inductive load (AC15)	10A	5A	3A
		DC	Resistive load (DC12)	6A	—	—
			Inductive load (DC13)	3A	0.9A	—
	Auxiliary Circuit	AC	Resistive load (AC12)	—	3A	3A
			Inductive load (AC15)	—	—	3A
		DC	Resistive load (DC12)	3A	—	—
			Inductive load (DC13)	—	0.9A	—

HS1C-R44R-* - using the straight actuator (HS9Z-A1)

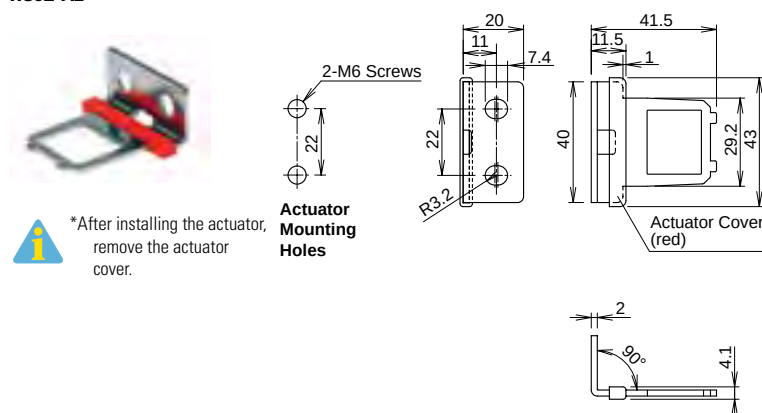


Accessories

Straight Actuator (mainly for sliding doors) HS9Z-A1



Right-angle Actuator (mainly for hinged doors) HS9Z-A2

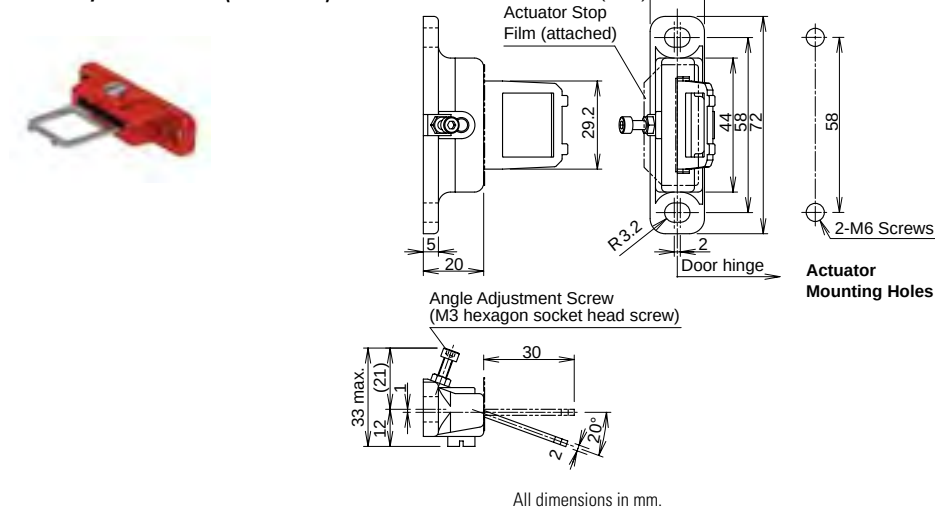


*After installing the actuator, remove the actuator cover.

Adjustable Actuator

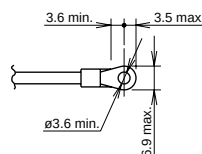
- The actuator angle is adjustable (0° to 20°) for hinged doors.
- The minimum radius of the door opening can be as small as 100mm.

For HS1/HS2 Series (HS9Z-A3)

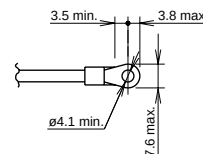


Applicable Crimping Terminals

- (Refer to the Crimping Terminal 1 or 2 shown in the drawing below.)
- HS1C
Terminals No. 1 to 6: Use solid or stranded wires only (crimping terminals not applicable).
Terminals No. 7 and 8: Crimping Terminal 1
Ground Terminal: Crimping Terminal 2
- HS1B
Ground Terminal: Crimping Terminal 2
Other Terminals: Crimping Terminal 1
HS2B, HS5B, and HS1E
Crimping Terminal 1



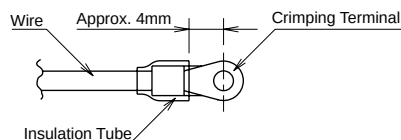
Crimping Terminal 1



Crimping Terminal 2



Use an insulation tube on the crimping terminal.



HS1L Interlock Switches with Solenoid

Key features:

- 3,000N locking retention force
- LED indicator
- Energy-efficient solenoid
- 6 contacts with easy-to-wire terminations
- M3 terminal screws for easy wiring



Part Numbers

Mechanical Spring Lock (power solenoid to unlock)			
Contact Configuration	Conduit Size	LED	Part Number
	G1/2	Red	HS1L-R44KMSR-R
	G1/2	Green	HS1L-R44KMSR-G
	PG13.5	Red	HS1L-R44KMSRP-R
	PG13.5	Green	HS1L-R44KMSRP-G
	M20	Red	HS1L-R44KMSRM-R
	M20	Green	HS1L-R44KMSRM-G
	G1/2	Red	HS1L-DQ44KMSR-R
	G1/2	Green	HS1L-DQ44KMSR-G
	PG13.5	Red	HS1L-DQ44KMSRP-R
	PG13.5	Green	HS1L-DQ44KMSRP-G
	M20	Red	HS1L-DQ44KMSRM-R
	M20	Green	HS1L-DQ44KMSRM-G
	G1/2	Red	HS1L-DT44KMSR-R
	G1/2	Green	HS1L-DT44KMSR-G
	PG13.5	Red	HS1L-DT44KMSRP-R
	PG13.5	Green	HS1L-DT44KMSRP-G
	M20	Red	HS1L-DT44KMSRM-R
	M20	Green	HS1L-DT44KMSRM-G

Solenoid Lock (Remove Power to Unlock)			
Contact Configuration	Conduit Size	LED	Part Number
	G1/2	Red	HS1L-R7Y4KMSR-R
	G1/2	Green	HS1L-R7Y4KMSR-G
	PG13.5	Red	HS1oh yL-R7Y4KMSRP-R
	PG13.5	Green	HS1L-R7Y4KMSRP-G
	M20	Red	HS1L-R7Y4KMSRM-R
	M20	Green	HS1L-R7Y4KMSRM-G
	G1/2	Red	HS1L-DQ7Y4KMSR-R
	G1/2	Green	HS1L-DQ7Y4KMSR-G
	PG13.5	Red	HS1L-DQ7Y4KMSRP-R
	PG13.5	Green	HS1L-DQ7Y4KMSRP-G
	M20	Red	HS1L-DQ7Y4KMSRM-R
	M20	Green	HS1L-DQ7Y4KMSRM-G
	G1/2	Red	HS1L-DT7Y4KMSR-R
	G1/2	Green	HS1L-DT7Y4KMSR-G
	PG13.5	Red	HS1L-DT7Y4KMSRP-R
	PG13.5	Green	HS1L-DT7Y4KMSRP-G
	M20	Red	HS1L-DT7Y4KMSRM-R
	M20	Green	HS1L-DT7Y4KMSRM-G

1. Contact configuration shows the contact status when actuator is inserted and solenoid off for spring lock.
2. Contact configuration shows the contact status when actuator is inserted and solenoid on for solenoid lock.
3. Actuator keys are not supplied with the interlock switch and must be ordered separately.
4. Manual unlock key is included with the interlock switch.
5. Standard stock items in bold

Actuator Keys & Accessories (order separately)

Appearance	Part Number	Description	Appearance	Part Number	Description
	HS9Z-A1S	Straight Actuator		HS9Z-T1	Key Wrench (included with switch)
	HS9Z-A2S	L-shaped Actuator		HS9Z-P1	Conduit Opening Plug (G1/2)
	HS9Z-A3S	Angle Adjustable Actuator (vertical operation only)			

Specifications

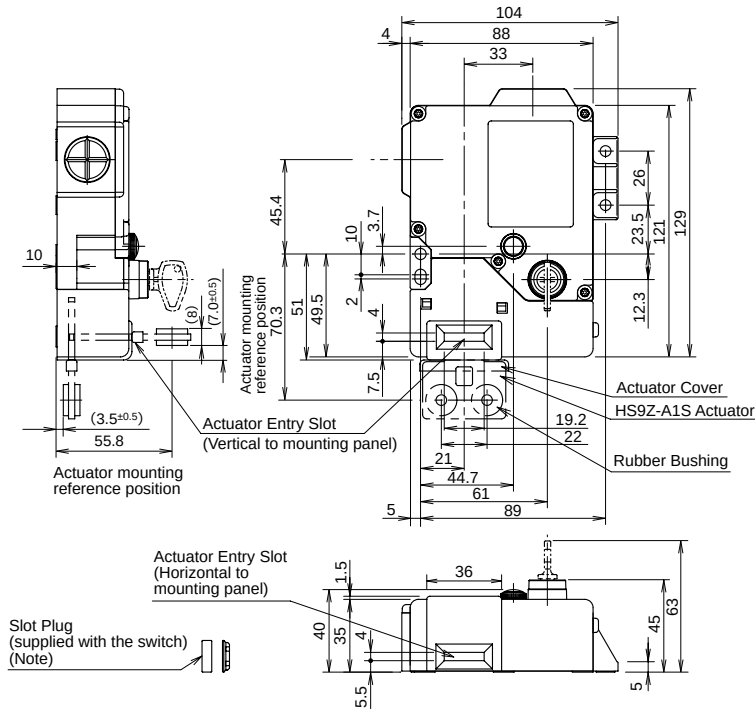
Conforming to Standards		ISO14119, IEC60947-5-1, EN60947-5-1 (TÜV approval), GS-ET-19 (TÜV approval), UL508, CSA C22.2 No. 14 IEC60204-1/EN60204-1 (applicable standards for use)
Operating Temperature		−20 to +55°C (no freezing)
Storage Temperature		−40 to +80°C (no freezing)
Relative Humidity		45 to 85% (no condensation)
Rated Insulation Voltage (Ui)		300V
Overvoltage Category		III
Electric Shock Protection		Class II (IEC 61140)
Degree of Protection		IP67 (IEC 60529)
Shock Resistance		Damage limits: 1000m/s ²
Actuator Retention Force		3000N minimum (GS-ET-19)
Actuator Operating Speed		0.05 to 1.0m/s
Direct Opening Travel		11mm minimum
Direct Opening Force		50N minimum
Thermal Current (Ith)		10A
Operating Frequency		900 operations per hour
Mechanical Life		1,000,000 operations minimum (GS-ET-19)
Electrical Life		100,000 operations minimum (AC-15 3A/250V) 1,000,000 operations minimum (24V AC/DC, 100mA) (operating frequency 900 operations per hour)
Solenoid Unit	Rated Operating Voltage	24V DC (100% duty cycle)
	Rated Current	200mA (initial value)
Indicator	Rated Operating Voltage	24V DC
	Rated Current	10mA
	Light Source	LED
	Illumination Color	Green (G), Red (R)
Weight (approx.)		450g (HS1L-DQ44)

Contact Ratings

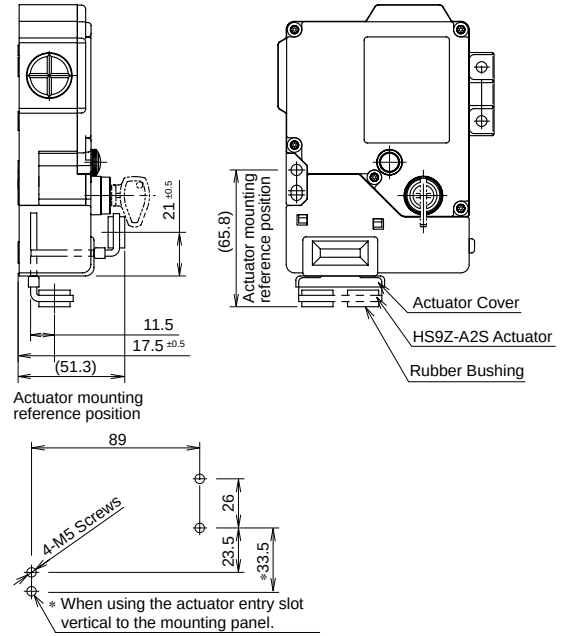
		Rated Voltage (U _e)			
		30V	125V	250V	
Rated Operating Current (I _e)	AC	Resistive load (AC12)	10A	10A	6A
		Inductive load (AC15)	10A	5A	3A
	DC	Resistive load (DC12)	8A	2.2A	1.1A
		Inductive load (DC13)	4A	0.9A	0.6A

Dimensions (mm) and Mounting Hole Layouts

Interlock switch when using straight actuator (HS9Z-A1S)



Interlock switch when using L-shaped actuator (HS9Z-A2S)

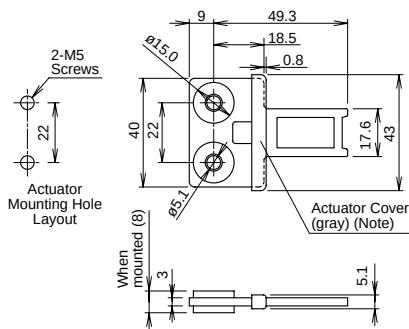


Interlock Switch Mounting Hole Layout

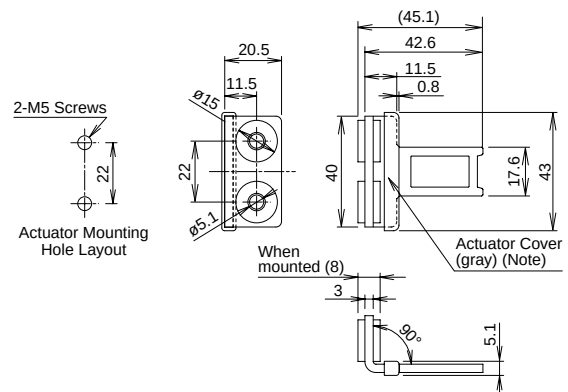
Note: Plug the unused actuator entry slot using the slot plug supplied with the interlock switch.

* Install the interlock switch using four mounting screws when using the actuator entry slot vertical to the mounting panel, and three mounting screws when using the actuator entry slot horizontal to the mounting panel.

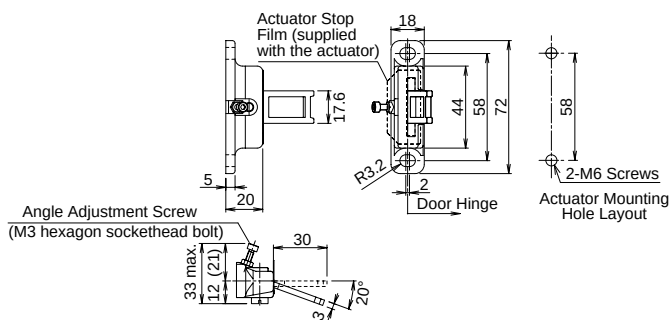
Straight Actuator (HS9Z-A1S)



L-shaped Actuator (HS9Z-A2S)



Angle Adjustable (vertical) Actuator (HS9Z-A3S)



The actuator cover and the actuator stop film are supplied with the actuator and used when adjusting the actuator position. Remove them after the actuator position is determined.

HS5E-K Key Locking Safety Interlock Switches

Key features:

- Head removal detection circuitry.
- High-security pin tumbler key types are used. Sixteen types of key numbers are available, see page 356.
- Available with rear unlocking button for emergency escape.
- Accessory available for aluminum frame mounting.
- Gold-plated contacts.
- The locking strength is 1400N minimum. (GS-ET-19)
- The head orientation can be rotated, allowing 8 different actuator entries.
- Metal actuator entry slot ensures high durability.
- Actuator with rubber bushings alleviates the impact of the actuator entry slot.
- Environmentally-friendly. RoHs directive compliant.
- Double insulation structure. No need for grounding.
- Compact body: 35 × 40 × 146 mm



A single key used for interlock switch and selector switch prevents itself from being left in the lock.



Hostage key ensures that the person holding the key is not locked inside the hazardous area.



Hostage key prevents the machine from starting unexpectedly.

HS5E-K key interlock switches use a key to lock and unlock a door of safeguard. When the key is taken into a dangerous area, the interlock switch cannot be locked and the machine does not operate. Therefore, workers can be prevented from being locked in a dangerous area, and the system is prevented from restarting unexpectedly. Furthermore, because the key used for HS5E-K key interlock switches can also be used for HW series key selector switches (pin tumbler type), switching operation modes of systems and door unlocking can be performed using a single key. 16 types of key numbers are available, so that each system can have its own key, and a higher level of safety can be achieved.

Overview

XW Series E-Stops

Interlock Switches

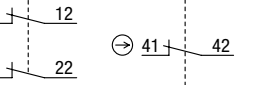
Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Spring Lock Type (Power Solenoid to VA Lock)

Circuit Code	Contact Configuration	Key Removal Position	Cable Length	Part Number	
				Standard	With Rear Unlock Button
VA	 Monitor Circuit : 11 12 Monitor Circuit : 23 24 Monitor Circuit : 41 42 Monitor Circuit : 53 54	A (removable in all positions)	3m	HS5E-KVA003-2A	HS5E-KVA0L03-2A
			5m	HS5E-KVA005-2A	HS5E-KVA0L05-2A
		B (removal in UNLOCK position)	3m	HS5E-KVA003-2B	HS5E-KVA0L03-2B
			5m	HS5E-KVA005-2B	HS5E-KVA0L05-2B
	 Monitor Circuit : 11 12 Monitor Circuit : 21 22 Monitor Circuit : 41 42 Monitor Circuit : 51 52	C (removable in LOCK position)	3m	HS5E-KVA003-2C	HS5E-KVA0L03-2C
			5m	HS5E-KVA005-2C	HS5E-KVA0L05-2C
VD	 Monitor Circuit : 11 12 Monitor Circuit : 23 24 Monitor Circuit : 41 42 Monitor Circuit : 53 54	A (removable in all positions)	3m	HS5E-KVD003-2A	HS5E-KVD0L03-2A
			5m	HS5E-KVD005-2A	HS5E-KVD0L05-2A
		B (removal in UNLOCK position)	3m	HS5E-KVD003-2B	HS5E-KVD0L03-2B
			5m	HS5E-KVD005-2B	HS5E-KVD0L05-2B
	 Monitor Circuit : 11 12 Monitor Circuit : 21 22 Monitor Circuit : 41 42 Monitor Circuit : 51 52	C (removable in LOCK position)	3m	HS5E-KVD003-2C	HS5E-KVD0L03-2C
			5m	HS5E-KVD005-2C	HS5E-KVD0L05-2C



The contact configuration shows the status when the actuator is inserted and the switch is locked. Actuators are not supplied with interlock switches and must be ordered separately. Key number 500 is supplied as the default key in table above (500 not added to part number).

To order additional key types, specify key number at end of part number (special order). Example: HS5E-KVA003-2A501
501 to 515
Note: The key number is engraved on the cylinder.

Actuator Keys & Accessories

Appearance	Part Number	Description	Appearance	Part Number	Description	Appearance	Part Number	Description
	HS9Z-A51	Straight		HS9Z-A55	Angle adjustable horizontal/vertical operation ¹		HS9Z-SP51	Mounting Plate (allows easy mounting to aluminum frames)
	HS9Z-A52	Right-angle		HS9Z-A5P	Plug Actuator (allows switch to be used as interlock plug unit)		HS9Z-T3	Manual unlock key (long type - metal)
	HS9Z-A53	Angle adjustable vertical operation		HS9Z-PH5	Padlock Hasp (prevents unauthorized insertion of actuator)		HS9Z-SH5	Sliding Actuator



1. The actuator tensile strength is 500N minimum.
2. Actuators are not included and must be included separately.

Specifications

Applicable Standards	ISO14119, IEC60947-5-1, EN60947-5-1 (TÜV approval), EN1088, GS-ET-19 (TÜV approval), UL508 (UL recognition), CSA C22.2 No. 14 (c-UL recognized)
	IEC60204-1/EN60204-1 (applicable standards for use)
Operating Temperature	-25 to +70°C (No freezing)
Relative Humidity	45 to 85% (No condensation)
Storage Temperature	-40 to +80°C (No freezing)
Pollution Degree	3
Impulse Withstand Voltage	2.5 kV
Insulation Resistance (500V DC megger)	Between live and dead metal parts: 100 MΩ minimum (500V DC megger) Between live metal part and ground: 100 MΩ minimum (500V DC megger) Between live metal parts: 100 MΩ minimum (500V DC megger) Between terminals of the same pole: 100 MΩ minimum
Electric Shock Class	Class II (IEC61140)
Degree of Protection	IP65 (IEC60529)
Shock Resistance	Operating extremes: 100 m/s ² Damage limits: 1,000 m/s ²
Vibration Resistance	Operating extremes: 10 to 55 Hz, amplitude 0.35 mm Damage limits: 30 Hz, amplitude 1.5 mm
Actuator Operating Speed	0.05 to 1.0 m/s
Direct Opening Travel	Actuator HS9Z-A51: 11 mm minimum Actuator HS9Z-A51A/A52/A52A/A53/A55: 12 mm minimum
Direct Opening Force	80N minimum
Actuator Retention Force ¹	1,400N minimum (GS-ET-19)
Operating Frequency	900 operations per hour
Rear Unlocking Button Mechanical Durability	3,000 operations minimum (HS5E-K□L)
Mechanical Durability	1,000,000 operations minimum (GS-ET-19)
Electrical Durability	100,000 operations minimum (AC-12, 250V, 1A) 1,000,000 operations minimum (24V AC/DC, 100 mA) (Operating frequency: 900 operations per hour)
Performance between 41 and 42 when head is removed	Mechanical durability: 10 operations minimum Insulation resistance: 100 MΩ (initial value) Withstand voltage: 1,000V for 1 minute (initial value)
Conditional Short-circuit Current	50A (250V) ²
Cable	22 AWG (12-core, 0.3 mm ² or equivalent/core)
Cable Diameter	ø7.6 mm
Weight (approx.)	400g (HS5E-KVA003)

Key Cylinder Specifications

Operating Method	2-position maintained
Mechanical Durability	100,000 operations minimum
Insertion/Removal Durability	10,000 operations minimum
Operator Strength	1.0 N·m minimum
Direct Opening Force	0.6 N·m minimum
Direct Opening Angle	60° minimum



1. See page 356 for actuator retention force.
2. Use 250V/10A fast-blow fuse for short-circuit protection.

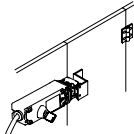
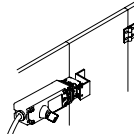
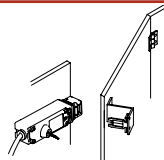
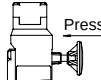
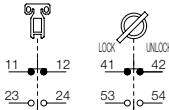
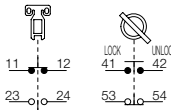
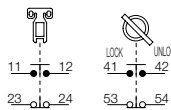
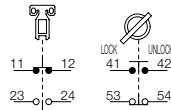
Contact Rating

Rated Insulation Voltage (U _i) ¹		250V		
Rated Thermal Current (I _{th})		Operating temperature: -25°C to 60°C: 2.5A max. 60° to 65°C: 1.5A max. 65°C to 70°C: 1.0A max.		
Rated Voltage (U _e)		30V	125V	250V
Rated Current (I _e) ²	AC	Resistive load (AC12)	—	2.5A
		Inductive Load (AC15)	—	1.5A
	DC	Resistive load (DC12)	2.5A	1.1A
		Inductive Load (DC13)	2.3A	0.55A



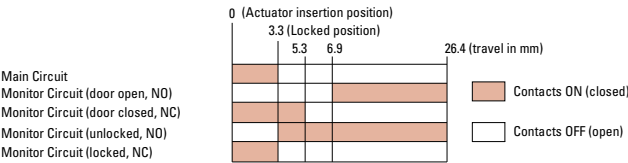
- Minimum applicable load (reference value) = 3V AC/DC, 5 mA
(Applicable range may vary with operating conditions and load types.)
- 1: UL rating: 125V
 - 2: TÜV rating: AC-15, 0.5A/250V, DC-13, 0.22A/125V
UL, c-UL rating: Pilot Duty AC 0.5A/125V, Pilot Duty DC 0.22A/125V

Standard Type - Solenoid Lock Type

Interlock Switch Status		Status 1	Status 2	Status 3	Manual Unlock	
		• Door Closed • Machine ready to operate • Solenoid energized	• Door Closed • Machine cannot be operated • Solenoid de-energized	• Door Open • Machine cannot be operated • Solenoid de-energized	• Door Closed • Machine cannot be operated • Solenoid de-energized energized	
Door Status					 Press rear unlocking button. (Note)	
Circuit Diagram (HS5E-KVA)						
Door		Closed (locked)	Closed (unlocked)	Open	Closed (unlocked)	
Type No. and Contact Configuration	HS5E-KVA	Main Circuit (door closed) 11-12	ON (closed)	ON (closed)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 23-24	OFF (open)	OFF (open)	ON (closed)	OFF (open)
		Monitor Circuit (locked) 41-42	ON (closed)	OFF (open)	OFF (open)	ON (closed)
		Monitor Circuit (unlocked) 53-54	OFF (open)	ON (closed)	ON (closed)	ON (closed)
	HS5E-KVD	Main Circuit (door closed) 11-12	ON (closed)	ON (closed)	OFF (open)	ON (closed)
		Monitor Circuit (door open) 21-22	ON (closed)	ON (closed)	OFF (open)	OFF (open)
		Monitor Circuit (locked) 41-42	ON (closed)	OFF (open)	OFF (open)	OFF (open)
		Monitor Circuit (unlocked) 51-52	ON (closed)	OFF (open)	OFF (open)	OFF (open)

Note: When the operator is confined in a hazardous area, the actuator can be unlocked manually by pressing the rear unlocking button, which should be accessed easily by the operator.
The above contact configuration shows the status when the actuator is inserted and the switch is locked.
Monitor circuit: Sends monitoring signals of protective door open/closed status or protective door lock/unlock status.

Operation Characteristics (reference)



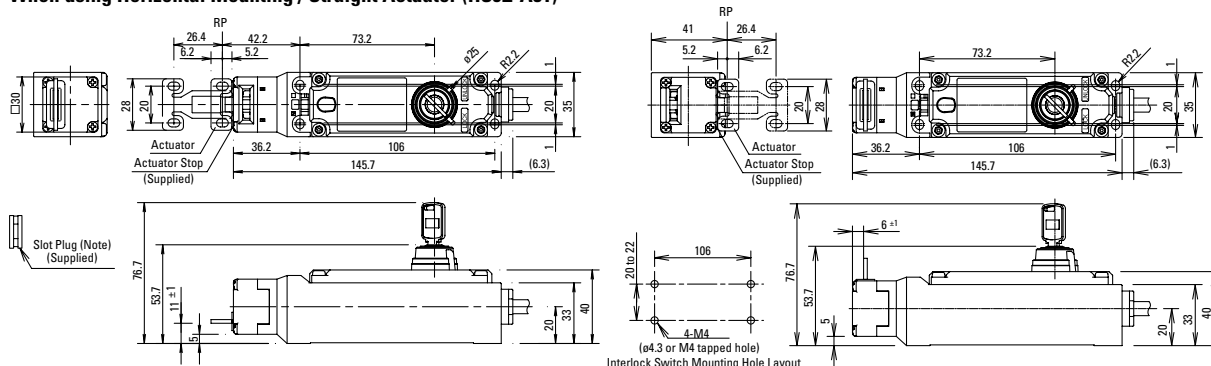
The operation characteristics shown in the chart above are of the HS9Z-A51. For other actuator types, add 1.3 mm.

The operation characteristics show the contact status when the actuator enters the entry slot of an interlock switch.

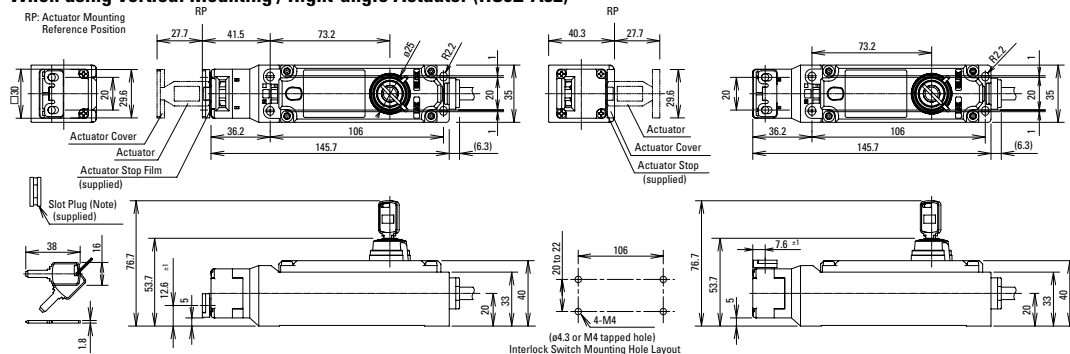
Dimensions (mm) and Mounting Hole Layouts

HS5E-K ☐

When using Horizontal Mounting / Straight Actuator (HS9Z-A51)



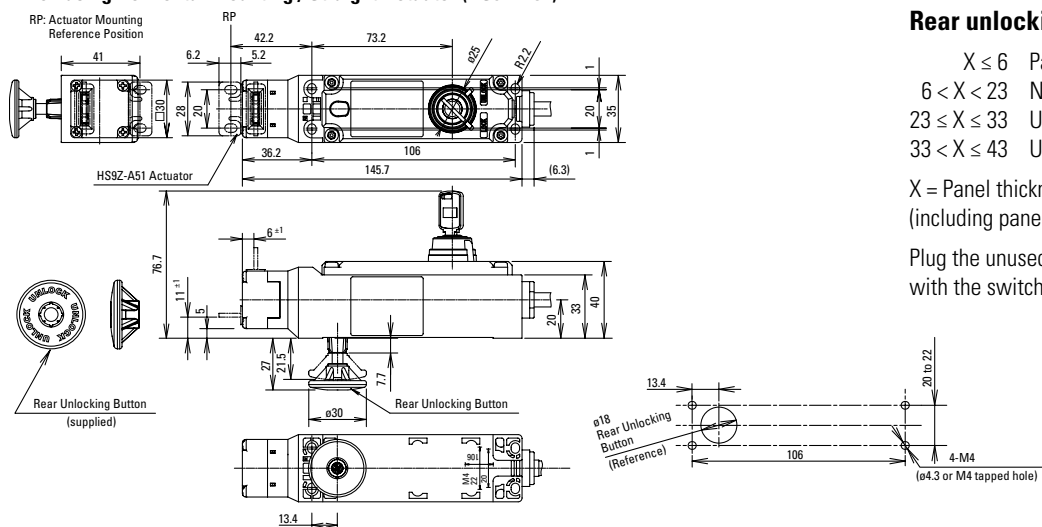
When using Vertical Mounting / Right-angle Actuator (HS9Z-A52)



Operation Key (supplied)

Operation Key (supplied)
HS5E-K□L (Rear Unlocking Button Type)

When using Horizontal Mounting / Straight Actuator (HS9Z-A51)



Rear unlocking button mounting

- | | |
|-------------|--|
| X ≤ 6 | Panel mounting |
| 6 < X < 23 | Not mountable |
| 23 ≤ X ≤ 33 | Use HS9Z-FL53 rear unlocking button kit (Note) |
| 33 < X ≤ 43 | Use HS9Z-FL54 rear unlocking button kit (Note) |

X = Panel thickness

(including panel, mounting frame, and mounting plate)

Plug the unused actuator entry slot using the plug supplied with the switch.

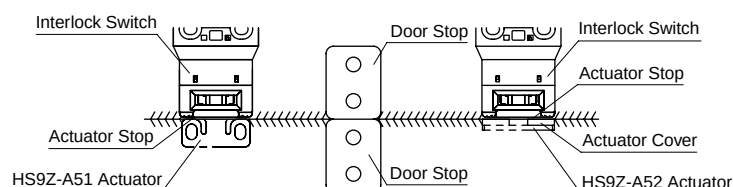


Note: With the mounting hole dimension, the rear unlocking button rod does not touch the hole even when the interlock switch moves sideways.

Actuator Mounting Reference Position

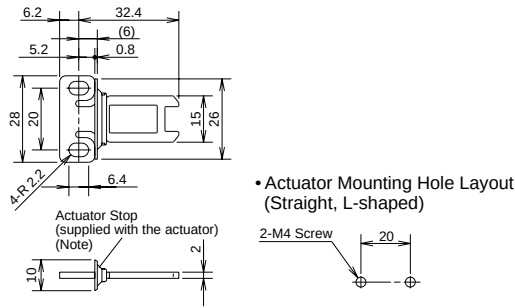
As shown in the figure on the right, the mounting reference position of the actuator when inserted in the interlock switch is where the actuator stop placed on the actuator lightly touches the interlock switch.

Note: After mounting the actuator, remove the actuator stop from the actuator.

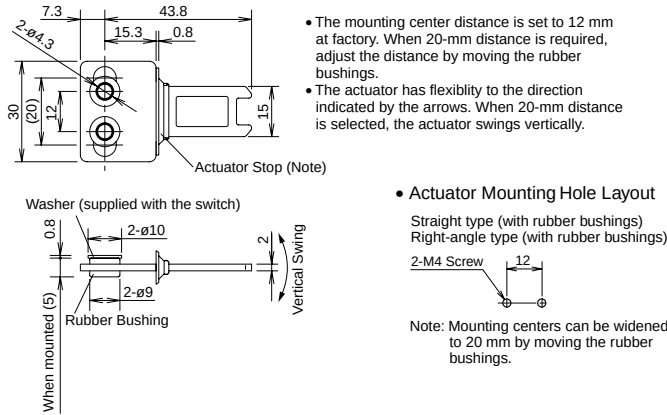


Dimensions and Mounting Hole Layouts, continued

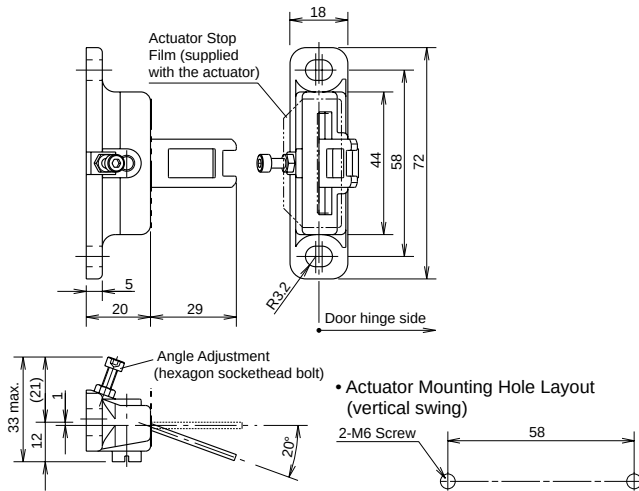
Straight Actuator (HS9Z-A51)



Straight Actuator w/Rubber Bushings (HS9Z-A51A)



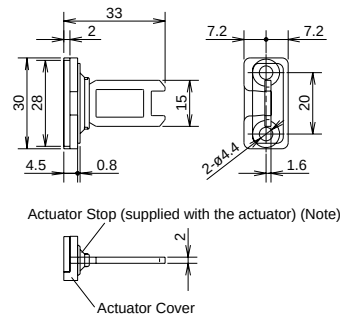
Angle Adjustable Actuator (Vertical) (HS9Z-A53)



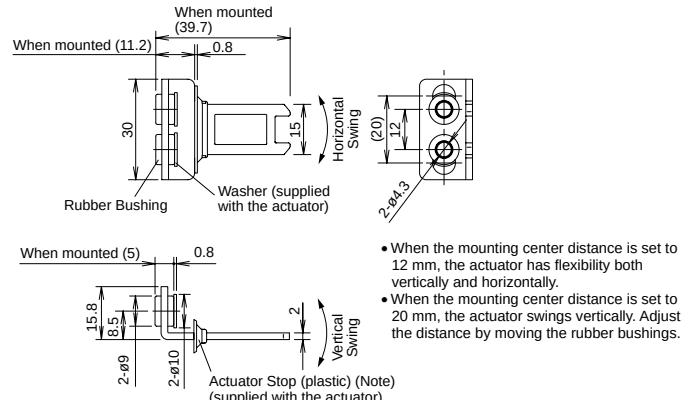
Actuator Orientation

The orientation of actuator swing (horizontal/vertical) can be changed using the orienting insert (white plastic) installed on the back of the actuator. Do not lose the orientating insert, otherwise the actuator will not swing properly.

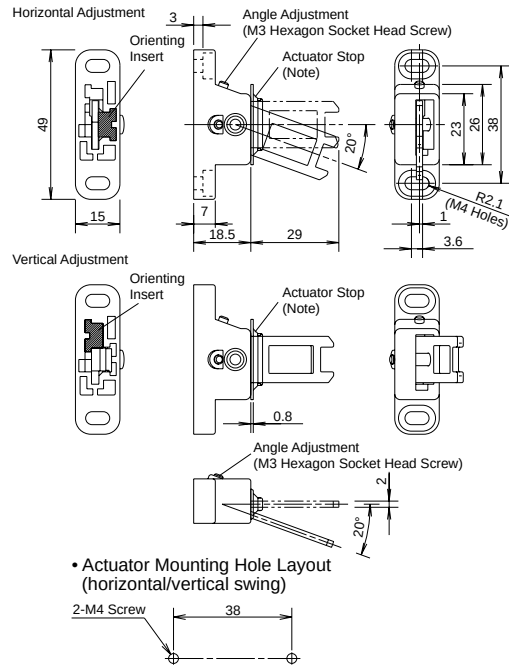
Right-angle Actuator (HS9Z-A52)



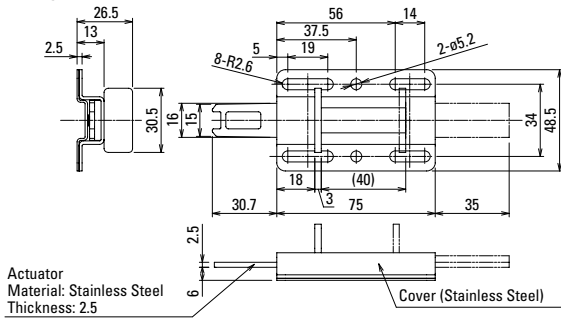
Right-angle Actuator w/Rubber Bushings (HS9Z-A52A)



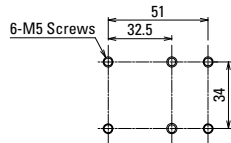
Angle Adjustable Actuator (Horizontal/Vertical) (HS9Z-A55)



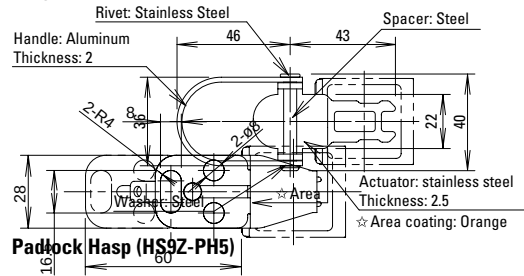
Sliding Actuator (HS9Z-SH5)



Panel Cut-out

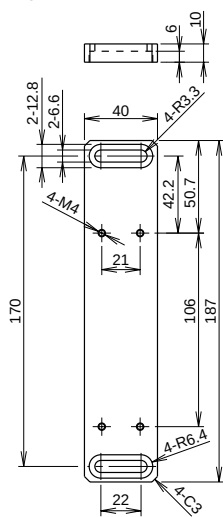


Plug Actuator (HS9Z-A5P)

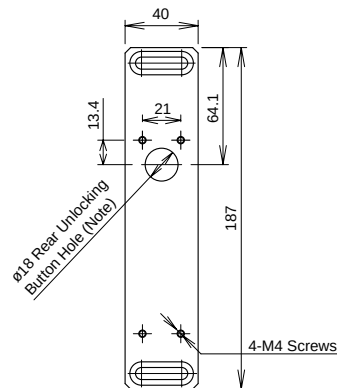


Padlock Hasp (HS9Z-PH5)

Mounting Plate (HS9Z-SP51)



Drilling Rear Unlocking Button Hole

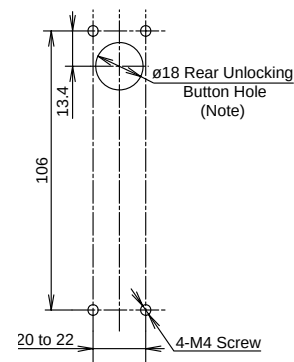


When installing the HS5E-□44L□-G (rear unlocking button type), provide a rear unlocking button hole on the HS9Z-SP51.

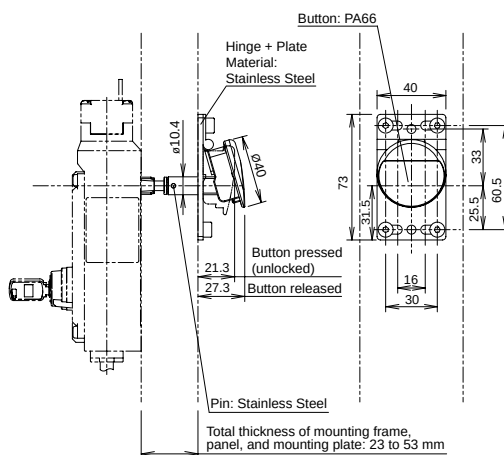
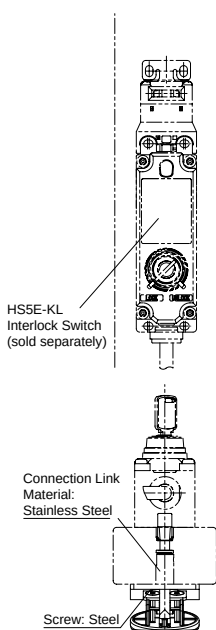
Material: Anodized aluminum A6063

Weight: Approx. 180g

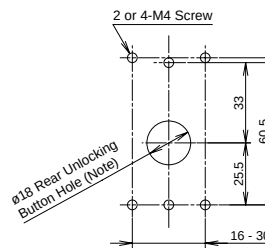
Manual Unlocking Key (Metal) (HS9Z-T3)



Rear Unlocking Button Kit (HS9Z-FL5□)



Rear Unlocking Button Mounting Dimensions



Note: With the mounting hole dimension, the rear unlocking button rod does not touch the hole even when the interlock switch moves sideways.

Example:

When mounted on a □30 mm frame using the mounting plate above (HS9Z-SP51), select HS9Z-FL54 since the mounting part thickness (X) is 40 (X=10 + 30=40).

Operating Instructions

Minimum Radius of Hinged Door

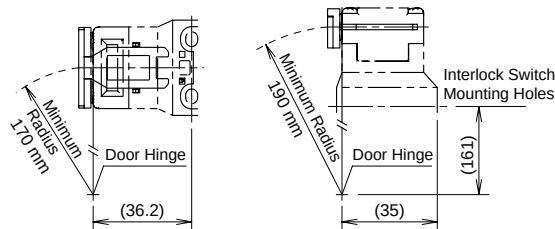
- When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For the doors with small minimum radius, use angle adjustable actuators (HS9Z-A53 or HS9Z-A55).



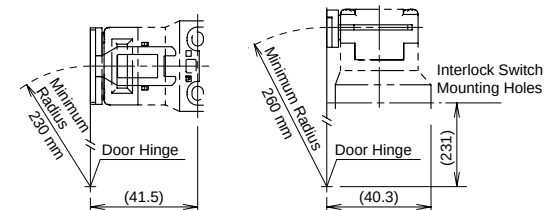
Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

HS9Z-A52 Actuator

When the door hinge is on the extension line of the interlock switch surface:

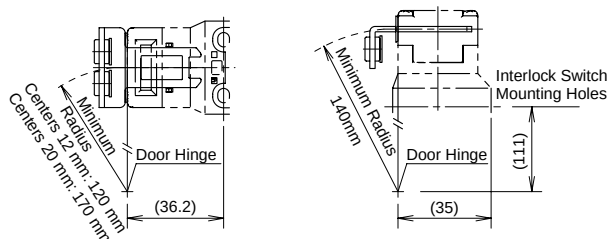


When the door hinge is on the extension line of the actuator mounting surface:

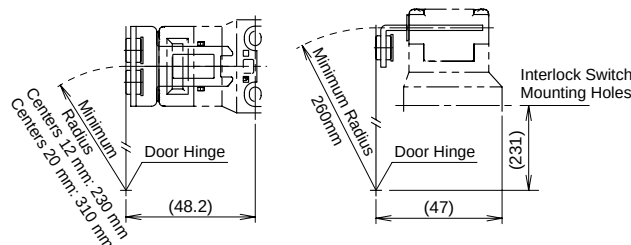


HS9Z-A52 Actuator (w/rubber bushings)

When the door hinge is on the extension line of the interlock switch surface:



When the door hinge is on the extension line of the actuator mounting surface:



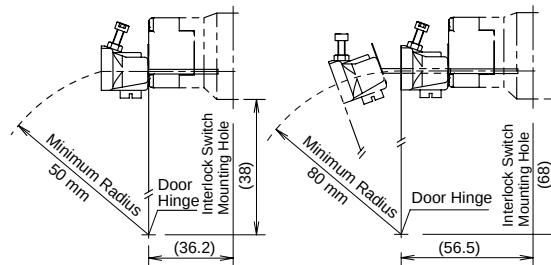
Actuator Angle Adjustment (vertical/horizontal)

- Using the angle adjustment screw, the actuator angle can be adjusted (refer to the dimensional drawing on page 359). Adjustable angle: 0 to 20°
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening.
- After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not move.

When using the HS9Z-A53 Angle Adjustable (vertical) Actuator

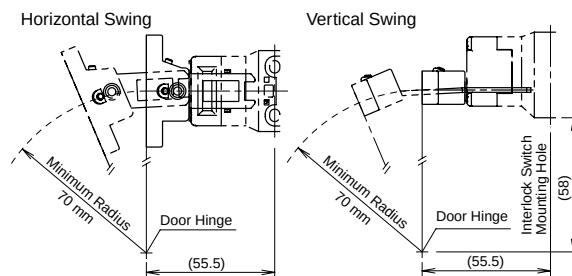
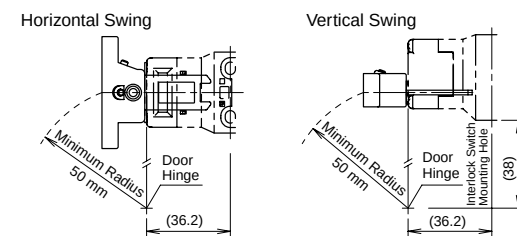
When the door hinge is on the extension line of the interlock switch surface: 50 mm

When the door hinge is on the extension line of the actuator mounting surface: 80 mm



When using the HS9Z-A55 Angle Adjustable (vertical/horizontal) Actuator

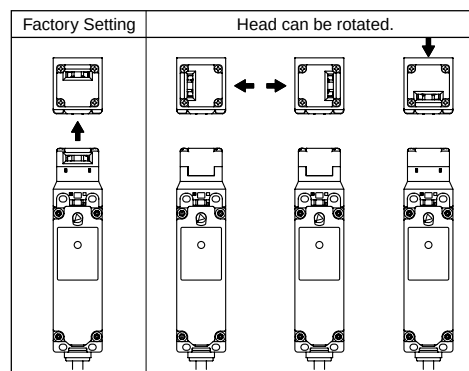
When the door hinge is on the extension line of the interlock switch surface: 50 mm



When the door hinge is on the extension line of the actuator mounting surface: 70 mm

Rotating the Head

The head of the HS5E can be rotated by removing the four screws from the corners of the HS5E head and reinstalling the head in the desired orientation. Before wiring the HS5E, replace the head if necessary. Before replacing the head, turn the manual unlock to the UNLOCK position using the manual unlock key. When reinstalling the head, make sure that no foreign object enters the interlock switch. Tighten the screws tightly, without leaving space between the head and body, otherwise the interlock switch may malfunction. Recommended tightening torque: 0.9 to 1.1 N·m.



Instructions, continued

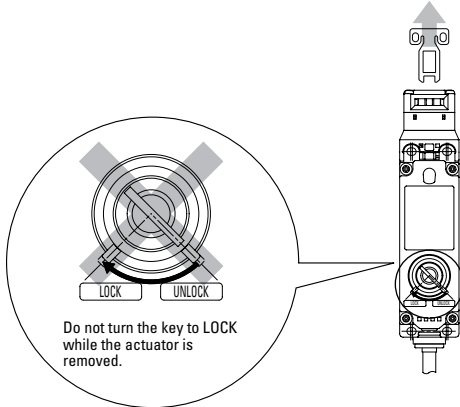
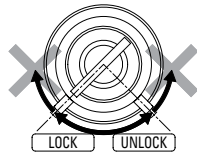
Head Removal Detection Circuitry

- Only the lock monitor circuit 41-42 turns off (open) when the head is removed, such as when the head is rotated. The other monitor circuit 51-52 turns ON (close). Be sure to connect the lock monitor circuit (41-42) to a safety circuit.
- When connecting the HS5E-K to a safety circuit, connect the door monitor circuits (11-12) and the lock monitor circuits (41-42) in series. (GS-ET-19)
- When rotating the head, make sure that the interlock switch is not wired or that the key position is in the UNLOCK position.

Key

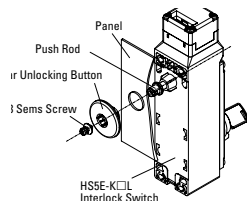
Follow the instructions below to avoid operating failures and damage.

- Insert the key completely.
- Do not remove or insert the key while turning the key.
- Other than the standard key number (500), 15 types of key numbers are available. Use a key with the same number as the number on the cylinder.
- Do not apply excessive force when turning the key. Otherwise operating failures and damage may occur.
- Do not turn the key to the LOCK side while the actuator is removed (door open). Otherwise, operating failures and breakdowns may occur.



Installing the Rear Unlocking Button (HS5E-K□L)

- After installing the interlock switch on the panel, place the rear unlocking button (supplied with the switch) on the push rod on the back of the interlock switch, and fasten the button using the screw supplied with the switch. Rear unlocking buttons can be installed alone when the total thickness of mounting frame and panel is 6 mm or less. When the total thickness of mounting frame, panel, and mounting plate is 23 to 53 mm, use the rear unlocking button kit (HS9Z-FL53, HS9Z-FL54, or HS9Z-FL55) sold separately.



Recommended Tightening Torque for Mounting Screws

- HS5E interlock switch: 1.8 to 2.2 N·m (four M4 screws) (Note)
- Rear unlocking button: 0.5 to 0.7 N·m

- Rear unlocking button kit: 4.8 to 5.2 N·m (M5 screw)
- Actuators
 - HS9Z-A51: 1.8 to 2.2 N·m (two M4 screws)
 - HS9Z-A52: 0.8 to 1.2 N·m (two M4 Phillips screws)
 - HS9Z-A51A/A52A: 1.0 to 1.5 N·m (two M4 screws)
 - HS9Z-A53: 4.5 to 5.5 N·m (two M6 screws)
 - HS9Z-A55: 1.0 to 1.5 N·m (two M4 screws)

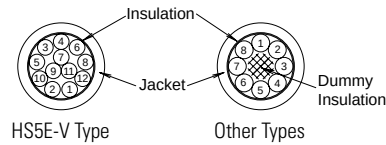
Note: The above recommended tightening torque of the mounting screws are the values with hex socket head bolts. When other screws are used and tightened to a smaller torque, make sure that the screws do not become loose after mounting.

Wire Identification

Wires can be identified by color and a white line printed on the wire.

- HS5E-V: Wires of gray and gray/white insulation cannot be used.
- HS5E-DD: Wires of brown and brown/white insulation cannot be used.

No.	Insulation	No.	Insulation	No.	Insulation	No.	Insulation
1	White	4	Blue	7	Blue/White	10	Pink/White
2	Black	5	Brown/White	8	Orange/White	11	Gray
3	Brown	6	Orange	9	Pink	12	Gray/White



Circuit Code Identification

- Circuit codes can be identified by the insulation color in each contact configuration.
- The following table shows the identification of circuit numbers.
- When wiring, cut unnecessary wires such as the dummy insulation (white) and any unused wires.

Type	Circuit Diagram	
HS5E-KVA	Monitor Circuit: Blue	11 — 12 Blue/White
	Monitor Circuit: Pink	41 — 42 Pink/White
	Monitor Circuit: Orange	23 — 24 Orange/White
	Monitor Circuit: Brown	53 — 54 Brown/White
HS5E-KVD	Monitor Circuit: Blue	11 — 12 Blue/White
	Monitor Circuit: Pink	41 — 42 Pink/White
	Monitor Circuit: Orange	21 — 22 Orange/White
	Monitor Circuit: Brown	51 — 52 Brown/White



The contact configuration shows the status where the actuator is inserted and the switch is locked.

ø22 HW Key Switch

Key features:

- Key Selector Switches with Direct Opening Action Mechanism
- High-security Pin Tumbler Key
- The NC contact is opened by direct opening action mechanism ⊖. Mode selection enables easy construction of safety systems.
- The single key enables the hostage control of combining HW series key selector switch (pin tumbler type) and HS5E-K interlock key switch. High-security pin tumbler key is used. Sixteen types of key numbers are available.
- Selection of 2-position and 3-position, maintained, spring-return types and key retained variety is available.
- Degree of Protection: IP65 (IEC60529)

Applicable Standards	Mark	File No. or Organization
UL508		UL Listing File No. E68961
CSA C22.2 No.14		CSA166730 (LR92374)
EN60947-5-1		TÜV Rheinland R50054316
		Self-declaration Low Voltage Directive of Europe



Two-position Key Switch (90°)

			Standard Logic			Inverse Logic		
Contact Code	Contact Block		Logic Table		12	Logic Table		21
	Mounting Position	Contact	1	2		1	2	
1NO (10)	①	NO		●	HW1K-2PA10	●		HW1K-2JPA10
	②	—	Dummy Block			Dummy Block		
1NC (01)	①	NC	●		HW1K-2PA01		●	HW1K-2JPA01
	②	—	Dummy Block			Dummy Block		
2NO (20)	①	NO		●	HW1K-2PA20	●		HW1K-2JPA20
	②	NO		●		●		
2NC (02)	①	NC	●		HW1K-2PA02		●	HW1K-2JPA02
	②	NC	●				●	
1NO-1NC (11)	①	NO		●	HW1K-2PA11	●		HW1K-2JPA11
	②	NC	●				●	
2NO-2NC (22)	①	NO		●	HW1K-2PA22	●		HW1K-2JPA22
	②	NC	●				●	
	③	NO		●		●		
	④	NC	●				●	

Contact Block Mounting Position



For contact block mounting position, see the figure to the right of the table.
Each key selector switch is supplied with two keys.
Key number 500 is supplied as the default key in table above (500 not added to part number).
To order additional key types, specify key number at end of part number (special order).
Example: HS5E-KVA003-2A501
501 to 515
Note: The key number is engraved on the cylinder.

Three-position Key Switch (45°)

Contact Code	Contact Block		Logic Table			Cam Code	Maintained 102
	No.	Contact	1	0	2		
2NC (02)	①	NC				—	HW1K-3PA02
	②	NC					
2NO-2NC (22N1)	①	NO	●			—	HW1K-3PA22N1
	②	NO			●		
	③	NC					
	④	NC					
2NO (02)	①	NO	●			—	HW1K-3PA20
	②	NO			●		
2NO-1NC (21N1)	①	NO	●			J	HW1K-3JPA21N1
	②	NO			●		
	③	NC		●			
	☆ ④	—	Dummy Block				
2NO-2NC (22N9)	①	NC			●	S	HW1K-3SPA22N9
	②	NC	●				
	③	NO					
	☆ ④	NO			●		
4NC (04)	①	NC			●	S	HW1K-3SPA04
	②	NC	●				
	③	NC			●		
	☆ ④	NC	●				

Contact Block Mounting Position



On the contact arrangement marked with ☆ in the table above, the rated current (load switching current) is reduced to a half of the rated current of the contact block. The rated insulation voltage and the rated thermal current remain unchanged.

For models with ☆, contacts may overlap when the operator position is changed.

For contact block mounting position, see the figure on the right.

Each key selector switch is supplied with two keys.

15 types of key numbers are available in addition to standard (500) key.

Key number 500 is supplied as the default key in table above (500 not added to part number).

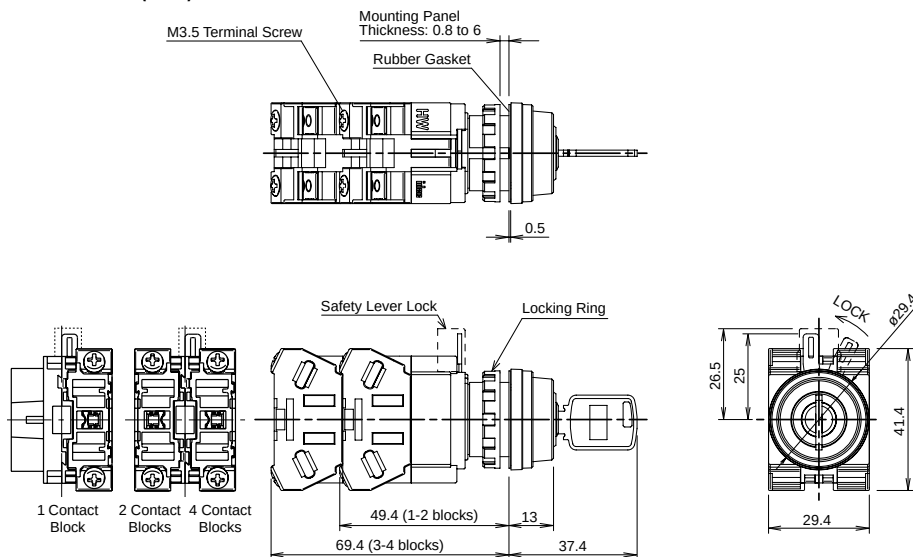
To order additional key types, specify key number at end of part number (special order).

Example: HS5E-KVA003-2A501

501 to 515

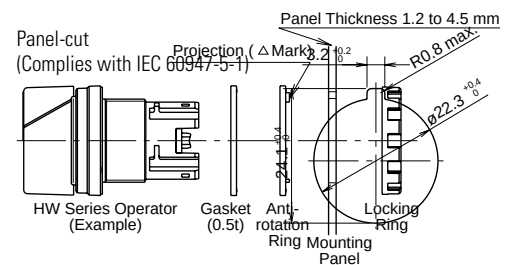
Note: The key number is engraved on the cylinder.

Dimensions (mm)



Anti-rotation Ring and Panel cut-out

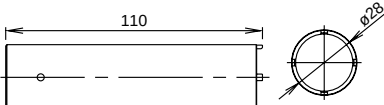
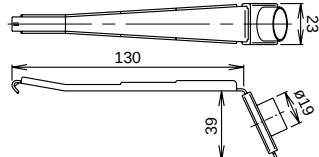
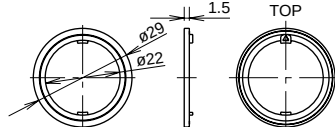
Align the TOP marking on the operator and the TOP mark on the anti-rotation ring with the recess in the mounting panel.

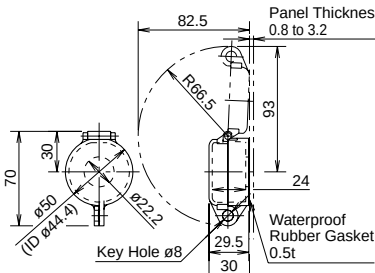
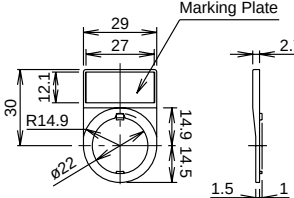
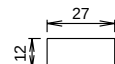


Replacement Parts

Item	Material	Part No.	Remarks
	1NO contact 	HW-G10	Housing color: blue Push rod: green
	1NC contact 	HW-G01	Housing color: purple Push rod: red
	Nylon	TW-DB	Used when using contact blocks in odd numbers.
	Metal (nickel-plated brass)	LW9Z-SK-500	Standard key number
		LW9Z-SK- 	Key number 501 to 515
	Polyamide	HW9Z-LN	Black
	Polyacetal	HW9Z-LS	Yellow One safety lever lock is supplied as standard.
	Polyacetal	HW9Z-WM	Black

Accessories

Item	Material	Part No.	Dimensions
	Metal (brass) Weight: approx. 150g	MW9Z-T1	Used to tighten the locking ring when installing the HW switch onto a panel. Tighten the locking ring to a torque of 2.0 N·m. 
	Metal (copper-zinc plating) / Nitrile Rubber	TW-KC1	Used to remove the contact block and the transformer, and also to install or remove the pilot light lens. Also used to adjust the panel thickness (1, 1.6, 2, 2.3, 3.2, and 5 mm). 
	Ring: Nylon Gasket: Nitrile Rubber	HW9Z-RL	Used to prevent the operator from turning. 

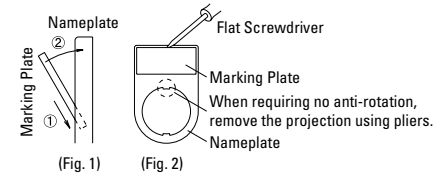
Item	Material	Part No.	Dimensions								
Padlock Cover 	Body: Polyarylate Gasket: Nitrile Rubber	HW9Z-KL1									
Nameplate 	Plastic (black) 1.5 mm thick	HWAM	Order marking plate (HWNP-□) separately. 								
Marking Plate 	Aluminum (black) 1.0 mm thick	HWNP-□	White letters on black background  Specify a legend code in place of □ in the Type No. <table><thead><tr><th>Code</th><th>Legend</th></tr></thead><tbody><tr><td>31</td><td>OFF-ON</td></tr><tr><td>35</td><td>HAND-AUTO</td></tr><tr><td>53</td><td>HAND-OFF-AUTO</td></tr></tbody></table>	Code	Legend	31	OFF-ON	35	HAND-AUTO	53	HAND-OFF-AUTO
Code	Legend										
31	OFF-ON										
35	HAND-AUTO										
53	HAND-OFF-AUTO										

To install the marking plate on a nameplate, see Fig. 1.

To remove the marking plate, insert a flat screwdriver between the marking plate and nameplate as shown in Fig. 2.

When using a nameplate, mounting panel thickness is decreased by 1.5 mm.

When an anti-rotation ring on the nameplate is not required, remove the projection using pliers as shown in Fig. 2.



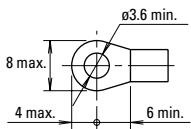
Operating Instructions

Applicable Wiring

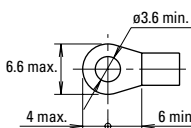
- The applicable wire size is 14 AWG maximum (Solid wire 16 AWG max.). One or two wires can be connected.

Applicable Crimping Terminal

Crimping Terminal for ①

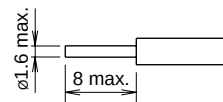


Crimping Terminal for ②



Be sure to use an insulation tube or cover on the crimping part of the crimping terminal to prevent electrical shocks.

Solid Wire



- Tighten the M3.5 terminal screw to a recommended tightening torque of 1.0 to 1.3 N·m.

HS7A-DMC Magnetic Safety Switches

Key features:

- Compact size and easy positioning.
- Combination with proprietary relay modules achieves safety category 4 (EN954-1).
- Compact size (7 × 16 × 51mm)
- Positioning for installation is easy.
- Up to 36 sets can be connected.
(safety relay module: HR1S-DME)
- Degree of protection: IP67



Part Numbers

HS7A Non-contact Magnetic Interlock Switches

Contact Configuration	Cable Length	LED	Part Number	Applicable Safety Relay Module
1NO + 1NC	2m	Without	HS7A-DMC5902	HR1S-D□
		With	HS7A-DMC5912	
	5m	Without	HS7A-DMC5905	
		With	HS7A-DMC5915	
	10m	Without	HS7A-DMC59010	
		With	HS7A-DMC59110	
2NO	2m	Without	HS7A-DMC7902	HR1S-AF□
		With	HS7A-DMC7912	
	5m	Without	HS7A-DMC7905	
		With	HS7A-DMC7915	
	10m	Without	HS7A-DMC79010	
		With	HS7A-DMC79110	

Accessory

Name	Part Number
Actuator	HS9Z-ZC1



One HS9Z-ZC1 is supplied with each HS7A-DMC non-contact interlock switch.

Maximum Number of Connectable Non-contact Interlock Switches per Input of Safety Relay Module

Non-contact Interlock Switch	HS7A-DMC59□□		HS7A-DMC79□□	
	Without LED	With LED	Without LED	With LED
HR1S-D□	6	3	—	—
HR1S-AF□	—	—	6	1



The HS7A-DMC non-contact interlock switch is supplied with an HS9Z-ZC1 actuator.
The contact configuration in the table above shows the contact status when the non-contact interlock switch is not activated.

HR1S Safety Relay Modules for Non-contact Interlock Switches

Safety Relay Module	Voltage	Number of Inputs	Max. Number of Connectable Non-contact Interlock Switches
HR1S-DMB□32	24V DC -20 to +20%	2	12
HR1S-DME□32		6	36
HR1S-AF□30B	24V AC -15 to +10% 50/60 Hz 24V DC -15 to +10%	1	6

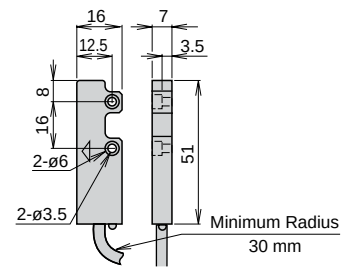


Safety category 3 can be achieved when connecting two or more non-contact interlock switches per one input.
When connecting multiple non-contact interlock switches (HS7A-DMC790□), use HR1S-AF51□.
(HS7A-DMC791□ cannot be connected in multiple numbers.)

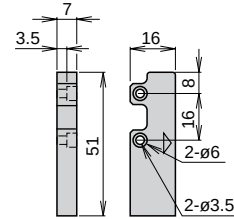
Specifications

Applicable Standards	IEC/EN 60947-5-1 UL508 (UL listed) CSA C22.2, No. 14	
Operating Temperature	-25 to 85°C (no freezing)	
Relative Humidity	30 to 85% RH (no condensation)	
Storage Temperature	-40 to +85°C (no freezing)	
Pollution Degree	3	
Electric Shock Protection	Class II (IEC 60536)	
Degree of Protection	IP67 (IEC 60529)	
Shock Resistance	300 m/s ² (11 ms) (IEC 60068-2-7)	
Vibration Resistance	100 m/s ² (10 to 150 Hz) (IEC 60068-2-6)	
Rated Voltage (Ue)	24V DC	
Rated Current (Ie)	100 mA	
Repeat Accuracy	10% maximum	
Maximum Operating Frequency	150 Hz	
Voltage Drop	I = 10 mA	0.1V (without LED) / 2.4V (with LED)
	I = 100 mA	1V (without LED) / 4.2V (with LED)
Housing Material	PBT	
Housing Color	Red	
Cable	AWG23 × 4 Cable length: 2m, 5m, 10m	
Weight (approx.)	HS7A-DMC: 100g (cable length: 2m) HS9Z-ZC1: 9g	

Dimensions (mm)

HS7A-DMC
(Non-contact Interlock Switch)

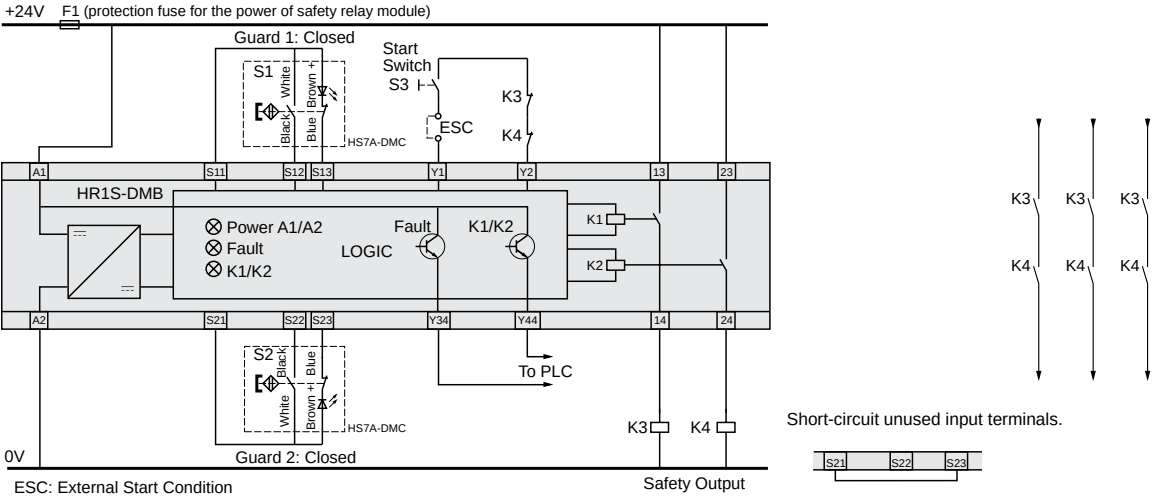
HS9Z-ZC1 (Actuator)



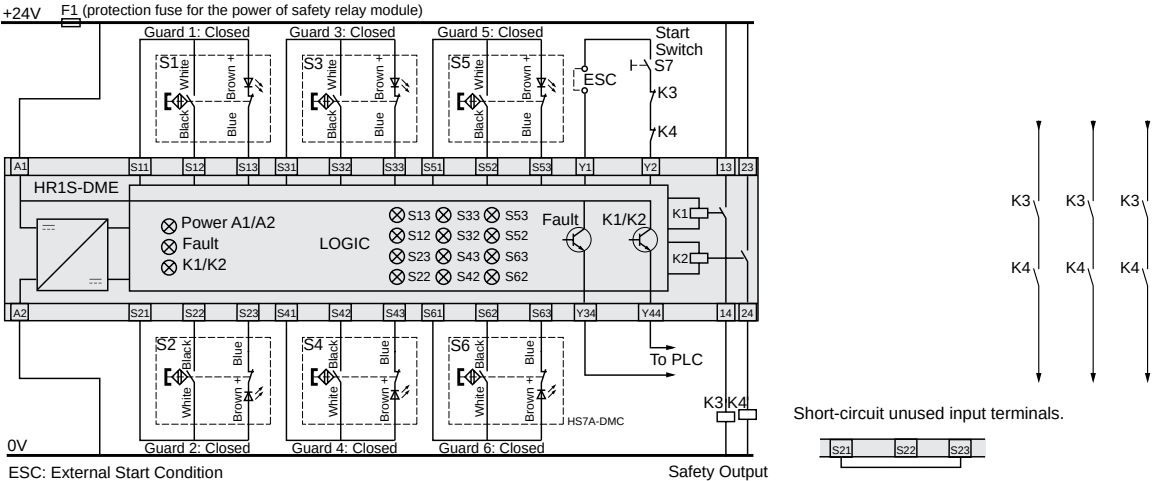
Example Wiring Diagram

The following diagrams show the contact statuses when the non-contact interlock switches are activated by the actuators.

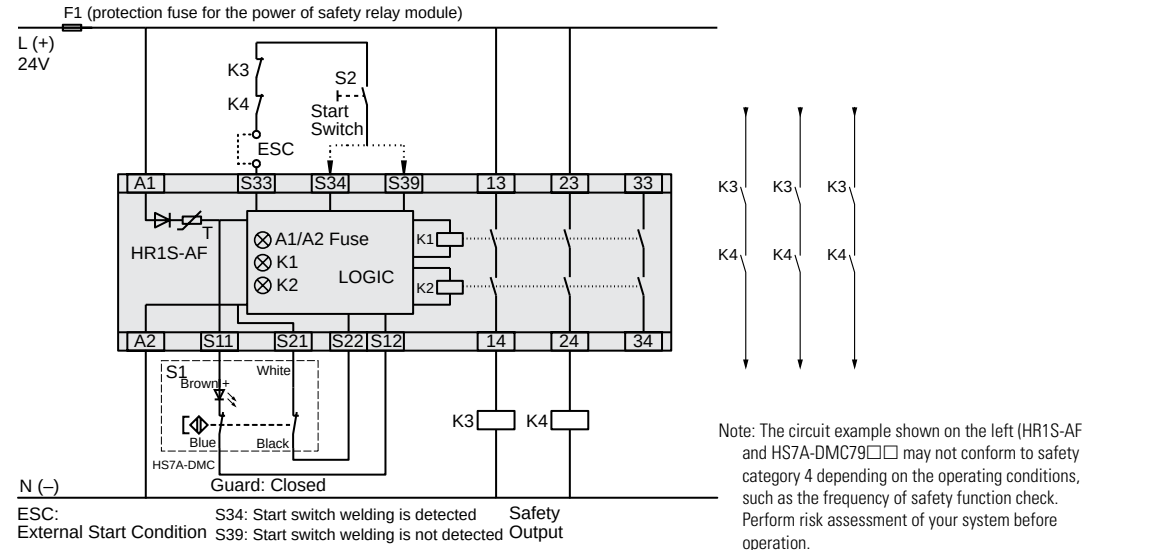
Example: Safety Category 4 (ISO 13849-1) Circuit, HR1S-DMB + HS7A-DMC591 (1NO+1NC) + HS9Z-ZC1



Example: Safety Category 4 (EN 13849-1) Circuit, HR1S-DME + HS7A-DMC591 (1NO+1NC) + HS9Z-ZC1



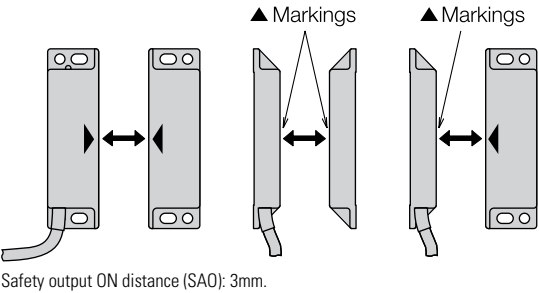
Example: Safety Category 4 (EN 13849-1) Circuit, HR1S-DME + HS7A-DMC591 (1NO+1NC) + HS9Z-ZC1



Note: The circuit example shown on the left (HR1S-AF and HS7A-DMC79) may not conform to safety category 4 depending on the operating conditions, such as the frequency of safety function check. Perform risk assessment of your system before operation.

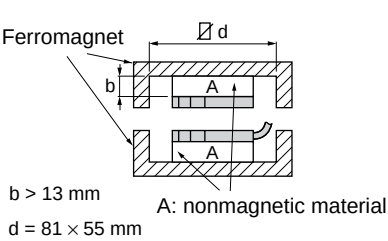
Operating Instructions

Operating Direction

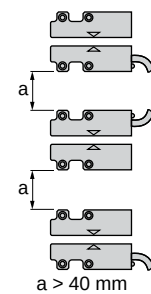


Precautions for Installation

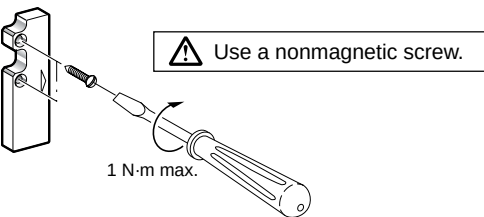
When installing on a ferromagnet



Close mounting



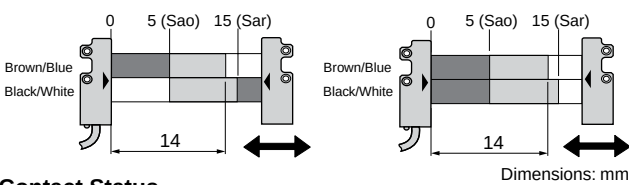
Tightening Torque



Operation Chart

HS7A-DMC59 (1NO+1NC)

HS7A-DMC79 (2NO)



Contact Status

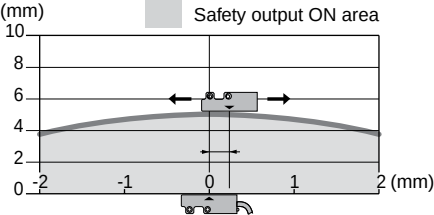
■	Contact Closed (1)
□	Contact Open (0)
■ □	Transient State

Sao: Assured operating distance where the safety output is sure to turn on.

Sar: Assured release distance where the safety output is sure to turn off.

Note: When the transfer time between the actuator's Sao-Sar is 500 ms or longer, the time lag is detected as an error.

Operation Area



HS7A-DMP Magnetic Safety Switches

Key features:

- Three-contact models.
Auxiliary contacts enable PLCs to monitor the door status.
- Operation signals from auxiliary contacts can be read directly by controllers such as PLCs, allowing for monitoring HS7A-DMP non-contact interlock switches.
- Ideal for installation on guard doors where positioning is difficult.
- Conformable up to safety category 4 (EN ISO 13849-1)
(Combining with proprietary safety relay module achieves safety category 4.)
- A maximum of 36 sets can be connected (safety relay module: HR1S-DME)
- Degree of protection: IP67



The HS7A-DMP non-contact interlock switches can be used as interlock switches when used in combination with safety relay modules specified by IDEC.

Part Numbers

HS7A Non-contact Interlock Switches

Contact Configuration	Cable Length	LED	Ordering Type No.	Applicable Safety Relay Module
1NO+2NC	2m	Without	HS7A-DMP5002	HR1S-D□
		With	HS7A-DMP5012	
	5m	Without	HS7A-DMP5005	
		With	HS7A-DMP5015	
2NO+1NC	2m	Without	HS7A-DMP7002	HR1S-AF□
		With	HS7A-DMP7012	
	5m	Without	HS7A-DMP7005	
		With	HS7A-DMP7015	



The HS7A-DMP non-contact interlock switch is supplied with an HS9Z-ZP1 actuator.
The contact configuration in the table above shows the contact status when the non-contact interlock switch is not activated.

Accessory

Name	Part Number
Actuator	HS9Z-ZP1



One HS9Z-ZP1 is supplied with each HS7A-DMP non-contact interlock switch.

Maximum Number of Connectable Non-contact Interlock Switches per Input of Safety Relay Module

Non-contact Interlock Switch	HS7A-DMP50□□		HS7A-DMP70□□	
	Without LED	With LED	Without LED	With LED
HR1S-DM□	6	3	—	—
HR1S-AF□	—	—	6	1

HR1S Safety Relay Modules for Non-contact Interlock Switches

Safety Relay Module	Number of Inputs	Max. Number of Connectable Non-contact Interlock Switches
HR1S-DMB□	2	12
HR1S-DME□	6	36
HR1S-AF□	1	6

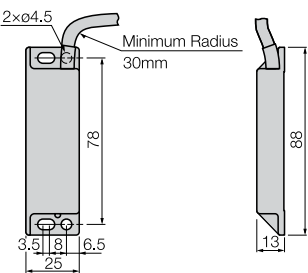


When connecting multiple non-contact interlock switches (HS7A-DMP700□), use HR1S-AF□.
(HS7A-DMP701□ cannot be connected in multiple numbers.)

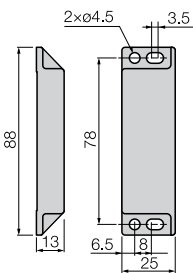
Specifications

Applicable Standards	IEC/EN 60947-5-1 UL508 (UL listed) CSA C22.2, No. 14	
Operating Temperature	-25 to 85°C (no freezing)	
Relative Humidity	35 to 85% RH (no condensation)	
Storage Temperature	-40 to +85°C (no freezing)	
Pollution Degree	3	
Electric Shock Protection	Class II (IEC 60536)	
Degree of Protection	IP67 (IEC 60529)	
Shock Resistance	300 m/s ² (11 ms) (IEC 60068-2-7)	
Vibration Resistance	100 m/s ² (10 to 150 Hz) (IEC 60068-2-6)	
Rated Voltage (Ue)	24V DC	
Rated Current (Ie)	100 mA	
Repeat Accuracy	10% maximum	
Maximum Operating Frequency	150 Hz	
Voltage Drop	I = 10 mA	0.1V (without LED) / 2.4V (with LED)
	I = 100 mA	1V (without LED) / 4.2V (with LED)
Electrical Durability	1,200,000 operations minimum	
Housing Material	PBT	
Housing Color	Red	
Cable	AWG23 × 6 Cable length: 2m, 5m	
Weight (approx.)	HS7A-DMP: 180g (cable length: 2 m) HS9Z-ZP1: 50g	

Dimensions (mm)
HS7A-DMP□□□□
(Non-contact
Interlock Switch)



HS7A-ZP1 (Actuator)

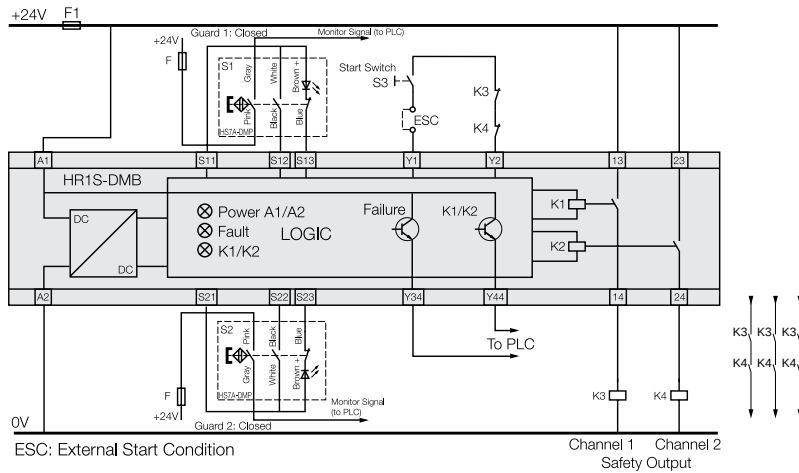


Example Wiring Diagram

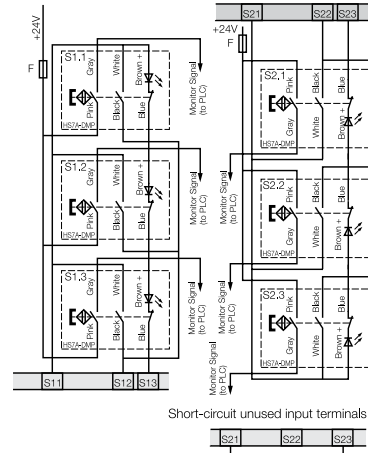


The following diagrams show the contact statuses when the non-contact interlock switches are activated by the actuators.

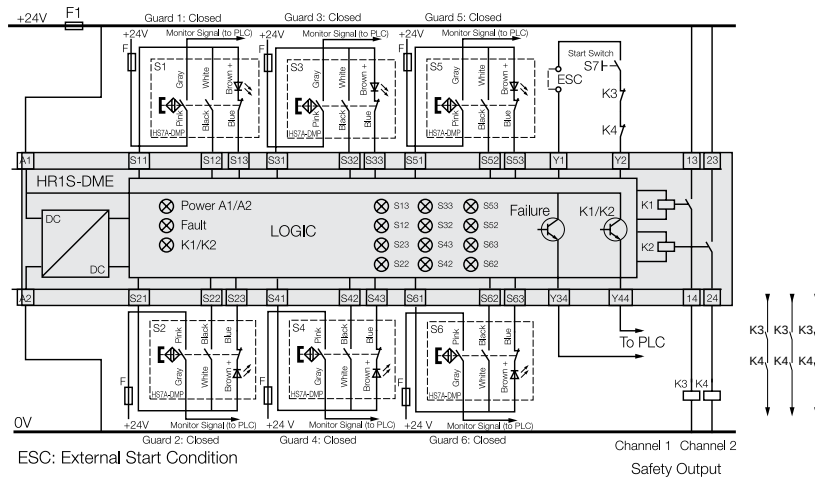
Example: Safety Category 4 (ISO 13849-1) Circuit HR1S-DMB + HS7A-DMP50□□ (1NO+2NC) + HS9Z-ZP1



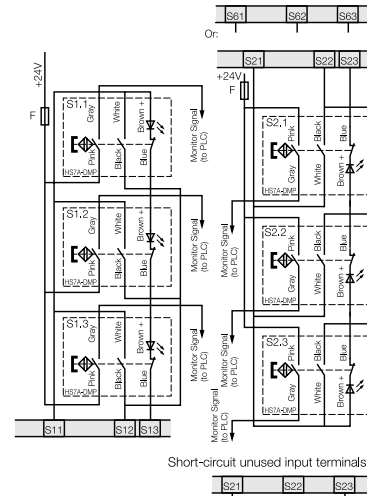
Example: Safety Category 3 (EN ISO 13849-1) Circuit HR1S-DMB



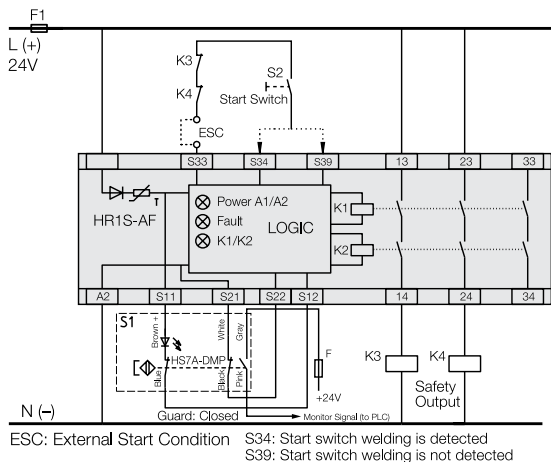
Example: Safety Category 4 (ISO 13849-1) Circuit HR1S-DME + HS7A-DMP50□□ (1NO+2NC) + HS9Z-ZP1



Example: Safety Category 3 (ISO 13849-1) Circuit HR1S-DME



Example: Safety Category 4 (ISO 13849-1) Circuit HR1S-AF + HS7A-DMP70□□ (2NO+1NC) + HS9Z-ZP1



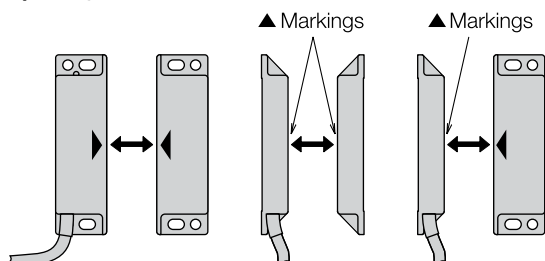
F1: Protection fuse for the power of safety relay module

F: Protection fuse for monitor signal contacts (max. 500mA gG (gL))

Note: The circuit example shown on the left (HR1S-AF and HS7A-DMP70□□) may not conform to safety category 4 depending on the operating conditions, such as the frequency of safety function check. Perform risk assessment of your system before operation.

Operating Instructions

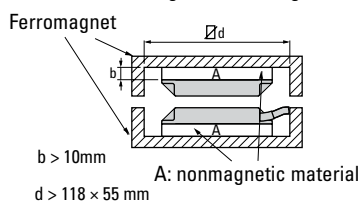
Operating Direction



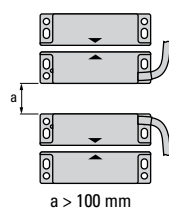
Safety output ON distance (SAO): 3mm.

Precautions for Installation

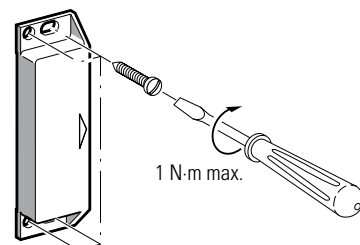
When installing on a ferromagnet



Close mounting



Tightening Torque



1 N·m max.

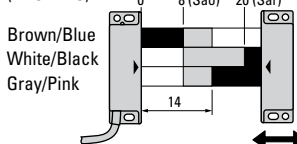
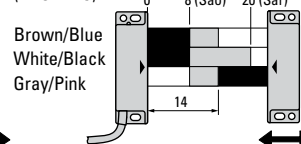


 Use a nonmagnetic screw.

Operation Chart

HS7A-DMP50 ☐ ☐

(1NO+2NC)

HS7A-DMP70 ☐ ☐ $(2\text{NO}+1\text{NC})$ 

Contact Status

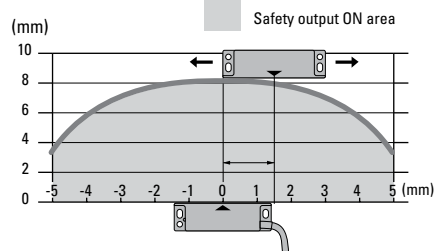
	Contact closed (1)
	Contact open (0)
	Transient area

Sao: Assured operating distance where the safety output is sure to turn on.

Sar: Assured release distance when the safety output is sure to turn off.

Note: When the transfer time between the actuator's Sao-Sar is 500 ms or longer, the time lag is detected as an error.

Operation Area



HS3A Non-contact RFID Safety Switches

Key features:

- RFID non-contact interlock switch, Category 4 and PLe (EN/ISO 13849-1) compliant.
- The sensor head with built-in safety function (redundant solid state output with internal monitoring) eliminates the need for a designated safety module.
- RFID ensures detection of slow-moving, open, sliding, and rattling doors.
- Multicode and unicode sensor heads are available. Unicode sensor head (one sensor head corresponds to one actuator) prevents tampering with the use of an unassigned spare actuator.
- Sensor head can be installed in 5 directions.
- Degree of protection IP67. Actuator IP67, IP69K (Note)

Note: IP69K is a degree of protection specified by Deutsches Institut für Normung (DIN), DW 40050 Part 9 for hot and high-pressure water.



Interlock Switch
(Sensor Head)

Actuator

Part Numbers

HS3A Non-contact RFID Safety Switches

Outputs	Type	Part Number
Safety output: 2	Multicode	HS3A-H21M4
Monitor output: 1	Unicode	HS3A-H21U4

Accessories

Name		Part Number	Remarks
Actuator		HS9Z-ZH31	Actuator for both multicode and unicode sensor heads. Supplied with two M5 × 10 mounting screws (stainless steel)
Terminal Plug (For serial connection)		HS9Z-H3TP	Used on Y-branch connector when connecting two or more switches in series.
Y-branch Connector (For serial connection)		HS9Z-H3YD	Used when connecting two or more switches in series. Plug connector: 8-pin (switch side), 5-pin (cable side)
	 For connecting two or more switches in series	5-pin, 5m	Used when connecting two or more switches in series. 5-pin plug connector is provided at one end.
		5-pin, 10m	
	 For connecting a single switch	8-pin, 5m	Used when connecting a single switch. 8-pin plug connector is provided at one end.
		8-pin, 10m	
		5-pin, 5m	Used when connecting two or more switches in series. 5-pin plug connectors are provided at both ends.
		5-pin, 10m	

See below for an example of accessories required when connecting N number of HS3A switches in series.

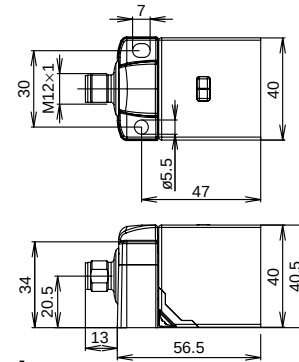
HS3A non-contact interlock switch (HS3Z-H21□4): N pcs.	Y-branch connector (HS9Z-H3YD): N pcs.
Actuator (HS9Z-ZH31): N pcs.	M12 plug connection cable, open end (HS9Z-H3F5□□): 1 pc.
Terminal plug (HS9Z-H3TP): 1 pc.	M12 plug connection cable, plug connectors at both ends (HS9Z-H3F5M□□): N-1 pcs.

Specifications

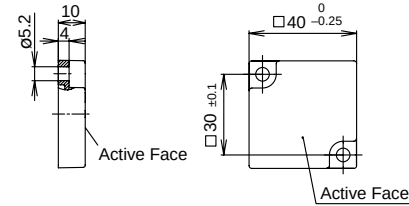
Applicable Standards		EN60947-5-3 (IFA approval) EN954-1 EN ISO13849-1 EN62061 GS-ET-14 (IFA approval) UL508 (UL listed) CSA C22.2 No.14 (c-UL listed)
Operating Temperature		−20 to +55°C (no freezing)
Relative Humidity		5 to 80% (no condensation)
Storage Temperature		−25 to +70°C
Pollution Degree		3
Sensor Classification		PDF-M (EN60947-5-3)
Performance Level (PL)		e (EN ISO 13849-1)
Safety Category		4 (EN ISO 13849-1)
Safety Integrity Level (SIL)		3 (EN 62061)
Degree of Protection	Interlock Switch (sensor head)	IP67
	Actuator	IP67, IP69K (Note)
Rated Voltage (UB)		24V DC ±15%
Current Consumption		80mA (at no load)
Dielectric Strength		500V AC
Output Specifications	Safety Output	Semiconductor output, P-channel Output voltage: Max: UB [V], Min.: UB-1.5 [V] Maximum output current per safety output: 400 mA
	Monitor Output	Semiconductor output, P-channel Output voltage: Max: UB [V], Min.: 0.8×UB [V] Maximum output current: 200 mA
Operation Distance	Turn-on Distance	15mm (typ.)
	Assured Turn-on Distance (Sao)	13mm
	Maximum Turn-off Distance (Sar)	58mm
Response Time	When using a single switch	260 ms (actuator removed)
		150 ms (non-identical input signal at IA/IB)
		150 ms (non-identical enabling input state at IA/IB)
		300 ms (short-circuit or cross-circuit at OA/OB, or internal error)
	When using two or more switches (max.)	360 ms (actuator removed)
		250 ms (non-identical input signal at IA/IB)
		400 ms (non-identical enabling input state at IA/IB)
		400 ms (short-circuit or cross-circuit at OA/OB, or internal error)
Shock Resistance		Operating extremes: 300 m/s ² (11 ms)
Vibration Resistance		10 to 55 Hz, amplitude 0.5 mm
Material		PBT
Cable		M12 plug connection cable, 8-pin
Weight (approx.)		400g (HS3A-H21□□)
Attachment		System Manual (CD-ROM)

Dimensions (mm)

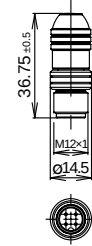
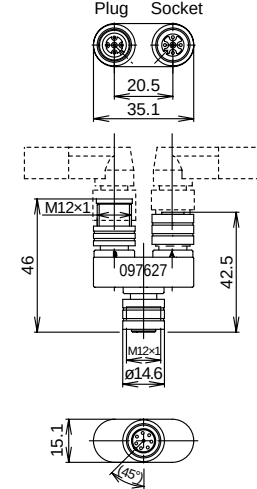
Sensor Head



Actuator

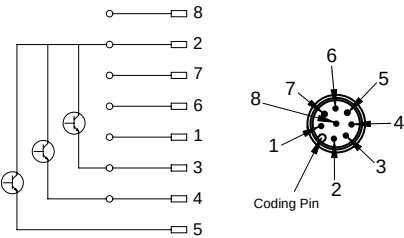


Supplied with two mounting screws (M5 × 10).

Terminal Plug
HS9Z-H3TPY-branch Connector
HS9Z-H3YD

Specifications

Non-contact Interlock Switch



Plug Connection Cable
HS9Z-H3FB

Pin	Wire	Legend	Description
1	White	IB	Enabling input (channel 2)
2	Brown	UB	Power supply (24V DC)
3	Green	OA	Safety output (channel 1)
4	Yellow	OB	Safety output (channel 2)
5	Gray	OUT	Monitoring output
6	Pink	IA	Enabling input (channel 1)
7	Blue	0V	0V
8	Red	RST	Reset input for hardware

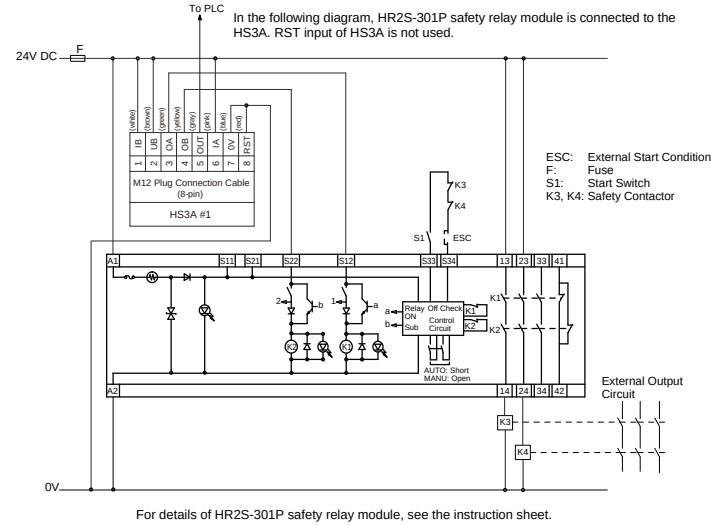
HS9Z-H3FS

Pin	Wire	Legend
1	Brown	UB
2	White	OA
3	Blue	0V
4	Black	OB
5	Gray	RST

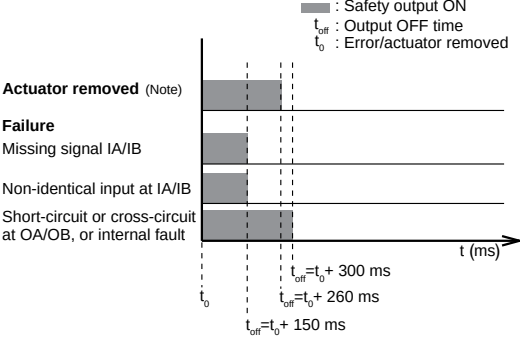
Wiring Diagram

When using a single HS3A

When using a single HS3A, connect as shown in the figure below (Note). The OUT output can be connected to a control system, to a PLC for example, as a monitoring output. The HS3A can be reset via the RST input. To reset, apply 24V DC for at least 3 seconds. When not using the RST input, connect the RST input to 0V.



Safety Output Response Time



Note: The time required for the safety output to turn off after the actuator moves outside the operating distance of the HS3A switch.

Note: Safety performance of the actual system is determined by performing a risk assessment on the entire system. Depending on the risk level the system may entail, K1 and K2 need to be monitored to prevent serious accidents.

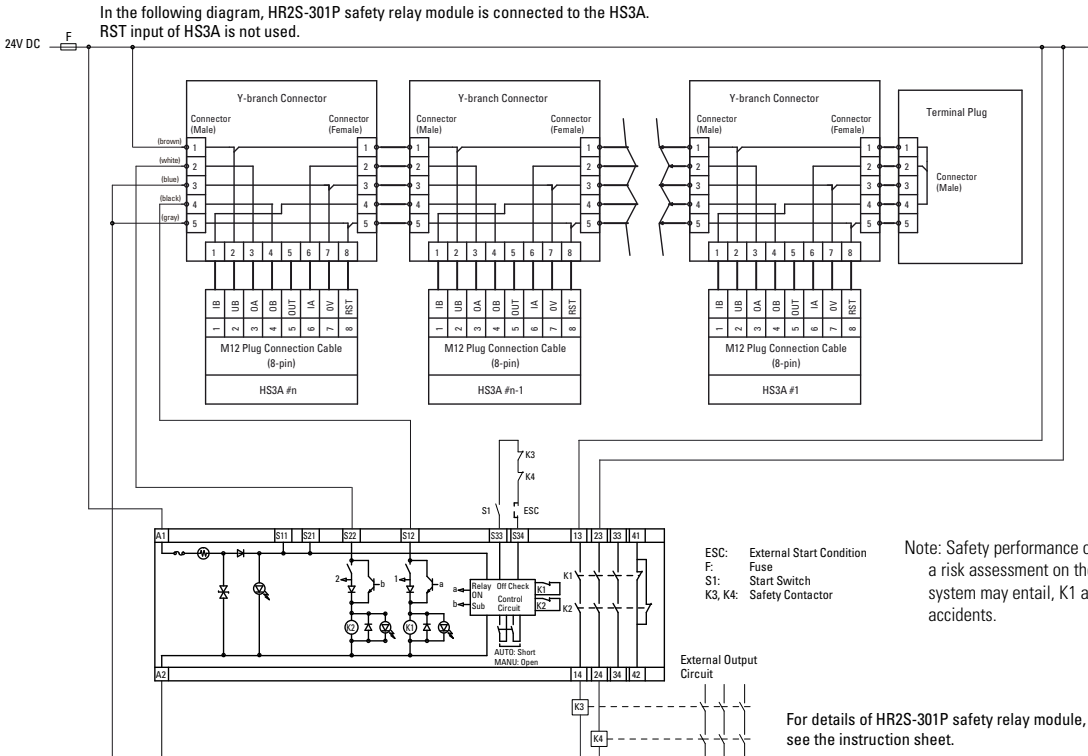
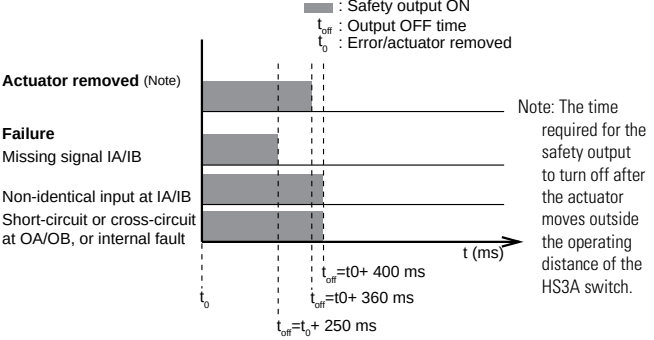
When using two or more HS3A in series

A maximum of 20 can be connected in series.
Pay attention to the contact resistance at the connection points.

The HS3A switches can be connected in series using plug connection cables and Y-branch connectors as shown in the figure below (Note). When any of the HS3A switches detects that the safety guard is open, or when a failure has occurred on any of the switches, the system turns off the machine. However, the external control system cannot detect which safety guard is open or where a failure has occurred.

The HS3A can be reset via the RST input. To reset, apply 24V DC for at least 3 seconds. When not using the RST input, connect the RST input to 0V.

Safety Output Response Time



Operation Distance and Response Time

When installing the HS3A, ensure the safety of the door opening area by paying attention to the operation distance (Table 1) and response time (Table 2) shown below.

Table 1: Operation Distance ¹

Distance	Value (mm)		
	Min.	Typ.	Max.
Turn-on distance	—	15 ²	—
Assured turn-on distance Sa0	13	—	—
Switching hysteresis	1.5	2.5	—
Assured turn-off distance Sar	—	—	58

- 1. When the off-center displacement of the interlock switch (sensor head) and actuator is 0 mm.
- 2. When surface-mounted on aluminum. When using by embedding in metal, pay attention to the operation distance affected by the metal. In non-metallic environment, the typical turn-on distance increases to 30mm.

Table 2: Response Time

Response Time	When connecting a single switch (max.)	260 ms (actuator removed)
		150 ms (missing enabling input IA/IB)
		150 ms (non-identical enabling input state at IA/IB)
	When connecting two or more switches (max.)	300 ms (short-circuit or cross-circuit at OA/OB, or internal fault)
		360 ms (actuator removed)
		250 ms (missing signal enabling input IA/IB)
		400 ms (non-identical enabling input state at IA/IB)
		400 ms (short-circuit or cross circuit at OA/OB or internal fault)

Note: To ensure safety, both safety outputs (OA and OB) must always be evaluated. Single-channel use of the safety outputs as shown below leads to a reduction of safety category stipulated in EN954-1.

HS5B/HS5E Door Handle Actuator

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Key features:

- Easy and secure operation
- Rattling doors can be locked smoothly and securely.
- A door can be locked with an actuator by pushing and turning the handle.
- Padlock tab is provided to ensure operator safety.
- Interlock switch with or without solenoid lock can be installed.
- LED shows solenoid status
(when using HS5E-□44L□□-G).

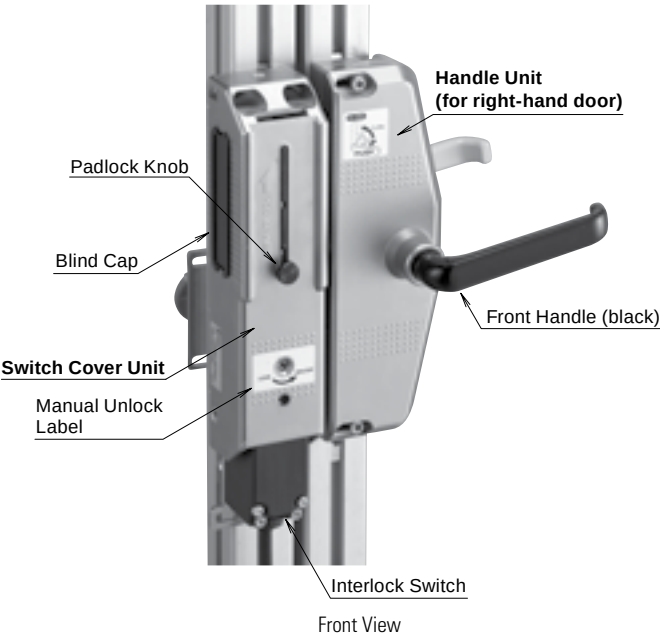


Part Numbers

Description		Ordering Type No.	Remarks	
Handle Unit	For right-hand door	HS9Z-DH5RH	Choose according to the required opening side.	
	For left-hand door	HS9Z-DH5LH		
Switch Cover Unit		HS9Z-DH5C	Used for installing the interlock switch inside.	
HS5B Installation Kit		HS9Z-DH5B	Contains a mounting plate and two spacers.	
Rear Unlocking Button Kit ¹		HS9Z-FL53	Contains a button with base plate and a connecting rod	Mounting panel thickness (X): 20 ≤ X ≤ 30mm ²
		HS9Z-FL54		Mounting panel thickness (X): 30 ≤ X ≤ 40mm ²

-  1. Use the kit in combination with the HS5E-□44L□□-G rear unlocking button type interlock switch.
2. Mounting panel is a frame or a panel.

Parts Description



Specifications

Applicable Interlock Switch	HS5B Metal Head Interlock Switch ¹ HS5E Rear Unlocking Button Type Interlock Switch with Solenoid ²
Operating Temperature	-25 to +70°C (no freezing)
Mechanical Durability	100,000 operations minimum
Applicable Shackle Diameter of Padlock	ø6 to 7.5 mm
Withstand Load of Padlock Tab	30N maximum
Handle Operation Angle	77° (removed position ↔ inserted position)
Insulation Resistance (500V DC megger)	Between live and dead metal parts: 100 MΩ minimum Between terminals of different poles: 100 MΩ minimum.

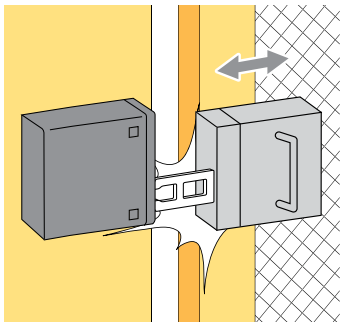


1. HS5B-□□ZB, HS5B-□□ZBM
2. HS5E-□44L□□-G

Interlock switch is not supplied with the actuator and must be ordered separately.
For the specifications of interlock switches, see pages XX, XX, and XX.

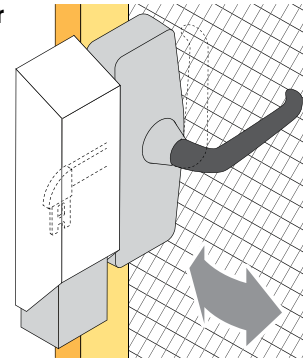
Rotational handle actuator can be inserted/removed smoothly on rattling doors.

Conventional Sliding Actuator



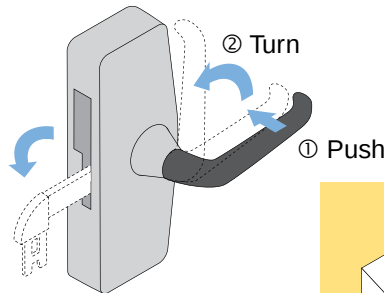
IDEC's Door Handle Actuator

Rattling doors can be locked smoothly and securely.

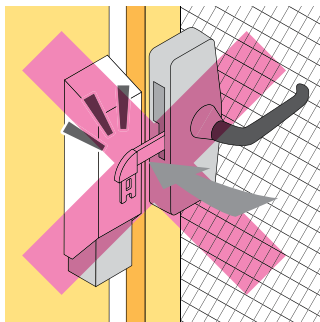
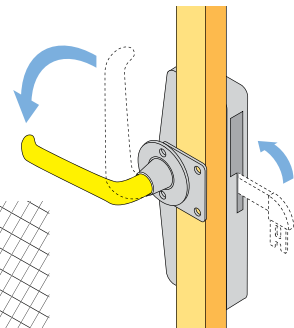


The door can be locked and unlocked by pushing and turning the handle.

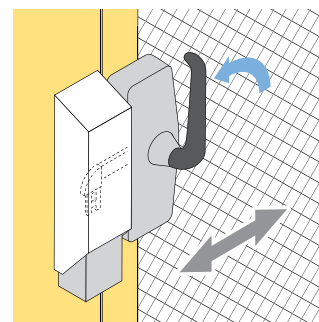
The actuator can be inserted into the interlock switch by pushing and turning the front handle. The actuator can be removed from the interlock switch by turning the front handle.



The rear handle can remove the actuator, but cannot insert the actuator.



Because the handle can be turned only while it is pushed, the actuator is prevented from hitting the switch cover unit.

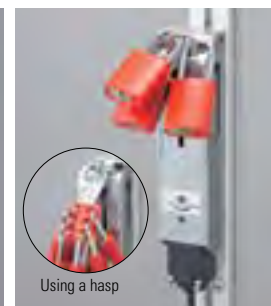


Sliding doors can also be locked securely.

Padlockable tab ensures operator's safety.

When padlocks are installed on the padlock tab, the machine cannot be started because the actuator entry slot is blocked and the actuator cannot enter the interlock switch. By requiring all operators to have their own padlock and installing them on the door handle actuator before entering the hazardous area, the door will not be closed unless all padlocks are removed—i.e. all operators have left the hazardous area.

Note: Operators must observe rules in the workplace in order to ensure safety. Residual risk such as failure to install padlocks must be taken into consideration.



Interlock switch with/without solenoid locking can be selected.

HS5E

HS5B



(HS5E-□44L□□-G)

(HS5B-□□Z)

Door Handle Actuator Configuration

Interlock Switches



HS5E-□44L□□-G
Rear Unlocking
Button Type



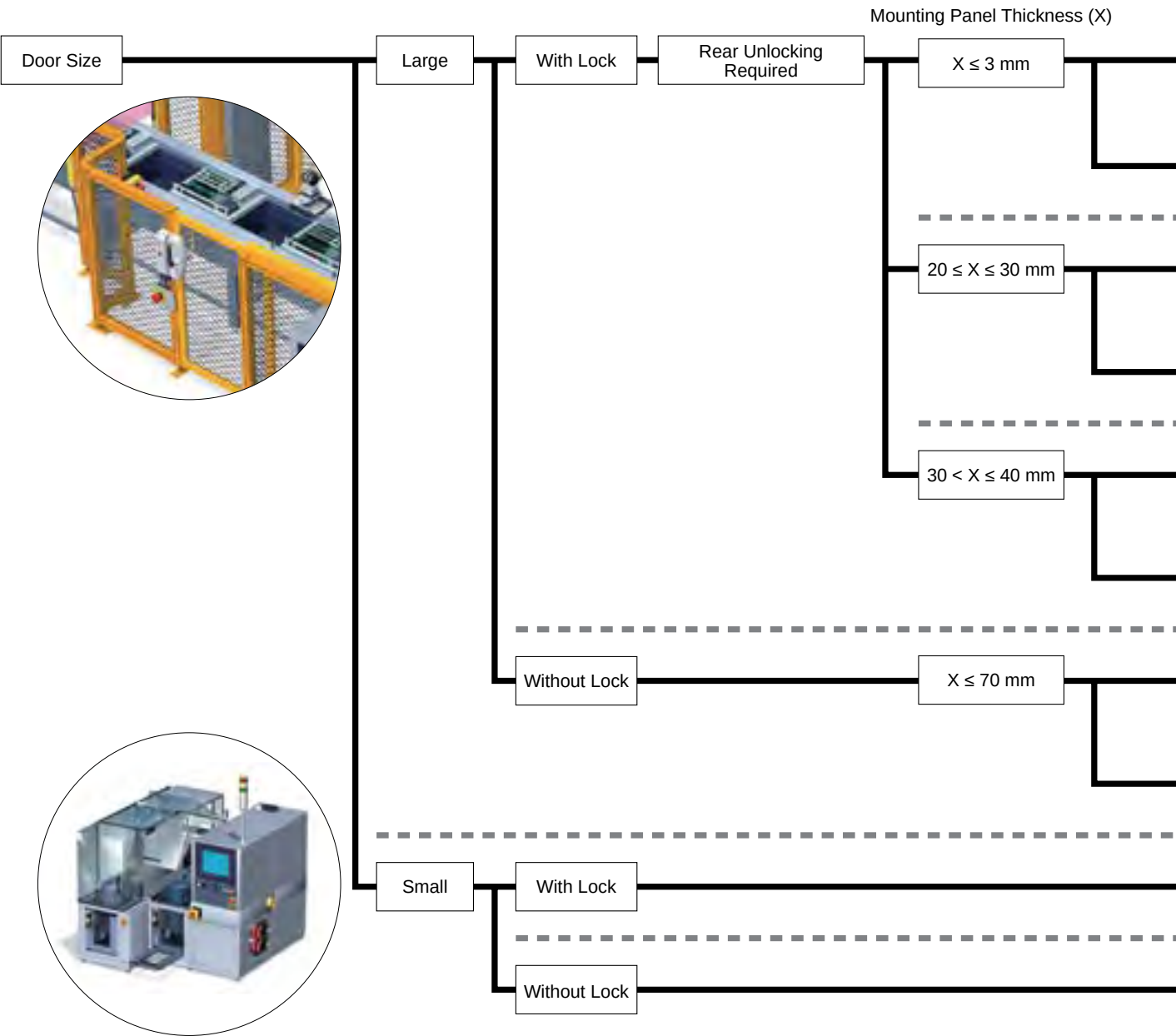
HS5B-□□Z
Metal Head Type

Switch Cover Unit



HS9Z-DH5C

Selection Chart



Handle Unit

Right-hand Door



HS9Z-DH5RH

Left-hand Door



HS9Z-DH5LH

Accessories

Rear Unlocking Button Kit



HS9Z-FL53
HS9Z-FL54

HS5B Installation Kit



HS9Z-DH5B

Overview

XW Series E-Stops

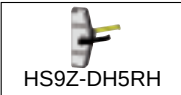
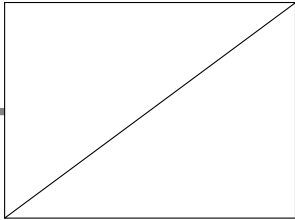
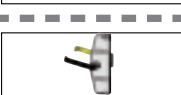
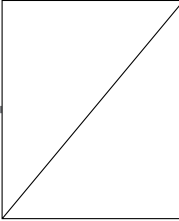
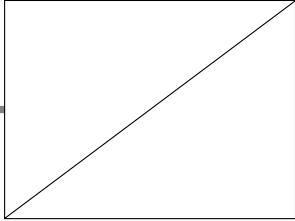
Interlock Switches

Enabling Switches

Safety Control Relays

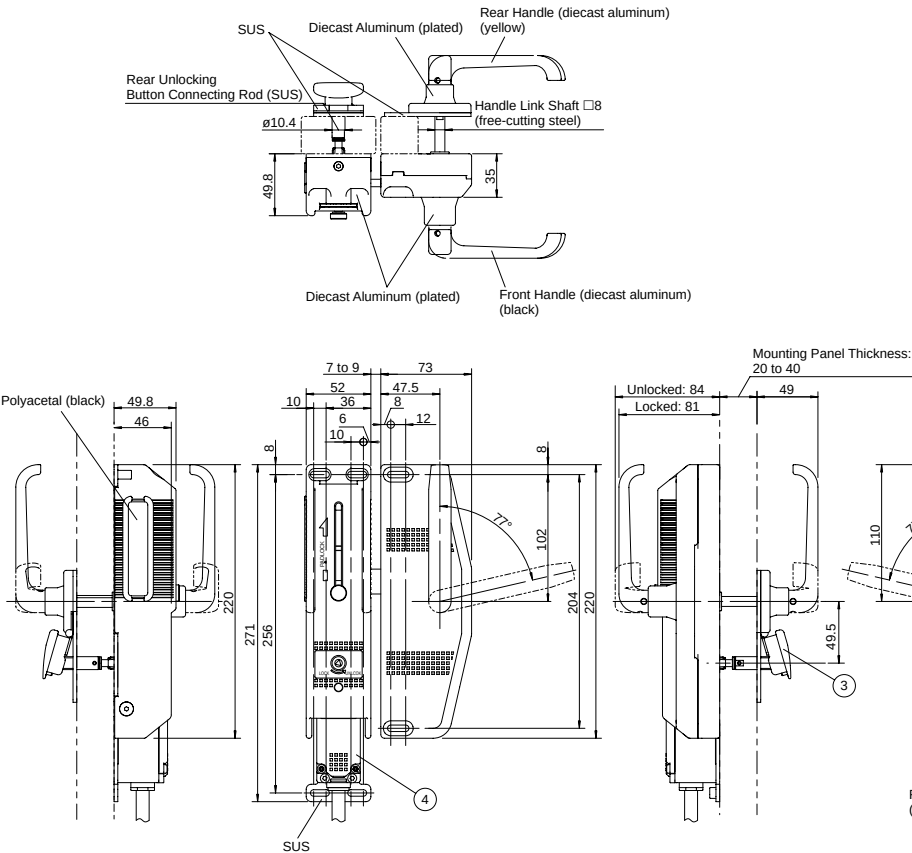
Light Curtains

AS-Interface Safety at Work

	Handle Unit		Switch Cover Unit		Accessories		Interlock Switch
Right-hand Door	 HS9Z-DH5RH	+		+		+	 HS5E-44L**G (Rear Unlocking Button Type)
Left-hand Door	 HS9Z-DH5LH	+		+		+	
Right-hand Door	 HS9Z-DH5RH	+		+	 Rear Unlocking Button Kit HS9Z-FL53	+	
Left-hand Door	 HS9Z-DH5LH	+		+		+	
Right-hand Door	 HS9Z-DH5RH	+		+	 Rear Unlocking Button Kit HS9Z-FL54	+	 HS5B-**Z (Metal Head Type)
Left-hand Door	 HS9Z-DH5LH	+		+		+	
Right-hand Door	 HS9Z-DH5RH	+		+	 HS5B Installation Kit HS9Z-DH5B	+	
Left-hand Door	 HS9Z-DH5LH	+		+		+	
 Sliding Actuator HS9Z-SH5	 Sliding Actuator HS9Z-SH5	+		+		+	HS5E (All types) 
		+		+		+	HS5B-**Z (Metal Head Type) 

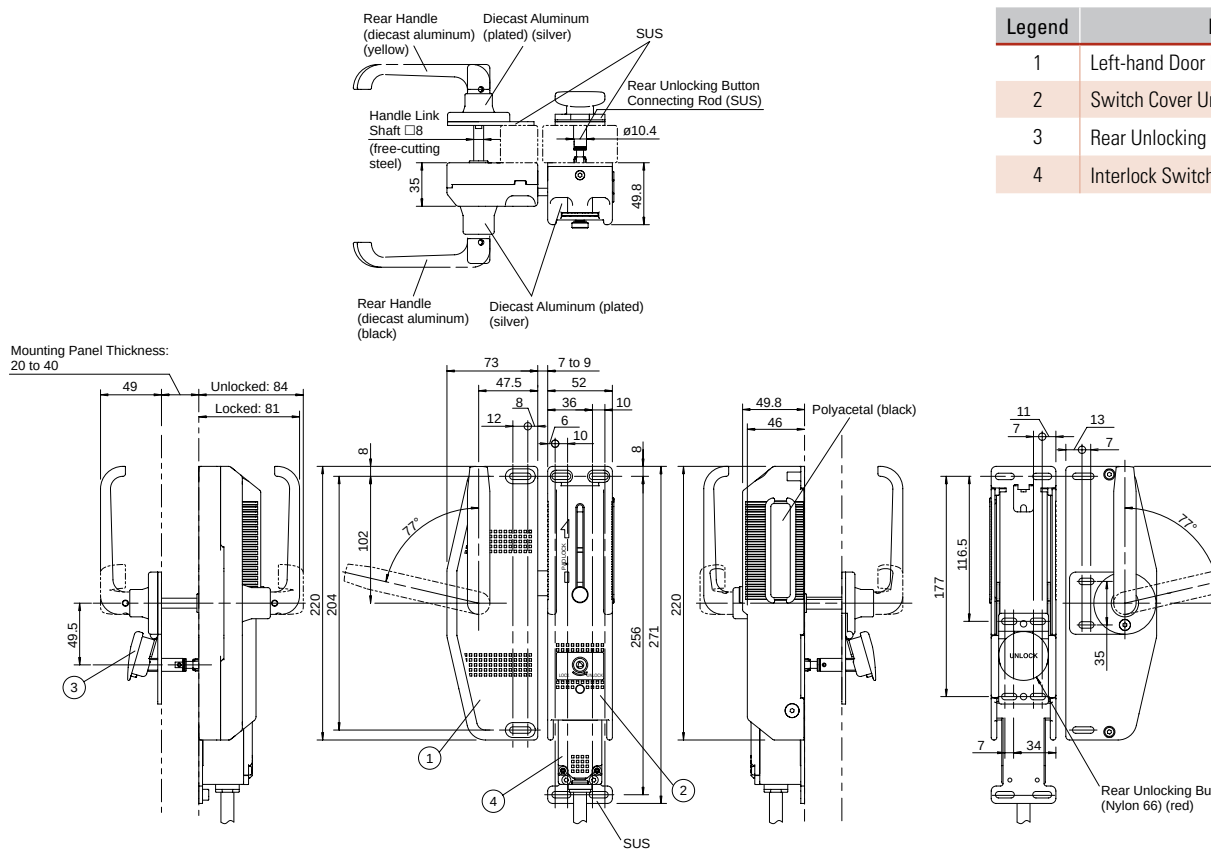
Dimensions (mm)

HS9Z-DH5RH (right-hand door) and HS5E-□44L□□-G Interlock Switch with Solenoid



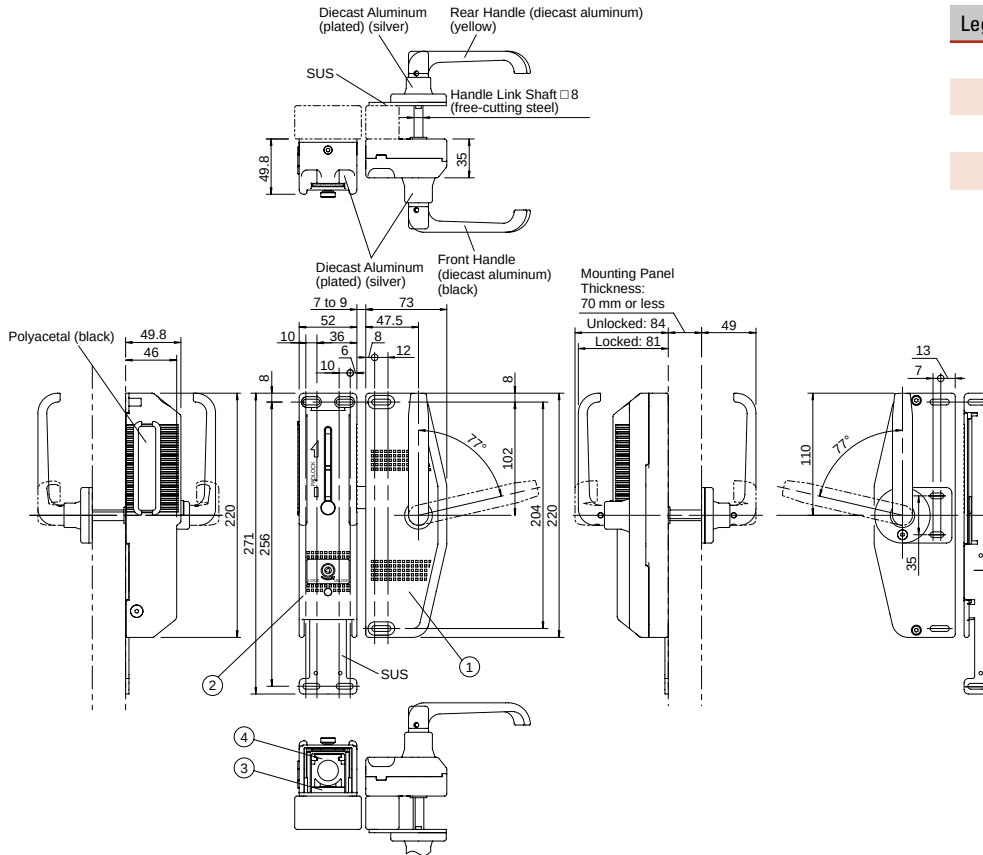
Legend	Description
1	Right-hand Door Handle Unit HS9Z-DH5RH
2	Switch Cover Unit HS9Z-DH5C
3	Rear Unlocking Button Kit HS9Z-FL5□
4	Interlock Switch HS5E-□44L□□-G

HS9Z-DH5LH (left-hand door) and HS5E-□44L□□-G Interlock Switch with Solenoid



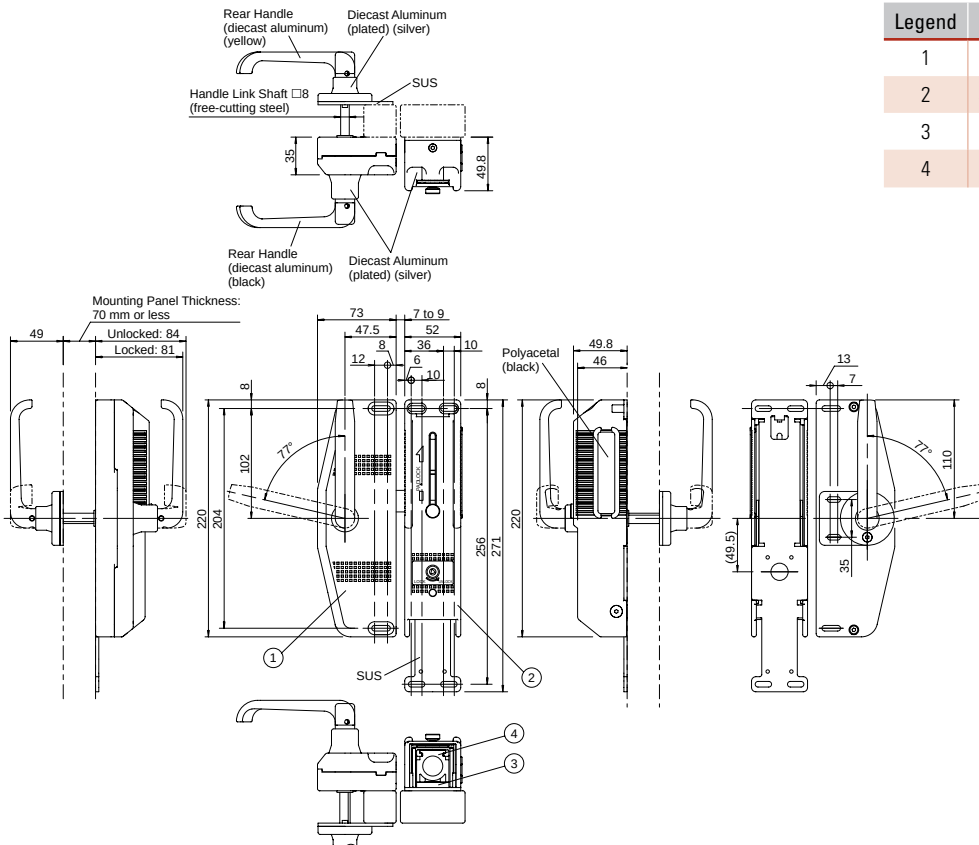
Legend	Description
1	Left-hand Door Handle Unit HS9Z-DH5LH
2	Switch Cover Unit HS9Z-DH5C
3	Rear Unlocking Button Kit HS9Z-FL5□
4	Interlock Switch HS5E-□44L□□-G

HS9Z-DH5RH (right-hand door) and HS5B-□□Z Interlock Switch



Legend	Description
1	Right-hand Door Handle Unit HS9Z-DH5RH
2	Switch Cover Unit HS9Z-DH5C
3	HS5B Installation Kit HS9Z-DH5B
4	Interlock Switch HS5B-□□Z

HS9Z-DH5LH (left-hand door) and HS5B-□□Z Interlock Switch

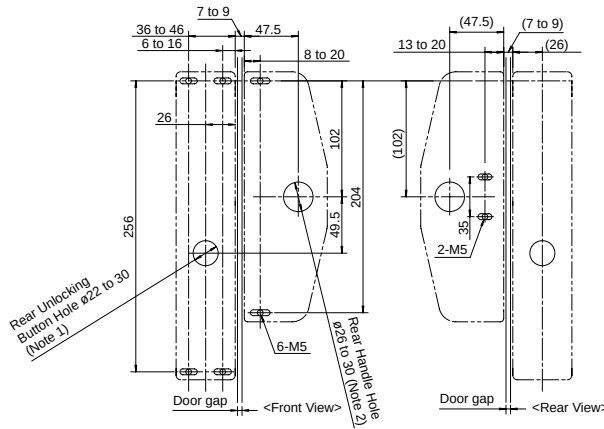


Legend	Description
1	Left-hand Door Handle Unit HS9Z-DH5LH
2	Switch Cover Unit HS9Z-DH5C
3	HS5B Installation Kit HS9Z-DH5B
4	Interlock Switch HS5B-□□Z

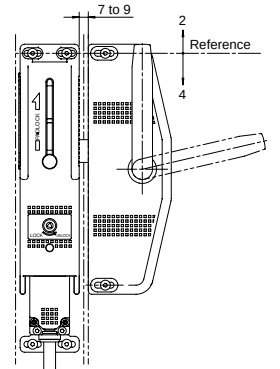
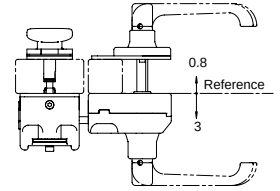
Panel Cut-out HS9Z-DH5RH right-hand door handle unit

When using the HS5E-□44L□□-G on the mounting panel of 3 mm or less in thickness (use the rear unlocking button).

When using the HS5B-□Z (mounting panel thickness $X \leq 70\text{mm}$).

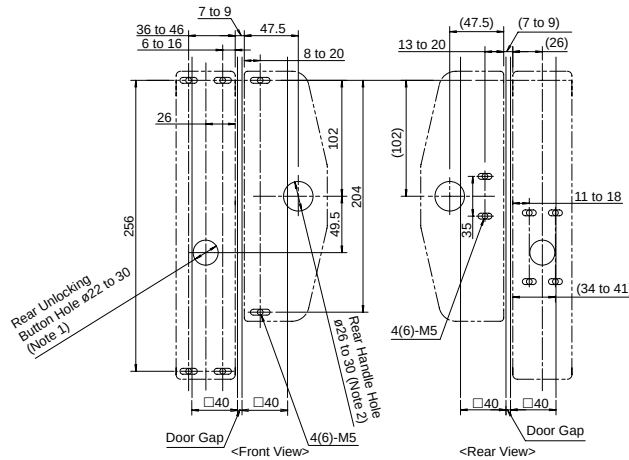


Mounting Position Tolerance



When using the HS5E-□44L□□-G on the mounting panel of 20 to 40 mm in thickness.

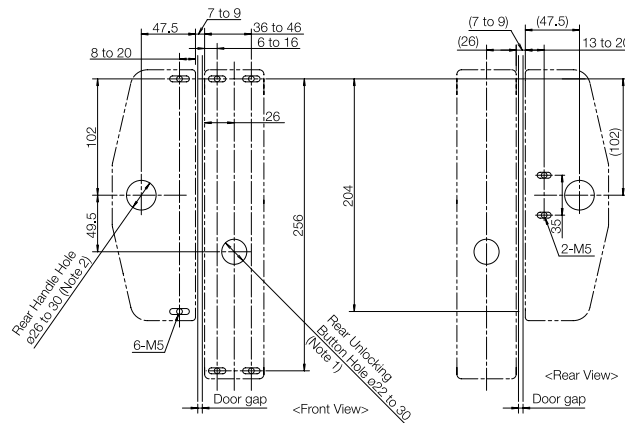
- Use the rear unlocking button kit (HS9Z-FL5□).
- In the figure shown on the right, □40mm frame is used.



HS9Z-DH5LH left-hand door handle unit

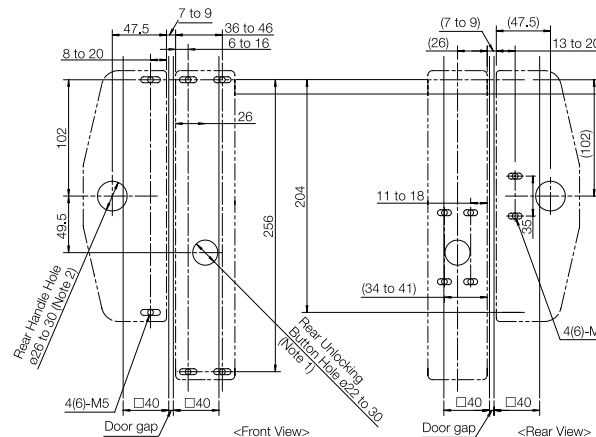
When using the HS5E-□44L□□-G on the mounting panel of 3 mm or less in thickness (use the rear unlocking button).

When using the HS5B-□Z (mounting panel thickness $X \leq 70\text{mm}$).



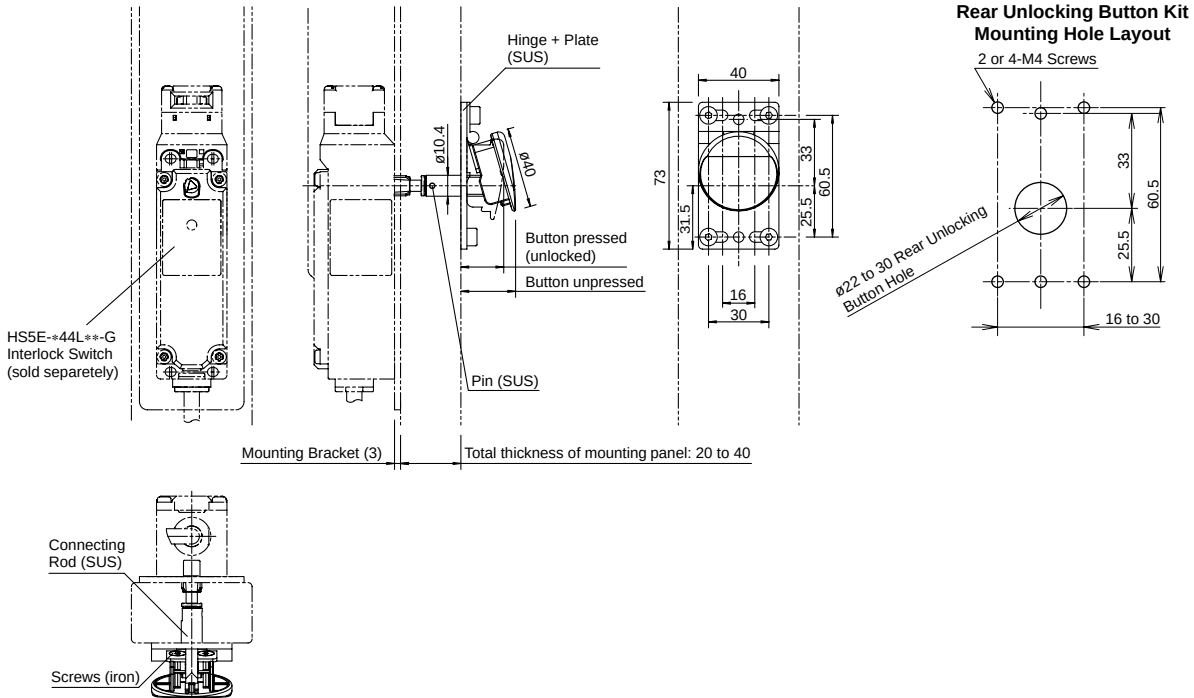
When using the HS5E-□44L□□-G on the mounting panel of 20 to 40 mm in thickness.

- Use the rear unlocking button kit (HS9Z-FL5□).
- In the figure shown on the right, □40mm frame is used.

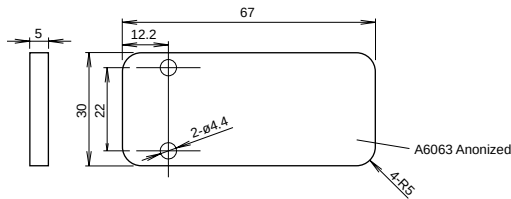


Note 1: Required when using the HS5E-□44L□□-G.
Not required when using the HS5B-□□Z (without locking function).
Note 2: Ensure that the hole in the mounting panel does not interfere with the rear handle shaft.

Rear Unlocking Button Kit (HS9Z-FL53/HS9Z-FL54) (Use with the HS5E-*44L**G Interlock Switch)



HS5B Installation Kit (HS9Z-DH5B)



Note: The illustration kit contains the aluminum mounting plate shown above and two spacers.

For more information, download instruction sheet from web.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Selection Guide..... 391

Panel Mount Enabling Switches..... 392

 HE1B Series 392

 HE2B Series 394

 HE3B Series 397

 HE5B Series 400

 HE6B Series 403

Grip Enabling Switches..... 406

 HE1G Series 406

 HE1G-L Series 410

 HE2G Series 413

 HE5B Housing 417

Enabling Switches



www.IDEC.com/safety



Enabling "Dead Man" Switches

What is an enabling switch?

An enabling switch is a 3-position (OFF-ON-OFF) switch to allow a machine operation only when the switch is lightly pressed and held in the middle position (position 2). Because it disables machine operation when released (position 1) or further depressed (position 3) by a panicked operator, the safety of operators is ensured.

IDEC was a pioneer in developing these type of switches and championed the additional IEC60947-5-8 requirements for enabling switches to be used in automated manufacturing cells.



IEC symbol designating a 3-position enabling switch as specified in IEC60947-5-8

Because operators use pendants in dangerous environments performing teaching, system changeover, and maintenance of robots, they must have protection against unpredictable motion of robots, and therefore teach pendants are equipped with 3-position enabling switches.



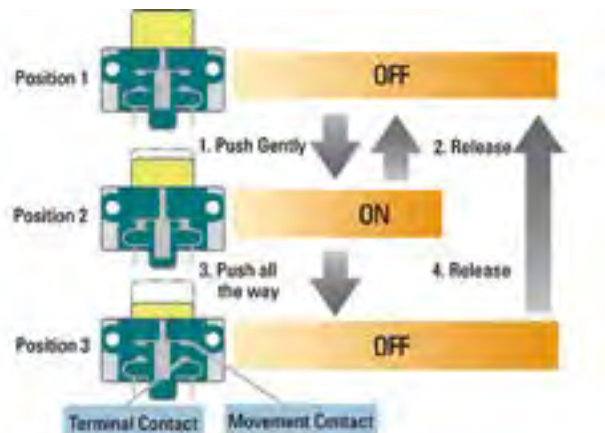
HE1B Enabling Switch Movement

3 Position Enabling Switch

Position 1 - Normal position - Contact Open

Position 2 - Push half way - Contact Closed

Position 3 - Push all the way - Contact Open



When releasing switch from position 3 back to position 1, the switch will not enter the ON state.

Selection Guide

Enabling Switches

Series	HE1B	HE2B	HE3B	HE5B	HE6B
Appearance					
Page	392	394	397	400	403
Description	Basic Switch	Full Size Contacts	16mm Panel Mount	16mm Panel Mount	Compact Size
Main Contacts	1NO	DPDT/DPDT, 2NC/DPDT, 4NC	DPDT	DPDT	DPDT
Monitor Contacts	–	2NC, 4NC	–	–	2NC

Grip Switches

Series	HE1G	HE1G-L	HE2G	HE5B Housing
Appearance				
Page	406	410	413	417
Description	Grip Switch	Light Force Grip Switch	Compact, Ergonomic Grip Switch	Grip switch housing for HE5B
Maximum Contacts	DPDT, 1NC/DPDT, 2NC	DPDT, 1NC/DPDT, 2NC	DPDT	DPDT
Options	E Stop or Push Button	E Stop or Push Button	E Stop, Push Button, Key Switch, Pilot Light	–

Application Example



Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

HE1B Basic Enabling Switch

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Key features:

- 3-position functionality (OFF – ON –OFF) as required for manual robotic control
- Ideally suited for use as enabling (aka “deadman”) switch on teach pendants
- Provides a high level of safety based on human behavioral studies that determine personnel may squeeze OR let go when presented with a panic situation
- Positive action contacts “On” (pos. 2) to “Off” (pos. 3) ensure no contact welding (per EN60947-5-1 / IEC60947-5-1)
- Contacts will not close when released from “Off” (pos. 3) to “Off” (pos. 1) (per IEC60204-1; 9.2.5.8)
- Small and lightweight



Part Numbers

Item	Installation	Part Number
	Side	HE1B-M1
	Front	HE1B-M1N



Specifications

Conforming to Standards		UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized), IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Operating Temperature		–25 to +60°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Storage Temperature		–40 to +80°C (no freezing)
Pollution Degree		2
Initial Contact Resistance		50mΩ maximum
Insulation Resistance		100MΩ minimum
Impulse Withstand Voltage		2.5kV
Operating Frequency		1200 operations/hour
Mechanical Life		Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life		100,000 operations minimum at rated load
Shock Resistance	Operating Extremes	150m/s ² (15G)
	Damage Limits	1000m/s ² (100G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Terminal		Solder Terminal
Recommended Wire Size		0.5mm ² maximum / 1 line (20AWG)
Solder Heat Resistance		260°C / 3 seconds maximum
Terminal Pulling Strength		20N minimum
Recommended Screw Torque		HE1B-M1: M3 screw / 0.5 to 0.8Nm
Degree of Protection		IP40 (IEC 60529) excluding terminal part
Conditional Short-Circuit Current		50A (250V)
Recommended Short Circuit Protection		250V, 10A fast blow fuse (IEC 60127-1)
Circuit Opening Force		30N minimum (position 2→3)
Control Resistance (Operating)		250N minimum
Weight		Approx. 6g

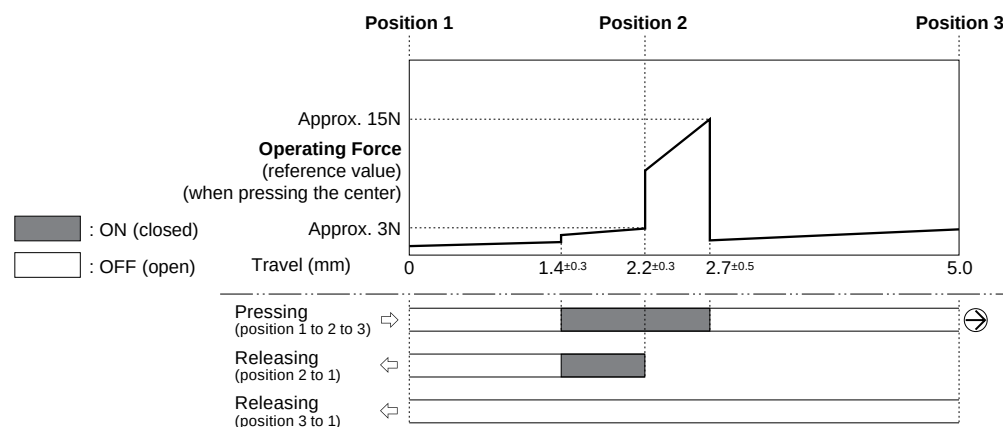
Current Ratings

Rated Insulation Voltage (Ui)			AC / DC250V		
Thermal Current (Ith)			5A		
Rated Operating Voltage (Ue)			30V	125V	250V
Rated Operating Current (Ie)	AC 50/60Hz	Resistive Load (AC-12)	—	3A	1.5A
		Inductive Load (AC-15)	—	1.5A	0.75A
	DC	Resistive Load (DC-12)	2A	0.4A	0.2A
		Inductive Load (DC-13)	1A	0.22A	0.1A
Contact Configuration			SPST-NO three position (OFF-ON-OFF)		



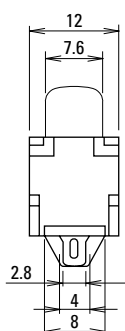
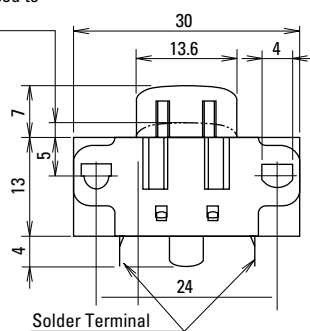
Minimum applicable load: AC/DC3V • 5mA (For reference only).

Operating Characteristics



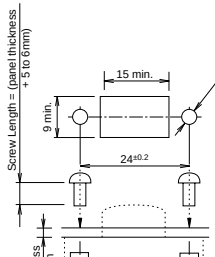
Dimensions (mm)

When pressed to position 3: 2



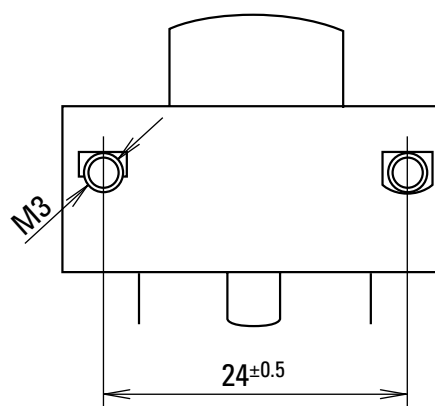
HE1B-M1 (Side Mounting)

1. M3 Screw (not provided)
2. Thread built in



HE1B-M1N (Front Mounting)

1. M3 Screw (not provided)
2. Locking nut (2 pcs) included



When using a panel thicker than 2mm, the button will be lower than the surface of the panel

HE2B Redundant (Double) Basic Enabling Switch

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Key features:

- 3-position functionality (OFF – ON –OFF) as required for manual robotic control
- Ideally suited for use as enabling (aka “deadman”) switch on teach pendants
- Provides a high level of safety based on human behavioral studies that determine personnel may squeeze OR let go when presented with a panic situation
- Snap acting contacts from Off→On (1→ 2)
- Positive action contacts from On→Off (2→ 3) ensure no contact welding (per EN60947-5-1 / IEC60947-5-1)
- Contacts will not re-close when released from Off→On (3→1) (per IEC60204-1; 9.2.5.8)
- Multiple contacts for enhanced reliability
- Monitoring contacts in addition to main load contacts
- Available with or without rubber cover (cover provides IP65 watertight seal)



Part Numbers

Style			Number of Contacts			Part Number
			3 Position Switch	Push Monitor Switch	Return Monitor Switch	
	Without Rubber Cover		2	0	0	HE2B-M200
			2	1	1	HE2B-M211
			2	2	2	HE2B-M222
	With Rubber Cover	Yellow	2	0	0	HE2B-M200PY
			2	1	1	HE2B-M211PY
			2	2	2	HE2B-M222PY
Black		2	0	0	HE2B-M200PB	
		2	1	1	HE2B-M211PB	
		2	2	2	HE2B-M222PB	
		Gray	2	0	0	HE2B-M200PN1
			2	1	1	HE2B-M211PN1
			2	2	2	HE2B-M222PN1
						

Accessories

Replacement Rubber Cover

Apperance	Color	Part Number	Material
	Yellow	HE9Z-D2Y	Silicon Rubber
	Black	HE9Z-D2B	
	Gray	HE9Z-D2N1	NBR/PVC Polyblend

Specifications

Conforming to Standards		UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized), IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Application Standards		ISO 12100-1, -2, EN 12100-1, 2 / EN 292, IEC 60204-1 / EN 60204-1 ISO11161 / prEN 11161, ISO10218 / EN 775, ANSI / RIA R15.06, ANSI B11.19
Operating Temperature		–25 to +60°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Storage Temperature		–40 to +80°C (no freezing)
Pollution Degree		2 (inside of panel/contact side) 3 (outside of panel/operating side)
Contact Resistance		50mΩ maximum
Insulation Resistance		Between live and dead metal parts: 100MΩ maximum Between positive and negative live parts: 100MΩ minimum
Impulse Withstand Voltage		2.5kV
Operating Frequency		1200 operations/hour
Mechanical Life		Position 1→2: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life		100,000 (at full rated load)
Shock Resistance	Operating Extremes	150m/s ² (15 G)
	Damage Limits	1000m/s ² (100 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Terminal		0.110" quick connect / solder terminal
Recommended Wire Size		0.5mm ² maximum / 1 line (20AWG)
Solder Heat Resistance		310 ~ 350°C / 3 seconds maximum
Terminal Pulling Strength		20N minimum
Recommended Screw Torque		0.5 to 0.8Nm
Degree of Protection		with rubber cover: IP65, without rubber cover: IP40 (IEC 60529),
Conditional Short-Circuit Current		50A (250V)
Recommended Short Circuit Protection		250V/10A fast blow fuse (IEC 60127-1)
Circuit Opening Force		60N minimum (button return monitor & button push monitor)
Actuating Force (Operating)		500N minimum
Weight		Approx. 26g (without cover), 30g (with cover)

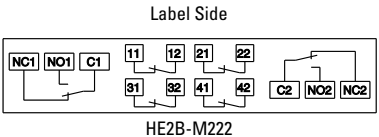
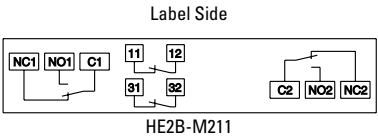
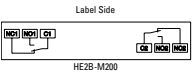
Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Thermal Current (Ith)				3A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current (Ie)	3 Position Switch	AC	Resistive Load (AC-12)	—	1A	0.5A
			Inductive Load (AC-15)	—	0.7A	0.5A
		DC	Resistive Load (DC-12)	1A	0.2A	—
			Inductive Load (DC-13)	0.7A	0.1A	—
	Push/return Monitor Switch (NC Contacts)	AC	Resistive Load (AC-12)	—	2.5A	1.5A
			Inductive Load (AC-15)	—	1.5A	0.75A
		DC	Resistive Load (DC-12)	2.5A	1.1A	0.55A
			Inductive Load (DC-13)	2.3A	0.55A	0.27A
Contact Configuration		3 Position Switch		2 contacts (DPDT)		
		Return Monitor Switch		0 ~ 2 contacts (NC)		
		Push Monitor Switch		0 ~ 2 contacts (NC)		

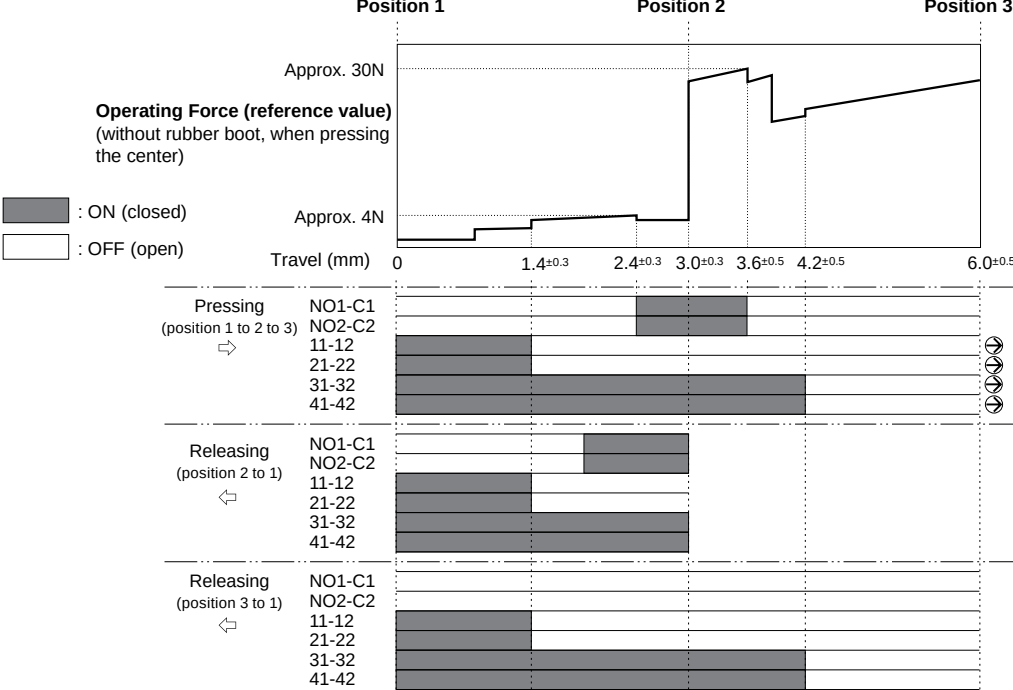


Minimum applicable load (reference) = AC/DC3V • 5mA (for reference only)

Circuit Diagrams
Terminal Circuit Diagrams (bottom view)

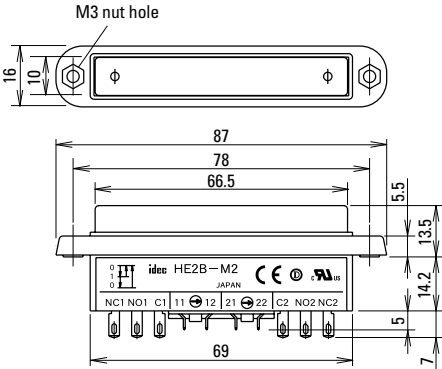


Operating Characteristics
Operating Characteristics (without rubber cover/center of button being pushed)

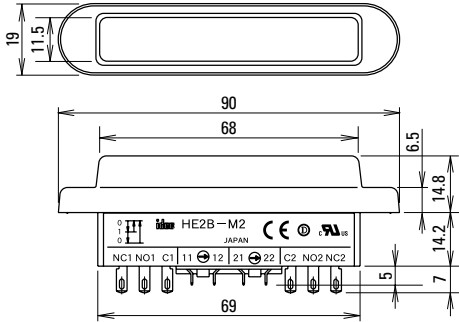


Using rubber boot will change the operating force depending on the operating temperature.

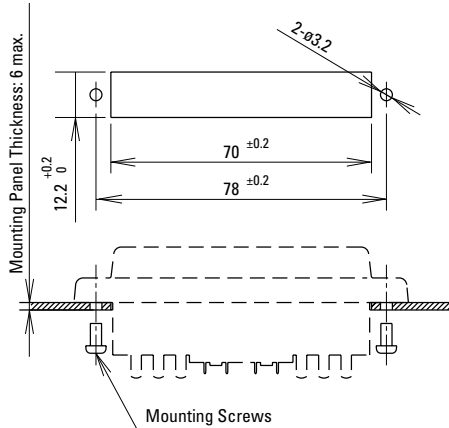
Dimensions (mm)
Without Rubber Cover



With Rubber Cover



Mounting Hole Layout



HE3B ø16mm Redundant Contact Switch

Key features:

- 3-position functionality (OFF – ON – OFF) as required for manual robotic control
- Provides a high level of safety based on human behavioral studies that determine personnel may squeeze OR let go when presented with a panic situation
- Contacts will not re-close when released from Off→On (3→1) (per IEC60204-1; 9.2.5.8)
- Multiple contacts for enhanced reliability
- Snap acting contacts from position 1 to 2
- Available with or without rubber cover



Part Numbers

Style	Part Numbers	
	Without Rubber Cover	HE3B-M2
	Yellow	HE3B-M2PY
	Black	HE3B-M2PB
	Gray	HE3B-M2PN1

Accessories

Replacement Rubber Cover

Appearance	Color	Part Number	Material
	Yellow	HE9Z-D3Y	Silicon Rubber
	Black	HE9Z-D3B	
	Gray	HE9Z-D3N1	NBR/PVC polyblend

Lock Nut Tool

Appearance	Part Number	Material
	MT-001	Metal

Specifications

Conforming to Standards	UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized) IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Application Standards	ISO 12100-1, -2, EN 12100-1, 2, IEC 60204-1 / EN 60204-1 ISO 11161 / prEN 11161, ISO 10218 / EN 775 ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	–25 to +60°C (no freezing)
Operating Humidity	45 to 85% RH maximum (no condensation)
Storage Temperature	–40 to +80°C (no freezing)
Pollution Degree	2 (inside panel, terminal side) 3 (outside panel, operator side)
Contact Resistance	50mΩ maximum
Insulation Resistance	Between live & dead metal parts: 100MΩ maximum
	Between positive & negative live parts: 100MΩ minimum
Impulse Withstand Voltage	1.5kV
Operating Frequency	1200 operations/hour
Mechanical Life	Position 1→2→1: 1,000,000 operations minimum
	Position 1→2→3→1: 100,000 operations minimum

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Specifications con't

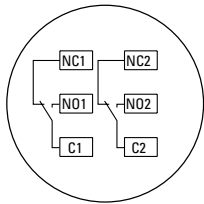
Electrical Life		100,000 operations minimum at rated load
Shock Resistance	Operating Extremes	150m/s ² (15 G)
	Damage Limits	500m/s ² (50 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, applitude 0.5mm minimum
	Damage Limits	16.7Hz, applitude 1.5mm minimum
Terminal		0.110" quick connect / solder terminal
Recommended Wire Size		0.5mm ² maximum / 1 line (20AWG)
Solder Heat Resistance		310 ~ 350°C / 3 seconds maximum
Terminal Pulling Strength		20N minimum
Recommended Screw Torque		0.68 to 0.88Nm
Degree of Protection		with rubber cover: IP65, without rubber cover: IP40 (IEC 60529)
Conditional Short-Circuit Current		50A (125V)
Recommended Short Circuit Protection		125V/10A fast blow fuse (IEC 60127-1)
Circuit Opening Force		500N minimum
Weight		without rubber cover - Approx. 14g with rubber cover - Approx. 18g

Contact Ratings

Rated Insulation Voltage (Ui)			125V	
Thermal Current (Ith)			3A	
Rated Operating Voltage (Ue)			30V	125V
Rated Operating Current (Ie)	AC	Resistive Load (AC-12)	—	1A
		Inductive Load (AC-15)	—	0.7A
	DC	Resistive Load (DC-12)	1A	0.2A
		Inductive Load (DC-13)	0.7A	0.1A
Contact Configuration			2 contacts (DPDT)	
Minimum Applicable Load			AC/DC5V 1mA reference	

Circuit Diagrams

Terminal Circuit Diagrams (bottom view)

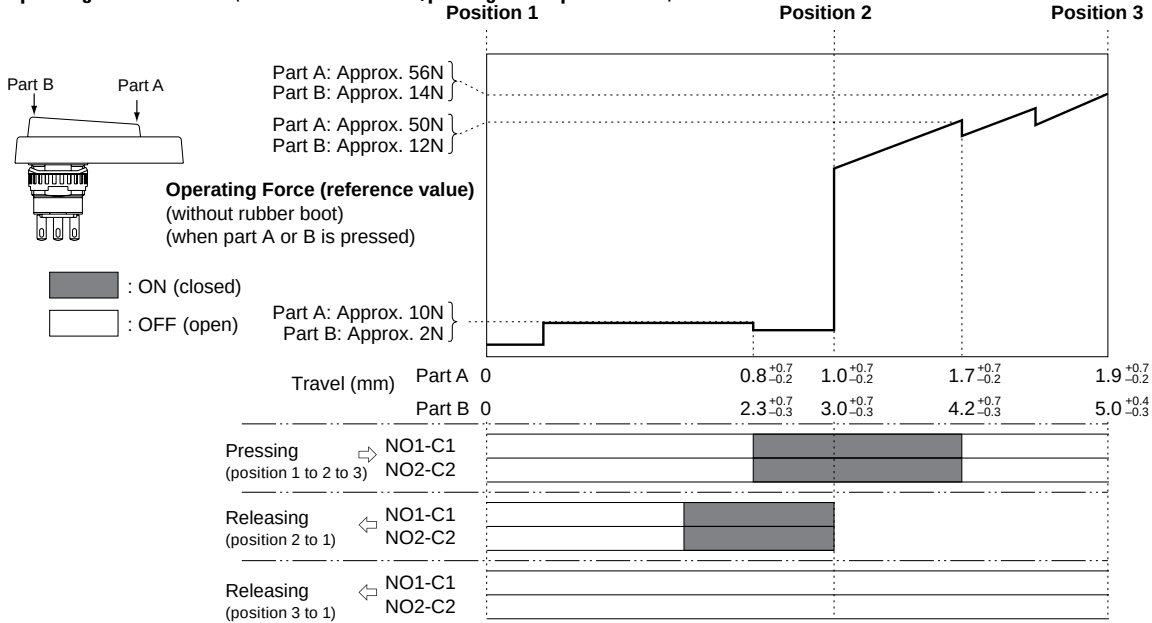


-
1. 3 position switch: 2 contacts, terminal no. = between NO1-C1, between NO2-C2

2. Use between NO-C for OFF→On→ OFF 3 position switch (NC is not used).

Operating Characteristics

Operating Characteristics (without rubber cover/pushing button part A and B)

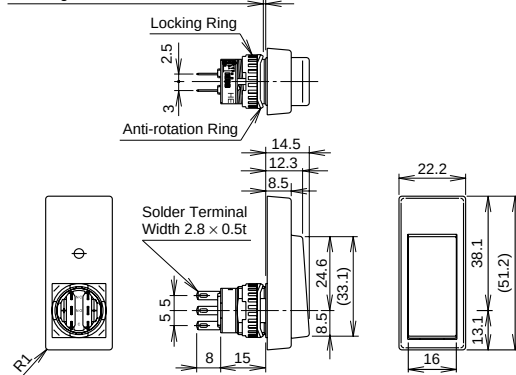


Using rubber boot will change the operating force depending on the operating temperature.

Dimensions (mm)

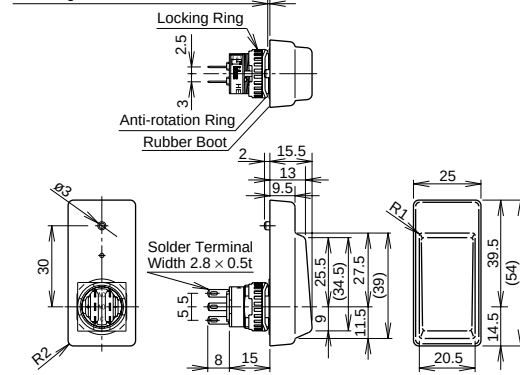
Without Rubber Cover

Mounting Panel Thickness: 0.5 to 4



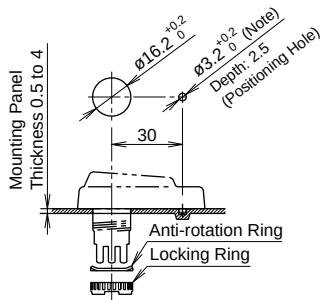
With Rubber Cover

Mounting Panel Thickness: 0.5 to 4



All dimensions in mm.

Mounting Hole Layout



1. Recommended Lock Nut Torque: 0.68 to 0.88Nm.
2. Use a lock nut tool to screw on the lock nut (see page 397).
3. To retain the switches waterproof performance, do not penetrate the rubber cover.
4. Remove the rubber cover projection if you do not want a positioning hole. (Do not penetrate the rubber cover).

HE5B ø16mm Redundant Contact Pushbutton Enabling Switch

Key features:

- Ergonomically-designed OFF-ON-OFF 3-position operation
- Easy recognition of position 1 → 2 transition, made possible by snap action switch
- Sufficient load difference is provided for shifting from position 2 → 3
- Light force needed to maintain position 2, so that operators can easily use the enabling switch
- The switch does not turn ON when being released from position 3 (OFF when pressed) to position 1 (OFF when released) (IEC60204-1, 9.2.5.8)
- Two contacts are provided for safety
- IP65 (using the waterproof rubber cover)
- Mounts in a 16mm (5/8") round hole



Part Numbers

Style	Color	Part Number
	Yellow	HE5B-M2PY
	Black	HE5B-M2PB
	Gray	HE5B-M2PN1

 NBR/PVC cover comes in gray only.

Accessories
Replacement Rubber Cover

Appearance	Part Number	Material
	Silicon Rubber	Yellow HE9Z-D5Y
		Black HE9Z-D5B
	NBR/PVC Polyblend	Gray HE9Z-D5N1

Lock Nut Tool

Appearance	Part Number	Material
	MT-001	Metal

Grip Housing

Appearance	Part Number
	HE9Z-GSH51

See page 417 for more information.

Specifications

Conforming to Standards	UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized) IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Application Standards	ISO 12100-1, -2, EN 12100-1, 2 / EN292, IEC 60204-1 / EN 60204-1, ISO 11161 / prEN 11161, ISO 10218 / EN 775, ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	Silicon rubber boot: -25 to 60°C (no freezing) NBR/PVC Polyblend rubber boot: -10 to 60°C (no freezing)
Relative Humidity	45 to 85% RH (no condensation)
Storage Temperature	-40 to +80°C (no freezing)
Operating Environment	Degree of pollution: 2 (panel inside/terminal side) Degree of pollution: 3 (panel outside/operator side)
Contact Resistance	50 mΩ maximum (initial value)
Insulation Resistance (DC megger)	Between live and dead metal parts: 100 MΩ minimum Between terminals of different pole: 100 MΩ minimum
Impulse Withstand Voltage	1.5 kV

Specifications con't

Operating Frequency	1200 operations per hour
Mechanical Life	Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life	100,000 operations minimum
Shock Resistance	Operating extremes: 150 m/s ² (15 G) Damage limits: 500 m/s ² (50 G)
Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5 mm minimum Damage limits: 5 to 55 Hz, amplitude 0.5 mm minimum
Terminal Style	Solder Terminal
Recommended Wire Size	0.5 mm ² maximum per line (20AWG)
Solder Heat Resistance	310 ~ 350°C, 3 seconds maximum
Terminal Pulling Strength	20 N minimum
Recommended Tightening Torque of Locking Ring	0.29 to 0.49 N·m
Degree of Protection	IP65
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast acting type fuse for short circuit protection.)
Operator Strength	250N minimum (when pressing the entire surface of the operator)
Weight (approx.)	9 g

Current Ratings

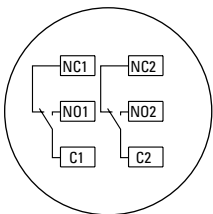
Rated Insulation Voltage (Ui)			125V	
Thermal Current (Ith)			3A	
Rated Operating Voltage (Ue)			30V	125V
Rated Operating Current (Ie)	AC	Resistive Load (AC-12)	—	0.5A
		Inductive Load (AC-15)	—	0.3A
	DC	Resistive Load (DC-12)	1A	—
		Inductive Load (DC-13)	0.7A	—
Contact Configuration			2 contacts (DPDT)	



Minimum applicable load (reference): 5V AC/DC, 5mA.

Circuit Diagrams

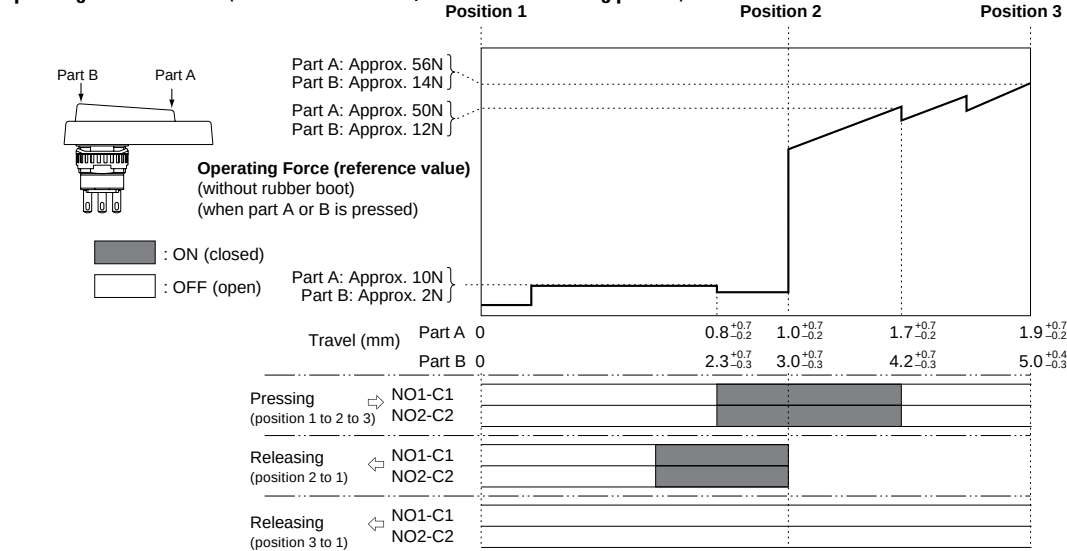
Terminal Arrangement (Bottom View)



1. 3 position switch: 2 contacts, terminal no. = between NO1-C1, between NO2-C2
2. Use between NO-C for OFF→On→OFF 3 position switch (NC is not used).

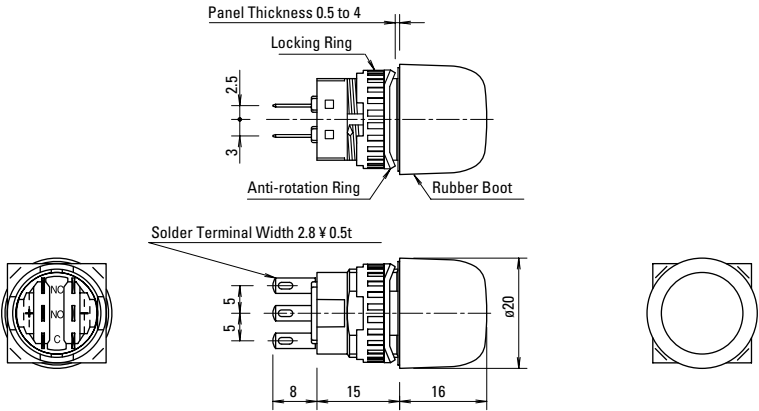
Operating Characteristics

Operating Characteristics (without rubber cover/center of button being pushed)

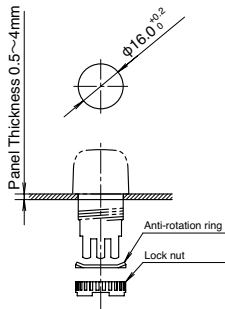


Operating load depends on ambient temperature.

Dimensions (mm)
With Rubber Cover



Mounting Hole Layout



1. Recommended tightening torque for Locking Ring: 0.29 to 0.49 N·mm.
2. Use a lock nut tool to screw on the lock nut (see page 400).

HE6B Enabling Switch

Key features:

- Ergonomically-designed OFF-ON-OFF operation.
- The switch does not turn ON while returning from position 3 (OFF) to position 1 (OFF)
- IEC 60204-1 (2005), 10.9
- IEC 60947-5-8 (2006), 7.1.9*
- Some teach pendants are equipped with two 3-position enabling switches, and when one switch is pressed to position 3 (OFF), the other switch must not enable machine operation even when pressed to position 2. Machine operation can resume after both switches are released. The monitoring switches monitor the OFF status of the 3-position enabling switch, whether the button is returned to position 1 or the button is pressed to position 3 (monitor switches have direct opening action mechanism.)
- Two contacts are provided in a 3-position enabling switch so that even if one contact fails, the other contact will still disable machine operation.
- The waterproof rubber boot provides IP65 protection.



* IEC 60947-5-8 Control circuit devices and switching elements – Three-position enabling switches



Part Numbers

Model	Contact Configuration/No. of Contacts			Color	Part Number
	3-position Switch	Button Return Monitor Switch	Button Depress Monitor Switch		
	2	0	0	Yellow	HE6B-M200Y
				Black	HE6B-M200B
	2	1	1	Yellow	HE6B-M211Y
				Black	HE6B-M211B

Accessories

Replacement Rubber Cover

Appearance	Color	Part Number	Material
	Yellow	HE9Z-D6Y	Silicon Rubber
	Black	HE9Z-D6B	

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Specifications

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Conforming to Standards	IEC 60947-5-1/EN60947-5-1 IEC 60947-5-8/EN60947-5-8 (TÜV approved) GS-ET-22 (TÜV approved) UL508 (UL recognized) CSA C22.2 No.14 (c-UL recognized)
Application Standards for Use	ISO 12100/EN ISO 12100, IEC 60204-1/EN 60204-1, ISO 11161/EN ISO 11161, ISO 10218-1/EN ISO 10218-1, ANSI/RIA/ISO 10218-1, ANSI/RIA/R15.06, ANSI B 11.19 ISO 13849-1/EN ISO 13849-1
Operating Temperature	–25 to +60°C (no freezing)
Relative Humidity	45 to 85% RH (no condensation)
Storage Temperature	–40 to +80°C (no freezing)
Pollution Degree	2 (inside panel, terminal side) 3 (outside panel, operator side)
Contact Resistance	50mΩ maximum (initial value)
Insulation Resistance	Between live and dead metal parts: 100MΩ minimum (500V DC megger) Between terminals of different poles: 10 MΩ minimum (500V DC megger)
Impulse Withstand Voltage	1.5kV (3 position switch) 2.5kV (monitor switch)
Operating Frequency	1200 operations per hour
Mechanical Life	Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life	100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA)
Shock Resistance	Operating extremes: 150m/s ² (15G) Damage limits: 500m/s ² (50G)
Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5mm Damage limits: 16.7Hz, amplitude 1.5mm
Terminal Style	Solder terminal
Applicable Wire Size	1 cable, 0.5mm ² maximum (20AWG wire)
Solder Terminal Heat Resistance	310 to 350°C, 3 seconds maximum
Terminal Tensile Strength	20N minimum
Locking Ring Recommended Tightening Torque	0.5 to 0.8N·m
Degree of Protection	IP65 (IEC 60529)
Conditional Short-circuit Current	50A (125V): 3-position switch (Use 120V/10A fast acting type fuse for short circuit protection.) (IEC 60127-1) 50A (250V): monitor switch (Use 250V/10A fast acting type fuse for short circuit protection.) (IEC 60127-1)
Direct Opening Force	40N minimum (button release monitor and button depress monitor switches)
Direct Opening Stroke (when pressing the entire button surface)	0.9mm minimum (button return monitor switch) 4.0mm minimum (button depress monitor switch)
Operator Strength	250N minimum (when pressing the entire button surface)
Weight (approx.)	17g

Current Ratings

Rated Insulation Voltage (Ui)				125V (monitor switch: 250V)		
Rated Thermal Current (Ith)				3A		
Rated Voltage (Ue)				30V	125V	250V
Rated Current (Ie)	3-position switch	AC	Resistive Load (AC-12)	—	0.5A	—
			Inductive Load (AC-15)	—	0.3A	—
		DC	Resistive Load (DC-12)	1A	—	—
			Inductive Load (DC-13)	0.7A	—	—
	Button return monitor switch Button depress monitor switch (NC)	AC	Resistive Load (AC-12)	—	2.5A	1.5A
			Inductive Load (AC-15)	—	1.5A	0.75A
		DC	Resistive Load (DC-12)	2.5A	1.1A	0.55A
			Inductive Load (DC-13)	2.3A	0.55A	0.27A
Contact Configuration		3-position switch		2 contacts		
		Button return monitor switch		0 or 1 contact		
		Button depress monitor switch		0 or 1 contact		

TÜV ratings:
 3 position switch:
 AC-12 125V/0.5A
 DC-12 30V/1A
 DC-13 30V/0.7A
 Monitor Switch:
 AC-15 250V/0.5A
 DC-13 125V/0.22A
 DC-13 30V/1A

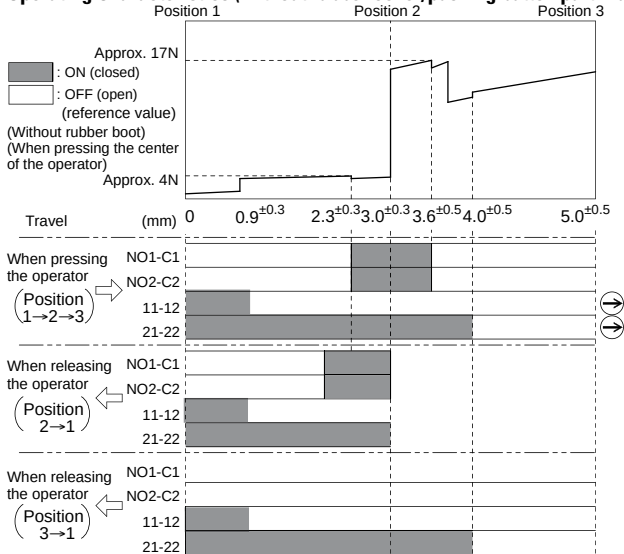
UL ratings:
 3-position switch:
 125V AC/0.5A (Resistive)
 30V DC/1A (Resistive)
 Monitor switch:
 250V AC/0.5A (General use)
 30V DC/1A (General use)



Minimum applicable load (reference value): 3V AC/DC, 5mA (Applicable operation area depends on the operating conditions and load.)

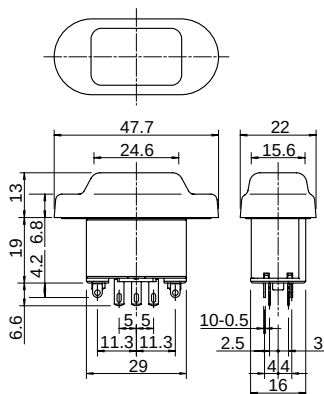
Operating Characteristics

Operating Characteristics (without rubber cover/pushing button part A and B)

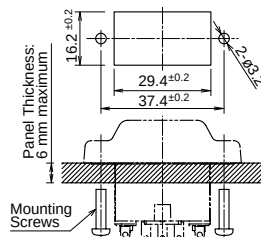


Notes: When a rubber boot is used, the operating force depends on the operating temperature.

Dimensions (mm)

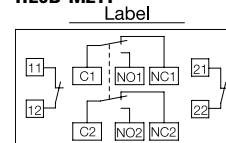


Mounting Hole Layout



Mounting screws: M3 screw × 2
 (not attached and must be supplied by the user)
 Mounting screw length: 5 to 6 mm (panel thickness + gasket)

Terminal Arrangement (bottom view) HE6B-M211



3-position switch 2 contacts¹
 Button return monitor switch: 1 contact, terminals 11-12
 Button depress monitor switch: 1 contact, terminals 21-22
 There are no terminals 11-22 and 21-22 for HE6B-M200 type.
¹Use NO and C terminals for OFF → ON → OFF 3-position switch
 (NC terminal is not used.)

HE1G Basic Grip Enabling Switch

Key features:

- 3 position functionality (Off – On – Off) as required for manual robotic control
- Ideally suited for use as an enabling (aka “deadman”) switch for robotic cells
- Provides a high level of safety based on human behavioral studies that determine personnel may squeeze OR let go when presented with a panic situation
- Contacts will not re-close when released from Off → On (3 → 1) (per IEC60204-1; 9.2.5.8)
- Optional E-Stop switch built in
- Connection for conduit and cable strain relief built in
- IP66 waterproof sealing
- Meets ANSI RIA 15.06 robotics standards
- Optional momentary pushbutton or E-Stop built in



Part Numbers

Contact Configuration			Rubber Boot	Part No.
3-position Switch	Monitor Switch	Pushbutton		
2 contacts	With (1NC)	—	Silicon Rubber / yellow	HE1G-21SM
			NBR/PVC Polyblend / gray	HE1G-21SM-1N
		Momentary Pushbutton (1NO) (1NO: AB6M-M1PB)	Silicon Rubber / yellow	HE1G-21SMB
			NBR/PVC Polyblend / gray	HE1G-21SMB-1N
	Without	Emergency Stop Switch (2NC) (2NC: HA1E-V2S2R)	Silicon Rubber / yellow	HE1G-20ME
			NBR/PVC Polyblend / gray	HE1G-20ME-1N
		Momentary Pushbutton (2NO) (2NO: AB6M-M2PB)	Silicon Rubber / yellow	HE1G-20MB
			NBR/PVC Polyblend / gray	HE1G-20MB-1N

Accessories

Replacement Rubber Cover

Appearance	Part Number	Material	Color
	HE9Z-GBK1	Silicon Rubber	Yellow
	HE9Z-GBK1-1N	NBR/PVC	Gray

Mounting Plate (secures grip switch)

Appearance	Part Number	Material
	HE9Z-GH1	Metal

Specifications

Conforming to Standards	UL508 (UL listed), CSA C22.2, No. 14 (c-UL listed), IEC/EN 60947-5-1 (TÜV/BG approval), GS-ET-22 (TÜV/BG approval)
Applicable Standards	ISO 12100-1, -2, EN12100-1, -2, IEC 60204-1 / EN 60204-1, ISO11161 / prEN11161, ISO 10218 / EN 775, ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	–25 to +60°C (no freezing)
Operating Humidity	45 to 85% RH maximum (no condensation)
Storage Temperature	–40 to +80°C (no freezing)
Pollution Degree	3
Contact Resistance	100mΩ maximum
Insulation Resistance	Between live & dead metal parts: 100MΩ maximum Between positive & negative live parts: 100MΩ minimum

Specifications con't

Impulse Withstand Voltage		2.5kV
Operating Frequency		1200 operations/hour
Mechanical Life		Position 1→2→1: 1,000,000 operations minimum
		Position 1→2→3→1: 100,000 operations minimum
Electrical Life		100,000 minimum at rated load
Shock Resistance	Operating Extremes	150m/s ² (15 G)
	Damage Limits	1000m/s ² (100 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Recommend Wire Size		0.14 to 1.5mm ² (24AWG - 16AWG)
Recommend Cable Size		ø7 to 13mm
Conduit Size		M20
Terminal Pulling Strength		20N minimum
Terminal Screw Torque		0.5 to 0.6Nm
Degree of Protection		HE1G-21SM: IP66, HE1G-20MB: IP65
		HE1G-20ME: IP65, HE1G-21SMB: IP65
Conditional Short Circuit Current		50A (250V)
Recommended Short Circuit Protection		250V/10A fast blow fuse (IEC 60127-1)
Weight (approx.)		HE1G-21SM: 210g
		HE1G-20ME: 250g
		HE1G-20MB/HE1G-21SMB: 220g

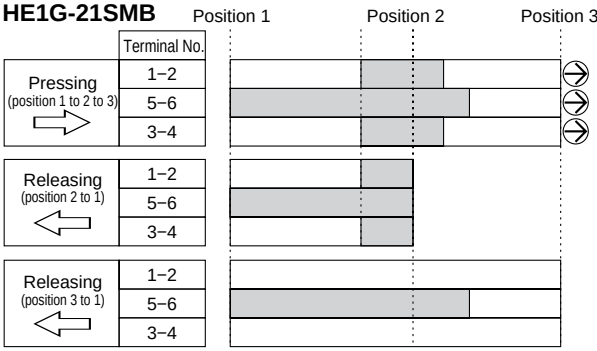
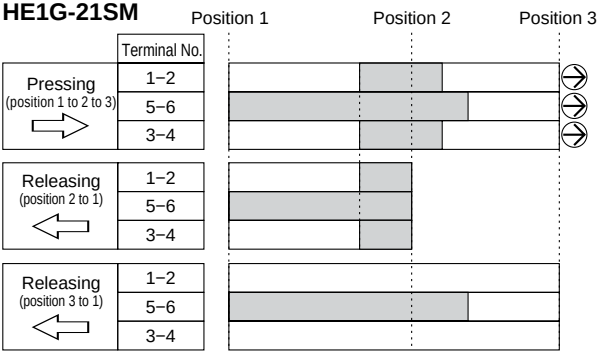
Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Thermal Current (Ith)				3A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current (Ie)	3 Position Switch (Terminal No.1-2, 3-4)	AC	Resistive Load (AC-12)	—	3A	1.5A
			Inductive Load (AC-15)	—	1.5A	0.75A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Monitor Switch (Terminal No. 5-6 of HE1G-21SM)	AC	Resistive Load (AC-12)	—	2A	1A
			Inductive Load (AC-15)	—	1A	0.5A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Emergency Stop Pushbutton (Terminal No. 5-6, 7-8 of HE1G-20ME)	AC	Resistive Load (AC-12)	—	—	—
			Inductive Load (AC-15)	—	—	0.5A
		DC	Resistive Load (DC-12)	—	—	—
			Inductive Load (DC-13)	—	—	0.1A
Contact Configuration		3 Position Switch		2 Contacts		
		Monitor Switch		0 or 1 Contact		
		Emergency Stop Pushbutton		0 or 2 Contacts		
		Momentary Pushbutton		0 to 2 contacts		



The minimum load (reference) = AC/DC3V • 5mA (for reference only).

Operating Characteristics
Contact Movement



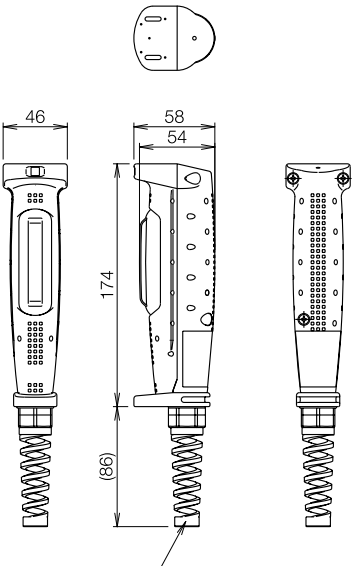
Momentary Pushbutton: 1NO contact (terminal no. 7-8)

■ : contact ON (closed) □ : contact OFF (open)

- Notes:
1. 3-position switches operate with direct opening action when shifting from position 2 to position 3.
 2. For the output of the enabling device, use terminals 1-2 and 3-4.
 3. The above operation characteristics show when the center of the button is pressed. Pressing the edge of a button turns on one contact earlier than the other contact, causing a delay in operation.

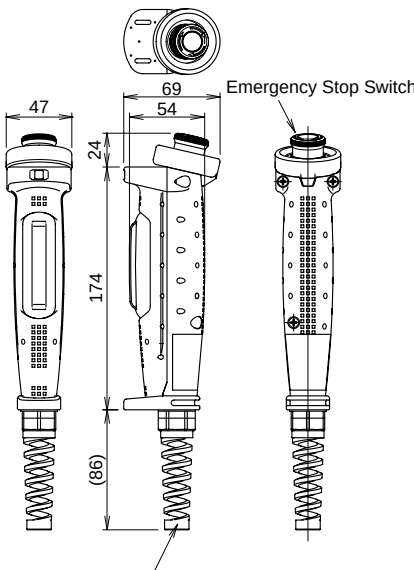
Dimensions (mm)

HE1G-21SM



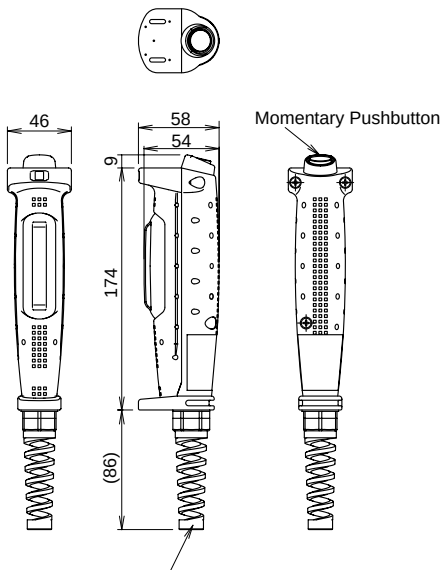
Connector (supplied with grip switch)
Part No. SKINTOP BS-M20x1.5 (LAPP)

HE1G-20ME



Connector (supplied with grip switch)
Part No. SKINTOP BS-M20x1.5 (LAPP)

HE1G-20MB/21SMB

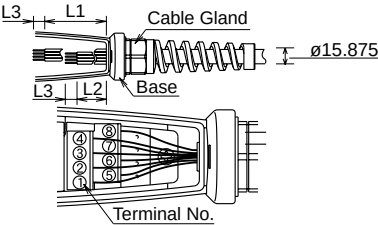


Connector (supplied with grip switch)
Part No. SKINTOP BS-M20x1.5 (LAPP)

Wiring Precautions
HE1G

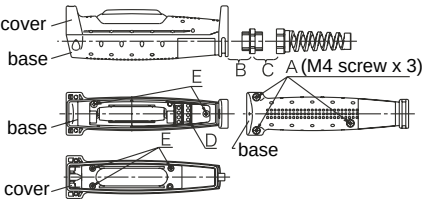
- Wire Stripping Information

Wire Length	Terminal Number 1-4	Terminal Number 5-8
L1, L2 (mm)	L1=40mm	L2=27mm
L3 (mm)	L3=6mm	



- Applicable Wire Size: 0.14 to 1.5mm² (24 - 16AWG, one wire per terminal)

- Recommended Torque

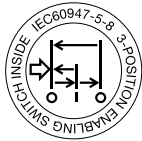


	See Drawing Above	Recommended Torque
Rubber Boot & Base	A	1.2±0.1Nm
Connector & Grip Switch	B	4.0±0.3Nm
Connector	C	4.0±0.3Nm
Terminal Screw	D	0.5±0.6Nm
Do Not Remove	E	

HE1G-L Light Force Grip Enabling Switch

Key features:

- 3 position functionality (Off – On – Off) as required for manual robotic control
- Ideally suited for use as an enabling (aka “deadman”) switch for robotic cells
- Provides a high level of safety based on human behavioral studies that determine personnel may squeeze OR let go when presented with a panic situation
- Contacts will not re-close when released from Off → On (3 → 1) (per IEC60204-1; 9.2.5.8)
- Optional E-Stop switch built in
- Connection for conduit and cable strain relief built in
- IP66 waterproof sealing
- Meets ANSI RIA 15.06 robotics standards
- Optional momentary pushbutton
- Distinctive tactile feedback when shifting to position 2 (enabling position)
- Lighter operating force to on position



Variation

In addition to a monitoring switch, the HE1G grip switch is also available with an emergency stop switch or a momentary pushbutton. Screw terminal and wire-saving internal connector models can be selected.

Part Numbers

Contact Configuration			Rubber Boot	Part Numbers	
3-position Switch	Monitor Switch	Additional Pushbutton Switch		Screw Terminals	Internal Connector
2 contacts	With (1NC)	Without	Yellow ¹	HE1G-L21SM	HE1G-L21SMC
			Gray ²	HE1G-L21SM-1N	HE1G-L21SMC-1N
		Momentary Pushbutton Switch (1NO: AB6M-M1PB)	Yellow ¹	HE1G-L21SMB	HE1G-L21SMCB
			Gray ²	HE1G-L21SMB-1N	HE1G-L21SMCB-1N
	Without	Emergency Stop Switch (2NC: HA1E-V2S2R)	Yellow ¹	HE1G-L20ME	HE1G-L20MCE
			Gray ²	HE1G-L20ME-1N	HE1G-L20MCE-1N
		Momentary Pushbutton Switch (2NO: AB6M-M2PB)	Yellow ¹	HE1G-L20MB	HE1G-L20MCB
			Gray ²	HE1G-L20MB-1N	HE1G-L20MCB-1N

 1: Yellow silicon rubber: Can be used in general factories. Remains flexible at cold temperatures. Suitable to applications in a wide operating temperature range.
 2: Gray NBR/PVC polyblend: Oil-proof. Suitable for environments subjected to machine oil and painting robot where silicon rubber cannot be used.

Specifications

Applicable Standards	UL508 (UL listed, screw terminal only) CSA C22.2, No. 14 (c-UL listed, screw terminal only) IEC/EN 60947-5-1 (TÜV/BG approval) GS-ET-22 (TÜV/BG approval)
Applicable Standards for Use	ISO 12100-1, -2, IEC 60204-1/EN 60204-1, ISO11161 / prEN11161, ISO 10218 / EN 775, ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	Silicon rubber boot: -25 to 60°C (no freezing) NBR/PVC Polyblend rubber boot: -10 to 60°C (no freezing)
Relative Humidity	45 to 85% (no condensation)
Storage Temperature	-40 to +80°C (no freezing)
Pollution Degree	3
Contact Resistance	100 mΩ maximum (initial value)
Insulation Resistance	Between live and dead metal parts: 100 MΩ minimum (500V DC megger) Between terminals of different pole: 100 MΩ minimum (500V DC megger)
Impulse Withstand Voltage	Screw terminal: 2.5 kV (momentary pushbuttons: 1.5 kV) Internal connector: 1.5 kV
Electric Shock Protection Class	Class II (IEC 61140)
Operating Frequency	1,200 operations per hour
Mechanical Life	Position 1 → 2 → 1: 1,000,000 operations minimum Position 1 → 2 → 3 → 1: 100,000 operations minimum
Electrical Life	100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA)
Shock Resistance	Operating extremes: 150 m/s ² Damage limits: 1,000 m/s ²
Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5 mm minimum Damage limits: 16.7 Hz, amplitude 1.5 mm minimum
Applicable Wire Size	Screw terminal: 0.14 to 1.5 mm ² (AWG16 to 24) Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30)
Applicable Cable	Outside diameter ø7 to 13 mm
Conduit Port Size	M20 (cable gland is supplied with the grip style enabling switch)
Terminal Tensile Strength	20N minimum
Terminal Screw Tightening Torque	0.5 to 0.6 N·m
Degree of Protection	HE1G-L21SM: IP66 (IEC 60529) HE1G-L20ME: IP65 (IEC 60529) HE1G-L20MB: IP65 (IEC 60529) HE1G-L21SMB: IP65 (IEC 60529)
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast-blow fuse for short circuit protection.)
Direct Opening Force	70N minimum (monitor switch)
Operator Strength	500N minimum (when pressing the entire button surface)
Weight (approx.)	HE1G-L21SMC: 190g HE1G-L21SM/L21SMCB/L20MCB: 200g HE1G-L21SMB/L20MB: 210g HE1G-L20MCE: 230g HE1G-L20ME: 240g



See grip switch catalog for complete list of specifications.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

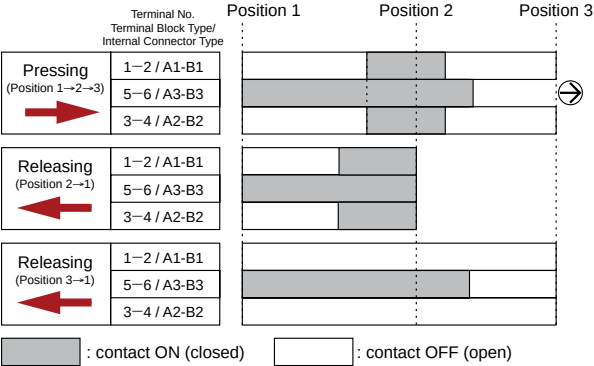
AS-Interface Safety at Work

Contact Ratings

Rated Insulation Voltage (Ui)					250V (momentary pushbutton: 125V)		
Rated Thermal Current (Ith)					2.5A (Note)		
Rated Voltage (Ue)					30V	125V	250V
Rated Current (Ie)	Grip Style Enabling Switch	3-position Switch (Terminal No.1-2/A1-B1,3-4/A2-B2)	AC	Resistive Load (AC-12)	—	1A	0.5A
				Inductive Load (AC-15)	—	0.7A	0.5A
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—
		Monitor Switch (HE1G-L21SM/ HE1G-L21SMB, Terminal No.5-6/A3-B3)	AC	Resistive Load (AC-12)	—	2A	1A
				Inductive Load (AC-15)	—	1A	0.5A
			DC	Resistive Load (DC-12)	2.5A	1.1A	0.55A
				Inductive Load (DC-13)	2.3A	0.55A	0.27A
	Pushbutton	Emergency Stop Switch (HE1G-L20M, Terminal No. 5-6/A3-B3, 7-8/A4-B4)	AC	Resistive Load (AC-12)	—	—	—
				Inductive Load (AC-15)	—	—	0.5A
			DC	Resistive Load (DC-12)	—	—	—
				Inductive Load (DC-13)	—	—	0.1A
		Momentary Pushbutton (HE1G-L20M, Terminal No.5-6/A3-B3,7-8/A4-B4) (HE1G-L21SM, Terminal No.7-8/A4-B4)	AC	Resistive Load (AC-12)	—	0.5A	—
				Inductive Load (AC-15)	—	0.3A	—
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—

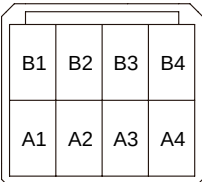
 Minimum applicable load (reference value): 3V AC/DC, 5 mA (Applicable range is subject to the operating conditions and load.)
Note: Operating temp. 40 to up to +50°C (not included): 2A (4 circuits) 50 to +60°C: 1.5A (3 or 4 circuits)

Operating Characteristics
HE1G-L21SM, HE1G-L21SMC,
HE1G-L21SM-1N, HE1G-L21SMC-1N



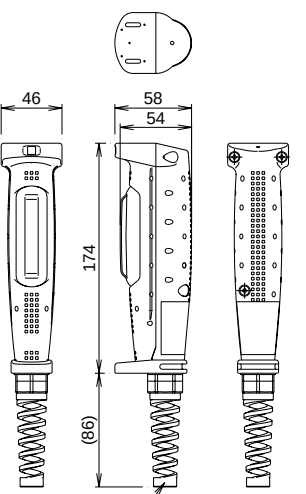
Terminals 1-2/A1-B1 and 3-4/A2-B2 are outputs of the 3-position enabling switch.
Terminals 5-6/A3-B3 are outputs of the monitor switch.
The above operation characteristics show when the center of the grip switch button is pressed. Because two contacts are designed to operate independently, pressing the edge of the button turns on one contact earlier than the other contact, causing a delay in operation. To avoid this, always press the center of the button.

Internal Connector Terminal No.



Connector
Tyco Electronics D-1200D series
Receptacle housing: 1-1827864-4
Receptacle contact
1827586-2: AWG28 to 30
(Hand tool: 1762952-1)
1827587-2: AWG22 to 28
(Hand tool: 1762846-1)
1827588-2: AWG22 to 28
(Hand tool: 1762950-1)
1827589-2: AWG18 to 22
(Hand tool: 1762625-1)

Dimensions (mm)
HE1G-L21SM, HE1G-L21SMC,
HE1G-L21SM-1N, HE1G-L21SMC-1N

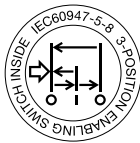


Cable Gland (supplied with grip switch)
Type No.: SKINTOP BS-M20 × 1.5 (LAPP)

HE2G Compact Grip Enabling Switch

Key features:

- New compact, light-weight grip switch provides a comfortable hold
- Compact design fits comfortably in the hand
- Light operating force ensures worry-free operation
- 3-position switch with distinctive tactile feedback
- Dual enabling contacts ensure a high level of safety



Part Numbers

Additional Control Units		Rubber Boot Color	Solder Terminal	Internal Connector
None		Yellow	HE2G-21SH	HE2G-21SC
		Gray	HE2G-21SH-1N	HE2G-21SC-1N
Estop		Yellow	HE2G-21SHE	—
Estop and Green Pilot Light			HE2G-21SHE-P-0	
Two Momentary Pushbuttons			HE2G-21SH-L-L	
E-Stop and Two Momentary Pushbuttons			HE2G-21SHE-L-L	HE2G-21SCE-L-L
E-Stop, Momentary Pushbutton and Key Switch			HE2G-21SHE-L-K	HE2G-21SCE-L-K



1. Additional control units installed on the HE2G are as follows:
Emergency Stop Switch: XA1E-BV3U02R
Momentary Pushbutton: AB6M-M2PLW
Key Selector Switch: AS6M-2KT2PA Pilot Light: UP9P-2498G

2. Silicon rubber: Can be used in general factories. Remains flexible in cold temperatures. Suitable in applications with a wide operating temperature range.
3. NBR/PVC polyblend: Oil-proof. Suitable for environments subjected to machine oil and painting robots where silicon rubber cannot be used.

Specifications

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Applicable Standards	UL508 (UL recognition) CSA C22.2, No. 14 (c-UL recognition) IEC/EN 60947-5-1 (TÜV) GS-ET-22 (TÜV approval)	
Applicable Standards for Use	ISO 12100-1, -2 IEC 60204-1/EN 60204-1 ISO11161 / prEN11161 ISO 10218 / EN 775 ANSI/RIA R15.06 ANSI B11.19	
Operating Temperature	Silicon rubber boot:	−25 to 60°C (no freezing)
	NBR/PVC Polyblend rubber boot:	−10 to 60°C (no freezing)
Relative Humidity	45 to 85% (no condensation)	
Storage Temperature	−40 to +80°C (no freezing)	
Pollution Degree	3	
Contact Resistance	50 mΩ maximum (initial value)	
Insulation Resistance	Between live and dead metal parts: 100 MΩ minimum (500V DC megger) Between terminals of different pole: 100 MΩ minimum (500V DC megger)	
Impulse Withstand Voltage	(Solder terminal) Grip style enabling switch/emergency stop switch: 2.5 kV Momentary pushbutton/key selector switch: 1.5 kV Pilot light: 500V AC, 1 minute (between live and dead parts) (Internal connector) Grip style enabling switch/emergency stop switch/momentary pushbutton/key selector switch: 1.5 kV	
Electric Shock Protection Class	Class II (IEC 61140) (With pilot light: class III)	
Operating Frequency	1,200 operations per hour	
Mechanical Life	Position 1 → 2 → 1:	1,000,000 operations minimum
	Position 1 → 2 → 3 → 1:	100,000 operations minimum
Electrical Life	100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA)	
Shock Resistance	Operating extremes:	150 m/s ² (15G)
	Damage limits:	1,000 m/s ² (100G)
Vibration Resistance	Operating extremes:	5 to 55 Hz, amplitude 0.5 mm minimum
	Damage limits:	16.7 Hz, amplitude 1.5 mm minimum
Applicable Wire	Solder terminal: 0.5 mm ² maximum (20 AWG) Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30)	
Applicable Wire Size	Solder terminal: 0.5 mm ² (20 AWG) Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30) (AWG22 between switch and connector)	
Applicable Cable	Outside diameter: ø4.5 to 10 mm	
Conduit Port Size	M16 (cable gland is supplied)	
Terminal Tensile Strength	20N minimum	
Degree of Protection	With control unit: IP67/IP66 (IEC 60529) Without control unit: IP65 (IEC 60529)	
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast-blow fuse for short circuit protection.)	
Direct Opening Force	60N minimum (monitor switch)	
Operator Strength	500N minimum (when pressing the entire button surface)	
Weight (approx.)	HE2G-21SH: 140g HE2G-21SH-P-0/-21SC: 145g HE2G-21SHE/-21SC-P-0: 150g HE2G-21SH-L-L/-21SHE-P-0/-21SCE: 155g HE2G-21SH-L-K/-21SCE-P-0: 160g HE2G-21SHE-L-L/-21SC-L-L: 165g HE2G-21SHE-L-K/-21SC-L-K: 170g HE2G-21SCE-L-L: 175g HE2G-21SCE-L-K: 180g	

Contact Ratings

Rated Insulation Voltage (Ui)					250V (momentary pushbutton and key selector: 125V) / 30V (with pilot light)		
Rated Thermal Current (Ith)					3A (emergency stop switch: 5A)		
Rated Voltage (Ue)					30V	125V	250V
Rated Current	Grip Style Enabling Switch	3-position switch (Terminal No. N01-C1/A1-B1, N02-C2/A3-B3)	AC	Resistive Load (AC-12)	—	1A	0.5A
				Inductive Load (AC-15)	—	0.7A	0.5A
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—
		Monitor Switch (NC contact) (Terminal No. 31-32/A2-B2)	AC	Resistive Load (AC-12)	—	2.5A	1.5A
				Inductive Load (AC-15)	—	1.5A	0.75A
			DC	Resistive Load (DC-12)	2.5A	1.1A	0.55A
				Inductive Load (DC-13)	2.3A	0.55A	0.27A
	Control Unit	Emergency Stop Switch XA1E-BV3U02R (Terminal No.1-2/A1-B1, 1-2/A2-B2)	AC	Resistive Load (AC-12)	—	5A	3A
				Inductive Load (AC-15)	—	3A	1.5A
			DC	Resistive Load (DC-12)	2A	0.4A	0.2A
				Inductive Load (DC-13)	1A	0.22A	0.1A
		Momentary Pushbutton Key Selector Switch AB6M-M2PLW, AS6M-2KT2PA (Terminal No.C1/B1, N01/B2, NC1/B3, C2/A1, N02/A2, NC2/A3)	AC	Resistive Load (AC-12)	—	0.5A	—
				Inductive Load (AC-15)	—	0.3A	—
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—
		UP9 Pilot Light UP9P-2498G (Terminal No. +, -)				Rated operating voltage: 24V DC ±10% Rated current: 15mA	

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

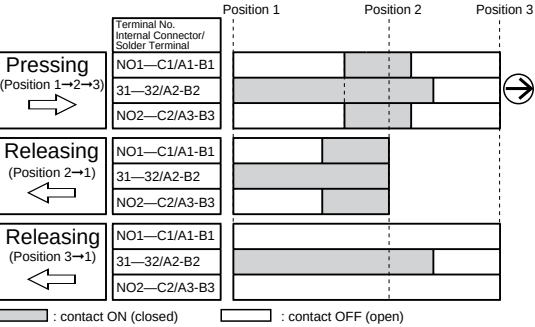
Safety Control Relays

Light Curtains

AS-Interface Safety at Work

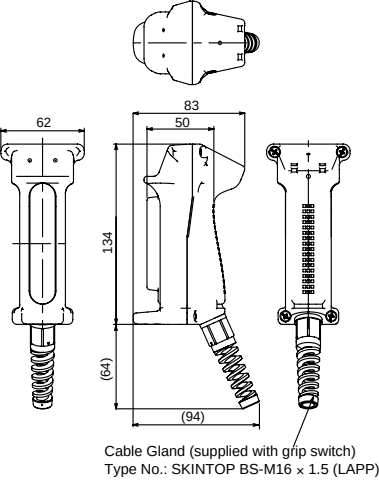
 Note: Minimum applicable load (reference value): 3V AC/DC, 5 mA
(Applicable range is subject to the operating conditions and load.)
*Operating temperature for internal connectors:
-25°C min., 40°C max. 2.5A (12 to 19 poles), 2A (20 to 22 poles)
40°C min., 50°C max. 2.5A (8 to 12 poles), 2A (13 to 22 poles)
50°C min., 60°C max. 2.5A (6, 7 poles), 2A (8 to 13 poles), 1.5A (14 to 22 poles)

Operation Characteristics



 Terminals NO1-C1/A1-B1, NO2-C2/A3-B3 are outputs of the 3-position enabling switch.
The above operation characteristics show when the center of the grip switch button is pressed. Because two contacts are designed to operate independently, pressing the edge of the button turns on one contact earlier than the other contact, causing a delay in operation. To avoid this, always press the center of the button.

Dimensions (mm)
HE2G-21SH/HE2G-21SC



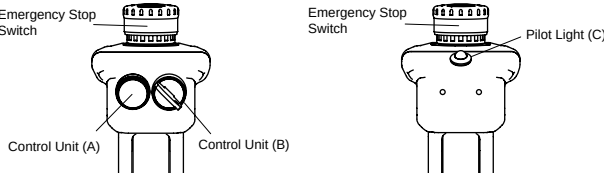
All dimensions in mm.

Internal Connector
Cable side connector:
Tyco Electronics D-1200D Series

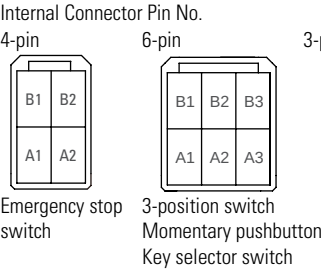
- Receptacle: 1-1827864-□
- Receptacle contact
1827586-2: AWG28 to 30
(Hand tool: 1762952-1)
1827587-2: AWG22 to 28
(Hand tool: 1762846-1)
1827588-2: AWG22 to 28
(Hand tool: 1762950-1)
1827589-2: AWG18 to 22
(Hand tool: 1762625-1)

Specify 2 or 3 in place of □.
2: 4-pin connector
3: 6-pin connector
The customer needs to purchase the connector separately.

Additional Control Unit Layout

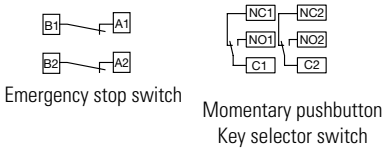


Contact Arrangement (Internal Connector)



3-position switch /control unit side connector:
Tyco Electronics D-1200D Series
Tab housing: 1-1903130-2 (4-pin connector)
1-1903130-3 (6-pin connector)
Tab contact: 19303116-2

Terminal Arrangement (TOP VIEW) 6-Pin Connector Allotment Table



Internal Connector Pin No.	Momentary pushbutton Key selector switch
A1	C2
A2	NO2
A3	NC2
B1	C1
B2	NO1
B3	NC1

Grip Switch Housing for HE5B Enabling Switch

Grip Style Enabling Switch Housing

- HE5B enabling switches can be installed in the HE9Z-GSH51 grip style enabling switch housing to be used as 3-position grip style enabling switches.



Shown with HE5B switch.

Part Numbers

Part Number	Description
HE9Z-GSH51	Grip Switch Housing for HE5B Enabling Switch

Specifications

Applicable Standards	IEC/EN 60529, UL50
Operating Temperature	−25 to 60°C (no freezing)
Relative Humidity	45 to 85% RH (no condensation)
Storage Temperature	−40 to 80°C (no freezing)
Pollution Degree	3
Shock Resistance	Damage limits: 500 m/s ² (50G)
Vibration Resistance	Damage limits: 5 to 55 Hz, amplitude 0.5 mm
Electric Shock Protection Class	Class II (when using HE5B-M2P*)
Applicable Cable	Outside diameter ø4.5 to 10 mm
Conduit Port Size	M16 (cable gland is supplied with the grip style enabling switch housing)
Degree of Protection	IP65 (with HE5B-M2P*) Type 4X (with HE5B-M2P*)
Weight (approx.)	65g (grip style enabling switch housing only)



The specifications are for the grip style enabling switch housing only. For enabling switch, see the HE5B specifications on page 400.

The following switches can be installed on the grip style enabling switch housing to be used as hand-held switches.

AB6M pushbuttons (IP65, except for AB6M-V)

AS6M selector switches (IP65)

AS6M key selector switches (IP65)

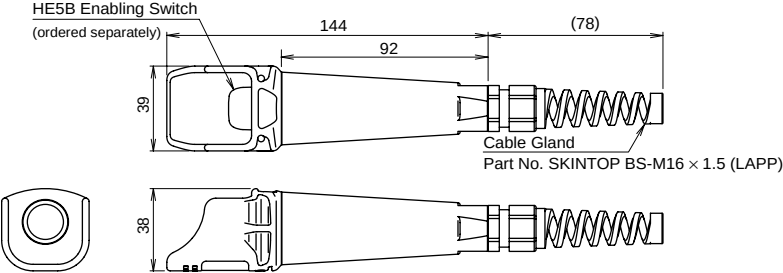
Notes:

The HE9Z-GSH51 grip style enabling switch housing does not include the HE5B enabling switch. The enabling switch must be ordered separately.

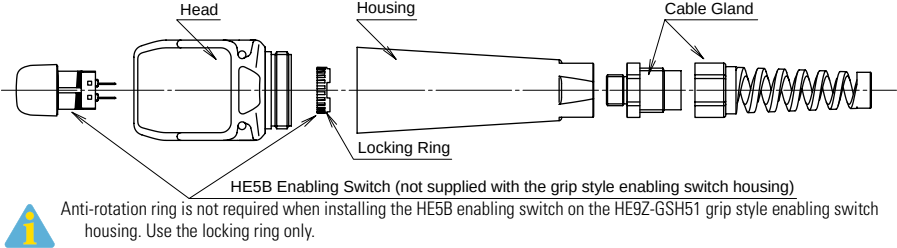
The HE5B enabling switch must be installed and wired to the HE9Z-GSH51 grip style enabling switch housing by the user. For information on wiring, see the instruction sheet supplied with the HE9Z-GSH51.

Dimensions (mm)

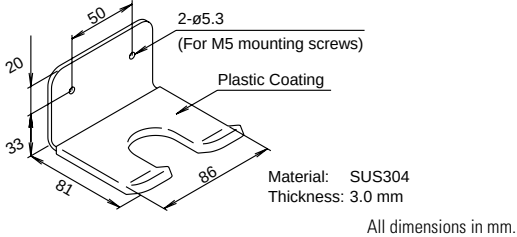
HE9Z-GSH51



HE9Z-GSH51 + HE5B Construction



Mounting Bracket
Part No. HE9Z-GH1



Selection Guide..... 420

Safety Relay HR1S-AC 421

Safety Relay HR1S-AF..... 424

Safety Relay HR1S-DM..... 427

Safety Relay HR1S-ATE..... 429

Safety Relay HR2S-301..... 432

Safety Relay HR2S-332N..... 437

FS1A Multi-function Safety Relay 443

Safety Control



www.IDEC.com/safety



Selection Guide

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Series	Single Function Safety Relay	Single Function Safety Relay	Multi-function Safety Relay
	HR1S	HR2S	FS1A
Appearance			
Page	421	432	443
Performance Level	PLe	PLe	PLe
Safety Category	3/4	3/4	4
Contact Configuration	1NO/1NC, 2NC, 2NO/3NO (time delay)	3NO/1NC, 3NO/3NO (time delay) /2NC (Aux.)	4NO

Safety Relay HR1S-AC

Key features:

- 1NC or 2NC safety input type, such as E-Stops or Interlock Switches
- EN ISO 13849-1 PL_e, Safety Cat 3 compliant, and EN 62061 SIL 3
- Fault diagnosis function with dual safety circuits.
- Internal relay operations can be monitored with LED Indicator.
- Finger-safe protection
- 22.5mm wide, 35mm DIN rail mounting
- UL listed, CSA certified, TÜV NORD approved



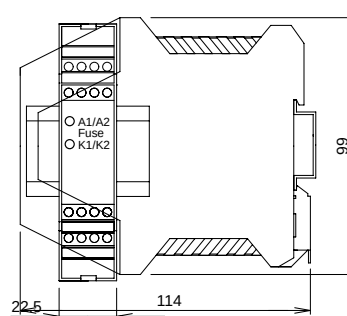
Part Numbers

Part Number	Terminal Style
HR1S-AC5121	Integrated Terminal Block
HR1S-AC5121P	Removable Terminal Block

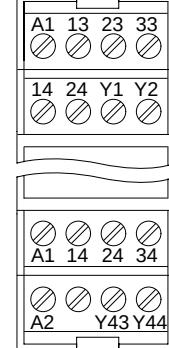
Specifications

Operating Temperature	-10 to 55°C (no freezing)	
Degree of Protection	Terminal: IP20, Housing: IP40	
Rated Power Voltage	24V AC (-20 to +10%) 50/60 Hz 24V DC (±20%)	
Power Consumption	AC: 2.2 VA (24V AC) maximum DC: 1.2W (24V DC) maximum	
Overcurrent Protection	Electronic	
Control Circuit Voltage	24V	
Performance Level (PL)	e (EN ISO 13849-1)	
Safety Category	3 (EN 954-1)	
Safety Integrity Level (SIL)	3 (EN 62061)	
Response Time	100ms maximum	
Input Synchronization Time	Unlimited	
Overvoltage Category	III	
Pollution Degree	2	
Rated Insulation Voltage	300V	
Safety Outputs	Instantaneous (Stop Cat 0)	3NO
	Auxiliary Contact	1NO (transistor, PNP)
Output Contact Ratings	Safety Circuit	AC-15 C300: U _e = 240VAC, I _e =0.75A
		DC-13 U _e =24VDC, I _e =2A
	Transistor Circuit	24V/20mA
	Minimum Applicable Load	17V/10mA (initial value)
Operation Frequency	1200 operations/h maximum	
Rated Current	Safety circuit output total: 10.5A maximum	
Wire Size	HR1S-AC5121: 1 × 2.5mm ² , 2 × 0.75mm ² maximum HR1S-AC5121P: 1 × 2.5mm ² , 2 × 1.5mm ² maximum	
Weight	160g	

Dimensions (mm)

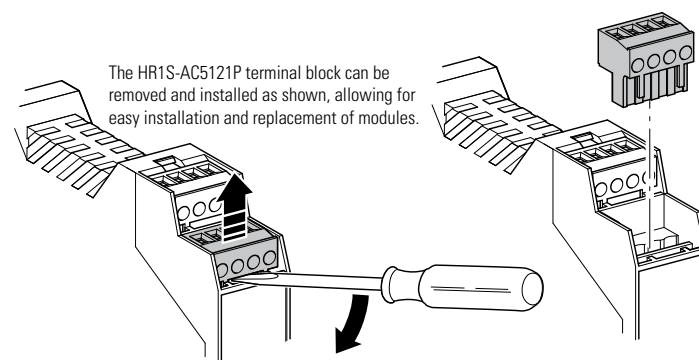


Terminal Arrangement



LED Indicator

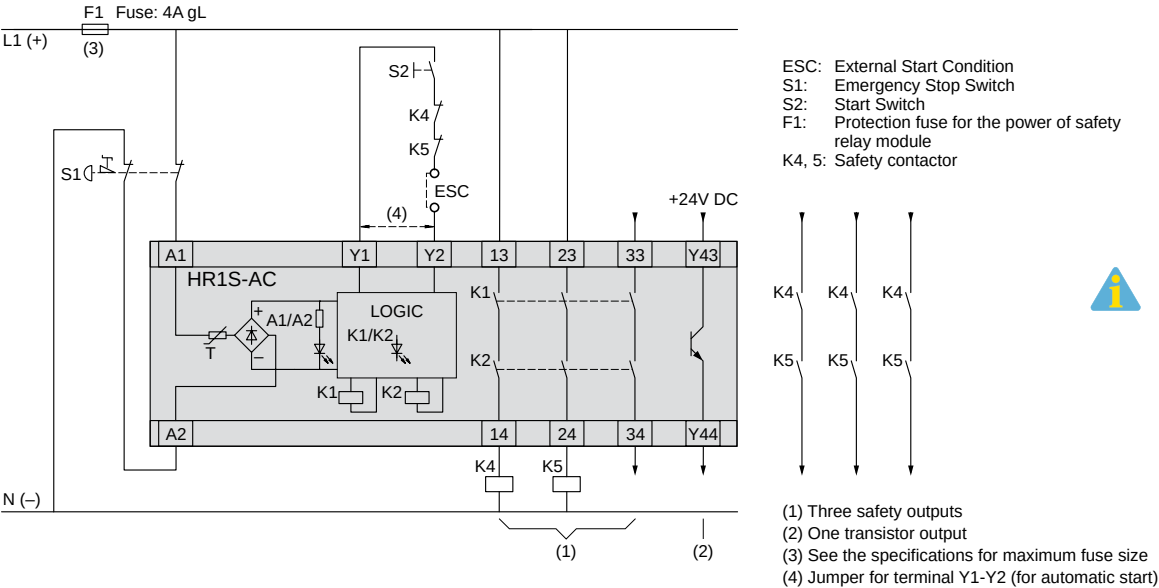
- A1/A2 Fuse:
Turns on when power circuit is normal.
Turns off when power is interrupted or the electronic fuse blows.
- K1: Turns on when K1 relay operates.
- K2: Turns on when K2 relay operates.



The HR1S-AC5121P terminal block can be removed and installed as shown, allowing for easy installation and replacement of modules.

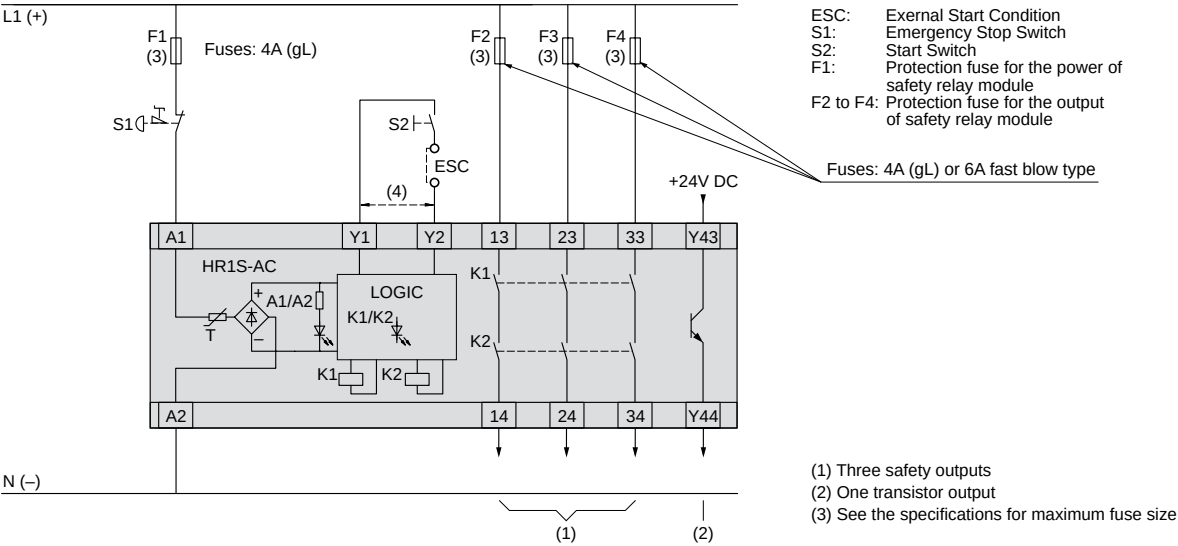
Use a 4A fuse (Type gL) for power fuse protection.
Use a 4A (Type gL) or a 6A fast blow fuse for output fuse protection

HR1S-AC Wiring Diagram
Safety Category 3 Example Circuit (using an emergency stop switch with 2NC contacts)

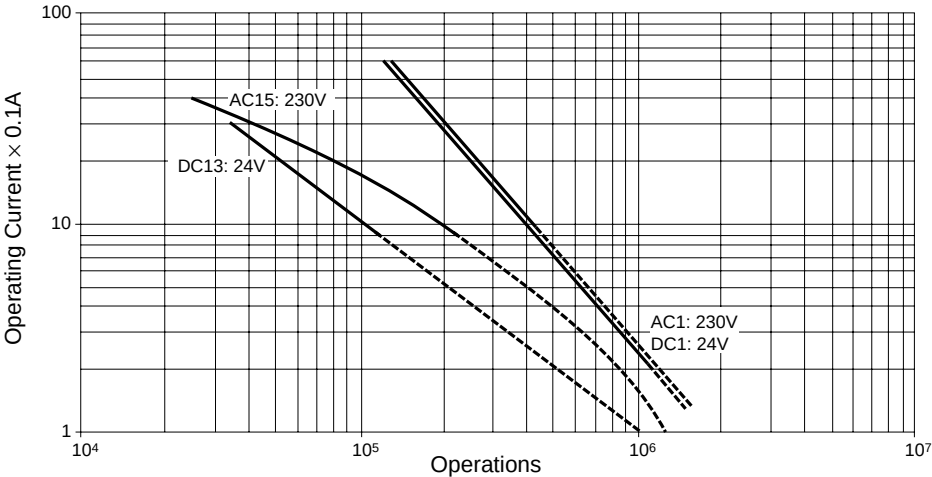


The Safety Category is achieved by the entire control system. Take any connected safety equipment and wiring into consideration.

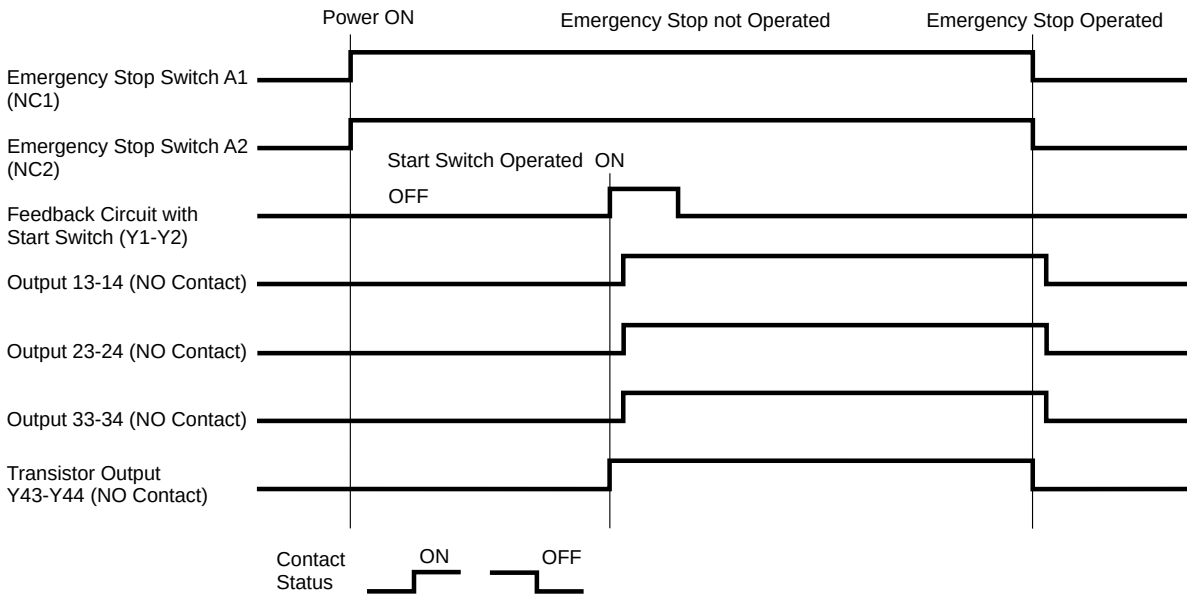
Safety Category 3 Example Circuit (using an emergency stop switch with 2NC contacts)



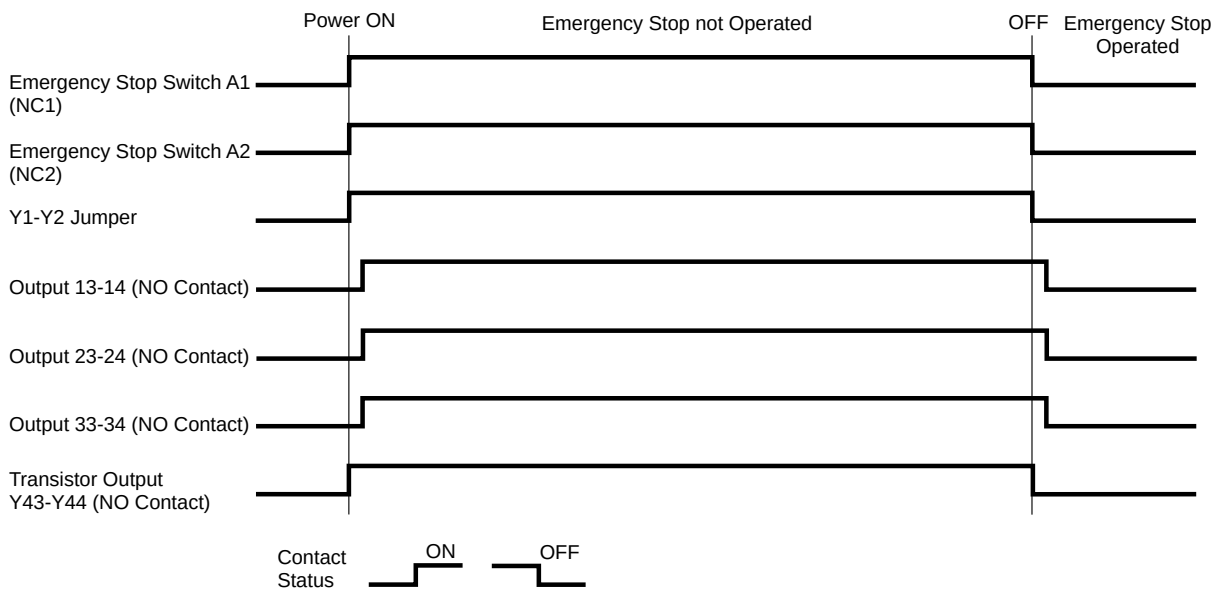
Output Contact Electrical Life



HR1S-AC Safety Relay Module Operation Chart When Using a Start Switch



When Not Using a Start Switch



Safety Relay HR1S-AF

Key features:

- 2NC safety input type, such as E-Stops or Interlock Switches
- EN ISO 13849-1 PL_e, Safety Cat 4 compliant, and EN 62061 SIL 3
- Welding detection of start switch
- Fault diagnosis function with dual safety circuits
- Internal relay operations can be monitored with LED Indicator.
- Finger-safe protection
- 22.5mm wide, 35mm DIN rail mounting
- UL listed, CSA certified, TÜV NORD approved



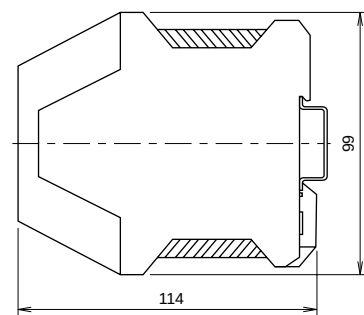
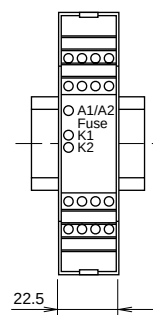
Part Numbers

Part Number	Terminal Style
HR1S-AF5130B	Integrated Terminal Block
HR1S-AF5130PB	Removable Terminal Block

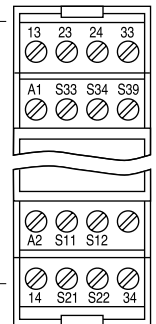
Specifications

Operating Temperature	-25 to +55°C (no freezing)	
Degree of Protection	Terminal: IP20, Housing: IP40	
Rated Power Voltage	24V AC (-15 to +10%) 50/60 Hz 24V DC (-15 to +10%)	
Power Consumption	5 VA maximum (24V AC) 2.5W maximum (24V DC)	
Overcurrent Protection	Electronic (Note)	
Control Circuit Voltage	24V	
Performance Level (PL)	e (EN ISO 13849-1)	
Safety Category	4 (EN ISO 13849-1)	
Safety Integrity Level (SIL)	3 (EN 62061)	
Response Time	When S11-S12, S21-S22 are interrupted: 20 ms maximum When power is interrupted: 60 ms maximum	
Input Synchronization Time	Unlimited	
Overvoltage Category	III	
Pollution Degree	2	
Rated Insulation Voltage	300V	
Safety Outputs	Instantaneous (Stop Cat 0)	3NO
Output Contact Ratings	Safety Circuit	AC-15 C300: U _e = 240VAC, I _e =0.75A
		DC-13 U _e =24VDC, I _e =2A
	Minimum Applicable Load	17V/10mA (initial value)
Operation Frequency	1200 operations/h maximum	
Rated Current	Safety circuit output total: 18A maximum Each safety circuit output: 6A maximum	
Wire Size	HR1S-AF5130B: 1 × 2.5 mm ² , 2 × 0.75 mm ² maximum HR1S-AF5130PB: 1 × 2.5 mm ² , 2 × 1.5 mm ² maximum	
Weight	250g	

Dimensions (mm)

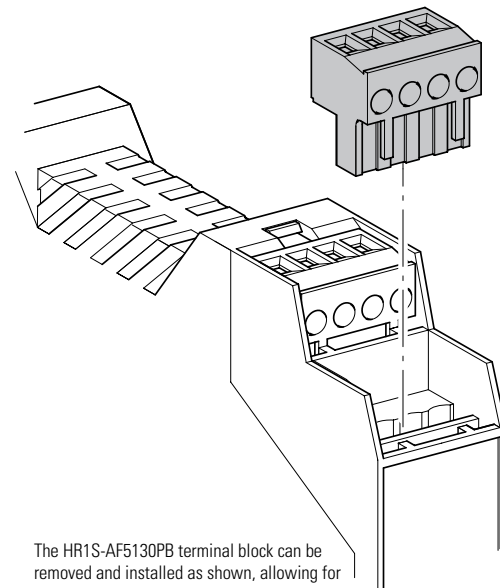


Terminal Arrangement



LED Indicator

- A1/A2 Fuse:
Turns on when power circuit is normal.
Turns off when power is interrupted or the electronic fuse blows.
- K1: Turns on when K1 relay operates.
- K2: Turns on when K2 relay operates.



The HR1S-AF5130PB terminal block can be removed and installed as shown, allowing for easy installation and replacement of modules.



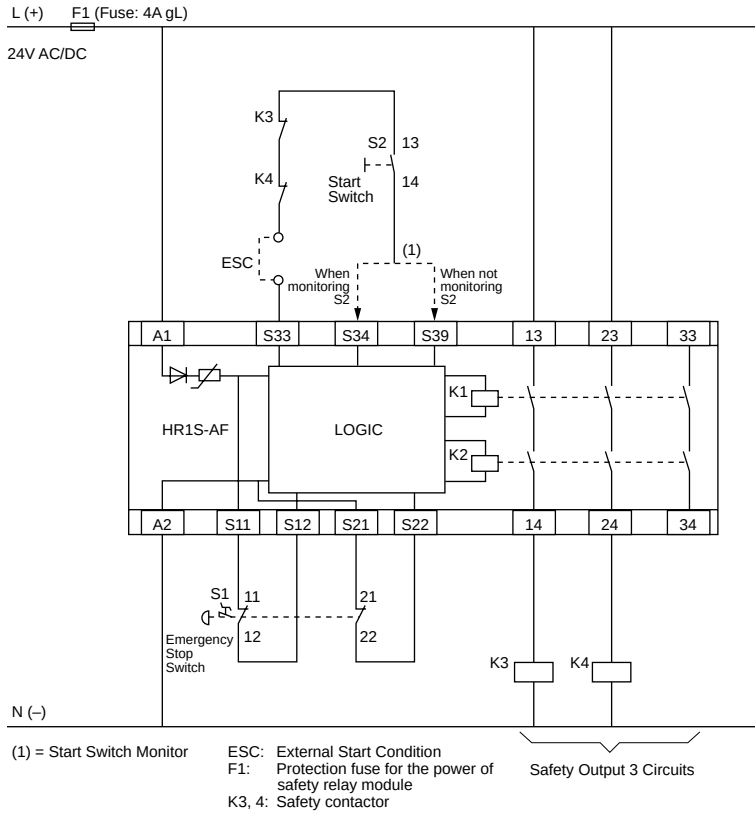
Note: Short-circuit of S11 and S21 activates the overcurrent protection circuit, interrupting the power supply. The safety output turns off. Normal status is restored when the short-circuit is removed.
Use a 4A fuse (Type gL) for power line protection. Use a 4A fuse (Type gL) or a 6A fast blow fuse for output line protection.

HR1S-AF Wiring Diagram

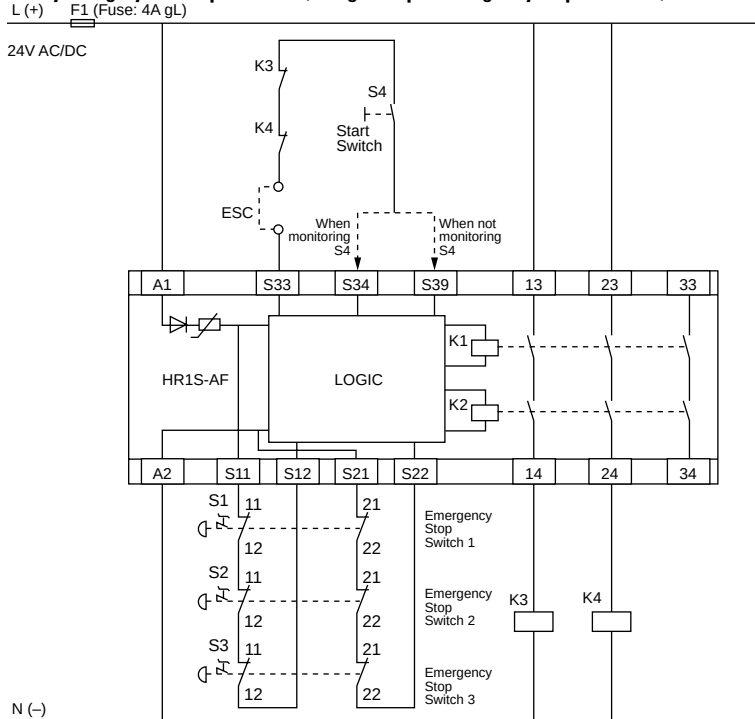
Safety Category 4 Example Circuit (using an emergency stop switch)



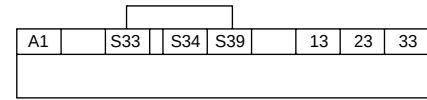
The Safety Category is achieved by the entire control system. Take any connected safety equipment and wiring into consideration.



Safety Category 3 Example Circuit (using multiple emergency stop switches)

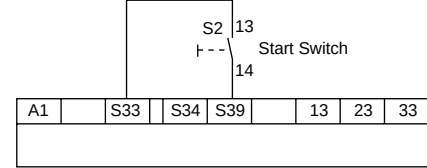


When not using a start switch (automatic start)



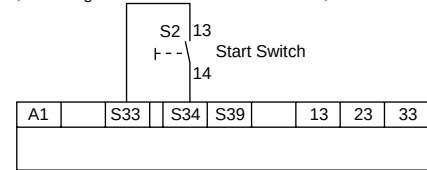
When not monitoring the start switch

(welding of start switch cannot be detected)



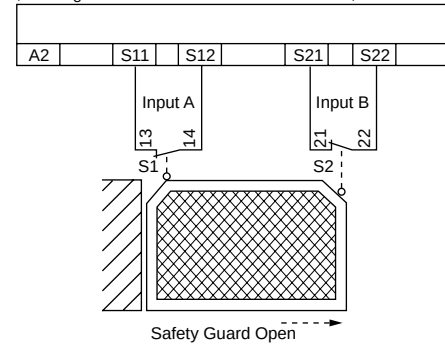
When monitoring the start switch

(detecting the OFF status of start switch)



When not monitoring the start switch

(welding of start switch cannot be detected)



ESC: External Start Condition
F1: Protection fuse for the power of safety relay module
K3, 4: Safety contactor

HR1S-AF Operation Chart
When Using the Emergency Stop Switch

Overview

XW Series E-Stops

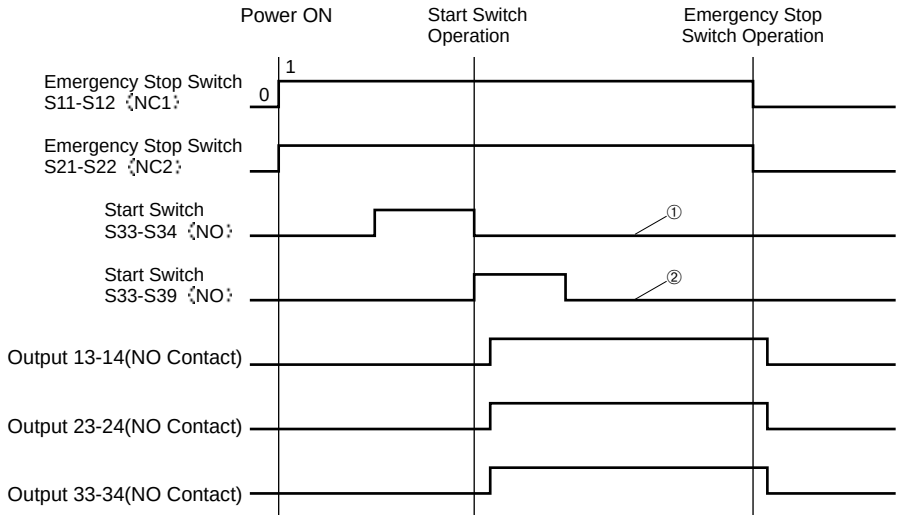
Interlock Switches

Enabling Switches

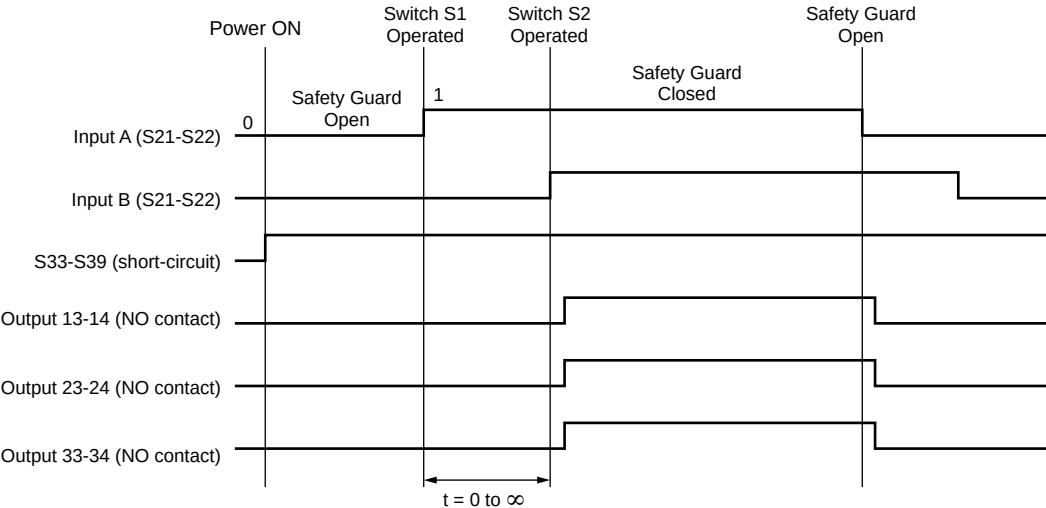
Safety Control

Light Curtains

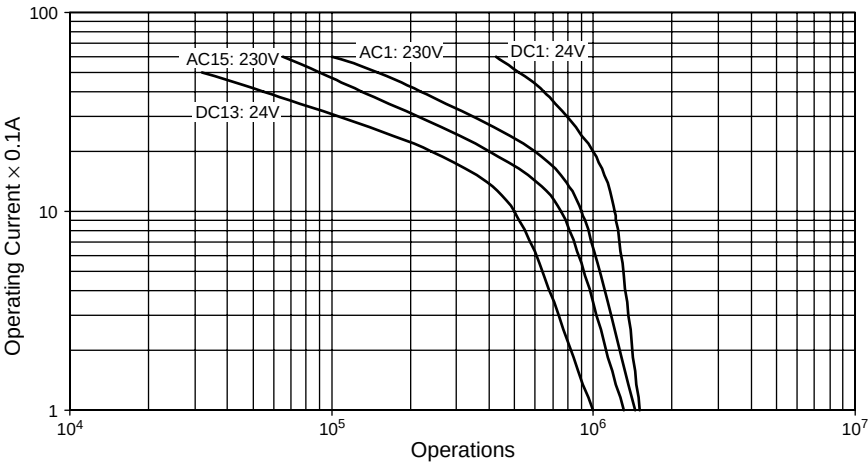
AS-Interface Safety at Work



When not Using the Safety Guard (Automatic Start)



Output Contact Electrical Life



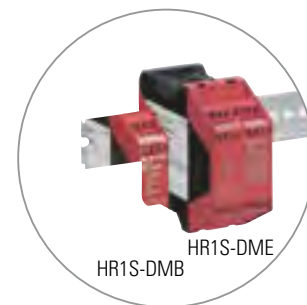
Safety Relay HR1S-DM

Key features:

- 1NO-1NC safety input type, such as magnetic coded safety switches
- Fault diagnosis function with dual safety circuits.
- Internal relay operations can be monitored with LED Indicator.
- Finger-safe protection
- 22.5 or 45mm wide, 35mm DIN rail mounting
- EN ISO 13849-1 PL_e, Safety Cat 4 compliant, and EN 62061 SIL 3
- UL listed, CSA certified, TÜV NORD approved



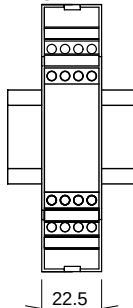
HR1S-DMB()P



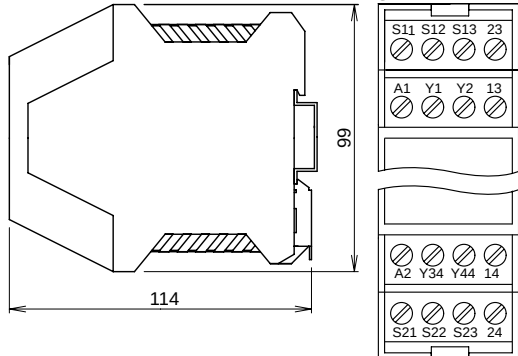
Part Numbers

Part Number	Terminal Style	Input
HR1S-DMB1132	Integrated Terminal Block	2
HR1S-DMB1132P	Removable Terminal Block	
HR1S-DME1132	Integrated Terminal Block	6
HR1S-DME1132P	Removable Terminal Block	

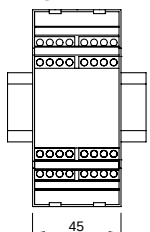
Dimensions (mm)
HR1S-DMB



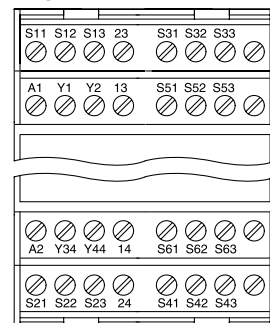
Terminal Arrangement
HR1S-DMB



Dimensions (mm)
HR1S-DME



Terminal Arrangement
HR1S-DME



Specifications

Operating Temperature	−10 to 55°C (no freezing)
Degree of Protection	Terminal: IP20, Housing: IP40
Rated Power Voltage	24V DC (−20 to +20%)
Power Consumption	HR1S-DMB: 2.5W maximum (24V DC) HR1S-DME: 3.5W maximum (24V DC)
Overcurrent Protection	Electronic
Control Circuit Voltage	24V DC
Performance Level (PL)	e (EN ISO 13849-1)
Safety Category	4 (EN ISO 13849-1)
Safety Integrity Level (SIL)	3 (EN 62061)
Response Time	20 ms maximum
Input Synchronization Time	500ms max
Overvoltage Category	III
Pollution Degree	2
Rated Insulation Voltage	300V
Maximum Input Resistance	100Ω (per input point)
No. of Outputs	Safety Circuit 2NO Auxiliary Contact 2NO (transistor PNP)
Output Contact Ratings	Safety Circuit AC-15 C300: U _e = 240VAC, I _e =0.75A
	DC-13 U _e = 24V DC, I _e = 1.5A
	Transistor Circuit 24V/20 mA
	Minimum Applicable Load 17V/10 mA (initial value)
Operation Frequency	1200 operations/hour maximum
Rated Current	Output total 12A maximum
Wire Size	0.14 to 2.5 mm ²
Weight	HR1S-DMB: 180g HR1S-DME: 250g



Use a 4A fuse (Type gL) for power fuse protection.
Use a 4A (Type gL) or a 6A fast blow fuse for output fuse protection.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

LED Indicator

HR1S-DMB

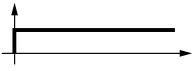
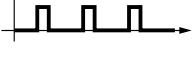
- Power A1/A2:
Turns on when power circuit is normal.
Turns off when power is interrupted or the electronic fuse blows.
- Fault:
Turns on when the HR1S fails (see failure causes on page 694).
- K1/K2:
Turns on when K1/K2 relays operate.

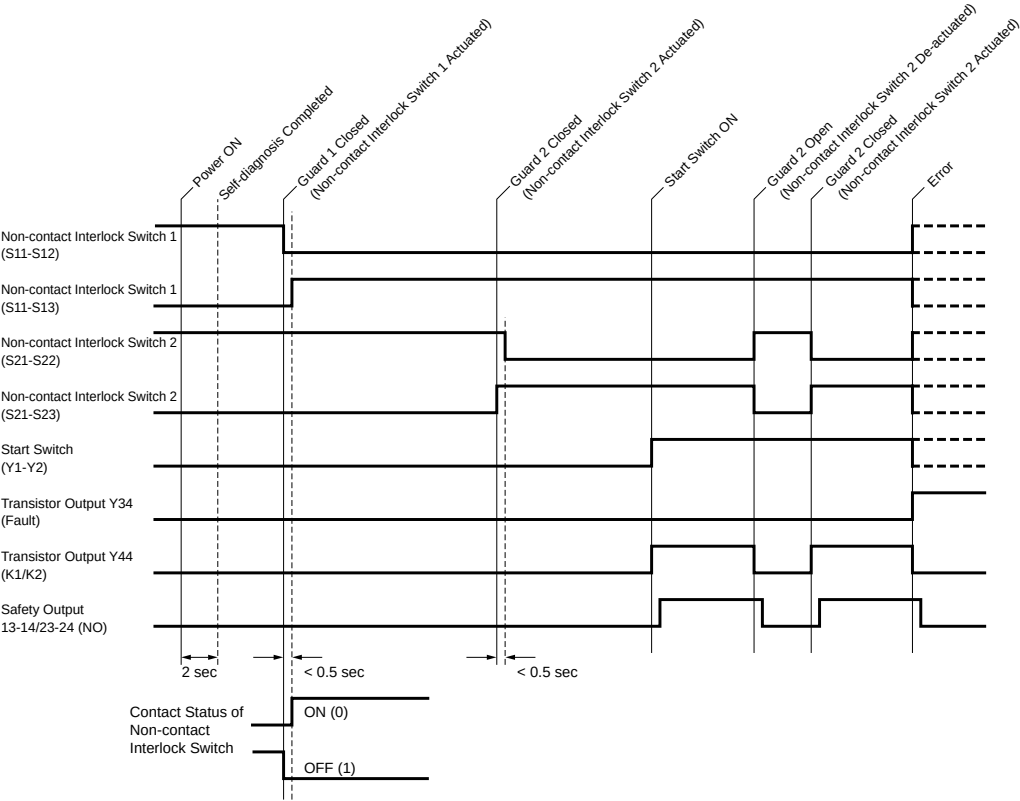
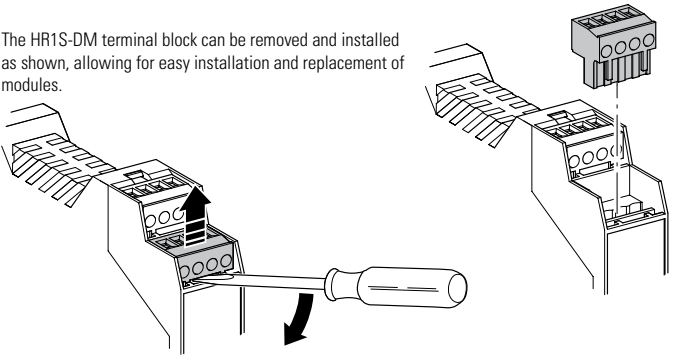
HR1S-DME

- Power A1/A2:
Turns on when power circuit is normal.
Turns off when power is interrupted or the electronic fuse blows.
- Fault:
Turns on when the HR1S fails (see failure causes on page 694)
- K1/K2:
Turns on when K1/K2 relays operate.
- S13: NO contact of non-contact interlock switch 1
- S12: NC contact of non-contact interlock switch 1
- S23: NO contact of non-contact interlock switch 2
- S22: NC contact of non-contact interlock switch 2
- S33: NO contact of non-contact interlock switch 3
- S32: NC contact of non-contact interlock switch 3
- S43: NO contact of non-contact interlock switch 4
- S42: NC contact of non-contact interlock switch 4
- S53: NO contact of non-contact interlock switch 5
- S52: NC contact of non-contact interlock switch 5
- S63: NO contact of non-contact interlock switch 6
- S62: NC contact of non-contact interlock switch 6

HR1S-DM Operation Chart
When Using the Emergency Stop Switch

Causes of Fault LED Indication

LED2: Fault	Fault Type	Fault Cause	Measures
	Internal Fault	Fault of the internal circuit	Replace the safety relay module.
	External Fault	Short circuit of the +24V power supply and input terminal	Remove the short circuit and reboot.
	External Fault	Short-circuit of the non-contact interlock switch wiring	Correct the wiring of the non-contact interlock switch and reboot.
	Synchronization time excess of switch contact input	Synchronization for the NO contact and NC contact of the non-contact interlock switch (HS7A) is 0.5 seconds or longer.	Open and close the door again.
		Fault of the non-contact interlock switch (HS7A)	Replace the non-contact interlock switch.



Safety Relay HR1S-ATE

Key features:

- EN ISO 13849-1 performance level e, safety category 4 compliant, and EN 62061 safety integrity level 3
- Integrated and removable terminal styles available
- Compact design: 45 mm in width
- Time delay outputs: 3NO
- Auxiliary output enables power supply monitoring, inputs (2 channels), and a time delay output
- Environmentally friendly, RoHs directive compliant
- UL Listed, CSA certified, TÜV NORD approved

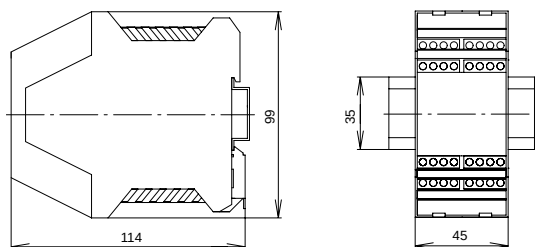


Part Numbers

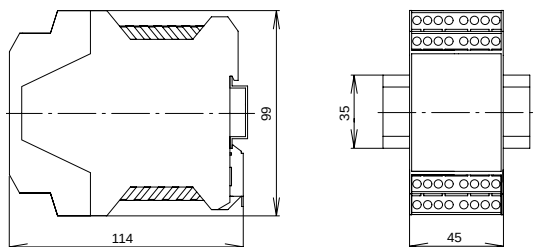
Part Number	Terminal Style
HR1S-ATE5110	Integrated Terminal Block
HR1S-ATE5110P	Removable Terminal Block

Dimensions (mm)

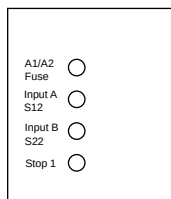
HR1S-ATE5110 Integrated Terminal Type



HR1S-ATE5110P Removable Terminal Type



LED Indicator



- A1/A2 Fuse: Turns on when power circuit is normal.
- Input A S12: Turns on when S11–S12 is closed.
- Input B S22: Turns on when S21–S22 is closed.
- Stop1: Turns on when the time-delay output circuits 57-58, 67-68, and 77-78 are closed.



Note: Safety output contact
Time-delay output contact

Stop category 0
Stop category 1

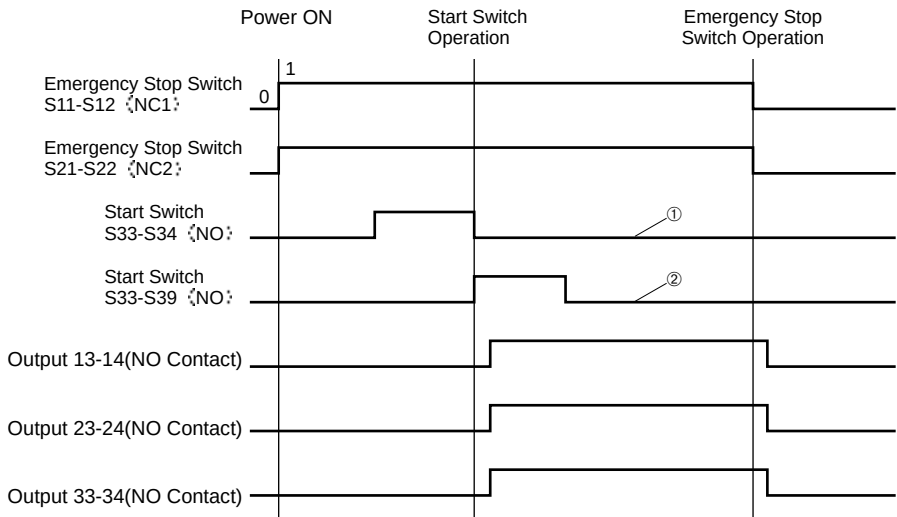


Specifications

Applicable Standards			EN 60204-1: 2007, EN 60947-1: 2007, EN 60947-5-1:2004, EN 61000-6-2: 2005 EN 61000-6-4: 2007, EN 62061: 2005 EN ISO 13849-1: 2008, EN ISO 13849-2: 2008
Applicable Standards for Use			EN 60204-1: 2006 EN ISO 13850: 2008
Performance level (PL)			e (EN ISO 13849-1)
Safety Category			4 (EN ISO 13849-1)
Safety Integrity Level (SIL)			3 (EN 62061)
Stop Category			0, 1 (EN 60204-1) (Note)
Operating Temperature			−10 to +55°C (no freezing)
Relative Humidity			30 to 85% RH (no condensation)
Impulse Withstand Voltage			4 kV (IEC 60947-5-1)
Shock Resistance			150 m/s ² , 11m sec, 3 shocks in each 3 axes
Vibration Resistance			10 to 60 Hz, amplitude 0.35 mm 60 to 150 Hz, acceleration 50 m/s ²
Degree of Protection			Terminal: IP20 Enclosure: IP40
Rated Voltage			24V AC −20% +10% 24V DC −20% +20%
Power Consumption			24V AC: 8 VA max. 24V DC: 4W max.
Overcurrent Protection			Built-in, electronic
Minimal Applicable Load			17V DC / 10 mA (initial value)
Response Time			ON to OFF: 20 ms max. (instantaneous output)
Overvoltage Category			III
Pollution Degree			2
Rated Insulation Voltage			300V Ac
No of Outputs	Safety Circuit		2NO
	Time-delay Circuit		3NO
	Auxilliary Circuit	Contact	None
Output Contact Ratings	Safety Circuit	Transistor	4
		AC15	C300 (230V AC / Ie=0.75A)
	Time-delay Circuit	DC13	24V DC / Ie=1A
		AC15	C300 (230V AC/ Ie=0.75A)
	Time-delay Circuit	DC13	24V DC / Ie=1A
		Preset Time	0, 0.5, 1, 2, 4, 6, 8, 10, 15, 20, 25, 30 sec.
Auxilliary Circuit			24V DC / 20 mA (PNP)
Mechanical Durability			10,000,000 operations
Electrical Durability			See page XX
Rated Current			Total output: 8A max. 1 output 4A max.
Wire Size	HR1S-ATE5110		Single wire: 0.2 to 2.5 mm ² max. (24~14 AWG) Multiple wires: 0.14 to 0.75 mm ² max.
	HR1S-ATE5110P		Single wire: 0.2 to 2.5 mm ² max.(24~14 AWG) Multiple wires: 0.2 to 1.5 mm ² max.
Weight (approx.)			280g

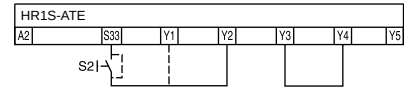
Use a 4A fuse (Type gG) for power protection. Use a 6A fuse (Type gG) for safety output protection.
Use a 4A fuse (Type gG) for time-delay output and auxiliary output protection.

HR1S-ATE Wiring Diagram
Safety Category 4 (3) Circuit (using an emergency stop switch) (Note)

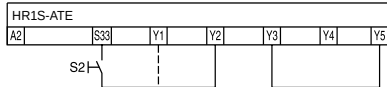


Safety category is achieved by the entire control system. Take the connected safety equipment and wiring into consideration.

When not monitoring the start switch
(Y3-Y4 short-circuited)
(automatic start when S33-Y2 is short-circuited)



When monitoring the start switch
(Y3-Y5 short-circuited)

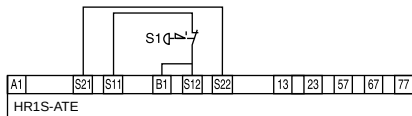


- 1. When monitoring the start switch, starts when switched off (default setting/recommended)
 - 2. When monitoring the start switch, starts when switched on
 - 3. Outputs must be fused (see the instruction manual for maximum fuse size)
 - 4. To PLC, etc.
- Note: When using off-delay output, safety category becomes 3.

S1 = Emergency stop switch with 2 NC contacts (recommended)
S2 = Start switch
ESC = External start conditions
Y1 (S33) – Y2 = Feedback loop

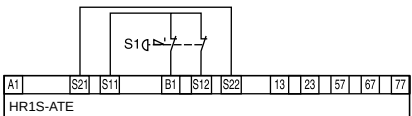
Emergency stop switch - Input 1 channel

When not detecting short-circuit (All failures such as short-circuit of emergency stop switch wiring not detected)

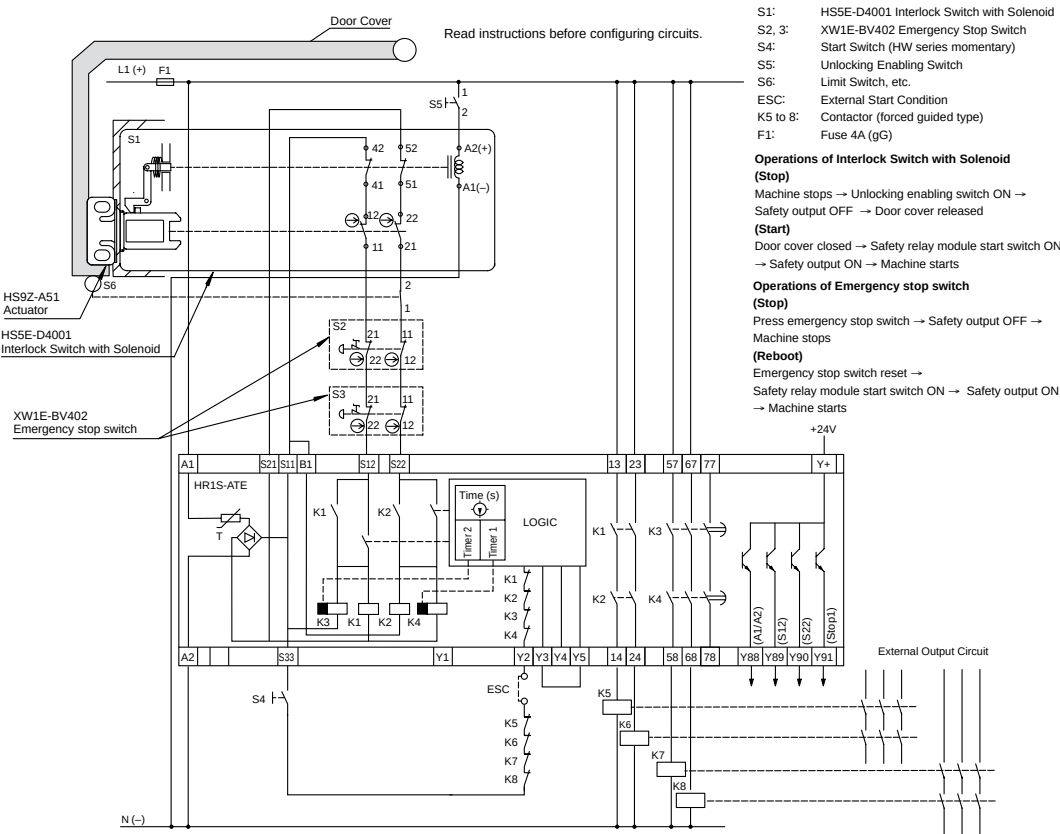


Emergency stop switch - Input 2 channels

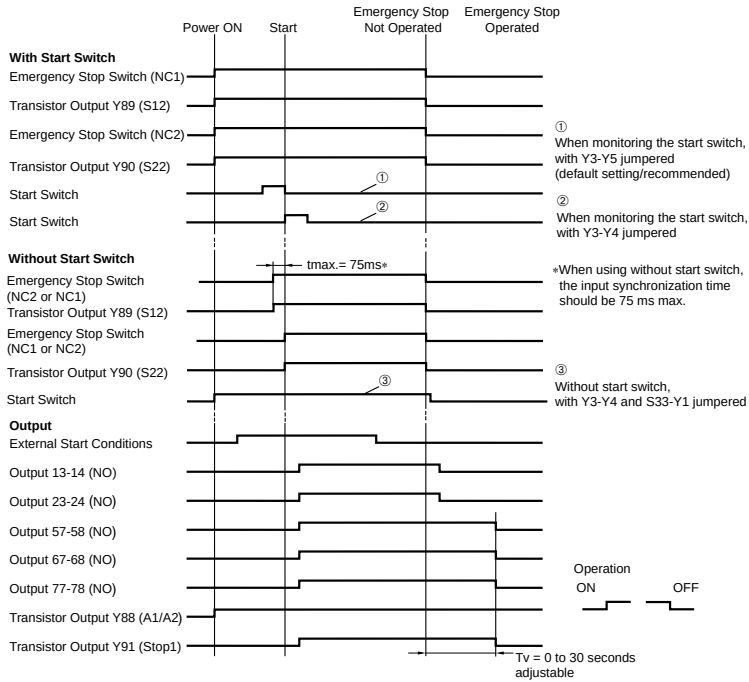
When not detecting short-circuit (B1-S12 short-circuit not detected)



Safety Category 3 Example Circuit (using multiple emergency stop switches)

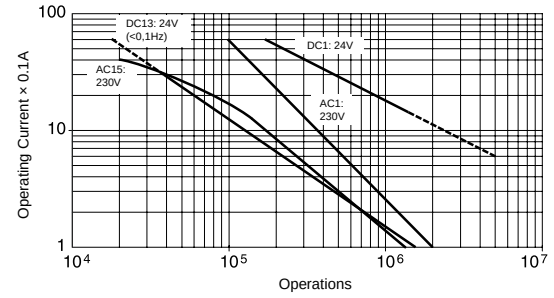


HR1S-ATE Operation Chart



Output Contact Electrical Life

(Safety Circuit, Time-delay Circuit, Auxilliary Circuit)



Residual Risk (En ISO/ISO12100-1)

The wiring diagrams on previous page have been tested under actual operating conditions. The HR1S-ATE safety relay module can be used in a safety circuit by connecting to safety equipment compliant to applicable standards. Consider residual risk in the following circumstances:

a) When it is necessary to modify the recommended circuit and if added/modified components are not properly integrated into the control circuit.

b) When applicable standards of machine operation are not observed, or when the machine is not adjusted or maintained properly (adhere to a strict maintenance schedule).

c) When the contacts of relays and contactors for connected with safety outputs are not forced guided (compliant with EN 50205).

HR2S-301P/HR2S-301N Safety Relay Modules

Key features:

- Simple wiring procedure
- Removable terminal block enables easy replacement
- Terminal cover detects improper connection
- Operation modes can be changes with a single action
- Compact design enables installation in a narrow space
- Safety Category 4, Performance Level e according to EN ISO 13849-1: 2008
- TÜV SÜD European and North American (NRTL)



Part Numbers

Contact Configuration		Input	Supply Voltage	Part No.
Safety Output	Auxiliary Contact			
3NO	1NC	Positive	24V DC –15% to +10%	HR2S-301P
		Negative	24V DC –15% to +10%	HR2S-301N

Specifications

Applicable Standards	EN ISO 13849-1: 2008 EN 954-1: 1996 EN 50178: 1997 EN 55011/A2: 2007 EN 61000-6-2: 2005 IEC/EN 61496-1: 2006 UL508/R2005-07 CAN/CSA C22.2 No.14: 2005
Applicable Standards for Use	EN 60204-1: 2006
Performance level (PL)	e (EN ISO 13849-1)
Safety Category ¹	3 or 4 (EN ISO 13849-1)
Stop Category	0 (IEC/EN 60204-1)
Operating Temperature	–10 to +55°C (no freezing)
Relative Humidity	30 to 85% (no condensation)
Altitude	0 to 2000m (operating)
Insulation Resistance	100Ω minimum (500V DC megger, same measurement positions as dielectric strength)
Dielectric Strength	Between outside housing and internal circuit: 3,750V AC, 1 minute
	Between outputs of different poles: 2,500V AC, 1 minute
	Between input and output terminals: 2,500V AC, 1 minute
	Between power supply and output terminals: 2,500V AC, 1 minute
Shock Resistance	300 m/s ² , pulse width 11m sec, 3 shocks in each of 3 axes
Bump	100 m/s ² , pulse width 16m sec, 1000 times in each of 3 axes
Vibration Resistance	10 to 55 Hz, 1 octave/minute, 0.7 mmp-p in each of 3 axes, 20 sweeps, 5 to 55 Hz, 30 m/s ² , for 2 hours in each of 3 axes
Degree of Protection	Terminals: IP20 Housing: IP40
Rated Voltage	24V DC –15% +10%
Power Consumption	2.2W (26.4V DC)
Overcurrent Protection	Built-in, electronic (approx. 0.9A)
Contact Resistance	200 mΩ maximum ²
Turn-On Time	50 ms maximum ³

Minimum Applicable Load			24V DC / 5 mA (Reference value)	
Response Time			20 ms maximum ^{3 4}	
Overvoltage Category			III (IEC60664-1)	
Pollution Degree			2 (IEC60664-1)	
Rated Insulation Voltage (output contact)			250V (IEC60664-1)	
Output Contact Ratings	Terminals 13-14 23-24 33-34	Rated Load ^{5 6}	250V AC / 30V DC (resistive load) ⁷ Category 3 or lower: 5.0A maximum Category 4 or lower: 3.6A maximum	
		Safety	AC15	240V AC / 2A cosø=0.3
		Circuit	DC13	24V DC / 1A L/R=48 ms
		No. of Outputs		3 (NO contact output)
	Terminals 41-42	Rated Load ⁶	250V AC / 30V DC (resistive load) Category 3 or lower: 5.0A maximum Category 4 or lower: 3.6A maximum	
		Safety	AC15	240V AC / 2A cosø=0.3
		Circuit	DC13	24V DC / 1A L/R=48 ms
	No. of Outputs		1 (NC contact output)	
Mechanical Durability			5,000,000 operations minimum	
Electrical Durability			100,000 operations minimum	
Wire Size			0.2 mm ² to 1.5 mm ² ^(24 to 16 AWG)	
Weight (approx.)			200g	

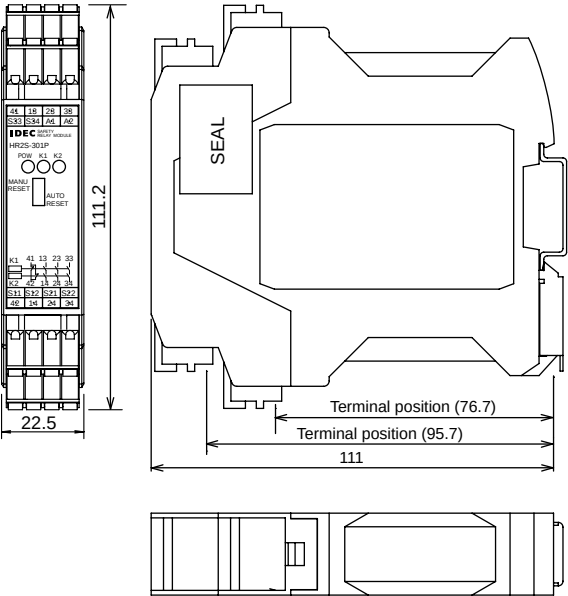


- HR2S-301N is recommended for use in category 4 safety applications. The requirements of the safety category must be determined according to the safety equipment. We recommend that you consult a third party organization. Categories may change depending on the combination of the safety equipment. Categories may also change depending on the output contact ratings.
- Measured using 5 or 6V DC, 1A voltage drop method.
- When measured at the rated voltage (at 20°C), excluding contact bounce time.
- The time from when the safety input turns OFF to when the safety output turns OFF.
- Leave 5 mm of space between the sides of the module when more than 3A is continuously applied to the relay contact.
- The module is not suitable for use with a load less than the minimum applicable load. Once a large load is applied, contacts may not operate with a small load.
- The maximum current of the safety output contact is specified by the approved standard.

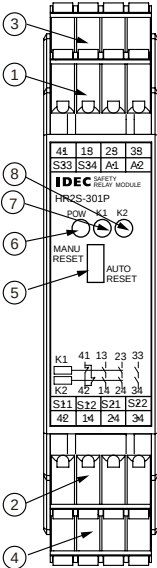
Category 4	HR2S-301N, HR2S-301P + Type 4 OSSD's	3.6A
Category 3	HR2S-301P	5.0A

 To prevent the safety output contact from overcurrent, use a fuse. To satisfy Category 4, use a fuse with a maximum current of 3.6A. This fuse is not required if the short circuit current is less than 5A.

Dimensions (mm)



Terminal Arrangement



Part Description

Part No.	Part Names and Functions
1	CN1: Power supply input, start/off-check input
2	CN2: Safety input (dual channel)
3	CN3: Safety output contact
4	CN4: Safety output contact
5	Switch: Select AUTO or MANU mode
6	POW: Power LED
7	K1: ON-LED for safety output
8	K2: ON-LED for safety output

Terminal Arrangement

Terminal	Markings	I/O Signals		Notes
CN1	A1	Power supply +24V DC input		Use a dry contact.
	A2	Power supply 0V input		
	S33	Start/off-check input		
	S34			
CN2	S11	Safety input 1	Common	For HR2S-301N, use a dry contact. When connecting TYPE 4 safety light curtain to HR2S-301P, use only S12 (S22).
	S12		Function	
	S21	Safety input 2	Common	
	S22		Function	
CN3	41–42	Monitor contact for safety output (NC)		Rated load 250V AC / 30V DC, 1A (Resistive load)
	13–14	Safety output contact (NO)		Rated load 250V AC / 30V DC (Note) (Resistive load)
23–24				
33–34				



Note: 5.0A max.
3.6A max.

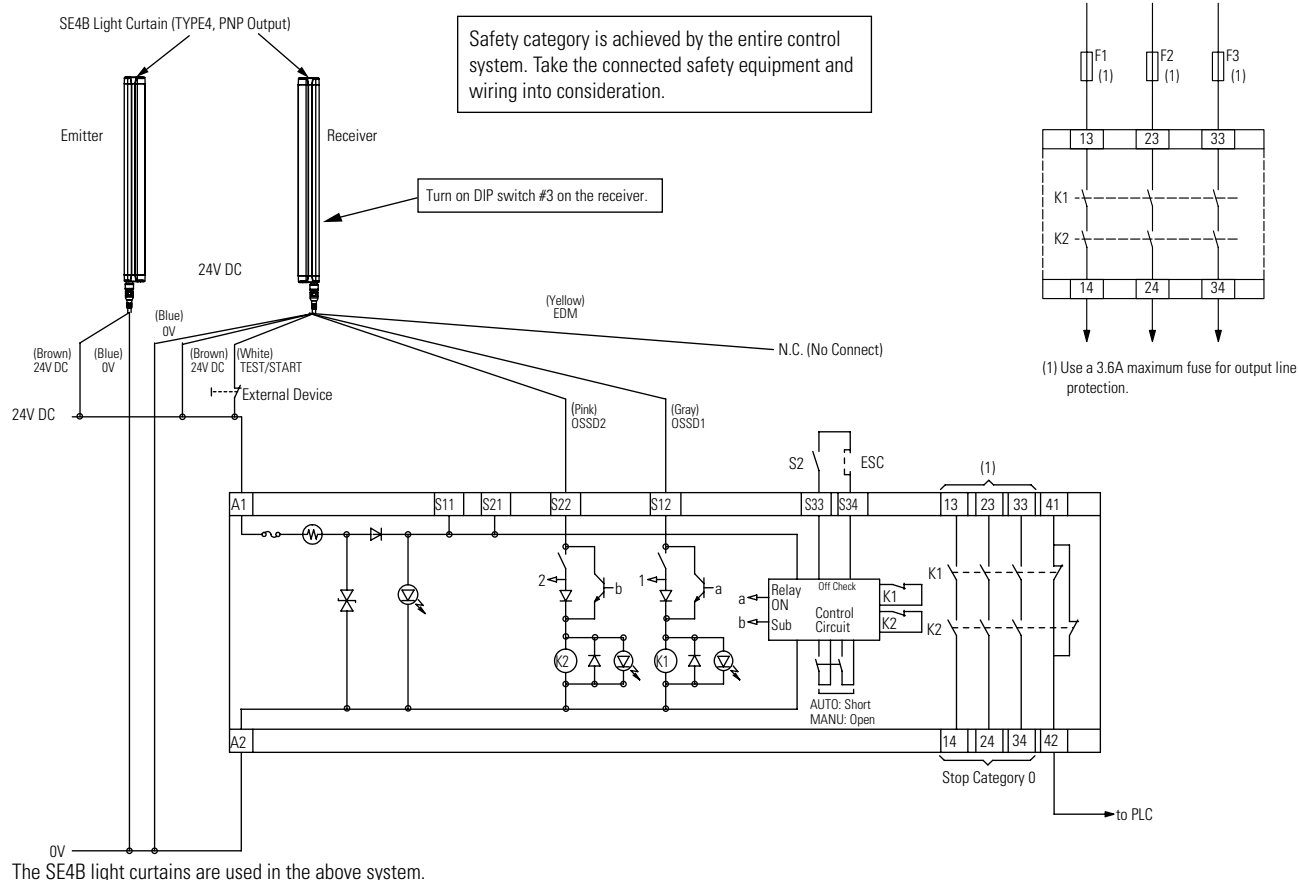
Category 3 or lower
Category 4

HR2S-301P
HR2S-301N, HR2S-301P + Type 4 OSSD's

HR2S-301P Wiring Diagram

Safety Category 4 Circuit Example (using a safety light curtain)

*EDM function disabled

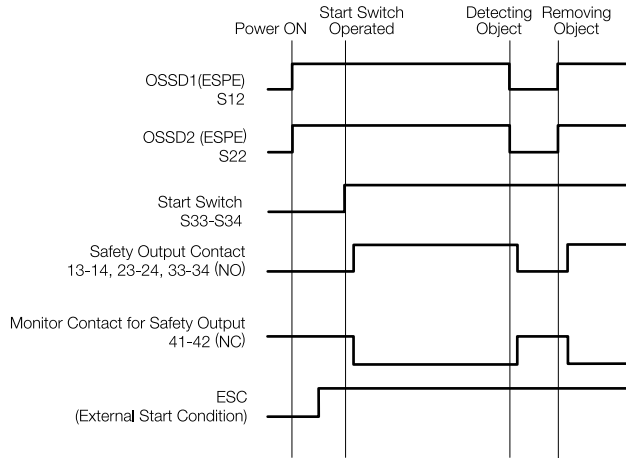


The SE4B light curtains are used in the above system.

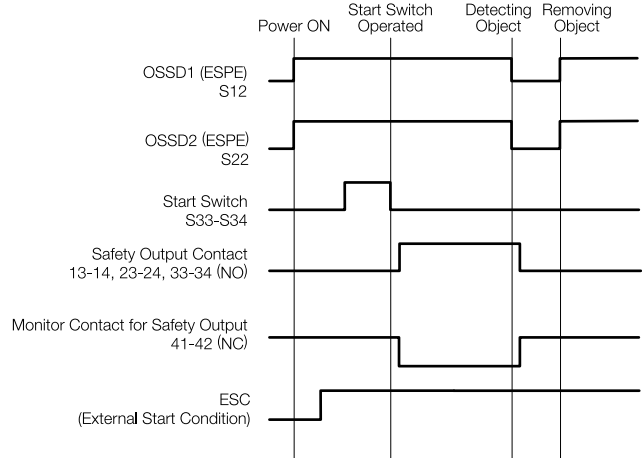
ESC:	External Start Condition
F1 to 3:	Protective fuse for the output of safety relay module
K1 to 2:	Safety Contactor
S2:	Start Switch
S33-S34:	Feedback loop

HR2S-301P Operation Chart Using OSSD outputs of a light curtain (EPSE)

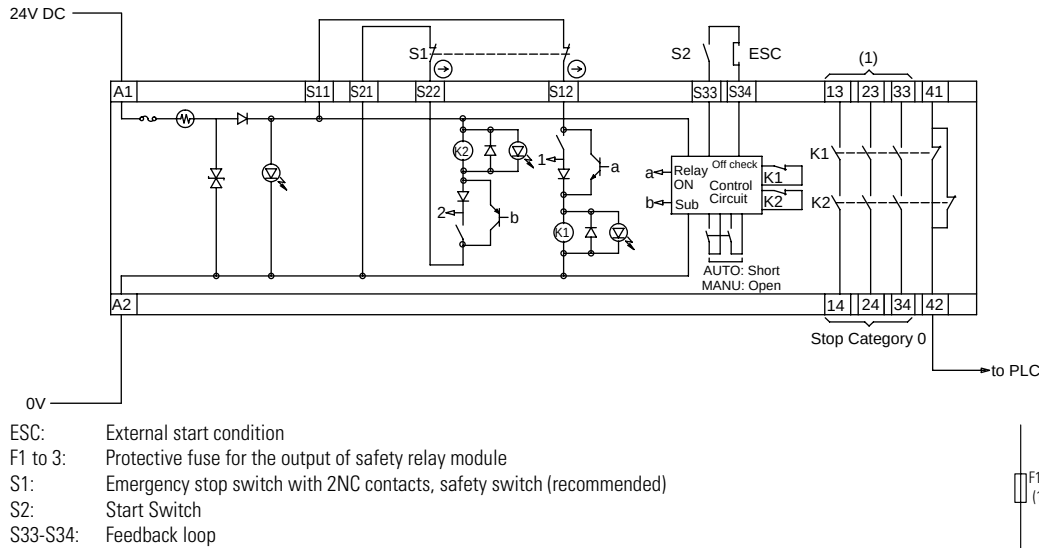
AUTO mode



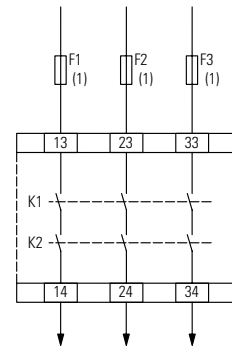
MANU mode



HR2S-301N Wiring Diagram Safety Category 4 (3) Circuit Example (using an emergency stop switch)



Safety category is achieved by the entire control system. Take the connected safety equipment and wiring into consideration.



(1) Use a 3.6A maximum fuse for output line protection.

HR2S-301N Wiring Diagram Safety Category 4 (3) Circuit Example (using an emergency stop switch)

Overview

XW Series E-Stops

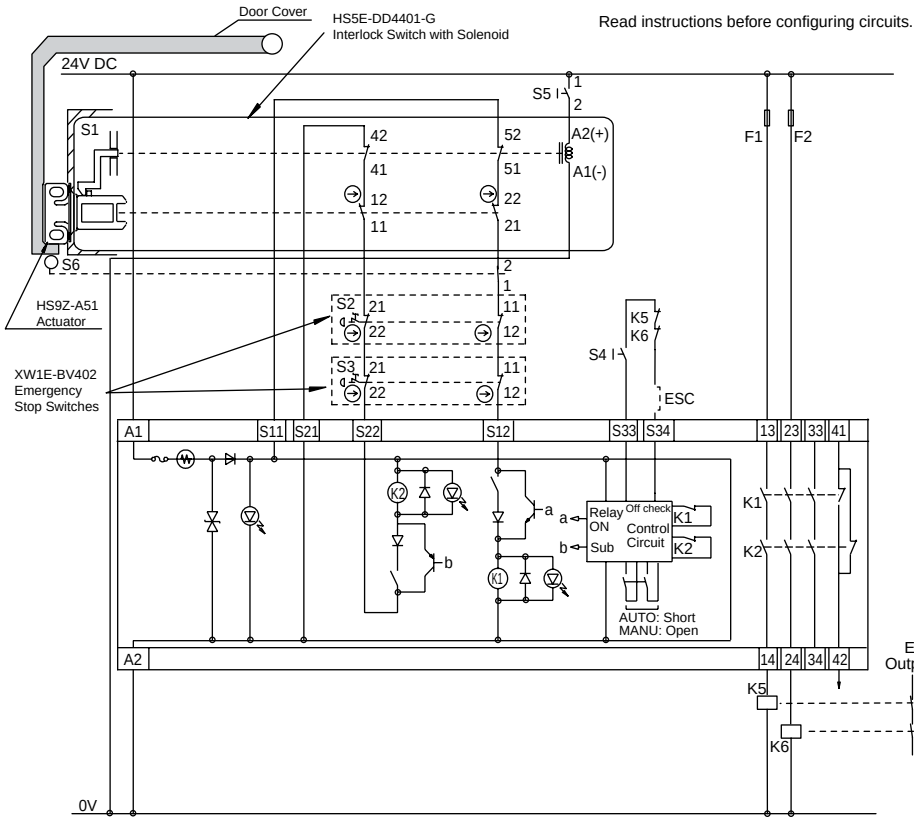
Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work



Safety category is achieved by the entire control system. Take the connected safety equipment and wiring into consideration.

- ESC: External Start Condition
- F1, F2: Fuse 3.6A
- K5, 6: Safety Contactor (force guided)
- S1: HS5E-DD4401-G Interlock Switch with Solenoid
- S2, 3: XW1E-BV402 Emergency Stop Switches
- S4: Start Switch (HW series momentary)
- S5: Unlocking Enabling Switch
- S6: Limit Switch, etc.

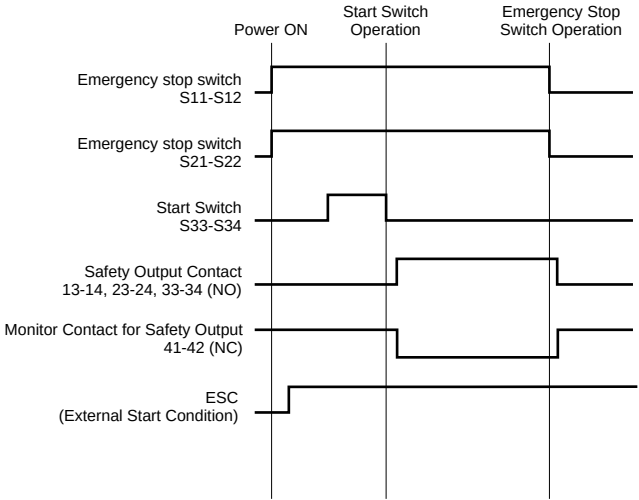
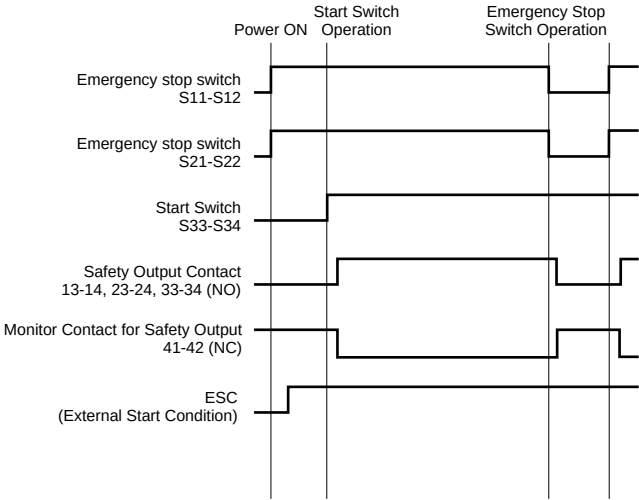
Operations of Interlock Switch with Solenoid
(Stop)
Machine stops → Unlocking enabling switch ON → Safety output OFF → Door cover released
(Start)
Door cover closed → Safety relay module start switch ON → Safety output ON → Machine starts

Operations of Emergency Stop Switch
(Stop)
Press emergency stop switch → Safety output OFF → Machine stops
(Start)
Emergency stop switch reset → Safety relay module start switch ON → Safety output ON → Machine starts

HR2S-301N Operation Chart
Using an emergency stop switch

AUTO mode

MANU mode



HR2S-332N-T075/T15/T30 Safety Relay Modules

Key features:

- Simple wiring procedure
- Removable terminal block enables easy replacement
- Terminal cover detects improper connection
- Operation modes can be changes with a single action
- Compact design enables installation in a narrow space
- Safety Category 4, Performance Level e according to EN ISO 13849-1: 2008
- TÜV SÜD European and North American (NRTL)



Part Numbers

Contact Configuration			Input	Supply Voltage	Part No.
Safety Output	Time-delay Safety Output	Auxiliary Contact			
3NO	3NO	2NC	Negative	24V DC –15% to +10%	HR2S-332N-T075 HR2S-332N-T15 HR2S-332N-T30



Note: Time-delay duration can be set in 15 steps. 7.5 sec. (0.5, 1.0 ... 7.0, 7.5); 15 sec. (1, 2 ... 14, 15); 30 sec. (2, 4 ... 28, 30)

Specifications

Applicable Standards	EN ISO 13849-1: 2008 EN 954-1: 1996 EN 50178: 1997 EN 55011/A2: 2007 EN 61000-6-2: 2005 EN 61496-1: 2004 UL508/R2005-07 CAN/CSA C22.2 No.14: 2005	Shock Resistance	300 m/s ² , pulse width 11m sec, 3 times in each of 3 axes
Applicable Standards for Use	EN 60204-1: 2006	Bump	100 m/s ² , pulse width 16m sec, 1000 times in each of 3 axes
Performance level (PL)	e (EN ISO13849-1)	Vibration Resistance	10 to 55 Hz, 1 octave/minute, 0.7 mm-p in each of 3 axes, 20 sweeps, 5 to 55 Hz, 30 m/s ² , for 2 hours in each of 3 axes
Safety Category	4 (EN ISO13849-1)	Degree of Protection	Terminals: IP20 Housing: IP40
Stop Category	0, 1 (IEC/EN 60204-1) ¹	Rated Voltage	24V DC –15% to +10%
Operating Temperature	–10 to +55°C (no freezing)	Power Consumption	4.6W (26.4V DC)
Relative Humidity	30 to 85% (no condensation)	Overcurrent Protection	Built-in, electronic (approx. 0.9A)
Altitude	0 to 2000m (operating)	Contact Resistance	200 mW maximum (measured using 5 or 6V DC, 1A voltage drop method)
Insulation Resistance	100 MΩ minimum (500V DC megger, same measurement positions as dielectric strength)	Turn-On Time	50 ms maximum
Dielectric Strength	Between outside housing and internal circuit: 3,750V AC, 1 minute	Minimum Applicable Load	24V DC / 5 mA (reference value)
	Between outputs of different poles: 2,500V AC, 1 minute	Response Time	20 ms maximum ^{2,3}
	Between input and output terminals: 2,500V AC, 1 minute	Overvoltage Category	III (IEC60664-1)
	Between power supply and output terminals: 2,500V AC, 1 minute	Pollution Degree	2 (IEC60664-1)
		Rated Insulation Voltage (output contact)	250V (IEC60664-1)



1. Safety output contact: Stop Category 0
Time-delay output contact: Stop Category 1
2. When measured at the rated voltage (at 20°C), excluding contact bounce time.
3. The time from when the safety input turns OFF to when the safety output turns OFF.

Specifications, con't

Output Contact Ratings	Terminals 13-14 23-24 33-34	Rated Load ^{5 6}		250V AC / 30V DC (resistive load) ⁷ Category 3 or lower: 5.0A maximum Category 4 or lower: 3.6A maximum
		Safety Circuit	AC15	240V AC / 2A cosφ=0.3
			DC13	24V DC / 1A L/R=48 ms
		No. of Outputs		3 (NO contact output)
	Terminals 41-42	Rated Load ⁶		250V AC / 30V DC (resistive load) Category 3 or lower: 5.0A maximum Category 4 or lower: 3.6A maximum
		Safety Circuit	AC15	240V AC / 2A cosφ=0.3
			DC13	24V DC / 1A L/R=48 ms
		No. of Outputs		1 (NC contact output)

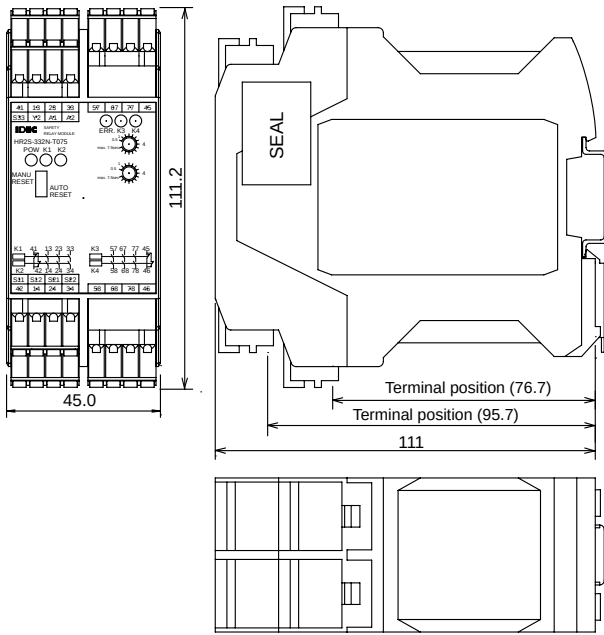
Time-delay Output Contact	Terminals 57-58 67-68 77-78	Rated Load ^{5 6}		250V AC / 30V DC (resistive load) ⁷ Category 3 or lower: 5.0A maximum Category 4 or lower: 3.6A maximum
		Safety Circuit	AC15	240V AC / 2A cosφ=0.3
			DC13	24V DC / 1A L/R=48 ms
		No. of Outputs		3 (NO contact output)
	Terminals 45-46	Rated Load ⁶		250V AC / 30V DC (resistive load) Category 3 or lower: 5.0A maximum Category 4 or lower: 3.6A maximum
		Safety Circuit	AC15	240V AC / 2A cosφ=0.3
			DC13	24V DC / 1A L/R=48 ms
		No. of Outputs		1 (NC contact output)
Mechanical Durability				5,000,000 operations minimum
Electrical Durability				100,000 operations minimum
Wire Size				0.2 mm ² to 1.5 mm ² (24 to 16 AWG)
Weight (approx.)				320g

- 
5. Leave 5 mm of space between the sides of the module when more than 3A is continuously applied to the relay contact.

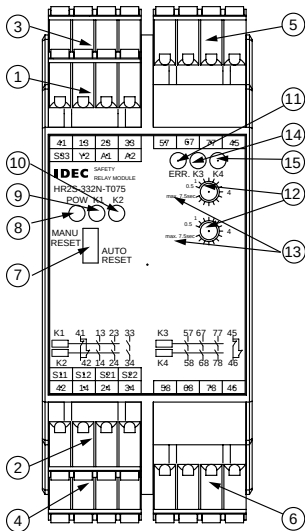
6. The module is not suitable for use with a load less than the minimum applicable load. Once a large load is applied, contacts may not operate with a small load.

7. The maximum current of the safety output contact is specified by the approved standard.
Category 4: 3.6A Category 3: 5.0A
To prevent the safety output contact from overcurrent, use a fuse. To satisfy Category 4, use a fuse with a maximum current of 3.6A. This fuse is not required if the short circuit current is less than 5A.

Dimensions (mm)



Terminal Arrangement



Part Description

Part No.	Part Names and Functions
1	CN1: Power supply input, start/off-check input
2	CN2: Safety input (dual channel)
3	CN3: Safety output contact
4	CN4: Safety output contact
5	CN5: Time-delay safety output contact
6	CN6: Time-delay safety output contact
7	Switch: Select AUTO or MANU mode
8	POW: Power LED
9	K1: ON-LED for safety output
10	K2: ON-LED for safety output
11	ERR: Error (timer) LED
12	Switches: Time-delay. The same value should be set for both switches. Otherwise, an error occurs.
13	Characters: Maximum time-delay duration is displayed. 0.75: 7.5 sec., 15: 15 sec., 30: 30 sec.
14	K3: ON-LED for safety output
15	K4: ON-LED for safety output

Terminal Arrangement

Terminals	Markings	I/O Signals		Remarks
CN1	A1	Power supply +24V DC input		Use a dry contact.
	A2	Power supply 0V input		
	S33	Start/off-check input		
	Y2			
CN2	S11	Safety input 1	Common	Use a dry contact.
	S12		Function	
	S21	Safety input 2	Common	
	S22		Function	
CN3 CN4	41–42	Monitor contact for safety output (NC)		Rated load 250V AC / 30V DC 1A (Resistive load)
	13–14	Safety output contact (NO)		Rated load 250V AC / 30V DC (Note) (Resistive load)
	23–24			
	33–34			
CN5 CN6	45–46	Time-delay safety output contact (NC)		Rated load 250V AC / 30V DC 1A (Resistive load)
	57–58	Time-delay safety output contact (NO)		Rated load 250V AC / 30V DC (Note) (Resistive load)
	67–68			
	77–78			



Note: 5.0A maximum Category 3 or lower
3.6A maximum Category 4

HR2S-332N-T075/T15/T30 Wiring Diagram
Safety Category 4 Circuit Example (using an emergency stop switch)

Overview

XW Series E-Stops

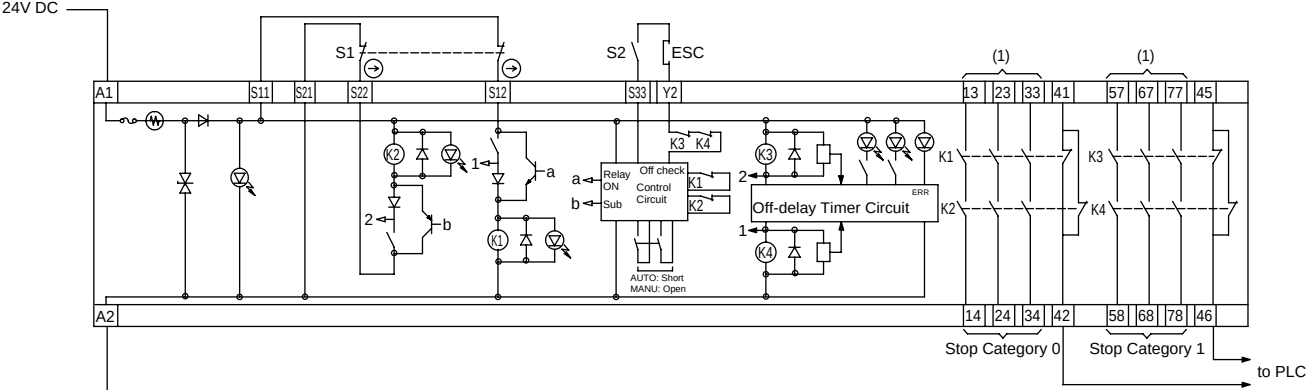
Interlock Switches

Enabling Switches

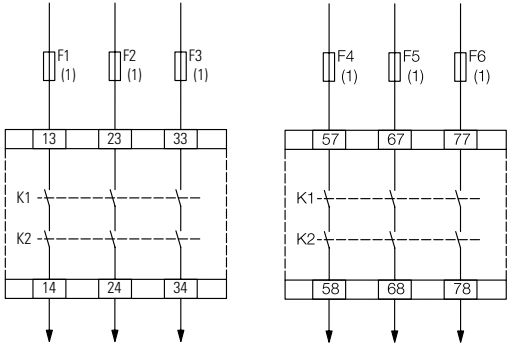
Safety Control

Light Curtains

AS-Interface Safety at Work



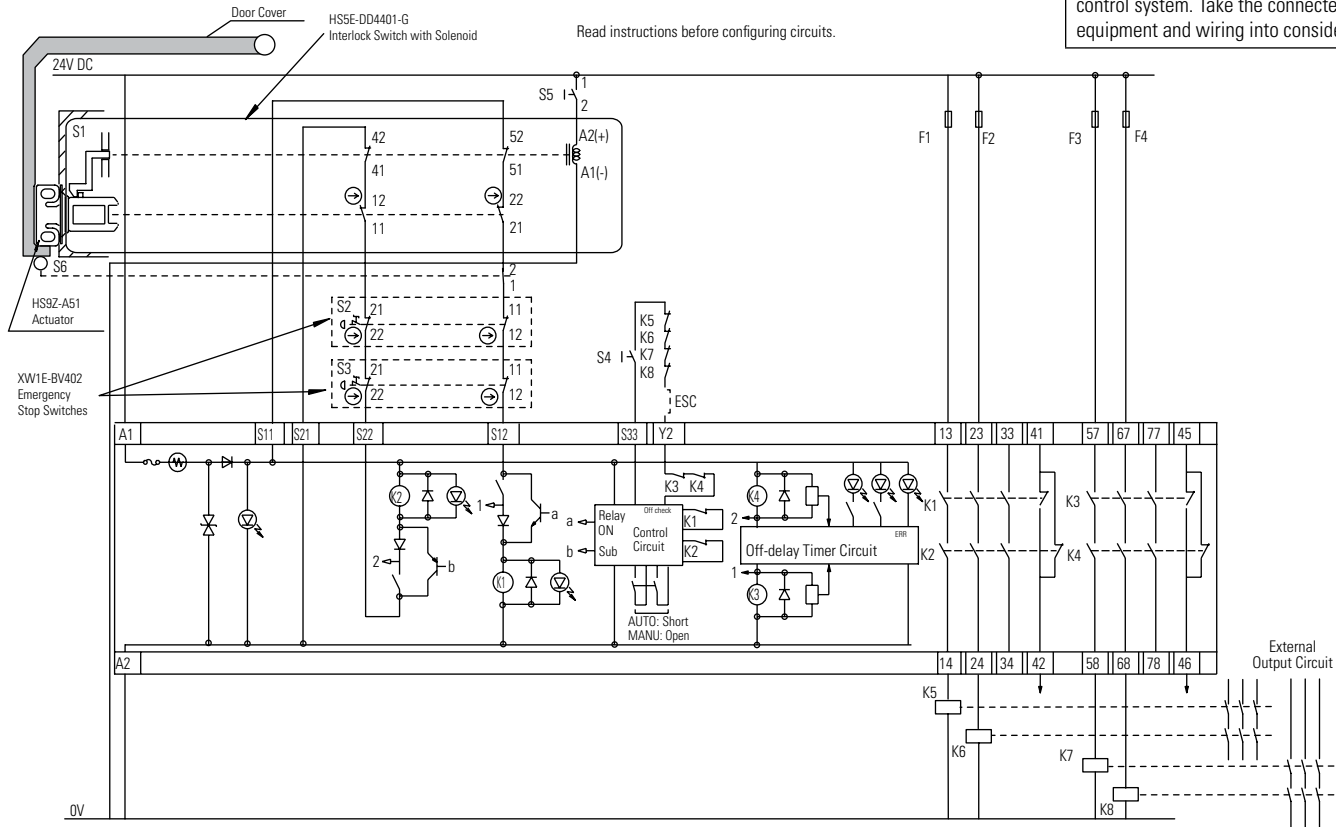
- ESC: External Start Condition
F1 to 6: Protective fuse for the output of safety relay module
S1: Emergency stop switch with 2NC contacts, safety switch (recommended)
S2: Start Switch
S33-Y2: Feedback loop



(1) Use a 3.6A maximum fuse for output line protection.

Safety Category 3 Circuit (using multiple emergency stop switches)

Safety category is achieved by the entire control system. Take the connected safety equipment and wiring into consideration.



Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

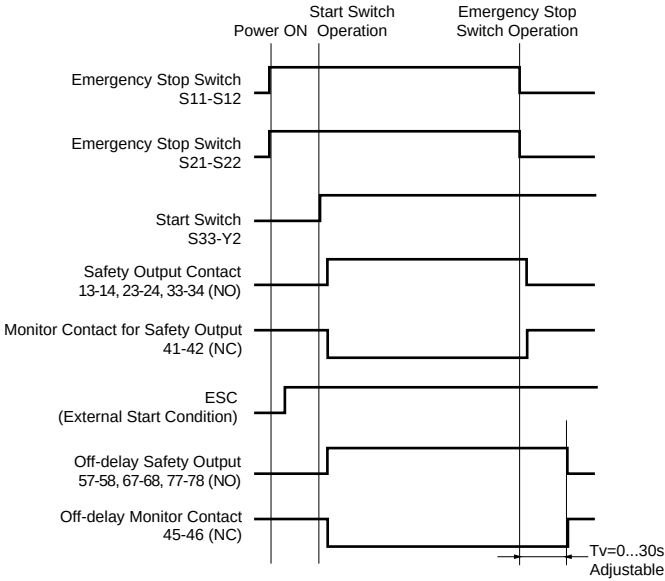
Safety Control

Light Curtains

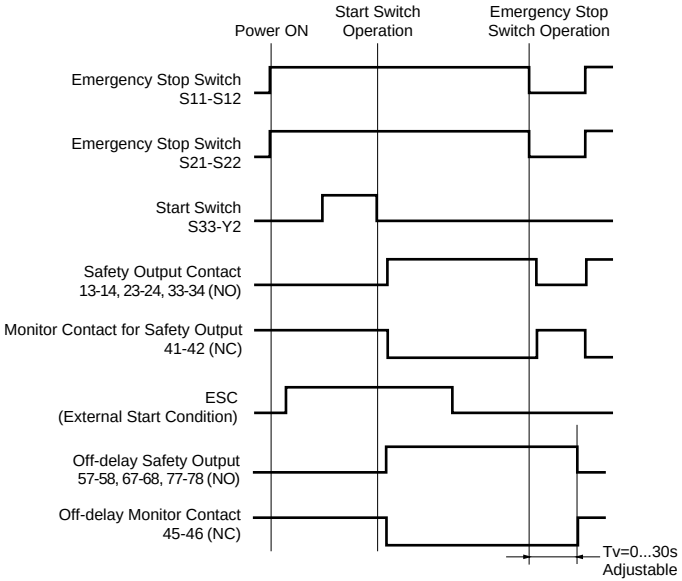
AS-Interface Safety at Work

HR2S-332N-T075/T15/T30 Operation Chart
Using emergency stop switches

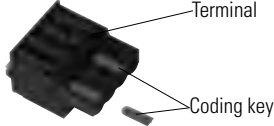
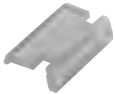
AUTO mode



MANU mode



Maintenance Parts

Item	Part Number	Remarks
Terminal / Coding Key 	HR9Z-PMT1	Coding keys are used to prevent incorrect insertion of terminals.
Terminal Cover 	HR9Z-PMC1	Used to make sure that the terminals are fully inserted.
Protective Tape 	HR9Z-PE1	Used to protect the AUTO/MANU switch on the front of the module.

FS1A Multi-function Safety Relay

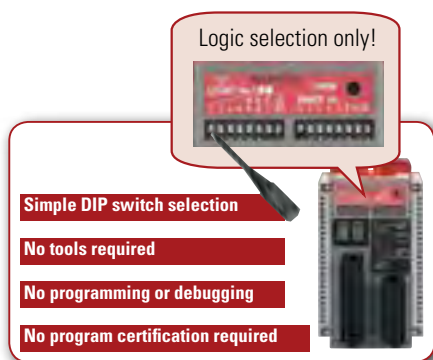
Key features:

- No programming required. Configuration complete by turning on a logic switch
- A safety circuit can be configured easily just by selecting a logic from eight pre-programmed logics
- Mode selection, partial/entire stop can be achieved just by selecting a logic
- One SafetyOne module can connect with various safety inputs such as emergency stop switches and light curtains
- The status of safety I/Os and the SafetyOne errors can be monitored
- Solenoid drive output is provided, eliminating the need for a PLC
- IEC 61508 safety integrity level 3, ISO 13849-1 performance level e, and EN954-1 control category 4 compliant



Part Numbers

No. of Logic	Part Number
8	FS1A-C01S
24	FS1A-C11S



Optional Parts

Product	Part Number	Note
Input Connector 	FS9Z-CN01	
Output Connector 	FS9Z-CN02	
Connecting Tool 	FS9Z-SD01	
Marked Cable Tie 	FS9Z-MT01	Used to lock the protective cover of the FS1A.
DIN Rail 	BNDN1000	Aluminum, 1m 35mm wide
End Clip 	BNL6	

Complies with key safety standards!

International
Standards
Compliant

ISO13849-1 PLe

The SafetyOne satisfies:

EN 954-1	Category 4	ISO	IEC	EN	ANSI/RIA
IEC 61508	SIL3	ANSI	SEMI	NFPA	
ISO 13849-1	Performance level e				

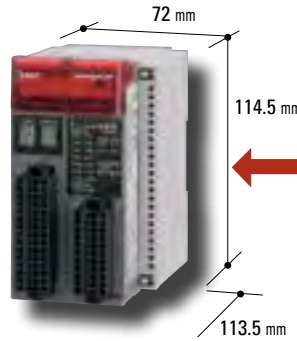
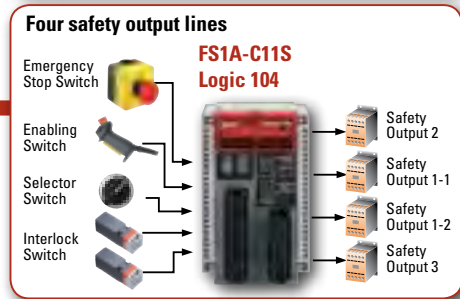
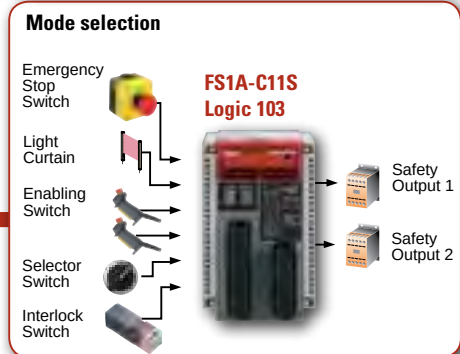
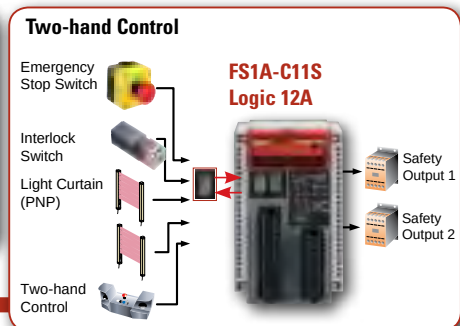
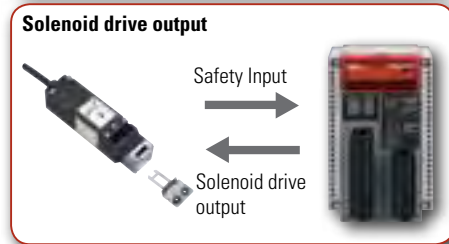
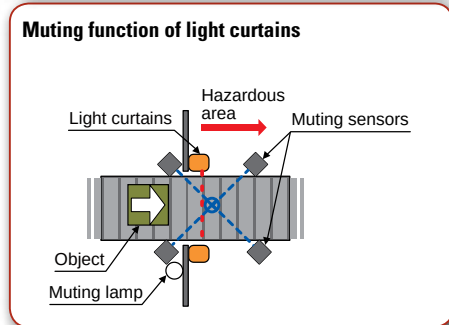
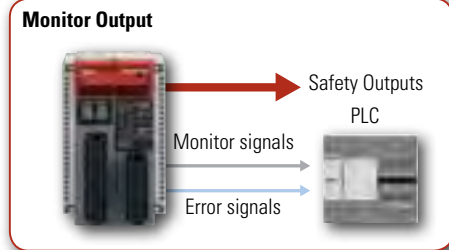
With 8 (FS1A-C01S) or 24 (FS1A-C11S) pre-programmed safety circuit logics in a compact housing, the FS1A SafetyOne safety controller allows you to build a safety circuit by just sliding a DIP switch. Because the programs are tested and approved for compliance with key safety standards, labor, cost, and time for safety system certification can be reduced greatly.

Note: The eight logic programs of FS1A-C01S are not included in the 24 logic programs of FS1A-C11S.

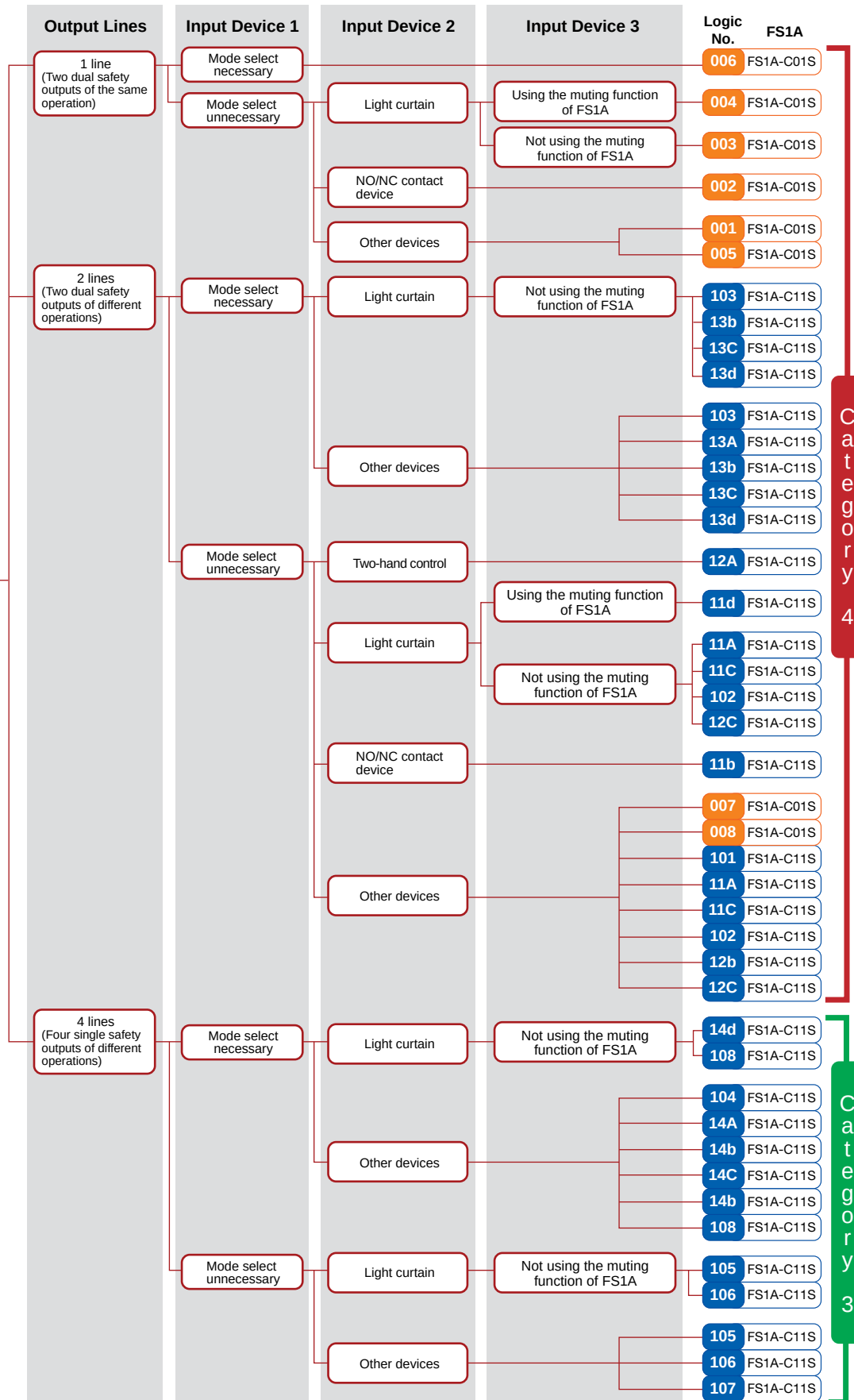




Large functionality in a compact housing!



START



Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Category 4

Category 3

Specifications

Operating Environment

Applicable Standards	TÜV approval: IEC/EN 61000-6-2, IEC/EN 61000-6-4, IEC/EN 61496-1, IEC 61508 Part 1-7, IEC/EN 62061, ISO 13849-1, ISO 13851 (FS1A-C11S), EN 954-1 UL: UL508, CSA C22.2 No. 142 Applicable standards: IEC/EN 60204-1, IEC/EN 61131-2, ISO 10218-1, ANSI/RIA R15.06, ANSI B11.19, SEMI S2-0706, NFPA79 EN 954-1, 13849-1, 62061, 61496-1, 60204-1, 61131-2, 61000-6-2, 61000-6-4 ANSI/RIA R15.06 ANSI B11.19 SEMI S2 NFPA 79
Safety Circuit	Logic selection
Operating Temperature	−10 to +55°C (no freezing)
Operating Humidity	10 to 95% RH (no condensation)
Storage Temperature	−40 to +70°C (no freezing)
Storage Humidity	10 to 95% RH (no condensation)
Pollution Degree	2 (IEC/EN60664-1)
Degree of Protection	IP20 (IEC/EN60529)
Corrosion Immunity	Free from corrosive gases
Altitude	Operation: 0 to 2000m, Transport: 0 to 3000m
Vibration Resistance	Vibration: 5 to 8.4 Hz, amplitude 3.5 mm 8.4 to 150 Hz Acceleration: 9.8 m/s ² (2 hours each on three mutually perpendicular axes) (IEC/EN60028-2-6) Bump: Acceleration 98 m/s ² , 16 ms (1000 times each on three mutually perpendicular axes) (IEC/EN60028-2-29)
Shock Resistance	147 m/s ² , 11ms (3 shocks each on three mutually perpendicular axes (IEC/EN 60028-2-27)
Connector Insertion/Removal Durability	50 times maximum
Configuration Switch Durability	100 operations maximum per pole
Enter Button Durability	1000 operations maximum
Housing Material	Modified-polyphenyleneether (m-PPE)
Weight (approx.)	330g

Electric Characteristics

Rated Voltage	24V DC
Allowable Voltage Range	20.4 to 28.8V DC
Maximum Power Consumption	48W (at the rated power voltage, when all I/Os are ON) (incl. output load)
Allowable Momentary Power Interruption	10 ms minimum (at the rated power voltage)
Response Time	ON→OFF: 40 ms maximum ¹ 100 ms maximum ² OFF→ON: 100 ms maximum ³
Start-up Time ⁴	6 sec maximum
Dielectric Strength	Between live part and FE terminal: 500V AC, 1 minute Between housing and FE terminal: 500V AC, 1 minute
Insulation Resistance	Between live part and FE terminal: 10 MΩ minimum (500V DC megger) Between housing and FE terminal: 10 MΩ minimum (500V DC megger)
Impulse Noise Immunity (noise simulator)	Power terminal: ±1 kV 50 ns, 1μs (direct connection) I/O terminal: ±2kV 50 ns, 1μs (coupling adapter)
Inrush Current	25A maximum
Ground	Ground resistance of 100Ω maximum
Effect of Incorrect Wiring	Reverse polarity: No operation, no damage Improper voltage: Permanent damage may occur



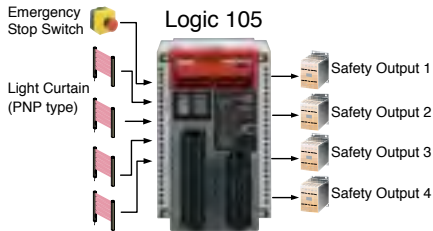
1. The time to shut off safety outputs after inputs are turned off or input monitor error is detected (when off-delay timer is set to 0s)
2. Time to shut off safety outputs after an error (except input monitor error) or a configuration change of logic or timer is detected (not depending on the off-delay timer value)
3. Auto start—Time to turn on safety outputs after safe inputs are turned on
Manual start—Time to turn on safety outputs after start inputs are turned on
Control start—Time to turn on safety outputs after the start inputs are turned off-on-off (maintain ON for 0.1 to 5s)
4. Time to change to Run state after power supply is turned on.

Examples

FS1A-C11S Logic 105	Partial stop logic for apparatus with openings	Output Line: 4 4 single safety outputs of different operations	Category 3
------------------------	--	---	---------------

Logic 105 is used for safeguarding measures of machine tools and robots, which use safety equipment such as light curtains with dual solid state outputs. Safety outputs are single output. Five dual channel safety inputs can be connected. Safety output 4 has an off-delay timer.

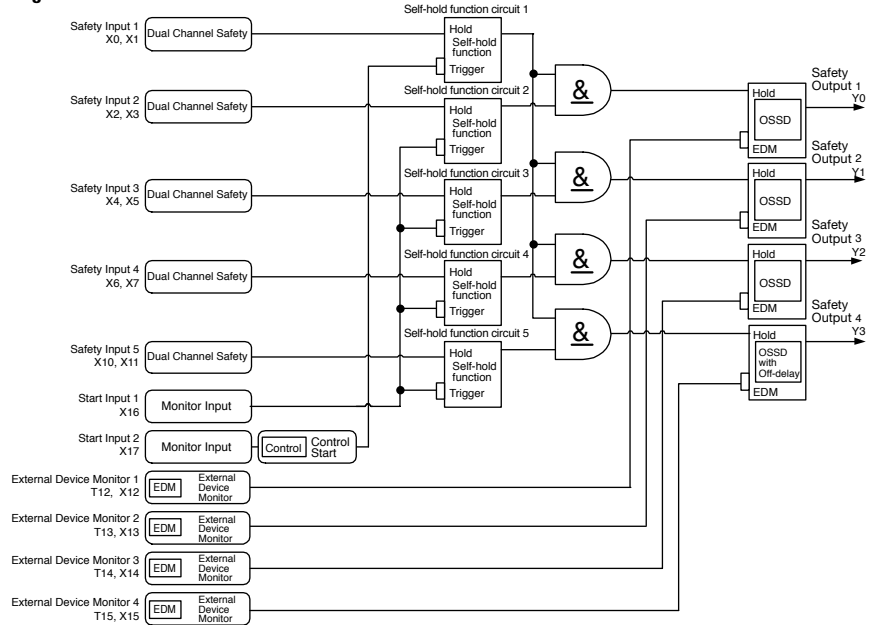
Wiring Example



DIP Switch and LED Display



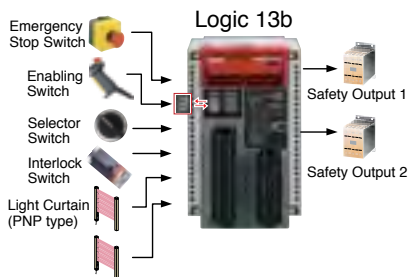
Logic Chart



FS1A-C11S Logic 13b	The logic constructing an OR circuit applicable for selection of active safety input devices	Output Line: 2 2 dual safety outputs of different operations	Category 4
------------------------	--	---	---------------

In machine tools and robots, a hazard source is isolated by a guard in automatic operation. In human-attended operation such as teaching and maintenance, the operator has to work inside a hazardous area. Logic 13b is used to configure a system in which teach or auto mode can be selected using a selector switch. Safety outputs are dual channel outputs. OR circuit can be configured in auto mode. Two dual channel direct opening input, one mode select input, one dual channel dependent input, and two dual channel safety inputs can be connected. Safety output 2 has an off-delay timer.

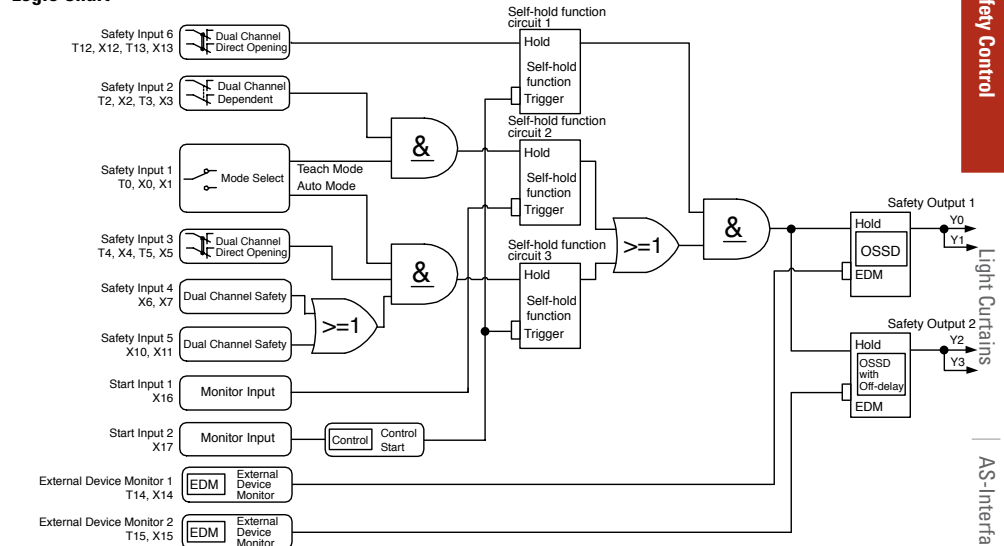
Wiring Example



DIP Switch and LED Display



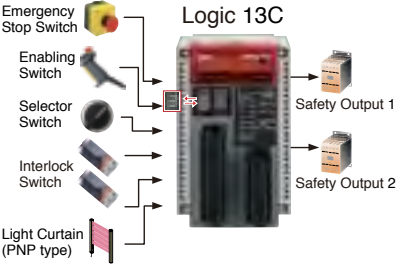
Logic Chart



FS1A-C11S Logic 13C	Partial stop logic applicable for selection of ac- tive safety input devices	Output Line: 2 2 dual safety outputs of different operations	Category 4
------------------------	---	--	---------------

In machine tools and robots, a hazard source is isolated by a guard in automatic operation. In human-attended operation such as teaching and maintenance, the operator has to work inside a hazardous area. Logic 13C is used to configure a system in which teach or auto mode can be selected using a selector switch. Safety outputs are dual channel outputs. Three dual channel direct opening inputs, one mode select input, one dual channel dependent input, one dual channel safety input can be connected. Safety output 2 has an off-delay timer.

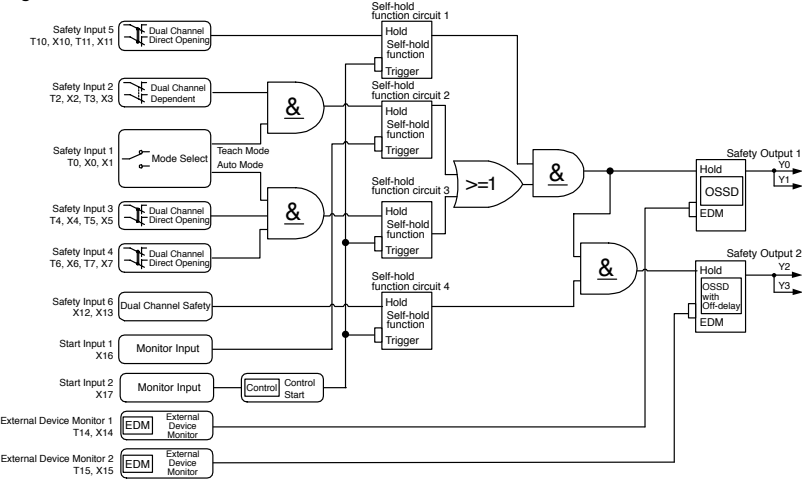
Wiring Example



DIP Switch and LED Display



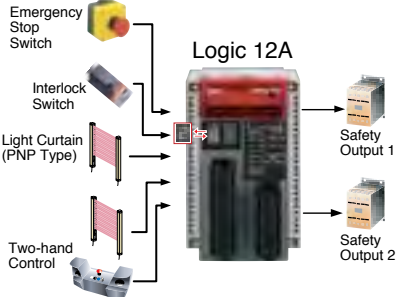
Logic Chart



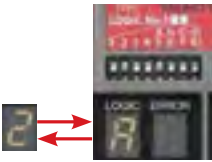
FS1A-C11S Logic 12A	The logic for apparatus with a two-hand control device	Output Line: 2 2 dual safety outputs of different operations	Category 4
------------------------	---	---	---------------

Logic 12A is used for safeguarding measures of machine tools that use two-hand control. Safety outputs are dual channel outputs. Two dual channel direct opening inputs, one two-hand control input (two safety inputs = one point), and two dual channel safety inputs can be connected. Safety output 2 has an off-delay timer.

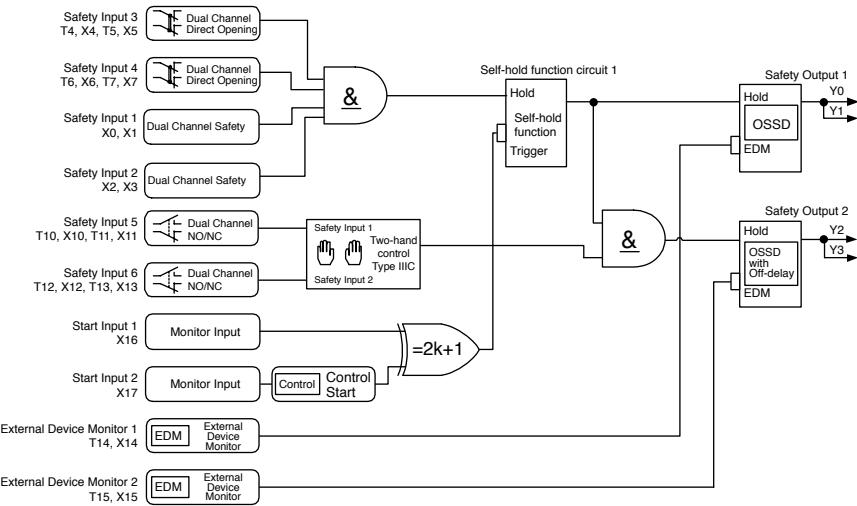
Wiring Example



DIP Switch and LED Display



Logic Chart



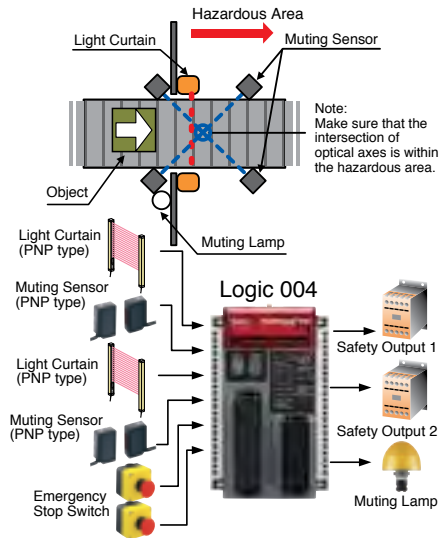
FS1A-C01S Logic 004	Muting function logic for apparatus with openings	Output Line: 1 2 dual safety outputs of the same operation	Category 4
------------------------	--	---	---------------

In Logic 004, muting functions are added to the dual solid state output of Logic 003. Dual direct-opening components such as emergency stop switches and interlock switches can be used at the same time.

Muting Function Improves Productivity

With a muting function, the system stops when detecting a human and temporarily defeats the light curtain while work objects are being supplied. This improves the system's productivity. Muting functions can be used easily by connecting a light curtain, muting sensor, and muting lamp to the SafetyOne (Note). In muting status, the OFF signals of corresponding safety solid state outputs are defeated.

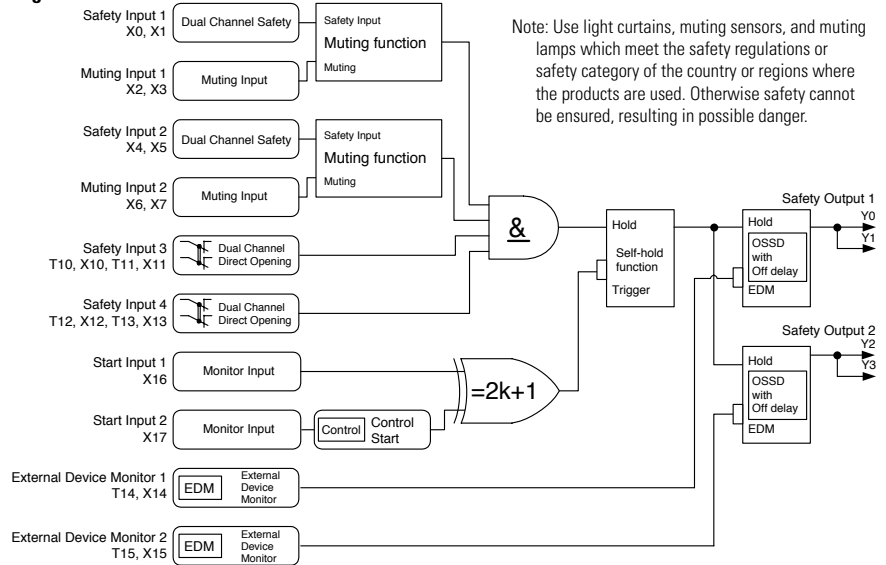
Wiring Example



DIP Switch and LED Display



Logic Chart



Note: When installing light curtain and muting sensor, ensure safety by referring to IEC TS 62046 technical documents.

Safety Input Specifications

Drive Terminals

(T0, T1, T2, T3, T4, T5, T6, T7, T10, T11, T12, T13, T14, T15)

Rated Drive Voltage	Power supply voltage
Minimum Drive Voltage	Power supply voltage – 2.0V
Number of Drive Terminals	14
Maximum Drive Current	20 mA per terminal (28.8V DC) (Note)

Note: Drive terminals of safety inputs send safety confirmation signals (pulse signals) for the diagnosis of safety components and input circuits.

Wiring and diagnosis function change depending on the selected logic. See user's manual "Chapter 5 Logic." Basic specifications remain the same.

Receive Terminals

(X0, X1, X2, X3, X4, X5, X6, X7, X10, X11, X12, X13, X14, X15)

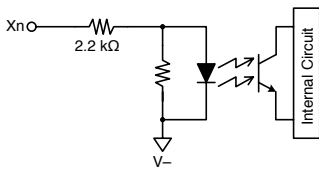
Rated Input Voltage	24V DC
Input ON Voltage	15.0 to 28.8V DC
Input OFF Voltage	Open or 0 to 5.0V DC
Number of Inputs	14
Input Current	10 mA per terminal (at the rated power voltage)
Input Signal	Sink input (for PNP output), Type 1 (IEC61131-2)

Wire

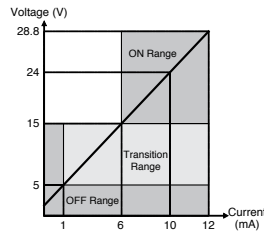
Cable Length (Note)	100m maximum (total wire length per input)
Allowable Wire Resistance	300Ω maximum

Note: When wiring between the SafetyOne and a component is 30m or more, use shielded cable to ensure electromagnetic immunity.

• Receive Terminal Internal Circuit



• Receive Terminal Operating Range

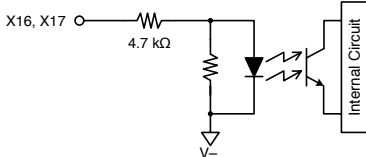


Start Input Specifications

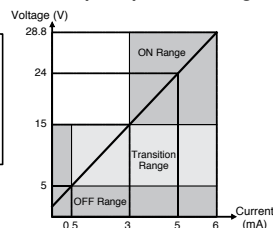
Rated Input Voltage	24V DC
Input ON Voltage	15.0 to 28.8V DC
Input OFF Voltage	Open or 0V to 5.0V DC
Number of Start Inputs	2 (X16, X17)
Input Current	5 mA per terminal (at the rated power voltage)
Input Signal	Sink input (PNP output), Type 1 (IEC61131-2)
Cable Length (Note)	100m maximum (total wire length per input)
Allowable Wire Resistance	300Ω maximum

Note: When wiring between the SafetyOne and a component is 30m or more, use shielded cable to ensure electromagnetic immunity.

• Start Input Internal Circuit



• Start Input Operation Range



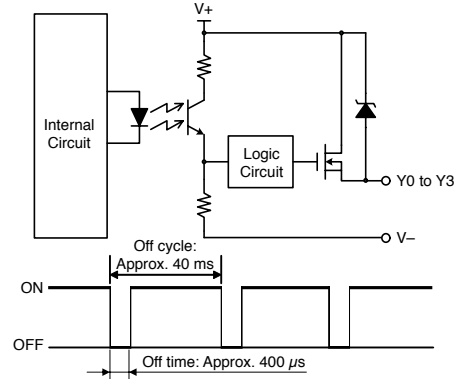
Safety Output Specifications

Output Type	Source output (N channel MOSFET)
Rated Output Voltage	Power supply voltage
Minimum Output Voltage	Power supply voltage – 2.0V
Number of Safety Outputs	4 (Y0, Y1, Y2, Y3)
Maximum Output Current	1 output: 500 mA maximum Total: 1A maximum
Leakage Current	0.1 mA maximum
Allowable Inductive Load ¹	L/R = 25 ms
Allowable Capacitive Load	1 μF maximum
Cable Length ²	100m maximum (total length per output)

1. When connecting an inductive load, connect a protection element such as a diode.

2. When wiring between the SafetyOne and a component is 30m or more, use shielded cable to ensure electromagnetic immunity.

• Safety Output Internal Circuit



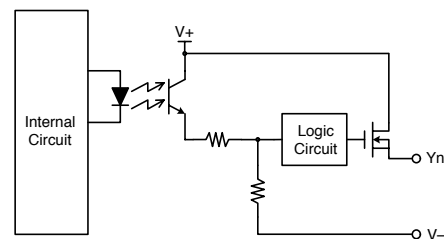
The safety outputs of the SafetyOne are solid state outputs. When the output is on, off-check signals are generated at regular intervals. The operating characteristics of the safety output change depending on the selected logic. For details, see user's manual "Chapter 5 Logic." The basic specifications remain the same. Note that off-check signals may cause reaction of some safety components depending on their response speed. Monitor output and solenoid/lamp output do not generate outputs of off-check signals.

Monitor Output Specifications

Output Type	Source output (N channel MOSFET)
Rated Output Voltage	Power supply voltage
Minimum Output Voltage	Power supply voltage – 2.0V
Number of Safety Outputs	4 (Y0, Y1, Y2, Y3)
Maximum Output Current	1 output: 500 mA maximum Total: 1A maximum
Leakage Current	0.1 mA maximum
Allowable Inductive Load ¹	L/R = 25 ms
Allowable Capacitive Load	1 μF maximum
Cable Length ²	100m maximum (total length per output)

Note: When wiring between the SafetyOne and a component is 30m or more, use shielded cable to ensure electromagnetic immunity.

• Monitor Output Internal Circuit



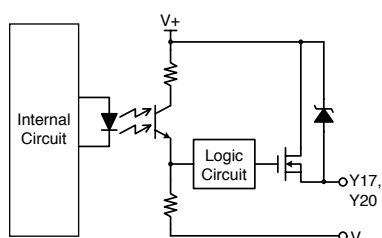
The operating characteristics of the monitor output change depending on the selected logic. For details, see user's manual "Chapter 5 Logic." The basic specifications remain the same. Do not use monitor output as a safety output, otherwise the system's safety cannot be assured when the SafetyOne or safety components fail.

Solenoid/Lamp Output Specifications

Output Type	Source output (N channel MOSFET)	
Rated Output Voltage	Power supply voltage	
Minimum Output Voltage	Power supply voltage – 2.0V	
No. of Solenoid/Lamp Outputs	2 (Y17, Y20)	
Maximum Output Current	1 output	500 mA maximum
	Total	500 mA maximum
Leakage Current	0.1 mA maximum	
Allowable Inductive Load ¹	L/R = 25 ms	
Cable Length ²	100m maximum (total length per output)	

1. When connecting an inductive load, connect a protection element such as a diode.
2. When wiring between the SafetyOne and a component is 30m or more, use shielded cable to ensure electromagnetic immunity.

Solenoid/Lamp Output Internal Circuit



The selected operating characteristics of solenoid/lamp output change depending on the selected logic. For details, see user's manual "Chapter 5 Logic." The basic specifications remain the same. Do not use solenoid/lamp output as a safety output, otherwise the system's safety cannot be assured when the SafetyOne or safety components fail.

Internal States

State	Description
Initial	Initial processing is performed immediately after power is supplied to the SafetyOne. The internal circuits are checked and the LEDs show operation confirmation (blinking) for 6 seconds (approx).
Run	The SafetyOne is under normal operation. Logic processing continues without failures or wiring errors.
Configuration	A logic or off-delay timer value is being configured. Configuration enables the logic and off-delay timer value. When completed, the SafetyOne changes to the Run state.
Protection	An input monitor error has occurred with dual channel input, EDM input, or muting input. When the problem is removed, the SafetyOne changes to Run state.
Stop	A failure or error has occurred with an external device or internal circuit. When the problem is removed and the power is turned on, Stop state is cleared.

LED and Output States

When safety outputs are dual channel outputs

State	Logic LED	Error LED	Timer LED	Safety Output	Solenoid/Lamp Output	Monitor Output			
				Y0 to Y3	Y17, Y20	Y4 to Y13	Y14	Y15	Y16
Initial	(Note 1)	(Note 1)	(Note 1)	OFF	OFF	OFF	ON	ON	OFF
Run	Logic #	Blank	Selected Value	(Note 2)	(Note 2)	(Note 2)	OFF	OFF	ON
Configuration	(Note 3)	C	(Note 3)	OFF	OFF	OFF	OFF	ON	OFF
Protection	Logic #	1	Selected Value	Off (Note 6)	OFF	(Note 4)	OFF	ON	OFF
Stop	Blank	(Note 5)	Blank	OFF	OFF	(Note 4)	ON	ON or OFF	OFF

When safety outputs are single channel outputs

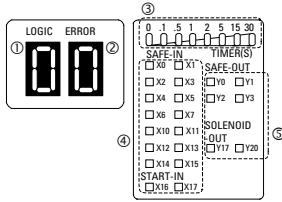
State	Logic LED	Error LED	Timer LED	Safety Output	Monitor Output			
				Y0 to Y3	Y4 to Y13, Y17, Y20	Y14	Y15	Y16
Initial	(Note 1)	(Note 1)	(Note 1)	OFF	OFF	ON	ON	OFF
Run	Logic #	Blank	Selected Value	(Note 2)	(Note 2)	OFF	OFF	ON
Configuration	(Note 3)	C	(Note 3)	OFF	OFF	OFF	ON	OFF
Protection	Logic #	1	Selected Value	Off (Note 6)	(Note 4)	OFF	ON	OFF
Stop	Blank	(Note 5)	Blank	OFF	(Note 4)	ON	ON or OFF	OFF



1. Random display of Initial state.
 2. Output and LED display of the selected logic.
 3. Blinking LED display of the selected logic number or the selected timer value.
 4. Pulsing display of monitor output and output LED corresponding to the input of error. Other LEDs and monitor outputs maintain the display of Run state.
 5. Error number is displayed.
 6. Safety output with timer is turned OFF after set OFF-delay time.
- Caution: Solenoid/lamp outputs (Y17, Y20) turn on for 1 second maximum when the state changes to Run state. Take operation of connected components into consideration.

LEDs

- ① Logic LED (green)
 ② Error LED (red)
 ③ Timer LED (green)
 ④ Input LED (orange)
 ⑤ Output LED (orange)



Logic LED ①

Type	LED	Status	Description
FS1A-C01S	1, 2, 3, 4, 5, 6, 7, 8	ON	The selected logic is in Run or Protection state
		Blink	The selected logic is in Configuration state
FS1A-C11S	1, 2, 3, 4, 5, 6, 7, 8, A, b, C, d	ON	The selected logic is in Run or Protection state (Ex. Logic 14A: 4→A→4→A→4→...)
		Blink	The selected logic is in Configuration state (Ex. Logic 14A: 4→A→OFF→A→4→OFF...)
FS1A-C01S/ C11S	E	Blink	The selected logic has Configuration error (logic not selected, or multiple logics are selected)
	Random	ON/Blink	Initializing (Initial state)
	OFF	OFF	Error (Stop state)

FS1A-C01S setting

Correct: Selecting one logic from 1 to 8
 Wrong: Selecting two or more logics from 1 to 8

FS1A-C11S setting

Correct: Selecting one logic from 1 to 8
 Selecting one from 1 to 4, and one from A, b, C, or d.
 Wrong: Selecting three or more logics from 1 to 8
 Selecting two or more logics from 1 to 4
 Selecting two or more logics from A (5), b (6), C (7), or d (8)

Error LED ②

Type	LED	Status	Description
FS1A-C01S/ FS1A-C11S	1	ON	Input monitor error (Protection state)
	2	ON	Wiring error at safety input or an error in safety input circuits
	3	ON	Wiring error at start input or an error in start input circuit
	4	ON	Wiring error at safety output or an error in safety output circuit
	5	ON	Muting lamp error (disconnection) (FS1A-C01S: logic 4 only) (FS1A-C11S: logic 11d only)
	6	ON	Power supply error or internal power supply circuit error
	7	ON	Internal error, power supply error, or internal power supply circuit error
	9	ON	EMC disturbance
	C	ON	Configuration procedure is in progress (Configuration state)
		Blink	Configuration is valid (Note) (Configuration state)
	Random	ON/Blink	Initializing (Initial state)
	OFF	OFF	Normal operation (Run state)



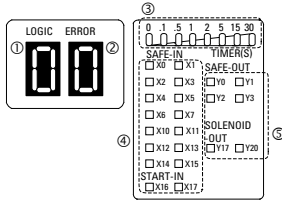
Note: Blinks for 1 to 5 seconds after the enter button is pressed. Releasing the button during blinking activates the setting. The blinking LED becomes ON if the button is pressed for more than 5 seconds, and the setting becomes invalid even after the button is released.

Timer LED ③

Type	LED	Status	Description
FS1A-C01S/ FS1A-C11S	0	ON	No off-delay (safety outputs shut down immediately)
	.1	ON	Off-delay timer 0.1s
	.5	ON	Off-delay timer 0.5s
	1	ON	Off-delay timer 1s
	2	ON	Off-delay timer 2s
	5	ON	Off-delay timer 5s
	15	ON	Off-delay timer 15s
	30	ON	Off-delay timer 30s
	Each LED	Blink	Selected timer value (Configuration state)
	Random	ON/Blink	Initializing (Initial state)
	All LEDs	OFF	Timer value is not selected or the SafetyOne is in Stop state

LEDs, con't

- ① Logic LED (green)
- ② Error LED (red)
- ③ Timer LED (green)
- ④ Input LED (orange)
- ⑤ Output LED (orange)



Input LED ④

SAFE-IN (X0 to X15), START-IN (X16, X17)

Type	LED	Status	Description
FS1A-C01S	X0 to X15	ON	Input ON
		OFF	Input OFF, Stop/Configuration state
		Blink	Input monitor error
	X16, X17	ON	Input ON
		OFF	Input OFF, Stop/Configuration state
		Blink	Input error (error displayed on error LED)
FS1A-C11S	X0 to X15	ON	Input ON
		OFF	Input OFF, Stop/Configuration state
		Blink	Input error (error displayed on error LED)
	X16, X17	ON	Input ON
		OFF	Input OFF, Stop/Configuration state
		Blink	Input error (error displayed on error LED)

Output LED ⑤

SAFE-OUT (Y0 to Y3), SOLENOID-OUT (Y17, Y20)

Type	LED	Status	Description
FS1A-C01S	Y0 to Y3	ON	Output ON
		OFF	Output OFF, Stop/Configuration state
		Blink	Off-delay operating
	Y17, Y20	ON	Output ON
		OFF	Output OFF, Stop/Configuration state
		Blink	Off-delay operating, or output error (error displayed on error LED)
FS1A-C11S	Y0 to Y3	ON	Output ON
		OFF	Output OFF
		Blink	Off-delay operating, or output error (error displayed on error LED)
	Y17, Y20	ON	Output ON
		OFF	Output OFF
		Blink	Off-delay operating, or output error (error displayed on error LED)

Configuration Switches

• FS1A-C01S

ENTER ③

LOGIC No.
1 2 3 4 5 6 7 8

TIMER(S)
0 .1 .5 1 2 5 15 30

① ②

① Logic Switch ② Timer Switch ③ Enter button

• FS1A-C11S

TYPE : FS1A-C11S ENTER ③

LOGIC No. 1

A b c d

TIMER(S)
0 .1 .5 1 2 5 15 30

① ②

Logic Switch ①
FS1A-C01S

Eight DIP switches are provided for selecting a logic by moving a switch upward. For details, see user’s manual “Chapter 5 Logic.” Only one logic switch can be selected.

DIP Switch	1	2	3	4	5	6	7	8
Logic	001	002	003	004	005	006	007	008

FS1A-C11S

Eight DIP switches are provided for selecting a logic by moving one or two switch(es) upward. For details, see user’s manual “Chapter 5 Logic.”

DIP Switch	1	2	3	4	5	6	7	8
Logic	001	002	003	004	005	006	007	008
	1 + A	1 + b	1 + C	1 + d	2 + A	2 + b	2 + C	2 + d
	11A	11b	11C	11d	12A	12b	12C	12d
	3 + A	3 + b	3 + C	3 + d	4 + A	4 + b	4 + C	4 + d
	13A	13b	13C	13d	14A	14b	14C	14d

Timer Switch ②

Eight DIP switches are provided for selecting an off-delay timer value, by moving a switch upward. Only one timer switch can be selected.

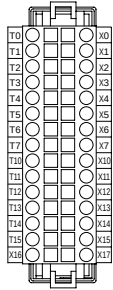
Switch No.	Timer Value	Description
1	0	No off-delay (safety outputs shut down immediately)
2	.1	Off-delay timer 0.1s
3	.5	Off-delay timer 0.5s
4	1	Off-delay timer 1s
5	2	Off-delay timer 2s
6	5	Off-delay timer 5s
7	15	Off-delay timer 15s
8	30	Off-delay timer 30s

Enter Button ③

The enter button is used to activate the configuration of logic and timer switches. Error LED will blink for 1 to 5 seconds after pressing the enter button. Releasing the button during blinking activates the setting. The blinking LED becomes ON if the button is pressed for more than 5 seconds, and the setting becomes invalid even after the button is released. For setting the switches and enter button, use the setting tool supplied with the SafetyOne.

Connector Specifications

Input Connector

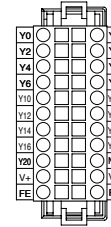


Applicable connector

- Spring clamp (30-pin)
FS9Z-CN01 (IDEC)
2-1871940-5
(Tyco Electronics)
- Crimp (30-pin)
2-1871946-5
(Tyco Electronics)

Terminal	No.	Description
T0	A1	Safety input drive terminal 0
T1	A2	Safety input drive terminal 1
T2	A3	Safety input drive terminal 2
T3	A4	Safety input drive terminal 3
T4	A5	Safety input drive terminal 4
T5	A6	Safety input drive terminal 5
T6	A7	Safety input drive terminal 6
T7	A8	Safety input drive terminal 7
T10	A9	Safety input drive terminal 10
T11	A10	Safety input drive terminal 11
T12	A11	Safety input drive terminal 12
T13	A12	Safety input drive terminal 13
T14	A13	Safety input drive terminal 14
T15	A14	Safety input drive terminal 15
T16	A15	Start input terminal 16
X0	B1	Safety input receive terminal 0
X1	B2	Safety input receive terminal 1
X2	B3	Safety input receive terminal 2
X3	B4	Safety input receive terminal 3
X4	B5	Safety input receive terminal 4
X5	B6	Safety input receive terminal 5
X6	B7	Safety input receive terminal 6
X7	B8	Safety input receive terminal 7
X10	B9	Safety input receive terminal 10
X11	B10	Safety input receive terminal 11
X12	B11	Safety input receive terminal 12
X13	B12	Safety input receive terminal 13
X14	B13	Safety input receive terminal 14
X15	B14	Safety input receive terminal 15
X17	B15	Start input terminal 17

Output Connector



Applicable connector

- Spring clamp (22-pin)
FS9Z-CN02 (IDEC)
2-1871940-1
(Tyco Electronics)
- Crimp (22-pin)
2-1871946-1
(Tyco Electronics)

Terminal	No.	Description
Y0	A1	Safety output terminal 0
Y2	A2	Safety output terminal 2
Y4	A3	Safety output terminal 4
Y6	A4	Safety output terminal 6
Y10	A5	Safety output terminal 10
Y12	A6	Safety output terminal 12
Y14	A7	Safety output terminal 14
Y16	A8	Safety output terminal 16
Y20	A9	Solenoid/lamp output terminal 20
V+	A10	24V DC power terminal
FE	A11	Functional ground terminal
Y1	B1	Safety output terminal 1
Y3	B2	Safety output terminal 3
Y5	B3	Safety output terminal 5
Y7	B4	Safety output terminal 7
Y11	B5	Safety output terminal 11
Y13	B6	Safety output terminal 13
Y15	B7	Safety output terminal 15
Y17	B8	Solenoid/lamp output terminal 17
NC	B9	Blank terminal
V-	B10	0V DC power terminal
FE	B11	Functional ground terminal



Note: For the specifications of crimp connector, contact Tyco Electronics.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Selection Guide..... 458

SE4D Series: Type 4 459

SG Series..... 464

 SG2 Series: Type 2 (Basic & Extended Models) 464

 SG4 Series: Type 4 468

Mounting Brackets and Accessories 472

Light Curtains



www.IDEC.com/safety



Selection Guide

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Series	Type 4 Safety Category	Type 2 Safety Category		Type 4 Safety Category	
	SE4D Hand Series	SG2 - Hand Series	SG2 - Presence Series	SG4 - Finger Series	SG4 - Hand Series
Appearance					
Page	459		464		468
Protection Type	Type 4		Type 2		Type 4
Resolution	25mm		30mm	50mm, 90mm	14mm 30mm
Material	Aluminum		Painted Aluminum		

SE4D Series

Key features

The IDEC SE4D Light Curtains are easy to install and use specialized technology to ensure there are no dead zones around the units. Their features increase safety, reduce downtime and improve productivity.

- Cascading with no dead zone
- Built-in muting function
- Built-in EDM function
- Fixed and floating blanking function
- Fast and Unified response time of 14ms
- Supports both PNP and NPN outputs in a single model
- Beam Axis Adjustment function
- Type 4 Hand protection
- Category 4, PLe, SIL3
- IP67 Degree of Protection



Part Numbers

Shape	Minimum Sensing Object	Sensing Distance (Note 2) (Effective Distance)	No. of Beams	Sensing Length (mm)	Part Number (Note 3)
Diagram labels: Beam No. (n), 5mm, Sensing Length, Beam pitch 20mm, 5mm, ø25mm, 0.3 to 9m, 0.3 to 7m.			12	230	SE4D-H12
			16	310	SE4D-H16
			20	390	SE4D-H20
			24	470	SE4D-H24
			28	550	SE4D-H28
			32	630	SE4D-H32
			36	710	SE4D-H36
			40	790	SE4D-H40
			48	950	SE4D-H48
			56	1,110	SE4D-H56
			64	1,270	SE4D-H64
			72	1,430	SE4D-H72
			80	1,590	SE4D-H80
			88	1,750	SE4D-H88
			96	1,910	SE4D-H96

1. Package quantity is 1 set (emitter/receiver). Mounting brackets and bottom cap cables are not included with the light curtain. Purchase a mounting bracket and bottom cap cable separately.

2. The sensing distance is the possible setting distance between the emitter and the receiver.

3. The light curtain with "E" in the part number (indicated on the nameplate) is the emitter. The light curtain with "D" in the part number (indicated on the nameplate) is the receiver.
Example for SE4D-H12: Emitter = SE4D-H12E, Receiver = SE4D-H12D

Accessories

Item	Description	Cable Length	Weight	Part Number	Remarks
	8-pin Bottom Cap Cable	3m	370g approx.	SE9Z-CCB3	Standard cable Cable diameter: ø6mm Cable color: Emitter - Gray, Receiver - Gray with black line Minimum bending diameter: R6 mm
		7m	820g approx.	SE9Z-CCB7	
		10m	1,160g approx.	SE9Z-CCB10	
		15m	1,710g approx.	SE9Z-CCB15	
	12-pin Bottom Cap Cable	3m	420g approx.	SE9Z-CCB3-MU	Used for muting function Cable diameter: ø6mm Cable color: Emitter - Gray, Receiver - Gray with black line Minimum bending diameter: R6 mm
		7m	930g approx.	SE9Z-CCB7-MU	
	Cable for Series Connection	0.5m	95g approx.	SE9Z-CSL05	Used for connecting the light curtains in series. Cable color: Gray (for emitter and receiver) Minimum bending diameter: R6 mm

Each pkg contains 2 cables.

Overview

XW Series E-Stops

Interlock Switches

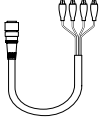
Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Controller

Name and Shape	Part Number
Controller (adapter cable, 2 pcs, included) 	SE9Z-HC
Cable for Connecting Controller 	SE9Z-WNC1

The controller is used for setting optional functions.
The cable is used for connecting the controller and the light curtain. Order the cable when purchasing the controller

Mounting Brackets

Item	Part Number	Remarks
Standard Mounting Bracket	SE9Z-SED-1	Mounting bracket for easy adjustment of the beam axis. Includes 2 hexagon socket head screws (M5) or 1 hexagon socket head screw (M8). The light curtain can be rotated 360 degrees. Material: Zinc diecast
M8 Mounting Bracket	SE9Z-SED-1-T	Mounting bracket for easy adjustment of the beam axis. The light curtain can be rotated 360 degrees. Material: Zinc diecast
Dead Space Mounting Bracket	SE9Z-SED-3	Mounting bracket that eliminates dead space. Material: Zinc diecast

Specifications

General Specifications

Applicable standards	IEC/EN 61496-1 (TÜV), IEC 61496-2 (TÜV), IEC 61508-1 to 4 (TÜV), ISO 13849-1 (TÜV), EN ISO 13849-1 (TÜV), EN 50178 (TÜV), EN 55011 (TÜV), EN 61000-6-2 (TÜV), UL 508 (UL), UL 61496-1/2 (UL), UL 1998 (UL), CSA C22.2 No.14 (c-UL), CSA C22.2 No.0.8 (c-UL)	
Minimum Sensing Object	ø25mm (opaque)	
Effective Aperture Angle	When detection distance is more than 3m: within ±2.5° maximum (IEC 61496-2, UL 61496-2)	
Rated Voltage	24V DC ±20% Ripple P-P10% maximum	
Control output (OSSD1/2)	PNP open-collector transistor / NPN open-collector transistor (switching type)	
	PNP Output Maximum source current: 200mA Applied voltage: Same as supply voltage (between control output and +V) Residual voltage: 2.5V max. (source current 200mA, using 15m length cable) Leakage current: 0.1mA max. (includes power off state) Maximum load capacity: 0.22µF (no load to max. output current) Load wiring resistance: 3W max.	NPN Output Maximum sink current: 200mA Applied voltage: Same as supply voltage (between control output and 0V) Residual voltage: 2.5V max. (sink current 200 mA, using 15m length cable) Leakage current: 0.1mA max. (includes power off state) Maximum load capacity: 0.22µF (no load to max. output current) Load wiring resistance: 3W max.
	Operation mode (Output operation)	ON when all beams are received, OFF when one or more beams are interrupted (Note 1, 2) (Also turns OFF at sensor or synchronization error)
	Protection circuit (Short-circuit)	Built-in
Auxiliary output (Non-safety output)	PNP open-collector transistor / NPN open-collector transistor (switching type)	
	PNP Output Maximum source current: 60mA Applied voltage: Same as supply voltage (between auxiliary output and +V) Residual voltage: 2.5V min. (source current 60mA, using 15m length cable)	NPN Output Maximum sink current: 60mA Applied voltage: Same as supply voltage (between auxiliary output and 0V) Residual voltage: 2.5V min. (sink current 60mA, using 15m length cable)
	Operation mode (Output operation)	When OSSDs are ON: OFF, when OSSDs are OFF: ON (factory set) [Operation modes can be changed by using the SE9Z-HC controller (optional).]
	Protection circuit (Short-circuit)	Built-in
Interference Prevention Function	OFF response: 14ms max., ON response: 80 to 90ms	
	Response Time	
	OFF response: 34ms max., ON response: 110ms max.	
	Built-in	
Emission Halt Function	Built-in	
Interlock Function		
External Device Monitoring Function		
Override Function		
Muting Function		
Optional Functions (Note 4)	Fixed blanking function, Floating blanking function, Auxiliary output switching function, Interlock setting adjust function, External relay monitoring setting adjust function, Muting setting adjust function, Protect function, Emitted light intensity control function	
Degree of Protection	IP65, IP67 (IEC 60529)	
Operating Conditions	Operating temperature: -10 to +55°C (no freezing) Relative humidity: 30 to 85%RH (no condensation) Storage temperature: -25 to +70°C (no freezing) Storage humidity: 30 to 95%RH (no condensation) Pollution Degree: 3	

General Specifications (con't)

Operating Illuminance	Incandescent lamp: 3,500 lux max. at light-receiving surface
Dielectric Strength	1,000V AC, 1 minute between power terminals connected together and enclosure
Insulation Resistance	20MW minimum (500V DC megger) between power terminals connected together and enclosure
Vibration Resistance	Damage limits: 10 to 55Hz, amplitude: 0.75mm 2 hours each in 3 axes
Shock Resistance	Damage limits: 300m/s ² (30G approx.) 3 times each in 3 axes
Light Source	Infrared LED (emission wavelength = 870nm)
Connection	Connector
Material	Enclosure: Aluminum Upper / lower case: Aluminum Sensing surface: PC / Polyester resin Cap: PBT
Accessories	SE9Z-SED-2 (intermediate supporting bracket) (Note 3), SE9Z-TR25 (test rod): 1

1. Does not turn OFF during muting even when the light beam is interrupted.
 2. When the blanking function is enabled, the operation mode changes:

Floating Blanking Function (Min. Sensing Object)			
No setting	Setting		
	1 beam	2 beam	3 beam
ø25mm	ø45mm	ø65mm	ø85mm

3. The number of intermediate supporting brackets that is included differs with each model.
 SE4D-H40/H48/H56 = 1 set, SE4D-H64/H72/H80 = 2 sets, SE4D-H88/H96 = 3 sets
 4. When using the optional functions, the controller is required.

Individual Specifications

Part Number	SE4D-H12	SE4D-H16	SE4D-H20	SE4D-H24	SE4D-H28	SE4D-H32
No. of Beams	12	16	20	24	28	32
Sensing Range	0.3 to 9m					
Beam Width	20mm					
Protective Height	230mm	310mm	390mm	470mm	550mm	630mm
Current Consumption	Emitter: 70mA max., Receiver: 95mA max.			Emitter: 80mA max., Receiver: 115mA max.		
PFHd	2.01×10 ⁻⁹	2.21×10 ⁻⁹	2.41×10 ⁻⁹	2.61×10 ⁻⁹	2.81×10 ⁻⁹	3.01×10 ⁻⁹
MTTFd	100 years minimum					
Weight (approx.)	510g	660g	810g	960g	1,110g	1,260g

Part Number	SE4D-H36	SE4D-H40	SE4D-H48	SE4D-H56	SE4D-H64	SE4D-H72
No. of Beams	36	40	48	56	64	72
Sensing Range	0.3 to 9m					0.3 to 7m
Beam Width	20mm					
Protective Height	710mm	790mm	950mm	1,110mm	1,270mm	1,430mm
Current Consumption	Emitter: 80mA max. Receiver: 115mA max.	Emitter: 90mA max. Receiver: 140mA max.		Emitter: 100mA max. Receiver: 160mA max.		Emitter: 110mA max. Receiver: 180mA max.
PFHd	3.21×10 ⁻⁹	3.41×10 ⁻⁹	3.80×10 ⁻⁹	4.20×10 ⁻⁹	4.60×10 ⁻⁹	5.00×10 ⁻⁹
MTTFd	100 years minimum					
Weight (approx.)	1,420g	1,570g	1,870g	2,170g	2,470g	2,770g

Part Number	SE4D-H80	SE4D-H88	SE4D-H96
No. of Beams	80	88	96
Sensing Range	0.3 to 7m		
Beam Width	20mm		
Protective Height	1,590mm	1,750mm	1,910mm
Current Consumption	Emitter: 110mA max. Receiver: 180mA max.		Emitter: 120mA max. Receiver: 200mA max.
PFHd	5.40×10 ⁻⁹	5.80×10 ⁻⁹	6.20×10 ⁻⁹
MTTFd	100 years minimum		
Weight (approx.)	3,070g	3,370g	3,670g

Note: PFHd (Probability of dangerous failure per hour), MTTFd (Mean time to dangerous failure)
 Weight is the (total of emitter and receiver).

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Controller

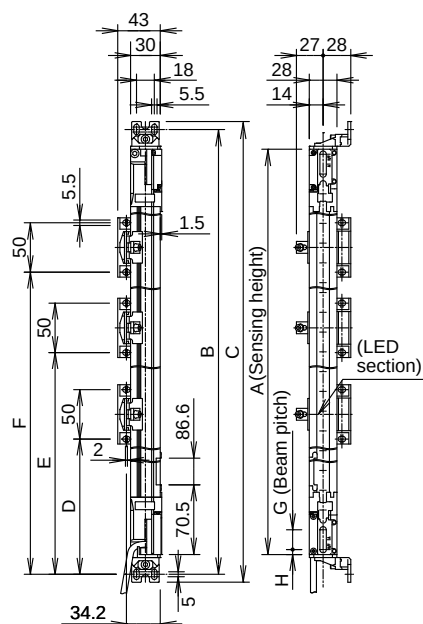
Part Number	SE9Z-HC	
Supply Voltage	24V DC ±10% Ripple P-P10 % or less (common to light curtain power supply)	
Current Consumption	65mA max.	
Communication Method	RS-485 two-way communications (exclusive procedure)	
Digital LED	4-digit red LED display × 2 (selected beams and settings are displayed)	
Functional LED	Green LED × 9 (lights on when set)	
Functions	- Fixed blanking function (factory setting: disabled) - Floating blanking function (factory setting: disabled) - Auxiliary output switching function (factory setting: negative logic of OSSD) - Emitted light intensity control function (factory setting: disabled) - Muting setting adjust function (factory setting: all beam channels enabled, A = B (Note 2), Muting lamp diagnosis function enabled, Muting sensor output operation N.O/N.O) - Interlock setting adjust function (factory setting: start /restart) - External device monitoring setting adjust function (factory setting: enabled, 300ms) - Override setting adjust function, Setting detail monitoring function - Protect function (factory setting: disabled) (factory password setting: 0000) - Initialization function - Copy function	
Operating Conditions	Operating Temperature: −10 to +55°C (no freezing) Operating Humidity: 30 to 85% RH (no condensation) Storage Temperature: −25 to +70°C (no freezing) Storage Humidity: 30 to 85% RH (no condensation)	
Dielectric Strength	1,000V AC, 1 minute between power terminals connected together and enclosure	
Insulation Resistance	20MΩ min. (500V DC megger) between power terminals connected together and enclosure	
Cable	8-core shielded cable, 0.5m 1.640 ft long, with a connector at the end (2 cables)	
Weight (approx.)	200g	
Accessories	Adapter cable: 2	

1. The operating humidity is +20° for conditions that are not specified.
2. To enable the muting function, A or B input order can be specified. The muting function is enabled, at the factory, whether muting A or B is input first.

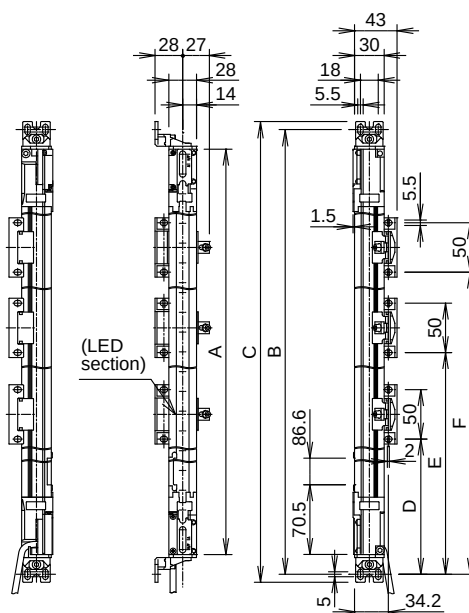
Dimensions

Light Curtains with Standard Mounting Bracket (SE9Z-SED-1) & Intermediate Supporting Bracket Side Mounting ^(Note 1)

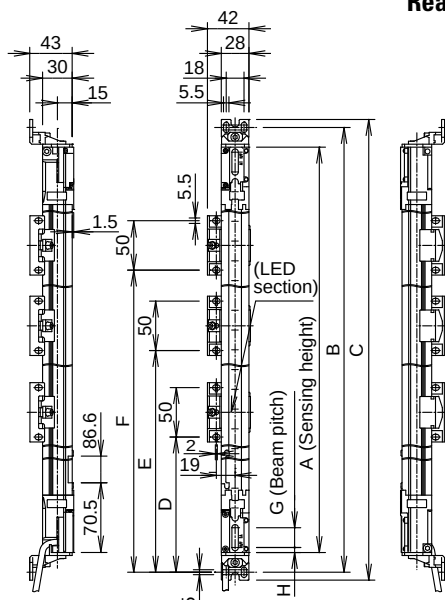
Emitter



Receiver

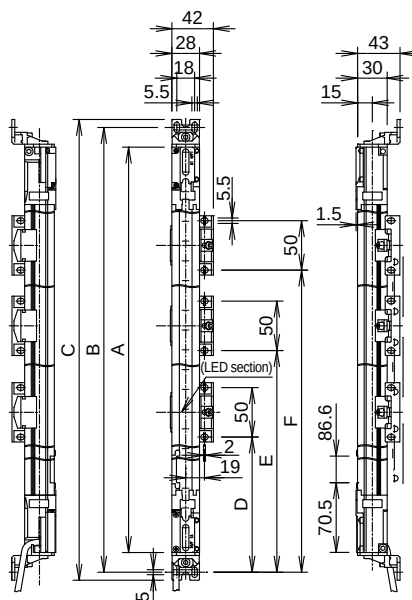


Emitter



Rear Mounting

Receiver



SE4D-H12	230	270	286	-	-	-	20	5
SE4D-H16	310	350	366	-	-	-	20	5
SE4D-H20	390	430	446	-	-	-	20	5
SE4D-H24	470	510	526	-	-	-	20	5
SE4D-H28	550	590	606	-	-	-	20	5
SE4D-H32	630	670	686	-	-	-	20	5
SE4D-H36	710	750	766	-	-	-	20	5
SE4D-H40	790	830	846	390	-	-	20	5
SE4D-H48	950	990	1,006	470	-	-	20	5
SE4D-H56	1,110	1,150	1,166	550	-	-	20	5
SE4D-H64	1,270	1,310	1,326	418	842	-	20	5
SE4D-H72	1,430	1,470	1,486	472	948	-	20	5
SE4D-H80	1,590	1,630	1,646	525	1,055	-	20	5
SE4D-H88	1,750	1,790	1,806	433	870	1,308	20	5
SE4D-H96	1,910	1,950	1,966	473	950	1,428	20	5

1. The intermediate supporting bracket (SE9Z-SED-2) is supplied (for SE4D-H40 to H96).
The number of brackets supplied varies according to the model:
SE4D-H40/H48/H56 = 1 set, SE4D-H64/H72/H80 = 2 sets, SE4D-H88/H96 = 3 sets

Type 2 SG2 Series (Basic & Extended Models)

Hand Protection



Presence Protection



Type 2 SG2 features:

- Integrated light curtain for Hand or Presence Protection
- Operating distance up to 19m
- Sensing field heights from 150 to 1800mm
- Compact 32 x 37mm profile
- Sturdy profile and rotating brackets
- Test/Restart, Auto/Manual Restart, EDM, Anti-interference
- User interface with display
- Alignment function

The SG2 Type 2 series offers two models, the SG2 basic and the SG2 extended. Available functions include Test/Restart, EDM and Anti-interference. With very fast response times, the SG2 series can be installed right next to a dangerous area, improving productivity. The adjustable mounting brackets make installation and the alignment of emitting and receiving units easy, even at long distances and in applications that use mirrors.



Part Numbers

Part Number	Protection Type	Resolution	Features
SG2-30-□-00-X			Basic Model - Test/Reset
SG2-30-□-00-E-C			Extended Model - Test/Reset, Auto/Manual Restart, EDM
SG2-50-□-00-X			Basic Model - Test/Reset
SG2-50-□-00-E-C			Extended Model - Test/Reset, Auto/Manual Restart, EDM
SG2-90-□-00-X			Basic Model - Test/Reset
SG2-90-□-00-E-C			Extended Model - Test/Reset, Auto/Manual Restart, EDM

Sensing Field Height Code

Sensing Field Height	Code
150mm ¹	015 ¹
300mm	030
450mm	045
600mm	060
750mm	075
900mm	090
1050mm	105
1200mm	120
1350mm	135
1500mm	150
1650mm	165
1800mm	180

In place of □ enter the Height code. See table on the right.

1. Not applicable to SG2 Presence Series

Accessories

M12 Unshielded Axial Connector Cable

Item	# of Poles	Used For	Cable Length	Part Number
	4	SG4 & SG2 Emitters	3m	CS-A1-02-U-03
			5m	CS-A1-02-U-05
			10m	CS-A1-02-U-10
			15m	CS-A1-02-U-15
			25m	CS-A1-02-U-25
	5	SG2 Basic Model Receivers	3m	CS-A1-03-U-03
			5m	CS-A1-03-U-05
			10m	CS-A1-03-U-10
			15m	CS-A1-03-U-15
			25m	CS-A1-03-U-25
	8	SG4 & SG2 Extended Model Receivers	3m	CS-A1-06-U-03
			5m	CS-A1-06-U-05
			10m	CS-A1-06-U-10
			15m	CS-A1-06-U-15
			25m	CS-A1-06-U-25

Mounting Brackets

Item	Description	Part Number
	Angled mounting brackets (4 pc kit)	ST-KSTD
	Anti-vibration supports (4 pc kit)	ST-K4AV
	Anti-vibration supports (6 pc kit)	ST-K6AV
	Top-Bottom adjustable mounting brackets (4 pc kit)	ST-K4ROT

Laser Pointer

Item	Description	Part Number
	Laser pointer used to aid in aligning safety light curtains.	SG-LP

Specifications

SG2 - Hand Series	SG2 - Presence Series
	

Electrical	Power supply (Vdd)	24V DC $\pm$ 20%	
	Power (TX)	2.5W max	
	Power (RX)	3.5W max (without load)	
	OSSD outputs	2 PNP (push-pull)	
	Short-circuit protection	1.4A max	
	Output current	0.5A max on each output	
	Output voltage – ON status	Vdd-1V min	
	Output voltage – OFF status	0.2V max	
	Leakage current	< 1mA	
	Capacitive load	2.2 μ F @ 24V DC max*	
Optical	Height	150 - 1800mm	300 - 1800mm
	Auxiliary functions	Test/Reset, Auto/Manual Restart (extended), EDM (extended)	
	Electrical protection	Class I / Class III	
	Connections	M12: Emitter 4 pole, Receiver 5 pole (basic), 8 pole (extended)	
	Cable length (for powering)	50m. max *	
Mechanical & Environmental	Light emission	Infrared LED (950nm)	
	Resolution	30mm	50mm / 90mm
	Operating distance	0.2m-19m (basic) or selectable 0.2m-9m / 0.2-19m (extended)	
	Aperture angle (EAA)	$\pm 5^\circ$	
	Ambient light rejection	IEC 61496-2	
	Operating temperature	0 - 55°C	
	Storage temperature	-25 to +70°C	
	Temperature class	T6	
	Humidity	15 - 95% (no condensation)	
	Mechanical protection	IP65 (EN 60529)	
Safety Control	Vibration	0.35mm amplitude, 10 - 55 Hz frequency 20 sweep per axis, 1 octave/min (EN 60068-2-6)	
	Shock resistance	16ms (10g) 1.000 shock per axis, (EN 60068-2-29)	
	Housing material	Painted aluminium (yellow)	
	Protective shield material	PMMA	

* If a longer cable is needed, please verify that the capacitive load specifications are followed.

Sensing Field Heights

Height
150mm ¹
300mm
450mm
600mm
750mm
900mm
1050mm
1200mm
1350mm
1500mm
1650mm
1800mm

Number of Beams

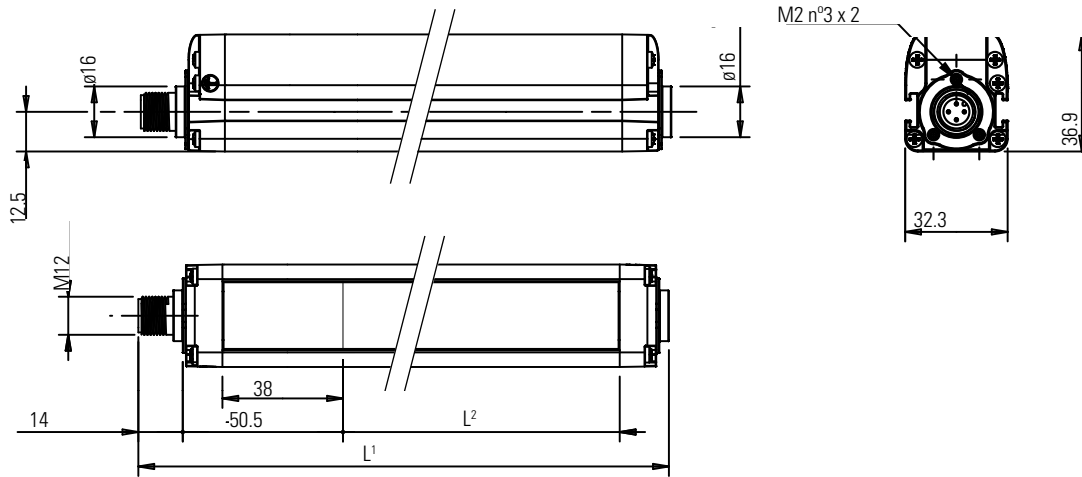
Height	SG2 Hand	SG2 Presence	
		50mm	90mm
150	8	—	—
300	16	9	5
450	24	13	7
600	32	17	9
750	40	21	11
900	48	25	13
1050	56	29	15
1200	64	33	17
1350	72	37	19
1500	80	41	21
1650	88	45	23
1800	96	49	25

Response Time (ms)

Height	SG2 Hand	SG2 Presence	
		50mm	90mm
150	8	—	—
300	9	9	9
450	11	10	10
600	12	11	11
750	14	12	12
900	15	14	13
1050	17	15	14
1200	18	16	15
1350	20	17	16
1500	21	18	17
1650	23	19	18
1800	24	20	19

1. Not applicable to SG2 Presence Series

Dimensions (mm)



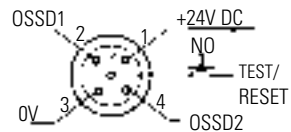
Dimension Table

Model	L ¹	L ²
150 ¹	233.3	153.3
300	383.2	303.2
450	533.2	453.3
600	683.2	603.2
750	833.2	753.3
900	983.2	903.2
1050	1133.2	1053.2
1200	1283.3	1203.3
1350	1433.2	1353.2
1500	1583.3	1503.3
1650	1733.3	1653.3
1800	1883.3	1803.3

1. Not applicable to SG2 Presence Series

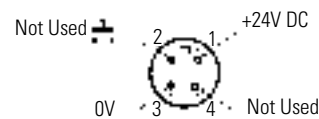
Dimensions (mm) SG2 Basic Models

M12 5-Pole Connector



Pin	Cable Color	Function
1	brown	+24V DC
2	white	OSSD1
3	blue	0V
4	black	OSSD2
5	gray	TEST/RESET

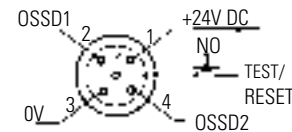
M12 4-Pole Connector



Pin	Cable Color	Function
1	brown	+24V DC
2	white	Not Used
3	blue	0V
4	black	Not Used

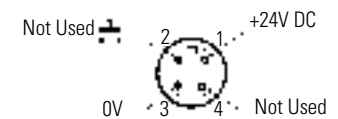
SG2 Extended Models

M12 8-Pole Connector



Pin	Cable Color	Function
1	white	RESET ¹
2	brown	+24V DC
3	green	EDM Activation
4	yellow	EDM
5	gray	OSSD1
6	pink	OSSD2
7	blue	0V
8	red	SEL MAN / AUTO RESTART

M12 4-Pole Connector



Pin	Cable Color	Function
1	brown	+24V DC
2	white	TEST
3	blue	0V
4	black	SG2: SEL operating distance

1. Automatic RESTART - RESET function
Manual RESTART - RESET/RESTART function

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Type 4 SG4 Series

Finger Protection



Hand Protection



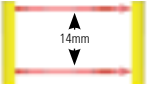
Type 4 SG4 features:

- Integrated light curtain for Finger Protection or Hand Protection
- Operating distance up to 6m for Finger Protection series and 19m for Hand Protection series
- Sensing field heights from 150 to 1800mm
- Compact 32 x 37mm profile
- Sturdy profile and adjustable brackets
- Test/Restart, Auto/Manual Restart, EDM
- User interface with display
- Alignment function

With mounting brackets that rotate, no connection is necessary between emitter and receiver, and configuration can be accomplished without external control units or supplementary cables. In addition, the light curtains can be aligned using the 7 segment display on either the emitter or receiver.



Part Numbers

Part Number	Protection Type	Resolution	Features
SG4-14-□-00-E	Finger 		Test/Reset, Auto/Manual Restart, EDM
SG4-30-□-00-E	Hand 		Test/Reset, Auto/Manual Restart, EDM

 In place of □ enter the Height code. See table on the right.

Sensing Field Height Code

Sensing Field Height	Code
150mm ¹	015 ¹
300mm	030
450mm	045
600mm	060
750mm	075
900mm	090
1050mm	105
1200mm	120
1350mm	135
1500mm	150
1650mm	165
1800mm	180

 1. Not applicable to SG2 Presence Series

Accessories

M12 Unshielded Axial Connector Cable

Item	# of Poles		Used For	Cable Length	Part Number
	4		SG4 & SG2 Emitters	3m	CS-A1-02-U-03
				5m	CS-A1-02-U-05
				10m	CS-A1-02-U-10
				15m	CS-A1-02-U-15
				25m	CS-A1-02-U-25
	8		SG4 & SG2 Extended Model Receivers	3m	CS-A1-06-U-03
				5m	CS-A1-06-U-05
				10m	CS-A1-06-U-10
				15m	CS-A1-06-U-15
				25m	CS-A1-06-U-25

Mounting Brackets

Item	Description	Part Number
	Angled mounting brackets (4 pc kit)	ST-KSTD
	Anti-vibration supports (4 pc kit)	ST-K4AV
	Anti-vibration supports (6 pc kit)	ST-K6AV
	Top-Bottom adjustable mounting brackets (4 pc kit)	ST-K4ROT

Laser Pointer

	Laser pointer used to aid in aligning safety light curtains.	SG-LP
---	--	-------

Specifications

SG4 - Finger Protection Type	SG4 - Hand Protection Type
	

Electrical	Power supply (Vdd)	24V DC ± 20%	
	Power (TX)	2.5W max	
	Power (RX)	4W max (without load)	
	OSSD outputs	2 PNP (push-pull)	
	Short-circuit protection	1.4A max	
	Output current	0.5A max on each output	
	Output voltage – ON status	Vdd-1V	
	Output voltage – OFF status	0.2V max	
	Leakage current	< 1mA	
	Capacitive load	2.2 uF @ 24V DC*	
	Height	150 - 1800mm	
	Auxiliary functions	Test/Reset, Auto/Manual Restart, EDM	
	Electrical protection	Class I / Class III	
	Connections	M12: Emitter 4 pole, Receiver 8 pole	
Optical	Cable length (for powering)	50m. max *	
	Light emission	Infrared LED (950nm)	
	Resolution	14mm	30mm
	Operating distance	0.2 - 6m	0.2 - 19m
	Aperture angle (EAA)	±2.5°	
Mechanical & Environmental	Ambient light rejection	IEC 61496-2	
	Operating temperature	0 - 55°C	
	Storage temperature	-25 to +70°C	
	Temperature class	T6	
	Humidity	15 - 95% (no condensation)	
	Mechanical protection	IP65 (EN 60529)	
	Vibration	0.35mm amplitude, 10 - 55 Hz frequency 20 sweep per axis, 1 octave/min (EN 60068-2-6)	
	Shock resistance	16ms (10g) 1.000 shock per axis, (EN 60068-2-29)	
	Housing material	Painted aluminium (yellow)	
	Protective shield material	PMMA	



* If a longer cable is needed, please verify that the capacitive load specifications are followed.

Sensing Field Heights

Height
150mm
300mm
450mm
600mm
750mm
900mm
1050mm
1200mm
1350mm
1500mm
1650mm
1800mm

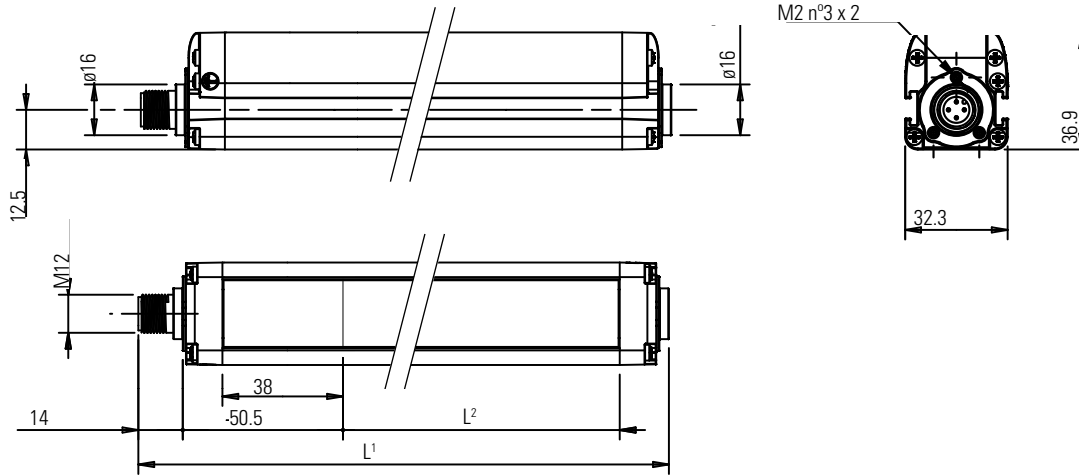
Number of Beams

Height	SG4 Finger	SG4 Hand
150	16	8
300	32	16
450	48	24
600	64	32
750	80	40
900	96	48
1050	112	56
1200	128	64
1350	144	72
1500	160	80
1650	176	88
1800	192	96

Response Time (ms)

Height	SG4 Finger	SG4 Hand
150	11	9
300	15	11
450	18	13
600	22	14
750	25	16
900	29	18
1050	33	19
1200	36	21
1350	40	23
1500	43	25
1650	47	26
1800	50	28

Dimensions (mm)

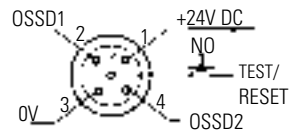


Dimension Table

Model	L ¹	L ²
150 ¹	233.3	153.3
300	383.2	303.2
450	533.2	453.3
600	683.2	603.2
750	833.2	753.3
900	983.2	903.2
1050	1133.2	1053.2
1200	1283.3	1203.3
1350	1433.2	1353.2
1500	1583.3	1503.3
1650	1733.3	1653.3
1800	1883.3	1803.3

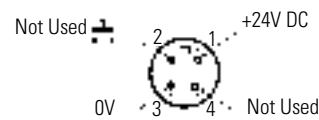
Dimensions (mm) SG4 Models

M12 8-Pole Connector



Pin	Cable Color	Function
1	white	RESET ¹
2	brown	+24V DC
3	green	EDM Activation
4	yellow	EDM
5	gray	OSSD1
6	pink	OSSD2
7	blue	0V
8	red	SEL MAN / AUTO RESTART

M12 4-Pole Connector



Pin	Cable Color	Function
1	brown	+24V DC
2	white	TEST
3	blue	0V
4	black	SG2: SEL operating distance



1. Automatic RESTART - RESET function
Manual RESTART - RESET/RESTART function

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

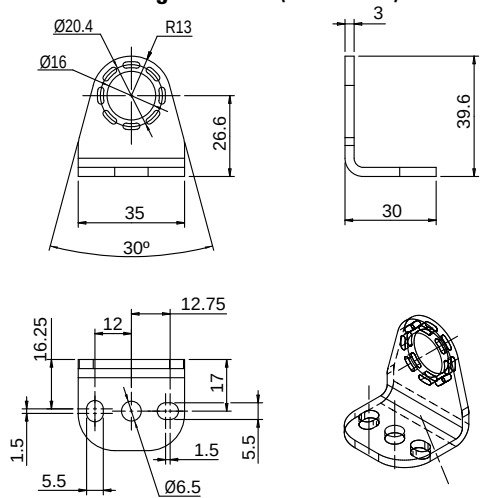
Light Curtains

AS-Interface Safety at Work

Mounting Bracket and Accessories

Mounting Brackets Dimensions (mm)

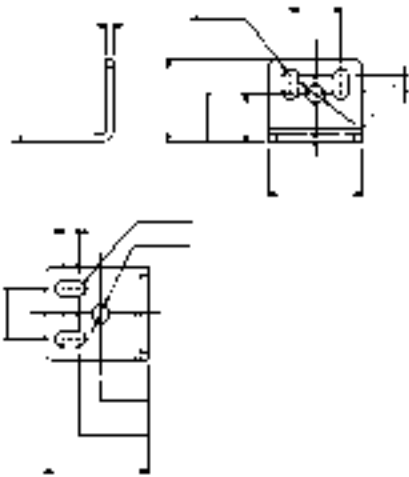
Adjustable Mounting Bracket ¹ (ST-K4ROT)



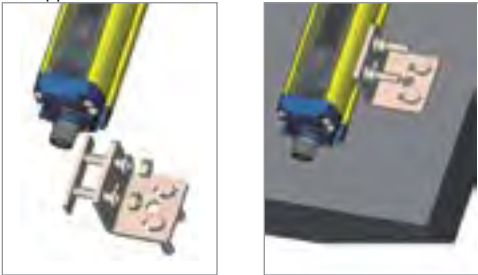
1. Supplied with the SG2 extended models only.



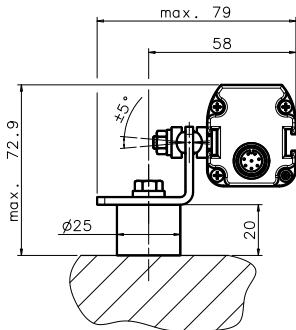
Angled Mounting Bracket ² (ST-KSTD)



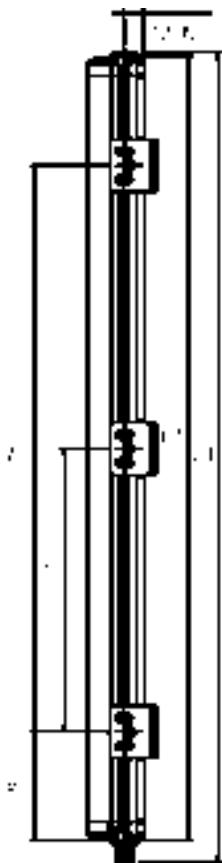
2. Supplied with SG2 standard models and all SG4 models.



Anti-vibration Support Brackets (ST-K4AV/ST-K6AV)



Mounting Bracket with Light Curtain (mm)



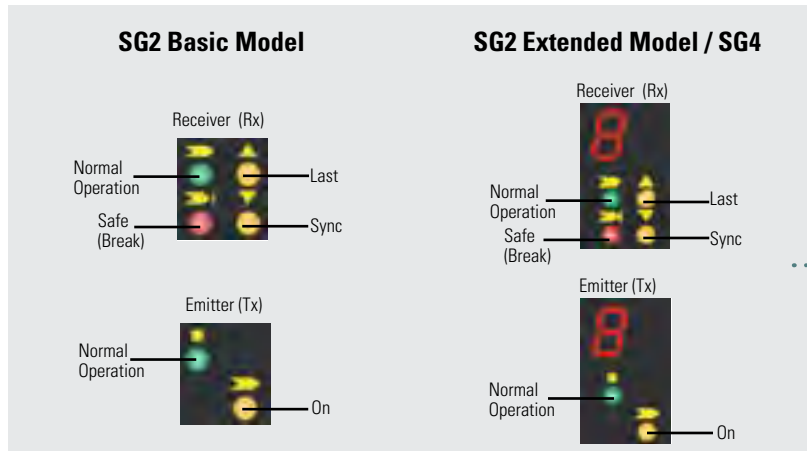
Mounting Bracket Dimension Table (mm)

Height	L	A	B	C
150*	216.3	108	54	-
300	366.2	216	75	-
450	516.3	316	100	-
600	666.2	366	150	-
750	816.3	466	175	-
900	966.2	566	200	-
1050	1116.2	666	225	-
1200	1266.3	966	150	483
1350	1416.2	1066	175	533
1500	1566.3	1166	200	583
1650	1716.3	1266	225	633
1800	1866.3	1366	250	683

1. Not applicable to SG2 Presence Series

Indicators & Settings

SG4 and SG2 light curtains are equipped with an Alignment system that shows alignment status on a visual display, making configuration quick and easy. Alignment level and any change in environment conditions (presence of dust, light disturbance, etc.) are monitored during normal operating mode. The display also gives diagnostic messages to ensure accurate and correct functioning.



Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

Light Curtains

AS-Interface Safety at Work

Emergency Stop Switches 478
Operating Instructions..... 482

AS-Interface Safety at Work



www.IDEC.com/safety



AS-Interface Safety at Work

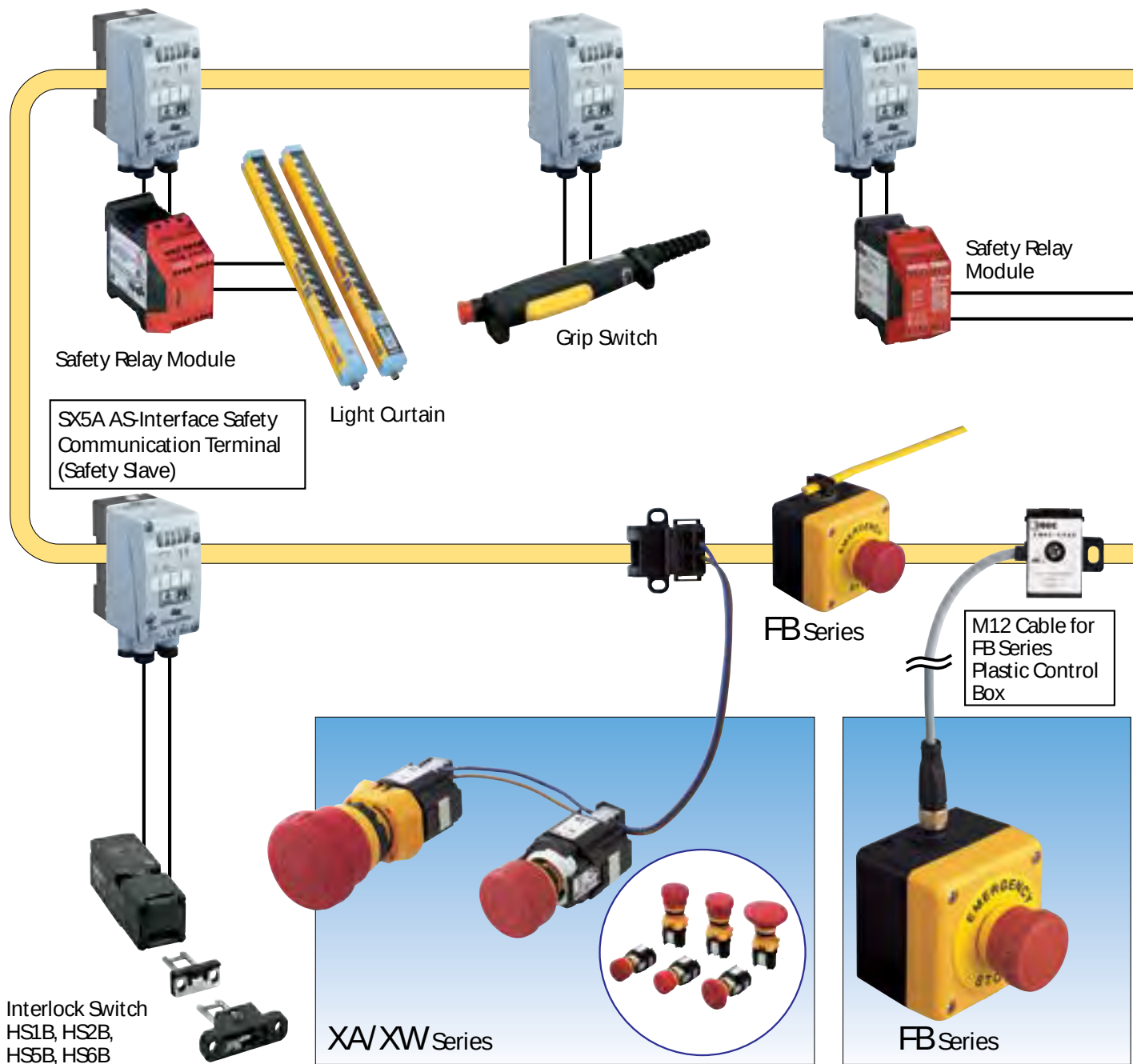
AS-Interface safety at work integrates a safety network into one wire-saving system.

- Safety slaves and safety monitors can be simply connected to the existing AS-Interface network to establish the AS-Interface Safety at Work.
- Interlock switches, safety relay modules and other safety components can be connected to the safety network via safety slaves.
- Emergency stop switches can be connected directly to AS-Interface Safety at

Work, further reducing wiring.

- Safety components can be connected to other networks through gateways.

SX5A AS-Interface Safety Communication Terminal (Safety Slave)





Emergency Stop Switches

XA Series/XW Series/FB Series (Plastic Enclosures) with Safety Slave Functions for Direct Connection to the AS-Interface Safety at Work

- Emergency stop switches with safety slave functions can be connected to the AS-Interface Safety at Work network.
- Complies with IEC 61508 SIL3 (Functional safety of electrical/electronic/programmable electronic safety-related systems) and EN954-1 safety category 4 (Safety of machinery-Safety related parts of control systems).
- Space, wire, and labor-saving solutions for safety equipment
- Equipped with AS-Interface standard slave functions. Monitored with AS-Interface master devices.
- A wide variety of safety components:
 - 1-IN (non-illuminated) and 1-IN/1-OUT (illuminated) available.
 - FB series plastic control stations with $\varnothing 16\text{mm}$ XA series and $\varnothing 22\text{mm}$ XW series emergency stop switches available.
 - XA series available with $\varnothing 29\text{mm}$ and $\varnothing 40\text{mm}$ mushroom buttons and XW series available with $\varnothing 40\text{mm}$ and $\varnothing 60\text{mm}$ jumbo mushroom buttons.
 - Terminal connectors are available in insulation displacement, crimping, and M12 connectors which enable effective connection of multiple switches.

**Part Numbers** **$\varnothing 16\text{mm}$ XA Series**

Button Size	Connector Terminal	I/O Points	Illumination	Part Number	Button/Lens Color
ø29	IDC	1-IN	Non-illuminated	XA1E-BV3Z10C1R	Red
				XA1E-BV3Z10C1N	Gray
1-IN 1-OUT		Illuminated	XA1E-LV3Z114C1R	Red	
ø40		1-IN	Non-illuminated		XA1E-BV4Z10C1R
		1-IN 1-OUT	Illuminated		XA1E-LV4Z114C1R

 $\varnothing 22\text{mm}$ XW Series

Button Size	Connector Terminal	I/O Points	Illumination	Part Number	Button/Lens Color
$\varnothing 40$	IDC	1-IN	Non-illuminated	XW1E-BV4Z10C1R	Red
	Crimping			XW1E-BV4Z10C2R	
	IDC	1-IN 1-OUT	Illuminated	XW1E-LV4Z114C1R	
	Crimping			XW1E-LV4Z114C2R	
$\varnothing 60$	IDC	1-IN	Non-illuminated	XW1E-BV5Z10C1R	
	Crimping			XW1E-BV5Z10C2R	

E-Stop Enclosure

Button Size	Connector Terminal	I/O Points	Illumination	Nameplate	Part Number	Button/Lens Color
$\varnothing 40$	M12	1-IN	Non-illuminated	Without	FB1W-XW1E-BV4Z10C2R-Y0-1	Red
				With	FB1W-XW1E-BV4Z10C2R-Y1-1	
		1-IN	Illuminated	Without	FB1W-XW1E-LV4Z114C2R-Y0-1	
		1-OUT		With	FB1W-XW1E-LV4Z114C2R-Y1-1	
$\varnothing 60$		1-IN	Non-illuminated	Without	FB1W-XW1E-BV5Z10C2R-Y0-1	
$\varnothing 40$	AS- Interface Piercing	1-IN	Non-illuminated	Without	FB1W-XW1E-BV4Z10C2R-Y0-2	
				With	FB1W-XW1E-BV4Z10C2R-Y1-2	
		1-IN 1-OUT	Illuminated	Without	FB1W-XW1E-LV4Z114C2R-Y0-2	
				With	FB1W-XW1E-LV4Z114C2R-Y1-2	
$\varnothing 60$		1-IN	Non-illuminated	Without	FB1W-XW1E-BV5Z10C2R-Y0-2	



- Units have been evaluated as emergency stop devices by TÜV.
- Units with nameplates are engraved "Emergency Stop".

Accessories

Name	Specification	Part Number
XA/XW Series IDC Connector Kit ¹	End connector (with cover)	XW9Z-C100-1
	Through connector (with cover)	XW9Z-C100-2
IDC Connector Termination Tool	Manufactured by ITW Pancon	MMIT-156F
Crimping Type Connector Cable	Length 500 mm, with one connector	XW9Z-C205
	Length 1m, with one connector	XW9Z-C210
FB Series Control Station M12 Connector Cable	Length 300 mm, straight	FB9Z-CS03
	Length 1m, straight	FB9Z-CS10
	Length 2m, straight	FB9Z-CS20
	Length 1m, right-angle	FB9Z-CL10
	Length 2m, right-angle	FB9Z-CL20
Hand-held Programming Device	²	SX9Z-ADR1N



- Minimum order is 5 pieces. IDC connector termination tool MMIT-156F (ITW Pancon) may be required to connect the cable to the connector.
- *Hand-held programming device accessories:
 -Programming device cable (SX9Z-CN1)
 -Programming device AC adapter (SX9Z-ADPT)
 -SwitchNet addressing port adapter (LA9Z-SNADP)

Specifications

General	Operating Voltage	26.5 to 31.6V DC (supplied from AS-Interface)
	Rated Input Current	Illuminated type: 35 mA (XA series), 40 mA (XW, FB series) Non-illuminated type: 25 mA
	Dielectric Strength	500V AC, 1 minute
	Insulation Resistance	100 MΩ (500V DC megger)
	Operating Temperature	XA, XW series: -25 to +55°C (no freezing) FB series: Illuminated type -25 to +50°C (no freezing) Non-illuminated type -25 to +55°C (no freezing)
	Storage Temperature	-40 to +70°C (no freezing)
	Operating Humidity	45 to 85% RH (no condensation)
	Pollution Degree (IEC60664)	XA, XW series - Operator unit: 3, Communication unit: 2, FB series: 3 (2 - per UL)
	Degree of Protection	Operator unit: IP65
	IEC60529	Terminal unit: IP20 (FB series: IP65)
	Corrosion Immunity	Free from corrosive gases
	Vibration Resistance	Damage limits/Operating extremes: 10 to 500 Hz, amplitude 0.35 mm, acceleration 50 m/s ²
	Shock Resistance	Damage limits: 150 m/s ² , Operating extremes: 1000 m/s ²
Communication	Weight (approx.)	XA series ø29: 35g, ø40: 40g XW series ø40: 60g, ø60: 70g FB series M12 connector: 195g (ø40), 205g (ø60) Piercing: 235g (ø40), 245g (ø60)
	Communication	AS-Interface Ver. 3.0
	Slave Type	Safety slave
	Maximum Network Length	100m total
	Maximum No. of Slaves	31 (when only safety slaves are connected)
	Profile (I/O, ID, ID2)	S-7, B, E (illuminated type) S-0, B, E (non-illuminated type)
	Data Bit	Emergency stop switch DI0 DI1 DI2 DI3 When pressed 0 0 0 0 Emergency stop switch DI0 DI1 DI2 DI3 When not pressed X X X X x0.1 (unspecified)
	Output	D00 = 1 Pilot light: on D01 to 3: not used D00 = 0 Pilot light: off
	Parameter Bit	Not used

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control

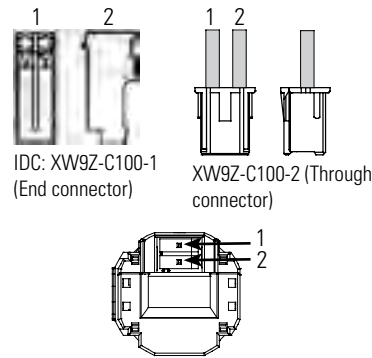
Light Curtains

Mechanical/Electrical

Operating Force	Pushlock: 10.5N (XA series), 32N (XW, FB series) Pull reset: 10N (XA series), 21N (XW, FB series) Turn reset: 0.16N·m (XA series), 0.27 N·m (XW, FB series)
Minimum Force Required for Direct Opening Action	60N (XA series), 80N (XW, FB series)
Minimum Operator Stroke Required for Direct Opening Action	4.0 mm
Maximum Operating Stroke	4.5 mm
Operating Frequency	900 operations/hour
Mechanical Life	250,000 operations minimum
Electrical Life	250,000 operations minimum
Connectors	IDC connector (XA series) IDC connector, crimping connector (XW series) M12 connector/AS-Interface piercing connector (FB series)
Recommended Tightening Torque for Locking Ring	0.88 N·m (XA series), 2.0 N·m (XW series)

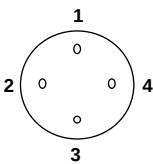
Pin Assignment

XA/XW Series

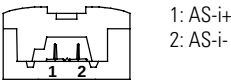


FB Series

(M12 Connector)

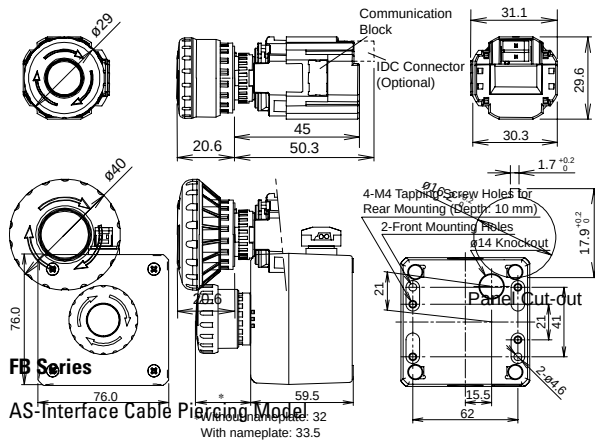


(AS-Interface Piercing Connector)



Dimensions

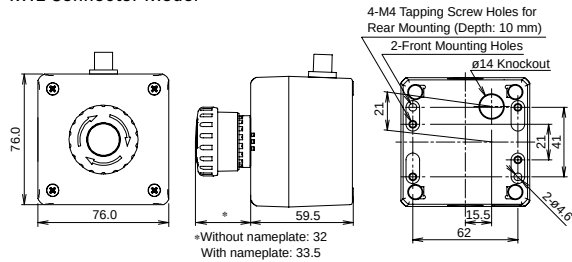
XA Series



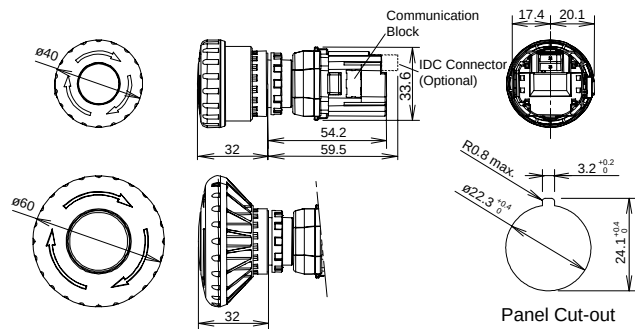
FB Series

AS-Interface Cable
With nameplate: 33.5

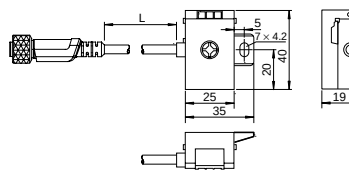
M12 Connector Model



XW Series



M12 Connector Cable for FB Series



Mounting Centers

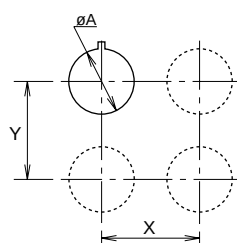
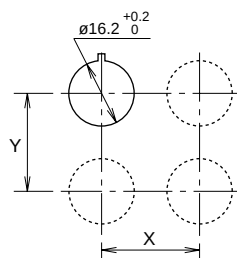
XA Series

XA Size	X & Y
29	40mm minimum
40	50mm minimum
60	70mm minimum

The above values are for installing with $\phi 16$ mm pushbutton switches. For using with control units of other size and operator shape, determine the mounting centers in consideration of easy operation and wiring.

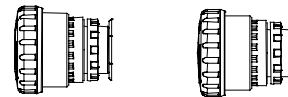
XW Series

XW Size	ϕA	X & Y
40mm	$22.3^{+0.4}$	70mm min



Resetting

These emergency stop switches are push-lock, pull/turn reset types. When pressed, the operator is latched, and reset by pulling or turning.



Operating Instructions

AS-Interface Safety Monitor

Wiring and Installation

Before wiring the interface cable, discharge static electricity. Tighten the screws to a torque of 0.8 to 1.2 N·m.

The AS-Interface power supply unit must separate the main power (input) and output safely according to IEC 60742. It must also maintain a stable supply in the event of instantaneous power failure.

Replacing the Safety Slave

Press "Service" button before and after replacing the safety slave. Resetting of safety monitor using the PC is not necessary. After replacement, check whether the new safety slave performs correctly.

Replacing the Safety Monitor

The settings of the safety monitor can be transferred to the new safety monitor using the download cable sold separately, and the new safety monitor does not require resetting using software. After replacement, check whether the new safety monitor performs correctly.

AS-Interface Safety Communication Terminal & Base Module

Wiring

The AS-Interface safety communication terminal will be connected to the AS-Interface network via the base module. When only one AS-i flat cable is used, plug the unused grooves using the gaskets supplied with the base module. Tighten the screws to a torque of 0.7 N·m maximum.

Before wiring, disconnect the safety communication terminal and discharge static electricity with an adequate method. Connect the emergency stop switches and interlock switches in normally-closed status.

The slave has two independent inputs for connecting the products to comply with the required safety category. When complying with safety category 4, limit the cable length between the module and the input device to not longer than 30m. For leading in the cables, use the upper part (1 and 2), and tighten the cable gland to a torque of 0.5 to 0.7 N·m.

Emergency Stop Switches

Panel Mounting

The panel thickness should be within the range from 0.8 to 6.0 mm. Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side without thread on the operator with TOP marking upward, and tighten the locking ring using ring wrench MW9Z-T1 to a torque of 2.0 N·m maximum. Do not use pliers. Do not tighten with excessive force, otherwise the locking ring will be damaged.

To prevent the XW emergency stop switches from rotating when resetting from the latched position, use of an anti-rotation ring (HW9Z-RL) or a nameplate is recommended.

Address Setting

The lid of the address setting device on the side of the unit can be removed by prying it out. Take care not to lose the lid, which comes off completely. By removing the lid of the address setting section, you can see the terminals for connecting a programming cable. Connect the programming cable to the terminals.

To set an address while mounting this product on the panel, more than 60mm space is necessary on the left side in terms of the AS-Interface communication unit. Note that adequate space cannot be allocated by the distance specified with minimum mounting centers. If adequate space cannot be allocated, set the address before installing the product on the panel or set the address after removing the AS-Interface communication unit from the operation section.

Wiring

A maximum of 31 units can be connected to a network. Addresses must be assigned to avoid overlaps.

This product allows connecting safety slaves with safety equipment, and normal slaves without safety equipment at the same time. Do not connect safety related signals to a normal slave.

The AS-Interface slaves are divided into two types: A/B slaves with expanded addresses and standard slaves without expanded addresses. If A/B slaves and standard slaves are connected simultaneously, the maximum number of slaves connectable to a network may exceed 31.

The network length is a maximum of 100 meters, including all wires. However, the maximum possible length of the wires may actually be shorter than 100 meters depending on the type of master and composition of slaves. Consider the lengths of cables and wiring topology so that voltage drops in transmission lines are no higher than 3V.

Use applicable two-wire flat cables for wiring.

Do not operate the switch using solid object such as metal or with excessive force, otherwise the switch may be deformed or damaged, causing malfunction or operation failure.

Selection Guide.....	484
Miniature Switches & Pilot Devices.....	486
AP Series ø8-16mm	486
A8 Series ø8mm.....	490
ø16mm Switches & Pilot Devices.....	497
X6 E-Stops ø16mm.....	497
XA E-Stops ø16mm	501
LB Series ø16mm	508
A6 Series ø16mm.....	542
L6 Series ø16mm	545
ø22mm Switches & Pilot Devices.....	578
LBW Series ø22mm	578
UP-Series Pilot Lights	599
XW E-Stops ø22mm.....	603
AP22M Series ø22mm	609
CW Series ø22mm	612
HW Series ø22mm	634
TW Series ø22mm	696
FB Series Enclosures.....	737
ø30mm Switches & Pilot Devices.....	739
XN E-Stops ø30mm	739
TWND Series ø30mm	745
TWTD Series ø30mm	773
EC2B Series Control Stations	805
EU2B Series ø30mm	805
Cam Switches - CS Series	828
Mono-Lever Switches - ARN Switches	835
Piezo Switches	835



www.IDEC.com/switches

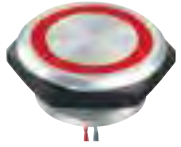


Switches & Pilot Devices

Selection Guide

Appearance	Product Series	Mounting Hole	Contact Rating	Contact Mounting	Function	Page
	AP	ø8mm, ø10mm, ø12mm, ø16mm	N/A	N/A	Pilot light	486
	A8	ø8mm	1A	Unibody	Pushbutton, Pilot Light	490
	X6	ø16mm	5A	Unibody	E-Stop	497
	XA		5A	Removable/Unibody	E-Stop	501
	A6		1A	Unibody	Pushbutton, Pilot Light, Selector Switch, Key Switch, Stop Switch	541
	LB		3A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch, Lever Switch, Buzzer	508
	L6		5A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch, Stop Switch, Buzzer	526
	LBW		5A	Removable	Pushbutton, Illuminated Pushbutton, Pilot Light, Selector Switch, Key Switch	578
	UP	ø22mm	N/A	LED Removable	LED Pilot Light	599
	XW		5A	Removable	E-Stop	603
	AP22M		N/A	Unibody	Pilot Light	609
	CW		10A	Removable	Pushbutton, Pilot light, selector switch, key selector	612
	HW		10A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch, E-Stop, MonoLever	634

Selection Guide con't

Appearance	Product Series	Mounting Hole	Contact Rating	Contact Mounting	Function	Page
	TW	ø22mm	10A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch, Stop Switch	696
	FB		N/A	N/A	Enclosures	737
	XN	ø30mm	5A	Removable	E-Stop	739
	TWND		10A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch, Stop Switch	743
	TWTD		10A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch, Stop Switch	773
	CS		10A	Unibody	Cam Switch	828
	ARN		10A	Removable	MonoLever	835
	LW Flush		5A	Removable	Pushbutton, Pilot Light, Selector Switch, Key Switch	www.IDEC.com/switches
	Piezo Switches	ø22mm ø30mm	1A	Unibody	Momentary, solid state pushbutton, LED illumination	835

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

AP Series — Miniature Pilot Lights

Key features:

- Long service life, low maintenance
- Space saving miniature style
- Dome or flat lens models
- Built-in current-limiting resistor
- Five illumination colors: red, green, amber, yellow, and white
- Transformer (120V AC and 240V AC) and DC-DC Converter (110V DC) options on 12mm and 16mm units



UL Recognized
File No. E55996



CSA Certified
File No. LR21451



*AP8/AP1 series only.

Specifications

Lamp	Built-in LED with current limiting resistor
Operational Voltage	5, 6, 12, 24VDC (full voltage), 110/120, 220/240VAC, (with transformer) 110VDC (with converter)
Current Ratings	AP8: 5V DC/9mA, 12V DC/9mA, 24V DC/9mA, 12V AC/15mA, 24V AC/15mA AP1: 5V DC/9mA, 12V DC/9mA, 24V DC/9mA, 12V AC/15mA, 24V AC/15mA AP2: 6V DC/33mA, 12V DC/22mA, 24V DC/11mA AP6: 6V DC/33mA, 12V DC/22mA, 24V DC/11mA
Operating Temp.	-20°C to +55°C
Operating Humidity	45 to 85% RH
Insul. Resistance	100MΩ min. (500V DC megger) Between live and dead parts
Rev. Withstand Voltage	AP2/AP6: 100V AP1/AP8: 200V
Solder Terminal	Soldering 260°C maximum (5 sec.)
Degree of Protection	AP8: IP40 (dustproof) Other Series: IP65 (oiltight)

Optional Adaptors/Converters

Model	Transformer	DC-DC Converter
Applicable Units	AP2 & AP6 (with 6V LED only)	
Operating Voltage	110/120VAC 50/60 Hz 220/240VAC 50/60 Hz	110V DC (90 to 140V DC)
Power Consumption	1.6 VA maximum	1W maximum
Insulation Voltage	250 V AC	140V DC
Insulation Resistance	10MΩ min. (500V DC megger) Between live and dead parts	
Dielectric Strength	2,000V AC, 1 minute Between live/dead parts 2,000V AC, 1 minute Between terminals	2,000V AC, 1 minute Between live/dead parts 1,500V AC, 1 minute Between terminals



Available as one piece only (replacement LEDs are not available).

Miniature Pilot Lights

AP Miniature Pilot Lights - ø8 & ø10mm

Style	Lens Style	Operating Voltage	Part Numbers
AP8 Series - ø8mm	Dome	5V DC +/- 5% 12V AC/DC +/- 10% 24V AC/DC +/- 10%	AP8M255-② AP8M211-② AP8M222-②
	Flat	5V DC +/- 5% 12V AC/DC +/- 10% 24V AC/DC +/- 10%	AP8M155-② AP8M111-② AP8M122-②
AP1 Series - ø10mm	Dome	5V DC +/- 5% 12V AC/DC +/- 10% 24V AC/DC +/- 10%	AP1M255-② AP1M211-② AP1M222-②
	Flat	5V DC +/- 5% 12V AC/DC +/- 10% 24V AC/DC +/- 10%	AP1M155-② AP1M111-② AP1M122-②

② Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S*
Warm White	W
Cool White	PW
Yellow	Y

1. In place of ②, specify the color code.
2. For dimensions, see page 489.
3. For accessories, see page 488.

* Available in only the AP8 and AP1 series.

AP Miniature Pilot Lights - ø12 & ø16mm

Style	Lens Style	Operating Voltage	Part Numbers
AP2 Series - ø12mm	Dome	6V DC +/- 5% 12V DC +/- 10% 24V DC +/- 10%	AP2M266-② AP2M211-② AP2M222-②
	Flat	6V DC +/- 5% 12V DC +/- 10% 24V DC +/- 10%	AP2M166-② AP2M111-② AP2M122-②
AP6 Series - ø16mm	Dome	6V DC +/- 5% 12V DC +/- 10% 24V DC +/- 10%	AP6M266-② AP6M211-② AP6M222-②
	Flat	6V DC +/- 5% 12V DC +/- 10% 24V DC +/- 10%	AP6M166-② AP6M111-② AP6M122-②

② Color Codes

Color	Code
Amber	A
Green	G
Red	R
Warm White	W
Yellow	Y

1. In place of ②, specify the color code.
2. For dimensions, see page 489.
3. For accessories, see page 488.

Optional Transformers and DC-DC Converters (for AP2 and AP6 only)

Style	Voltage	Part Numbers	
		Used with AP2 Series	Used with AP6 Series
	Transformer	110/120V AC 220/240V AC	AP2-0126D AP2-0246D
	DC-DC Converter	110V DC (90–140V DC)	AP2-016DD AP6-016DD

1. Optional Transformers and DC-DC converters snap onto the back of AP2 or AP6 pilot lights.
2. Transformers and DC-DC Converters step down to 6V.
3. For dimensions, see page 489.

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Accessories — AP Series

Item	Appearance	Description	Used With	Part Number
Locking Ring Wrench		Made of metal. Used for tightening plastic locking ring during installation. Tightening torque should not exceed 3kgf-cm	Ø 16mm units	MT-001
			Ø 12mm units	MT-002
			Ø 10mm units	MT-003
			Ø 8mm units	MT-004
Mounting Hole Plug		Made of rubber. Fills unused mounting holes to provide IP65 protection	Unused 8mm panel cutouts	AL-B8
			Unused 10mm panel cutouts	AL-B1
			Unused 12mm panel cutouts	AL-B2
			Unused 16mm panel cutouts	AL-B6
Transformer Removal Tool		A Series Blank/Lens Removal Tool	AP2 and AP6 snap on transformer and DC-DC converter	MT-100
Replacement Lenses		Lenses (included with all units).	AP1M Flat	AP1M-L1-②
			AP1M Dome	AP1M-L2-②
			AP2M Flat	AP2M-L1-②
			AP2M Dome	AP2M-L2-②
			AP6M Flat	AP6M-L1-②
			AP6M Dome	AP6M-L2-②

- 
1. In place of ②, specify the Lens Color Code.

2. Internal LED is fixed and cannot be removed or replaced.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S*
White	W
Yellow	Y

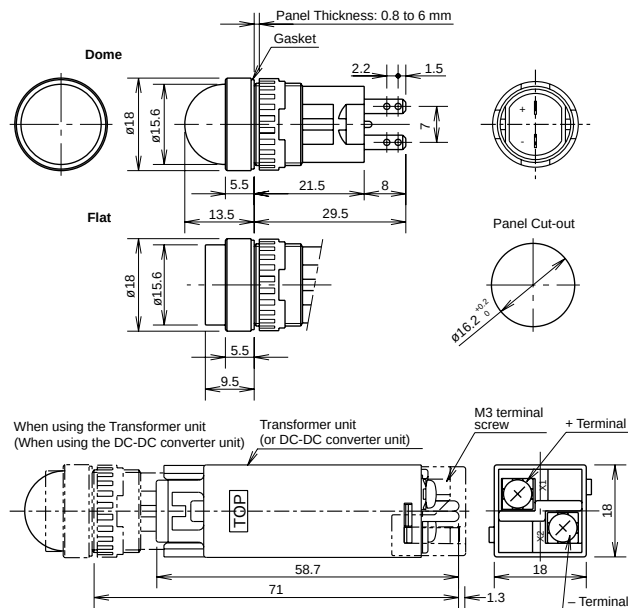
- 
- *Blue available in AP8/AP1 series only.

Dimensions — AP Series

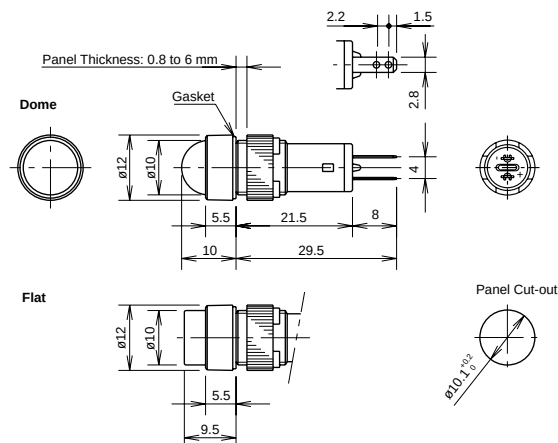
Pilot Lights (AP Series)

Style	AP8		AP1		AP2			AP6		
	Flat	Dome	Flat	Dome	Flat	Dome	w/ Adaptor or Converter	Flat	Dome	w/ Adaptor or Converter
Panel Cut-out	Ø 0.319" (+0.0118, -0) 8.1mm (+0.3, -0)		Ø 0.398" (+0.0118, -0) 10.1mm (+0.3, -0)		Ø 0.480" (+0.0118, -0) 12.2mm (+0.3, -0)			Ø 0.638" (+0.0118, -0) 16.2mm (+0.3, -0)		
Outside Dimension	Ø 0.386" (9.8mm)		Ø 0.472" (12mm)		Ø 0.551" (14mm)		□ 0.709" (18mm)	Ø 0.709" (18mm)		□ 0.709" (18mm)

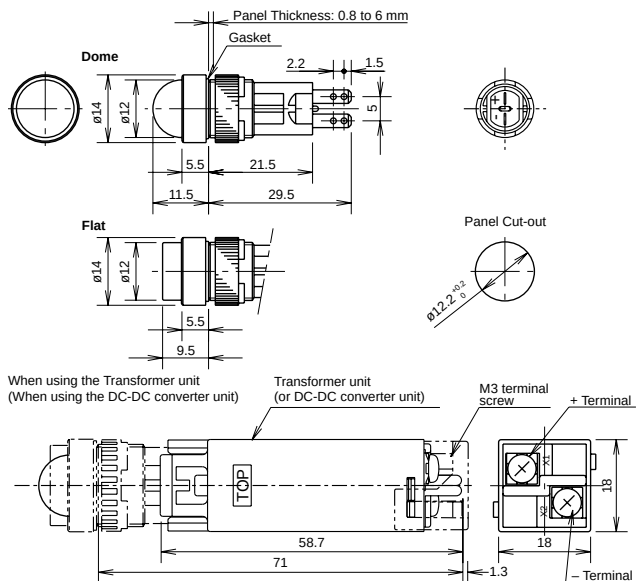
AP6



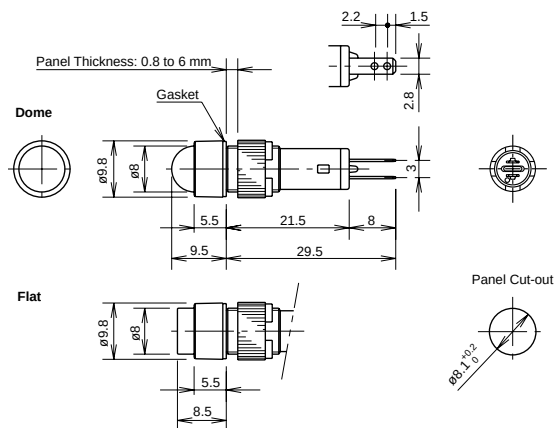
AP1



AP2



AP8



A8 Series — Miniature Switches and Pilot Devices: 8mm

Key features:

- 21/64" (8mm) round mounting hole
- Compact Design Saves Space
- Bright and Vivid Illumination
- Choice of Shapes and Functions
- Gold Clad Silver Contacts for reliable low level switching
- Snap action contacts
- IP40 (Dustproof) Construction



UL Listed
File No. E55996



CSA Certified
File No. LR21451

Specifications

LED Lamp Life	50,000 hours approximately (reduced to half of original intensity)
Contact Configuration	SPDT
Maximum Voltage	250V AC/DC
Thermal Current	3A
Contact Material	Gold-clad Silver
Terminal Style	Solder Tab Terminal
Operating Temperature	-25° to +55°C (no freezing)
Operating Humidity	45 to 85% RH
Contact Resistance	50mΩ maximum (initial value)
Insulation Resistance	100MΩ minimum (500V DC megger)
Vibration Resistance	5 to 55Hz, 0.75mm amplitude
Shock Resistance	Damage limits: 500m/sec ² (approx. 50G) Operating extremes: 200m/sec ² (approx. 20G)
Electrical Life	100,000 operations minimum
Mechanical Life	Maintained: 100,000 (1200 operations/hour) Momentary: 200,000 minimum
Degree of Protection	IP40 Enclosed/Dustproof
Soldering Temperature	20W/5 seconds or 260°C/3 seconds
Dielectric Strength	Switch Unit: 2,000V AC, 1 min. between live/dead part and terminals of different poles; 1,000V AC, 1 minute between terminals of the same pole; 1,500V AC, 1 minute between contact and lamp terminals. Illumination Unit: 2,000V AC, 1 min. between live part/ground

Contact Ratings

Operating Voltage		24V	120V	240V
AC 50/60Hz	Resistive	—	1.0A	0.5A
	Inductive	—	0.7A	0.5A
DC	Resistive	1.0A	0.2A	—
	Inductive	0.7A	0.1A	—

1. AC Inductive Load, PF = 0.6 – 0.7; DC Inductive Load, L/R = 7.
2. Minimum applicable load (reference value) is 5V AC/DC 3mA
(applicable range is subject to the operating conditions and load).

AB8 Non-Illuminated Pushbuttons (Assembled)

Non-Illuminated Pushbuttons

Style		Contact	Part Numbers	
			Momentary	Maintained
Round		SPDT	AB8M-M1-①	AB8M-A1-①
Square		SPDT	AB8Q-M1-①	AB8Q-A1-①
Rectangular		SPDT	AB8H-M1-①	AB8H-A1-①

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

- 
1. In place of ①, specify button color code from the table below.

2. For accessories, see page 493.

3. For dimensions, see page 494.

AL8 Illuminated Pushbuttons & Pilot Lights (Assembled)

Illuminated Pushbuttons

Style		Contact	Part Numbers		Pilot Light Part Number
			Momentary	Maintained	
Round		SPDT	AL8M-M11-②	AL8M-A11-②	AL8M-P1-②
Square		SPDT	AL8Q-M11-②	AL8Q-A11-②	AL8Q-P1-②
Rectangular		SPDT	AL8H-M11-②	AL8H-A11-②	AL8H-P1-②

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
White	W
Yellow	Y

1. In place of ②, specify lens color code from table on the right.
2. A replaceable LED lamp is included with the operator.
3. Because the LED lamp does not contain an internal current limiting resistor, an external resistor must be added.
For recommended values, see table below.
4. For accessories, see page 493.
5. For dimensions, see page 494.

Replacement LEDs

Lens Color	LED Lamp	Part Number
Amber	Amber	LAD-SA
Green	Green	LAD-SG
Red	Red	LAD-SR
White	Yellow*	LAD-SY
Yellow	Yellow	LAD-SY

* White units use a white lens and a yellow LED.

LED Voltage and Recommended Current Limiting Resistor

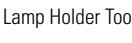
Voltage	External Resistor
5V DC	150Ω, 1/2W
6V DC	200Ω, 1/2W
12V DC	510Ω, 1W
24V DC	1.1kΩ, 1W

LED Lamp Ratings: LED Specifications

LED Lamp	Forward Current I_f	Forward Voltage (Nominal) V_f	Reverse Voltage V_r	Operating Voltage & External Current Limiting Resistor (Recommended Value)
Amber	20mA	2.2V	4V	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1kΩ, 1W
Green	20mA	2.1V	4V	
Red	20mA	1.7V	4V	
Yellow	20mA	2.2V	4V	

When LED lamps are used at voltages other than those stated above, external resistor value, R, is determined by the following formula: $R = (\text{Operating Voltage} - V_f) / I_f$

Accessories

Item	Description	Used With		Part Number
 Locking Ring Wrench	Made of metal. Used for tightening plastic locking ring during installation. Tightening torque should not exceed 3kgf-cm	All units		MT-004
 Lens Removal Tool	Made of metal. Used for removing lens or button from the housing	Illuminated pushbuttons and pilot lights		MT-101
 Lamp Holder Tool	Made of rubber. Used for removing and replacing LED lamps in illuminated units	Illuminated pushbuttons and pilot lights		OR-66
 Switch Guard	Used to avoid operating the pushbutton inadvertently. Cover flips open 90°. Provides IP40 protection	Round & square units		AL-K8
		Rectangular units		AL-KH8
 Terminal Cover	Made of translucent nylon. Fits over and shields the terminals	All units		AL-V8
 Adaptor Socket AL-C8 AL-C8V shown attached	Plug-on adaptor with solder terminals, allows easy control unit replacement.	All units		AL-C8
	Plug-on adaptor with PCB terminals, allows easy control unit replacement.			AL-C8V
 Mounting Hole Plug	Made of rubber. Fills unused mounting holes to provide IP65 protection	Extra panel cutouts		AL-B8
 Replacements LEDs	LED lamp is included in every illuminated control unit. Replacement lamp is ordered separately. External current limiting resistor required.	Illuminated units and pilot lights		LAD-SR (red)
				LAD-SG (green)
				LAD-SA (amber)
				LAD-SY (yellow)
 Replacement Lenses		Illuminated pushbuttons and pilot lights	Round	AL8M-LK1-②
			Square	AL8Q-LK1-②
			Rectangular	AL8H-LK1-②
 Replacement Buttons		Non-Illuminated buttons	Round	AB8M-BK1-①
			Square	AB8Q-BK1-①
			Rectangular	AB8H-BK1-①



1. In place of ①, specify Button Color Code from the table.
2. In place of ②, specify Lens Color Code from table.

① Button Color Codes

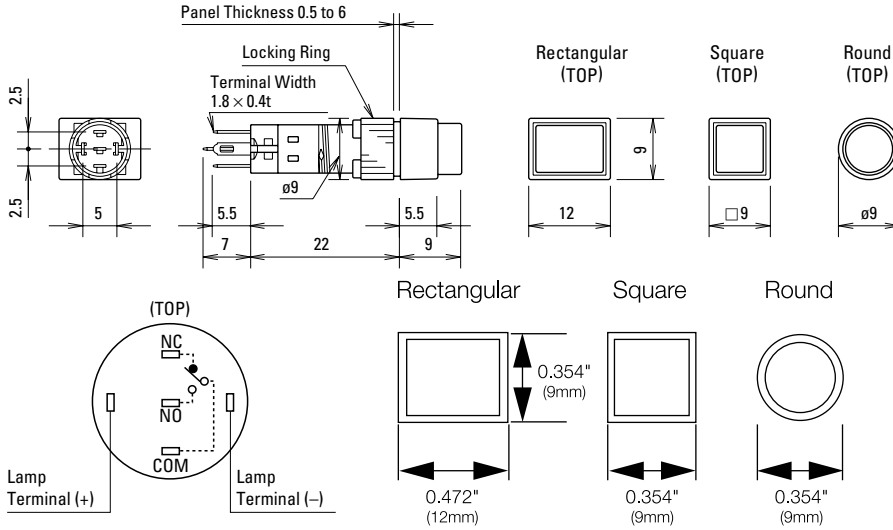
Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

② LED/Lens Color Codes

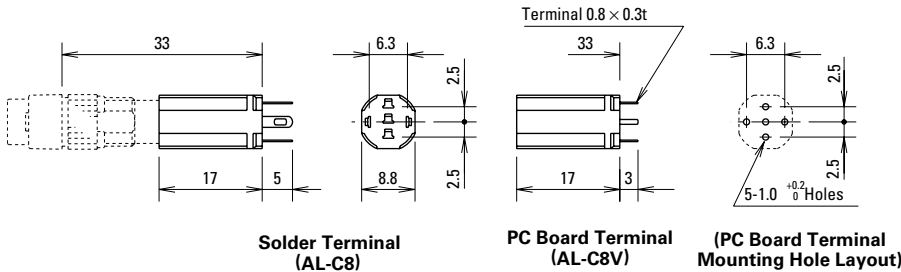
Color	Code
Amber	A
Green	G
Red	R
White	W
Yellow	Y

Dimensions

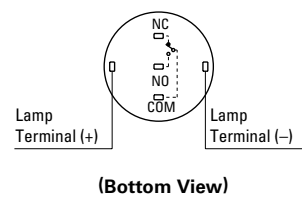
AΔ8



Terminal Sockets

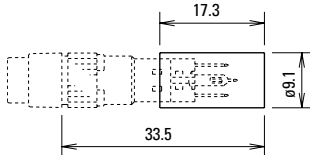


Terminal Arrangement (TOP)

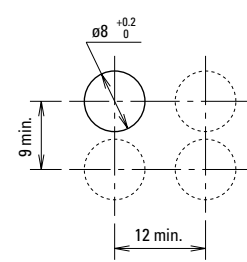


Terminal Cover

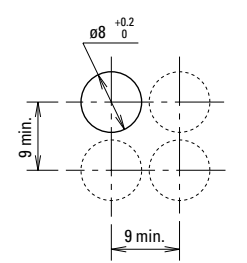
AL-V8, Ø 21/64" (8mm)



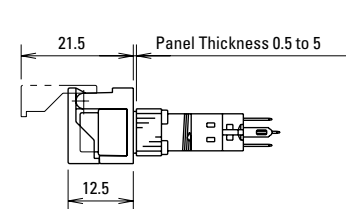
Panel Cut-Out (not drawn to scale)



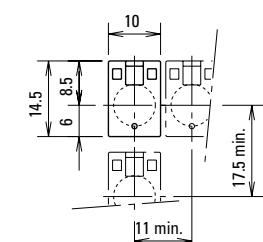
Round/Square



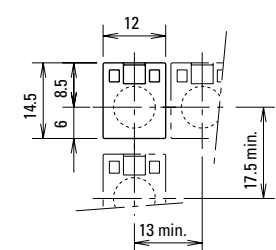
Switch Guard, Ø 21/64" (8mm)



For Round/Square Units (AL-K8)



For Rectangular Units (AL-KH8)



Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

16mm X6 E-Stops

Key features:

- Two button sizes—ø30mm and ø40mm
- Two button colors—red for emergency stop and yellow for stop switch
- Two ways of resetting —pulling and turning
- Solder/tab terminal #110 makes for easy connections
- UL, c-UL recognized, EN compliant
- Safety lock mechanism (IEC 60947-5-5; 6.2)
- Direct opening action (IEC 60947-5-5; 5.2, IEC 60947-5-1, Annex K)



UL File No. E68961



CCC No. 2010010305411586



Specifications

Applicable Standards	IEC 60947-5-1, EN 60947-5-1 IEC 60947-5-5 (Note), EN 60947-5-5 (Note) JIS C8201-5-1, JIS C8201-5-5, UL508 CSA C22.2 No.14, GB14048.5
Operating Temperature	–25 to +60°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Storage Temperature	–45 to +80°C (no freezing)
Operating Force	Push to lock: 10.5N, Pull to reset: 8.8N, Turn to reset: 0.17 N·m
Minimum Force Required for Direct Opening Action	40N
Minimum Operator Stroke Required for Direct Opening Action	4.5mm
Maximum Operator Stroke	4.5mm
Contact Resistance	50mΩ maximum (initial value)
Insulation Resistance	100MΩ minimum (500V DC megger)
Overvoltage Category	II
Impulse Withstand Voltage	2.5kV
Pollution Degree	3
Operation Frequency	900 operations/hour
Shock Resistance	Operation extremes: 150 m/s ² , Damage limits: 1000 m/s ²
Vibration Resistance	Operation extremes: 10 to 500 Hz amplitude 0.35 mm, acceleration 50 m/s ² Damage limits: 10 to 500 Hz, amplitude 0.35 mm, acceleration 50 m/s ²
Mechanical Life	100,000 operations minimum
Electrical Life	100,000 operations minimum
Degree of Protection	IP65 (IEC 60529)
Short-circuit Protection	250V/10A fuse (Type aM IEC 60269-1/IEC 60269-2)
Conditional Short-circuit Current	1000A
Terminal Style	Solder/tab terminal #110
Recommended Tightening Torque for Locking Ring	0.88N·m
Applicable Wire Size	1.25mm ² maximum (AWG16 maximum)
Terminal Soldering Condition	310 to 350°C, within 3 seconds
Weight (approx.)	ø30mm button: 13g, ø40mm button: 16g

Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Rated Thermal Current (Ith)				5A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current (Note)	Main Contacts	AC 50/60 Hz	Resistive Load (AC-12)	–	5A	3A
			Inductive Load (AC-15)	–	1.5A	0.75A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A



- Minimum applicable load: 5V AC/DC, 1mA (reference value) (May vary depending on the operating conditions and load)
- Operational current represents the classification by making and breaking currents (IEC 60947-5-1)
- TÜV rating: AC-15 0.75A/250V, DC-13 1A/30V
UL rating: Standard Duty AC 0.75A/250V
Standard Duty DC 1A/30V



Except for stop switch (yellow button)

Part Numbers

Pushlock Pull/Turn Reset Switch (Unmarked)

Shape	Main Contact (NC)	Part Number Solder/tab Terminal #110
 ø30mm Mushroom	1NC	AB6E-3BV01PTRH
	2NC	AB6E-3BV02PTRH
 ø40mm Mushroom	1NC	AB6E-4BV01PTRH
	2NC	AB6E-4BV02PTRH

Pushlock Pull/Turn Reset Switch (Marked with Arrow)

Shape	Main Contact (NC)	Part Number Solder/tab Terminal #110
 ø30mm Mushroom	1NC	AB6E-3BV01PTRM
	2NC	AB6E-3BV02PTRM
 ø40mm Mushroom	1NC	AB6E-4BV01PTRM
	2NC	AB6E-4BV02PTRM

Yellow Button, Pushlock Pull/Turn Reset Switch (Unmarked)

Shape	Operator	Main Contact (NC)	Part Number Solder/tab Terminal #110
 ø30mm Mushroom	ø30mm button	1NC	AB6E-3BV01PTY
		2NC	AB6E-3BV02PTY
	ø40mm button	1NC	AB6E-4BV01PTY
		2NC	AB6E-4BV02PTY

1. Pushlock pull/turn reset switches are locked when pressed, and reset when pulled or turned clockwise.
 2. Do not use the stop switch as an emergency stop switch.

Accessories

Shape	Material	Part Number	Remarks
 Locking Ring Wrench	Metal (nickel-plated brass)	MT-001	Used to tighten the locking ring when installing the X6 switch onto a panel. Recommended tightening torque: 0.88 N·m maximum
 Locking Ring	Plastic	XA9Z-LNPN10	Black
 SEMI S2 Compliant Switch Guard	Polyamide (PA6)	XA9Z-KG1	IP65 degree of protection Color: yellow (Munsell 2.5Y8/10 or equivalent) Cannot be used with nameplate.

Part Number Key

AB6E - 3 BV 01 PT RH

Mushroom Size
 3: ø29mm
 4: ø40mm

Contact Configuration
 01: 1NC
 02: 2NC

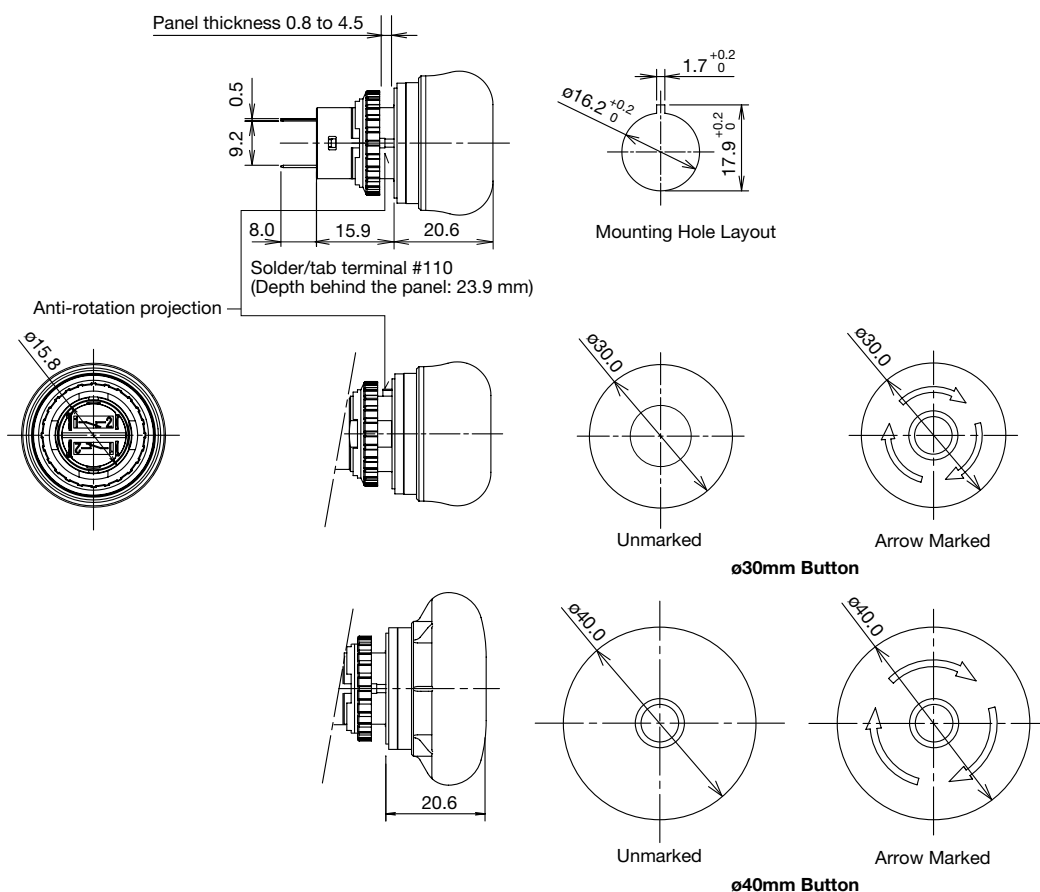
Color/Marking
 RH: Red (unmarked)
 RM: Red (marked with arrow)
 Y: Yellow (unmarked)

Nameplates

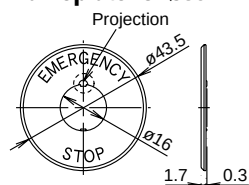
Use With	Description	Legend	Part Number	Material	Background Color	Legend Color
E-Stops	For ø30mm Button	Blank	HAAV-0	Polyamide	Yellow	Black
		EMERGENCY STOP	HAAV-27			
	For ø40mm Button	Blank	HAAV4-0		Yellow	Black
		EMERGENCY STOP	HAAV4-27			
Stop Switch	For ø30mm Button	Blank	HAAV-0-W	Polyamide	White (Munsell N9.5)	
	For ø40mm Button		HAAV4-0-W			

- Cannot be used with switch guard.

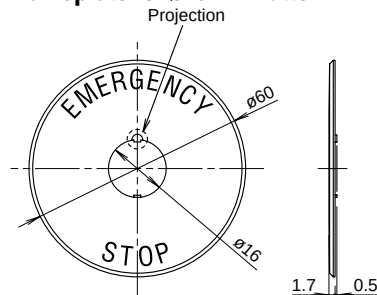
Dimensions (mm)



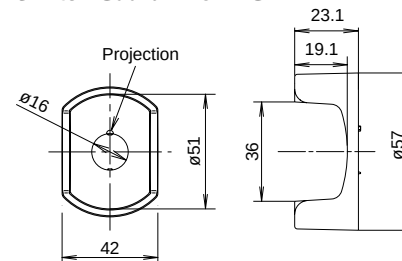
Nameplate for ø30mm Button HAAV-*



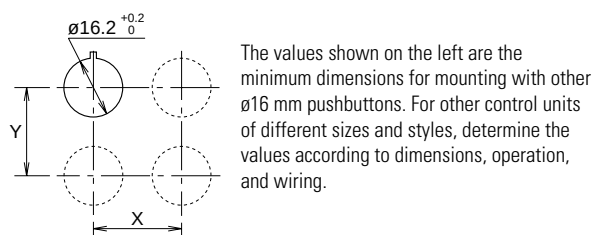
Nameplate for ø40mm Button HAAV4-*



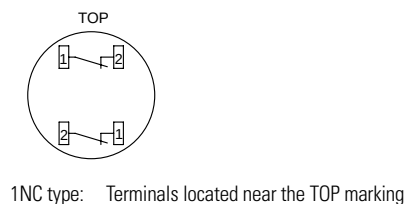
Switch Guard XA9Z-KG1



Mounting Hole Layout



Terminal Arrangement (Bottom View)



	X	Y
ø30 mm Button	40 mm min.	40mm min.
ø40 mm Button	50 mm min.	50mm min.

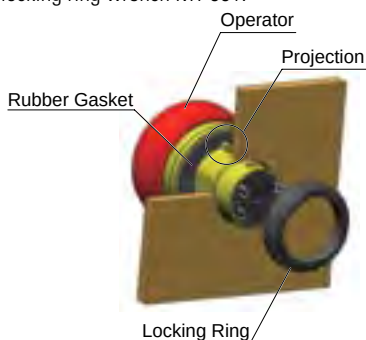
Safety Precautions

- Turn off power to the X6 series units before installation, removal, wiring, maintenance, and inspection. Failure to turn power off may cause electrical shocks or fire hazard.
- For wiring, use wires of proper size to meet the voltage and current requirements and solder properly. Improper soldering may cause overheating and create fire hazards.

Instructions

Panel Mounting

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side with the projection upward, and tighten the locking ring using the locking ring wrench MT-001.



Notes for Panel Mounting

Using the locking ring wrench MT-001, tighten the locking ring to a torque of 0.88 N·m. Do not use pliers. Do not apply excessive force, otherwise the locking ring will become damaged.

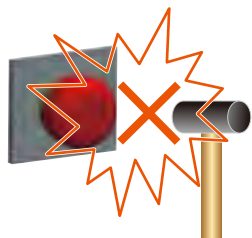
Contact Bounce

When the button is reset by pulling or turning, the NC contacts will bounce. When designing a control circuit, take the contact bounce time into consideration (reference value: 20ms).

Do not apply any external shock to the emergency stop switches, otherwise the contact will bounce.

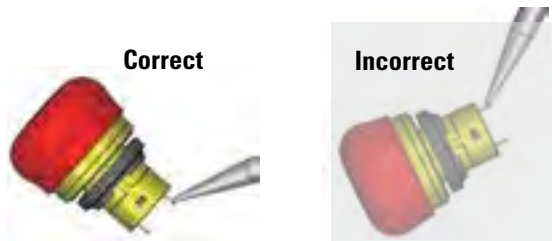
Handling

Do not expose the switch to excessive shock and vibrations, otherwise the switch may be deformed or damaged, causing malfunction or operation failure.



Wiring

1. Applicable wire size is 1.25mm² (16 AWG) maximum.
2. Solder the terminals using a soldering iron at 310 to 350°C for 3 seconds maximum. Do not use flow or dip soldering. SnAgCu type lead-free solder is recommended. Make sure that the soldering iron touches the terminals only, not any plastic parts. Do not apply external force (bending the terminals or applying tensile force on the wires).
3. Use a non-corrosive rosin flux. To prevent the flux from entering the switch while soldering, angle the terminals downward.



4. Because the terminal spacing is narrow, use protective tubes or heat shrinkable tubes to avoid burning the wire sheath or causing a short circuit.
5. Apply force on the terminals in the vertical direction to the panel only, otherwise the terminals will be damaged.
6. When using tab connectors, specify quick connect #110 and 0.5mm tab thickness.

16mm XA E-Stops

Key features:

- Two button sizes: ø29 and ø40mm
- Lead-free, RoHS compliant, (EU directive 2002/95/EC)
- Depth behind the panel:
Standard - only 27.9mm for 1 to 4 contacts
Unibody - only 23.9mm for 1NC or 2NC
- IDEC's original "Safe break action" ensures that the NC contacts open when the contact block is detached from the operator.
- Push-to-lock, Pull or Turn-to-reset operator
- Direct opening action mechanism (IEC60947-5-5, 5.2, IEC60947-5-1, Annex K)
- Safety lock mechanism (IEC60947-5-5, 6.2)
- Degree of protection:
Standard - IP65 (IEC60529)
Unibody - IP65 and IP40 (IEC 60529)
- UL, c-UL recognized. EN compliant
- UL NISD2 category emergency stop button (File# E305148)



CCC No. 2005010305150899

Specifications

Model	Standard	Unibody
Applicable Standards	IEC60947-5-1, EN60947-5-1, IEC60947-5-5, EN60947-5-5, UL508, UL991, CSA C22.2 No. 14	UL508, CSA C22.2 No.14, IEC 60947-5-1, EN 60947-5-1, IEC 60947-5-5 ^{Note} , EN 60947-5-5 ^{Note} , JIS C8201-5-1
Operating Temperature	Non-illuminated: -25 to +60°C (no freezing), Illuminated: -25 to +55°C (no freezing)	-25 to +60°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)	
Storage Temperature	-45 to +80°C	
Operating Force	Push-to-lock: 10.5N Pull-to-reset: 10N Turn-to-reset: 0.16N·m	
Minimum Force Required for Direct Opening Action	60N	40N
Min Operator Stroke Required for Direct Opening Action	4mm	
Maximum Operator Stroke	4.5mm	
Contact Resistance	50mΩ maximum (initial value)	
Contact Material	Gold plated silver	
Insulation Resistance	100MΩ minimum (500V DC megger)	
Impulse Withstand Voltage	2.5kV	
Pollution Degree	3 (inside LED unit: 2)	3
Operation Frequency	900 operations/hour	
Shock Resistance	Operating extremes: 150 m/s ² , Damage limits: 1000 m/s ²	
Vibration Resistance	Operating extremes: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ² , Damage limits: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ²	
Mechanical Life	250,000 operations minimum	
Electrical Life	100,000 operations minimum, (250,000 operations minimum @ 24V AC/DC, 100mA)	
Degree of Protection	IP65 (IEC60529)	IP65, IP40 (IEC 60529)
Terminal Style	Solder terminal, PC board terminal	Solder/tab #110 terminal
Recommended Tightening Torque for Locking Ring	0.88N·m	
Wire Size	16 AWG max	
Soldering Conditions	310 to 350°C, 3 seconds maximum	
Weight	ø29mm: 23g ø40mm: 28g	ø29mm mushroom: 14g ø40mm mushroom: 17g



Note: Except for stop switches (operator color: yellow and gray)

Part Numbers

Non-Illuminated XA E-Stop

Style	Termination	Monitor Contacts	Main Contacts	Part Number
 29mm Mushroom	PCB Terminal	1NO	1NC	XA1E-BV311V-R
		—	2NC	XA1E-BV302V-R
		1NO	3NC	XA1E-BV313V-R
		—	4NC	XA1E-BV304V-R
	Solder Terminal	1NO	1NC	XA1E-BV311-R
		—	2NC	XA1E-BV302-R
		1NO	3NC	XA1E-BV313-R
		—	4NC	XA1E-BV304-R
 40mm Mushroom	PCB Terminal	1NO	1NC	XA1E-BV411V-R
		—	2NC	XA1E-BV402V-R
		1NO	3NC	XA1E-BV413V-R
		—	4NC	XA1E-BV404V-R
	Solder Terminal	1NO	1NC	XA1E-BV411-R
		—	2NC	XA1E-BV402-R
		1NO	3NC	XA1E-BV413-R
		—	4NC	XA1E-BV404-R

Illuminated XA E-Stop

Style	Termination	Monitor Contacts	Main Contacts	Part Number
 29mm Mushroom	PCB Terminal	1NO	1NC	XA1E-LV311Q4V-R
		—	2NC	XA1E-LV302Q4V-R
		1NO	3NC	XA1E-LV313Q4V-R
		—	4NC	XA1E-LV304Q4V-R
	Solder Terminal	1NO	1NC	XA1E-LV311Q4-R
		—	2NC	XA1E-LV302Q4-R
		1NO	3NC	XA1E-LV313Q4-R
		—	4NC	XA1E-LV304Q4-R
 40mm Mushroom	PCB Terminal	1NO	1NC	XA1E-LV411Q4V-R
		—	2NC	XA1E-LV402Q4V-R
		1NO	3NC	XA1E-LV413Q4V-R
		—	4NC	XA1E-LV404Q4V-R
	Solder Terminal	1NO	1NC	XA1E-LV411Q4-R
		—	2NC	XA1E-LV402Q4-R
		1NO	3NC	XA1E-LV413Q4-R
		—	4NC	XA1E-LV404Q4-R



All illuminated XA E-Stops come with a replaceable 24V AC/DC LED.

Part Number Key

XA1E - L V 3 11 Q4 V - R

Illumination
B: Non-Illuminated
L: Illuminated

Mushroom Size
3: ø29mm
4: ø40mm

Contact Configuration
11: 1NO - 1NC
02: 2NC
13: 1NO - 3NC
04: 4NC

Terminal
Blank: solder tab
V: PCB

Voltage Code
Blank: Non-illuminated
Q4: Illuminated 24V AC/DC

Unibody XA E-Stop

Style	Contact	Part Number	
		IP40 (black housing)	IP65 (yellow housing)
29mm Mushroom 	1NC	XA1E-BV3U01KT-R	XA1E-BV3U01T-R
	2NC	XA1E-BV3U02KT-R	XA1E-BV3U02T-R
40mm Mushroom 	1NC	XA1E-BV4U01KT-R	XA1E-BV4U01T-R
	2NC	XA1E-BV4U02KT-R	XA1E-BV4U02T-R

Unibody XA Stop Switch

Style	Operator Type	Contact	① Color Code	Part Number	
				IP40 (black housing)	IP65 (yellow housing)
	29mm Mushroom	1NC	Y: yellow N: gray	XA1E-BV3U01KT-①	XA1E-BV3U01T-①
		2NC		XA1E-BV3U02KT-①	XA1E-BV3U02T-①
	40mm Mushroom	1NC		XA1E-BV4U01KT-①	XA1E-BV4U01T-①
		2NC		XA1E-BV4U02KT-①	XA1E-BV4U02T-①

EMO XA E-Stop

Style	NC Main Contact	NO Monitor Contact	Part Number
40mm Mushroom 	1NC	-	XA1E-BV401-RH-EMO
	2NC	-	XA1E-BV402-RH-EMO
	3NC	-	XA1E-BV403-RH-EMO
	4NC	-	XA1E-BV404-RH-EMO
	1NC	1NO	XA1E-BV411-RH-EMO
	2NC	1NO	XA1E-BV412-RH-EMO
	3NC	1NO	XA1E-BV413-RH-EMO

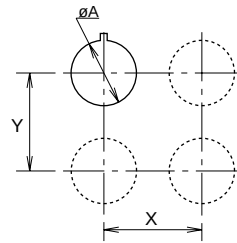
Contact Ratings

Standard						
Rated Insulation Voltage (Ui)				300V (illuminated part: 60V)		
Rated Current (Ith)				5A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current	Main Contacts (NC)	AC 50/60Hz	Resistive Load (AC-12)	—	3A	3A
			Inductive Load (AC-15)	—	1.5A	1.5A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Monitor Contacts (NO)	AC 50/60Hz	Resistive Load (AC-12)	—	1.2A	0.6A
			Inductive Load (AC-14)	—	0.6A	0.3A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
Unibody						
Rated Insulation Voltage (Ui)				250V		
Thermal Current (Ith)				5A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current	AC 50/60Hz	Resistive Load (AC-12)		—	5A	3A
		Inductive Load (AC-15)		—	3A	1.5A
	DC	Resistive Load (DC-12)		2A	0.4A	0.2A
		Inductive Load (DC-13)		1A	0.22A	0.1A



Minimum applicable load: 5V AC/DC, 1mA (reference value).
The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.

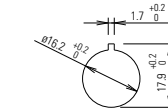
Mounting Hole Layout



Measurements

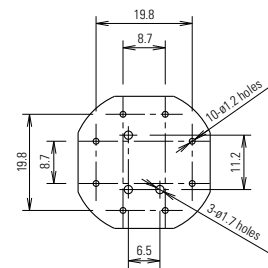
Model	øA	X & Y
ø29mm	16.2 ^{+0.2}	40mm min
ø40mm		50mm min

Panel Cutout

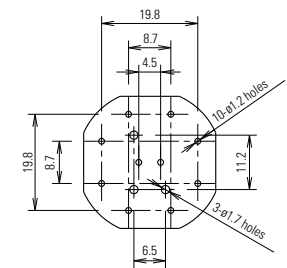


PC Board Layout - Bottom View

Non-Illuminated



Illuminated



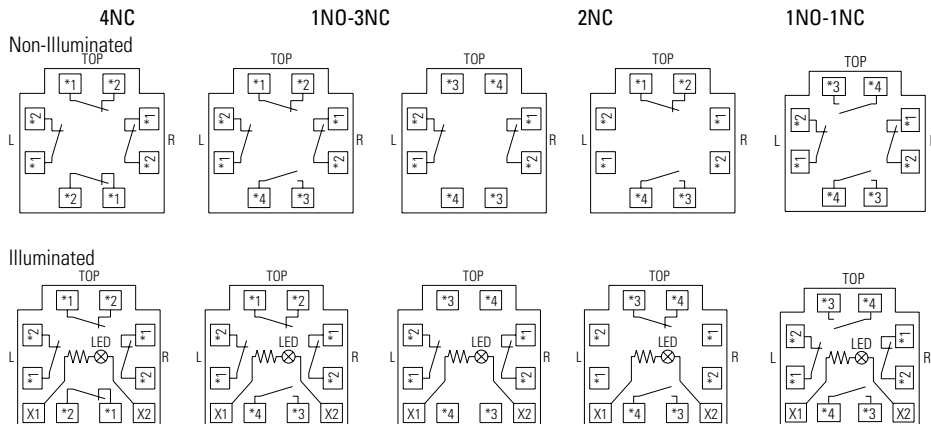
Illuminated Unit LED Ratings

Operating Voltage	Current
24V AC/DC ±10%	11mA

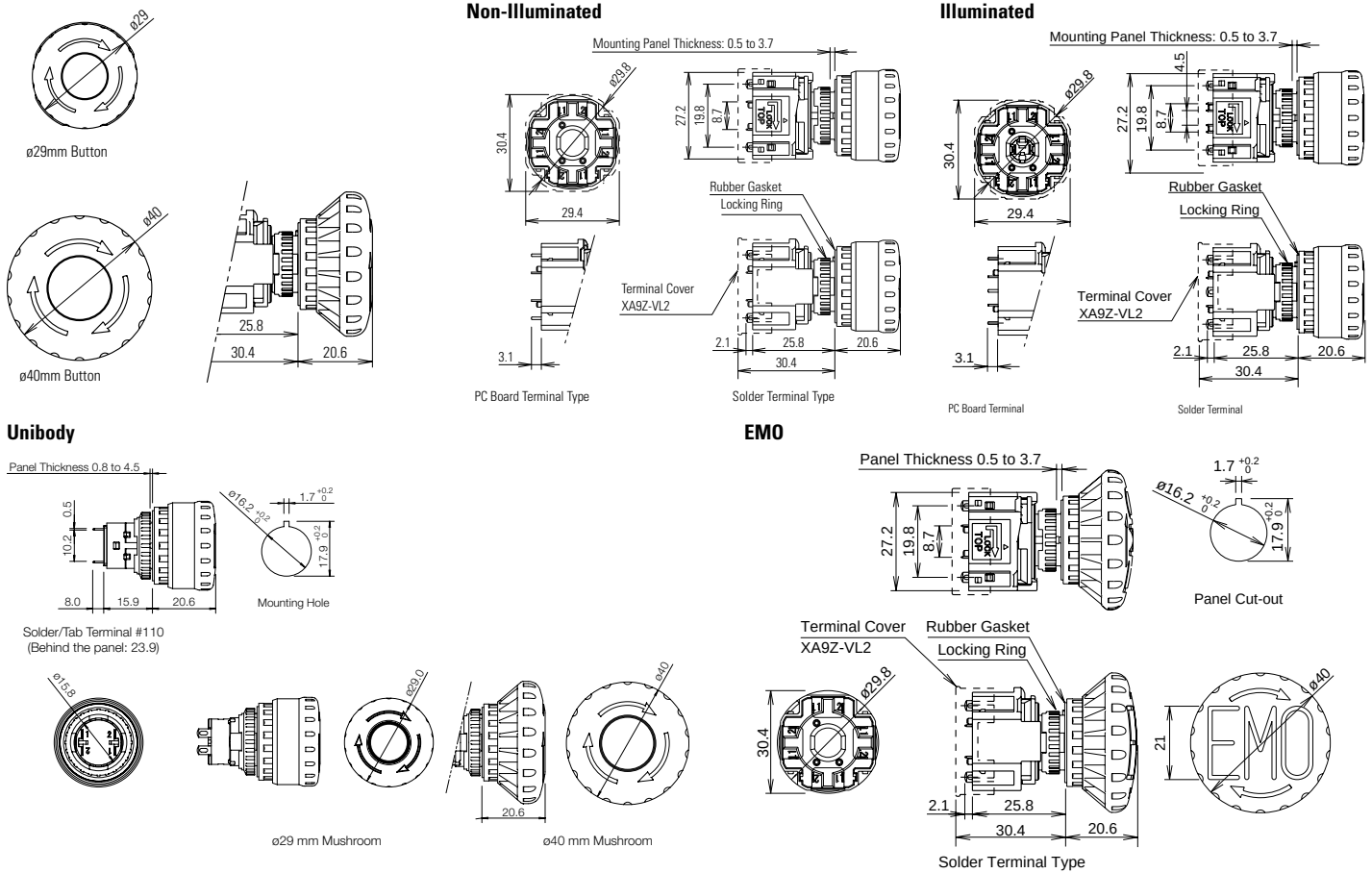
Depth Behind the Panel

Depth (mm)	Description
27.9 (Standard)	1 - 4 contacts, both illuminated and non-illuminated
23.9 (Unibody)	1NC or 2NC

Terminal Arrangements (Bottom View)



Dimensions (mm)



Accessories

Description	Part Numbers
Replacement LED Unit: Solder Terminal	XA9Z-LED2R
Replacement LED Unit: PCB Terminal	XA9Z-LED2VR
Terminal Cover for contact block (solder terminal only)	XA9Z-VL2

Accessories: Shroud

Appearance	Part Number	Applicable Standards
	XA9Z-KG1	SEMI S2 Compliant (Approved by TUV)

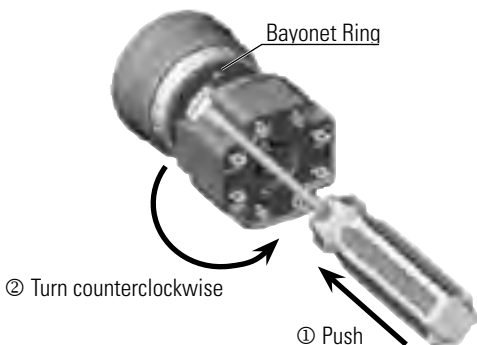
Accessories: Nameplates

Appearance	Legend	Part Number	Inner Ø	Outer Ø	Applicable Mushroom Size
	(blank)	HAAV-0	16mm	43mm	29mm
	"Emergency Stop"	HAAV-27	16mm	43mm	
	(blank)	HAAV4-0	16mm	60mm	40mm
	"Emergency Stop"	HAAV4-27	16mm	60mm	

Operating Instructions

Removing the Contact Block

First unlock the operator button. While pushing up the white bayonet ring, using a small screwdriver (width: 2.5 to 3 mm) if necessary, turn the contact block counterclockwise and pull out. **Do not exert excessive force when using a screwdriver, otherwise the bayonet ring may be damaged.**

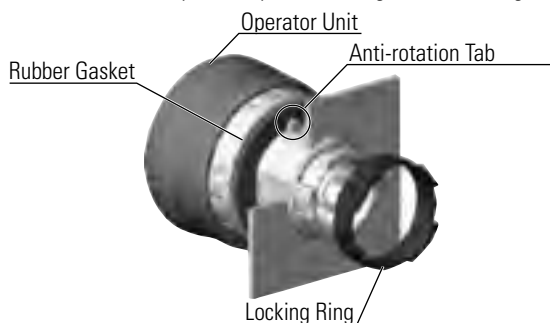


Notes for Removing the Contact Block

1. When the contact block is removed, the monitor contact (NO contact) is closed.
2. While removing the contact block, do not exert excessive force, otherwise the switch may be damaged.

Panel Mounting

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side with the anti-rotation tab on the operator upward, and tighten the locking ring.

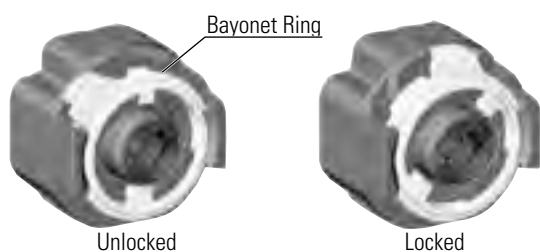


Notes for Panel Mounting

To mount XA emergency stop switches onto a panel, tighten the locking ring to a tightening torque of 0.88 N·m maximum using ring wrench MT-001. Do not use pliers. Do not exert excessive force, otherwise the locking ring may be damaged.

Installing the Contact Block

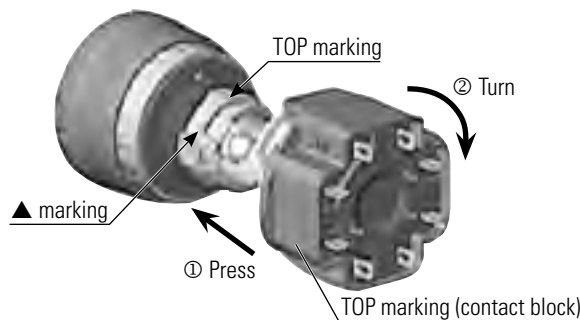
First turn the bayonet ring to the unlocked position.



Align the small ▲ marking on the edge of the operator base with the TOP marking on the contact block. Press the contact block onto the operator and turn the contact block clockwise until the bayonet ring clicks.

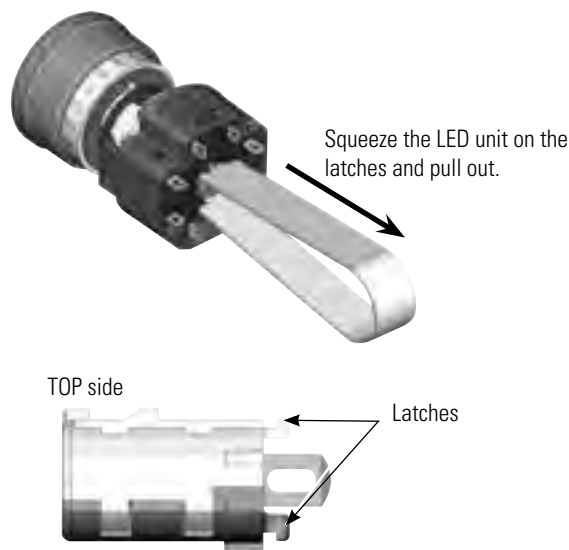
Notes for Installing the Contact Block

Check that the contact block is securely installed on the operator. When the emergency stop switch is properly assembled, the bayonet ring is in place as shown below.



Removing the LED Unit

Pull out the LED unit while squeezing the latches on the LED unit using the LED unit removal tool (MT-101).



Installing the LED Unit

Align the top of the LED unit with the TOP marking on the contact block. Push the LED unit into the contact block.



Operating Instructions, continued

Wiring

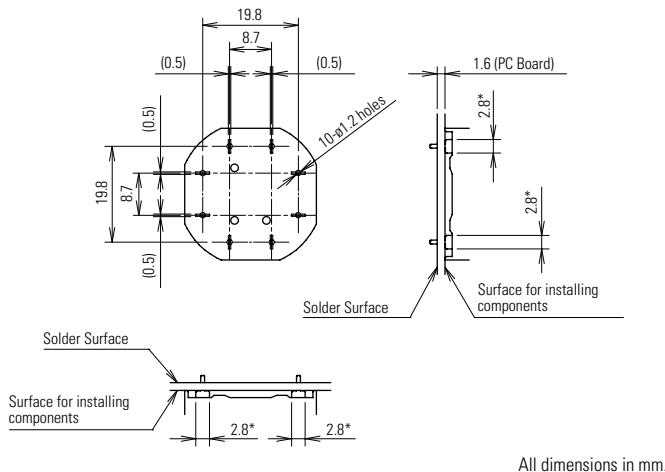
1. The applicable wire size is 16 AWG maximum.
2. Solder the terminal at a temperature of 310 to 350°C within 3 seconds using a soldering iron. Sn-Ag-Cu solder is recommended. When soldering, do not touch the switch with the soldering iron. Also ensure that no tensile force is applied to the terminals. Do not bend the terminals or apply excessive force to the terminals.
3. Use a non-corrosive rosin flux.
4. Because the terminal spacing is narrow, use protective tubes or heat shrinkable tubes to avoid burning of wire coating or short circuit.

PC Board Terminal Type

1. When mounting a contact block on a PC board, provide sufficient rotating space for the PC board when installing and removing the contact block.
2. When mounting an XA emergency stop switch on a PC board, make sure that the operator is securely installed.

About PC Board and Circuit Design

1. Use PC boards made of glass epoxy copper-clad laminated sheets of 1.6 mm in thickness, with double-sided through holes.
2. PC boards and circuits must withstand rated voltage and current, including instantaneous current and voltage at switching.
3. The minimum applicable load is 5V AC/DC, 1 mA.
4. Within the 2.8* mm areas shown in the figure below, terminals touch the PC board, resulting in possible short circuit on the printed circuit. When designing a PC board pattern, take this possibility into consideration.



Installing Insulation Terminal Cover

To install the terminal cover (XA9Z-VL2), align the TOP marking on the terminal cover with TOP marking on the contact block, and press the terminal cover toward the contact block.

Note: For wiring, insert the wires into the holes in the terminal cover before soldering.



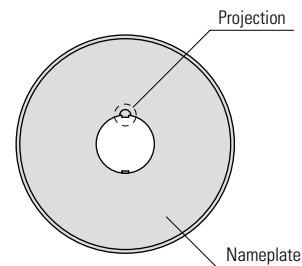
Contact Bounce

When the button is reset by pulling or turning, the NC main contacts will bounce. When pressing the button, the NO monitor contacts will bounce.

When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms).

Nameplate

When anti-rotation is not required, remove the projection from the nameplate using pliers.



Handling

Do not expose the switch to excessive shock and vibration, otherwise the switch may be deformed or damaged, causing malfunction or operation failure.



Safety Precautions

- Turn off power to the XA series emergency stop switch before starting installation, removal, wiring, maintenance, and inspection of the relays. Failure to turn power off may cause electrical shock or fire hazard.
- Use the LED unit removal tool when replacing the LED unit to avoid burning your hands.
- Use wires of the proper size to meet the voltage and current requirements, and solder the wires correctly. If soldering is incomplete, the wire may heat during operation, causing a fire hazard.

LB Flush Mount & 16mm Miniature Switches & Pilot Lights

Flush bezel projects only 2mm from front of panel. Standard bezel has a depth of only 27.9mm! Removable contact blocks are ideal for single board mounting.

Key Features

- Pushbuttons, lever switches, selector switches, and key selector switches with up to 3PDT contacts.
- Key selectors with keys that are difficult to duplicate. Seven different key numbers to choose from.
- Pilot lights with flat or dome lenses.
- Buzzers with 80dB steady sound.
- Black or metallic flush bezels available.
- Bright and clear LED illuminated face.
- Choice of either gold-clad or silver contacts.
- Degree of protection: IP65 (from the front of the panel).



Applicable Standards	Mark	File No. or Organization
UL508		UL Recognition No.E55996
CSA 22.2 No.14		CSA File No. LR 21451
EN60947-5-1		TÜV Rheinland
		EU Low Voltage Directive
GB14048.5		

Specifications

Operating Temperature	−25 to +60°C (no freezing), Illuminated units: −25 to +55°C
Storage Temperature	−30 to +80°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Contact Resistance	50 mW maximum (initial value)
Insulation Resistance	100 MW minimum (500V DC megger)
Dielectric Strength	Switch Between live part and ground: 2,000V AC, 1 min. Between terminals of different poles: 2,000V AC, 1 min. Between terminals of the same poles: 1,000V AC, 1 min.
	Illumination Between live part and ground: 2,000V AC, 1 min.
Vibration Resistance	Operating extremes/Damage limits: 5 to 55 Hz, amplitude 0.5mm
Shock Resistance	Operating extremes: 100 m/s ² Damage limits: 1,000 m/s ²
Mechanical Life (minimum operations)	Momentary: 2,000,000 Maintained: 250,000 Selector switches: 250,000 Key selector switches: 250,000
Electrical Life (minimum operations)	Momentary: 50,000 / 100,000 ¹ Maintained: 50,000 / 100,000 ² Selector switches: 50,000 / 100,000 ² Key selector switches: 50,000 / 100,000 ²
Degree of Protection	IP65 (IEC 60529)
Terminal Style	Solder/tab terminal #110, PC board terminal
Bezel	Black plastic or metallic
Weight (approx.)	11g (lever switch) 13g (pilot light, pushbutton) 14g (illuminated pushbutton, pushbutton with guard, buzzer) 15g (selector switch, illuminated pushbutton with guard) 27g (key selector switch)

1. Switching frequency 1,800 operations/h.
2. Switching frequency 1,200 operations/h.

Contact Ratings

Gold Contact (switch base color: blue)		
Rated Insulation Voltage	250V	
Rated Thermal Current	3A	
Rated Operating Voltage	30V DC	125V AC
Rated Operating Current (resistive load)	0.1A	0.1A
Contact Material	Gold-clad silver	

Minimum applicable load (reference value): 5V AC/DC, 1 mA

Silver Contact (switch base color: gray)				
Rated Insulation Voltage	250V			
Rated Operating Voltage	30V	125V	250V	
Rated Operating Current	AC 50/60Hz	Resistive load	—	5A
		Inductive load	—	3A
	DC	Resistive load	5A	1.1A
		Inductive load	2.5A	0.55A
	AC 50/60Hz	Resistive load	—	5A
		Inductive load	—	3A
	DC	Resistive load	3A	0.6A
		Inductive load	1A	0.22A
Rated Thermal Current	5A			
Contact Material	Silver			

AC inductive load: PF=0.6 to 0.7 DC inductive load: L/R=7 ms max.

LED Ratings

Rated Voltage	5V DC	12V AC/DC	24V AC/DC
Voltage Range	5V DC±5%	12V AC/DC±10%	24V AC/DC ±10%
LED Part No.	LB9Z-LED5②	LB9Z-LED1②	LB9Z-LED2②

Rated Current A, R: 22 mA G, PW, S: 16 mA

Voltage Rating Marked on the side of the LED unit

LED Life (reference value) Approx. 30,000 hours (until the brightness reduces to 50% of the initial value)

Internal Circuit	A, PW, R		A, PW, R	
	G, S		G, S	

- LED Chip
- Protection Diode
- Zener Diode
- Resistor
- Varistor

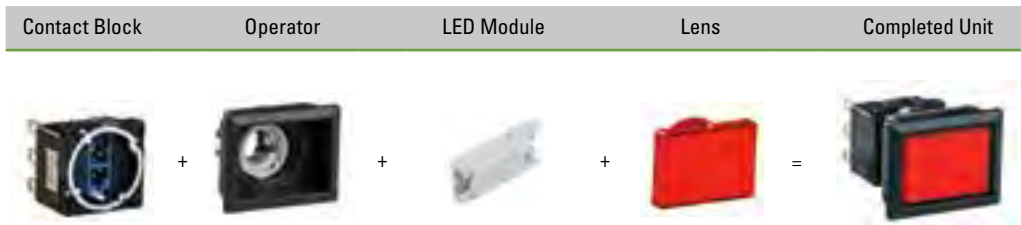
1. For ② (color code): A (amber), G (green), PW (white), R (red), S (blue)
2. Use the white LED for yellow illumination.
3. LED lamp contains a current-limiting resistor.

Illuminated Pushbuttons (Assembled)

Style	Operation	Operating Voltage	Contact	Standard Bezel		Flush Bezel		② Color Code
				Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	
Standard Bezel (black)   	Momentary	5V DC	SPDT	LB⓪L-M1T51②	LB⓪L-M1T11V②	LB③④L-M1T51②	LB③④L-M1T11V②	Specify the color code in place of ② in the Part Number: A: amber G: green R: red S: blue PW: white Y: yellow
			DPDT	LB⓪L-M1T61②	LB⓪L-M1T21V②	LB③④L-M1T61②	LB③④L-M1T21V②	
		12V AC/DC	SPDT	LB⓪L-M1T53②	LB⓪L-M1T13V②	LB③④L-M1T53②	LB③④L-M1T13V②	
			DPDT	LB⓪L-M1T63②	LB⓪L-M1T23V②	LB③④L-M1T63②	LB③④L-M1T23V②	
		24V AC/DC	SPDT	LB⓪L-M1T54②	LB⓪L-M1T14V②	LB③④L-M1T54②	LB③④L-M1T14V②	
			DPDT	LB⓪L-M1T64②	LB⓪L-M1T24V②	LB③④L-M1T64②	LB③④L-M1T24V②	
Flush Bezel (metallic or black)   	Maintained	5V DC	SPDT	LB⓪L-A1T51②	LB⓪L-A1T11V②	LB③④L-A1T51②	LB③④L-A1T11V②	
			DPDT	LB⓪L-A1T61②	LB⓪L-A1T21V②	LB③④L-A1T61②	LB③④L-A1T21V②	
		12V AC/DC	SPDT	LB⓪L-A1T53②	LB⓪L-A1T13V②	LB③④L-A1T53②	LB③④L-A1T13V②	
			DPDT	LB⓪L-A1T63②	LB⓪L-A1T23V②	LB③④L-A1T63②	LB③④L-A1T23V②	
		24V AC/DC	SPDT	LB⓪L-A1T54②	LB⓪L-A1T14V②	LB③④L-A1T54②	LB③④L-A1T14V②	
			DPDT	LB⓪L-A1T64②	LB⓪L-A1T24V②	LB③④L-A1T64②	LB③④L-A1T24V②	
Black Bezel with Guard 								

- For Standard Bezel part numbers specify:
 - Bezel shape in place of ①. 1 (round), 2 (square), 3 (rectangular)
 - Lens/LED color in place of ②. A (amber), G (green), PW (white), R (red), S (blue), Y (yellow)
- For Flush Bezel part numbers specify:
 - Lens/LED in place of ②. A (amber), G (green), PW (white), R (red), S (blue), Y (yellow)
 - Bezel shape in place of ③. 6 (round), 7 (square), 8 (rectangular)
 - Bezel material in place of ④. M (metallic), Blank (black), G (black with guard)
- Solder/Tab terminals have silver contacts and PC Board Terminals have gold contacts.
- Illuminated pushbuttons contain an LED unit.
- See page 526 for dimensions.
- See page 541 for replacement LED units.
- Illuminated pushbuttons can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See page 541 for details on the marking plate and film.

Illuminated Pushbuttons (Sub-assembled)



Contact Block

Terminal Style	Material	Contact	Part Number
	Solder/Tab	Silver	SPDT
		DPDT	LB-T50
	PCB	Gold	SPDT
		DPDT	LB-T60
	Solder/Tab	Silver	SPDT
		DPDT	LB-T10V
	PCB	Gold	SPDT
		DPDT	LB-T20V

LED Module

Style	Color	Voltage	Part Number
	Amber	5V	LB9Z-LED5A
		12V	LB9Z-LED1A
		24V	LB9Z-LED2A
	Green	5V	LB9Z-LED5G
		12V	LB9Z-LED1G
		24V	LB9Z-LED2G
	Red	5V	LB9Z-LED5R
		12V	LB9Z-LED1R
		24V	LB9Z-LED2R
	Blue	5V	LB9Z-LED5S
		12V	LB9Z-LED1S
		24V	LB9Z-LED2S
	White	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW
	Yellow	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW

Operator

Style	Mounting Style	Shape	Monmontary	Maintained
	Standard (Plastic)	Round	LB1L-M0	LB1L-A0
		Square	LB2L-M0	LB2L-A0
		Rectangular	LB3L-M0	LB3L-A0
	Flush Mount (Plastic)	Round	LB6L-M0	LB6L-A0
		Square	LB7L-M0	LB7L-A0
		Rectangular	LB8L-M0	LB8L-A0
	Flush Mount (Metallic)	Round	LB6ML-M0	LB6ML-A0
		Square	LB7ML-M0	LB7ML-A0
		Rectangular	LB8ML-M0	LB8ML-A0
	Flush Mount (Built-in switch guard)	Round	LB6GL-M0	LB6GL-A0
		Square	LB7GL-M0	LB7GL-A0
		Rectangular	LB8GL-M0	LB8GL-A0

Lens

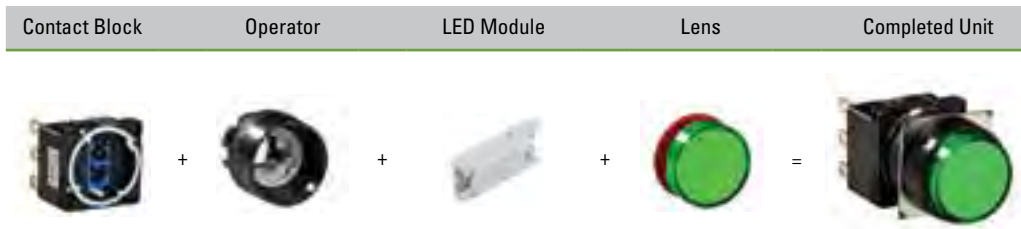
Shape	Color	Part Number
	Amber	LB1A-L1A
	Green	LB1A-L1G
	Red	LB1A-L1R
	Blue	LB1A-L1S
	White	LB1A-L1W
	Yellow	LB1A-L1Y
	Amber	LB2A-L1A
	Green	LB2A-L1G
	Red	LB2A-L1R
	Blue	LB2A-L1S
	White	LB2A-L1W
	Yellow	LB2A-L1Y
	Amber	LB3A-L1A
	Green	LB3A-L1G
	Red	LB3A-L1R
	Blue	LB3A-L1S
	White	LB3A-L1W
	Yellow	LB3A-L1Y

Pilot Lights (Assembled)

Style	Operating Voltage	Standard Bezel		Flush Bezel		② Color Code
		Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	
Standard Bezel (black) 	5V DC	LB①P-⑤T01②	LB①P-⑤T01V②	LB③④P-⑤T01②	LB③④P-⑤T01V②	Specify the color code in place of ② in the Part Number: A: amber G: green PW: white R: red S: blue Y: yellow
Flush Bezel (metallic or black) 	12V AC/DC	LB①P-⑤T03②	LB①P-⑤T03V②	LB③④P-⑤T03②	LB③④P-⑤T03V②	
	24V AC/DC	LB①P-⑤T04②	LB①P-⑤T04V②	LB③④P-⑤T04②	LB③④P-⑤T04V②	

- For Standard Bezel part numbers specify:
 - bezel shape in place of ①. 1 (round), 2 (square), 3 (rectangular)
 - lens/LED color in place of ②. A (amber), G (green), PW (white), R (red), S (blue), Y (yellow)
 - lens type code in place of ⑤. 1 (flat), 2 (dome with round lens)
- For Flush Bezel part numbers specify:
 - lens/LED in place of ②. A (amber), G (green), PW (white), R (red), S (blue), Y (yellow)
 - bezel shape in place of ③. 6 (round), 7 (square), 8 (rectangular)
 - bezel material in place of ④. M (metallic), Blank (black)
 - lens type code in place of ⑤. 1 (flat), 2 (dome with round lens)
- Pilot lights contain an LED unit.
- See page 526 for dimensions.
- See page 541 for replacement LED unit.

Pilot Lights (Sub-assembled)



Contact Block

Terminal Style	Part Number
	LB-T00
	LB-T00V

LED Module

Style	Color	Voltage	Part Number
	Amber	5V	LB9Z-LED5A
		12V	LB9Z-LED1A
		24V	LB9Z-LED2A
	Green	5V	LB9Z-LED5G
		12V	LB9Z-LED1G
		24V	LB9Z-LED2G
	Red	5V	LB9Z-LED5R
		12V	LB9Z-LED1R
		24V	LB9Z-LED2R
	Blue	5V	LB9Z-LED5S
		12V	LB9Z-LED1S
		24V	LB9Z-LED2S
	White	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW
	Yellow	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW

Operator

Style	Mounting Style	Shape	Part Number
	Standard (Plastic)	Round	LB1P-0
		Square	LB2P-0
		Rectangular	LB3P-0
	Flush Mount (Plastic)	Round	LB6P-0
		Square	LB7P-0
		Rectangular	LB8P-0
	Flush Mount (Metallic)	Round	LB6MP-0
		Square	LB7MP-0
		Rectangular	LB8MP-0

Lens

Shape	Color	Part Number
	Amber	LB1A-P1A
	Green	LB1A-P1G
	Red	LB1A-P1R
	Blue	LB1A-P1S
	White	LB1A-P1W
	Yellow	LB1A-P1Y
	Amber	LB1A-P2A
	Green	LB1A-P2G
	Red	LB1A-P2R
	Blue	LB1A-P2S
	White	LB1A-P2W
	Yellow	LB1A-P2Y
	Amber	LB2A-P1A
	Green	LB2A-P1G
	Red	LB2A-P1R
	Blue	LB2A-P1S
	White	LB2A-P1W
	Yellow	LB2A-P1Y
	Amber	LB3A-P1A
	Green	LB3A-P1G
	Red	LB3A-P1R
	Blue	LB3A-P1S
	White	LB3A-P1W
	Yellow	LB3A-P1Y

Non-Illuminated Pushbuttons (Assembled)

Style	Operation	Contact	Standard Bezel		Flush Bezel		② Color Code
			Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	
Standard Bezel (black)   	Momentary	SPDT	LB①B-M1T5②	LB①B-M1T1V②	LB③④B-M1T5②	LB③④B-M1T1V②	
		DPDT	LB①B-M1T6②	LB①B-M1T2V②	LB③④B-M1T6②	LB③④B-M1T2V②	
		3PDT	LB①B-M1T7②	LB①B-M1T3V②	LB③④B-M1T7②	LB③④B-M1T3V②	
Flush Bezel (metallic or black)   	Maintained	SPDT	LB①B-A1T5②	LB①B-A1T1V②	LB③④B-A1T5②	LB③④B-A1T1V②	Specify the color code in place of ② in the Part Number: B: black G: green R: red S: blue W: white Y: yellow
		DPDT	LB①B-A1T6②	LB①B-A1T2V②	LB③④B-A1T6②	LB③④B-A1T2V②	
		3PDT	LB①B-A1T7②	LB①B-A1T3V②	LB③④B-A1T7②	LB③④B-A1T3V②	

1. For Standard Bezel part numbers specify:

- bezel shape in place of ①. 1 (round), 2 (square), 3 (rectangular)
- lens/LED in place of ②. B (black), G (green), R (red), S (blue), W (white), Y (yellow)

2. For Flush Bezel part numbers specify:

- lens/LED in place of ②. B (black), G (green), R (red), S (blue), W (white), Y (yellow)
- bezel shape in place of ③. 6 (round), 7 (square), 8 (rectangular)
- bezel material in place of ④. M (metallic), Blank (black)

3. See page 528 for dimensions.

4. Lens can be used with legend markings. Engraving can be done on a marking plate which is placed into the lens, or a clear film can be printed and placed under the lens. For details on the marking plate and film, see page 541.

Non-Illuminated Pushbuttons (Sub-assembled)



Contact Block

Terminal Style	Material	Contact	Part Number
	Solder/Tab	Silver	SPDT LB-T5
			DPDT LB-T6
			3PDT LB-T7
	PCB	Gold	SPDT LB-T1V
			DPDT LB-T2V
			3PDT LB-T3V

Button

Style	Color	Part Number
	Black	LB1A-B1B
	Green	LB1A-B1G
	Red	LB1A-B1R
	Blue	LB1A-B1S
	White	LB1A-B1W
	Yellow	LB1A-B1Y
	Black	LB2A-B1B
	Green	LB2A-B1G
	Red	LB2A-B1R
	Blue	LB2A-B1S
	White	LB2A-B1W
	Yellow	LB2A-B1Y
	Black	LB3A-B1B
	Green	LB3A-B1G
	Red	LB3A-B1R
	Blue	LB3A-B1S
	White	LB3A-B1W
	Yellow	LB3A-B1Y

Operator

Style	Mounting style	Shape	Momentary	Maintained
	Standard (Plastic)	Round	LB1L-M0	LB1L-A0
		Square	LB2L-M0	LB2L-A0
		Rectangular	LB3L-M0	LB3L-A0
	Flush Mount (Plastic)	Round	LB6L-M0	LB6L-A0
		Square	LB7L-M0	LB7L-A0
		Rectangular	LB8L-M0	LB8L-A0
	Flush Mount (Metallic)	Round	LB6ML-M0	LB6ML-A0
		Square	LB7ML-M0	LB7ML-A0
		Rectangular	LB8ML-M0	LB8ML-A0
	Flush Mount (Built-in switch guard)	Round	LB6GL-M0	LB6GL-A0
		Square	LB7GL-M0	LB7GL-A0
		Rectangular	LB8GL-M0	LB8GL-A0

Selector Switches (Assembled)

Style	Operator Position	Contact	Standard Bezel		Flush Bezel	
			Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)
Standard Bezel (black) 	90° 2-position	Maintained 	SPDT	LB①S-2⑤T5	LB①S-2⑤T1V	LB③④S-2⑤T5
			DPDT	LB①S-2⑤T6	LB①S-2⑤T2V	LB③④S-2⑤T6
			3PDT	LB①S-2⑤T7	LB①S-2⑤T3V	LB③④S-2⑤T7
		Spring return from right 	SPDT	LB①S-21⑤T5	LB①S-21⑤T1V	LB③④S-21⑤T5
			DPDT	LB①S-21⑤T6	LB①S-21⑤T2V	LB③④S-21⑤T6
			3PDT	LB①S-21⑤T7	LB①S-21⑤T3V	LB③④S-21⑤T7
Flush Bezel (metallic or black) 	45° 3-position	Maintained 	DPDT	LB①S-3⑤T6	LB①S-3⑤T2V	LB③④S-3⑤T6
			3PDT	LB①S-3⑤T7	LB①S-3⑤T3V	LB③④S-3⑤T7
		Spring return from right 	DPDT	LB①S-31⑤T6	LB①S-31⑤T2V	LB③④S-31⑤T6
			3PDT	LB①S-31⑤T7	LB①S-31⑤T3V	LB③④S-31⑤T7
		Spring return from left 	DPDT	LB①S-32⑤T6	LB①S-32⑤T2V	LB③④S-32⑤T6
			3PDT	LB①S-32⑤T7	LB①S-32⑤T3V	LB③④S-32⑤T7
		Spring return two-way 	DPDT	LB①S-33⑤T6	LB①S-33⑤T2V	LB③④S-33⑤T6
			3PDT	LB①S-33⑤T7	LB①S-33⑤T3V	LB③④S-33⑤T7

Knob models shown above unless otherwise indicated.

5. For Standard Bezel part numbers specify:

- bezel shape in place of ①. 1 (round), 2 (square), 3 (rectangular)
- operator shape in place of ⑤. blank (knob), L (lever).

6. For Flush Bezel part numbers specify:

- bezel shape in place of ③. 6 (round), 7 (square), 8 (rectangular)
- bezel material in place of ④. M (metallic), Blank (black)
- operator shape in place of ⑤. blank (knob), L (lever).

7. See page 524 for contact operation .

8. See page 530 for dimensions.

Selector Switches (Sub-assembled)



Contact Block

Terminal Style	Material	Contact	Part Number
	Solder/Tab	Silver	SPDT LB-T5
			DPDT LB-T6
			3PDT LB-T7
	PCB	Gold	SPDT LB-T1V
			DPDT LB-T2V
			3PDT LB-T3V

SPDT contacts applicable for 2-position switches only.

Operator

Style	Shape	Position	Function	Part Number	
				Knob	Lever
Standard (Plastic)  Round	Round	2	Maintained	LB1S-2Y	LB1S-2L
			Spring from right	LB1S-21Y	LB1S-21L
		3	Maintained	LB1S-3Y	LB1S-3L
			Spring from right	LB1S-31Y	LB1S-31L
			Spring from left	LB1S-32Y	LB1S-32L
	Rectangular 	2	Maintained	LB2S-2Y	LB2S-2L
			Spring from right	LB2S-21Y	LB2S-21L
		3	Maintained	LB2S-3Y	LB2S-3L
			Spring from right	LB2S-31Y	LB2S-31L
			Spring from left	LB2S-32Y	LB2S-32L
	Rectangular	2	Maintained	LB3S-2Y	LB3S-2L
			Spring from right	LB3S-21Y	LB3S-21L
		3	Maintained	LB3S-3Y	LB3S-3L
			Spring from right	LB3S-31Y	LB3S-31L
			Spring from left	LB3S-32Y	LB3S-32L
		2	Maintained	LB8MS-2Y	LB8MS-2L
			Spring from right	LB8MS-21Y	LB8MS-21L
		3	Maintained	LB8MS-3Y	LB8MS-3L
			Spring from right	LB8MS-31Y	LB8MS-31L
			Spring from left	LB8MS-32Y	LB8MS-32L

Style	Shape	Position	Function	Part Number	
				Knob	Lever
Flush Mount (Plastic)  Round	Round	2	Maintained	LB6S-2Y	LB6S-2L
			Spring from right	LB6S-21Y	LB6S-21L
		3	Maintained	LB6S-3Y	LB6S-3L
			Spring from right	LB6S-31Y	LB6S-31L
			Spring from left	LB6S-32Y	LB6S-32L
	Square 	2	Maintained	LB7S-2Y	LB7S-2L
			Spring from right	LB7S-21Y	LB7S-21L
		3	Maintained	LB7S-3Y	LB7S-3L
			Spring from right	LB7S-31Y	LB7S-31L
			Spring from left	LB7S-32Y	LB7S-32L
	Rectangular	2	Maintained	LB8S-2Y	LB8S-2L
			Spring from right	LB8S-21Y	LB8S-21L
		3	Maintained	LB8S-3Y	LB8S-3L
			Spring from right	LB8S-31Y	LB8S-31L
			Spring from left	LB8S-32Y	LB8S-32L
Flush Mount (Metallic)  Round	Round	2	Maintained	LB6MS-2Y	LB6MS-2L
			Spring from right	LB6MS-21Y	LB6MS-21L
		3	Maintained	LB6MS-3Y	LB6MS-3L
			Spring from right	LB6MS-31Y	LB6MS-31L
			Spring from left	LB6MS-32Y	LB6MS-32L
	Square 	2	Maintained	LB7MS-2Y	LB7MS-2L
			Spring from right	LB7MS-21Y	LB7MS-21L
		3	Maintained	LB7MS-3Y	LB7MS-3L
			Spring from right	LB7MS-31Y	LB7MS-31L
			Spring from left	LB7MS-32Y	LB7MS-32L
	Rectangular	2	Maintained	LB8MS-2Y	LB8MS-2L
			Spring from right	LB8MS-21Y	LB8MS-21L
		3	Maintained	LB8MS-3Y	LB8MS-3L
			Spring from right	LB8MS-31Y	LB8MS-31L
			Spring from left	LB8MS-32Y	LB8MS-32L

Illuminated Selector Switches (Assembled)

Style	Operating Voltage	Operator Position	Contact	Standard Bezel		Flush Bezel		
				Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	
Standard Bezel (black)   	5V DC	90° 2-position	Maintained 	SPDT	LB①F-2T51②	LB①F-2T11V②	LB6③F-2T51②	LB6③F-2T11V②
			DPDT	LB①F-2T61②	LB①F-2T21V②	LB6③F-2T61②	LB6③F-2T21V②	
		45° 3-position	Maintained 	DPDT	LB①F-3T61②	LB①F-3T21V②	LB6③F-3T61②	LB6③F-3T21V②
			12V AC/DC	90° 2-position	Maintained 	SPDT	LB①F-2T53②	LB①F-2T13V②
	DPDT	LB①F-2T63②			LB①F-2T23V②	LB6③F-2T63②	LB6③F-2T23V②	
	Flush Bezel (metallic or black)  	45° 3-position		Maintained 	DPDT	LB①F-3T63②	LB①F-3T23V②	LB6③F-3T63②
24V AC/DC				90° 2-position	Maintained 	SPDT	LB①F-2T54②	LB①F-2T14V②
		DPDT	LB①F-2T64②		LB①F-2T24V②	LB6③F-2T64②	LB6③F-2T24V②	
		45° 3-position	Maintained 	DPDT	LB①F-3T64②	LB①F-3T24V②	LB6③F-3T64②	LB6③F-3T24V②

Flush bezel only available with round operator.

9. For Standard Bezel part numbers specify:

- bezel shape in place of ①. 1 (round), 2 (square), 3 (rectangular)
- color code in place of ②. A (amber), G (green), R (red), S (blue), PW (white), Y (yellow)

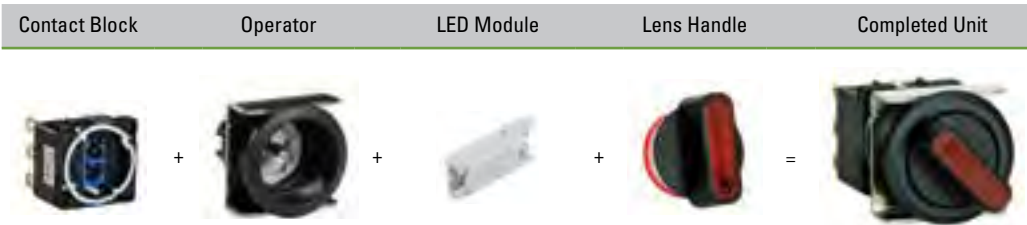
10. For Flush Bezel part numbers specify:

- color code in place of ②. A (amber), G (green), R (red), S (blue), PW (white), Y (yellow)
- bezel material in place of ③. M (metallic), Blank (black)

11. See page 524 for contact operation.

12. See page 532 for dimensions.

Illuminated Selector Switches (Sub-assembled)



Contact Block

Terminal Style	Material	Contact	Part Number
	Solder/Tab	Silver	SPDT LB-T50
			DPDT LB-T60
		Gold	SPDT LB-T10
			DPDT LB-T20
	PCB	Gold	SPDT LB-T10V
		Gold	DPDT LB-T20V

SPDT contacts applicable for 2-position switches only.

Operator

Style	Shape	Position	Function	Part Number
	Round	2	Maintained	LB1F-2
		3	Maintained	LB1F-3
	Square	2	Maintained	LB2F-2
		3	Maintained	LB2F-3
	Rectangular	2	Maintained	LB3F-2
		3	Maintained	LB3F-3
	Round	2	Maintained	LB6F-2
		3	Maintained	LB6F-3
	Round	2	Maintained	LB6MF-2
		3	Maintained	LB6MF-3

LED Module

Style	Color	Voltage	Part Number
	Amber	5V	LB9Z-LED5A
		12V	LB9Z-LED1A
		24V	LB9Z-LED2A
	Green	5V	LB9Z-LED5G
		12V	LB9Z-LED1G
		24V	LB9Z-LED2G
	Red	5V	LB9Z-LED5R
		12V	LB9Z-LED1R
		24V	LB9Z-LED2R
	Blue	5V	LB9Z-LED5S
		12V	LB9Z-LED1S
		24V	LB9Z-LED2S
	White	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW
	Yellow	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW

Lens Handle

Style	Color	Part Number
	Amber	LA1A-FA
	Green	LA1A-FG
	Red	LA1A-FR
	Blue	LA1A-FS
	White	LA1A-FW
	Yellow	LA1A-FY

Key Selector Switches (Assembled)

Style	Operator Position	Key retained at ●	Contact	Standard Bezel		Flush Bezel	
				Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)
Standard Bezel (black) 	90° 2-position	Maintained		SPDT	LB⓪K-2T5A	LB⓪K-2T1VA	LB⓪⓪K-2T5A
				DPDT	LB⓪K-2T6A	LB⓪K-2T2VA	LB⓪⓪K-2T6A
				3PDT	LB⓪K-2T7A	LB⓪K-2T3VA	LB⓪⓪K-2T7A
				SPDT	LB⓪K-2T5B	LB⓪K-2T1VB	LB⓪⓪K-2T5B
				DPDT	LB⓪K-2T6B	LB⓪K-2T2VB	LB⓪⓪K-2T6B
				3PDT	LB⓪K-2T7B	LB⓪K-2T3VB	LB⓪⓪K-2T7B
				SPDT	LB⓪K-2T5C	LB⓪K-2T1VC	LB⓪⓪K-2T5C
				DPDT	LB⓪K-2T6C	LB⓪K-2T2VC	LB⓪⓪K-2T6C
				3PDT	LB⓪K-2T7C	LB⓪K-2T3VC	LB⓪⓪K-2T7C
	Spring return from right			SPDT	LB⓪K-21T5B	LB⓪K-21T1VB	LB⓪⓪K-21T5B
				DPDT	LB⓪K-21T6B	LB⓪K-21T2VB	LB⓪⓪K-21T6B
				3PDT	LB⓪K-21T7B	LB⓪K-21T3VB	LB⓪⓪K-21T7B
Flush Bezel (metallic or black) 	45° 3-position	Maintained		DPDT	LB⓪K-3T6A	LB⓪K-3T2VA	LB⓪⓪K-3T6A
				3PDT	LB⓪K-3T7A	LB⓪K-3T3VA	LB⓪⓪K-3T7A
				DPDT	LB⓪K-3T6B	LB⓪K-3T2VB	LB⓪⓪K-3T6B
				3PDT	LB⓪K-3T7B	LB⓪K-3T3VB	LB⓪⓪K-3T7B
				DPDT	LB⓪K-3T6C	LB⓪K-3T2VC	LB⓪⓪K-3T6C
				3PDT	LB⓪K-3T7C	LB⓪K-3T3VC	LB⓪⓪K-3T7C
				DPDT	LB⓪K-3T6D	LB⓪K-3T2VD	LB⓪⓪K-3T6D
				3PDT	LB⓪K-3T7D	LB⓪K-3T3VD	LB⓪⓪K-3T7D
				DPDT	LB⓪K-3T6E	LB⓪K-3T2VE	LB⓪⓪K-3T6E
				3PDT	LB⓪K-3T7E	LB⓪K-3T3VE	LB⓪⓪K-3T7E
				DPDT	LB⓪K-3T6G	LB⓪K-3T2VG	LB⓪⓪K-3T6G
				3PDT	LB⓪K-3T7G	LB⓪K-3T3VG	LB⓪⓪K-3T7G
				DPDT	LB⓪K-3T6H	LB⓪K-3T2VH	LB⓪⓪K-3T6H
				3PDT	LB⓪K-3T7H	LB⓪K-3T3VH	LB⓪⓪K-3T7H

Assembled Key Selector Switches can't on next page.

Assembled Key Selector Switches con't on next page.

Style	Operator Position	Key retained at 	Contact	Standard Bezel		Flush Bezel			
				Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)		
Standard Bezel (black) 	45° 3-position	Spring return from right	B		DPDT	LB①K-31T6B	LB①K-31T2VB	LB③④K-31T6B	LB③④K-31T2VB
				3PDT	LB①K-31T7B	LB①K-31T3VB	LB③④K-31T7B	LB③④K-31T3VB	
			D		DPDT	LB①K-31T6D	LB①K-31T2VD	LB③④K-31T6D	LB③④K-31T2VD
				3PDT	LB①K-31T7D	LB①K-31T3VD	LB③④K-31T7D	LB③④K-31T3VD	
			G		DPDT	LB①K-31T6G	LB①K-31T2VG	LB③④K-31T6G	LB③④K-31T2VG
				3PDT	LB①K-31T7G	LB①K-31T3VG	LB③④K-31T7G	LB③④K-31T3VG	
Flush Bezel (metallic or black) 		Spring return from left	C		DPDT	LB①K-32T6C	LB①K-32T2VC	LB③④K-32T6C	LB③④K-32T2VC
				3PDT	LB①K-32T7C	LB①K-32T3VC	LB③④K-32T7C	LB③④K-32T3VC	
			D		DPDT	LB①K-32T6D	LB①K-32T2VD	LB③④K-32T6D	LB③④K-32T2VD
				3PDT	LB①K-32T7D	LB①K-32T3VD	LB③④K-32T7D	LB③④K-32T3VD	
			H		DPDT	LB①K-32T6H	LB①K-32T2VH	LB③④K-32T6H	LB③④K-32T2VH
				3PDT	LB①K-32T7H	LB①K-32T3VH	LB③④K-32T7H	LB③④K-32T3VH	
Spring return two-way	D		DPDT	LB①K-33T6D	LB①K-33T2VD	LB③④K-33T6D	LB③④K-33T2VD		
		3PDT	LB①K-33T7D	LB①K-33T3VD	LB③④K-33T7D	LB③④K-33T3VD			

13. Key is retained at ● and removable at ○ positions.

14. Two keys are supplied.

15. For Standard Bezel part numbers specify bezel shape in place of ①. 1 (round), 2 (square), 3 (rectangular)

16. For Flush Bezel part numbers specify:

- bezel shape in place of ③. 6 (round), 7 (square), 8 (rectangular)

- bezel material in place of ④. M (metallic), Blank (black)

17. See page 524 for contact operation.

18. See page 533 for dimensions.

19. For additional security, wave keys also available.

Add the letter "S" before the "T" in the part no. Example: LB1K-31ST1A

Besides the standard wave key (key number 0H), six other keys are available.

To order other keys, specify the key number as shown below:

Example: LB1K-31ST2B-1H (Key number is indicated on the key cylinder. Standard keys do not have a key number indication.)

(blank): Standard wave key (0H)

1H to 2H: Reversible wave key

3H to 6H: Non-reversible wave key

20. If ordering standard wave key (0H), subcomponents are available, see next page.

21. If ordering other than standard wave key (for example, key number 6H), only completed switches are available.

Key Selector Switches (Sub-assembled)

Contact Block	Operator	Completed Unit
---------------	----------	----------------



Contact Block

Terminal Style	Material	Contact	Part Number
	Solder/Tab	Silver	SPDT LB-T5
			DPDT LB-T6
			3PDT LB-T7
	PCB	Gold	SPDT LB-T1V
			DPDT LB-T2V
			3PDT LB-T3V

Operator

Style	Shape	Position	Function	Part number
	Round	2	Maintained	LB1K-2Ⓢ
			Spring from right	LB1K-21B
		3	Maintained	LB1K-3Ⓢ
			Spring from right	LB1K-31Ⓢ
			Spring from left	LB1K-32Ⓢ
			Spring from both	LB1K-33D
	Square	2	Maintained	LB2K-2Ⓢ
			Spring from right	LB2K-21B
		3	Maintained	LB2K-3Ⓢ
			Spring from right	LB2K-31Ⓢ
			Spring from left	LB2K-32Ⓢ
			Spring from both	LB2K-33D
	Rectangular	2	Maintained	LB3K-2Ⓢ
			Spring from right	LB3K-21B
		3	Maintained	LB3K-3Ⓢ
			Spring from right	LB3K-31Ⓢ
			Spring from left	LB3K-32Ⓢ
			Spring from both	LB3K-33D

Style	Shape	Position	Function	Part number
	Round	2	Maintained	LB6K-2Ⓢ
			Spring from right	LB6K-21B
		3	Maintained	LB6K-3Ⓢ
			Spring from right	LB6K-31Ⓢ
			Spring from left	LB6K-32Ⓢ
			Spring from both	LB6K-33D
	Square	2	Maintained	LB7K-2Ⓢ
			Spring from right	LB7K-21B
		3	Maintained	LB7K-3Ⓢ
			Spring from right	LB7K-31Ⓢ
			Spring from left	LB7K-32Ⓢ
			Spring from both	LB7K-33D
	Rectangular	2	Maintained	LB8K-2Ⓢ
			Spring from right	LB8K-21B
		3	Maintained	LB8K-3Ⓢ
			Spring from right	LB8K-31Ⓢ
			Spring from left	LB8K-32Ⓢ
			Spring from both	LB8K-33D
	Round	2	Maintained	LB6MK-2Ⓢ
			Spring from right	LB6MK-21B
		3	Maintained	LB6MK-3Ⓢ
			Spring from right	LB6MK-31Ⓢ
			Spring from left	LB6MK-32Ⓢ
			Spring from both	LB6MK-33D
	Square	2	Maintained	LB7MK-2Ⓢ
			Spring from right	LB7MK-21B
		3	Maintained	LB7MK-3Ⓢ
			Spring from right	LB7MK-31Ⓢ
			Spring from left	LB7MK-32Ⓢ
			Spring from both	LB7MK-33D
	Rectangular	2	Maintained	LB8MK-2Ⓢ
			Spring from right	LB8MK-21B
		3	Maintained	LB8MK-3Ⓢ
			Spring from right	LB8MK-31Ⓢ
			Spring from left	LB8MK-32Ⓢ
			Spring from both	LB8MK-33D

22. In place of Ⓢ specify retention option code from table below.

23. For standard wave key operators, add "S" to part number before the key retention code from table below. (For example, LB6K-2B with wave key would be LB6K-2SB.)

Ⓢ Retention Option Code

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only
C	Key retained in left position only
D	Key retained in left and right (3-position only)

Code	Description
E	Key retained in center only (3-position only)
G	Key retained in right and center (3-position only)
H	Key retained in left and center (3-position only)

Lever Switches (Assembled)

Style	Operator Position		Contact	Solder/Tab Terminal (silver contacts)	PC Board Terminal (gold contacts)
	2-position		SPDT	LB⊙T-2T5	LB⊙T-2T1V
			DPDT	LB⊙T-2T6	LB⊙T-2T2V
			3PDT	LB⊙T-2T7	LB⊙T-2T3V
	3-position		DPDT	LB⊙T-3T2	LB⊙T-3T6V
			3PDT	LB⊙T-3T3	LB⊙T-3T7V
	Spring return from top/bottom		DPDT	LB⊙T-33T2	LB⊙T-33T6V
			3PDT	LB⊙T-33T3	LB⊙T-33T7V

24. For all part numbers, specify bezel in place of ⊙. 1 (standard bezel), 6 (flush bezel).
25. See page page 524 for contact operation.,
26. See page page 535 for dimensions.

Lever Switches (Sub-assembled)

Contact Block	Operator	Completed Unit
		

Contact Block

Terminal Style	Material	Contact	Part Number
	Silver	SPDT	LB-T5
		DPDT	LB-T6
		3PDT	LB-T7
	Gold	SPDT	LB-T1
		DPDT	LB-T2
		3PDT	LB-T3
	Gold	SPDT	LB-T1V
		DPDT	LB-T2V
		3PDT	LB-T3V

Operator

Style	Position	Function	Part Number
	2	Maintained	LB1T-2
		Maintained	LB1T-3
	3	Spring return from both	LB1T-33
	2	Maintained	LB6T-2
		Maintained	LB6T-3
	3	Spring return from both	LB6T-33

Buzzers (Assembled)

Style	Shape	Voltage	Standard Bezel		Flush Bezel	
			Solder/Tab Terminal	PC Board Terminal	Solder/Tab Terminal	PC Board Terminal
Black Bezel   	Round	12V DC	—	—	LB6Z-1T03	LB6Z-1T03V
		24V DC	—	—	LB6Z-1T04	LB6Z-1T04V
	Rectangular	12V DC	LB3Z-1T03	LB3Z-1T03V	LB8Z-1T03	LB8Z-1T03V
		24V DC	LB3Z-1T04	LB3Z-1T04V	LB8Z-1T04	LB8Z-1T04V
Metallic Bezel  	Round	12V DC	—	—	LB6MZ-1T03	LB6MZ-1T03V
		24V DC	—	—	LB6MZ-1T04	LB6MZ-1T04V
	Rectangular	12V DC	—	—	LB8MZ-1T03	LB8MZ-1T03V
		24V DC	—	—	LB8MZ-1T04	LB8MZ-1T04V

27. IP54 Rated.

28. For IP40 rating, use part number LB3Z-104K.

29. See page 536 for dimensions.

Buzzers (Sub-assembled)

Contact Block	Operator	Completed Unit
	+	
		

Contact Block

Terminal Style	Part Number
	Solder/Tab LB-T00
	PCB LB-T00V

Operator

Style	Mounting Style	Shape	Voltage	
			12V DC	24V DC
	Standard (Plastic)	Rectangular	LB3Z-103	LB3Z-104
	Flush Mount (Plastic)	Round	LB6Z-103	LB6Z-104
		Rectangular	LB8Z-103	LB8Z-104
	Flush Mount (Metallic)	Round	LB6MZ-103	LB6MZ-104
		Rectangular	LB8MZ-103	LB8MZ-104

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

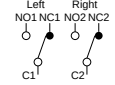
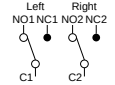
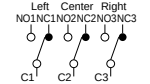
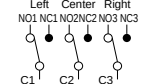
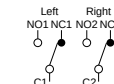
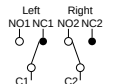
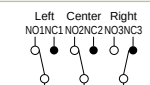
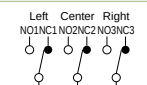
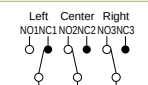
Contactors

Terminal Blocks

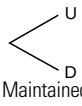
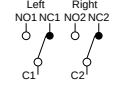
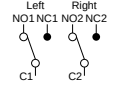
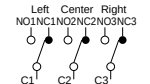
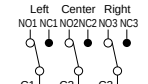
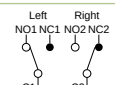
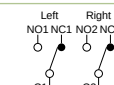
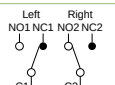
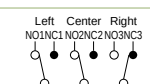
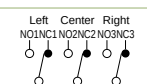
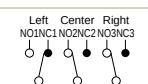
Circuit Breakers

Contact Operation

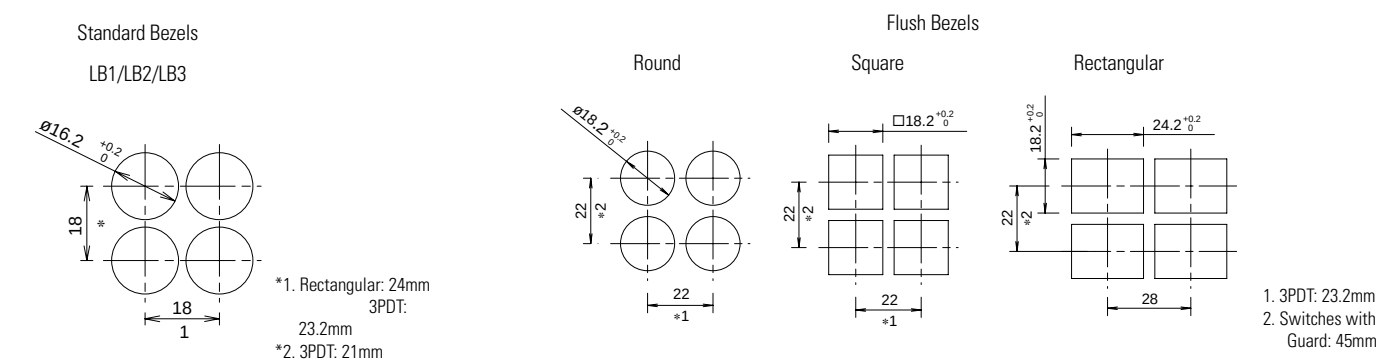
Selector Switch, Illuminated Selector Switch, Key Selector Switch

Operator Position & Contact Operation (Top View)					Contact	↙ Left	↑ Center	↘ Right
90° 2-position	 Maintained		 Spring return from right		SPDT			
					DPDT			
					3PDT			
45° 3-position	 Maintained	 Spring return from right	 Spring return from left	 Spring return two-way	DPDT			
					3PDT			

Lever Switch

Lever Position & Contact Operation (Top View)					
Position		Contact	Down	Center	Up
90° 2-position		SPDT			
		DPDT			
		3PDT			
45° 3-position		DPDT			
		3PDT			

Mounting Hole Layout (mm)



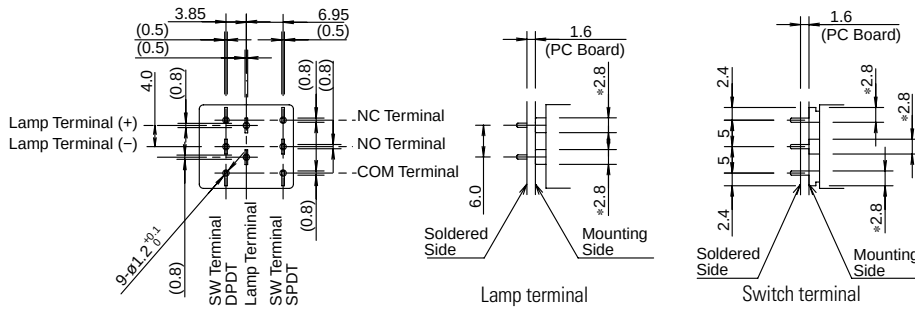
When using the LB series with a rubber boot or terminal cover, make sure to note the dimensions on pages page 539 and page 540.

PC Board Drilling Layout (mm)

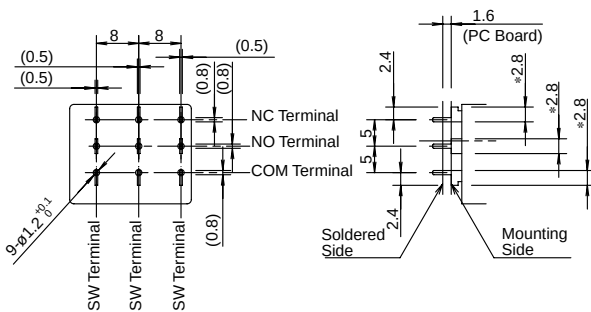
Notes for Designing PC Board and Circuit

1. Use 1.6mm-thick glass epoxy PC board with drilled holes.
2. Design a circuit so that the LB series can operate within the rated voltage and current range. Make sure that inrush current and voltage do not exceed the rating.
3. Minimum applicable load is 5V AC/DC, 1mA on gold contacts.
4. Since the *2.8mm-wide terminal touches the PC board as shown below, short circuit may occur with pattern lines. Design a circuit that prevents short circuits.

SPDT/DPDT Contacts

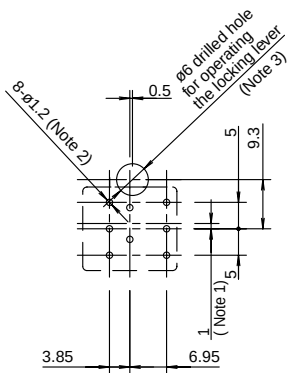


3PDT Contacts

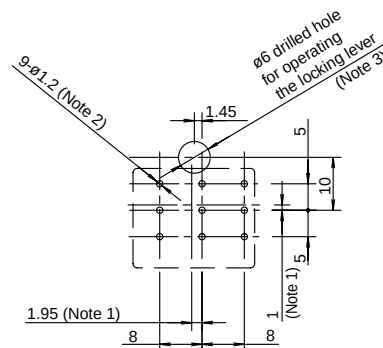


PC Board Drilling Layout (Bottom View)

SPDT/DPDT Contacts



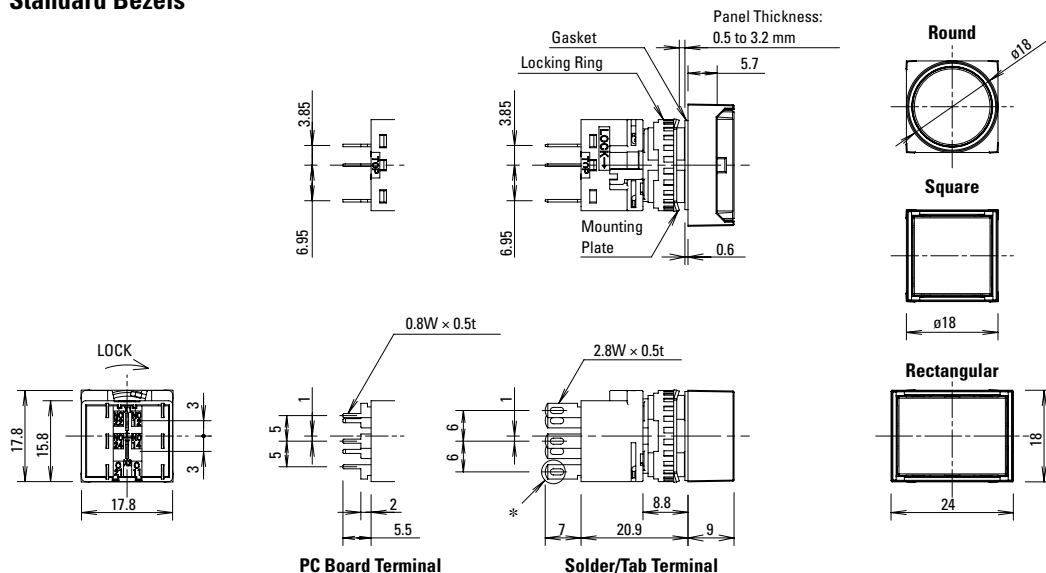
3PDT Contacts



5. When designing, note the alignment of the center lines of the contact blocks and operators.
6. The diameter of the terminal hole is ø1.2.
7. Hole diameter may vary to meet installation requirements. Determine the location and the size of the hole so that the locking lever can be operated.

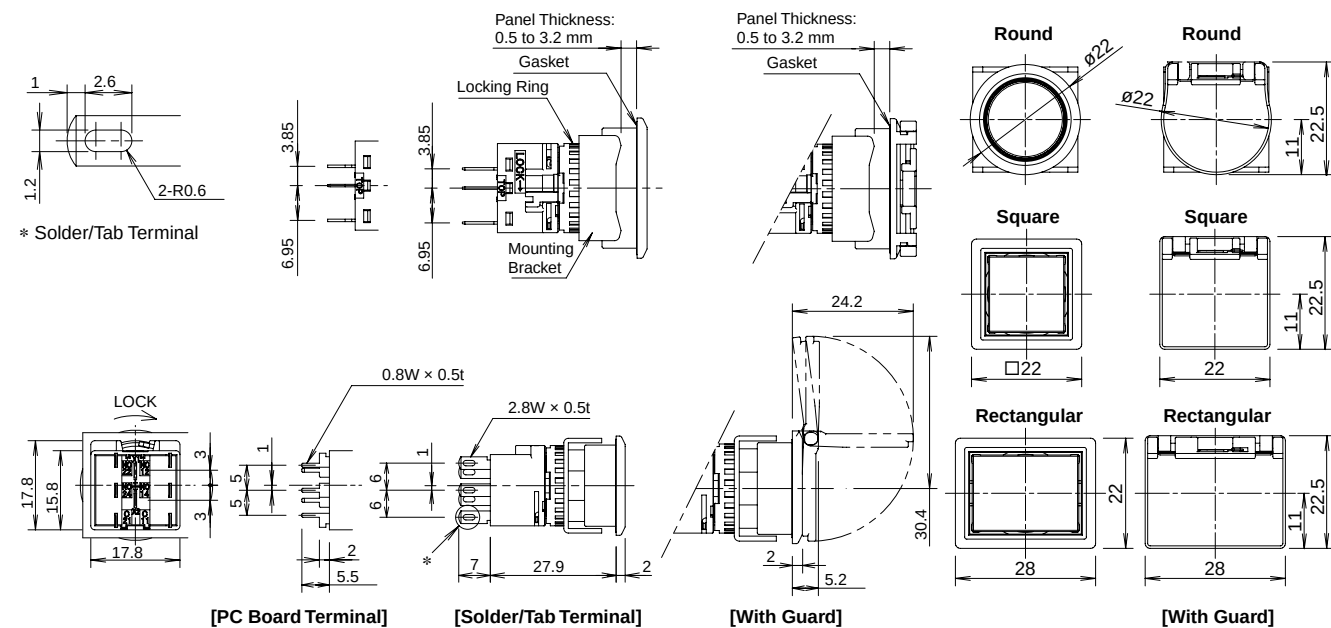
Dimensions (mm) Illuminated Pushbuttons

Standard Bezels



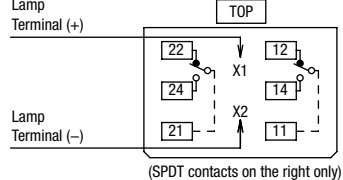
Flush Bezels

SPDT/DPDT Contacts

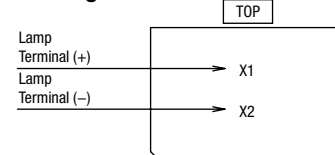


Terminal Arrangement (Bottom View)

Illuminated Pushbuttons

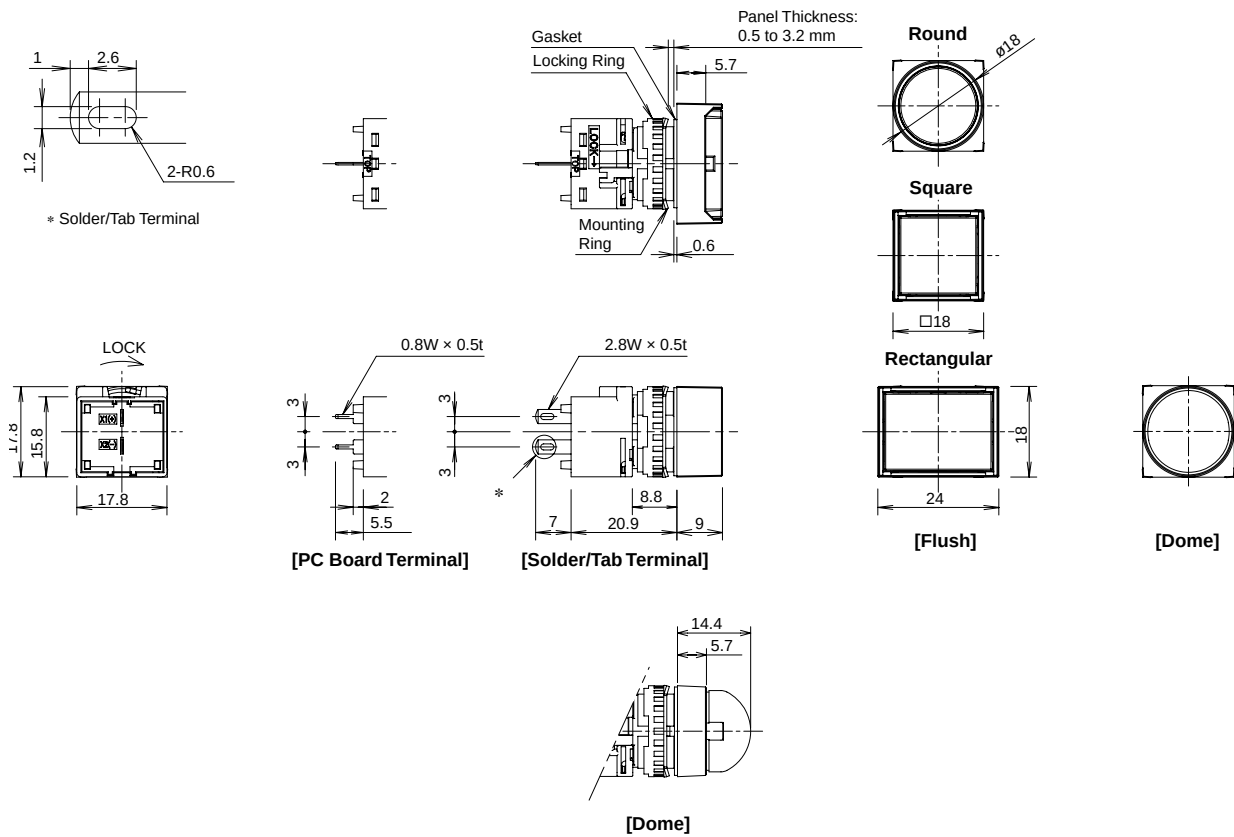


Pilot Lights

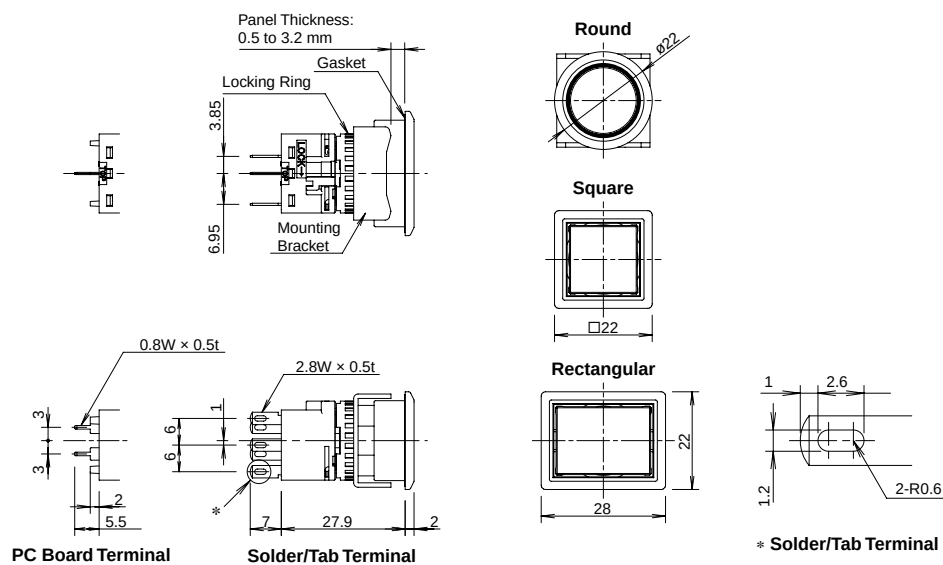


Pilot Lights

Standard Bezels

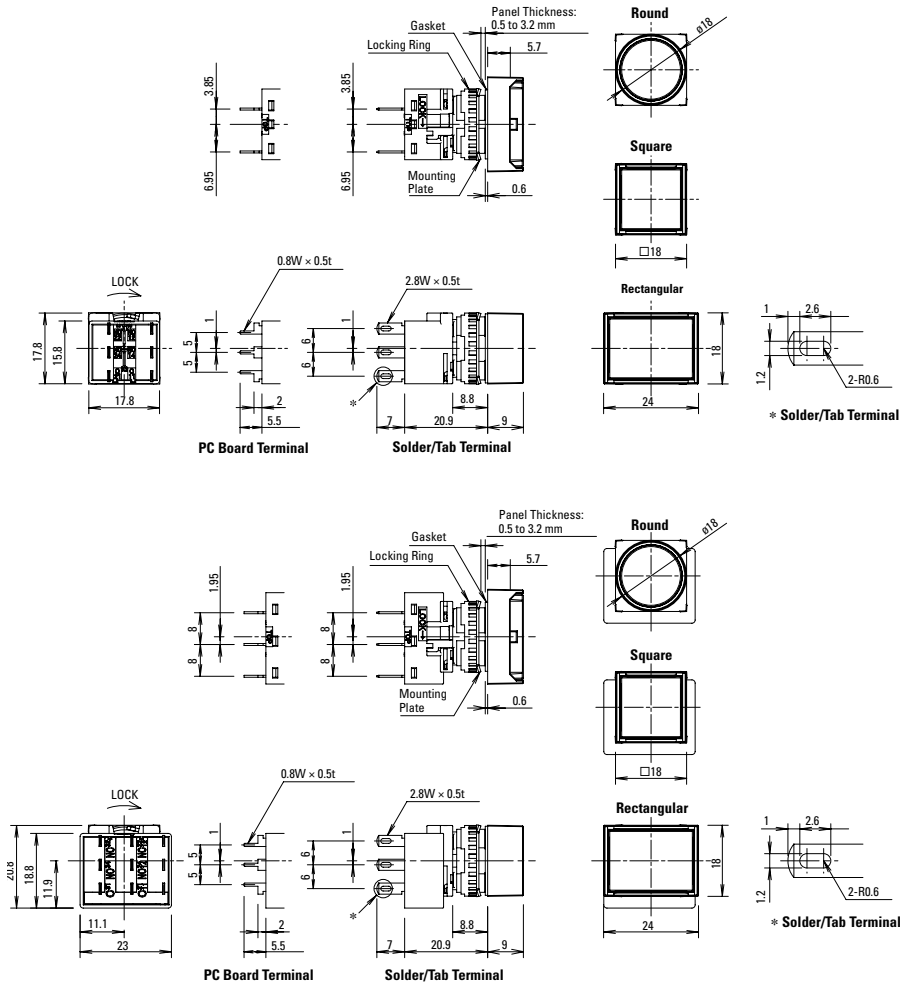


Flush Bezels



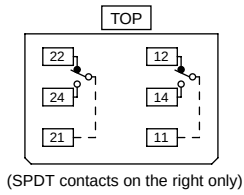
Non-Illuminated Pushbuttons

Standard Bezels

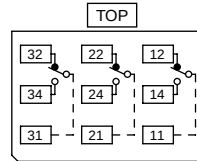


Terminal Arrangement (Bottom View)

SPDT/DPDT Contacts

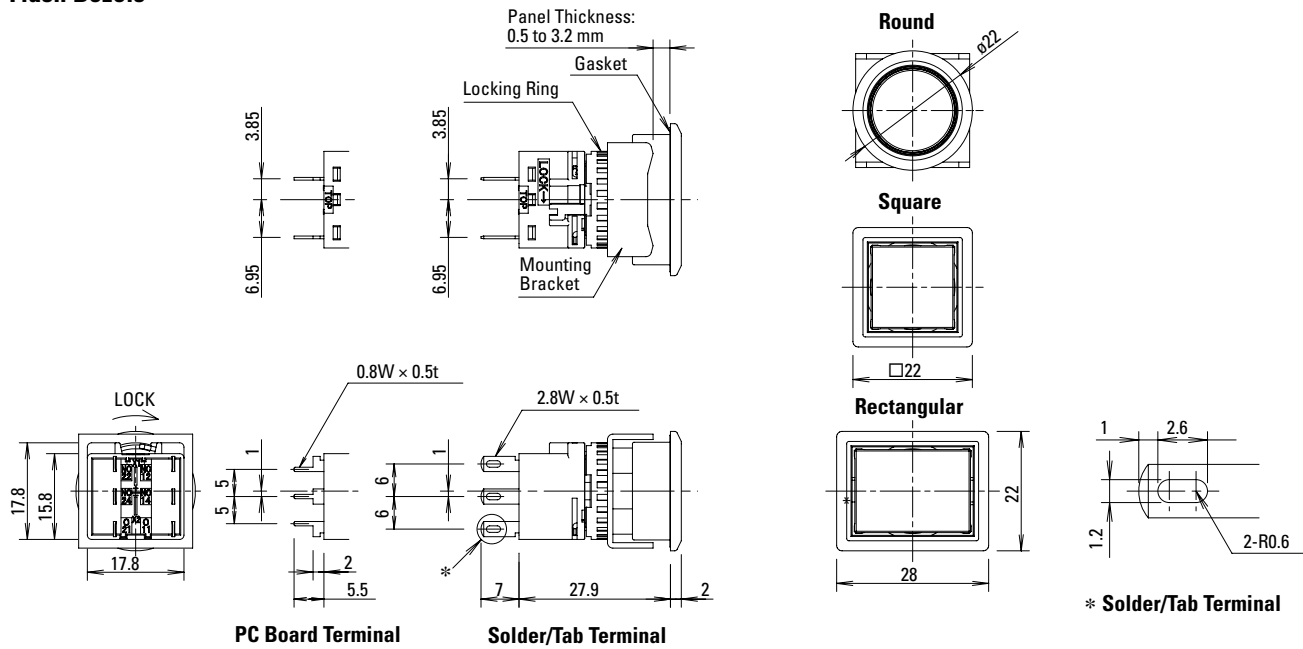


3PDT Contacts



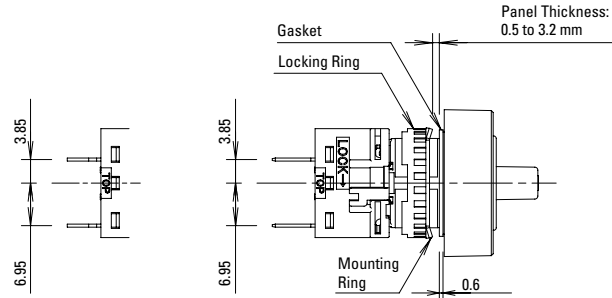
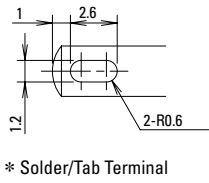
Non-Illuminated Pushbuttons

Flush Bezels

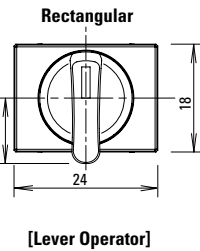
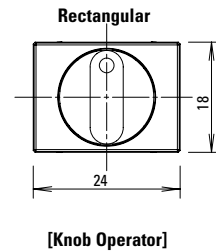
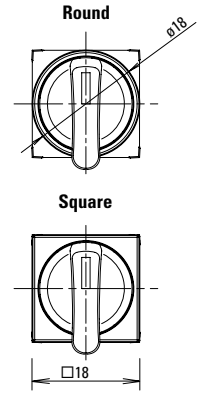
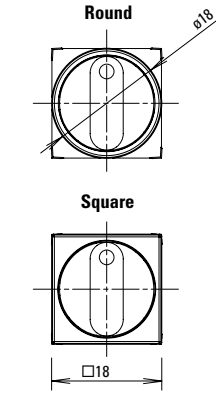
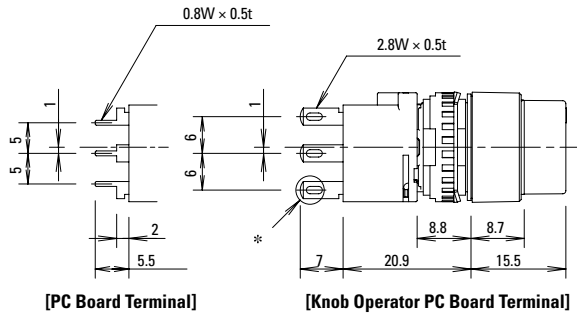
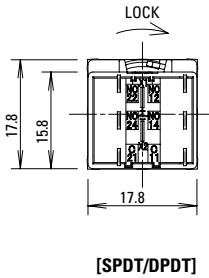
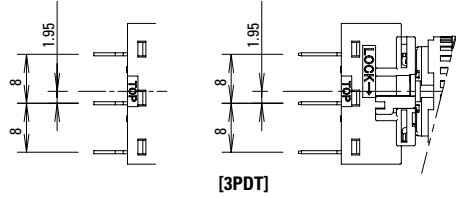


Selector Switches

Standard Bezels

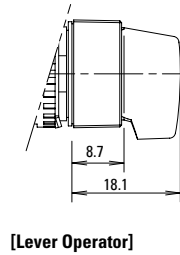
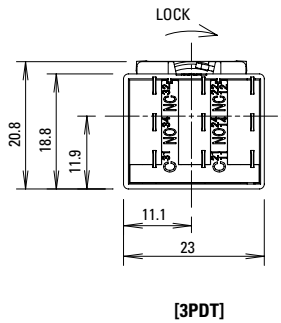


[SPDT/DPDT]



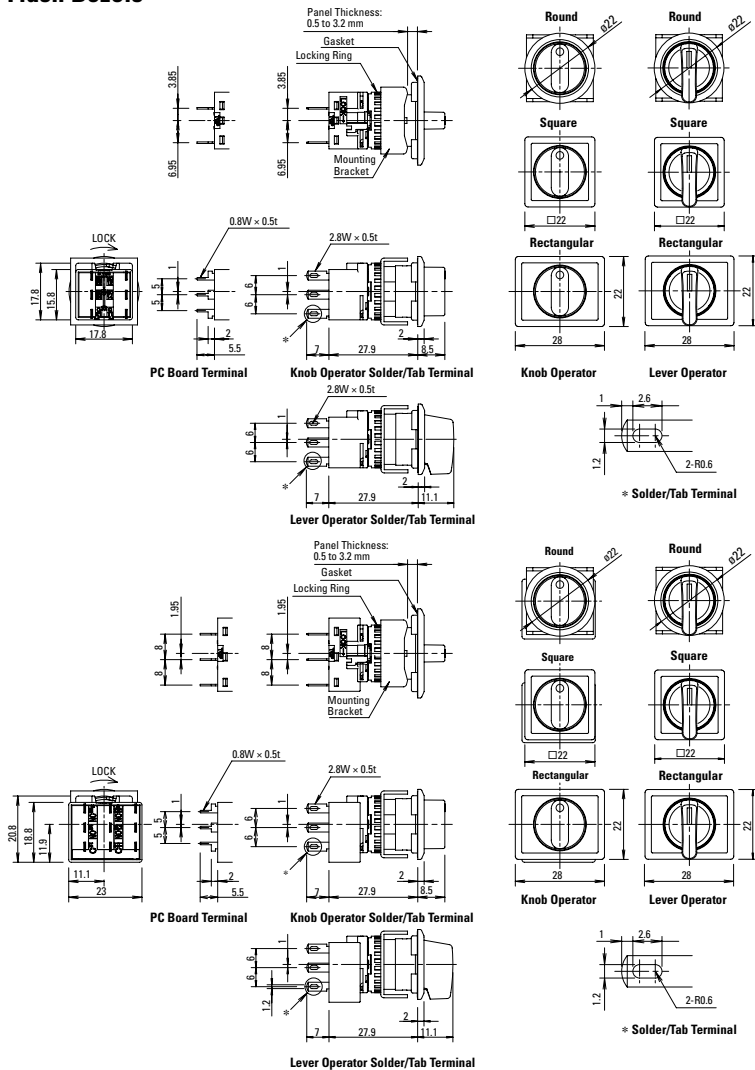
[Knob Operator]

[Lever Operator]



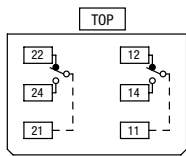
Selector Switches

Flush Bezels



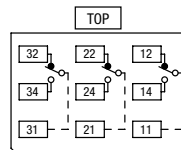
Terminal Arrangement (Bottom View)

SPDT/DPDT Contacts



(SPDT contacts on the right only)

3PDT Contacts



Standard Bezels



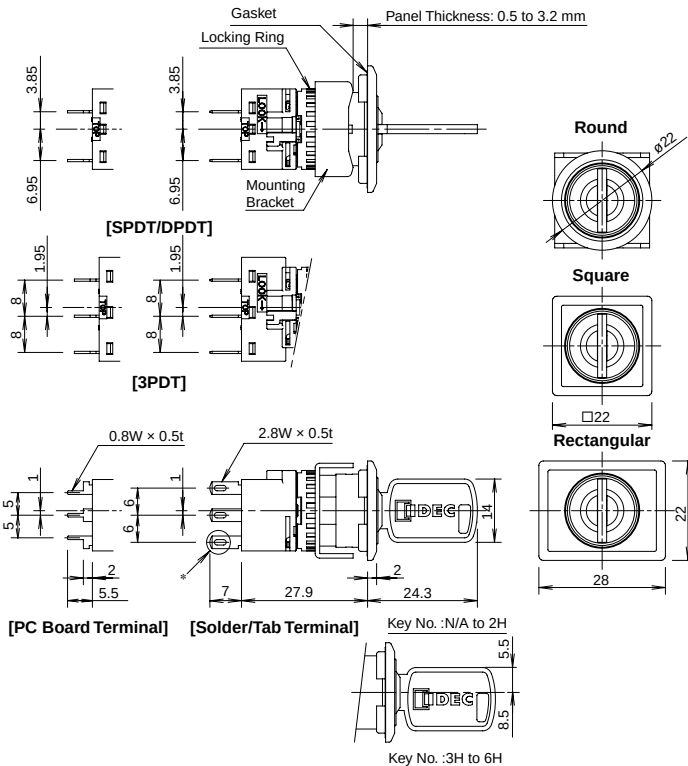
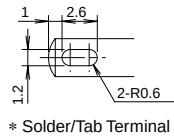
Terminal Blocks



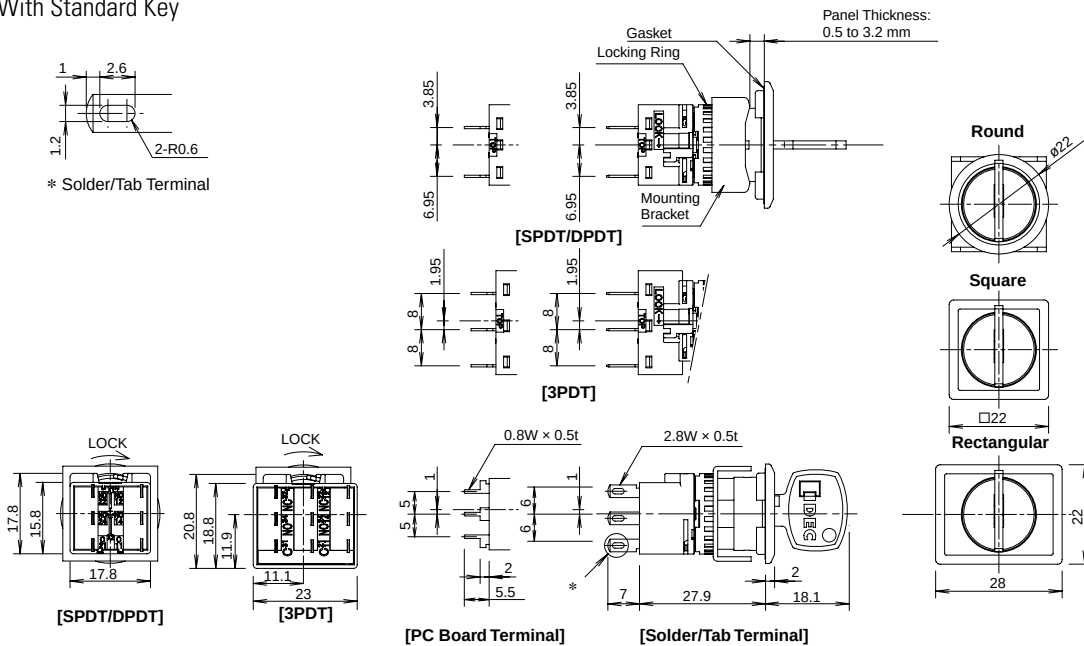
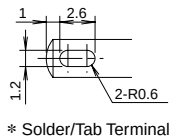
* Solder/Tab Terminal



Flush Bezels With Wave Key

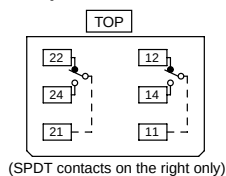


With Standard Key

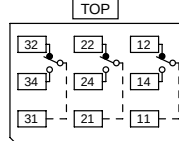


Terminal Arrangement (Bottom View)

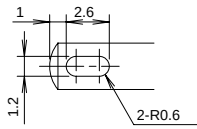
SPDT/DPDT Contacts



3PDT Contacts

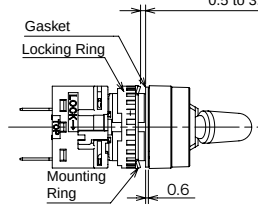


Standard Bezels

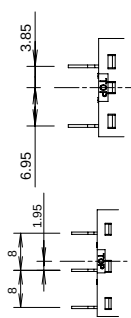


* Solder/Tab Terminal

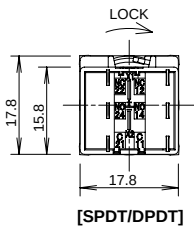
Lever Switches

Panel Thickness:
0.5 to 3.2 mm

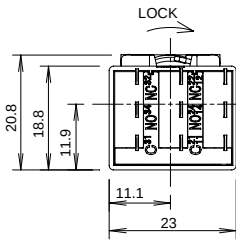
[SPDT/DPDT]



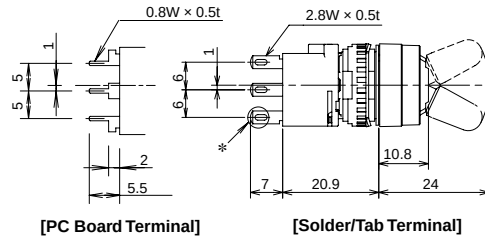
[3PDT]



[SPDT/DPDT]

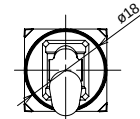


[3PDT]

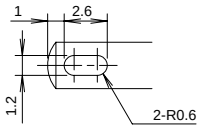


[PC Board Terminal]

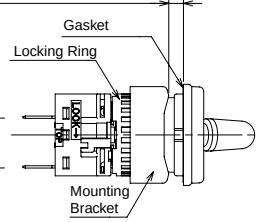
[Solder/Tab Terminal]



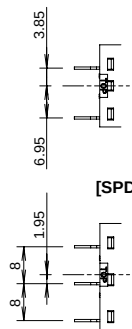
Flush Bezels



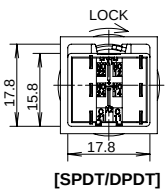
* Solder/Tab Terminal

Panel Thickness:
0.5 to 3.2 mm

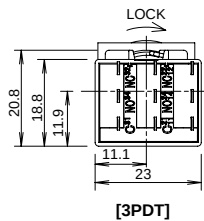
[SPDT/DPDT]



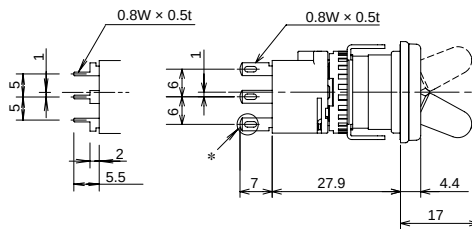
[3PDT]



[SPDT/DPDT]

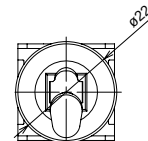


[3PDT]



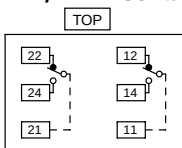
[PC Board Terminal]

[Solder/Tab Terminal]



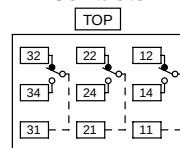
Terminal Arrangement (Bottom View)

SPDT/DPDT Contacts



(SPDT contacts on the right only)

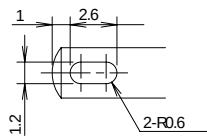
3PDT Contacts



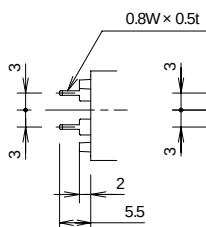
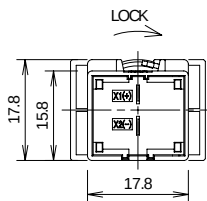
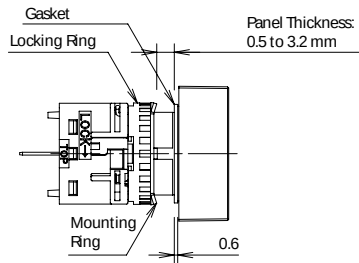
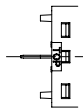
Buzzers

Standard Bezels

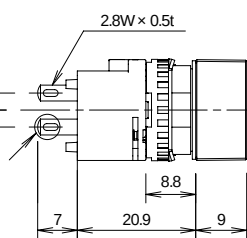
IP54



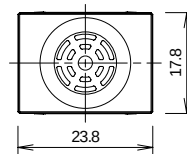
Solder/Tab Terminal



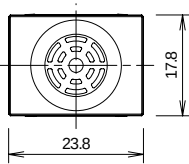
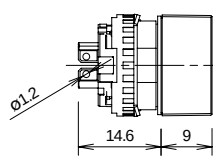
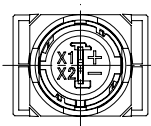
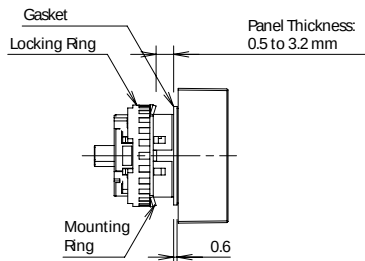
[PC Board Terminal]



[Solder/Tab Terminal]

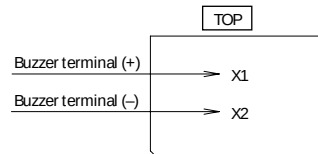


IP40

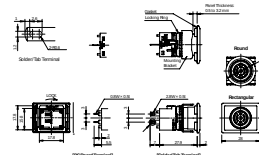


Terminal Arrangement (Bottom View)

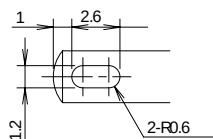
Flush & Standard IP54



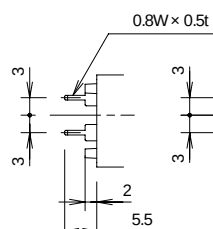
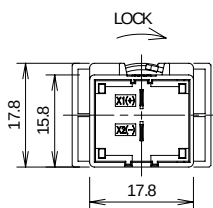
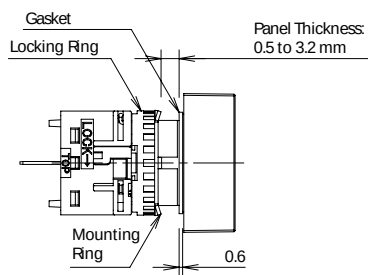
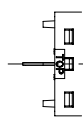
IP40



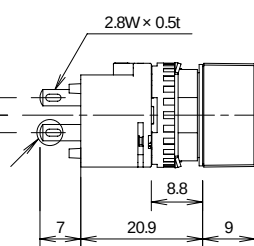
Flush Bezels



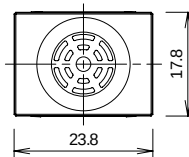
Solder/Tab Terminal



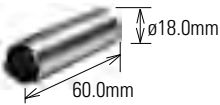
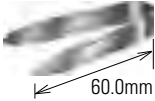
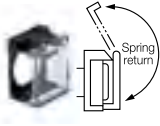
[PC Board Terminal]



[Solder/Tab Terminal]



Accessories

Item	Material	Part Number	Remarks
Locking Ring Wrench 	Metal: Nickel-plated brass	MT-001	Used to tighten the locking ring when installing the units on to the panel.
Lens Removal Tool 	Stainless Steel	MT-101	Used to remove the lens or button.
For Standard Bezels	Switch Guard (180° Spring return) 	For round / square standard units Guard: Polyacetal Base: Polyarylate	AL-K6SP Degree of protection: IP65 Used to protect standard pushbuttons and illuminated pushbuttons from inadvertent operation. See page page 540 for dimensions. With the gasket mounted on the switch, attach the switch guard and mount on the panel.
	Switch Guard for Single Board Mounting 	For rectangular units Guard: Polyacetal Base: Polyarylate	AL-KH6SP Note: not applicable for flush mounted units. Select operator with built-in switch guard.
	Switch Guard for Single Board Mounting 	For rectangular units Guard: Polyacetal Base: Polyarylate	LA9Z-K3 Degree of protection: IP65 With the gasket mounted on the switch, attach the switch guard and mount on the panel. See page page 540 for dimensions.
	Rubber Boot for Standard Bezels 1 	1. For round units Silicon Rubber	LB9Z-D1
	2 	2. For square units Silicon Rubber	LB9Z-D2 Degree of protection: IP65 See page page 539 for dimensions. See page page 542 for mounting.
	3 	3. For rectangular units Silicon Rubber	LB9Z-D3
	Mounting Hole Plug 	Metal Plug: Metal (Zinc diecast) Locking nut: Polyacetal Gasket: Nitrile rubber	AL-BM6 Degree of protection: IP65 Tightening torque: 0.1 to 0.29 N•m See page page 539 for dimensions.
	Mounting Hole Plug 	Rubber Nitrile rubber (black)	AL-B6 Degree of protection: IP65 See page page 539 for dimensions.

Accessories con't

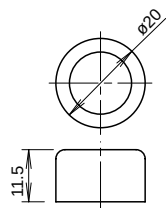
Item		Material	Part Number	Remarks
For Flush Bezels	Rubber Boot for Flush Bezels			
	1 	1. For round units	LB9Z-D6	Degree of protection: IP65 See page page 539 for dimensions. See page page 542 for mounting.
	2 	2. For square units	LB9Z-D7	
	3 	3. For rectangular units	LB9Z-D8	
	Mounting Hole Plug			
	1 	1. For round units	LB9Z-BS6	Degree of protection: IP65 Panel thickness: 0.5 to 3.2mm See page page 539 for dimensions.
2 	2. For square units	LB9Z-BS7		
3 	3. For rectangular units	LB9Z-BS8		
Terminal Cover				
1  2 	1. For SPDT/DPDT contacts	LB9Z-VL2	See page page 540 for dimensions.	
	2. For 3PDT contacts	LB9Z-VL3		

Accessory Dimensions (mm)

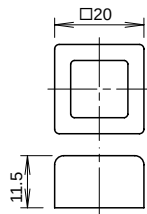
Rubber Boot

Standard Bezel

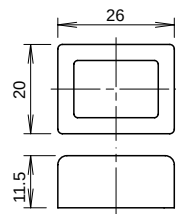
For round units (LB9Z-D1)



For square units (LB9Z-D2)

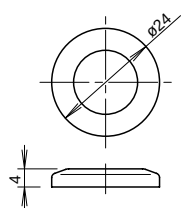


For rectangular units (LB9Z-D3)

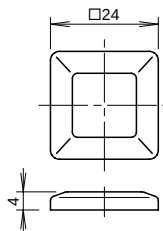


Flush Bezel

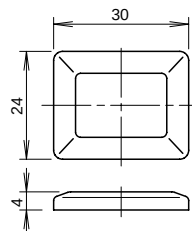
For round units (LB9Z-D6)



For square units (LB9Z-D7)



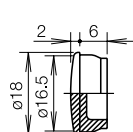
For rectangular units (LB9Z-D8)



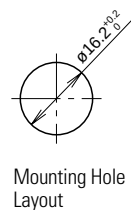
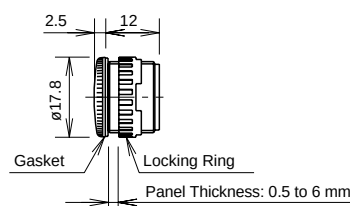
Mounting Hole Plug

Standard Bezels

AL-B6

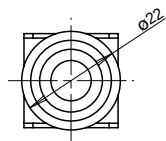


AL-BM6

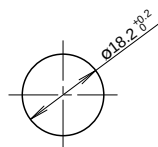


Flush Bezels

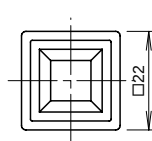
For round units (LB9Z-BS6)



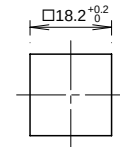
Mounting Hole Layout



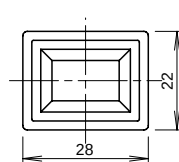
For square units (LB9Z-BS7)



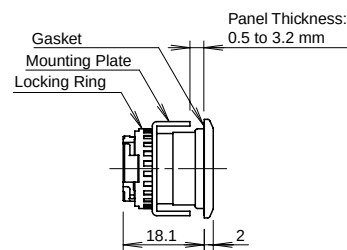
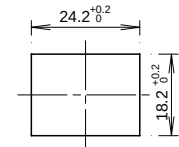
Mounting Hole Layout



For rectangular units (LB9Z-BS8)



Mounting Hole Layout



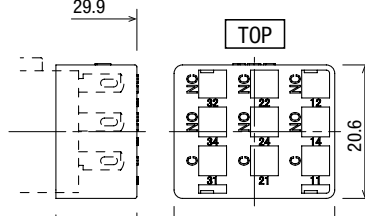
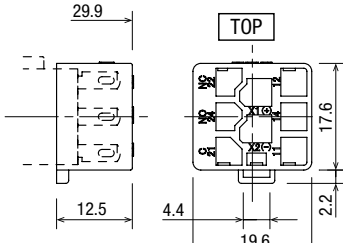
Accessory Dimensions (mm) con't

Terminal Cover

Standard Bezel

For SPDT/DPDT contacts (LB9Z-VL2)

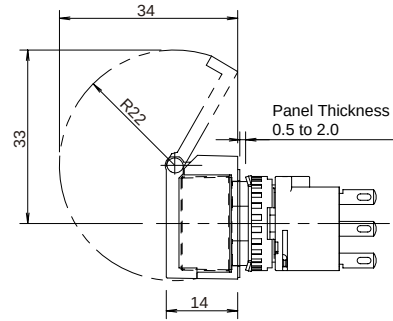
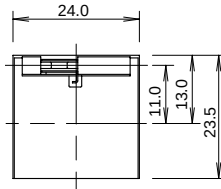
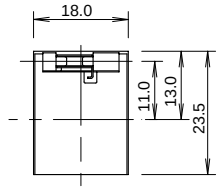
For 3PDT contacts (LB9Z-VL3)



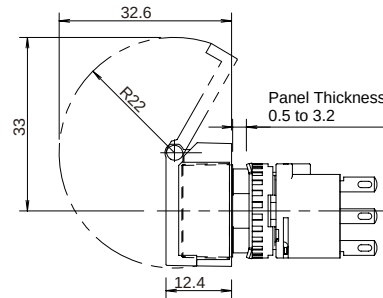
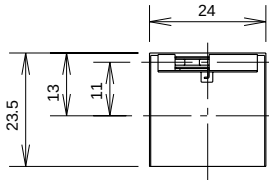
Switch Guard for Standard Bezel Models

For round / square units (AL-K6SP)

For rectangular units (AL-KH6SP)

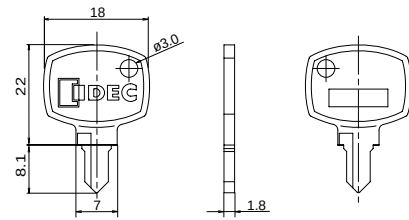


For Single Board Mounting (LA9Z-K3)



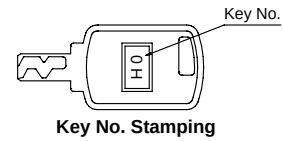
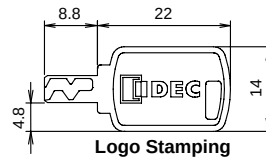
Note: The panel depth is the same for switches with or without switch guards. Both models can be installed on the same PC board.

Standard Key

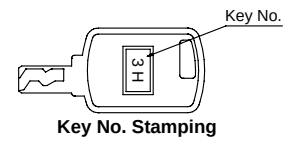
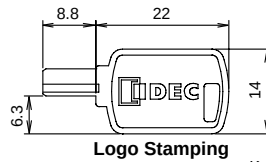


Wave Key

Reversible Wave Key



Non-reversible Wave Key



Replacement Parts

Item		Material	Part Number	Remarks
Lens 	For round units	Polyarylate ø15.4 H4mm	AL6M-L②	Specify the color code in place of ② in the part number. A: Amber, C: Clear, G: Green, R: Red, S: Blue, Y: Yellow Note: Use a clear lens for or white (PW) illumination.
	For square units	Polyarylate □15.4, H4mm	AL6Q-L②	
	For rectangular units	Polyarylate W21.4 x H4 x D15.4mm	AL6H-L②	
Button 	For round units	Polyarylate □15.4, H4mm	AB6M-B②	Specify the color code in place of ② in the part number. B: Black, G: Green, R: Red, S: Blue W: White, Y: Yellow
	For square units	Polyarylate □15.4, H4mm	AB6Q-B②	
	For rectangular units	Polyarylate W21.4 x H4 x D15.4	AB6H-B②	
Marking Plate 	For round units	Acrylic ø13.7 H0.8	AL6M-②	Specify the color code in place of ② in the part number. B: Black, W: White
	For square units	Acrylic □13.7, H0.8mm	AL6Q-②	
	For rectangular units	Acrylic W19.7 x H0.8 (0.4) x D13.7mm	AL6H-②	
Locking Ring 	For all units	Polyamide ø17.9, H3.9mm	LB9Z-LNP	
Anti-rotation Ring 	For standard bezel	Metal (Stainless steel) □17.9, t0.6mm	LB9Z-LP1	
Anti-rotation Ring 	For flush bezel	Metal (Stainless steel) W21 x H8.2 x D20.6 t0.8mm	LB9Z-LP6	
Spare Standard Key 	For key selector switches	Nickel-plated Brass	AS6-SK	See page page 540 for dimensions.
Spare Wave key Non-reversible Wave Key  Reversible Wave Key 	For Wave key selector switches	Diecast zinc alloy (nickel plated) W14 x H2 x D30.8mm	LA9Z-SK-⑤	Specify Wave key number in place of ⑤ in the part number. 0H: Standard wave key (reversible) 1H to 2H: Reversible wave key 3H to 6H: Non-reversible wave key See page page 540 for dimensions.

LB Series Replacement LED Unit

Item	Rated Operating Voltage	Part Number	②Color Code	
LED Unit 	DC5V	LB9Z-LED5②	A G PW R S	8. Specify color code in place of the ② in the part number. R: Red, G: Green, A: Amber, S: Blue, PW: White 9. All illuminated LB series contain an LED unit. 10. Use a white (PW) LED unit for yellow (Y) illumination.
	AC/DC12V	LB9Z-LED1②		
	AC/DC24V	LB9Z-LED2②		

Precautions & Instructions Safety Precautions

- Turn off the power to the LB series control units before installation, removal, wiring, maintenance, and inspection. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid burning your hand, use the lamp holder tool when replacing the lamps.

- For wiring, use wires of a proper size to meet voltage and current requirements. Solder correctly according to the instructions in "Wiring" and "Notes on Terminal Cover." Improper soldering may cause overheating and create a fire hazard. Also, when using tab terminals, use receptacles of appropriate size.

Instructions

Wiring

1. Solder the terminals at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu type is recommended. When soldering, do not touch the LB series with the soldering iron. Also ensure that no tensile force is applied to the terminals. Do not bend the terminal or apply excessive force to the terminal.
2. Use non-corrosive liquid flux.

Terminal Cover

Solder/tab terminal
Insert the terminal cover into the contact block with the TOP markings on the contact block and the terminal cover in the same direction.

Note: When wiring, insert the lead wires into the terminal cover holes before soldering. After wiring, terminal covers cannot be installed.

Standard Bezel



Flush Bezel



Operating Environment

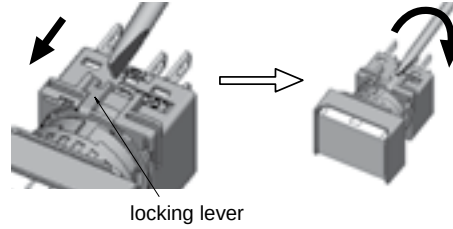
- Do not use the LB series where corrosive gases exist or under an environment exceeding the operating temperature and humidity ranges. Otherwise, damage such as contact failure or change of the surface color may occur.
- Major parts of the switch are plastic. Scratches or damage may occur when scraped with a sharp object or if excessive load or shock is applied. Note that this may cause operation and appearance failure of the operator and bezel.
- Application of detergent, cutting oil, or special chemicals to the switch may result in operation and/or appearance failure such as a change in surface color.

Handling

Contacts (micro switch)
When using NC (normally closed) and NO (normally open) contacts of the same microswitch, avoid connections of different voltages, or connections of different types of power supplies. Failure to observe this instruction may cause a short-circuit.

Removing and Installing the Contact Block

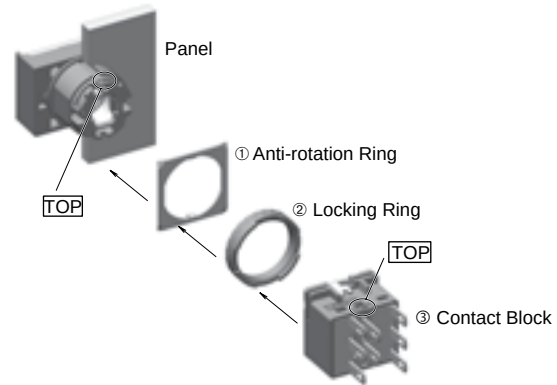
3. Turn the locking lever on the contact block in the direction opposite to the arrow on the housing. Then the contact block can be removed.
4. Insert the contact block with the TOP markings on the contact block and the operator placed in the same direction. Then lock the units, turning the locking lever in the direction of the arrow.



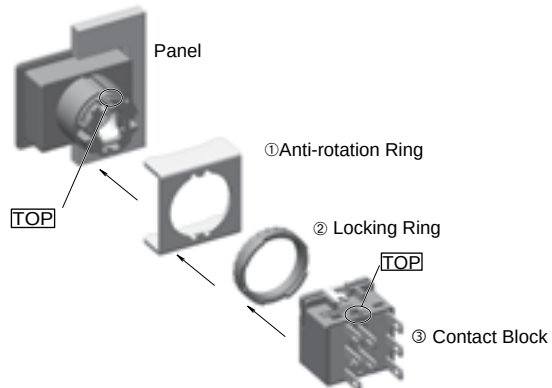
Panel Mounting

Remove the contact block from the operator. Insert the operator into the panel cut-out from the front, then install the contact block to the operator.

Standard Bezel



Flush Bezel



Notes on Mounting

Use the optional ring wrench (MT-001) to mount the operator onto the panel. Tightening torque should not exceed 0.7 N·m. Do not use pliers. Excessive tightening will damage the locking ring.

A6 Series — Miniature Switches and Pilot Devices: 16mm

Key features:

- 16mm (5/8") mounting hole
- LED illumination
- Compact design saves space
- Momentary, Maintained, Selectors, and E-Stops
- Gold-clad Silver contacts for reliable low level switching
- Snap action contacts
- IP40 (dustproof) or IP65 (oiltight) versions



UL Recognized
File No. E55996



CSA Certified
File No. LR21451



Specifications	Degree of Protection		IP40: Dustproof IP65 Watertight/Oiltight			
	Contact Configuration		SPDT, DPDT			
	Maximum Voltage		250V AC/DC			
	Thermal Current		3A			
	Minimum Applicable Load		5V AC/DC, 1mA			
	Contact Material		Gold-clad silver			
	Terminal Style		.110" Solder/ Quick Connect			
	Operating Temperature		-25° to +55°C (no freezing)			
	Operating Humidity		45 to 85% RH			
	Contact Resistance		50mΩ maximum (initial value)			
	Insulation Resistance		100MΩ minimum (500V DC megger)			
	Vibration Resistance		10 to 55Hz, amplitude 1.5mm p-p			
	Shock Resistance		Damage limits: 500m/sec ² (approx. 50G) Operating extremes: 200m/sec ² (approx. 20G)			
	Electrical Life		100,000 operations minimum (at full rated load)			
Contact Ratings	Mechanical Life		Maintained: 100,000 operations minimum Momentary: 1,000,000 operations minimum Selector/Keylock: 250,000 operations minimum			
	Dielectric Strength		Switch Unit: 2,000V AC, 1 min. between live/dead part and terminals of different poles; 1,000V AC, 1 minute between terminals of the same pole; 1,500V AC, 1 minute between contact and lamp terminals. Illumination Unit: 2,000V AC, 1 min. between live part/ground			
	Soldering Temperature		20W/5 seconds or 260°C/3 seconds			
	Operating Voltage		24V	120V	240V	
	AC (50/60Hz)	Resistive	—	1.0A	0.5A	
Inductive		—	0.7A	0.5A		
DC	Resistive	1.0A	0.2A	—		
	Inductive	0.7A	0.1A	—		
LED Lamp Ratings	Rated Voltage/Current		5V DC ±5%	6V AC/DC (±10%)	12V AC/DC (±10%)	24V AC/DC (±10%)
			8mA	AC: A, R, W, Y: 8mA G, S: 7mA DC: A, R, W, Y: 6mA G, S: 5mA	AC: 9mA DC: 8mA	AC: 9mA DC: 8mA



1. AC Inductive Load, PF = 0.6 – 0.7; DC Inductive Load, L/R = 7ms.
2. LED lamp contains a built-in current limiting resistor and a protection diode.
3. LED's don't "burn out." Luminance is reduced to 50% of initial intensity after being lit for 50,000 hours continuously.

AB6 Non-Illuminated Pushbuttons (Assembled)

Non-Illuminated Pushbuttons

Style	Contact	Part Number			
		Momentary		Maintained (Latching)	
		Dustproof (IP40)	Oiltight (IP65)	Dustproof (IP40)	Oiltight (IP65)
Standard Button  Round 18mm  Square 18mm  Rectangular 18mm x 24mm	SPDT DPDT	AB6M-M1-① AB6M-M2-①	AB6M-M1P-① AB6M-M2P-①	AB6M-A1-① AB6M-A2-①	AB6M-A1P-① AB6M-A2P-①
		AB6Q-M1-① AB6Q-M2-①	AB6Q-M1P-① AB6Q-M2P-①	AB6Q-A1-① AB6Q-A2-①	AB6Q-A1P-① AB6Q-A2P-①
		AB6H-M1-① AB6H-M2-①	AB6H-M1P-① AB6H-M2P-①	AB6H-A1-j AB6H-A2-j	AB6H-A1P-① AB6H-A2P-①
Oversize Button  Round 23.5mm  Square 23.5mm  Rectangular 17.5 X 23.5mm	SPDT DPDT	—	AB6M-M1P-M② AB6M-M2P-M②	—	AB6M-A1P-M① AB6M-A2P-M①
		—	AB6Q-M1P-Q① AB6Q-M2P-Q①	—	AB6Q-A1P-Q① AB6Q-A2P-Q①
		—	AB6Q-M1P-H① AB6Q-M2P-H①	—	AB6Q-A1P-H① AB6Q-A2P-H①

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y



1. In place of ① specify Button Color Code from the table at right.
2. To order as sub-assembled, see page 459.
3. For accessories, see page 466.
4. For dimensions, see page 468.

AB6 Non-Illuminated Pushbuttons (Sub-Assembled)

Operator	+	Button	=	Completed Unit
----------	---	--------	---	----------------



Operators

Style	Contact	Operator	Part Number		
			Round	Square	Rectangular
Non-Illuminated Pushbuttons 	SPDT	Momentary	AB6M-M100	AB6Q-M100	AB6H-M100
		Maintained	AB6M-A100	AB6Q-A100	AB6H-A100
	DPDT	Momentary	AB6M-M200	AB6Q-M200	AB6H-M200
		Maintained	AB6M-A200	AB6Q-A200	AB6H-A200



Oversize rectangular button uses square operator.

Buttons

Description	Part Number	
	Button	
	Dustproof (IP40)	Oiltight (IP65)
Round 	AB6M-BK1-j	AB6M-BK2-j
Square 	AB6Q-BK1-j	AB6Q-BK2-j
Rectangular 	AB6H-BK1-j	AB6H-BK2-j
Round Oversize 	—	AB6M-BK2-Mj
Square Oversize 	—	AB6Q-BK2-Qj
Rectangular Oversize 	—	AB6Q-BK2-Hj

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y



1. In place of j, specify Button Color Code from table.
2. Buttons which are rated IP65 include a waterproof rubber gasket.
3. For accessories, see page 466.

AL6 Illuminated Pushbuttons (Assembled)

LED Illuminated Pushbuttons

Description	Style	Contact	Part Numbers			
			Momentary		Maintained (Latching)	
			Dustproof (IP40)	Oiltight (IP65)	Dustproof (IP40)	Oiltight (IP65)
Standard Lens	Round (18mm lens) 	SPDT DPDT	AL6M-M1③-② AL6M-M2③-②	AL6M-M1③P-② AL6M-M2③P-②	AL6M-A1③-② AL6M-A2③-②	AL6M-A1③P-② AL6M-A2③P-②
	Square (18mm lens) 	SPDT DPDT	AL6Q-M1③-② AL6Q-M2③-②	AL6Q-M1③P-② AL6Q-M2③P-②	AL6Q-A1③-② AL6Q-A2③-②	AL6Q-A1③P-② AL6Q-A2③P-②
	Rectangular (18mm x 24mm lens) 	SPDT DPDT	AL6H-M1I-② AL6H-M2I-②	AL6H-M1IP-② AL6H-M2IP-②	AL6H-A1I-② AL6H-A2I-②	AL6H-A1IP-② AL6H-A2IP-②
Oversize Lens	Round (24mm lens) 	SPDT DPDT	—	AL6M-M1③P-M② AL6M-M2③P-M②	—	AL6M-A1③P-M② AL6M-A2③P-M②
	Square (24mm lens) 	SPDT DPDT	—	AL6Q-M1③P-Q② AL6Q-M2③P-Q②	—	AL6Q-A1③P-Q② AL6Q-A2③P-Q②
	Rectangular (18mm x 24mm lens) 	SPDT DPDT	—	AL6Q-M1③P-H② AL6Q-M2③P-H②	—	AL6Q-A1③P-H② AL6Q-A2③P-H②



1. In place of ②, specify Lens/LED Color Code from table below.
2. In place of ③, specify Voltage Code from table below.
3. Lamps also available in 5V DC, 6V AC/DC or 12 V AC/DC, change "4" using voltage/lamp codes (ie AL6M-M13-k uses 12V AC/DC LED).
4. LED lamp is included in unit and contains a current-limiting resistor and a protection diode. (External resistor not required.)
5. To order as sub-assembled, see page.
6. For accessories, see page.
7. For dimensions, see page.
8. Light independent of switch position.

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Warm White	W
Cool White	JW
Yellow	Y

③ Voltage Code

Voltage	Code
5V DC	1
6V AC/DC	2
12V AC/DC	3
24V AC/DC	4

AL6 Illuminated Pushbuttons (Sub-Assembled)

Operator	+	LED Lamp	+	Lens	=	Completed Unit
						

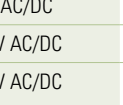
Operators

Style	Contact	Operator	Part Number		
			Round	Square	Rectangular
	SPDT	Momentary	AL6M-M100	AL6Q-M100	AL6H-M100
		Maintained	AL6M-A100	AL6Q-A100	AL6H-A100
	DPDT	Momentary	AL6M-M200	AL6Q-M200	AL6H-M200
		Maintained	AL6M-A200	AL6Q-A200	AL6H-A200



Oversize rectangular button uses square operator.

Lenses

Unit Degree of Protection	Dustproof (IP40)	Part Number	
		Oiltight (IP65)	
Size	Standard	Standard	Oversize
Round	AL6M-LK1-k 	AL6M-LK2-Ⓢ 	AL6M-LK2-M k 
	AL6Q-LK1-k 	AL6Q-LK2-k 	AL6Q-LK2-Q k 
Square	AL6H-LK1-k 	AL6H-LK2-k 	AL6Q-LK2-H k 
	AL6Q-LK1-k 	AL6Q-LK2-k 	AL6Q-LK2-Q k 
Rectangular	AL6H-LK1-k 	AL6H-LK2-k 	AL6Q-LK2-H k 
	AL6Q-LK1-k 	AL6Q-LK2-k 	AL6Q-LK2-Q k 



1. In place of Ⓢ, specify Lens Color Code from table below.
2. Lenses which are rated IP65 include a waterproof rubber gasket.
3. For accessories, see page.

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Warm White	W
Cool White	JW
Yellow	Y

LED Lamps

Appearance	Rated Voltage	Part Number
	5V DC	LATD-5 Ⓢ
	6V AC/DC	LATD-6 Ⓢ
	12V AC/DC	LATD-1 Ⓢ
	24V AC/DC	LATD-2 Ⓢ



1. In place of Ⓢ, specify LED Color Code from table at left.

AL6 Pilot Lights (Assembled)

LED Pilot Lights

Description	Part Number	
	Dustproof (IP40)	Oiltight (IP65)
Round (18mm Lens) 	AL6M-P③-②	AL6M-P③P-②
Square (18mm Lens) 	AL6Q-P③-②	AL6Q-P③P-②
Rectangular (18mm x 24mm Lens) 	AL6H-P③-②	AL6H-P③P-②

- 
1. In place of ②, specify Lens Color Code from table below.

2. In place of ③, specify Voltage Code from table below.

3. LEDs also available in 5V DC, 6V AC/DC or 12 V AC/DC, change “4” using voltage codes (ie AL6M-P3-② uses 12V AC/DC LED).

4. LED is included and contains built-in current limiting resistor and reverse polarity protection diode. (no external resistor required)

5. To order sub-assembled, see page.

6. For accessories, see page.

7. For dimensions, see page.

8. For one piece pilot lights and/or dome lens pilot lights, see AP series miniature pilot lights.

②Lens/LED Color Code

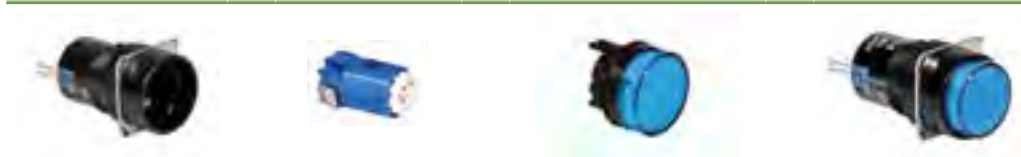
Color	Code
Amber	A
Green	G
Red	R
Blue	S
Warm White	W
Cool White	JW
Yellow	Y

③Voltage Code

Voltage	Code
5V DC	1
6V AC/DC	2
12V AC/DC	3
24V AC/DC	4

AL6 Pilot Lights (Sub-Assembled)

Operator	+	LED Lamp	+	Lens	=	Completed Unit
----------	---	----------	---	------	---	----------------



Operators

Style	Part Number		
	Round	Square	Rectangular
AL6 Pilot Lights			
	AL6M-P00	AL6Q-P00	AL6H-P00

Lenses

Degree of Protection	Part Number	
	Dustproof IP40	Oiltight IP65
Round	AL6M-LK1-② 	AL6M-LK3-② 
Square	AL6Q-LK1-② 	AL6Q-LK3-② 
Rectangular	AL6H-LK1-② 	AL6H-LK3-② 



1. In place of ②, specify Lens Color Code from table below.
2. Lenses which are rated IP65 include a waterproof rubber gasket.
3. For accessories, see page.

kLens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Warm White	W
Cool White	JW
Yellow	Y

LED Lamps

Appearance	Rated Voltage	Part Number
	5V DC	LATD-5 ②
	6V AC/DC	LATD-6 ②
	12V AC/DC	LATD-1 ②
	24V AC/DC	LATD-2 ②



1. In place of ②, specify LED Color Code from table at left.

AS6 Selector and Keylock Switches

AS6 Selector Switches and Keylock Switches (2 & 3 Position)

Style		Function		Knob	Key
Round Selector 	2-Position 90°	Maintained		AS6M-2Y2P	AS6M-2KT2P①
		Spring Return Right		AS6M-21Y2P	AS6M-21KT2PB
	3-Position 45°	Maintained		AS6M-3Y2P	AS6M-3KT2P①
		Spring Return Right → Center		AS6M-31Y2P	AS6M-31KT2P①
		Spring Return Left → Center		AS6M-32Y2P	AS6M-32KT2P①
		2-Way Return → Center		AS6M-33Y2P	AS6M-33KT2PD
Round Keylock 	2-Position 90°	Maintained		AS6Q-2Y2P	AS6Q-2KT2P①
		Spring Return to Right		AS6Q-21Y2P	AS6Q-21KT2PB
	3-Position 45°	Maintained		AS6Q-3Y2P	AS6Q-3KT2P①
		Spring Return Right → Center		AS6Q-31Y2P	AS6Q-31KT2P①
		Spring Return Left → Center		AS6Q-32Y2P	AS6Q-32KT2P①
		2-Way Return → Center		AS6Q-33Y2P	AS6Q-33KT2PD
Square Selector 	2-Position 90°	Maintained		AS6Q-2Y2P	AS6Q-2KT2P①
		Spring Return to Right		AS6Q-21Y2P	AS6Q-21KT2PB
	3-Position 45°	Maintained		AS6Q-3Y2P	AS6Q-3KT2P①
		Spring Return Right → Center		AS6Q-31Y2P	AS6Q-31KT2P①
		Spring Return Left → Center		AS6Q-32Y2P	AS6Q-32KT2P①
		2-Way Return → Center		AS6Q-33Y2P	AS6Q-33KT2PD
Square Keylock 	2-Position 90°	Maintained		AS6H-2Y2P	AS6H-2KT2P①
		Spring Return Right		AS6H-21Y2P	AS6H-21KT2PB
	3-Position 45°	Maintained		AS6H-3Y2P	AS6H-3KT2P①
		Spring Return Right → Center		AS6H-31Y2P	AS6H-31KT2P①
		Spring Return Left → Center		AS6H-32Y2P	AS6H-32KT2P①
		2-Way Return → Center		AS6H-33Y2P	AS6H-33KT2PD
Rectangular Selector 	2-Position 90°	Maintained		AS6H-2Y2P	AS6H-2KT2P①
		Spring Return Right		AS6H-21Y2P	AS6H-21KT2PB
	3-Position 45°	Maintained		AS6H-3Y2P	AS6H-3KT2P①
		Spring Return Right → Center		AS6H-31Y2P	AS6H-31KT2P①
		Spring Return Left → Center		AS6H-32Y2P	AS6H-32KT2P①
		2-Way Return → Center		AS6H-33Y2P	AS6H-33KT2PD
Rectangular Keylock 	2-Position 90°	Maintained		AS6H-2Y2P	AS6H-2KT2P①
		Spring Return Right		AS6H-21Y2P	AS6H-21KT2PB
	3-Position 45°	Maintained		AS6H-3Y2P	AS6H-3KT2P①
		Spring Return Right → Center		AS6H-31Y2P	AS6H-31KT2P①
		Spring Return Left → Center		AS6H-32Y2P	AS6H-32KT2P①
		2-Way Return → Center		AS6H-33Y2P	AS6H-33KT2PD



1. All models are IP65 and DPDT.
2. In place of ①, specify Key Retention Code. See table on right.
3. Available as assembled units only.
4. For accessories, see page 466.
5. For dimensions, see page 468.

Contact Operations

(for all selectors)

Contents	Operator Position & Contact Operation
2-pos. (DPDT)	Left
	Right
3-pos. (DPDT)	Left
	Center
	Right

Key Retention Codes

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only
C	Key retained in left position only
D	Key retained in left and right (3 position only)
E	Key retained in center only (3 position only)
G	Key retained right and center (3 position only)
H	Key retained left and center (3 position only)



Key cannot be removed in a spring return position.

Switch Engraving Order Form – A6 Series

Copy this order form and use it to specify Letter Height, Maximum Number of Lines and Text to be engraved.

To insure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company:	_____	Telephone:	_____
Name:	_____	Fax:	_____
Address:	_____	Email:	_____
PO:	_____	Part Number to be Engraved:	_____

Please check one of the boxes below to indicate your choice of engraving options:

Rectangular
Switch

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	6
☐	2	5/32	6
☐		1/8	6
☐	3	1/8	6
☐	4	N/A	

Square
Switch

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	5
☐	2	5/32	5
☐		1/8	6
☐	3	1/8	6
☐	4	N/A	

Round
Switch

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	3
☐		1/8	3
☐	2	5/32	Custom*
☐	3	1/8	Custom*
☐	4	3/32	Custom*

*Engraving is possible, but character size will be smaller than standard sizes.



1. Engraving is done on the button itself for non-illuminated pushbuttons and on marking plate for illuminated pushbuttons and pilot lights.
2. Please enter text exactly how you want it engraved, take care to emphasize capital or small letters.

Enter text to be engraved

:

Line 1: _____

Line 2: _____

Line 3: _____

Line 4: _____

Sample Letter Sizes

1/8 Letters: OPEN

5/32 Letters: OPEN

For IDEC Internal Use Only:

Work Order #: _____

Accessories

Appearance		Description	Used With	Part Number
Locking Ring Wrench		Made of metal. Used for tightening plastic locking ring during installation. Tightening torque should not exceed 3kgf-cm	Ø 5/8" (16mm) units	MT-001
			Ø 31/64" (12mm) AP2M units	MT-002
			Ø 13/32" (10mm) AP1M units	MT-003
Lens Removal Tool		Made of metal. Used for removing lens or button from the housing	All pushbuttons and pilot lights	MT-101
Lamp Holder Tool		Made of rubber. Used for removing and replacing LED lamps in illuminated units	All illuminated pushbuttons and pilot lights	OR-77
Switch Guard		Prevents inadvertent switch operation. IP40 dust-tight. 90 degrees opening maintained	Round/Square	AL-K6
			Rectangular	AL-KH6
		Prevents inadvertent switch operation. IP65 oiltight 180 degrees opening, spring return	Round/Square	AL-K6SP
			Rectangular	AL-KH6SP
Terminal Cover		Made of translucent nylon. Fits over and shields the terminals	All 5/8" (16mm) units	AL-V6
Dust Cover		Fits over the lens or button to provide extra protection from dust (not applicable for oversize lenses or buttons).	All round units	AL-D6
			All square units	AL-DQ6
			All rectangular units	AL-DH6
Adaptor Socket		Plug-on terminal adaptor with solder terminals	All 5/8" (16mm) units	AL-C6
		Plug-on terminal adaptor with PCB terminals		AL-C6V
Mounting Hole Plug		Fills unused panel cutouts. Made of nitrile rubber. Push-in installation from front of panel. IP65 (oiltight).	Rubber	AL-B6
		Fills unused panel cutouts. Made of aluminum. Screw-on locking ring from inside of panel. IP65 (oiltight).	Aluminum	AL-BM6
		Round Mounting Hole Plug	Plastic (Applicable for flush mount switches only)	LA9Z-BS6
		Square Mounting Hole Plug		LA9Z-BS7
		Rectangular Mounting Hole Plug		LA9Z-BS8
Replacement LED Lamps		LED with built in current limiting resistor (with all illuminated assemblies).	5V DC	LATD-5 ②
			6V AC/DC	LATD-6 ②
			12V AC/DC	LATD-1 ②
			24V AC/DC	LATD-2 ②
Replacement Locking Ring		Fastens operators to panel (included with all operators).	All switches & pilot lights	HA9Z-LN
Anti-Rotation Ring		Prevents rotation of switches in panel (included with all operators).	All switches & pilot lights	AL6-LP
Replacement Engraving Inserts		Engraving plates to allow legends underneath translucent lenses (included with all lenses).	Round standard	AL6M-W
			Square standard	AL6Q-W
			Rectangular standard	AL6H-W
			Round oversize	AL6M-MW
			Square/rectangular oversize	AL6Q-QW
Replacement Keys		Pair of keys (#132). All key switches use same standard key.	All key selectors	AS6-SK

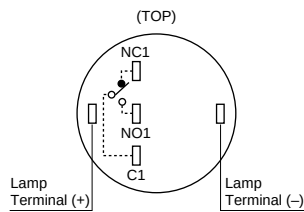
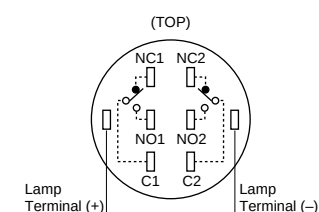
1. In place of ② specify color code. A=Amber, G=Green, Y=Yellow, R=Red, S=Blue, W=Warm White, JW=Cool White.
2. LEDs include built-in current limiting resistor and reverse polarity protection diode.

Appearance		Description	Used With	Part Number
Flush Bezel		ø24mm round, metal (aluminum color), panel cut-out ø20.2mm	Pushbuttons, pilot lights, illuminated pushbutton, selector switches, key selector switches and illuminated selector switches.	LA9Z-SM61
		ø24mm round, plastic (black), square panel cut-out ø20.2mm		LA9Z-S61B
		24mm square, plastic (black), panel cut-out 20.2 x 20.2mm	A6 Switch +	LA9Z-S71B
		24 x 30mm rectangular, plastic (black), rectangular panel cut-out ø20.2 x 26.2mm	Flush Bezel =	LA9Z-S81B
Switch Guard w/ Flush Bezel (spring return)		Rectangular, plastic (black)	 Flush Switch	LA9Z-KS8

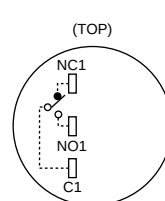
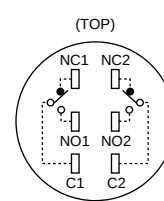
Schematics — A Series: 5/8" (16mm)

Terminal Arrangement (Top View)

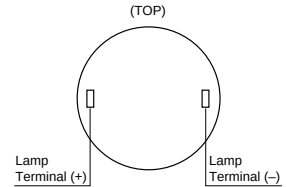
Illuminated Pushbuttons

SPDT Contact
(Single-pole/Double Throw)DPDT Contact
(Double-pole/Double Throw)

Non-illuminated Pushbuttons and Selector Switches

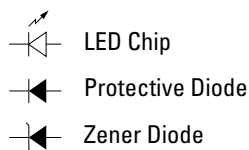
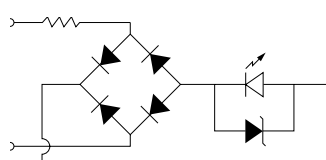
SPDT Contact
(Single-pole/Double Throw)DPDT Contact
(Double-pole/Double Throw)

Pilot Lights



IDEC's Superbright LED Internal Circuits

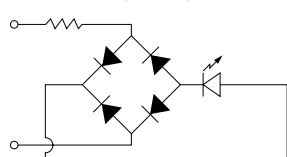
LATD-1,-2,-6 (GS)



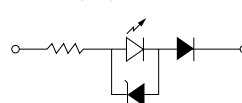
LATD-5 (ARWY)



LATD-1,-2,-6 (ARWY)

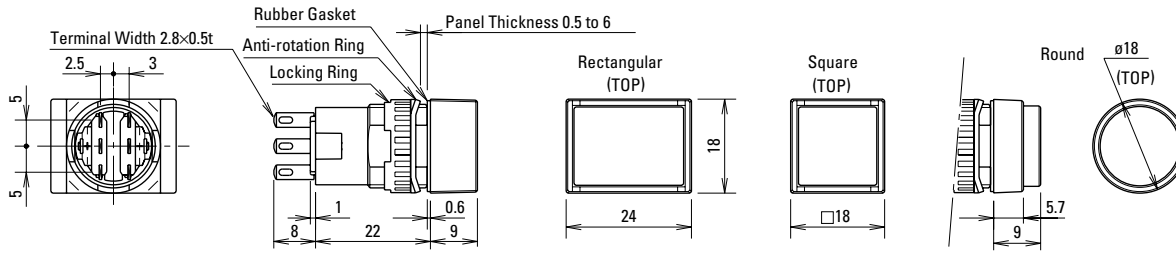


LATD-5 (GS)

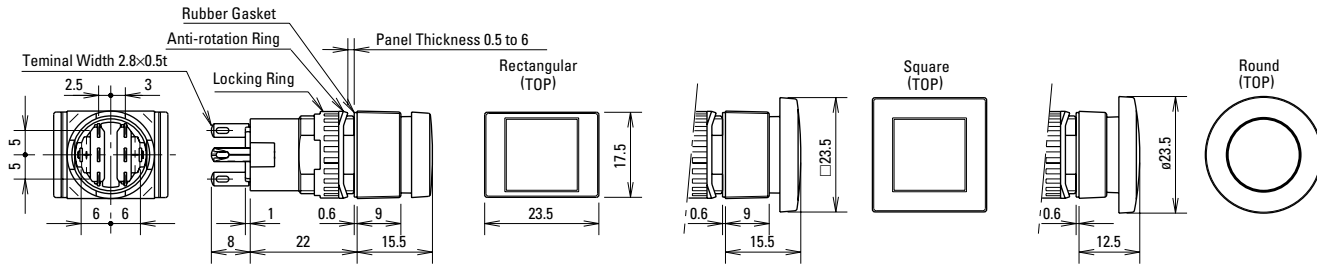


Dimensions (mm)

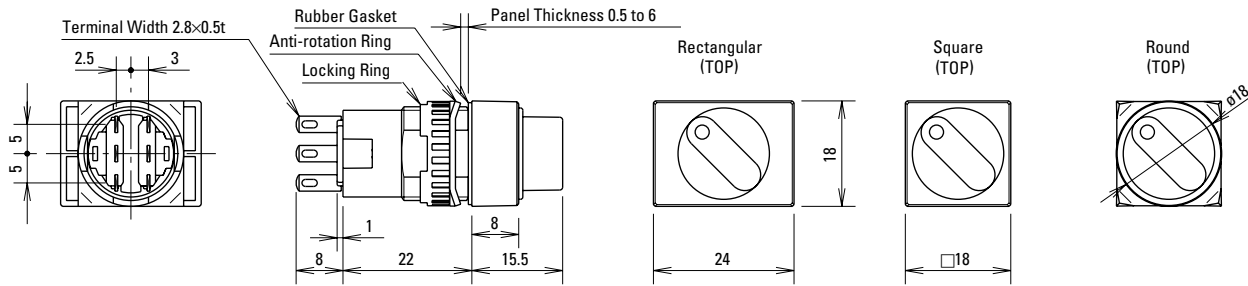
Pushbuttons, Ø 5/8" (16mm)



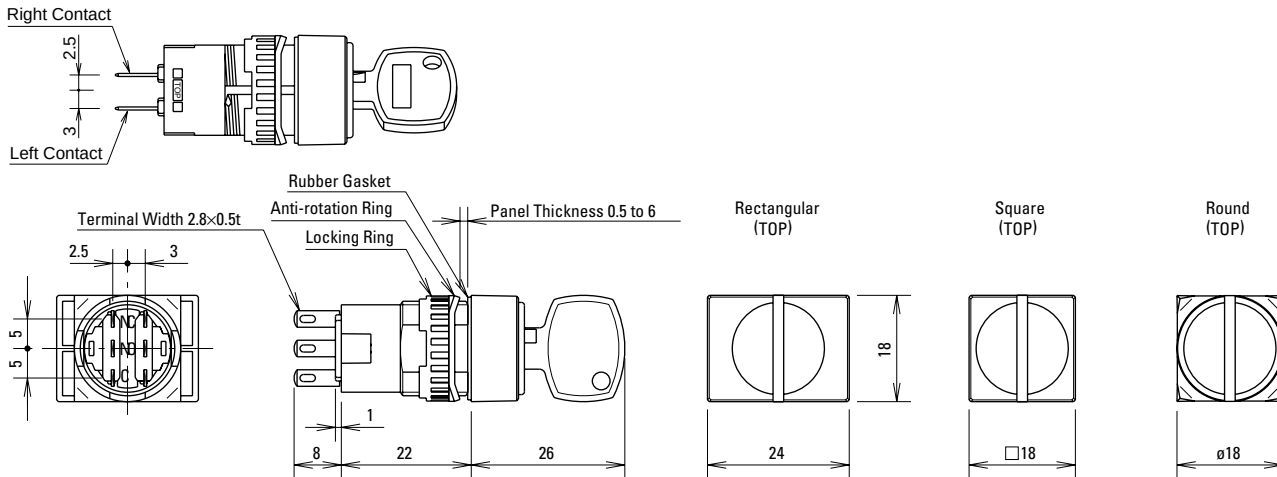
Overize Lens



Selector Switches, Ø 5/8" (16mm)

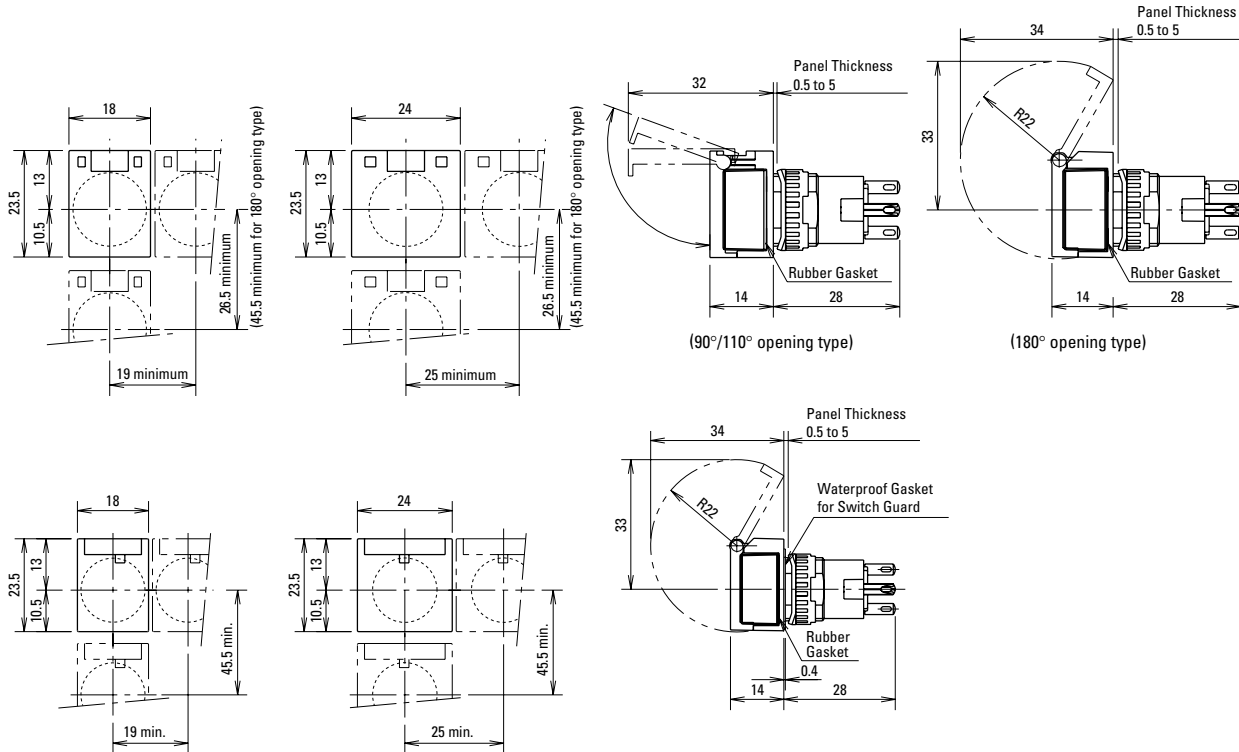


Key Selector Switches, Ø 5/8" (16mm)



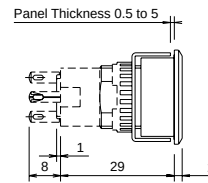
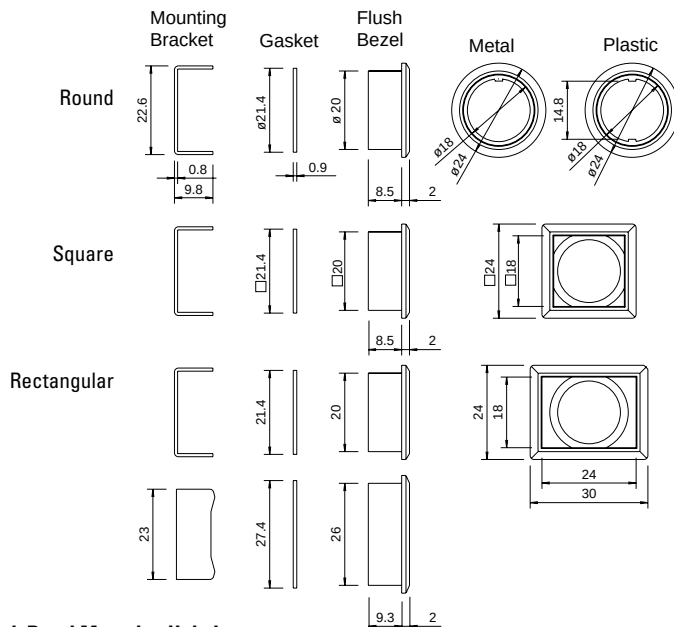
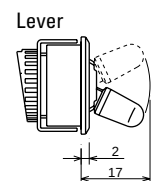
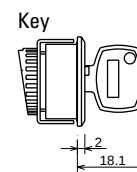
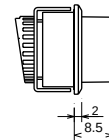
All dimensions are in mm.

Switch Guard, Ø 5/8" (16mm)



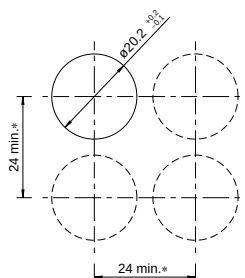
Flush Bezel

Flush Bezel with Switch

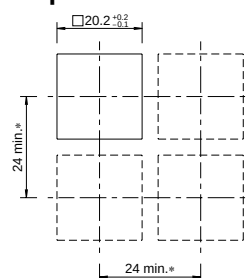
Selector Switches
Illuminated &
Non-Illuminated

Flush Bezel Mounting Hole Layout

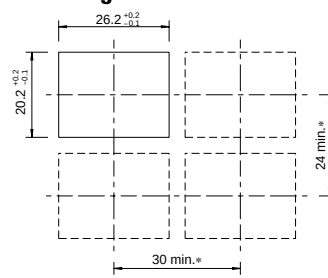
Round

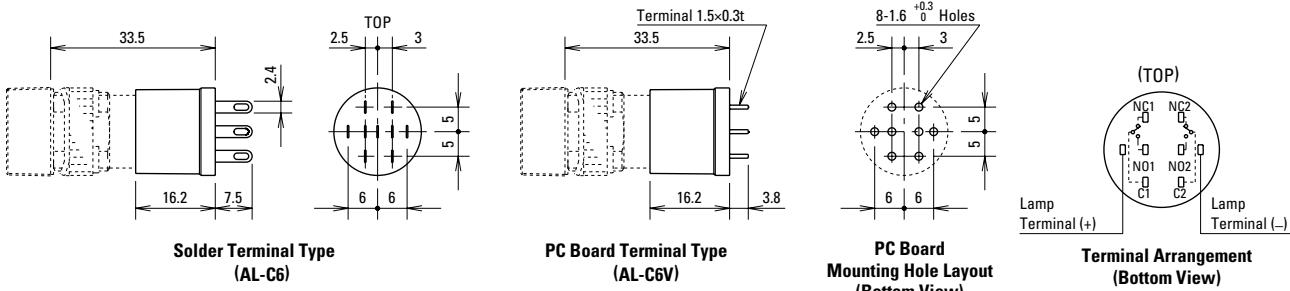


Square



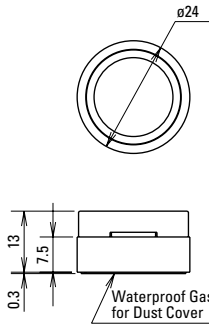
Rectangular



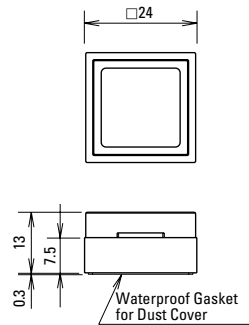


Terminal Sockets Dust Covers

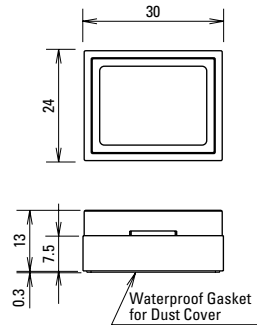
AL-D6, Round



AL-DQ6, Square

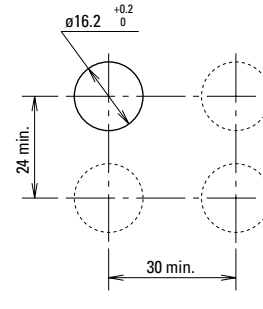


AL-DH6, Rectangular

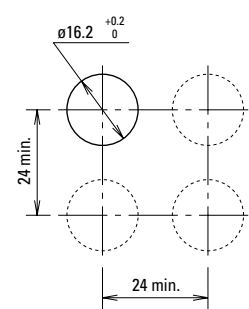


Panel Cut-Outs For Units w/Dust Cover

Round/Square



Rectangular



Pushbuttons with Standard Size Lens

Style	Round—AL6M-W	Square—AL6Q-W	Rectangular—AL6H-W
Dimensions			
Outside (OD)	(13.8mm)	(13.8mm)	(OD¹ x OD²) 13.8 x 19.8mm
Marking Area (a)	(12mm)	(12mm)	(a¹xa²) 12 x 18mm

Engraving must be made on the engraving area within 0.02" (0.5mm) deep.

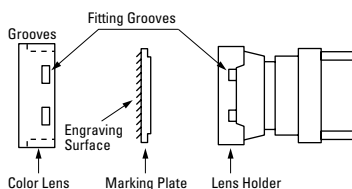
Pushbuttons with Oversize Lens

Style	Round—AL6M-MW	Square/Rectangular—AL6Q-QW
Dimensions		
Outside (OD)	Ø 0.491" (12.6mm)	0.491" (12.6mm)
Marking Area (a)	Ø 0.429" (11mm)	0.429" (11mm)

Replacing and Marking Plate

Removal

Remove the lens holder assembly (lens, marking plate and holder) from the operator by holding the color lens recesses with the lens removal tool (Part No.MT-101) and pulling out. Remove marking plate by pushing the color lens from the rear to disengage the latches. Marking plate must be engraved on the side as shown in the figure on the right. Ø 5/8" (16mm)



Installation

For illuminated pushbuttons:

1. Insert marking plate inside lens in correct direction
2. Press color lens on to lens holder to engage latches.
3. Insert lens holder into housing in correct direction.

Do not loosen spring on illuminated pushbutton units (except on pilot light units). The marking plate must be engraved on the front side as shown above.

L6 (Oversize) Series — Miniature Switches and Pilot Devices

Key features:

- 5/8" (16mm) mounting holes
- Locking lever removable contact blocks
- Solder terminal or PCB terminal options
- Available assembled or as sub-components
- Worldwide approvals
- Incandescent or LED illumination
- Snap action contacts



UL Recognized
File No. E55996



CSA Certified
File No. LR21451



Registration No. R9551089 (E-stops)
Registration No. J9551458 (all other switches)
Registration No. R95650511 (Pilot Lights)



Contact Ratings	Conforming to Standards	EN60947-1, EN60947-5-1, VDE0660-200, UL508, CSA C22-2 NO.14						
	Operating Temperature	Operation: −25 to +55°C (without freezing), 45 to 85% RH Storage: -30 to +80°C (without freezing)						
	Vibration Resistance	5 to 55Hz, 1.0 peak-peak amplitude max						
	Shock Resistance	Operating limit: 100 m/sec ² (approximately 10G) Damage limit: 1000 m/sec ² (approximately 100G)						
	Mechanical Life	Momentary pushbuttons 2,000,000 operations minimum All others: 250,000 operations minimum						
	Degree of Protection	IP65 (conforming to IEC 60529)						
	Dielectric Strength	Switch unit: between live and ground: 2500 volt AC, 1 minute 						

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

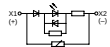
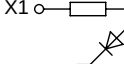
Timers

Contactors

Terminal Blocks

Circuit Breakers

Built-in LED Lamp Ratings

Model		LFTD-5②	LFTD-1②	LFTD-2②	LFTD-H2②
Lamp Base		SX6S/8x5.4			
Rated Voltage		5V DC	12V AC/DC	24V AC/DC	120V AC
Operating Voltage		5V DC ±5%	12V AC/DC ±10%	24V AC/DC ±10%	120V AC ±5%
Current Draw	AC	—	9mA	9mA	8mA
	DC	8mA	8mA	8mA	—
Color Code ②		Specify a color code in place of ② in the Part No: A (amber), G (green), R (red), S (blue), W (white), Y (yellow)			
Lamp Base Color		Same as illumination color			
Voltage Marking		Stamped on the lamp base			
Life (reference value)		Approx. 50,000 hours			
Internal Circuit	A, R, W, Y		A, R, W, Y		
					
	G, S		G, S		
					

Non-Illuminated Pushbuttons (Assembled)

Non-Illuminated Pushbuttons

Style	Operation	Contact	Terminal Style	
			Solder Tab	PCB
	Momentary	SPDT	HA1B-M2C5-①	HA1B-M2C1V-①
		DPDT	HA1B-M2C6-①	HA1B-M2C2V-①
	Maintained	SPDT	HA1B-A2C5-①	HA1B-A2C1V-①
		DPDT	HA1B-A2C6-①	HA1B-A2C2V-①
	Momentary	SPDT	HA2B-M1C5-①	HA2B-M1C1V-①
		DPDT	HA2B-M1C6-①	HA2B-M1C2V-①
	Maintained	SPDT	HA2B-A1C5-①	HA2B-A1C1V-①
		DPDT	HA2B-A1C6-①	HA2B-A1C2V-①
	Momentary	SPDT	HA2B-M2C5-①	HA2B-M2C1V-①
		DPDT	HA2B-M2C6-①	HA2B-M2C2V-①
	Maintained	SPDT	HA2B-A2C5-①	HA2B-A2C1V-①
		DPDT	HA2B-A2C6-①	HA2B-A2C2V-①
	Momentary	SPDT	HA1B-M3C5-①	HA1B-M3C1V-①
		DPDT	HA1B-M3C6-①	HA1B-M3C2V-①
	Maintained	SPDT	HA1B-A3C5-①	HA1B-A3C1V-①
		DPDT	HA1B-A3C6-①	HA1B-A3C2V-①

① Button Color Codes

Color	Code	Color	Code
Black	B	Blue	S
Green	G	White	W
Red	R	Yellow	Y

-  1. In place of ① specify Button Color Code from table.
2. Illuminated (translucent) style lenses also available, specify as such: instead of LA1B-M1C5-① use LA1B-M1C5L-② in place of ② (specify Lens Color Code from next page.)
3. PCB terminal models also available with silver contacts (change “1” or “2” to “5” or “6” respectively, ie LA1B-M1C1V-① becomes LA1B-M1C5V-①).

Non-Illuminated Pushbuttons (Sub-Assembled)

Contact + Safety Lever Lock + Operator + Button = Complete Part



Operators

Style	Momentary	Maintained
Oversize Round	HA1B-M0	HA1B-A0
Oversize Square	HA2B-M0	HA2B-A0
Mushroom	HA1B-M0L	HA1B-A0L



1. In place of ① specify Button Color Code from table on right.
2. In place of ② specify Lens Color Code from table on right.
3. *requires HA1L-M0 or HA1L-A0 operator instead of HA1B-M0 or HA1B-A0.
4. **requires HA2L-M0 or HA2L-A0 instead of HA2B-M0 or HA2B-A0.

Buttons/Lenses

Style	Button	Lens
Oversize Round Flush	HA1A-B1-①	HA1A-L1-②*
Oversize Round Extended	HA1A-B2-①	—
Oversize Square Flush	HA2A-B1-①	HA2A-L1-②**
Oversize Square Extended	HA2A-B2-①	—
Mushroom	HA1A-B3-①	HA1A-L3-②

Contacts

Style	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold SPDT DPDT	HA-C1 HA-C2	HA-C1V HA-C2V
	Silver SPDT DPDT	HA-C5 HA-C6	HA-C5V HA-C6V

Safety Lever Lock

Style	Part Number
	HA9Z-LS

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

② Lens Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

HA1B/HA1E Stop Switch

Key features:

- PCB or Solder Terminals
- Locking Lever Removable Contact Blocks
- Positive Action Contacts
- 1 or 2 form B (SPST-NC) Contacts
- IP65 Protection
- 16mm Mounting Hole
- Tamper Proof Construction



File No. DK95-00138



CSA
File No. LR21451



UL Recognized
File No. E55996



Direct
Opening
Action

Specifications

Contact Form	1 or 2 form B (SPST-NC)	
Termination	PCB or Solder Terminal	
Contact Material	Silver	
Applicable Standards	EN60947-5-1, UL508, CSA 22.2. No. 14	
Rated Insulation Voltage	250V AC/DC	
Degree of Protection	IP65	
Conditional Short-Circuit Current and Short-Circuit Protective Device	50 A (at 250V) 10A 250V Fuse, operation class M according to IEC269-1 and IEC269-2	
Positive Opening Operation	Positive opening travel	3.4mm
	Minimum force required to achieve positive opening operation of all break contacts.	10.3 N (2 form B contacts)
	Maximum travel including travel beyond the minimum travel position	5.5mm
	Maximum frequency of actuation	1,200 operations/hour
Pollution Degree	3	

Nameplates

HAAV–Yellow Plastic	
Marking	Part Number
Blank	HAAV-0

Positive Action Stop Switch

Style	Operation	Contact	Terminal Style	
			Solder Tab	PCB
	Pushlock/ Turn Reset	DPST(NC) (2 form B)	HA1B-V2E2R	HA1B-V2E2VR
		Short Body SPST-NC (1 form B) DPST-NC (2 form B)	HA1E-V2S1R HA1E-V2S2R	—

Accessories: Shroud

Style	Part Number	Applicable Standards
	XA9Z-KG1	SEMI S2 Compliant (Approved by TUV)



1. Button is non-removable, available in red and as complete assembled unit only.
2. Stop Switch does not come with safety lever lock.

Buzzers (IP40)

Style	Operating Voltage	Terminal Style	
		Solder/Tab	PCB
	6V AC/DC ± 10%	LA3Z-1X2	LA3Z-1X2V
	12V to 24 AC/DC ± 10%	LA3Z-1X4	LA3Z-1X4V

Buzzer Ratings

Frequency	2 khz ± 500 HZ
Amplitude	80db @ 0.1m (at rated voltage)
Operating Voltage	6V AC/DC or 12 - 24V AC/DC ± 10%
Adjustable Cycle	55 to 600 cycles per minute
Current Draw	DC: 7mA AC: 20mA
Life	1000 hrs. minimum
Insulation Voltage	60V AC/DC
Operating Temperature	-20 to 55°C (no freezing), 45 to 85% RH
Degree of Protection	IP40

Pilot Lights (Assembled)

Pilot Lights

Style	Terminal Style	
	Solder Tab	PCB
Oversize Round 	HA1P-1C0③-②	HA1P-1C0③V-②
Oversize Square 	HA2P-1C0③-②	HA2P-1C0③V-②
Oversize Round Unibody 	HA1P-1③-②	—
Oversize Square Unibody 	HA2P-1③-②	—



1. In place of ② specify Lens/LED Color Code from table.
2. In place of ③ specify Voltage Code from table.

② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Voltage/Lamp Code

Voltage	Code
5V DC LED	1
6V AC/DC LED	2
12V AC/DC LED	3
24V AC/DC LED	4
120V AC LED	8
6V AC/DC Incandescent	5
12V AC/DC Incandescent	6
24V AC/DC Incandescent	7

Pilot Lights (Sub-Assembled)

Terminals	+	Safety Lever Lock	+	Lamp Holder	+	Lamp	+	Operator	+	Lens	=	Completed Unit
												

Operators

Style	Part Number
Oversize Round	HA1P-0
Oversize Square	HA2P-0
Oversize Round Unibody	HA1P-00
Oversize Square Unibody	HA2P-00

Lenses

Style	Part Number
Oversize Round	HA1A-P1-②
Oversize Square	HA2A-P1-②

 In place of ② specify lens color code.

Lamps

Style	Voltage	Part Number
LED	5V DC 6V AC/DC 12V AC/DC 24V AC/DC 120 V AC	LFTD-5② LFTD-6② LFTD-1② LFTD-2② LFTD-H2②
Incandescent	6V AC/DC 12V AC/DC 24V AC/DC	LH-06 LH-14 LH-28

 In place of ② specify LED color code from table below.

Terminals

Style	Solder Tab	PCB
	HA-C00	HA-C00V

 Not required for unibody operators.

Lamp Holder

Style	Part Number
	HA9Z-AH

Safety Lever Lock

Style	Part Number
	HA9Z-LS

② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

Illuminated Pushbuttons (Assembled)

Illuminated Pushbuttons

Style	Operation	Contact	Terminal Style	
			Solder Tab	PCB
Oversize Round 	Momentary	SPDT DPDT	HA1L-M1C5③-② HA1L-M1C6③-②	HA1L-M1C1③V-② HA1L-M1C2③V-②
	Maintained	SPDT DPDT	HA1L-A1C5③-② HA1L-A1C6③-②	HA1L-A1C1③V-② HA1L-A1C2③V-②
Oversize Square 	Momentary	SPDT DPDT	HA2L-M1C5③-② HA2L-M1C6③-②	HA2L-M1C1③V-② HA2L-M1C2③V-②
	Maintained	SPDT DPDT	HA2L-A1C5③-② HA2L-A1C6③-②	HA2L-A1C1③V-② HA2L-A1C2③V-②
Mushroom 	Momentary	SPDT DPDT	HA1L-M3C5③-② HA1L-M3C6③-②	HA1L-M3C1③V-② HA1L-M3C2③V-②
	Maintained	SPDT DPDT	HA1L-A3C5③-② HA1L-A3C6③-②	HA1L-A3C1③V-② HA1L-A3C2③V-②



1. In place of ② specify Lens Color Code from table.
2. In place of ③ specify Voltage Code from table.
3. PCB terminal models also available with silver contacts change "1" or "2" to "5" or "6" respectively, (ie LA1L-M1C14V-① becomes LA1L-M1C54V-①).
4. Light independent of switch position.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

③ Voltage/Lamp Code

Voltage	Code
5V DC LED	1
6V AC/DC LED	2
12V AC/DC LED	3
24V AC/DC LED	4
120 V AC LED	8
6V AC/DC Incandescent	5
12V AC/DC Incandescent	6
24V AC/DC Incandescent	7

Illuminated Pushbuttons (Sub-Assembled)

Terminals	+	Safety Lever Lock	+	Lamp Holder	+	Lamp	+	Operator	+	Lens	=	Completed Unit
-----------	---	-------------------	---	-------------	---	------	---	----------	---	------	---	----------------



Operators

Style	Momentary	Maintained
Override Round 	HA1L-MO	HA1L-AO
Override Square 	HA2L-MO	HA2L-AO
Mushroom 	HA1B-MOL	HA1B-AOL

Lenses

Style	Part Number
Override Round 	HA1A-L1-②
Override Square 	HA2A-L1-②
Mushroom 	HA1A-L3-②



In place of ② specify lens color code.

② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

Lamps

Style	Voltage	Part Number
LED 	5V DC 6V AC/DC 12V AC/DC 24V AC/DC 120 V AC	LFTD-5② LFTD-6② LFTD-1② LFTD-2② LFTD-H2②
Incandescent 	6V AC/DC 12V AC/DC 24V AC/DC	LH-06 LH-14 LH-28

Contacts

Style	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold SPDT DPDT	HA-C10 HA-C20	HA-C10V HA-C20V
	Silver SPDT DPDT	HA-C50 HA-C60	HA-C50V HA-C60V

Lamp Holder

Style	Part Number
	HA9Z-AH

Safety Lever Lock

Style	Part Number
	HA9Z-LS

Selector Switches (Assembled)

Selector Switches

Style		Position		Contact	Terminal Style	
					Solder Tab	PCB
 Oversize Round	90° 2-Position	Maintained		DPDT	HA1S-2C6	HA1S-2C2V
		Spring return from right		DPDT	HA1S-21C6	HA1S-21C2V
	45° 3-Position	Maintained		DPDT	HA1S-3C6	HA1S-3C2V
		Spring return from right		DPDT	HA1S-31C6	HA1S-31C2V
		Spring return from left		DPDT	HA1S-32C6	HA1S-32C2V
		2-Way spring return		DPDT	HA1S-33C6	HA1S-33C2V



1. All assembled selector switches use DPDT contacts.
2. For SPDT contacts see sub-components on next page.
3. PCB terminal models also available with silver contacts change "1" or "2" to "5" or "6" respectively, (ie LA1S-21C2V becomes LA1S-21C6V).

Contact Operations

(for all selectors)

Contacts	Operator Position and Contact Operation	
2-pos. (DPDT)	Left	
	Right	
3-pos. (DPDT)	Left	
	Center	
	Right	



As viewed from front of switch.

Selector Switches (Sub-Assembled)

Contact	+	Safety Lever Lock	+	Operator	=	Complete Part
---------	---	-------------------	---	----------	---	---------------



Operators

Style	Position	Function	Part Number
 Oversize Round	2	Maintained Spring from right	HA1S-2Y HA1S-21Y
	3	Maintained Spring from right Spring from left Spring from both	HA1S-3Y HA1S-31Y HA1S-32Y HA1S-33Y

Safety Lever Lock

Style	Part Number
	HA9Z-LS

Contacts

Style	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold	SPDT DPDT	HA-C1 HA-C2V HA-C2V
	Silver	SPDT DPDT	HA-C5 HA-C6V HA-C6V

- 
1. All assembled switches listed on previous page use DPDT contacts.

2. SPDT Contacts for use on 2 position selector switch only

Key Switches (Assembled)

Key Switches

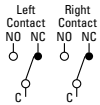
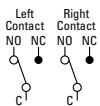
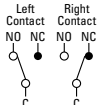
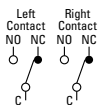
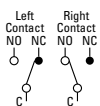
Style		Position		Contact	Terminal Style	
					Solder Tab	PCB
Oversize Round	90° 2-Position	Maintained		DPDT	HA1K-2C6③	HA1K-2C2V③
		Spring return from right		DPDT	HA1K-21C6B	HA1K-21C2VB
	45° 3-Position	Maintained		DPDT	HA1K-3C6③	HA1K-3C2V③
		Spring return from right		DPDT	HA1K-31C6③	HA1K-31C2V③
		Spring return from left		DPDT	HA1K-32C6③	HA1K-32C2V③
		2-Way spring return		DPDT	HA1K-33C6D	HA1K-33C2VD



1. In place of ③ specify Key Retention Code from next page.
2. All assembled key switches have DPDT contacts. For SPDT see sub-assembled on next page.
3. PCB terminal models also available with silver contacts change "1" or "2" to "5" or "6" respectively, (ie LA1K-2C2V③ becomes LA1K-2C6V③).

Contact Operations

(for all selectors)

Contacts	Operator Position and Contact Operation	
2-pos. (DPDT)	Left	
	Right	
3-pos. (DPDT)	Left	
	Center	
	Right	



As viewed from front of switch.

③ Key Retention Option Codes

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only
C	Key retained in left position only
D	Key retained in left and right (3 position only)
E	Key retained in center only (3 position only)
G	Key retained right and center (3 position only)
H	Key retained left and center (3 position only)



Key cannot be removed from a spring-return position.

Selector Switches (Sub-Assembled)

Contact

+

Safety Lever Lock

+

Operator

=

Complete Part






Operators

Style	Position	Function	Part Number
Oversize Round	2	Maintained Spring from right	HA1K-2③ HA1K-21B
	3	Maintained Spring from right Spring from left Spring from both	HA1K-3③ HA1K-31③ HA1K-32③ HA1K-33D

-
1. In place of ③ specify key removable code from table on right.
2. Operator includes two keys.

Contacts

Style	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold SPDT DPDT	HA-C1 HA-C2	HA-C1V HA-C2V
		HA-C5 HA-C6	HA-C5V HA-C6V

-
1. All assembled switches listed on previous page use DPDT contacts.
2. SPDT Contacts for use on 2 position selector switch only

Safety Lever Lock

Style	Part Number
	HA9Z-LS

③ Key Retention Option Codes

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only
C	Key retained in left position only
D	Key retained in left and right (3 position only)
E	Key retained in center only (3 position only)
G	Key retained right and center (3 position only)
H	Key retained left and center (3 position only)

-
- Key cannot be removed from a spring-return position.

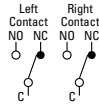
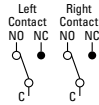
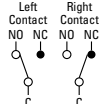
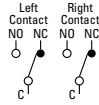
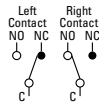
Illuminated Selector Switches (Assembled)

Illuminated Selector Switches

Style	Position	Contact	Terminal Style	
			Solder Tab	PCB
Round 	90° 2-Position	Maintained 	DPDT	LA1F-2C6③-② LA1F-2C2③V-②
		Spring return from right 	DPDT	LA1F-21C6③-② LA1F-21C2③V-②
	45° 3-Position	Maintained 	DPDT	LA1F-3C6③-② LA1F-3C2③V-②
		Spring return from right 	DPDT	LA1F-31C6③-② LA1F-31C2③V-②
		Spring return from left 	DPDT	LA1F-32C6③-② LA1F-32C2③V-②
		2-Way spring return 	DPDT	LA1F-33C6③-② LA1F-33C2③V-②
Square 	90° 2-Position	Maintained 	DPDT	LA2F-2C6③-② LA2F-2C2③V-②
		Spring return from right 	DPDT	LA2F-21C6③-② LA2F-21C2③V-②
	45° 3-Position	Maintained 	DPDT	LA2F-3C6③-② LA2F-3C2③V-②
		Spring return from right 	DPDT	LA2F-31C6③-② LA2F-31C2③V-②
		Spring return from left 	DPDT	LA2F-32C6③-② LA2F-32C2③V-②
		2-Way spring return 	DPDT	LA2F-33C6③-② LA2F-33C2③V-②
Rectangular 	90° 2-Position	Maintained 	DPDT	LA3F-2C6③-② LA3F-2C2③V-②
		Spring return from right 	DPDT	LA3F-21C6③-② LA3F-21C2③V-②
	45° 3-Position	Maintained 	DPDT	LA3F-3C6③-② LA3F-3C2③V-②
		Spring return from right 	DPDT	LA3F-31C6③-② LA3F-31C2③V-②
		Spring return from left 	DPDT	LA3F-32C6③-② LA3F-32C2③V-②
		2-Way spring return 	DPDT	LA3F-33C6③-② LA3F-33C2③V-②
Oversize Round 	90° 2-Position	Maintained 	DPDT	HA1F-2C6③-② HA1F-2C2③V-②
		Spring return from right 	DPDT	HA1F-21C6③-② HA1F-21C2③V-②
	45° 3-Position	Maintained 	DPDT	HA1F-3C6③-② HA1F-3C2③V-②
		Spring return from right 	DPDT	HA1F-31C6③-② HA1F-31C2③V-②
		Spring return from left 	DPDT	HA1F-32C6③-② HA1F-32C2③V-②
		2-Way spring return 	DPDT	HA1F-33C6③-② HA1F-33C2③V-②

Contact Operations

(for all selectors)

Contacts	Operator Position and Contact Operation	
2-pos. (DPDT)	Left	
	Right	
3-pos. (DPDT)	Left	
	Center	
3-pos. (DPDT)	Right	



As viewed from front of switch.

② Lens/LED Color Codes

Color	Code	Color	Code
Amber	A	Blue	S
Green	G	Yellow	Y
Red	R	White	W

③ Voltage/Lamp Code

Voltage	Code
5V DC LED	1
6V AC/DC LED	2
12V AC/DC LED	3
24V AC/DC LED	4
120V AC LED	8
6V AC/DC Incandescent	5
12V AC/DC Incandescent	6
24V AC/DC Incandescent	7



- In place of ② specify Lens/LED Color Code from table above.
- In place of ③ specify Voltage Code from table above.
- All switches listed have DPDT contacts. For SPDT see sub-assembled on next page.
- PCB terminal models also available with silver contacts change "1" or "2" to "5" or "6" respectively, (ie LA1F-2C24V-② becomes LA1F-2C64V-②).
- Light independent of switch position.

Illuminated Selector Switches (Sub-Assembled)

Contacts	+	Safety Lever Lock	+	Lamp Holder	+	Lamp	+	Operator	+	Lens/Handle	=	Completed Unit
----------	---	-------------------	---	-------------	---	------	---	----------	---	-------------	---	----------------



Operators

Style	Position	Function	Part Number
Round	2	Maintained Spring from right	LA1F-20 LA1F-210
	3	Maintained Spring from right Spring from left Spring from both	LA1F-30 LA1F-310 LA1F-320 LA1F-330
Square	2	Maintained Spring from right	LA2F-20 LA2F-210
	3	Maintained Spring from right Spring from left Spring from both	LA2F-30 LA2F-310 LA2F-320 LA2F-330
Rectangular	2	Maintained Spring from right	LA3F-20 LA3F-210
	3	Maintained Spring from right Spring from left Spring from both	LA3F-30 LA3F-310 LA3F-320 LA3F-330
Oversize Round	2	Maintained Spring from right	HA1F-20 HA1F-210
	3	Maintained Spring from right Spring from left Spring from both	HA1F-30 HA1F-310 HA1F-320 HA1F-330

Safety Lever Lock

Style	Part Number
	HA9Z-LS

Lamp Holder

Style	Part Number
	HA9Z-AH

Lamps

Style	Voltage	Part Number
LED	5V DC	LFTD-5②
	6V AC/DC	LFTD-6②
	12V AC/DC	LFTD-1②
	24V AC/DC	LFTD-2②
	120V AC	LFTD-H2②
Incandescent	6V AC/DC	LH-06
	12V AC/DC	LH-14
	24V AC/DC	LH-28



In place of ② specify LED color code from table below.

Contacts

Style	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold	SPDT DPDT	HA-C10 HA-C20
			HA-C10V HA-C20V
	Silver	SPDT DPDT	HA-C50 HA-C60
			HA-C50V HA-C60V



All assembled selectors on previous pages use DPDT contacts. SPDT contacts are for use only on two position selectors.

Lenses/Handles

Style	Part Number
Standard	LA1A-F-②
Oversize	HA1A-F-②



In place of ② specify lens color code from table.

② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

Pushbutton Selectors (Assembled)

Pushbutton Selectors

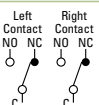
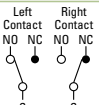
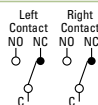
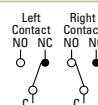
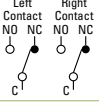
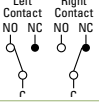
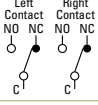
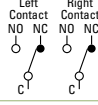
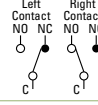
Style		Terminal Style	
		Solder Tab	PCB
	2 Position	HA1R-2C6-①	HA1R-2C2V-①
	3 Position	HA1R-3C6-①	HA1R-3C2V-①

① Button Color Codes

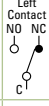
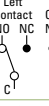
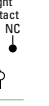
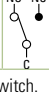
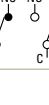
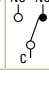
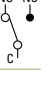
Color	Code	Color	Code
Amber	A	Blue	S
Green	G	Yellow	Y
Red	R	White	W

-  1. In place of ① specify Button Color Code.
 2. PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie HA1R-2C2V-① becomes HA1R-2C6V-①).
 3. Pushed position, momentary only.

Contact Operation

Style	Operator Position					
	Left		Center		Right	
	Normal	Pushed	Normal	Pushed	Normal	Pushed
2 Position			—	—		
3 Position				Blocked		

Contact Operation

Contacts	Operator Position and Contact Information	Down			Center			Up		
		Left Contact	Right Contact	NO NC	Left Contact	Right Contact	NO NC	Left Contact	Right Contact	NO NC
2-pos. (DPDT)	Maintained Spring from Top									
2-pos. (DPDT)	Spring Return from Bottom									
3-pos. (DPDT)	All models									



As viewed from front of switch.

Lever Switches

Style		Operation	Contacts	Terminal Type	
				Solder Tab	PCB
	2-Position	Maintained 	DPDT	LA1T-2C6	LA1T-2C2V
		Spring return from top 	DPDT	LA1T-21C6	LA1T-21C2V
		Spring return from bottom 	DPDT	LA1T-22C6	LA1T-22C2V
	3-Position	Maintained 	DPDT	LA1T-3C6	LA1T-3C2V
		Spring return from top 	DPDT	LA1T-31C6	LA1T-31C2V
		Spring return from bottom 	DPDT	LA1T-32C6	LA1T-32C2V
		Spring return from both 	DPDT	LA1T-33C6	LA1T-33C2V

-  1. PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie LA1T-2C2V becomes LA1T-2C6V).
 2. Terminology: U = up, D = down, C = center.

Switch Engraving Order Form – L6 Series

Copy this order form and use it to specify Letter Height, Maximum Number of Lines and Text to be engraved.
To insure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company: _____
Name: _____
Address: _____
PO: _____

Telephone: _____
Fax: _____
Email: _____
Part Number to be Engraved: _____

Please check one of the boxes below to indicate your choice of engraving options:

Rectangular
Switch

Square
Switch

Round
Switch

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	6
☐	2	5/32	6
☐		1/8	6
☐	3	1/8	6
☐	4	N/A	

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	5
☐	2	5/32	5
☐		1/8	6
☐	3	1/8	6
☐	4	N/A	

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	3
☐		1/8	3
☐	2	Custom*	
☐	3	Custom*	
☐	4	N/A	

*Engraving is possible, but character size will be smaller than standard sizes.



- 1. Above mentioned specifications hold true for standard size pushbuttons (round, square and rectangular).
- 2. Oversize pushbuttons and pilot lights allow you to engrave 1 additional character.
- 3. Engraving is done on the button itself for non-illuminated push buttons and on marking plate for illuminated pushbuttons and pilot lights.
- 4. Please enter text exactly how you want it engraved, take care to emphasize capital or small letters.

Enter text to be engraved:

Line 1: _____
Line 2: _____
Line 3: _____
Line 4: _____

Sample Letter Sizes

1/8 Letters: OPEN
5/32 Letters: OPEN

For IDEC Internal Use Only:

Work Order #: _____

Accessories

Item	Appearance	Specifications		Part Number	Notes
Ring Wrench		Made of metal		MT-001	Used for tightening the plastic locking ring when installing the L6 series unit on a panel. Tightening torque should not exceed 9kgf cm when tightening the locking ring.
Lamp Holder Tool (Made of Rubber)		Made of rubber. Used for removing and replacing LED and incandescent lamps in illuminated units.		OR-44	Rubber tool used for replacing LED and incandescent lamps.
Lens Removal Tool		For illuminated pushbuttons and pilot lights.		MT-101	Used for removing the lens or button from the housing.
LED Lamp		5V DC 6V AC/DC 12V AC/DC 24V AC/DC 120V AC		LFTD-5Ⓢ LFTD-6Ⓢ LFTD-1Ⓢ LFTD-2Ⓢ LFTD-H2Ⓢ	T 1-3/4 miniature flange base. In place of Ⓢ specify LED Color Code (A, G, R, S, W, Y).
Incandescent Lamp		6V AC/DC 12V AC/DC 24V AC/DC		LH-06 LH-14 LH-28	0.5W, T 1-3/4 miniature flange base
Switch Guard		180 degrees opening, spring return	Oversize Round/Sq	HA9Z-K1	Prevents inadvertent switch operation. IP65 oiltight rated.
Terminal Cover		Made of white nylon	All removable contacts	H6-VL2	Covers terminals to prevent possible electric shock.
			Unibody Pilot Lights	H6-PVL	
Mounting Hole Plug		Rubber		AL-B6	Fills unused panel cutouts. Made of nitrile rubber. Push-in installation from front of panel. IP65 (oiltight) rated.
		Aluminum		AL-BM6	Fills unused panel cutouts. Made of aluminum. Screw-on locking ring from inside of panel. IP65 (oiltight) rated.
Replacement Keys		for HA1K (#231) – oversize		KG9Z-SK	Pair of keys.
Replacement Engraving Inserts			Oversize Round Oversize Square Mushroom	HA9Z-P1-W HA9Z-P2-W HA9Z-P13-W	
Replacement Locking Ring		All models		HA9Z-LN	
Replacement Anti-Rotation Ring			L6 oversize	HA9Z-LP	Prevents rotation of switches in panel. (included with all assembled switches)
Replacement Selector Inserts				HA9Z-HC1-Ⓢ	Applicable to round oversize selectors only Ⓢ = (G, R, S, W, Y)
Replacement Safety Lever Lock				HA9Z-LS	

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

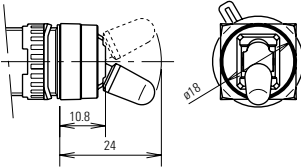
Circuit Breakers

Item	Appearance	Description	Used With	Part Number
Flush Bezel		ø24mm round, metal (aluminum color), panel cut-out ø20.2mm	 Illuminated selector switches.  L6 Switch +  Flush Bezel =  Flush Switch	LA9Z-SM61
		ø24mm round, plastic (black), panel cut-out ø20.2mm		LA9Z-S61B
		□24mm square, plastic (black), panel cut-out □20.2mm		LA9Z-S71B
		24 x 30mm rectangular, plastic (black), panel cut-out ø20.2 x 26.2mm		LA9Z-S81B
Switch Guard w/ Flush Bezel (spring return)		Rectangular, plastic (black)		LA9Z-KS8

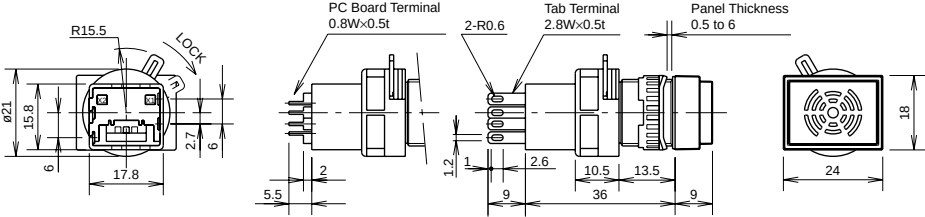
 Flush bezels not applicable for oversize units.

Dimensions (mm)

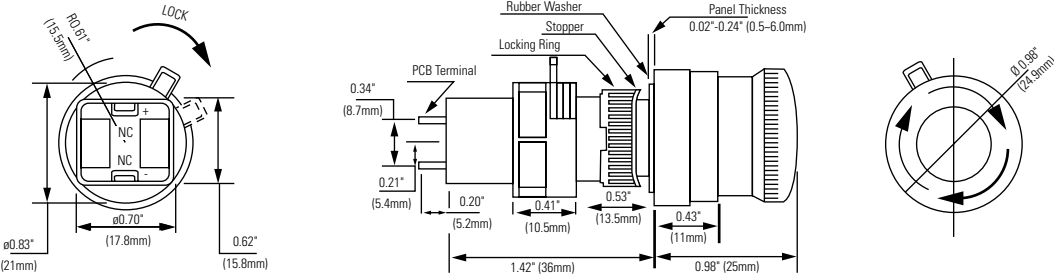
Lever Switches (LA1T)



Buzzer (LA3Z)



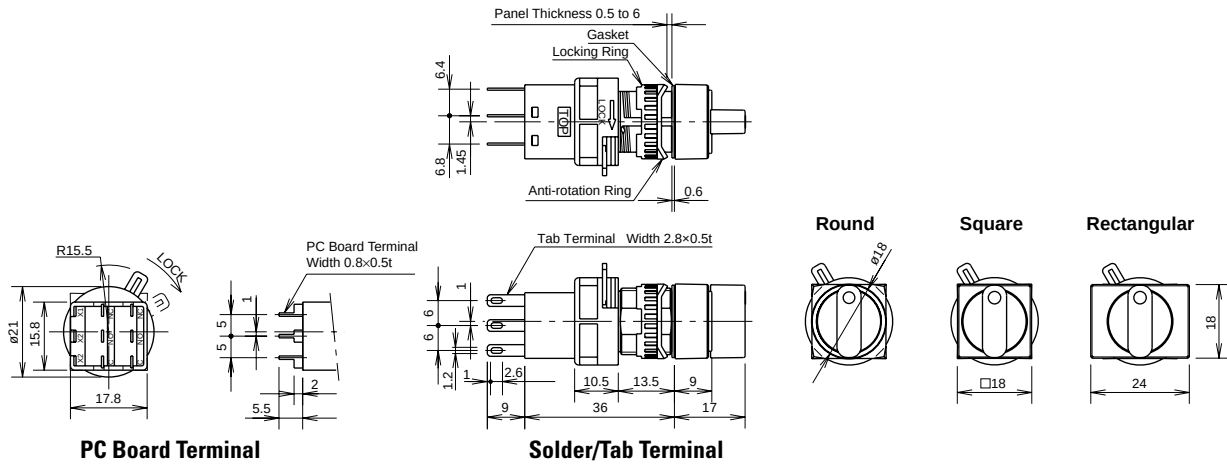
Emergency Stop Switch (HA1B)



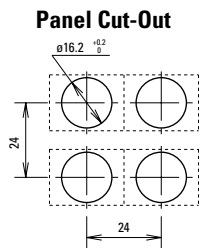
Emergency Stop Switch (HA1E) - Short Body Style



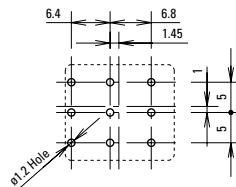
Illuminated Selector Switches (LA*F)



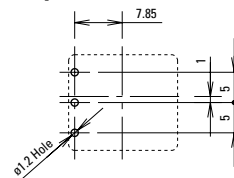
PC Board Drilling Layout (Bottom View)



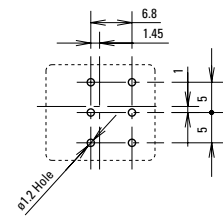
Illuminated Pushbuttons, Illuminated Selector Switches



Pilot Lights, Selector Switches, Key Selector Switches

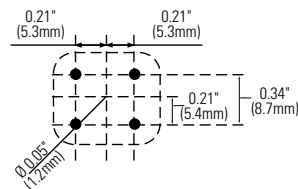


Pushbutton Lever Switches

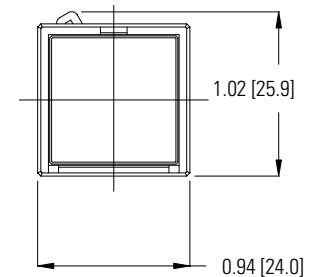
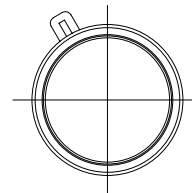
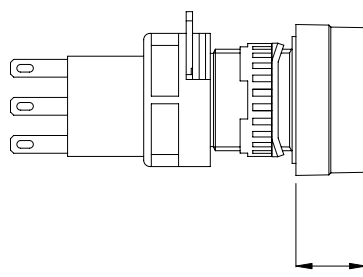
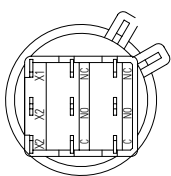


HA1B E-Stop

PCB Mounting Pattern



Oversize Flush Pushbutton and Pilot Lights



Switches & Pilot Devices

Signaling Lights

Relays & Sockets

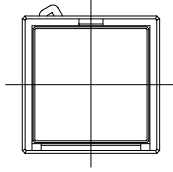
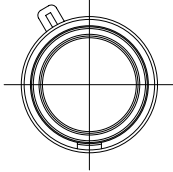
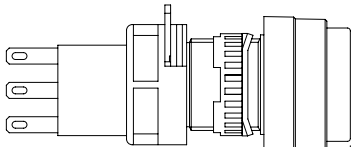
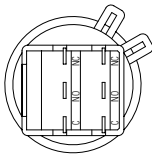
Timers

Contactors

Terminal Blocks

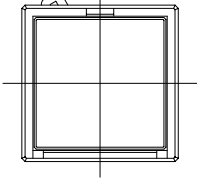
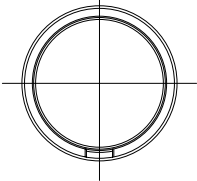
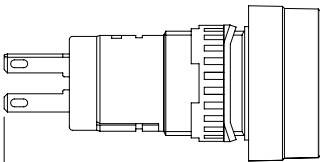
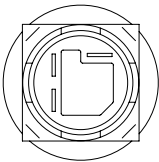
Circuit Breakers

Enlarge Extended Non-Illuminated Pushbutton



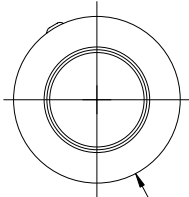
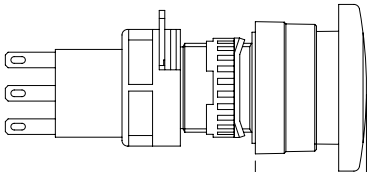
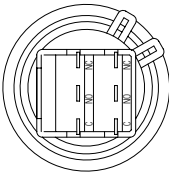
0.59 [15.1]

Enlarge Unibody Pilot Lights



1.48 [37.5]

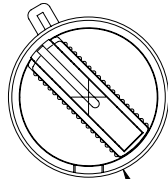
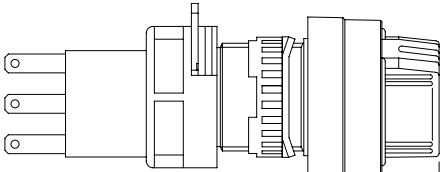
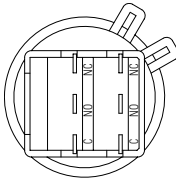
Mushroom Pushbuttons



1.18 [30.0]

0.79 [20.0]

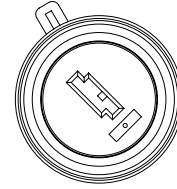
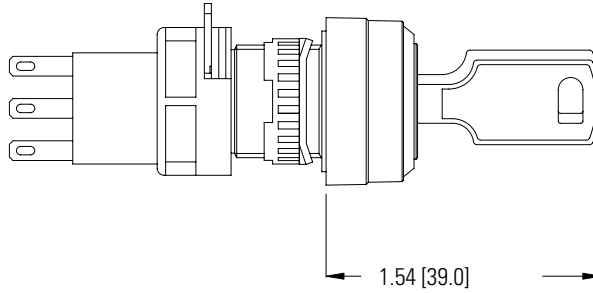
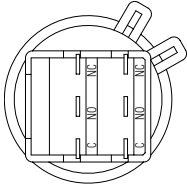
Enlarge Selector Switch



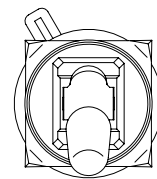
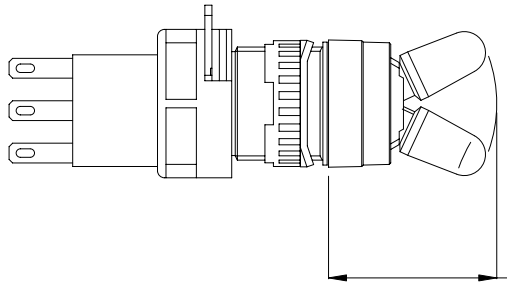
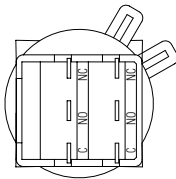
0.94 [23.8]

0.77 [19.5]

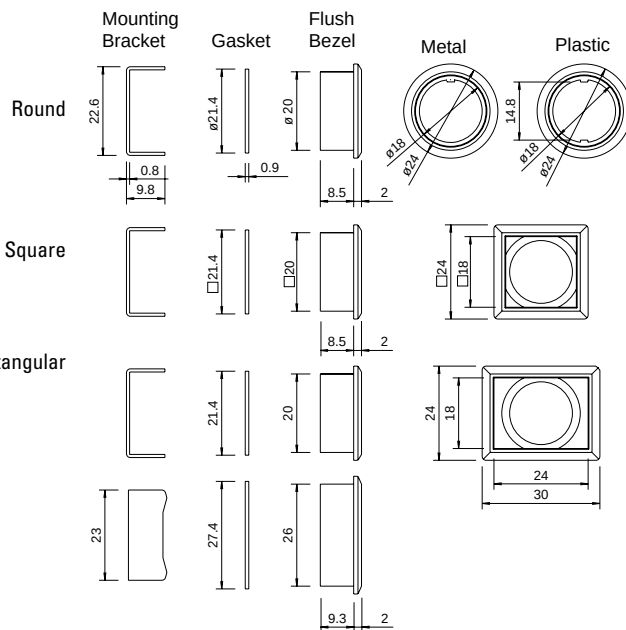
Oversize Key Switch



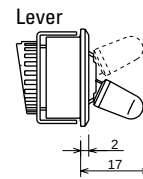
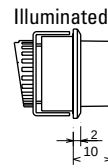
Lever Switch



Flush Bezel

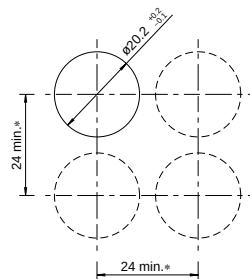


Selector Switches

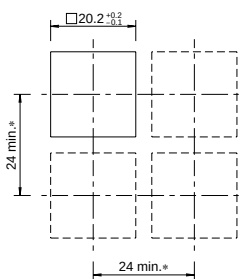


Flush Bezel Mounting Hole Layout

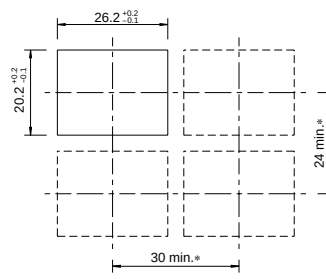
Round



Square



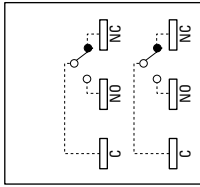
Rectangular



Terminal Configurations

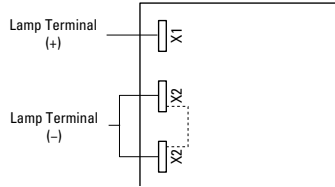
Non Illuminated Pushbutton

TOP



Pilot Lights

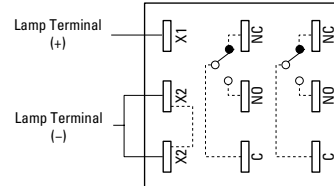
TOP



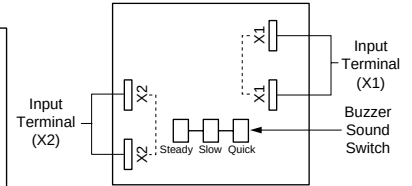
AL-K6SP

Illuminated Pushbuttons

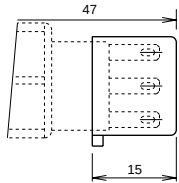
TOP



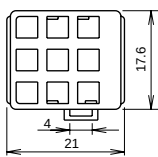
Buzzer



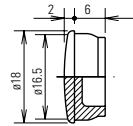
H6-VL2



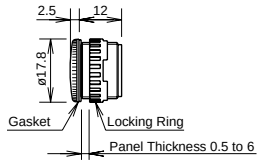
TOP



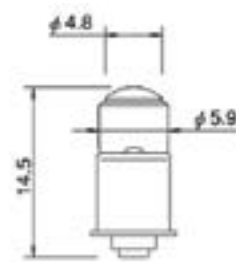
AL-B6



AL-BM6

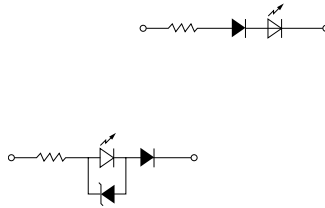
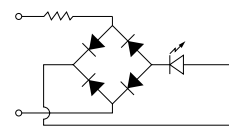


LFTD



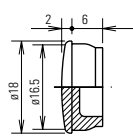
LED Lamp

Internal Circuit



- LED Chip
- Protective Diode
- Zener Diode

AL-B6



General Instructions

Pushbutton Assembly

Lamp Installation

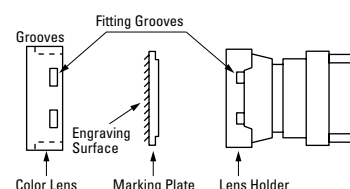
Lamps can be replaced in two ways:

1. If contacts are accessible (or pushbutton not installed in a panel) then it is easiest to first remove the contacts from the operator. This will allow easy access to the lamp/lamp-holder assembly. Grab lamp, depress slightly, and turn counter clockwise. Lamp can then be removed by pushing it back through the lamp holder.
2. If contacts are not accessible, then the lamp can be replaced by first removing the lens from the operator. Just pull lens straight out either with a fingernail or optional lens removal tool (MT-101). Lamp/lamp-holder assembly can then be removed with lamp removal tool (OR-44). Insert lamp removal tool through operator, depress slightly, turn counter clockwise, then pull lamp/lamp-holder assembly out. Lamp can then be removed by pushing it back through the lamp holder.



Engraving Lenses

All buttons and lenses can be engraved directly on the outside surface. Illuminated lenses also allow for engraving on a plate that is underneath the colored section of the lens. Remove the colored section of the lens by pulling on the edge while simultaneously unhooking it from the latches on the lens holder. The marking plate will then be accessible. It can then be engraved or a thin marked insert (such as mylar or paper) can be sandwiched between the marking plate and colored section of the lens.



Panel Mounting

Before any unit can be mounted into a panel, the contact block must be removed. Slide metal locking lever and pull contact off. Loosen and remove the locking ring and square anti-rotation ring from the operator and insert operator through panel cutout from the front of the panel. Slide on anti-rotation ring and tighten locking ring, using locking ring wrench (MT-001). Slide contact block onto operator, observing TOP marking on both parts. Slide metal locking lever in direction indicated by LOCK. The yellow plastic safety lever lock can then be snapped onto the locking lever; this will prevent vibration or maintenance actions from releasing the contact from the operator.

PCB Mounting

Being able to separate the contacts from the operator allows for assembly of the front panel components (operator and lens) to be performed in tandem with the PC board assembly and soldering. For applications where multiple rows of push-buttons are mounted closely together, or where other components may obstruct access to the contact locking lever, be sure to include access holes in the PC board (refer to PC board layout dimensions for location). Also be sure to allow for space above and to the side of contact to ensure that no components block the contact block locking lever. PC board pins are designed to rest on the PCB, take this into consideration to ensure that pins do not short closely spaced traces.



LBW Flush Mount 22mm Switches & Pilot Lights

Flush bezel projects only 2mm from front of panel. Removable contact blocks are ideal for single board mounting.

Key Features

- Pushbuttons, illuminated pushbuttons, selector switches, and key selector switches with up to 3PDT contacts.
- Key selectors with keys that are difficult to duplicate. Seven different key numbers to choose from.
- Pilot lights with round or square flat lenses.
- Solder / Tab or PC Board terminal.
- Black or metallic flush bezels available.
- Guard pushbuttons, illuminated or non-illuminated are available.
- Illuminated pushbuttons with bright, clear, ring, flush or extended lens.
- Choice of either gold-clad or silver contacts.
- Degree of protection: IP65 (from the front of the panel).



Applicable Standards	Mark	File No. or Organization
UL508		UL Recognition No.E55996
CSA 22.2 No.14		CSA File No. LR 21451
EN60947-5-1		TÜV Rheinland
		EU Low Voltage Directive
GB14048.5		

Specifications

Operating Temperature	-25 to +60°C (no freezing), Illuminated units: -25 to +55°C	
Storage Temperature	-30 to +80°C (no freezing)	
Operating Humidity	45 to 85% RH (no condensation)	
Contact Resistance	50 mW maximum (initial value)	
Insulation Resistance	100 MW minimum (500V DC megger)	
Dielectric Strength	Switch	Between live part and ground: 2,000V AC, 1 min. Between terminals of different poles: 2,000V AC, 1 min. Between terminals of the same poles: 1,000V AC, 1 min.
	Illumination	Between live part and ground: 2,000V AC, 1 min.
Vibration Resistance	Operating extremes/Damage limits: 5 to 55 Hz, amplitude 0.5mm	
Shock Resistance	Operating extremes: 100 m/s ² Damage limits: 1,000 m/s ²	
Mechanical Life (minimum operations)	Momentary: 2,000,000 Maintained: 250,000 Selector switches: 250,000 Key selector switches: 250,000	
Electrical Life (minimum operations)	Momentary: 50,000 / 100,000 ¹ Maintained: 50,000 / 100,000 ² Selector switches: 50,000 / 100,000 ² Key selector switches: 50,000 / 100,000 ²	
Degree of Protection	IP65 (IEC 60529)	
Terminal Style	Solder/tab terminal #110, PC board terminal	
Bezel	Black plastic or metallic	
Weight (approx.)	16g (illuminated pushbutton) 14g (pilot light) 15g (pushbutton) 17g (selector switch) 29g (key switch) 17g (illuminated pushbutton with guard) 18g (push button with guard)	

1. Switching frequency 1,800 operations/h.
2. Switching frequency 1,200 operations/h.

Contact Ratings

Gold Contact (switch base color: blue)		
Rated Insulation Voltage	250V	
Rated Thermal Current	3A	
Rated Operating Voltage	30V DC	125V AC
Rated Operating Current (resistive load)	0.1A	0.1A
Contact Material	Gold-clad silver	

Minimum applicable load (reference value): 5V AC/DC, 1 mA

Silver Contact (switch base color: gray)					
Rated Insulation Voltage			250V		
Rated Operating Voltage			30V	125V	250V
Rated Operating Current	AC 50/60Hz	Resistive load	—	5A	5A
		Inductive load	—	3A	1.5A
	DC	Resistive load	5A	1.1A	—
		Inductive load	2.5A	0.55A	—
	AC 50/60Hz	Resistive load	—	5A	3A
		Inductive load	—	3A	1.5A
	DC	Resistive load	3A	0.6A	—
		Inductive load	1A	0.22A	—
Rated Thermal Current			5A		
Contact Material			Silver		

AC inductive load: PF=0.6 to 0.7 DC inductive load: L/R=7 ms max.

LED Ratings

Rated Voltage	5V DC	12V AC/DC	24V AC/DC
Voltage Range	5V DC±5%	12V AC/DC±10%	24V AC/DC ±10%
LED Part No.	LB9Z-LED5②	LB9Z-LED1②	LB9Z-LED2②
Rated Current	A, R: 22 mA G, PW, S: 16 mA		
Voltage Rating	Marked on the side of the LED unit		
LED Life (reference value)	Approx. 30,000 hours (until the brightness reduces to 50% of the initial value)		

Internal Circuit	A, PW, R	A, PW, R
G, S	G, S	

- LED Chip
- Protection Diode
- Zener Diode
- Resistor
- Varistor

1. For ② (color code): A (amber), G (green), PW (white), R (red), S (blue)
2. Use the white LED for yellow illumination.
3. LED lamp contains a current-limiting resistor.

Illuminated Pushbuttons (Assembled)

Part No.	LBW①L-②③T④⑤⑥*					
	Flush					
						
	Round / Black Bezel	Square / Black Bezel	Round / Metallic Bezel	Square / Metallic Bezel	Round with Guard	Square with Guard
Extended		Flush Ring-illuminated				
(black bezel is also available)			(black bezel is also available)			
① Style	② Operation	④ Contact	⑤ LED Operating Voltage	Part No.	* Illumination Color Code	
Black bezel	Momentary	Gold/SPDT	24V AC/DC	LBW①L-M③T14*	Specify the color code in place of * in the Part No. A: amber G: green PW: pure white R: red S: blue Y: yellow	
		Gold/DPDT		LBW①L-M③T24*		
	Maintained	Gold/SPDT	24V AC/DC	LBW①L-A③T14*		
		Gold/DPDT		LBW①L-A③T24*		
Metallic bezel	Momentary	Gold/SPDT	24V AC/DC	LBW①L-M③T14*		
		Gold/DPDT		LBW①L-M③T24*		
	Maintained	Gold/SPDT	24V AC/DC	LBW①L-A③T14*		
		Gold/DPDT		LBW①L-A③T24*		
Guard Type	Momentary	Gold/SPDT	24V AC/DC	LBW①L-M③T14*		
		Gold/DPDT		LBW①L-M③T24*		
	Maintained	Gold/SPDT	24V AC/DC	LBW①L-A③T14*		
		Gold/DPDT		LBW①L-A③T24*		

- Flush/Extended color code: A (amber), G (green), PW (pure white), R (red), S (blue), Y (yellow)
- Ring-illuminated color code: PW (pure white), WA (amber), WG (green), WR (red), WS (blue)
- Illuminated pushbuttons contain an LED unit. For details on LED units, see 580.
- The guard opens 180 degrees spring-return.
- Illuminated pushbuttons can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See 594 for details on the marking plate and film.
- White lens type (when light is off) are available. Clear lens is used instead of colored lens for amber, green, red, and blue illuminated pushbuttons. Amber, green, red, or blue LED units are used. To specify, see Part Number Interpretation below.
- PC board terminals available for gold contacts. Silver contacts also available. To specify, see Part Number Interpretation below.
- Extended style is available. See Part Number Interpretation below (③).
- Flush ring-illuminated style is available. See Part Number Interpretation below (③). Guard is not available with flush ring-illuminated style.
- 5V DC and 12V AC/DC LED operating voltages also available.
- Marking plates are available. See accessory section.

Part Number Interpretation

LBW①L-②③T④⑤⑥*



To be used for interpreting part numbers only,
not for part number development.

① Style

Code	Shape
6	Round / Black Bezel
7	Square / Black Bezel
6M	Round / Metallic Bezel
7M	Square / Metallic Bezel
6G	Round with Guard
7G	Square with Guard

⑤ LED Operating Voltage

Code	Rated Operating Voltage
1	5V DC
3	12V AC/DC
4	24V AC/DC

② Operation

Code	Operation
A	Maintained
M	Momentary

③ Operator Style

Code	Operator Style
1	Flush
2	Extended
1R	Flush Ring-illuminated

* Extended style is available only for round (black/metallic bezel) and in momentary operation. Guard model is not available.

④ Contacts

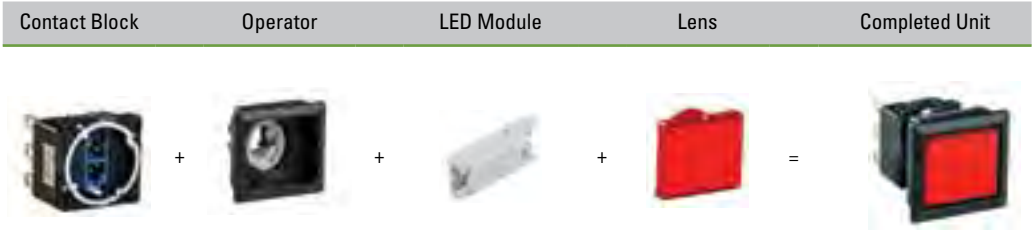
Code	Contact
1	Gold/SPDT
2	Gold/DPDT
5	Silver/SPDT
6	Silver/DPDT

⑥ Others

Code	Specification	Part No. Example
Blank	Solder/Tab Terminal	—
V	PC Board Terminal (Gold Contact Only)	LBW6L-M1T14V*

- Specify the color code in place of * in the table above.

Illuminated Pushbuttons (Sub-assembled)



Contact Block

Terminal Style		Material	Contact	Part Number
	Solder/Tab	Silver	SPDT	LB-T50
			DPDT	LB-T60
	PCB	Gold	SPDT	LB-T10V
			DPDT	LB-T20V

LED Module

Style	Color	Voltage	Part Number
	Amber	5V	LB9Z-LED5A
		12V	LB9Z-LED1A
		24V	LB9Z-LED2A
	Green	5V	LB9Z-LED5G
		12V	LB9Z-LED1G
		24V	LB9Z-LED2G
	Red	5V	LB9Z-LED5R
		12V	LB9Z-LED1R
		24V	LB9Z-LED2R
	Blue	5V	LB9Z-LED5S
		12V	LB9Z-LED1S
		24V	LB9Z-LED2S
	Pure White	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW

Operator

Style	Mounting Style	Shape	Momentary	Maintained
	Flush Mount (Plastic)	Round	LBW6L-M0	LBW6L-A0
		Square	LBW7L-M0	LBW7L-A0
	Flush Mount (Metallic)	Round	LBW6ML-M0	LBW6ML-A0
		Square	LBW7ML-M0	LBW7ML-A0
	Flush Mount (Built-in switch guard)	Round	LBW6GL-M0	LBW6GL-A0
		Square	LBW7GL-M0	LBW7GL-A0
	Flush Mount (Plastic)	Round (for extended lens)	LBW6L-M20	LBW6L-A20
	Flush Mount (Metallic)		LBW6ML-M20	LBW6ML-A20

Lens

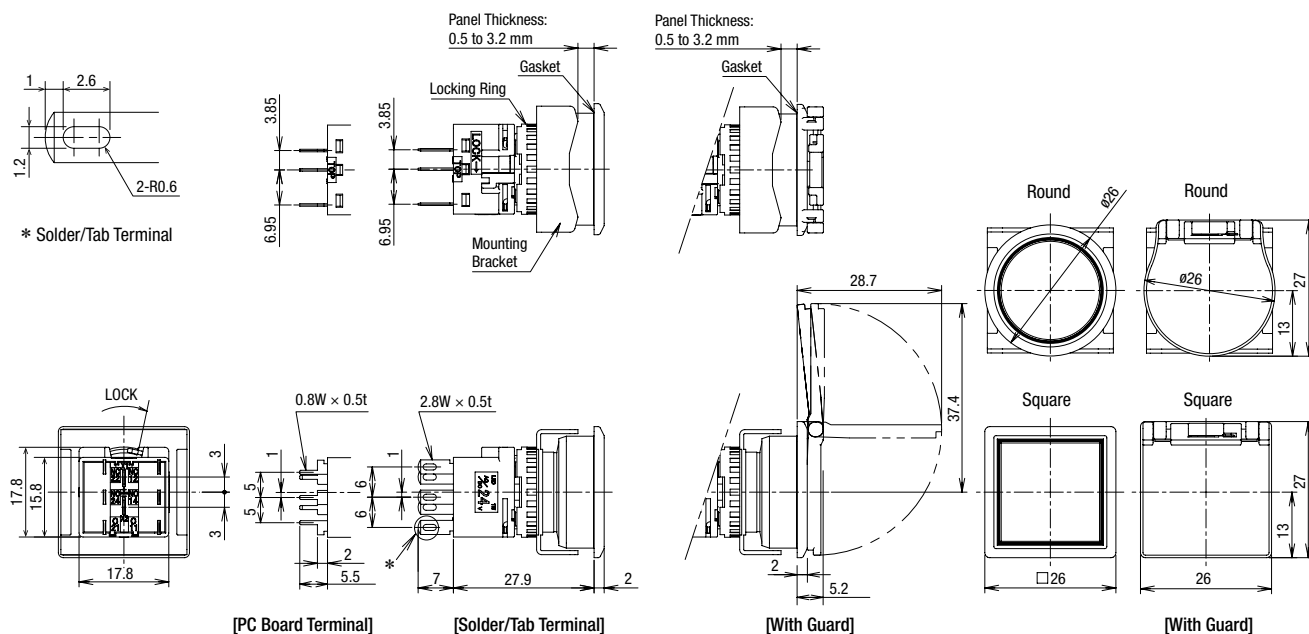
Shape	Color	Part Number
	Amber	LBW6A-L1A
	Green	LBW6A-L1G
	Red	LBW6A-L1R
	Blue	LBW6A-L1S
	White	LBW6A-L1W
	Yellow	LBW6A-L1Y
	Amber	LBW6A-L2A
	Green	LBW6A-L2G
	Red	LBW6A-L2R
	Blue	LBW6A-L2S
	White	LBW6A-L2W
	Yellow	LBW6A-L2Y
	Amber	LBW7A-L1A
	Green	LBW7A-L1G
	Red	LBW7A-L1R
	Blue	LBW7A-L1S
	White	LBW7A-L1W
	Yellow	LBW7A-L1Y
Round Ring Flush	White	LBW6A-L1R-W
Square Ring Flush	White	LBW7A-L1R-W

Note: No marking plate used in ring illuminated pushbuttons.

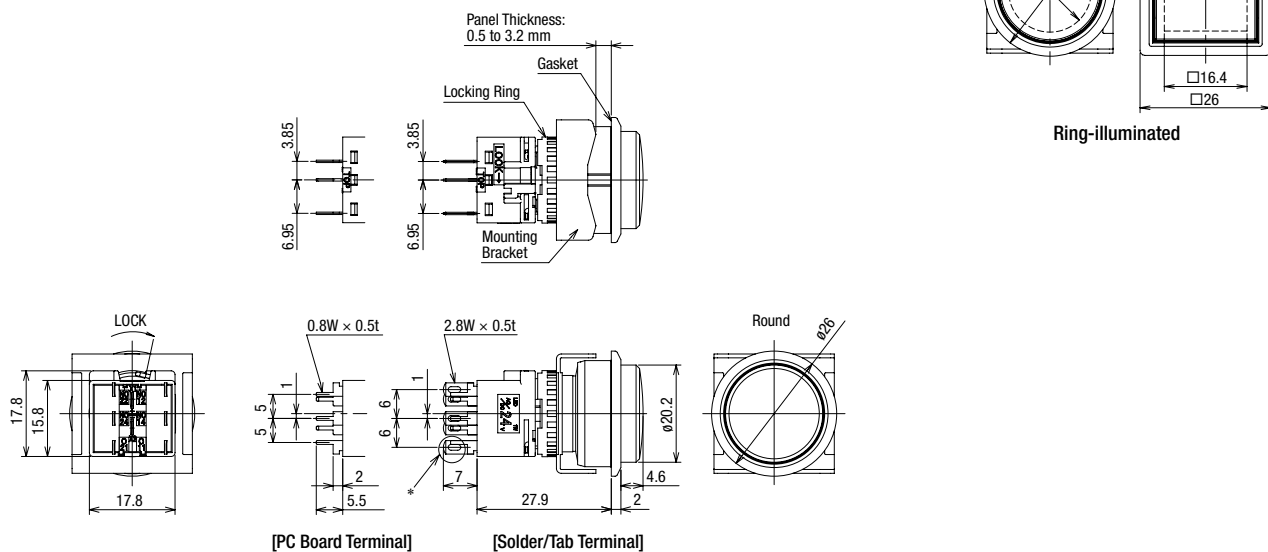
Dimensions

All dimensions in mm.

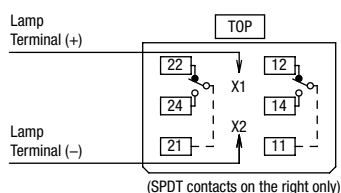
Flush/Ring-illuminated



Extended



Terminal Arrangement (Bottom View)



- For details on pc board and circuit design, see **594**.
- For details on single board mounting, see **593**.

Pilot Lights

LBW①P-1T0②③*			
Part No.	   		
	Round / Black Bezel	Square / Black Bezel	Round / Metallic Bezel
			Square / Metallic Bezel
① Style	③ LED Operating Voltage	Part No.	* Illumination Color Code
Black Bezel	24V AC/DC	LBW①P-1T04*	Specify the color code in place of * in the Part No. A: amber G: green PW: pure white R: red S: blue Y: yellow
Metallic Bezel	24V AC/DC	LBW①P-1T04*	

- Pilot lights contain an LED unit. For maintenance LED units see **583**.
- Legends and symbols can be engraved on a marking plate or film to be inserted under the lens by users for labelling purposes. See **596** for details.
- White lens type (when light is off) are available. Clear lens is used instead of colored lens for amber, green, red, and blue pilot lights. Amber, green, red, or blue LED units are used. To specify, see Part Number Interpretation below.
- PC board terminals available. To specify, see Part Number Interpretation below.
- 5V DC and 12V AC/DC LED operating voltages also available.

Part Number Interpretation

LBW①P-1T0②③*



To be used for interpreting part numbers only,
not for part number development.

① Style

Code	Shape
6	Round / Black Bezel
7	Square / Black Bezel
6M	Round / Metallic Bezel
7M	Square / Metallic Bezel

② LED Operating Voltage

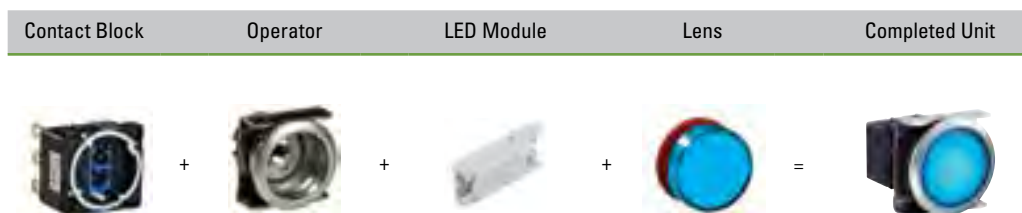
Code	Rated Operating Voltage
1	5V DC
3	12V AC/DC
4	24V AC/DC

③ Others

Code	Specification	Part No. Example
Blank	Solder/Tab Terminal	—
V	PC Board Terminal	LBW6P-1T04V*

- Specify the color code in place of * in the table above.

Pilot Lights (Sub-assembled)



Contact Block

Terminal Style	Part Number
	Solder Tab LB-T00
	PCB LB-T00V

LED Module

Style	Color	Voltage	Part Number
	Amber	5V	LB9Z-LED5A
		12V	LB9Z-LED1A
		24V	LB9Z-LED2A
	Green	5V	LB9Z-LED5G
		12V	LB9Z-LED1G
		24V	LB9Z-LED2G
	Red	5V	LB9Z-LED5R
		12V	LB9Z-LED1R
		24V	LB9Z-LED2R
	Blue	5V	LB9Z-LED5S
		12V	LB9Z-LED1S
		24V	LB9Z-LED2S
	Pure White	5V	LB9Z-LED5PW
		12V	LB9Z-LED1PW
		24V	LB9Z-LED2PW

Operator

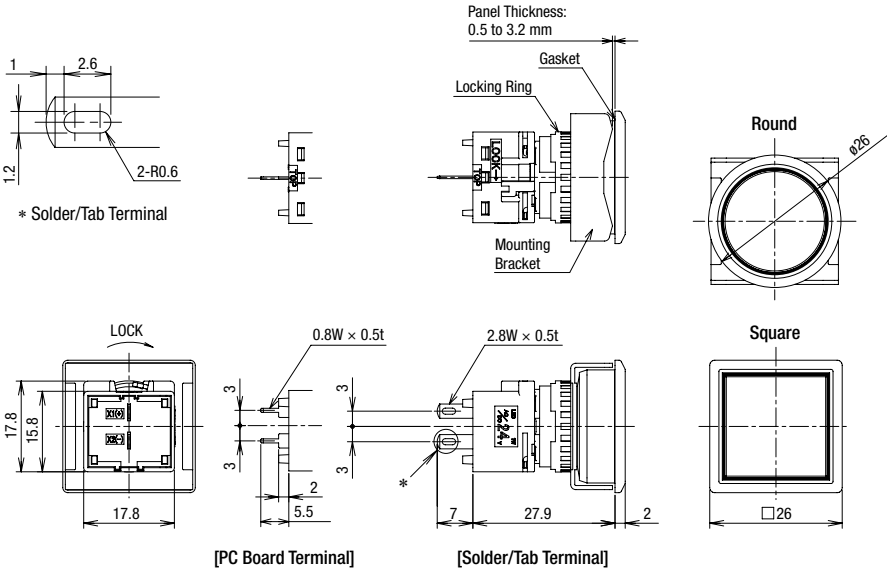
Style	Mounting Style	Shape	Part Number
	Flush Mount (Plastic)	Round	LBW6P-0
		Square	LBW7P-0
	Flush Mount (Metallic)	Round	LBW6MP-0
		Square	LBW7MP-0

Lens

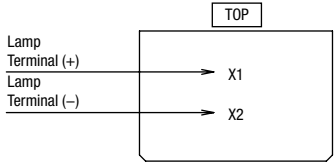
Shape	Color	Part Number
Round 	Amber	LBW6A-P1A
	Green	LBW6A-P1G
	Red	LBW6A-P1R
	Blue	LBW6A-P1S
	White	LBW6A-P1W
	Yellow	LBW6A-P1Y
Square 	Amber	LBW7A-P1A
	Green	LBW7A-P1G
	Red	LBW7A-P1R
	Blue	LBW7A-P1S
	White	LBW7A-P1W
	Yellow	LBW7A-P1Y

Dimensions

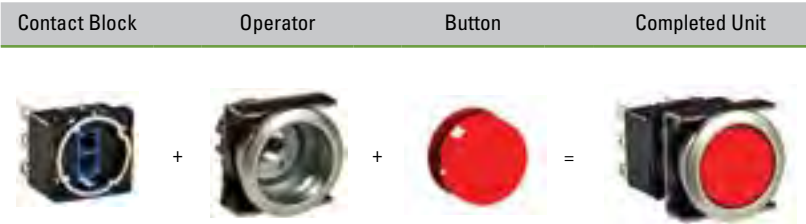
All dimensions in mm.



Terminal Arrangement (Bottom View)



Pushbuttons (Sub-assembled)



Contact Block

Terminal Style		Material	Contact	Part Number
	Solder/Tab	Silver	SPDT	LB-T5
			DPDT	LB-T6
			3PDT	LB-T7
	PCB	Gold	SPDT	LB-T1V
			DPDT	LB-T2V
			3PDT	LB-T3V

Button

Style		Color	Part Number
	Round Flush	Black	LBW6A-B1B
		Green	LBW6A-B1G
		Red	LBW6A-B1R
		Blue	LBW6A-B1S
		White	LBW6A-B1W
		Yellow	LBW6A-B1Y
	Round (Extended)	Black	LBW6A-B2B
		Green	LBW6A-B2G
		Red	LBW6A-B2R
		Blue	LBW6A-B2S
		White	LBW6A-B2W
		Yellow	LBW6A-B2Y
	Square Flush	Black	LBW7A-B1B
		Green	LBW7A-B1G
		Red	LBW7A-B1R
		Blue	LBW7A-B1S
		White	LBW7A-B1W
		Yellow	LBW7A-B1Y

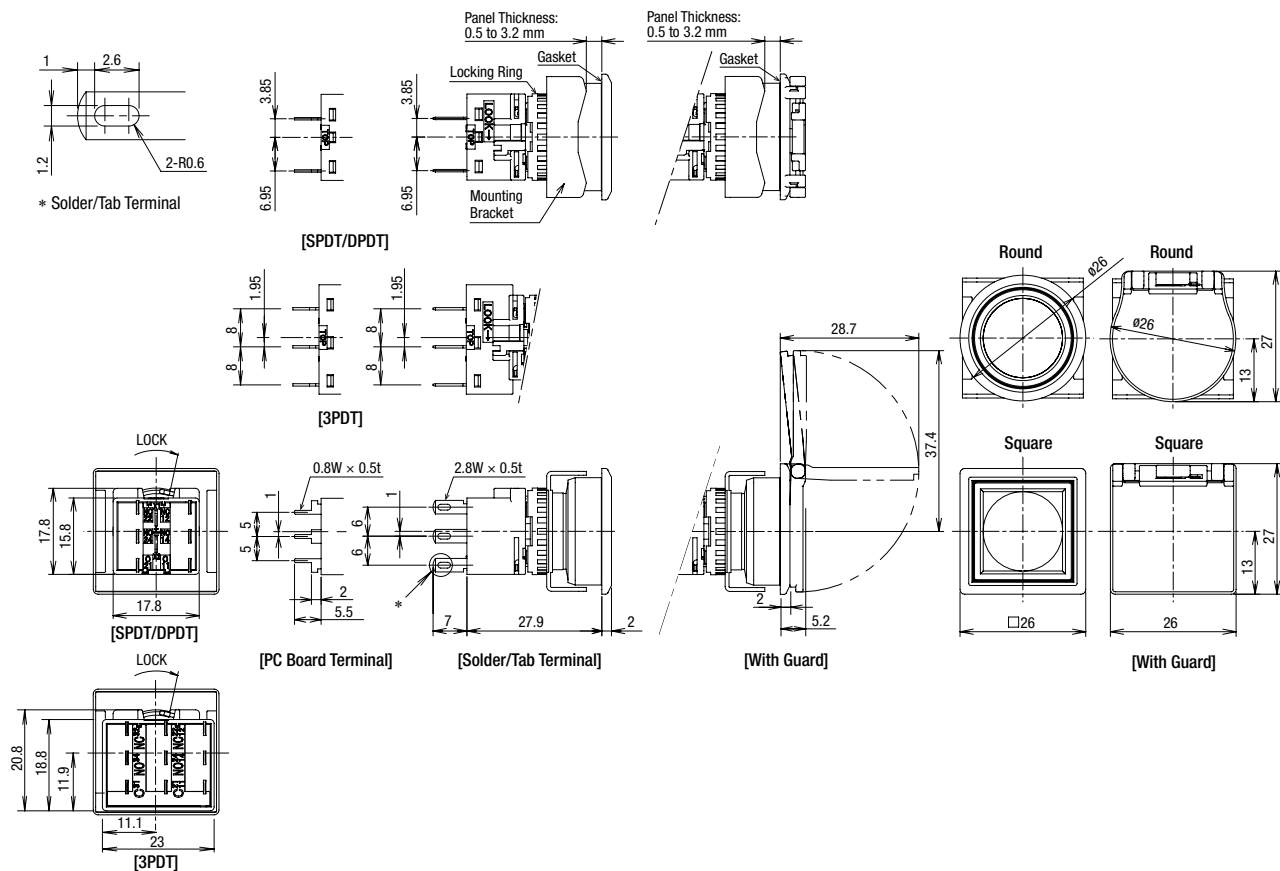
Operator

Style	Bezel Style	Shape	Momentary	Maintained
	Black plastic bezel	Round	LBW6L-M0	LBW6L-A0
		Square	LBW7L-M0	LBW7L-A0
	Metallic bezel	Round	LBW6ML-M0	LBW6ML-A0
		Square	LBW7ML-M0	LBW7ML-A0
	Plastic bezel with built-in switch guard	Round	LBW6GL-M0	LBW6GL-A0
		Square	LBW7GL-M0	LBW7GL-A0
	Flush Mount (Plastic)	Round (for extended lens)	LBW6L-M20	LBW6L-A20
	Flush Mount (Metallic)		LBW6ML-M20	LBW6ML-A20

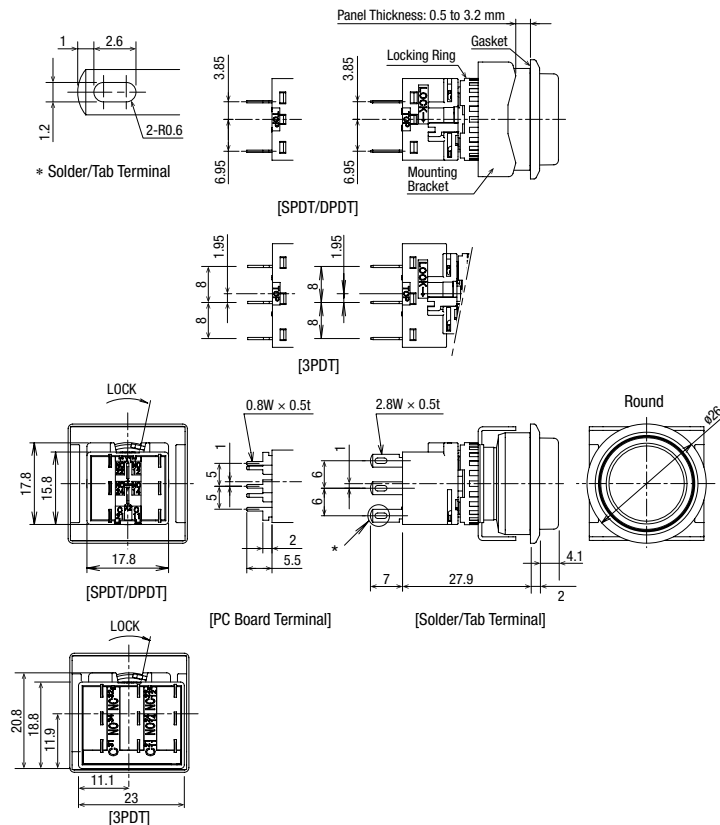
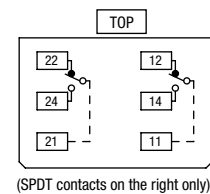
Dimensions

All dimensions in mm.

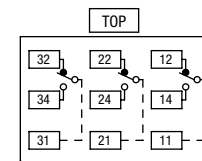
Flush Pushbutton



Extended Pushbutton

Terminal Arrangement (Bottom View)
SPDT/DPDT Contacts

3PDT Contacts



- For details on mounting hole layout, see [593](#).
- For details on pc board and circuit design, see [594](#).
- For details on single board mounting, see [593](#).

Selector Switches

Part No.	LBW①S-②T③④					
						
			Round / Black Bezel	Square / Black Bezel	Round / Metallic Bezel	Square / Metallic Bezel
① Style	② Operator Position			③ Contact	Part No.	
					Gold Contact	Silver Contact
Black bezel	90° 2-position	Maintained		SPDT	LBW①S-2T1	LBW①S-2T5
				DPDT	LBW①S-2T2	LBW①S-2T6
				3PDT	LBW①S-2T3	LBW①S-2T7
	45° 3-position	Maintained		DPDT	LBW①S-3T2	LBW①S-3T6
				3PDT	LBW①S-3T3	LBW①S-3T7
		Spring return two-way		DPDT	LBW①S-33T2	LBW①S-33T6
Metallic bezel	90° 2-position	Maintained		SPDT	LBW①S-2T1	LBW①S-2T5
				DPDT	LBW①S-2T2	LBW①S-2T6
				3PDT	LBW①S-2T3	LBW①S-2T7
	45° 3-position	Maintained		DPDT	LBW①S-3T2	LBW①S-3T6
				3PDT	LBW①S-3T3	LBW①S-3T7
		Spring return two-way		DPDT	LBW①S-33T2	LBW①S-33T6
				DPDT	LBW①S-33T3	LBW①S-33T7

- PC board terminals available for gold contacts. To specify, see Part Number Interpretation below.
- For contact operation, see 556.

Part Number Interpretation

LBW①S-②T③④



To be used for interpreting part numbers only, not for part number development.

① Style

Code	Shape
6	Round / Black Bezel
7	Square / Black Bezel
6M	Round / Metallic Bezel
7M	Square / Metallic Bezel

② Operator Position

2-position

Operator Position

2 Maintained



3-position

Operator Position

3 Maintained



33 Spring return two-way



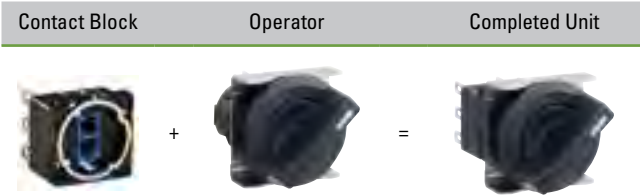
③ Contacts

Code	Contact
1	Gold/SPDT (90° 2-position only)
2	Gold/DPDT
3	Gold/3PDT
5	Silver/SPDT (90° 2-position only)
6	Silver/DPDT
7	Silver/3PDT

④ Others

Code	Specification	Part No. Example
Blank	Solder/Tab Terminal	—
V	PC Board Terminal (Gold Contact Only)	LBW6S-2T1V

Selector Switches (Sub-assembled)



Contact Block

Terminal Style		Material	Contact	Part Number
	Solder/Tab	Silver	SPDT	LB-T5
			DPDT	LB-T6
			3PDT	LB-T7
	PCB	Gold	SPDT	LB-T1V
			DPDT	LB-T2V
			3PDT	LB-T3V

SPDT contacts applicable for 2-position switches only.

Operator

Style	Shape	Position	Function	Part Number
 Round	Round	2	Maintained	LBW6S-2Y
		3	Maintained	LBW6S-3Y
			Spring from both	LBW6S-33Y
 Square	Square	2	Maintained	LBW7S-2Y
		3	Maintained	LBW7S-3Y
			Spring from both	LBW7S-33Y
 Round	Round	2	Maintained	LBW6MS-2Y
		3	Maintained	LBW6MS-3Y
			Spring from both	LBW6MS-33Y
 Square	Square	2	Maintained	LBW7MS-2Y
		3	Maintained	LBW7MS-3Y
			Spring from both	LBW7MS-33Y

Key Selector Switches

Part No.	LBW①K-②③T④⑤-⑥				Disc Tumbler Key	
	Wave Key					
						
	Round / Black Bezel	Square / Black Bezel	Round / Metallic Bezel	Square / Metallic Bezel	Round / Metallic Bezel	Square / Metallic Bezel
① Style	② Operator Position		⑤ Key Removable Position	⑤ Contact	Part No.	
					Gold Contact	Silver Contact
Black bezel	90° 2-position	Maintained	A: Key removable in all positions	SPDT	LBW①K-2ST1A	LBW①K-2ST5A
				DPDT	LBW①K-2ST2A	LBW①K-2ST6A
				3PDT	LBW①K-2ST3A	LBW①K-2ST7A
	45° 3-position	Maintained	A: Key removable in all positions	DPDT	LBW①K-3ST2A	LBW①K-3ST6A
Metallic bezel	90° 2-position	Maintained	A: Key removable in all positions	SPDT	LBW①K-2ST1A	LBW①K-2ST5A
				DPDT	LBW①K-2ST2A	LBW①K-2ST6A
				3PDT	LBW①K-2ST3A	LBW①K-2ST7A
	45° 3-position	Maintained	A: Key removable in all positions	DPDT	LBW①K-3ST2A	LBW①K-3ST6A
				3PDT	LBW①K-3ST3A	LBW①K-3ST7A

- For operator position, see Part Number Interpretation below.
- For key removable position, see Part Number Interpretation below. The key cannot be removed in a spring returned position.
- Two keys are supplied.
- Besides the standard key (key number 0H), six other keys are available.
- Disc tumbler keys also available. Only the standard key is available. To specify, see Part Number Interpretation below.
- PC board terminals available for gold contacts. To specify, see Part Number Interpretation below.
- For contact operation, see 593.

Part Number Interpretation

LBW①K-②③T④⑤-⑥



To be used for interpreting part numbers only,
not for part number development.

① Style

Code	Shape
6	Round / Black Bezel
7	Square / Black Bezel
6M	Round / Metallic Bezel
7M	Square / Metallic Bezel

② Operator Position

Code	Operator Position
2	90° 2-position maintained
3	45° 3-position maintained
33	45°-3-position spring return two-way

③ Key Style

Code	Key Style
S	Wave key
Blank	Disc tumbler key

④ Contacts

Code	Contact
1	Gold/SPDT (90° 2-position only)
2	Gold/DPDT
3	Gold/3PDT
5	Silver/SPDT (90° 2-position only)
6	Silver/DPDT
7	Silver/3PDT

⑤ Key Removal Position

2-position

Key Removable Position	
A: Key removable in all positions	B: Key removable at left position only
	

3-position

Key Removable Position	
A: Key removable in all positions	D: Key removable at center only
	

3-position

Spring return two-way



- Key removable at L, C, R.
- Key retained at L, R.

⑥ Key Number (for wave keys only)

Code	
0H or Blank	Standard key
1H to 2H	Reversible key
3H to 6H	Non-reversible key

Others

Code	Specification	Part No. Example
Blank	Solder/Tab Terminal	—
V	PC Board Terminal (Gold Contact Only)	LBW6K-2T1VA

Key Selector Switches (Sub-assembled)

Contact Block

Operator

Completed Unit



Contact Block

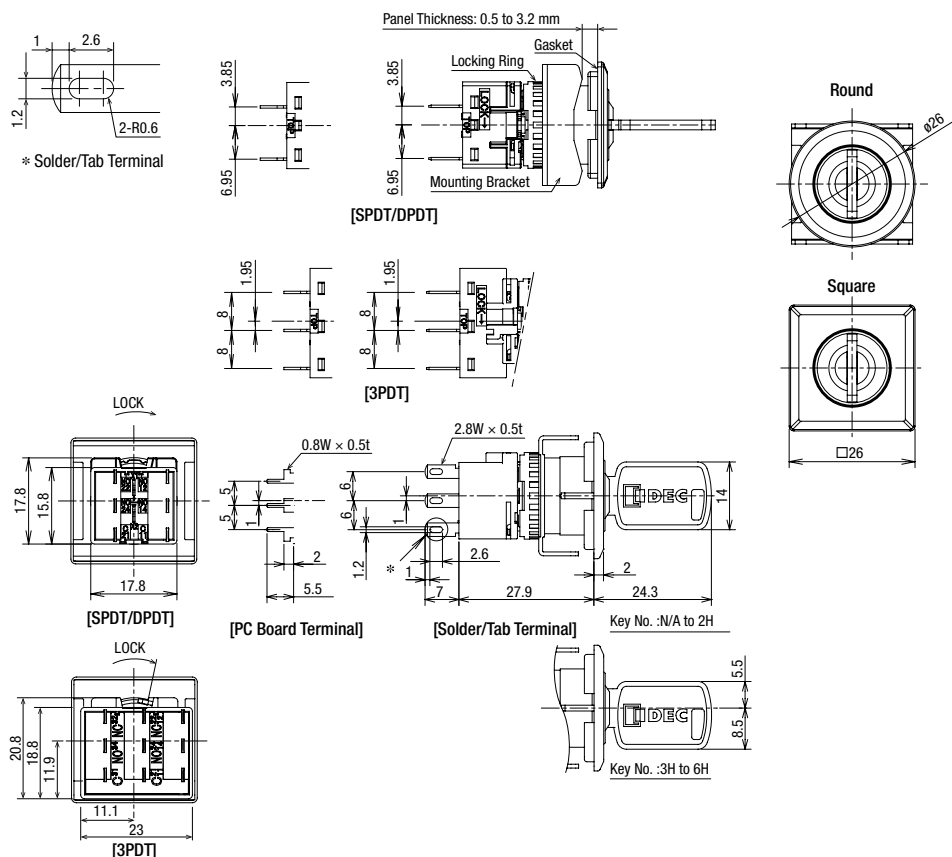
Terminal Style	Material	Contact	Part Number
	Solder/Tab	Silver	SPDT LB-T5
			DPDT LB-T6
			3PDT LB-T7
	PCB	Gold	SPDT LB-T1V
			DPDT LB-T2V
			3PDT LB-T3V

Operator

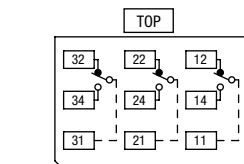
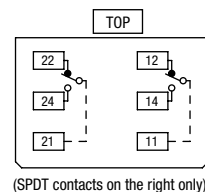
Style	Shape	Position	Function	Key Style	Key Remove Position	Part number
Black Plastic bezel 	Round	2	90° 2-position maintained	Disc tumbler key	All positions	LBW6K-2A
					Left	LBW6K-2B
				Wave key	All positions	LBW6K-2SA
					Left	LBW6K-2SB
		3	45° 3-position maintained	Disc tumbler key	All positions	LBW6K-3A
					Center	LBW6K-3D
				Wave key	All positions	LBW6K-3SA
					Center	LBW6K-3SD
			45°-3-position spring return two-way	Disc tumbler key	All positions	LBW6K-33D
				Wave key	Center	LBW6K-33SD
	Square	2	90° 2-position maintained	Disc tumbler key	All positions	LBW7K-2A
					Left	LBW7K-2B
				Wave key	All positions	LBW7K-2SA
					Left	LBW7K-2SB
		3	45° 3-position maintained	Disc tumbler key	All positions	LBW7K-3A
					Center	LBW7K-3D
				Wave key	All positions	LBW7K-3SA
					Center	LBW7K-3SD
			45°-3-position spring return two-way	Disc tumbler key	Center	LBW7K-33D
				Wave key		LBW7K-33SD

Style	Shape	Position	Function	Key Style	Key Remove Position	Part number
Metallic Bezel 	Round	2	90° 2-position maintained	Disc tumbler key	All positions	LBW6MK-2A
					Left	LBW6MK-2B
				Wave key	All positions	LBW6MK-2SA
					Left	LBW6MK-2SB
		3	45° 3-position maintained	Disc tumbler key	All positions	LBW6MK-3A
					Center	LBW6MK-3D
				Wave key	All positions	LBW6MK-3SA
					Center	LBW6MK-3SD
			45°-3-position spring return two-way	Disc tumbler key	Center	LBW6MK-33D
				Wave key		LBW6MK-33SD
	Square	2	90° 2-position maintained	Disc tumbler key	All positions	LBW7MK-2A
					Left	LBW7MK-2B
				Wave key	All positions	LBW7MK-2SA
					Left	LBW7MK-2SB
		3	45° 3-position maintained	Disc tumbler key	All positions	LBW7MK-3A
					Center	LBW7MK-3D
				Wave key	All positions	LBW7MK-3SA
					Center	LBW7MK-3SD
			45°-3-position spring return two-way	Disc tumbler key	Center	LBW7MK-33D
				Wave key		LBW7MK-33SD

Key Selector Switches with Wave Key



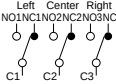
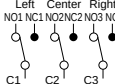
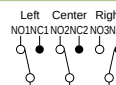
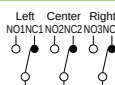
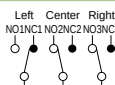
SPDT/DPDT Contacts



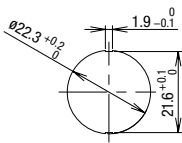
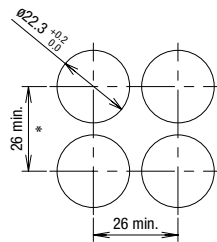
- For details on mounting hole layout, see **593**.
- For details on pc board and circuit design, see **594**.
- For details on single board mounting, see **593**.

Contact Operation

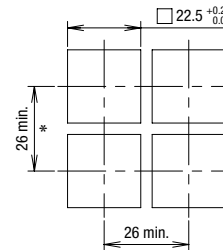
Selector Switch, Illuminated Selector Switch, Key Selector Switch

Operator Position & Contact Operation (Top View)								
Position				Contact	↙ Left	↑ Center	↘ Right	
90° 2-position	 Maintained		 Spring return from right		SPDT			
					DPDT			
					3PDT			
45° 3-position	 Maintained	 Spring return from right	 Spring return from left	 Spring return two-way	DPDT			
					3PDT			

Mounting Hole Layout (mm)

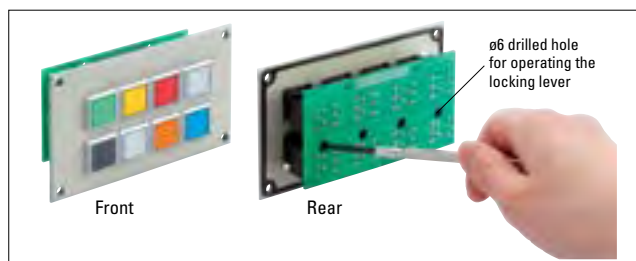
LBW Series Flush Bezel
(LBW6/LBW6M/LBW6G)LBW Series Flush Bezel
LBW6/LBW6M/LBW6G

* 53 mm minimum for switches with guard

LBW Series Flush Bezel
LBW7/LBW7M/LBW7G

Single Board Mounting

IDEC's LBW Series is available for single board mounting.



Assembly Procedure

1. Install the operator to the panel.
 2. Mount the contact block to the operator from the rear.
 3. Turn the locking lever to lock the contact block.
 4. Insert the PC board to terminals and solder.
- Note 1: Make sure that each terminal is inserted into the PC board correctly.
- Note 2: Do not apply tensile force to the connector cable for an extended period of time.
- Note 3: Do not expose the contact block to water.
- Note 4: Ensure to lock contact blocks when the contact blocks are installed on the operators. UP series can be installed on the same board. For details, see 599.

Installing and Removing Contact Blocks

Turn the locking lever to install and remove contact blocks on the PC using a screwdriver from a hole in the PC board. See "Notes for Designing PC Board and Circuit" on 594. Determine the location of the switches so that the locking lever can be operated. See "Removing and Installing the Contact Block" on 598.

Mounting Holes and Assembly Procedure

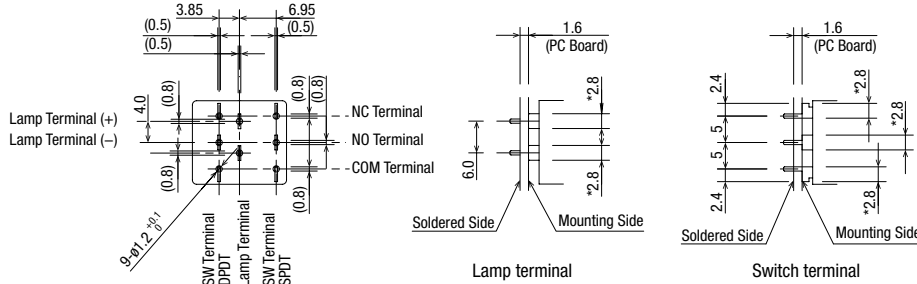
Drill mounting holes in the panel as shown below. When the units are mounted collectively, provide adequate clearance.

Notes for Designing PC Board and Circuit

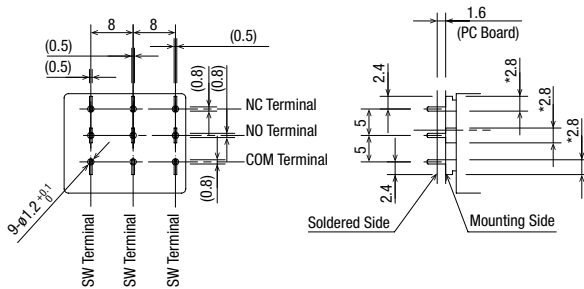
All dimensions in mm.

- Use 1.6-mm-thick glass epoxy PC board with drilled holes.
- Design a circuit so that the LBW series can operate within the rated voltage and current range. Make sure that inrush current and voltage do not exceed the rating.
- Minimum applicable load is 5V AC/DC, 1 mA on gold contacts. Applicable range is subject to the operating condition and load.
- Since the ø2.8-mm-wide terminal touches the PC board as shown on the right, short circuit may occur with pattern lines. Design a circuit that prevents short circuits.

SPDT/DPDT Contacts

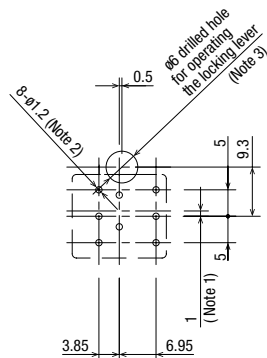


3PDT Contacts

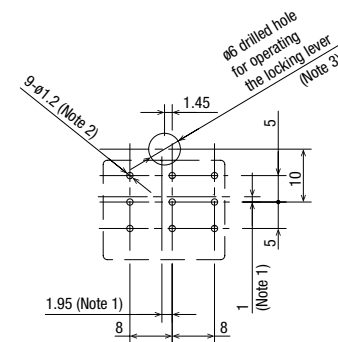


PC Board Drilling Layout (Bottom View)

SPDT/DPDT Contacts



3PDT Contacts

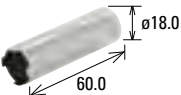
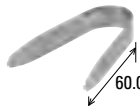


Note 1: When designing, note the alignment of center lines of the contact blocks and center lines of the operators.

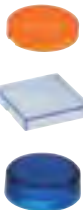
Note 2: The diameter of the terminal hole is ø1.2.

Note 3: Hole diameter may vary to meet installation requirements. Determine the location and the size of the hole so that the locking lever can be operated.

Accessories

Shape	Specification	Part No.	Remarks
Locking Ring Wrench 	Metal (Nickel-plated brass)	MT-001	Used to tighten the locking ring when installing the units on to the panel.
For Standard Bezels Lens Removal Tool 	Stainless Steel	MT-101	Used to remove the lens or button. (for standard bezels)
For LBW Series Flush Bezels Mounting Hole Plug   Mounting Hole Plug  Mounting Hole Plug 	1. For round units (LBW6/LBW6M) [Plug] Polyamide (Black) [Gasket] Nitrile rubber	LBW9Z-BS6*	* Color code: blank (black), W (white) Degree of protection: IP65 Panel thickness: 0.5 to 3.2 mm See 596 for dimensions.
	2. For square units (LBW7/LBW7M) [Mounting Plate] Stainless Steel	LBW9Z-BS7*	
	Metal [Plug] Zinc diecast [Locking Ring] Polyamide [Gasket] Nitrile rubber	LW9Z-BM	Degree of protection: IP66 Tightening torque: 1.2 N·m See 596 for dimensions.
	Rubber Nitrile rubber	LW9Z-BP1	Degree of protection: IP65 Tightening torque: 2.0 N·m See 596 for dimensions.
Terminal Cover  	1. For SPDT/DPDT contacts PBT (White)	LB9Z-VL2	See 596 for dimensions. See 598 for mounting.
	2. For 3PDT contacts	LB9Z-VL3	
Key  Reversible key  Non-reversible key 	For key selector switches (wave key)	Metal (zinc nickel-plated)	LA9Z-SK-* Specify a key number in place of * in the Part No. Blank: Standard key 0H (reversible) 1H to 2H: Reversible key 3H to 6H: Non-reversible key See 596 for dimensions.
Keys 	For key selector switches (disc tumbler key)	Metal (brass nickel-plated) 18×1.8×25.1 t1.8	AS6-SK-132

Accessories

Shape		Material / Dimensions (W×H×D)	Part No.	Remarks
Lens 	1. For round flush units	Polyarylate ø20 H4	HA9Z-L11*	Specify the color code in place of * in the part no. A: Amber, C: Clear, G: Green, R: Red, S: Blue, Y: Yellow Note: Use a clear lens for pure white (PW) illumination.
	2. For square flush units	Polyarylate ø20 H4	HA9Z-L21*	
	3. For round extended units	Polyarylate ø20.2 H7.8	LBW9Z-L12*	Specify the color code in place of * in the part no. A: Amber, G: Green, R: Red, S: Blue, W: clear, Y: Yellow Note: Use a clear lens for pure white (PW) illumination.
Buttons 	1. For round flush units	Polyacetal ø20 H3.2 (L5)	HA9Z-B11*	Specify the color code in place of * in the part no. B: Black, G: Green, R: Red, S: Blue W: White, Y: Yellow
	2. For square flush units	Polyacetal ø20 H3.9 (L5)	HA9Z-B21*	
	3. For round extended units	Polyacetal ø19.8 H7.3 (L9.1)	HA9Z-B12*	
Marking plate 	1. For round flush units	Acrylic ø17 t0.85 (L1.1)	HA9Z-P1*	Specify the color code in place of * in the part no. B: Black, W: White
	2. For square units	Acrylic □18.4 t0.85	HA9Z-P2*	
	3. For extended units	Acrylic ø15 t3.0	LBW9Z-P12W	
Anti-rotation Ring 	LBW series	Metal (Stainless steel) 25×8.2×24.8 t0.8	LBW9Z-LP6	
Locking ring 	All models	Polyamide ø17.9 H3.9	LB9Z-LN	

Dimensions for Accessories

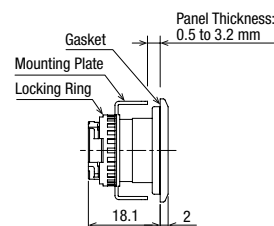
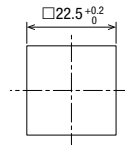
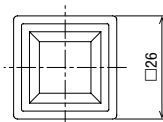
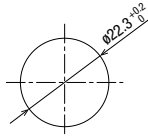
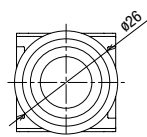
All dimensions in mm.

For round units (LBW9Z-BS6*)

Mounting Hole Layout

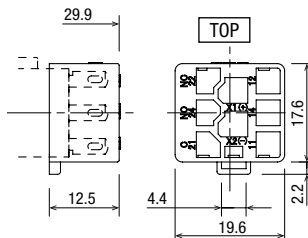
For round units (LBW9Z-BS6*)

Mounting Hole Layout

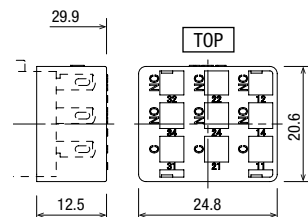


Terminal Cover

For SPDT/DPDT contacts (LB9Z-VL2)

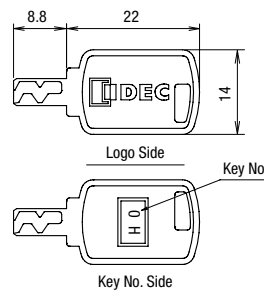


For 3PDT contacts (LB9Z-VL3)

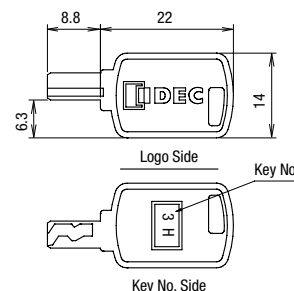


Key (Wave Key)

Reversible key



Non-reversible key



Maintenance Parts

Maintenance LED Unit

Package Quantity: 1

Shape	Rated Operating Voltage	Part No. (Ordering No.)	* Color Code
	5V DC	LB9Z-LED5*	A: Amber
	12V AC/DC	LB9Z-LED1*	G: Green
	24V AC/DC	LB9Z-LED2*	PW: Pure White R: Red S: Blue W: White

- Use a pure white (PW) LED unit for yellow (Y) illumination.

Transformer

Package Quantity: 1

Transformer	Primary Voltage	Secondary Voltage	Part No. (Ordering No.)	Applicable Load
	100/110V AC	100/110V AC $\pm 10\%$	TWR512	LB9Z-LED2* (24V AC/DC LED unit)
	200/220V AC	200/220V AC $\pm 10\%$	TWR522	
	400/440V AC	400/440V AC $\pm 10\%$	TWR542	

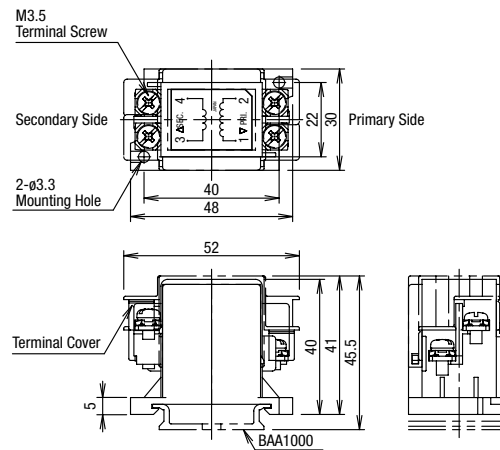
- Terminal cover (TWR-VL3) is supplied as standard.
- Connect one LB9Z-LED2* to a transformer.

Specifications

Part No.	TWR5□2
Operating Voltage	100/110V AC, 200/220V AC, 400/440V AC (50/60Hz)
Current Draw	2.4VA
Rated Insulation Voltage	600V
Insulation Resistance	100 M Ω minimum (500V DC megger)
Operating Temperature	-30 to +60°C (no freezing)
Storage Temperature	-40 to +80°C (no freezing)
Operating Humidity	35 to 85% RH (no condensation)
Vibration Resistance	Damage Limits: 30 Hz, amplitude 1.5 mm Operating extremes: 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	Damage limits: 1,000 m/s ² Operating Extremes: 100 m/s ²
Dielectric Strength	2,500V AC, 1 minute
Terminal Screw	M3.5
Applicable Wire	2 mm ² maximum, 2 wires maximum
Weight (approx.)	87g

Dimensions

All dimensions in mm.



- Use end clip BC9Z-E/N35NPN10 when using 400/440V AC primary voltage transformers.

Precautions & Instructions Safety Precautions

- Turn off the power to the LBW series control units before installation, removal, wiring, maintenance, and inspection. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid burning your hand, use the lamp holder tool when replacing the lamps.
- For wiring, use wires of a proper size to meet voltage and current requirements. Solder correctly according to the instructions in "Wiring" and "Notes on Terminal Cover." Improper soldering may cause overheating and create a fire hazard. Also, when using tab terminals, use receptacles of appropriate size.

Instructions

Wiring

1. Solder the terminals at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu type is recommended. When soldering, do not touch the LB series with the soldering iron. Also ensure that no tensile force is applied to the terminals. Do not bend the terminal or apply excessive force to the terminal.
2. Use non-corrosive liquid flux.

Terminal Cover

Solder/tab terminal

Insert the terminal cover into the contact block with the TOP markings on the contact block and the terminal cover in the same direction.

Note: When wiring, insert the lead wires into the terminal cover holes before soldering. After wiring, terminal covers cannot be installed.

Standard Bezel



Flush Bezel



Operating Environment

- Do not use the LB series where corrosive gases exist or under an environment exceeding the operating temperature and humidity ranges. Otherwise, damage such as contact failure or change of the surface color may occur.
- Major parts of the switch are plastic. Scratches or damage may occur when scraped with a sharp object or if excessive load or shock is applied. Note that this may cause operation and appearance failure of the operator and bezel.
- Application of detergent, cutting oil, or special chemicals to the switch may result in operation and/or appearance failure such as a change in surface color.

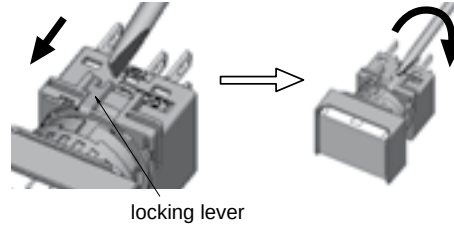
Handling

Contacts (micro switch)

When using NC (normally closed) and NO (normally open) contacts of the same microswitch, avoid connections of different voltages, or connections of different types of power supplies. Failure to observe this instruction may cause a short-circuit.

Removing and Installing the Contact Block

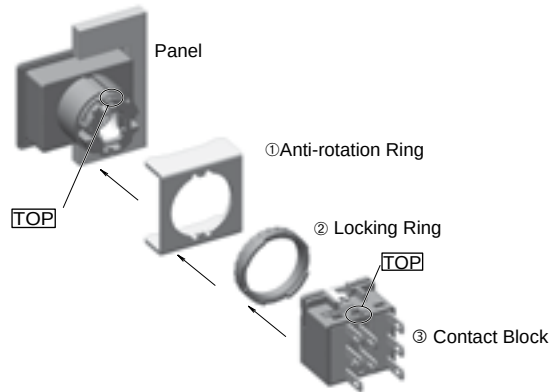
3. Turn the locking lever on the contact block in the direction opposite to the arrow on the housing. Then the contact block can be removed.
4. Insert the contact block with the TOP markings on the contact block and the operator placed in the same direction. Then lock the units, turning the locking lever in the direction of the arrow.



Panel Mounting

Remove the contact block from the operator. Insert the operator into the panel cut-out from the front, then install the contact block to the operator.

Flush Bezel



Notes on Mounting

Use the optional ring wrench (MT-001) to mount the operator onto the panel. Tightening torque should not exceed 0.7 N·m. Do not use pliers. Excessive tightening will damage the locking ring.

Mounts on the same panel as LB/LBW series

- Three illumination colors: Green (G), red (R), and white (W)

Specifications

Color Code	Red (R), White (W)	G (Green)
Rated Current (I)	7mA	2mA
Reverse Voltage (V_R)	9V	5V
Maximum Current ($T_a: 25^\circ\text{C}$)	Operating Temperature (T_{opr}) -25 to +55°C (no freezing)	
	Storage Temperature (T_{stg}) -30 to +80°C (no freezing)	
Forward Voltage (V_f)	Standard value: 2V ($I_f=7\text{mA}$)	Standard value: 2.7V ($I_f=2\text{mA}$)
Dielectric Voltage	Between live and dead parts: 500V AC, 1 minute	
Weight (approx.)	4.3g (UP8-89V1), 5.1g (UP8-89V2)	



UP Series

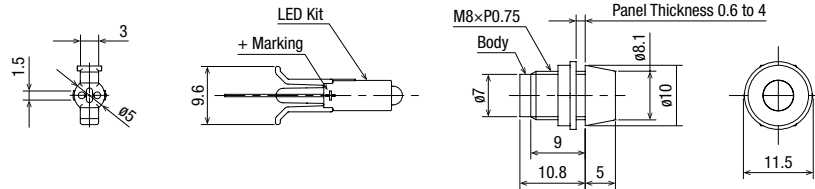
Mounting Hole Size	Shape	Degree of Protection (IEC 60529)	Matching LB/LBW Mounting Style	Part No.	Illumination Color Code
ø8 UP8	Shroud	IP40	Standard Bezel	UP8-89V1*	Specify the color code in place of * in the Part No. G: green R: red W: white
			Flush Bezel	UP8-89V2*	
ø9 UP9P	Shroud	IP65	Standard bezel Flush bezel	UP9P-99V1*	

- LED cannot be replaced.

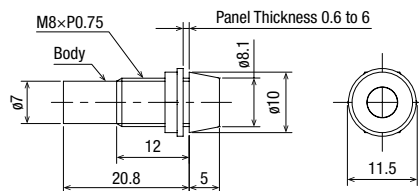
Note: Connect an external current limiting resistor in series. Otherwise, the LED may be damaged.

Dimensions

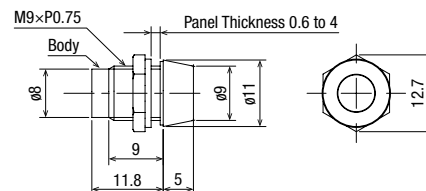
All dimensions in mm.



UP8-89V1

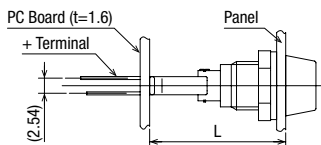


UP8-89V2



UP9P-99V1

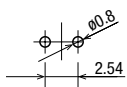
[Assembly Drawing]



Dimensions (L)

Standard Bezel	22.5mm
Flush Bezel	29.9mm

PC Board Mounting Hole



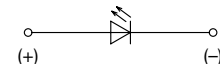
Panel Cut-out



UP9P



Internal Circuit



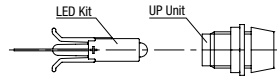
The longer pin is the positive terminal

⚠ Safety Precautions

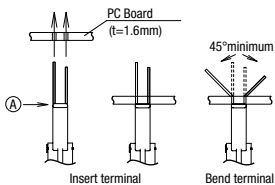
- Turn off power to the unit before installation, removal, wiring, maintenance, and inspection.
Failure to turn off may cause electrical shocks or fire hazard.
- For wiring, use wires of a proper size to meet the voltage and current requirements.
- Improper soldering or failure to tighten the terminal screw may cause overheating and fire.

Single Board Mounting

UP series miniature pilot light single board mounting types can be mounted with LB/ LBW series on the same panel. Follow the instructions below on single board mounting.



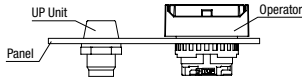
1. Mount the LED kit to the PC board.



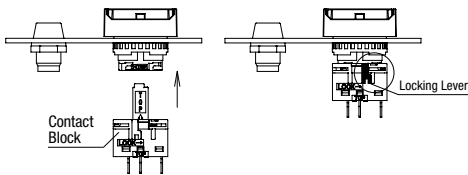
Temporary mounting

1. Note the polarity of the terminals and insert the terminals to the PC board.
2. Make sure that part A of the LED kit is pressed tightly to the PC board. Bend the terminals sideways as shown on the left.

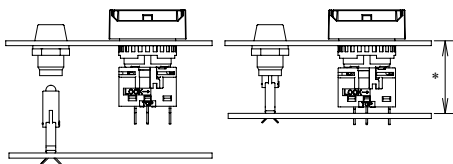
2. Mount the operator and the UP series pilot lights on to the control panel.



3. Mount the contact block to the operator of the miniature control unit and lock the unit by turning the locking lever.



4. Install the PC board in 1. to the panel in 3.



Note: Make sure that the LED kit is inserted into the UP series unit.

* When mounting LB/LBW and UP series on a single board, make sure that the distance between the front of the panel and the mounting side of the PC board (gasket distortion is taken into consideration) is as shown in the table below.

Part No.	Mountable Unit	Distance (*)
UP8-89V1*	Standard bezel	22.5mm
UP8-89V2*	Flush bezel	29.9mm
UP9P-99V1*	Standard bezel	22.5mm
	Flush bezel	29.9mm

5. Solder the terminals.
Before soldering, make sure that each terminal of the contact block is securely inserted into the PC board holes.

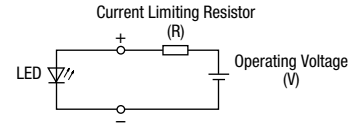
Instructions

Polarity

Pay attention to the polarity of the power supply as UP series units do not contain a diode for protection against reverse polarity. The long terminal is positive and the short terminal is negative.

Current Limiting Resistor

When using a UP series unit without a built-in current limiting resistor, connect an external current limiting resistor. Calculate the resistance using the following formula.



$$\text{Resistance } (\Omega) = \frac{\text{Operating Voltage (V)} - \text{Forward Voltage (Vf)}}{\text{Rated Current (I) *}}$$

- * Rated Current (I) = R (red), W (white) : 0.007A
G (green) : 0.002A
- Forward Voltage (Vf) = R (red), W (white) : 2V
G (green) : 2.7V

Note: Use a resistor of higher resistance than the calculated value (Ω)

$$\text{Rated Wattage of Resistor (W)} = \text{Rated Current (I)} \times \text{Operating Voltage (V)} \times 2 \text{ to } 3 *$$

* 2 to 3 is a safety factor

<Current Limiting Resistor Reference Value>

Color	Red (R), White (W)	Green (G)
Operating Voltage		
5V DC	430Ω (1/4W)	1200Ω (1/4W)
6V DC	560Ω (1/4W)	1600Ω (1/4W)
12V DC	1500Ω (1/4W)	4700Ω (1/4W)
24V DC	3000Ω (1/2W)	11000Ω (1/4W)

Wiring

Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. SnAgCu type lead-free solder is recommended.

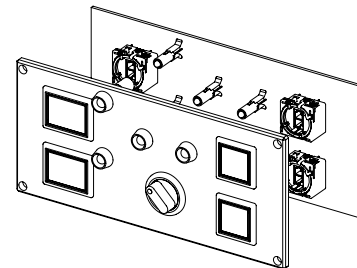
When soldering, do not touch the pilot light housing with the terminal. Do not bend the terminal or apply excessive force to the terminal.

Notes on Panel Mounting

Tightening torque should not exceed 0.49 N·m. Do not use pliers. Do not tighten with excessive force, otherwise the locking ring will be damaged.

PC Board and Circuit Design

Use glass epoxy copper clad laminate, double-sided through-hole PC boards with a thickness of 1.6 mm.



Example of single board mounting

22mm XW E-Stops

Key features:

- The depth behind the panel can be as little as 46.4 mm for 1 to 4 contacts (with terminal cover) for illuminated and non-illuminated units.
- IDEC's original "Safe break action" ensures that the NC contacts open when the contact block is detached from the operator.
- 1 to 4NC main contacts and 1 or 2NO monitor contacts
- Push-to-lock, Pull or Turn-to-reset operator
- Models with mechanical indicator on the operator body show the normal/latched status (green: normal).
- Safety lock mechanism (IEC60947-5-5, 6.2)
- Degree of protection IP65 (IEC60529)
- Fingersafe (IP20) terminals
- Three button sizes: ø38, ø40 and ø60 mm
- Push-ON illumination type available (40mm mushroom head)
- Direct opening action mechanism (IEC60947-5-5, 5.2, IEC60947-5-1, Annex K)
- RoHS compliant (EU directive 2002/95/EC).
- UL c-UL listed. EN compliant
- UL NISD category emergency stop device (File# E305148)



UL File #E68961



CCC No. 2005010305150897



Specifications

Applicable Standards	IEC60947-5-5, EN60947-5-5, JIS C8201-5-1, UL508, UL991, NFPA79, CSA C22.2 No. 14, GB14048.5
Operating Temperature	Non-illuminated: -25 to +60°C (no freezing), Illuminated: -25 to +55°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Storage Temperature	-45 to +80°C
Operating Force	Push-to-lock: 32N Pull-to-reset: 21N Turn-to-reset: 0.27N·m
Minimum Force Required for Direct Opening Action	80N
Min Operator Stroke Required for Direct Opening Action	4mm
Maximum Operator Stroke	4.5mm
Contact Resistance	50mΩ maximum (initial value)
Contact Material	Gold plated silver
Insulation Resistance	100MΩ minimum (500V DC megger)
Impulse Withstand Voltage	2.5kV
Pollution Degree	3
Operation Frequency	900 operations/hour
Shock Resistance	Operating extremes: 150m/s ² (15G), Damage limits: 1000m/s ² (100G)
Vibration Resistance	Operating extremes: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ² Damage limits: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ²
Mechanical Life	250,000 operations minimum
Electrical Life	100,000 operations minimum, (250,000 operations minimum @ 24V AC/DC, 100mA)
Degree of Protection	Operator: IP65 (IEC60529) Terminal: IP20 (when XW9Z-VL2MF is installed)
Terminal Style	M3.0 screw terminal
Recommended Tightening Torque for Locking Ring	2.0N·m
Wire Size	16 AWG max
Weight	ø40mm: 72g ø60mm: 81g

Part Numbers

Standard Button Without Mechanical Indicator

Style	Operator Type	Monitor Contact	Main Contact	Part Number
Non-Illuminated	40mm Mushroom	1NO	1NC	XW1E-BV411M-R
		—	2NC	XW1E-BV402M-R
		2NO	2NC	XW1E-BV422M-R
		1NO	3NC	XW1E-BV413M-R
		—	4NC	XW1E-BV404M-R
	60mm Mushroom	1NO	1NC	XW1E-BV511M-R
		—	2NC	XW1E-BV502M-R
		2NO	2NC	XW1E-BV522M-R
		1NO	3NC	XW1E-BV513M-R
		—	4NC	XW1E-BV504M-R
Illuminated ¹	40mm Mushroom with built-in 24V AC/DC LED	1NO	1NC	XW1E-LV411Q4M-R
		—	2NC	XW1E-LV402Q4M-R
		2NO	2NC	XW1E-LV422Q4M-R
		1NO	3NC	XW1E-LV413Q4M-R
		—	4NC	XW1E-LV404Q4M-R
	40mm Mushroom Push-ON LED ²	1NO	2NC	XW1E-TV412Q4M-R
		—	—	—

Smooth Button With Mechanical Indicator

Style	Operator Type	Monitor Contact	Main Contact	Part Number
Non-Illuminated	38mm Mushroom	—	1NC	XW1E-BV4TG01MR
		—	2NC	XW1E-BV4TG02MR
		—	3NC	XW1E-BV4TG03MR
		—	4NC	XW1E-BV4TG04MR
		1NO	1NC	XW1E-BV4TG11MR
		1NO	2NC	XW1E-BV4TG12MR
		1NO	3NC	XW1E-BV4TG13MR
Illuminated	38mm Mushroom with built-in 24V AC/DC LED ¹	2NO	4NC	XW1E-BV4TG22MR
		—	1NC	XW1E-LV4TG01Q4MR
		—	2NC	XW1E-LV4TG02Q4MR
		—	3NC	XW1E-LV4TG03Q4MR
		—	4NC	XW1E-LV4TG04Q4MR
		1NO	1NC	XW1E-LV4TG11Q4MR
		1NO	2NC	XW1E-LV4TG12Q4MR
		1NO	3NC	XW1E-LV4TG13Q4MR
		2NO	2NC	XW1E-LV4TG22Q4MR

-  1. The light is independent of the position of the switch, except for push-on LED type.
2. The light only operates when the switch is pressed as it is internally wired.

-  Note: Pushlock pull/turn reset switches are locked when pressed, and reset when pulled or turned clockwise.
1. LED lamp is not removable.

XW Series EMO Switches

Style	NC Main Contact	NO Monitor Contact	Part Number
40mm Mushroom	1NC	-	XW1E-BV401M-RH-EMO
	2NC	-	XW1E-BV402M-RH-EMO
	3NC	-	XW1E-BV403M-RH-EMO
	4NC	-	XW1E-BV404M-RH-EMO
	1NC	1NO	XW1E-BV411M-RH-EMO
	2NC	1NO	XW1E-BV412M-RH-EMO
	3NC	1NO	XW1E-BV413M-RH-EMO
	2NC	2NO	XW1E-BV422M-RH-EMO

FB Enclosures with XW E-Stops

	40mm Push-lock Turn/Pull Reset Non-Illuminated	2NC	—	FB1W-XW1E-BV402MR
		1NC	1NO	FB1W-XW1E-BV411MR
		2NC	2NO	FB1W-XW1E-BV422MR
		3NC	1NO	FB1W-XW1E-BV413MR
		4NC	—	FB1W-XW1E-BV404MR
	40mm Push-lock Turn/Pull Reset Illuminated*	2NC	—	FB1W-XW1E-LV402MR
		1NC	1NO	FB1W-XW1E-LV411MR
		2NC	2NO	FB1W-XW1E-LV422MR
		3NC	1NO	FB1W-XW1E-LV413MR
	60mm Push-lock Turn/Pull Reset Non-Illuminated	4NC	—	FB1W-XW1E-LV404MR
		2NC	—	FB1W-XW1E-BV502MR
		1NC	1NO	FB1W-XW1E-BV511MR
		2NC	2NO	FB1W-XW1E-BV522MR
		3NC	1NO	FB1W-XW1E-BV513MR
		4NC	—	FB1W-XW1E-BV504MR



For added safety, Switch Guards and Nameplates can be used with E-Stop Enclosures



*LED illumination voltage: 24V AC/DC

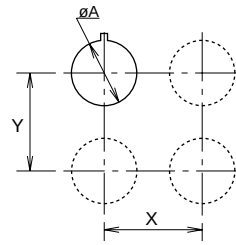
Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Rated Current (Ith)				5A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current	Main Contacts (NC)	AC 50/60Hz	Resistive Load (AC-12)	—	5A	3A
			Inductive Load (AC-15)	—	3A	1.5A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Monitor Contacts (NO)	AC 50/60Hz	Resistive Load (AC-12)	—	1.2A	0.6A
			Inductive Load (AC-14)	—	0.6A	0.3A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A



Minimum applicable load: 5V AC/DC, 1mA (reference value).
The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.

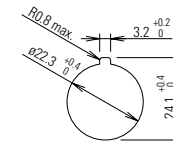
Mounting Hole Layout



Measurements

Size	øA	X & Y
40mm	22.3 ^{+0.4}	70mm min

Panel Cutout



Illuminated Unit LED Ratings

Operating Voltage	Current
24V AC/DC ±10%	15mA

Depth Behind the Panel

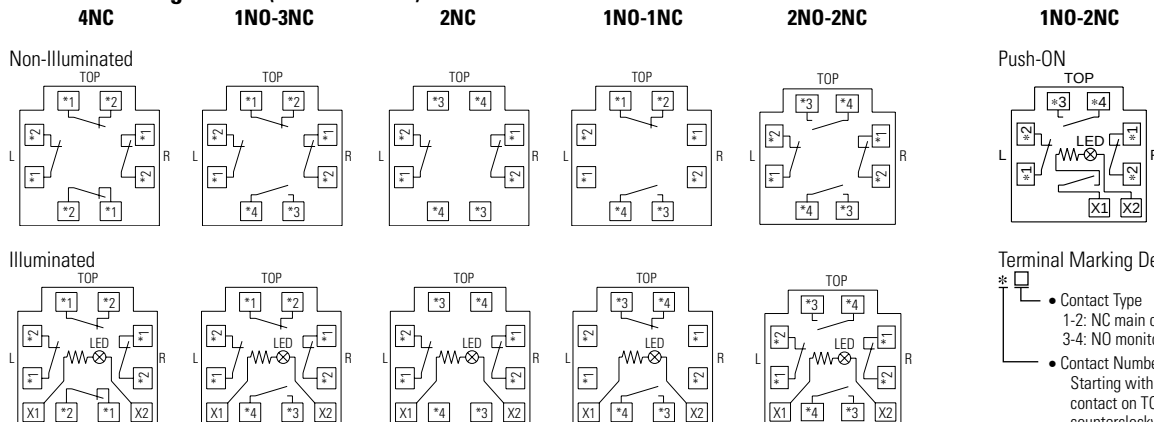
Depth (mm)	Description
46.4	with indicator, 1 - 4 contacts, both illuminated and non-illuminated
48.7	w/o indicator, 1 - 4 contacts, both illuminated and non-illuminated

Part Number Key

XW1E - L V 4 TG 11 Q4MR

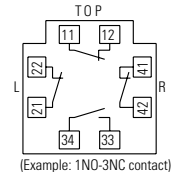
Illumination	Indicator	Contact Configuration	Color	Voltage Code
B: Non-Illuminated	TG: w/green mechanical indicator	11: 1NO - 1NC	R: red with indicator	Blank: Non-illuminated
L: Illuminated LED	blank: w/o indicator	02: 2NC	-R: red w/o indicator	Q4: Illuminated 24V AC/DC
T: Illuminated Push-ON LED		13: 1NO - 3NC	-RH-EMO: red w/o indicator with EMO engraving	
		04: 4NC		
		22: 2NO-2NC		
		12: 1NO-2NC (Push-ON LED only)		
		01: 1NC (EMO switch only)		
		03: 3NC (EMO switch only)		

Terminal Arrangements (Bottom View)



Terminal Marking Description

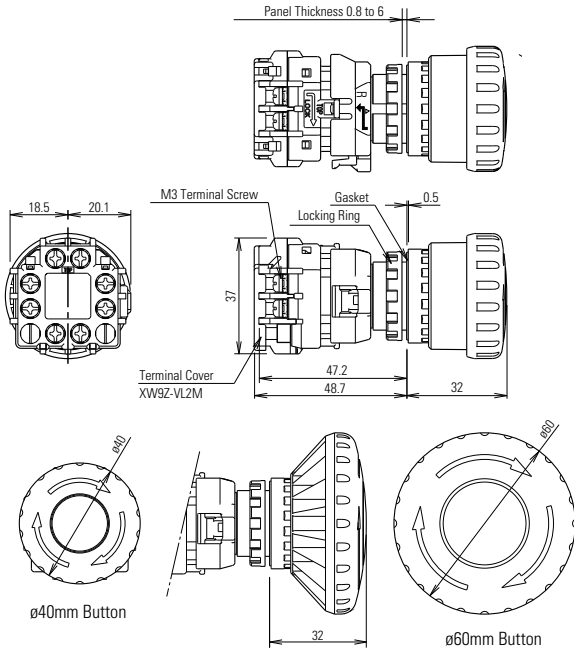
- Contact Type
 - 1-2: NC main contact
 - 3-4: NO monitor contact
 - Contact Number (1-4)
 - Starting with the contact on TOP in a counterclockwise direction.
- Note:
- 1: contact on the TOP
 - 2: contact on the Left
 - 3: contact on the Bottom
 - 4: contact on the Right



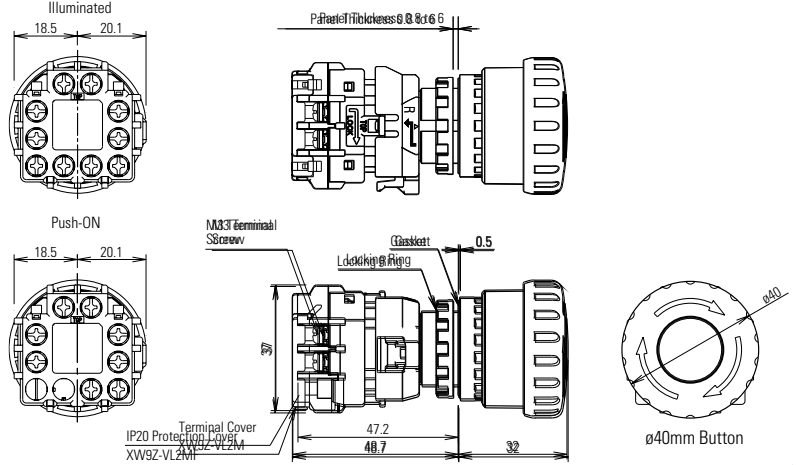
(Example: 1NO-3NC contact)

Dimensions (mm)

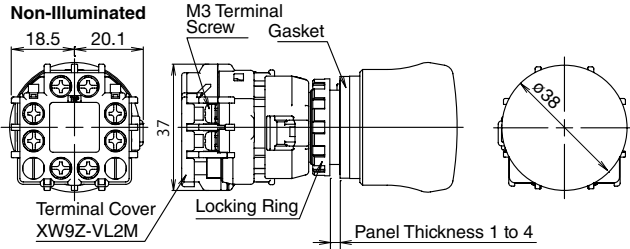
XW Standard Button Non-Illuminated Without Indicator (with terminal cover)



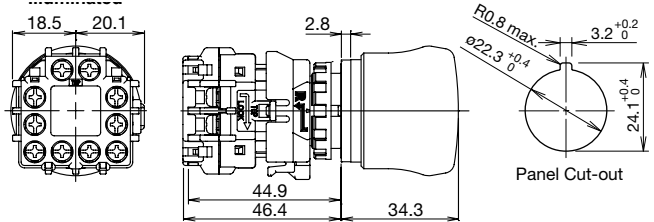
XW Standard Button LED Illuminated/Push-ON Without Indicator (with terminal cover)



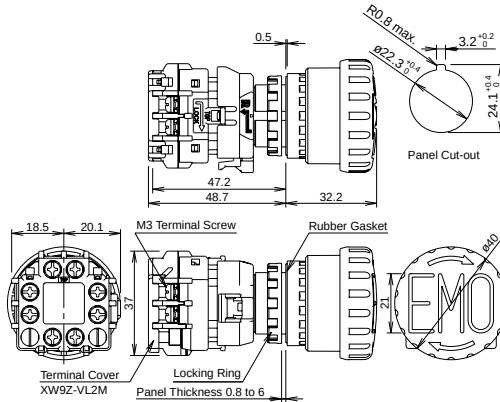
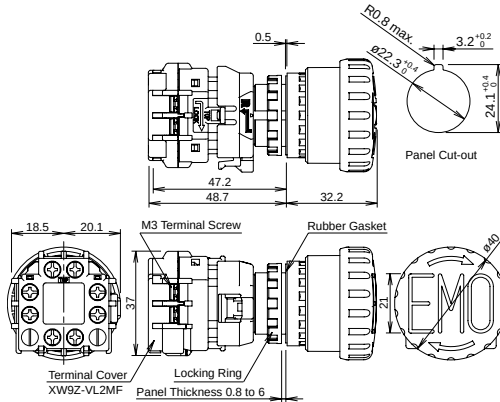
XW Smooth Button Non-Illuminated With Indicator (with terminal cover)



XW Smooth Button LED Illuminated/Push-ON With Indicator (with terminal cover)



EMO



Accessories: Terminal Covers

Appearance	Description	Part Numbers
	Terminal Cover for contact block	XW9Z-VL2M
	IP20 Fingersafe Cover	XW9Z-VL2MF

Accessories: Nameplates

Appearance	Legend	Part Number	Inner Ø	Outer Ø
	(blank)	HWAV-0	22mm	60mm
	"Emergency Stop"	HWAV-27	22mm	60mm
	(blank)	HWAV5-0	22mm	80mm
	"Emergency Stop"	HWAV5-27	22mm	80mm



Use 60mm nameplates for 38mm and 40mm mushroom buttons and 80mm nameplates for 60mm mushroom buttons.

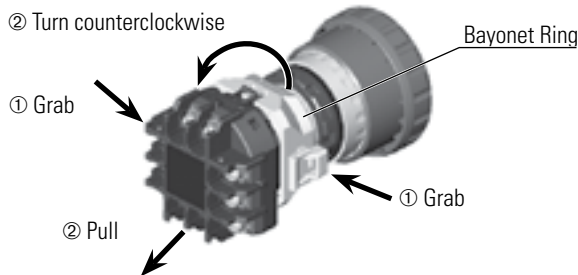
Accessories: Shrouds

Appearance	Part Numbers	E-Stop Types	Applicable Standards
	HW9Z-KG1	38mm, 40mm Mushroom Head	SEMI S2-0703, 12.5.1 Compliant
	HW9Z-KG2	38mm, 40mm, and 60mm Mushroom Head	SEMI S2-0703, 12.5.1 & SEMATECH Compliant
	HW9Z-KG3	38mm, 40mm Mushroom Head	SEMI S2 Compliant (Approved by TUV)
	HW9Z-KG4	38mm, 40mm Mushroom Head	SEMI S2 Compliant (Approved by TUV) & SEMATECH

Operating Instructions

Removing the Contact Block

First unlock the operator button. Grab the bayonet ring ① and pull back the bayonet ring until the latch pin clicks ②, then turn the contact block counterclockwise and pull out ③.

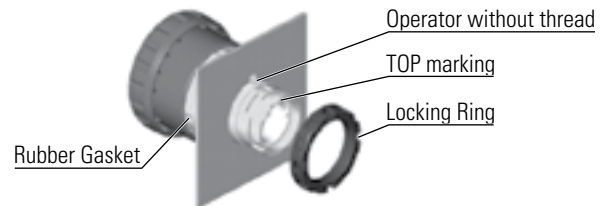


Notes for removing the contact block

- When the contact block is removed, the monitor contact (NO contact) is closed.
- While removing the contact block, do not exert excessive force, otherwise the switch may be damaged.
- An LED lamp is built into the contact block for illuminated pushbuttons. When removing the contact block, pull the contact block straight to prevent damage to the LED lamp. If excessive force is exerted, the LED lamp may be damaged and fail to light.

Panel Mounting

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side without thread on the operator with TOP marking upward, and tighten the locking ring using ring wrench HW9Z-T1 to a torque of 2.0 N·m maximum.

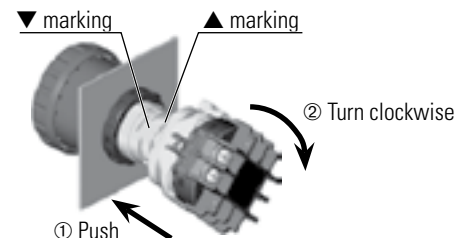


Notes for Panel Mounting

To prevent the XW emergency stop switch from rotating when resetting from the latched position, use of an anti-rotation ring (HW9Z-RL) or a nameplate is recommended.

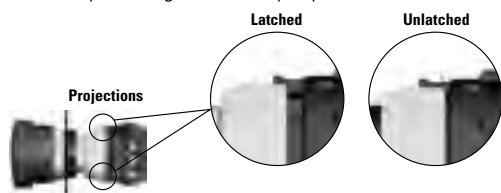
Installing the Contact Block

First unlock the operator button. Align the small ▲ marking on the edge of the operator with the small ▼ marking on the yellow bayonet ring. Hold the contact block, not the bayonet ring. Press the contact block onto the operator and turn the contact block clockwise until the bayonet ring clicks.



Notes for installing the contact block

Make sure that the bayonet ring is in the locked position. Check that the two projections on the bayonet ring are securely in place.



Wiring

The applicable wire size is 16 AWG maximum.

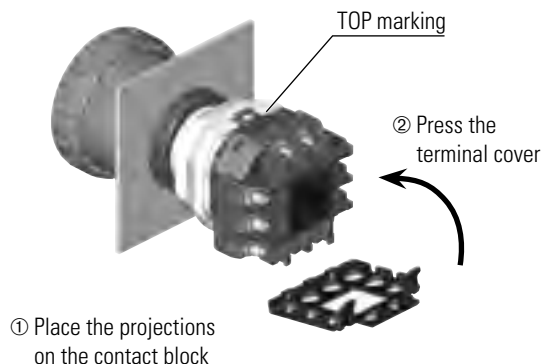
Screw Terminal

1. Wire thickness: AWG18 to 16
2. Tighten the M3 terminal screw to a tightening torque of 0.6 to 1.0 N·m.

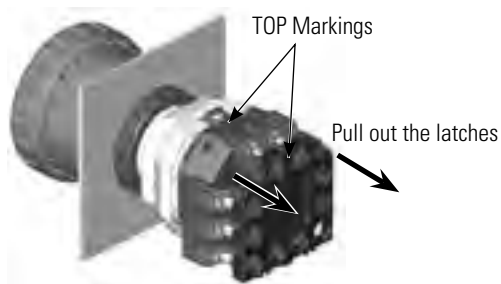
Installing and Removing Terminal Covers

XW9Z-VL2M

To install the terminal cover, align the TOP marking on the terminal cover with the TOP marking on the contact block. Place the two projections on the bottom side of the contact block into the slots in the terminal cover. Press the terminal cover toward the contact block.

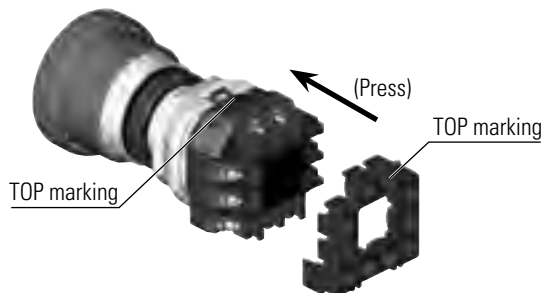


To remove the terminal cover, pull out the two latches on the top side of the terminal cover. Do not exert excessive force to the latches, otherwise the latches may break.



IP20 Protection Terminal Cover XW9Z-VL2MF

To install the IP20 protection cover, align the TOP marking on the cover with the TOP marking on the contact block, and press the cover toward the contact block.



1. Once installed, the XW9Z-VL2MF cannot be removed.
2. The XW9Z-VL2MF cannot be installed after wiring.
3. With the XW9Z-VL2MF installed, crimping terminals cannot be used.
4. Make sure that the XW9Z-VL2MF is securely installed. IP20 protection cannot be achieved when installed loosely, and electric shocks may occur.

Contact Bounce

When the button is reset by pulling or turning, the NC main contacts will bounce. When pressing the button, the NO monitor contacts will bounce.

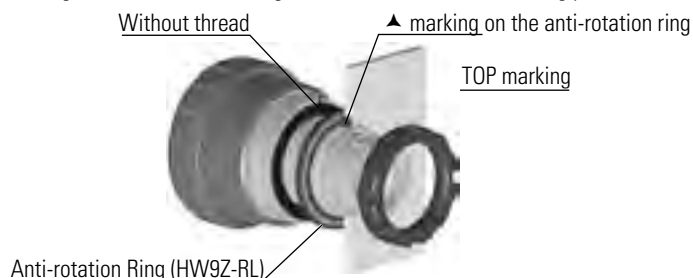
When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms).

LED Illuminated Switches

LED lamp is built into the contact block and cannot be replaced.

Installing the Anti-rotation Ring HW9Z-RL

Align the side without thread on the operator with TOP marking, the small s marking on the anti-rotation ring, and the recess on the mounting panel.



AP22M Series

Key Features

- Viewable in direct sunlight.
- Visible from all directions.
- The use of an ultra-bright LED that is not susceptible to external scattered light ensures high visibility and provides for more accurate recognition.
- Integrated terminal cover is IP20 protected (finger protection), preventing electrical shocks.
- UL and c-UL listed, EN standard compliant.
- Colored and clear lenses are offered. Clear lens (except for PW) provides for higher contrast.
- UL Type 4X



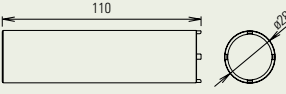
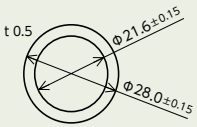
Part Numbers

Pilot Lights

Appearance	Lens	Rated Voltage	Part Number	Lamp Color
	Color	12V DC 24V AC/DC 120V AC	AP22M-2Q②①	R G Y A S PW
	Clear		AP22M-2Q②C①	R G Y A S

1. In place of ① insert LED color. Red (R), Green (G), Yellow (Y), Amber (A), Blue (S), and White (PW).
2. Clear lenses are standard (except for white). White (PW) only available as colored lens.
3. In place of ② insert voltage code. For 12V DC use (3), for 24V AC/DC use (4), for 120V AC use (H).
4. LED cannot be removed or replaced.

Accessories

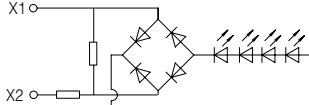
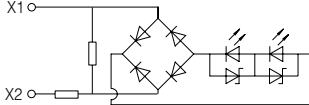
Appearance	Material	Part Number	Notes
	Metal (brass)	MW9Z-T1	Used for mounting unit into a panel. 
	Resin	YW9Z-PL12①	Dimension: ø29.8 H14.5 In place of ① insert color: R (Red), G (Green), Y (Yellow), A (Amber), S (Blue), C (Clear*)
	Nitrile rubber	HW9Z-WM	

1. Nameplates: HWAM, HWAS-0, and CWAM. Go to www.IDEC.com and review HW Series and CW Series catalogs for detailed information.
2. *Use a clear lens (C) for a PW (White) lamp.

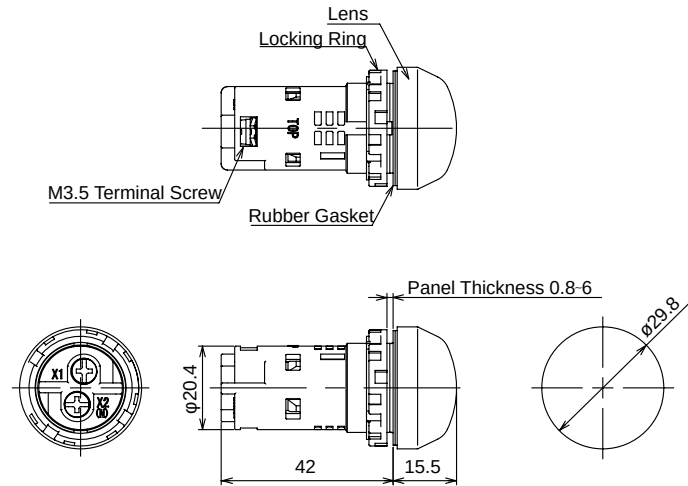
Specifications

Environment		Operating Temperature: -25 to +55°C (no freezing) Storage Temperature: -45 to +80°C (no freezing) Operating Humidity: 45-85%RH (no condensation)
Insulation Resistance		100MΩ (DC500V megger)
Over Voltage Category		II (IEC60664-1)
Impulse Dielectric Strength		2.5kV (IEC60664-1, IEC60947-5-1)
Degree of pollution		3 (IEC60947-5-1)
Dielectric Strength		between terminals of different poles: 2,000V AC, 1 min between live and non-live parts: 2,000V AC, 1 min
Vibration Resistance	Operation limit	5-55Hz half amp: 0.5mm
	Damage limit	30Hz half amp: 1.5mm
Shock Resistance	Operation limit	100m/s ² (10G)
	Damage limit	1000m/s ² (100G)
Degree of Protection		Panel front: IP66 (IEC 60529), UL Type 4X Terminals: IP20
Terminal Size		M3.5 screw
Tightening torque for terminal screw		1.0N•m
Tighten'g torque for Locking Ring		2.0N•m
Wire Size		AWG16 ~ AWG14, 2 wires max.
Weight (approx.)		18g

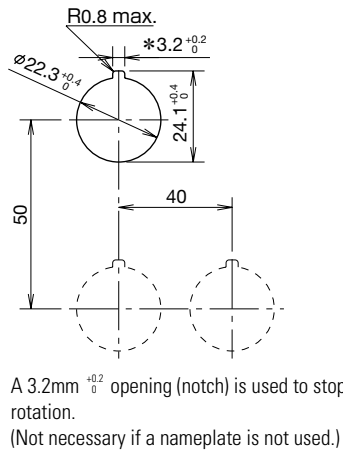
Lamp Ratings

Rated Voltage	12V DC, 24V AC/DC, 120V AC		
Voltage Range	12V DC $\pm 5\%$, 24V AC/DC $\pm 10\%$, 120V AC $\pm 10\%$		
LED Illumination Color	Red (R), Green (G), Yellow (Y), Amber (A), Blue (S), and White (PW)		
Rated Current	12V DC: R, A, Y - 21mA; G, S, PW - 22mA 24V AC/DC, 120V AC: 24mA (all colors)		
LED Life (Ref.)	Approx. 30,000 Hrs. at rated DC voltage at 25°C in specified environmental conditions (The brightness reduces to 50% of initial value.)		
Equivalent Circuit	Colors R, A, and Y 	Colors G, S, & PW 	Drawing Key  LED Chip  Rectifier Diode  Zener Diode  Resistor

Dimensions (mm)



Panel cut-out (mm)



Safety Instructions

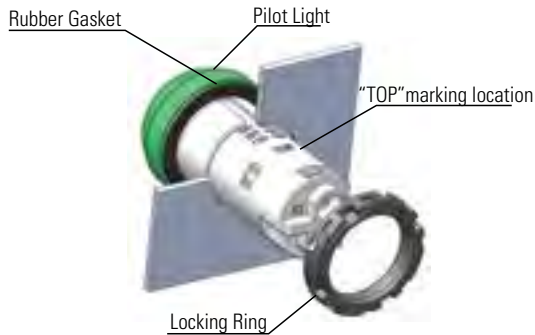
Turn off the power before installation, removal, wiring, maintenance and inspection. Failure to turn off power may cause electrical shocks or fire hazard.

When wiring, use proper size (AWG16 - AWG14) wires to meet voltage and current requirements. Tighten the terminal screws to a recommended tightening torque (1.0N•m). Operating with loose terminal screws may cause overheating and fire.

Installation Instructions

Panel Mounting

Remove the locking ring and check if the rubber gasket is properly aligned. Then insert the AP22M unit, aligning the "TOP" marking with the recess into the panel cut-out, and tighten the locking ring.



When installing the pilot light into a panel cut-out, use locking ring wrench (part number MW9Z-T1) to tighten the locking ring to a recommended torque of 2.0N•m. Do not use pliers and do not tighten excessively, otherwise the unit may become damaged.

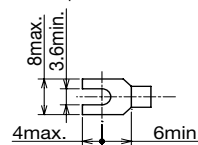
Mounting Notes

Applicable Wires

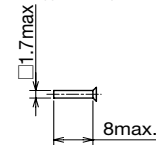
The applicable wire sizes are from AWG14 to AWG16 with 2 wires max. A ring-tongue crimp style terminal cannot be used.

Applicable Terminal

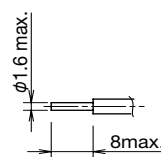
Fork Crimp Terminal



Bar Type Crimp Terminal

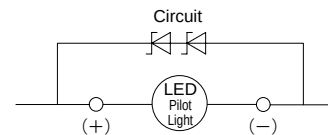


Single Wire



Noise

External noise may cause LED chips to deteriorate, leading to a reduction in brightness, a change in color, or malfunction. We recommend the following solution if this problem exists. However, please note that this solution will vary depending on the operating environment and the application.



Zener Diode Reference Value
Zener Voltage: 15V (1W)



Great Visibility - even from inside a train (automatic safety fence on a train station platform)



Compact Size - Perfect for mounting on small or narrow surfaces.

ø22 Flush Mount CW Switches & Pilot Devices

Flush bezel projects only 2.5mm from front of panel and as little as 39.9mm behind the panel!

Key features:

- ø22.3mm mounting hole compliant with IEC 60947-5-1
- 3.5-mm operator travel for pushbuttons ensures comfortable and reliable operation
- Up to 6 contacts per switch are possible with use of dual contact blocks
- Black and metallic bezels available
- Illuminated pushbuttons, pushbuttons, pilot lights, selector switches and key selector switches are available
- Direct opening NC contact
- Seven different keys can be chosen for key selector switches
- 10A contact rating; up to three contact blocks for non-illuminated and two contact blocks for illuminated models can be connected
- Contact blocks can be removed by locking lever
- IP20 finger-safe screw terminals
- UL Type 4X rating

Applicable Standards	Mark	File No. or Organization
UL508 CSA C22.2 No.14		UL/c-UL File No. E68961
EN60947-5-1		TÜV SÜD
		EC Low Voltage Directive



Specifications

Operating Temperature	Non-illuminated: -25 to +60°C (no freezing) LED illuminated: -25 to +55°C (no freezing)	
Operating Humidity	45 to 85% RH (no condensation)	
Storage Temperature	-40 to +80°C	
Contact Resistance	50 mΩ maximum (initial value)	
Insulation Resistance	100 MΩ minimum (500V DC megger)	
Overvoltage Category	II (IEC 60664-1)	
Impulse Withstand Voltage	2.5 kV (IEC60664-1/60947-5-1)	
Pollution Degree	3 (IEC60947-5-1)	
Vibration Resistance	Operating extremes: 5 to 55Hz, amplitude 0.5mm	
Shock Resistance	Operating extremes: 100m/s ² Damage limits: 1000m/s ²	
Mechanical Life (minimum operations)	Pushbutton, illuminated pushbutton: 2,000,000 Selector switch: 250,000 Key selector switch: 250,000	
Electrical Life (minimum operations)	50,000 (see Contact Ratings) 100,000 (see Contact Ratings) (switching frequency 1800 operations/h)	
Degree of Protection (IEC60529)	Panel front: IP65 Terminals: IP20	Type 4X
Short-circuit Protection	250V/10A fuse, (Type aM IEC60269-1, IEC602069-2)	
Electrical Shock Protection	Class II (IEC61140)	
Terminal Style	Screw terminal (M3.5 slotted Phillips screw)	
Bezel Material	Polyamide	
Applicable Wire Size	Up to 2 wires of 2mm ² (solid wire ø1.6) maximum (AWG14 to 16) (Ring terminal cannot be used)	
Recommended Tightening Torque	Terminal: 1.0 to 1.3N·m Locking ring: 1.2N·m	

Contact Ratings

Rated Insulation Voltage (Ui)				300V		
Rated Thermal Current (Ith)				10A		
Rated Operating Voltage (Ue)				24V	120V	240V
Rated Operating Current (Ie)	Electrical Life 50,000 operations	AC 50/60Hz	Resistive Load (AC-12)	10A	10A	6A
			Inductive Load (AC-15)	10A	6A	3A
		DC	Resistive Load (DC-12)	8A	2.2A	1.1A
			Inductive Load (DC-13)	4A	1.1A	0.55A
	Electrical Life 100,000 operations	AC 50/60Hz	Resistive Load (AC-12)	5A	5A	3A
			Inductive Load (AC-15)	5A	3A	1.5A
		DC	Resistive Load (DC-12)	4A	1.1A	0.55A
			Inductive Load (DC-13)	2A	0.55A	0.27A
Contact Material				Silver		



1. Minimum applicable load (reference value): 3V AC/DC, 5mA (Applicable range is subject to the operating conditions and load.)
2. The operational current represents the classification by making and breaking currents (IEC 60947-5-1).
3. UL, c-UL rating: A300

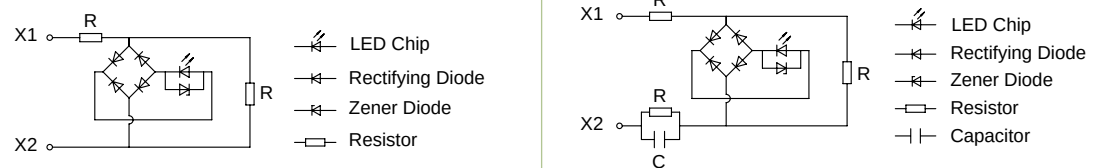
Direct Opening of Key Selector Switch

	2-position (3NC)	3-position (2NC)
Operator Angle for Direct Opening Action	90°	45°
Minimum Operator Torque for Direct Opening Action	0.2N·m	0.3N·m
Maximum Operator Angle	90°	45°

Weights

Illuminated Pushbutton	46g (CW1L-M1E02QH, 2 contacts) 62g (CW1L-M1E22QH, 4 contacts)
Pushbutton	45g (CW1B-M1E03, 3 contacts) 52g (CW1B-M1E22, 4 contacts)
Pilot Light	27g (CW1P-1EQH)
Selector Switch	48g (CW1S-2E03, 3 contacts) 55g (CW1S-2E22, 4 contacts)
Key Selector Switch	61g (CW1K-2AE03, 3 contacts) 68g (CW1K-2AE22, 4 contacts)

LED Module

Rated Insulation Voltage (Ui)	250V				
Rated Operating Voltage (Ue)	6V AC/DC	12V AC/DC	24V AC/DC	100/120V AC	230/240V AC
Operating Voltage Range	6V AC/DC±10%	12V AC/DC±10%	24V AC/DC±10%	100/120V AC±10%	230/240V AC±10%
Illumination Color Code ②	A (amber), G (green), PW (white), R (red), S (blue)				
LED Module Part Number	CW-EAQ2②	CW-EAQ3②	CW-EAQ4②	CW-EAQH②	CW-EAQM4②
Current Draw	15mA	15mA	16.5mA	18mA	18mA
Life (reference value)	Approx. 30,000 hours				
Internal Circuit					



- Specify an illumination color code in place of ② in the part number.
- Use the white (PW) LED module for yellow illumination.

Contact Blocks

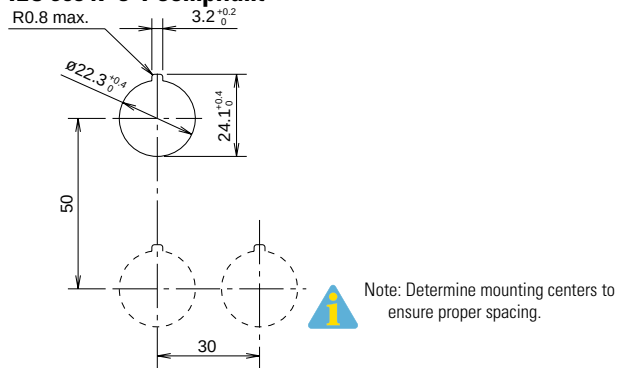
Contact Block	Single Contact Block		Double Contact Block		
Contact	1NO	1NC	2NO	2NC	1NO-1NC
Part No.	YW-E10R	YW-E01	YW-EW2R0	YW-EW02	YW-EW1R1
Shape					
Housing Color	Blue/Black	Reddish Purple	Blue/Black	Reddish Purple	Reddish Purple/Blue
Push Rod Color	Black	Red	Black	Red	Gray
Terminal No.	3-4	1-2	1st tier: 13-14 2nd tier: 23-24	1st tier: 11-12 2nd tier: 21-22	1st tier: (NO) 13-14 2nd tier: (NC) 21-22
Weight (approx.)	11g		19g		

Degree of Protection

Rating	IP65	IP66	IP67	UL Type 4X
Illuminated Pushbutton	Yes	Yes *	Yes *	Yes *
Pilot Light	Yes	Yes	No	Yes
Pushbutton	Yes	Yes *	Yes *	Yes *
Selector Switch	Yes	Yes	Yes	Yes
Key Selector Switch	Yes	Yes	No	Yes



*When used with rubber boot (CW9Z-D11, -D12)

Mounting Hole Layout
IEC 60947-5-1 compliant

Illuminated Pushbuttons (Assembled)

Style	Operating Voltage	Contact Configuration	Black Bezel	Metallic Bezel	Illumination Color Code ②	
Round Flush CW□L-□1  (black bezel)  (metallic bezel)	6V AC/DC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③1E10Q2② CW1L-③1E01Q2② CW1L-③1E11Q2② CW1L-③1E20Q2② CW1L-③1E02Q2② CW1L-③1E22Q2②	CW4L-③1E10Q2② CW4L-③1E01Q2② CW4L-③1E11Q2② CW4L-③1E20Q2② CW4L-③1E02Q3② CW4L-③1E22Q2②	A: amber G: green PW: white R: red S: blue Y: yellow	
	12V AC/DC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③1E10Q3② CW1L-③1E01Q3② CW1L-③1E11Q3② CW1L-③1E20Q3② CW1L-③1E02Q3② CW1L-③1E22Q3②	CW4L-③1E10Q3② CW4L-③1E01Q3② CW4L-③1E11Q3② CW4L-③1E20Q3② CW4L-③1E02Q3② CW4L-③1E22Q3②		
	24V AC/DC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③1E10Q4② CW1L-③1E01Q4② CW1L-③1E11Q4② CW1L-③1E20Q4② CW1L-③1E02Q4② CW1L-③1E22Q4②	CW4L-③1E10Q4② CW4L-③1E01Q4② CW4L-③1E11Q4② CW4L-③1E20Q4② CW4L-③1E02Q4② CW4L-③1E22Q4②		
	100/120V AC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③1E10QH② CW1L-③1E01QH② CW1L-③1E11QH② CW1L-③1E20QH② CW1L-③1E02QH② CW1L-③1E22QH②	CW4L-③1E10QH② CW4L-③1E01QH② CW4L-③1E11QH② CW4L-③1E20QH② CW4L-③1E02QH② CW4L-③1E22QH②		
	230/240V AC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③1E10QM4② CW1L-③1E01QM4② CW1L-③1E11QM4② CW1L-③1E20QM4② CW1L-③1E02QM4② CW4L-③1E22QM4②	CW4L-③1E10QM4② CW4L-③1E01QM4② CW4L-③1E11QM4② CW4L-③1E20QM4② CW4L-③1E02QM4② CW4L-③1E22QM4②		
Round Extended CW□L-□2  (black bezel)  (metallic bezel)	6V AC/DC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③2E10Q2② CW1L-③2E01Q2② CW1L-③2E11Q2② CW1L-③2E20Q2② CW1L-③2E02Q2② CW1L-③2E22Q2②	CW4L-③2E10Q2② CW4L-③2E01Q2② CW4L-③2E11Q2② CW4L-③2E20Q2② CW4L-③2E02Q2② CW4L-③2E22Q2②	A: amber G: green PW: white R: red S: blue Y: yellow	
	12V AC/DC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③2E10Q3② CW1L-③2E01Q3② CW1L-③2E11Q3② CW1L-③2E20Q3② CW1L-③2E02Q3② CW1L-③2E22Q3②	CW4L-③2E10Q3② CW4L-③2E01Q3② CW4L-③2E11Q3② CW4L-③2E20Q3② CW4L-③2E02Q3② CW4L-③2E22Q3②		
	24V AC/DC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③2E10Q4② CW1L-③2E01Q4② CW1L-③2E11Q4② CW1L-③2E20Q4② CW1L-③2E02Q4② CW1L-③2E22Q4②	CW4L-③2E10Q4② CW4L-③2E01Q4② CW4L-③2E11Q4② CW4L-③2E20Q4② CW4L-③2E02Q4② CW4L-③2E22Q4②		
	100/120V AC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③2E10QH② CW1L-③2E01QH② CW1L-③2E11QH② CW1L-③2E20QH② CW1L-③2E02QH② CW1L-③2E22QH②	CW4L-③2E10QH② CW4L-③2E01QH② CW4L-③2E11QH② CW4L-③2E20QH② CW4L-③2E02QH② CW4L-③2E22QH②		
	230/240V AC	1NO 1NC 1NO-1NC 2NO 2NC 2NO-2NC	CW1L-③2E10QM4② CW1L-③2E01QM4② CW1L-③2E11QM4② CW1L-③2E20QM4② CW1L-③2E02QM4② CW1L-③2E22QM4②	CW4L-③2E10QM4② CW4L-③2E01QM4② CW4L-③2E11QM4② CW4L-③2E20QM4② CW4L-③2E02QM4② CW4L-③2E22QM4②		



- Specify an illumination color code in place of ② in the Part Number.
- Specify function code in place of ③ in the Part Number. M: momentary, A: maintained
- See page 628 for dimensions.
- See next page for replacement LED modules.
- A dummy block is installed when one contact block is used.
- Additional contact configurations available, contact IDEC for more details

Illuminated Pushbuttons (Sub-assembled)

Contact Blocks + LED Module + Mounting Adapter + Operator + Lens = Completed Unit



Contact Blocks

Style	Contacts	Contact Block	Contact Configuration	Part Number
	Finger-safe screw terminal	Single	1NO	YW-E10R
			1NC	YW-E01
		Double	2NO	YW-EW2R0
			2NC	YW-EW02
			1NO-1NC	YW-EW1R1
	Dummy block			CW-DB

LED Module

Style	Part Number
	CW-EAQ ②①



1. In place of ①, specify the Lens/LED Color Code from table.
2. In place of ②, specify the Voltage Code from table.
3. Use PW LED for yellow lens.

Operators

Style			Black Bezel	Metallic Bezel
	Momentary	Round Flush	CW1L-M10	CW4L-M10
		Round Extended	CW1L-M20	CW4L-M20
	Maintained	Round Flush	CW1L-A10	CW4L-A10
		Round Extended	CW1L-A20	CW4L-A20

Lens

Style		Part Number
	Round Flush	CW9Z-L11①
	Round Extended	CW9Z-L12①



1. In place of ①, specify the Lens/LED Color Code from table.

① Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White*	PW or C
Yellow	Y

*Use PW for LED module, use C for lens.

② Voltage Code

Voltage	Code
6V AC/DC	2
12V AC/DC	3
24V AC/DC	4
100/120V AC	H
230/240V AC	M4

Contact Block Mounting Adaptor

Style	Part Number
	CW-CN

Non-Illuminated Pushbuttons (Assembled)

Style	Contact Configuration	Black Bezel	Metallic Bezel	Button Color Code ①
 Round Flush CW□B-□1 (black bezel)	1NO	CW1B-③1E10①	CW4B-③1E10①	B: black G: green R: red S: blue W: white Y: yellow
	1NC	CW1B-③1E01①	CW4B-③1E01①	
	1NO-1NC	CW1B-③1E11①	CW4B-③1E11①	
	2NO	CW1B-③1E20①	CW4B-③1E20①	
	2NC	CW1B-③1E02①	CW4B-③1E02①	
	2NO-1NC*	CW1B-M1E21①	CW4B-M1E21①	
	1NO-2NC*	CW1B-M1E12①	CW4B-M1E12①	
	3NO*	CW1B-M1E30①	CW4B-M1E30①	
	3NC*	CW1B-M1E03①	CW4B-M1E03①	
	2NO-2NC	CW1B-③1E22j	CW4B-③1E22j	
 Round Extended CW□B-□2 (metallic bezel)	1NO	CW1B-③2E10①	CW4B-③2E10①	
	1NC	CW1B-③2E01①	CW4B-③2E01①	
	1NO-1NC	CW1B-③2E11①	CW4B-③2E11①	
	2NO	CW1B-③2E20①	CW4B-③2E20①	
	2NC	CW1B-③2E02①	CW4B-③2E02①	
	2NO-1NC*	CW1B-M2E21①	CW4B-M2E21①	
	1NO-2NC*	CW1B-M2E12①	CW4B-M2E12①	
	3NO*	CW1B-M2E30①	CW4B-M2E30①	
	3NC*	CW1B-M2E03①	CW4B-M2E03①	
	2NO-2NC	CW1B-M2E22①	CW4B-③2E22①	



- Specify a button color code in place of ① in the part number.
- Specify function code in place of ③ in the Part Number. M: momentary, A: maintained
- See page 629 for dimensions.
- Two dummy blocks are installed when one contact is used and one dummy block is installed when two contact blocks are used.
- *These contact configurations are not available in maintained action
- Additional contact configurations available; contact IDEC for more details.

Non-Illuminated Pushbuttons (Sub-assembled)

Contact Blocks	+	Mounting Adaptor	+	Operator	=	Completed Unit
----------------	---	------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	Contact Block	Contact Configuration	Part Number
	Finger-safe screw terminal	Single	1NO	YW-E10R
			1NC	YW-E01
	Finger-safe screw terminal	Double	2NO	YW-EW2R0
			2NC	YW-EW02
			1NO-1NC	YW-EW1R1
	Dummy block			CW-DB

Operators*

Style		Black Bezel	Metallic Bezel
	Momentary	Round Flush	CW1B-M1①
		Round Extended	CW1B-M2①
	Maintained	Round Flush	CW1B-A1①
		Round Extended	CW1B-A2①

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y



- Specify a button color code in place of ①.
- *Operator button is not removable from operator.

Contact Block Mounting Adaptor

Style	Part Number
	CW-CN

Pilot Lights (Assembled)

Style	Operating Voltage	Black Bezel	Metallic Bezel	Illumination Color Code ②
Round Flush Lens CW□P-1  (black bezel)	6V AC/DC	CW1P-1EQ2②	CW4P-1EQ2②	A: amber G: green R: red S: blue PW: white Y: yellow
	12V AC/DC	CW1P-1EQ3②	CW4P-1EQ3②	
	24V AC/DC	CW1P-1EQ4②	CW4P-1EQ4②	
	100/120V AC	CW1P-1EQH②	CW4P-1EQH②	
	230/240V AC	CW1P-1EQM4②	CW4P-1EQM4②	
Round Dome Lens CW□P-2  (metallic bezel)	6V AC/DC	CW1P-2EQ2②	CW4P-2EQ2②	
	12V AC/DC	CW1P-2EQ3②	CW4P-2EQ3②	
	24V AC/DC	CW1P-2EQ4②	CW4P-2EQ4②	
	100/120V AC	CW1P-2EQH②	CW4P-2EQH②	
	230/240V AC	CW1P-2EQM4②	CW4P-2EQM4②	



1. Specify an illumination color code in place of ② in the Part Number
2. See page 629 for dimensions.
3. See page 627 for replacement LED modules.
4. Two dummy blocks are installed.

Pilot Lights (Sub-assembled)

Contact Blocks*	+	LED Module	+	Mounting Adaptor	+	Operator	+	Lens	=	Completed Unit
										



* 2 dummy blocks are required for each completed pilot light.

Contact Block

Style	Contacts	Part Number
	Dummy Block	CW-DB

LED Module

Style	Part Number
	CW-EAQ ②①

1. In place of ①, specify the Lens/LED Color Code from table.
2. In place of ②, specify the Voltage Code from table.
3. Use PW LED for yellow lens.

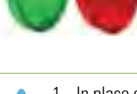
Contact Block Mounting Adaptor

Style	Part Number
	CW-CN

Operators

Style	Black Bezel	Metallic Bezel
	CW1P-00	CW4P-00
		

Lens

Style	Part Number
 Round Flush	CW9Z-L11①
 Round Dome	CW9Z-L15①



1. In place of ①, specify the Lens/LED Color Code from table.

① Lens/LED Color Code

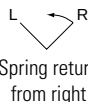
Color	Code
Amber	A
Green	G
Red	R
Blue	S
White*	PW or C
Yellow	Y

*Use PW for LED module, use C for lens.

② Voltage Code

Voltage	Code
6V AC/DC	2
12V AC/DC	3
24V AC/DC	4
100/120V AC	H
230/240V AC	M4

Selector Switches (Assembled)

Shape	CW□S (Knob Operator)			(black bezel)		(metallic bezel)		
No. of Positions	Contact Configuration	Contact Block		Operator Position		 Maintained	 Spring return from right	
90° 2-position	1NO (10)	1	NO		●	CW□S-2E10	CW□S-21E10	
		2	—	Dummy				
		3	—	Dummy				
	1NC (01)	1	—	Dummy		CW□S-2E01	CW□S-21E01	
		2	—	Dummy				
		3	NC	●				
	1NO-1NC (11)	1	NO		●	CW□S-2E11	CW□S-21E11	
		2	—	Dummy				
		3	NC	●				
	2NO (20)	1	NO		●	CW□S-2E20	CW□S-21E20	
		2	—	Dummy				
		3	NO		●			
	2NC (02)	1	NC	●		CW□S-2E02	CW□S-21E02	
		2	—	Dummy				
		3	NC	●				
	2NO-1NC (21)	1	NO		●	CW□S-2E21	CW□S-21E21	
		2	NO		●			
		3	NC	●				
	1NO-2NC (12)	1	NO		●	CW□S-2E12	CW□S-21E12	
		2	NC	●				
		3	NC	●				
	3NO (30)	1	NO		●	CW□S-2E30	CW□S-21E30	
		2	NO		●			
		3	NO		●			
	3NC (03)	1	NC	●		CW□S-2E03	CW□S-21E03	
		2	NC	●				
		3	NC	●				
	2NO-2NC (22)	1	NO/ NC	NC		●	CW□S-2E22	CW□S-21E22
				NC	●			
		2	—	Dummy				
			NO/ NC	NO		●		
	3	NC		●				
	4NO (40)	1	2NO	NO		●	CW□S-2E40	CW□S-21E40
				NO		●		
		2	—	Dummy				
		3	2NO	NO		●		
	NO				●			

Selector Switches (Assembled) con't

No. of Positions	Contact Configuration	Contact Block		Operator Position						
		Mounting Position	Type	L	C	R				
45° 3-position	1NO-1NC (11)	1	NO	●						
		2	—		Dummy					
		3	NC	■						
	1NO-1NC (11N1)	1	NC			■				
		2	—		Dummy					
		3	NO			●				
	1NO-1NC (11N2)	1	NO	●						
		2	NC		●					
		3	—		Dummy					
	1NO-1NC (11N3)	1	—		Dummy					
		2	NC		●					
		3	NO			●				
	1NO-1NC (11N4)	1	—		Dummy					
		2	NO	●		●				
		3	NC	■						
	2NO (20)	1	NO	●						
		2	—		Dummy					
		3	NO			●				
	2NO (20N1)	1	—		Dummy					
		2	NO	●		●				
		3	NO			●				
	2NC (02)	1	NC			■				
		2	—		Dummy					
		3	NC	■						
	2NC (02N1)	1	—		Dummy					
		2	NC		●					
		3	NC	■						
	2NO-1NC (21)	1	NO	●						
		2	NO	●		●				
		3	NC	■						
	2NO-1NC (21N1)	1	NO	●						
		2	NC		●					
		3	NO			●				
	1NO-2NC (12)	1	NO	●						
		2	NC		●					
		3	NC	■						
	1NO-2NC (12N1)	1	NC			■				
		2	NO	●		●				
		3	NC	■						
	3NO (30)	1	NO	●						
		2	NO	●		●				
		3	NO			●				
	3NC (03)	1	NC			■				
		2	NC		●					
		3	NC	■						

Selector Switches (Assembled) con't

No. of Positions	Contact Configuration	Contact Block		Operator Position			 Maintained	 Spring return from right	 Spring return from left	 Spring return two-way
		Mounting Position	Type	L	C	R				
45° 3-position	2NO-2NC (22)	1	NO/NC	NO NC	●	■	CW□S-3E22	CW□S-31E22	CW□S-32E22	CW□S-33E22
		2	—			Dummy				
		3	NO/NC	NO NC	■	●				
	4NO (40)	1	2NO	NO NO	● ●	■	CW□S-3E40	CW□S-31E40	CW□S-32E40	CW□S-33E40
		2	—			Dummy				
		3	2NO	NO NO	■ ●	●				
	2NO-2NC (22N2)	1	2NC	NC NC	■	■	CW□S-3E22N2	CW□S-31E22N2	CW□S-32E22N2	CW□S-33E22N2
		2	—			Dummy				
		3	2NO	NC NC	■	●				

- 
1. Specify a bezel color code in place of □ in the Part Number, 1 (black bezel), 4 (metallic bezel)

2. For the contact block mounting position, see below.

3. Lever operator is also available. For dimensions, see page 630.

4. To order a lever operator selector switch, insert L before E in the knob operator part number.
Example: Knob Operator part number CW1S-3E11 becomes CW1S-3LE11 for Lever Operator.

Lever Operator

Contact Block Mounting Position



CW1S-□L
(black bezel)



CW4S-□L
(metallic bezel)



		Left	Center	Right	
		L	C	R	Operator Position
1	NO	●			
2	NC		●		
3	NC	■			

Selector Switches (Sub-assembled)

Contact Block	+	Mounting Adaptor	+	Operator	=	Completed Unit
---------------	---	------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	Contact Block	Contact Configuration	Part Number
	Finger-safe screw terminal	Single	1NO	YW-E10R
			1NC	YW-E01
		Double	2NO	YW-EW2R0
			2NC	YW-EW02
	1NO-1NC		YW-EW1R1	
	Dummy block			CW-DB

Contact Block Mounting Adaptor

Style	Part Number
	CW-CN

Operators

Style	Position	Handle	Description	Black Bezel	Metallic Bezel
	2-position	Knob	Maintained	CW1S-2	CW4S-2
			Spring return from right	CW1S-21	CW4S-21
		Lever	Maintained	CW1S-2L	CW4S-2L
			Spring return from right	CW1S-21L	CW4S-21L
 (knob operator shown)	3-position	Knob	Maintained	CW1S-3	CW4S-3
			Spring return from right	CW1S-31	CW4S-31
			Spring return from left	CW1S-32	CW4S-32
			Spring return two-way	CW1S-33	CW4S-33
		Lever	Maintained	CW1S-3L	CW4S-3L
			Spring return from right	CW1S-31L	CW4S-31L
			Spring return from left	CW1S-32L	CW4S-32L
			Spring return two-way	CW1S-33L	CW4S-33L



Lever or knob is supplied with operator.

Key Selector Switches (Assembled)

Shape	CW□K			(black bezel)		(metallic bezel)	
No. of Positions	Contact Configuration	Contact Block		Operator Position		 Maintained	 Spring return from right
90° 2-position	1NO (10)	1	NO		●	CW□K-2AE10	CW□K-21BE10
		2	—	Dummy			
		3	—	Dummy			
	1NC (01)	1	—	Dummy		CW□K-2AE01	CW□K-21BE01
		2	—	Dummy			
		3	NC	●			
	1NO-1NC (11)	1	NO		●	CW□K-2AE11	CW□K-21BE11
		2	—	Dummy			
		3	NC	●			
	2NO (20)	1	NO		●	CW□K-2AE20	CW□K-21BE20
		2	—	Dummy			
		3	NO		●		
	2NC (02)	1	NC	●		CW□K-2AE02	CW□K-21BE02
		2	—	Dummy			
		3	NC	●			
	2NO-1NC (21)	1	NO		●	CW□K-2AE21	CW□K-21BE21
		2	NO		●		
		3	NC	●			
	1NO-2NC (12)	1	NO		●	CW□K-2AE12	CW□K-21BE12
		2	NC	●			
		3	NC	●			
	3NO (30)	1	NO		●	CW□K-2AE30	CW□K-21BE30
		2	NO		●		
		3	NO		●		
	3NC (03)	1	NC	●		CW□K-2AE03	CW□K-21BE03
		2	NC	●			
		3	NC	●			
	2NO-2NC (22)	1	NO/NC	NO		CW□K-2AE22	CW□K-21BE22
		NC		●			
		2	—		Dummy		
		3	NO/NC	NO			
	NC	●					
	4NO (40)	1	2NO	NO		CW□K-2AE40	CW□K-21BE40
				NO			
		2	—		Dummy		
			3	2NO	NO		
NO		●					

Key Selector Switches (Assembled) con't

No. of Positions	Contact Configuration	Contact Block		Operator Position						
		Mounting Position	Type	L	C	R	Maintained	Spring return from right	Spring return from left	Spring return two-way
45° 3-position	1NO-1NC (11)	1	NO	●			CW□K-3AE11	CW□K-31BE11	CW□K-32CE11	CW□K-33DE11
		2	—		Dummy					
		3	NC	■						
	1NO-1NC (11N1)	1	NC			■	CW□K-3AE11N1	CW□K-31BE11N1	CW□K-32CE11N1	CW□K-33DE11N1
		2	—		Dummy					
		3	NO			●				
	1NO-1NC (11N2)	1	NO	●			CW□K-3AE11N2	CW□K-31BE11N2	CW□K-32CE11N2	CW□K-33DE11N2
		2	NC		●					
		3	—		Dummy					
	1NO-1NC (11N3)	1	—		Dummy		CW□K-3AE11N3	CW□K-31BE11N3	CW□K-32CE11N3	CW□K-33DE11N3
		2	NC		●					
		3	NO			●				
	1NO-1NC (11N4)	1	—		Dummy		CW□K-3AE11N4	CW□K-31BE11N4	CW□K-32CE11N4	CW□K-33DE11N4
		2	NO	●		●				
		3	NC	■						
	2NO (20)	1	NO	●			CW□K-3AE20	CW□K-31BE20	CW□K-32CE20	CW□K-33DE20
		2	—		Dummy					
		3	NO			●				
	2NO (20N1)	1	—		Dummy		CW□K-3AE20N1	CW□K-31BE20N1	CW□K-32CE20N1	CW□K-33DE20N1
		2	NO	●		●				
		3	NO			●				
	2NC (02)	1	NC			■	CW□K-3AE02	CW□K-31BE02	CW□K-32CE02	CW□K-33DE02
		2	—		Dummy					
		3	NC	■						
	2NC (02N1)	1	—		Dummy		CW□K-3AE02N1	CW□K-31BE02N1	CW□K-32CE02N1	CW□K-33DE02N1
		2	NC		●					
		3	NC	■						
	2NO-1NC (21)	1	NO	●			CW□K-3AE21	CW□K-31BE21	CW□K-32CE21	CW□K-33DE21
		2	NO	●		●				
		3	NC	■						
	2NO-1NC (21N1)	1	NO	●			CW□K-3AE21N1	CW□K-31BE21N1	CW□K-32CE21N1	CW□K-33DE21N1
		2	NC		●					
		3	NO			●				
	1NO-2NC (12)	1	NO	●			CW□K-3AE12	CW□K-31BE12	CW□K-32CE12	CW□K-33DE12
		2	NC		●					
		3	NC	■						
	1NO-2NC (12N1)	1	NC			■	CW□K-3AE12N1	CW□K-31BE12N1	CW□K-32CE12N1	CW□K-33DE12N1
		2	NO	●		●				
		3	NC	■						
	3NO (30)	1	NO	●			CW□K-3AE30	CW□K-31BE30	CW□K-32CE30	CW□K-33DE30
		2	NO	●		●				
		3	NO			●				
	3NC (03)	1	NC			■	CW□K-3AE03	CW□K-31BE03	CW□K-32CE03	CW□K-33DE03
		2	NC		●					
		3	NC	■						

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Key Selector Switches (Assembled) con't

No. of Positions	Contact Configuration	Contact Block		Operator Position			 Maintained	 Spring return from right	 Spring return from left	 Spring return two-way
		Mounting Position	Type	L	C	R				
90° 2-position	2NO-2NC (22)	1	NO/NC	NO NC	●		CW□K-3AE22	CW□K-31BE22	CW□K-32CE22	CW□K-33DE22
		2	—	Dummy						
		3	NO/NC	NO NC		●				
	4NO (40)	1	2NO	NO NO	●		CW□K-3AE40	CW□K-31BE40	CW□K-32CE40	CW□K-33DE40
		2	—	Dummy						
		3	2NO	NO NO		●				
	2NO-2NC (22N2)	1	2NC	NC NC		●	CW□K-3AE22N2	CW□K-31BE22N2	CW□K-32CE22N2	CW□K-33DE22N2
		2	—	Dummy						
		3	2NC	NC NC		●				



- Specify a bezel color code in place of □ in the Part Number: 1 (black bezel), 4 (metallic bezel).
- On the spring-returned models, the key can be released only from the maintained position. On the maintained models, the key can be released from any position. Key retained positions are also available. See below.
- Two keys are supplied.
- Key cylinder material: Metal
- Besides the standard key (key number 0H), six other keys are also available. See below.
- For the contact block mounting position, see right.
- For dimensions, see page 631.
- When ordering an optional key or optional key-retained positions, specify designation codes as shown below:
Example: CW1K-2AE10-1H

blank: Standard key (0H, reversible)
1H to 2H: Reversible key
3H to 6H: Non-reversible key

Key removal position code
2-position
A: Removable in all positions
B: Removable in left only
C: Removable in right only

Contact Block Mounting Position



		Left	Center	Right	Operator Position
1	NO	●			
2	NC		●		
3	NC		●		

Note:
Key number is indicated on the key cylinder.
Standard keys do not have a key number indication.

3-position
A: Removable in all positions
B: Removable in left and center
C: Removable in right and center
D: Removable in center only
E: Removable in right and left
G: Removable in left only
H: Removable in right only

Note: Key is retained in all spring-returned positions.

Key Selector Switches (Sub-assembled)

Contact Block + Mounting Adaptor + Operator = Completed Unit



Contact Blocks

Style	Contacts	Contact Block	Contact Configuration	Part Number
	Finger-safe screw terminal	Single	1NO	YW-E10R
			1NC	YW-E01
		Double	2NO	YW-EW2R0
			2NC	YW-EW02
	1NO-1NC		YW-EW1R1	
	Dummy block			CW-DB

Contact Block Mounting Adaptor

Style	Part Number
	CW-CN

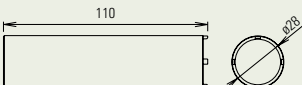
Operator

Style	Position	Description	Black Bezel	Metallic Bezel
	2-position	Maintained, key removable all positions	CW1K-2A	CW4K-2A
		Maintained, key removable left position only	CW1K-2B	CW4K-2B
		Maintained, key removable right position only	CW1K-2C	CW4K-2C
		Spring return from right	CW1K-21B	CW4K-21B
	3-position	Maintained, key removable all positions	CW1K-3A	CW1K-3A
		Maintained, key removable left and center positions only	CW1K-3B	CW4K-3B
		Maintained, key removable right and center positions only	CW1K-3C	CW4K-3C
		Maintained, key removable center position only	CW1K-3D	CW4K-3D
		Maintained, key removable left and right positions only	CW1K-3E	CW4K-3E
		Maintained, key removable left position only	CW1K-3G	CW4K-3G
		Maintained, key removable right position only	CW1K-3H	CW4K-3H
		Spring return from right, key removable left and center positions only	CW1K-31B	CW4K-31B
		Spring return from right, key removable center position only	CW1K-31D	CW4K-31D
		Spring return from right, key removable left position only	CW1K-31G	CW4K-31G
		Spring return from left, key removable right and center positions only	CW1K-32C	CW4K-32C
		Spring return from left, key removable center position only	CW1K-32D	CW4K-32D
		Spring return from left, key removable right position only	CW1K-32H	CW4K-32H
		Spring return two-way, key removable center position only	CW1K-33D	CW4K-33D

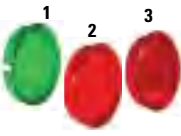
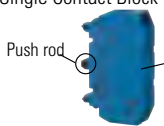


Two keys supplied with operator.

Accessories

Item	Appearance	Material	Part Number	Remarks
Locking Ring Wrench		Brass	MW9Z-T1	- Used to tighten the locking ring when installing the CW series control unit in a panel cut-out - Weight: Approx 150g 
Mounting Hole Plug		Polyamide (black)	LW9Z-BP1	- Used to plug an unnecessary ø22.3mm hole in the panel - Degree of protection: IP65 - Panel thickness: 0.8 to 6.0mm

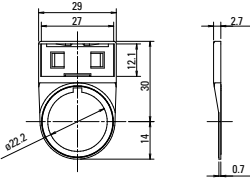
Replacement Parts

Shape	Material	Part Number	Remarks
Lens 	1 Round Flush	Polyallylate	CW9Z-L11②
	2 Round Extended	Polyallylate	CW9Z-L12②
	3 Round Dome	Polyallylate	CW9Z-L15②
Single Contact Block 	1NO	YW-E10R	Push rod color: Black Housing color: Blue/black Terminal No.: 3-4
	1NC	YW-E01	Push rod color: Red Housing color: Reddish purple Terminal No.: 1-2
	Double Contact Block	2NO	YW-EW2R0
	2NC	YW-EW02	Push rod color: black Housing color: blue and black Terminal No. 1st tier: 13-14, 2nd tier: 23-24
	2NC	YW-EW02	Push rod color: red Housing color: reddish purple Terminal No. 1st tier: 11-12, 2nd tier: 21-22
	1NO, 1NC	YW-EW1R1	Push rod color: gray Housing color: reddish purple/blue Terminal No. 1st tier: 13-14, 2nd tier: 21-22
Rubber Boot (clear) 	Round Flush		CW9Z-D11
	Round Extended		CW9Z-D12
Dummy Block 	Polyamide (black)	CW-DB	
Locking Ring 	Polyamide (black)	CW9Z-LN	
Gasket 	Nitrile rubber	CW9Z-WM	Waterproof gasket between CW control unit bezel and the mounting panel.
Nameplate 	Plastic	CWAM-OB	
Spare Key 	Zinc (nickel-plated)	LA9Z-SK-□	Specify a key No. in place of □. 0H: Standard key (reversible) 1H to 2H: Reversible key 3H to 6H: Non-reversible key For dimensions, see page 631.

LED Modules

Shape	Operating Voltage Range	Current Draw	Part Number	Illumination Color Code ②
	6V AC/DC±10%	15mA	CW-EAQ2②	Specify an illumination color code in place of ② in the Part Number A: amber G: green PW: white R: red S: blue
	12V AC/DC±10%	15mA	CW-EAQ3②	
	24V AC/DC±10%	16.5mA	CW-EAQ4②	
	100/120V AC±10%	18mA	CW-EAQH②	
	230/240V AC±10%	18mA	CW-EAQM4②	

Nameplate

CWAM—Black Plastic		
		
Nameplate (blank engraving plate included)	CWAM-OB	
Nameplate (engraved)	CWAM-①	
Additional Insert (blank)	HWNP-O	HWNP Dimensions
Additional Insert (engraved)	HWNP-①	

-  1. In place of ①, insert either the standard legend code from table below or custom engraving delimited by " ".
2. Standard engravings are available at no charge.

Standard Legend Codes

Pushbuttons				Pushbuttons/Selector Switches				Selector Switches	
Legend	Code	Legend	Code	Legend	Code	Legend	Code	Legend	Code
AUTO	101	OPEN	116	AUTO-MAN	201	REV-FOR	216	AUTO-MAN-OFF	301
CLOSE	102	OUT	117	CLOSE-OPEN	202	RUN-JOG	217	AUTO-OFF-MAN	302
DOWN	103	RAISE	118	DOWN-UP	203	RUN-SAFE	218	CLOSE-OFF-OPEN	303
EMERG.	104	RESET	119	FAST-SLOW	204	SAFE-RUN	219	DOWN-OFF-SLOW	304
STOP	105	REVERSE	120	FOR-REV	205	SLOW-FAST	220	FAST-OFF-SLOW	305
FAST	106	RUN	121	HAND-AUTO	206	START-STOP	221	FOR-OFF-REV	306
FORWARD	107	SLOW	122	HIGH-LOW	207	STOP-START	222	LEFT-OFF-RIGHT	307
HAND	108	START	123	JOG-RUN	208	UP-DOWN	223	LOWER-OFF-RAISE	308
HIGH	109	STOP	125	LEFT-RIGHT	209	OI (Int'l OFF ON)	250	OFF-MAN-AUTO	309
IN	110	TEST	126	LOWER-	210			OFF-SLOW-FAST	310
INCH	111	UP	127	RAISE	211			OFF-1-2	311
JOG	112	I (Int'l On)	150	MAN-AUTO	212			OPEN-OFF-CLOSE	312
LOW	113	O (Int'l Off)	151	OFF-ON	213			SLOW-OFF-FAST	313
LOWER	114	Off	152	ON-OFF	214			SUMMER-OFF-WINTER	314
OFF	115	EMO		OPEN-CLOSE	215			UP-OFF-DOWN	315
ON				RAISE-LOWER				1-OFF-2	316
								HAND-OFF-AUTO	317



1. To order engraved nameplates, add legend code to nameplate part number.
2. Character height based on the number of characters and size of nameplate. Standard character size is 3/16".
3. Nameplates with standard legends are the same list price as blank nameplates.

Nameplates Order Form — CW Series

Copy this order form and use it to specify Letter Height, Custom Engravings, Location of Engraving on Nameplate, and Quantity Desired.

To ensure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company:

Name:

Telephone:

Fax & Email:

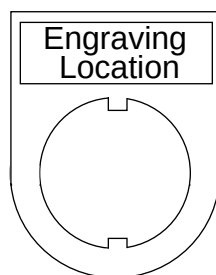
IDEC Rep/Distributor Contact:

PO number (if known):

IDEC Rep/Distributor Phone:

IDEC Rep/Distributor Fax & Email:

CWAM Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below the check boxes. Note: 1/8" size letters cannot exceed 9 characters.

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

7/64" Letter Size

☐

11 characters maximum (for 7/64" size letters)

1/8" Letter Size

☐

9 characters maximum (for 7/8" size letters)

1	2	3	4	5	6	7	8	9	10	11

Sample Letter Sizes

7/64" Letters: A B C D

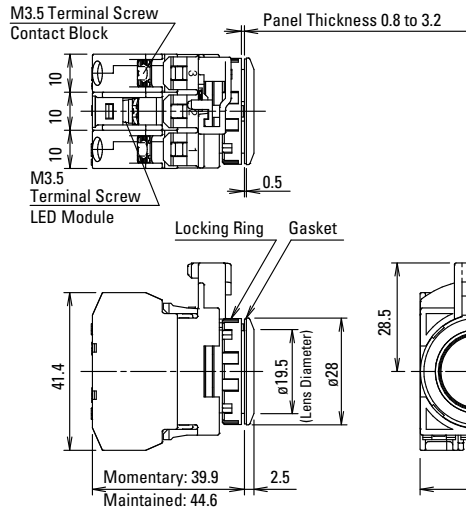
1/8" Letters: A B C D

Dimensions (mm)

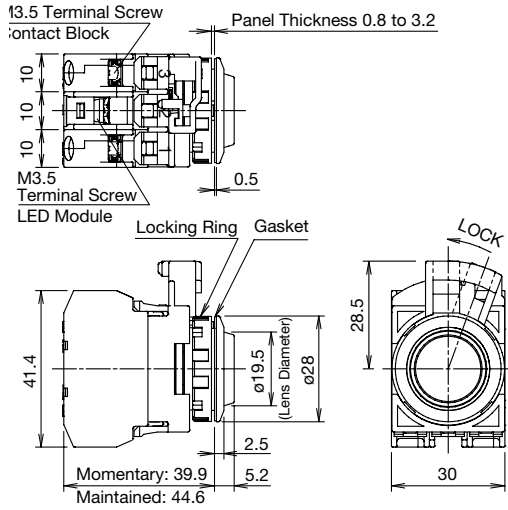
Illuminated Pushbuttons

1 to 3 Contacts

Round Flush

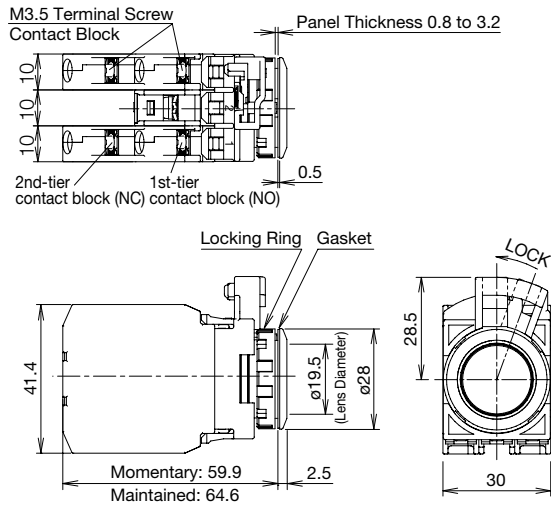


Round Extended

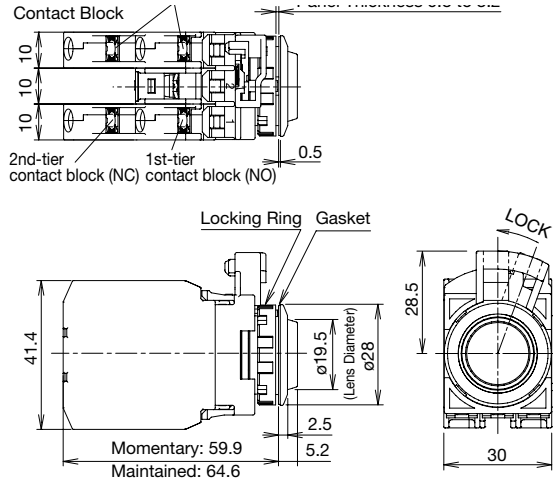


4 to 6 Contacts

Round Flush



Round Extended



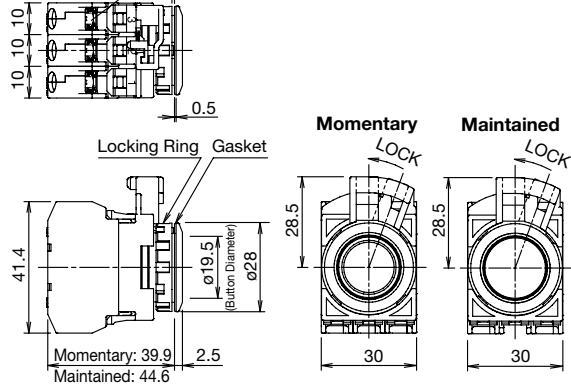
Pushbuttons

1 to 3 Contacts

Round Flush

M3.5 Terminal Screw
Contact Block

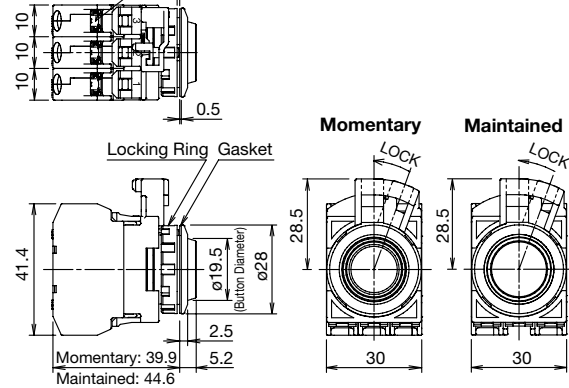
Panel Thickness 0.8 to 3.2



Round Extended

M3.5 Terminal Screw
Contact Block

Panel Thickness 0.8 to 3.2

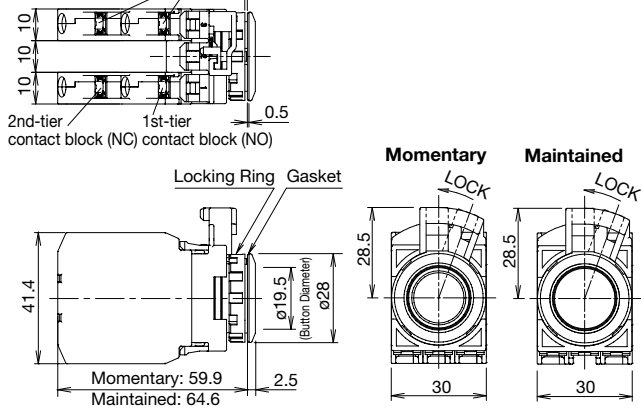


4 to 6 Contacts

Round Flush

M3.5 Terminal Screw
Contact Block

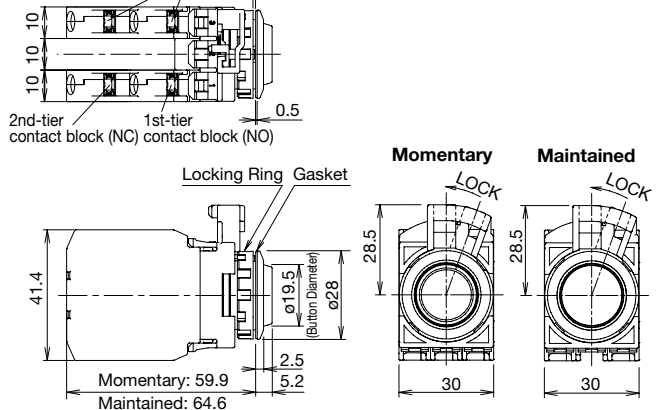
Panel Thickness 0.8 to 3.2



Round Extended

M3.5 Terminal Screw
Contact Block

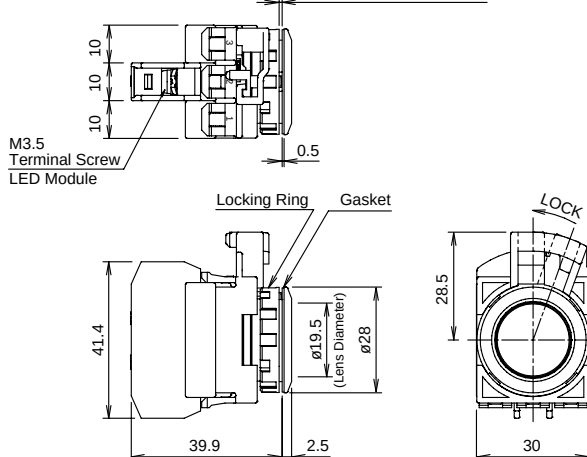
Panel Thickness 0.8 to 3.2



Pilot Lights

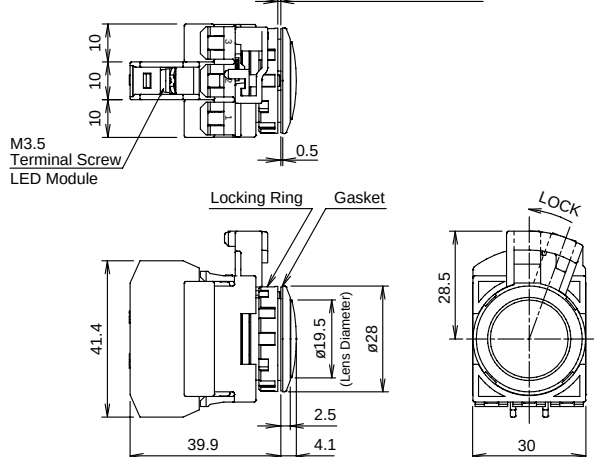
Round Flush

Panel Thickness 0.8 to 3.2



Round Dome

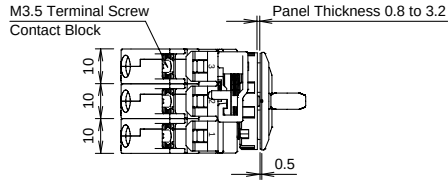
Panel Thickness 0.8 to 3.2



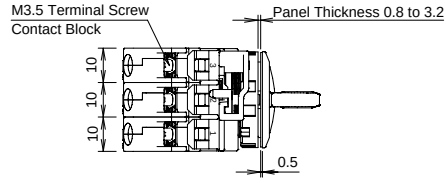
Selector Switches

1 to 3 Contacts

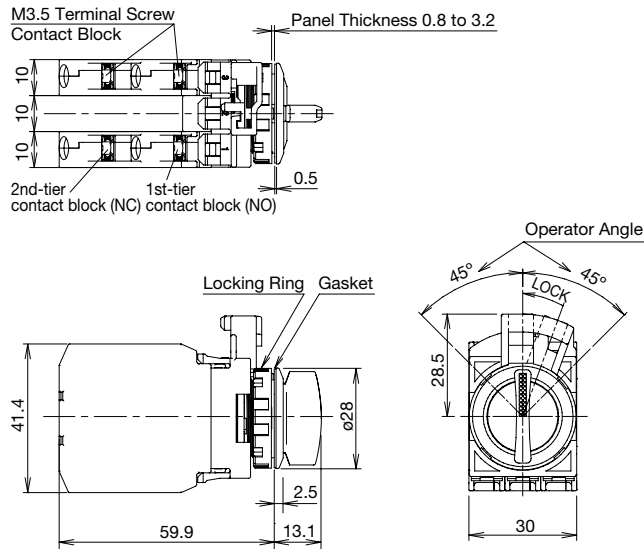
Knob Operator



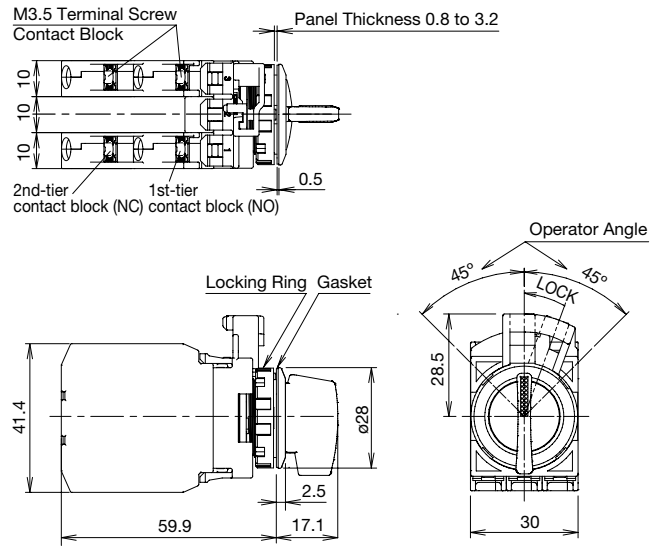
Lever Operator



Knob Operator

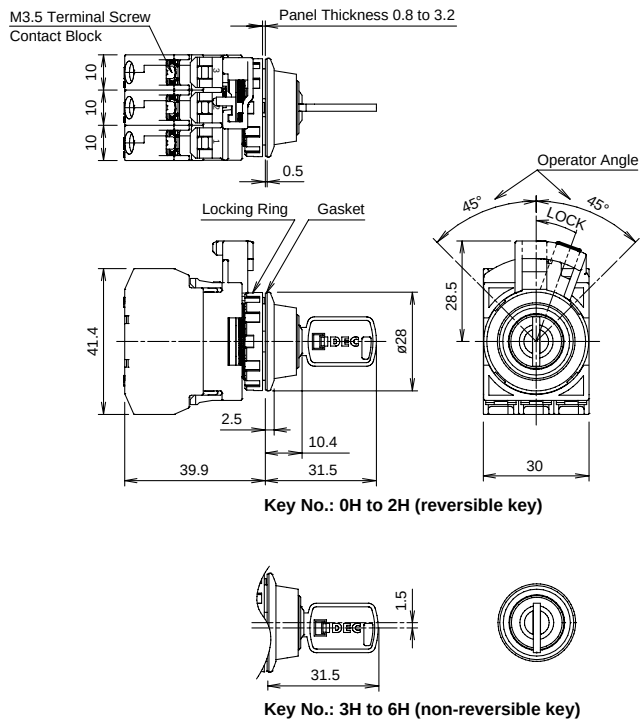


Lever Operator



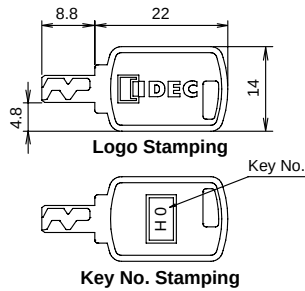
Key Selector Switches

1 to 3 Contacts

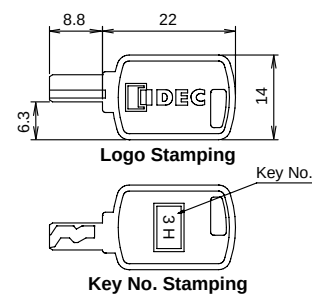


Keys

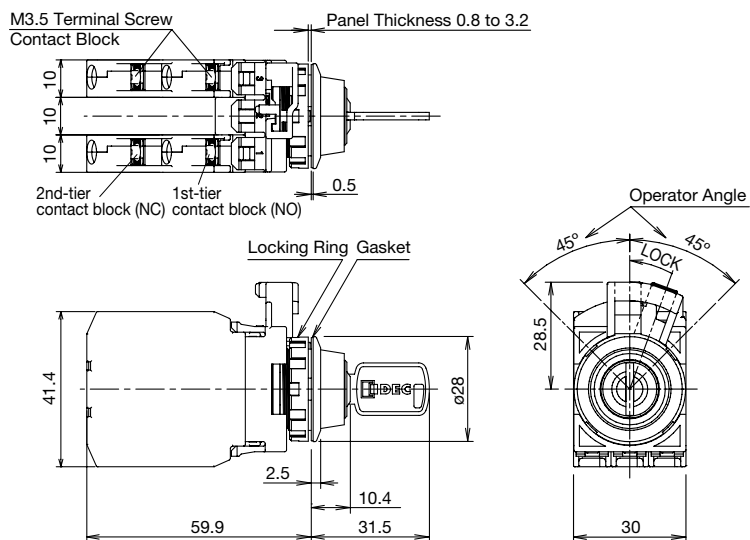
Reversible Key



Non-reversible Key



4 to 6 Contacts



Safety Precautions

Turn off the power to CW series switches before installation, removal, wiring and maintenance. Failure to turn power off may cause electrical shocks or fire hazard.

When wiring, use wires of a proper size to meet the voltage and current requirements. Tighten the M3.5 terminal screws to a tightening torque of 1.0 to 1.3 N·m. Failure to tighten the terminal screws may cause overheating and fire.

Operating Instructions

Notes for Operation

When using the CW series switches in a safety-related circuit of a control system, observe safety rules and regulations of each country concerning particular applications of the actual machines and facilities. Perform risk assessment before operation to ensure safety.

Operating Conditions

In corrosive gas or high-temperature, high-humidity environments, contact failure due to corrosion or color change or breakage of the housing may occur.

Main parts of the CW series switches are made of plastic. Do not scratch the surface with a sharp object or apply excessive electric shock or load, otherwise the switches may be damaged. In particular, keep the button, lens and bezel from such damage, otherwise appearance and function may be impaired.

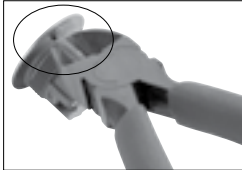
Do not apply detergents, cutting oils, or chemicals which may impair the function and appearance of the CW series switches.

Panel Mounting

First remove the contact block and then the locking ring from the operator. Insert the operator into the panel cut-out from the front, tighten the locking ring from the back, then install the contact block to the operator.

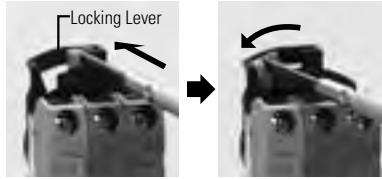
Mounting Hole

1. Mounting hole dimensions are in compliance with IEC60947-5-1.
2. If the anti-rotation projection is removed from the bezel, CW series switches can be mounted in ø22.3mm mounting holes. To remove the anti-rotation projection, remove the gasket and use cutting pliers to break the projection.



Removing and Installing the Contact Unit

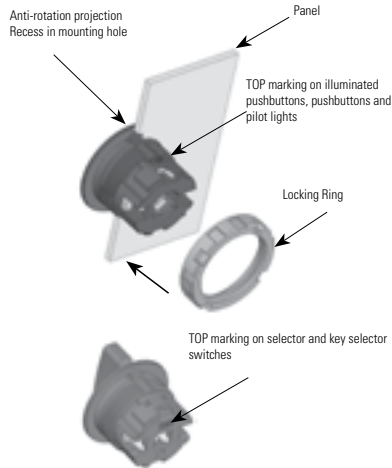
1. To remove the contact block from the operator, push the yellow locking lever and turn it to the left.



2. To install, align the TOP marking on the operator with the TOP marking on the contact block mounting adaptor, and turn the locking lever to the right.

Installation in Panel Cut-out

Remove the locking ring from the operator. With the anti-rotation projection on the operator aligned with the recess in the mounting hole, insert the operator into the mounting hole. Tighten the locking ring from the rear of the panel.



Note for Panel Mounting

When installing the operator in a panel cut-out, use the optional locking ring wrench (MW9Z-T1) to tighten the locking ring to a recommended tightening torque of 1.2 N·m. Do not use pliers and do not tighten excessively, otherwise the operator may be damaged.

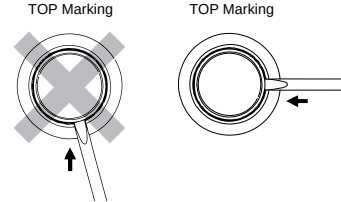
Illuminated Pushbuttons and Pilot Lights

Removing the Lens

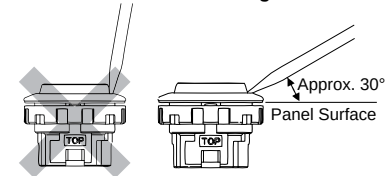
To remove the lens from an illuminated pushbutton or pilot light, insert a flat screwdriver under the flange of the lens at 90° from the TOP marking and twist the screwdriver.

Do not insert the screwdriver too far and do not apply excessive force to the lens, otherwise the bezel surface may be damaged.

Screwdriver Insertion Direction

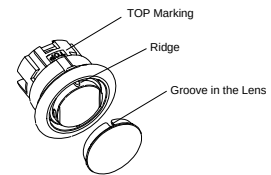


Screwdriver Insertion Angle



Installing the Lens

Turn the groove in the lens to the TOP marking on the operator housing. With the groove aligned with the ridge, press the lens in.



Marking

Marking film can be applied for inscriptions or identification.

Applicable Marking Film Size

Illuminated Pushbutton (Round Flush) Pilot Light (Round Flush, Round Extended)	Illuminated Pushbutton (Round Extended)

Thickness: 0.2mm maximum

Film material: Polyester (recommended)

Note: Film is not supplied and must be provided by the user.

Operating Instructions, con't

Pushbuttons

Pushbutton caps cannot be removed. Do not tamper with the cap using a screwdriver or pliers, otherwise it may be damaged.

Selector Switches

Turn the selector operator or key to the detent positions.

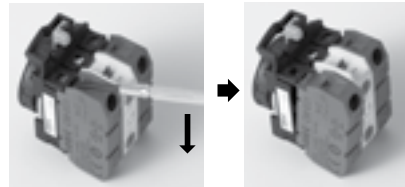
Key Selector Switches

To prevent malfunction and damage, take the following precautions.

- Completely insert the key before turning.
- Do not remove the key while turning.
- Besides the standard key (0H), six other keys are available. Use only a key with a number that matches the number on the switches' key cylinder. (The standard key does not have a key number.)
- Keys are available in two shapes.
 - 0H (standard), 1H, 2H: reversible keys
 - 3H, 4H, 5H, 6H: non-reversible keys
 Make sure of correct insertion direction.

Contact Blocks and LED Modules

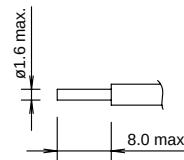
To remove the contact block from the operator, insert a flat screwdriver under the latch and push the screwdriver down as shown below. Before removing the LED module, first remove all contact blocks, and then remove the LED module in the same manner.



Wiring

Applicable Wires

Stranded wire: 2.0 mm² maximum (14AWG)
Solid wire: ø1.6 mm maximum

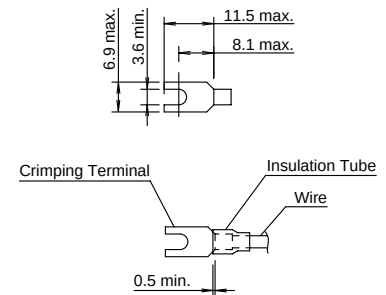


One or two wires can be connected to the terminal.

Applicable Crimping Terminals

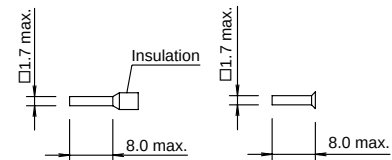
Spade terminal

When using crimping terminals, be sure to use insulating tubes or insulated crimping terminals.



Ferrule

When connecting two ferrules to one terminal, use ferrules without insulation.



When using spade terminals or ferrules, ensure that they are inserted completely. Ring terminals cannot be used.

Screw Tightening Torque

Tighten the M3.5 terminal screws to a recommended torque of 1.0 to 1.3N·m.

HW Series — 22mm IEC Style Global Pushbuttons

Key features:

- Locking lever removable contact blocks
- Finger-safe IP20 contacts
- Tamperproof construction
- All E-stops meet EN60947-5-5, and are compliant with SEMI S2 standards
- Worldwide approvals
- Easy to assemble
- Choice of black plastic or metallic front bezels
- LED illumination
- Transformer or full voltage
- Slow make double break contacts



HW: The Best Engineered Switch in the World

IDEC's HW switches are "The best engineered switch in the world" for a reason. Carrying the CE mark, UL, CSA, CCC (Chinese), and TUV approvals, these switches are designed for use in almost any part of the world.

Complete with finger-safe contact blocks offering IP20 protection, these 7/8" (22mm) switches

include illuminated and non-illuminated pushbuttons, pilot lights, selector switches, and emergency stop switches.

All switches also incorporate mechanically keyed safety locking levers, ensuring correct installation and maintaining safety in high-vibration applications.



File No. E68961



File No. LR21451



Certificate No.
R50086203_HW_e-stop
R50391189_HW



Certificate No.
2017010305987846

Specifications

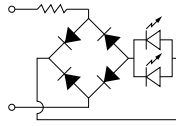
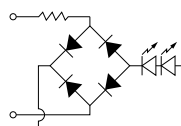
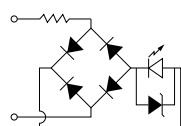
Electrical	Rated Operational Characteristics	AC-15: A600 or Ue = 250V, Ie = 3A (NO, NC, NO-EM, NC-LB) DC-13: P600 or Ue = 125V, Ie = 1.1A (NO, NC) DC-13: Q600 or Ue = 125V, Ie = 0.9A (NO-EM, NC-LB)						
	Rated Insulation Voltage	600V						
	Rated Switching Over-Voltage	Less than 4kV, conforming to IEC60947-1						
	Rated Impulse Withstanding Voltage	4kV for contact circuit, 2.5kV for lamp circuit						
	Rated Thermal Current	10 Amp						
	Minimum Switching Capacity	5 mA at 3V AC/DC						
	Electrical Reliability	MTBF < 1 fault for 10 million operation cycles (3V DC, 5mA)						
	Lamp Ratings	LEDs: 6V/17mA max, 12V & 24V/11mA max, 120 & 240V/10mA max						
Mechanical	Contact Operation	Slow break NC or NO						
	Positive Action Operation (Emergency Stops with NC contacts)	5.5mm to 10mm travel to latch, 45N minimum force to latch 10mm maximum travel, 1,800 operations per hour maximum for a Pushlock Turn Reset 900 operations per hour maximum for a Push-Pull						
	Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 7.0±2N (maintained) Additional contacts—1NO or 1NC: +3.2N (momentary), + 3.3N (maintained)						
	Recommended Terminal Torque	Unit	Wire		Number of Wires	Recommended Tightening Torque (Nm)	Terminal Screw	
			Crimping Terminal					
			HW-U Contact Block	Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	2		1.0 to 1.3
					ø1.7 to 2.0 mm (AWG12)	1		1.2 to 1.3
				Stranded Wire	0.3 to 2.0 mm² (AWG14 to 22)	2		1.0 to 1.3
					2.1 to 3.5 mm² (AWG12)	1		1.2 to 1.3
	Illuminated Unit (*1)	Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	2	1.0 to 1.3	M3.5		
			0.3 to 2.0 mm (AWG14 to 22)					
		Stranded Wire	Crimping Terminal					
			Crimping Terminal					
Applicable Wire Size	Pilot Light	Crimping Terminal		2	0.6 to 1.0 (M3.0)			
		Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)					
			Stranded Wire			ø0.3 to 2.0 mm (AWG14 to 22)		
		Crimping Terminal			1.0 to 1.3 (M3.5)			
		 1. * refers to the lamp terminals of the illuminated push buttons and selector switches.						
Applicable Wire Size	Minimum 1 x 22 AWG, max. 2 x 14 AWG or 1 x 12 AWG							
Contact Resistance	Initial contact resistance of 50mΩ or less							
Contact Gap	4mm (NO and NC), 2mm (NO-EM and NC-LB)							
Horsepower Rating	Reference Value: 1/4 HP @ 120V (1ø non-reversing), 1HP @ 240V (3ø non-reversing)							
Contact Material	Silver (gold plated contacts available - contact IDEC)							
Operating Temperature	Operation: -25 to +60°C (illuminated -25 to +50°C dome -25 to +55°C)							
Vibration Resistance	10 to 55Hz, 98m/sec² (10G) conforming to IEC6068-2-6							
Shock Resistance	980m/sec² (100G) conforming to IEC6068-2-7							
Mechanical Life	Momentary pushbuttons: 5,000,000 (900 operations per hour), All other switches: 500,000							

Standards & Approvals	Conforming to Standards			EN60947-1, EN60947-5-1, VDE0660-200, UL508, CSA C22-2 No.14						
	 File No. E68961  File No. LR92374  Approvals   TÜV Rheinland Certificate No. 2005010305145656 Registration No. R9551089 (E-stops) Registration No. R50054316 (Dual Pushbuttons) Registration No. J9650511 (Pilot Lights) Registration No. J9551458 (all other switches)			CSA: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) UL: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) TUV: pushbuttons and selector switches: A600=P600 (NO, NC)/Q600 (NO-EM, NC-LB) pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)						
	Electric Shock Protection			Class 2 conforming to IEC60664-7						
	Degree of Protection (conforming to IEC60529 and UL50)			UL Type 1, 4X, 12, 13 ¹ IP65 (from front of the panel) IP20 (Type HW-U contact block)						
	Pollution Degree (conforming to IEC60947-1)			3						
External Short-Circuit Protection			10A 250V fuse conforming to IEC60269-1							
Contact Ratings	Pushbuttons Illuminated Pushbuttons Selector Switches Illuminated Selector Switches Pushbutton Selectors			Contact Block			Type HW-U			
				Rated Insulation Voltage			600V			
				Rated Continuous Current			10A			
				Contact Ratings by Utilization Category IEC 60947-5-1			AC-15 (A600) DC-13 (P600)			
Characteristics	Operational Voltage			24V	48V	50V	110V	220V	440V	
	Operational Current	AC 50/60 Hz	AC-12 Control of resistive loads & solid state loads	10A	—	10A	10A	6A	2A	
			AC-15 Control of electromagnetic loads (> 72VA)	10A	—	7A	5A	3A	1A	
		DC	DC-12 Control of resistive loads & solid state loads	10A	5A	—	2.2A	1.1A	—	
			DC-13 Control of electromagnets	5A	2A	—	1.1A	0.6A	—	



For dimensions, see page 685.
Note 1. Except HW2B

LED Lamp Ratings (LSTD Type)

Model			LSTD-6②	LSTD-1②	LSTD-2②	LSTD-H2②	LSTD-M4②
Lamp Base			BA9S/13				
Rated Voltage			6V AC/DC	12V AC/DC	24V AC/DC	120V AC	240V AC
Voltage Range			6V AC/DC ±10%	12V AC/DC ±10%	24V AC/DC ±10%	120V AC ±5%	240V AC ±5%
Current Draw	AC	A, R, W: G, S:	17mA 8mA	11mA	11mA	10mA	10mA
	DC	A, R, W: G, S:	14mA 5.5mA	10mA	10mA	—	—
Color Code			A (amber), G (green), R (red), S (blue), W (white)				
Lamp Base Color			Same as illumination color				
Voltage Marking			Die stamped on the base				
Life (reference value)			Approx. 50,000 hours (The luminance reduces to 50% the initial intensity when used on complete DC.)				
Internal Circuit	A, R, W		A, R, W				
							
			G, S				
 LED Chip  Protection Diode  Zener Diode							



In place of ②, specify the Lens/LED Color Code.

Non-Illuminated Round Pushbuttons (Assembled)



		Round Flush		Round Extended	
Function	Contacts	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Momentary	Operator Only	HW1B-M1-①	HW4B-M1-①	HW1B-M2-①	HW4B-M2-①
	1NO	HW1B-M1F10-①	HW4B-M1F10-①	HW1B-M2F10-①	HW4B-M2F10-①
	1NC	HW1B-M1F01-①	HW4B-M1F01-①	HW1B-M2F01-①	HW4B-M2F01-①
	1NO-1NC	HW1B-M1F11-①	HW4B-M1F11-①	HW1B-M2F11-①	HW4B-M2F11-①
	2NO	HW1B-M1F20-①	HW4B-M1F20-①	HW1B-M2F20-①	HW4B-M2F20-①
	2NC	HW1B-M1F02-①	HW4B-M1F02-①	HW1B-M2F02-①	HW4B-M2F02-①
	2NO-2NC	HW1B-M1F22-①	HW4B-M1F22-①	HW1B-M2F22-①	HW4B-M2F22-①
Maintained	Operator Only	HW1B-A1-①	HW4B-A1-①	HW1B-A2-①	HW4B-A2-①
	1NO	HW1B-A1F10-①	HW4B-A1F10-①	HW1B-A2F10-①	HW4B-A2F10-①
	1NC	HW1B-A1F01-①	HW4B-A1F01-①	HW1B-A2F01-①	HW4B-A2F01-①
	1NO-1NC	HW1B-A1F11-①	HW4B-A1F11-①	HW1B-A2F11-①	HW4B-A2F11-①
	2NO	HW1B-A1F20-①	HW4B-A1F20-①	HW1B-A2F20-①	HW4B-A2F20-①
	2NC	HW1B-A1F02-①	HW4B-A1F02-①	HW1B-A2F02-①	HW4B-A2F02-①
	2NO-2NC	HW1B-A1F22-①	HW4B-A1F22-①	HW1B-A2F22-①	HW4B-A2F22-①

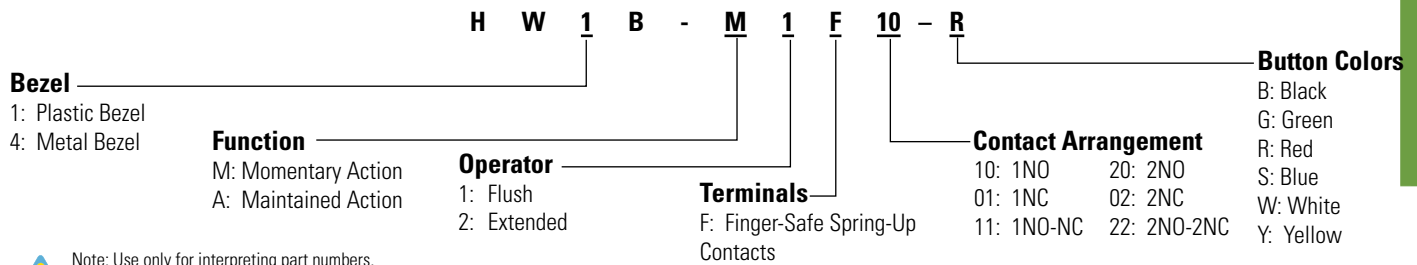
① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y



- 1. In place of ①, specify the Button Color Code from table below.
- 2. For nameplates and accessories, see page 680 and 683.
- 3. For dimensions, see page 685.
- 4. For contact assembly part numbers, see page 685.
- 5. All assembled part numbers in catalog include standard, Finger-Safe (HW-U...) contacts.
- 6. Operator only models include operator plus button.
- 7. Additional contact configurations available (up to 6 total contacts).

Part Number Structure



Non-Illuminated Round Pushbuttons (Replacement Parts)

Contact Blocks	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	+	Button	=	Completed Unit
----------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	--------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C

- Used to mount contact blocks to operator.
- IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style		Plastic Bezel	Metal Bezel
 Round Flush/ Extended	Momentary	HW1B-M0	HW4B-M0
	Maintained	HW1B-A0	HW4B-A0

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Buttons

Style	Part Number
 Round Flush	HW1A-B1-①
 Round Extended	HW1A-B2-①



1. In place of ①, specify the Button Color Code from table.

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Non-Illuminated Mushroom Head Pushbuttons (Assembled)



		ø29mm Mushroom Head		ø40mm Mushroom Head	
Function	Contacts	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Momentary	<i>Operator Only</i>	<i>HW1B-M3-①</i>	<i>HW4B-M3-①</i>	<i>HW1B-M4-①</i>	<i>HW4B-M4-①</i>
	1NO	HW1B-M3F10-①	HW4B-M3F10-①	HW1B-M4F10-①	HW4B-M4F10-①
	1NC	HW1B-M3F01-①	HW4B-M3F01-①	HW1B-M4F01-①	HW4B-M4F01-①
	1NO-1NC	HW1B-M3F11-①	HW4B-M3F11-①	HW1B-M4F11-①	HW4B-M4F11-①
	2NO	HW1B-M3F20-①	HW4B-M3F20-①	HW1B-M4F20-①	HW4B-M4F20-①
	2NC	HW1B-M3F02-①	HW4B-M3F02-①	HW1B-M4F02-①	HW4B-M4F02-①
Maintained	2NO-2NC	HW1B-M3F22-①	HW4B-M3F22-①	HW1B-M4F22-①	HW4B-M4F22-①
	<i>Operator Only</i>	<i>HW1B-A3-①</i>	<i>HW4B-A3-①</i>	<i>HW1B-A4-①</i>	<i>HW4B-A4-①</i>
	1NO	HW1B-A3F10-①	HW4B-A3F10-①	HW1B-A4F10-①	HW4B-A4F10-①
	1NC	HW1B-A3F01-①	HW4B-A3F01-①	HW1B-A4F01-①	HW4B-A4F01-①
	1NO-1NC	HW1B-A3F11-①	HW4B-A3F11-①	HW1B-A4F11-①	HW4B-A4F11-①
	2NO	HW1B-A3F20-①	HW4B-A3F20-①	HW1B-A4F20-①	HW4B-A4F20-①
	2NC	HW1B-A3F02-①	HW4B-A3F02-①	HW1B-A4F02-①	HW4B-A4F02-①
	2NO-2NC	HW1B-A3F22-①	HW4B-A3F22-①	HW1B-A4F22-①	HW4B-A4F22-①



① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y



- 1. In place of ①, specify the Button Color Code from table.
- 2. *60mm mushroom available only in red, green, black, and yellow.
- 3. For nameplates and accessories, see page 680 and 683.
- 4. For dimensions, see page 685.
- 5. For contact assembly part numbers, see page 685.
- 6. All assembled part numbers in catalog include standard spring-up Finger-Safe (HW-U...) contacts.
- 7. Operator only models include operator plus button.
- 8. Additional contact configurations available (up to 6 total contacts).

		ø60mm Mushroom Head
Function	Contacts	Plastic Bezel
Momentary	<i>Operator Only</i>	<i>HW1B-M5-①*</i>
	1NO	HW1B-M5F10-①*
	1NC	HW1B-M5F01-①*
	1NO-1NC	HW1B-M5F11-①*
	2NO	HW1B-M5F20-①*
	2NC	HW1B-M5F02-①*
	2NO-2NC	HW1B-M5F22-①*

Part Number Structure

Bezel

1: Plastic Bezel
4: Metal Bezel
(Not available for 60mm mushroom)

Function

M: Momentary Action
A: Maintained Action
(Not available for 60mm jumbo mushroom pushbutton.)

Operator

3: ø29mm Mushroom
4: ø40mm Mushroom
5: ø60mm Mushroom

Terminals

F: Finger-Safe Spring-Up
Contacts

Contact Arrangement

10: 1NO 20: 2NO
01: 1NC 02: 2NC
11: 1NO-NC 22: 2NO-2NC

Button Colors

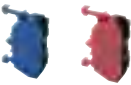
B: Black
G: Green
R: Red
S: Blue
W: White
Y: Yellow

 Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Non-Illuminated Mushroom Head Pushbuttons (Replacement Parts)

Contact Blocks	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	+	Button	=	Completed Unit
												

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C

-  1. Used to mount contact blocks to operator.
2. IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL

Operators

Style		Plastic Bezel	Metal Bezel
ø29mm Mushroom ø40mm Mushroom	Momentary	HW1B-M0L	HW4B-M0L
	Maintained	HW1B-A0L	HW4B-A0L
Ø60mm Jumbo Mushroom	Momentary	HW1B-M5-①*	—

-  1. *60mm mushroom operator includes non-removable button (available in red, black, green and yellow only).
2. For nameplates and accessories, see page 680 and 683.
3. For dimensions, see page 685.

Buttons

Style	Part Number
ø29mm Mushroom Cap	HW1A-B3-①
	
ø40mm Mushroom Cap	HW1A-B4-①
	

-  1. In place of ①, specify the Button Color Code from table.

① Button Color Code

Color	Code	Color	Code
Black	B	Blue	S
Green	G	White	W
Red	R	Yellow	Y

-  HW1B-M5 available only in black, red, green and yellow.

Non-Illuminated Square Pushbuttons (Assembled)



Function	Contacts	Square Flush	Square Extended
		Plastic Bezel	Plastic Bezel
Momentary	Operator Only	HW2B-M1-①	HW2B-M2-①
	1NO	HW2B-M1F10-①	HW2B-M2F10-①
	1NC	HW2B-M1F01-①	HW2B-M2F01-①
	1NO-1NC	HW2B-M1F11-①	HW2B-M2F11-①
	2NO	HW2B-M1F20-①	HW2B-M2F20-①
	2NC	HW2B-M1F02-①	HW2B-M2F02-①
	2NO-2NC	HW2B-M1F22-①	HW2B-M2F22-①
Maintained	Operator Only	HW2B-A1-①	HW2B-A2-①
	1NO	HW2B-A1F10-①	HW2B-A2F10-①
	1NC	HW2B-A1F01-①	HW2B-A2F01-①
	1NO-1NC	HW2B-A1F11-①	HW2B-A2F11-①
	2NO	HW2B-A1F20-①	HW2B-A2F20-①
	2NC	HW2B-A1F02-①	HW2B-A2F02-①
	2NO-2NC	HW2B-A1F22-①	HW2B-A2F22-①

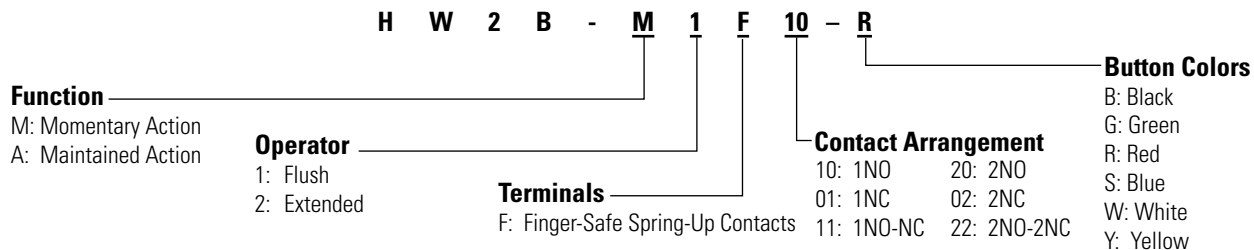
① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y



- 1. In place of ①, specify the Button Color Code from table.
- 2. For nameplates and accessories, see page 680 and 683.
- 3. For dimensions, see page 685.
- 4. For contact assembly part numbers, see page 685.
- 5. Square pushbuttons available in plastic bezel only.
- 6. All assembled part numbers in catalog include finger-safe spring-up (HW-U...) contacts.
- 7. Operator only model includes operator and button.
- 8. Additional contact configurations available (up to 6 total contacts).

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Non-Illuminated Square Pushbuttons (Replacement Parts)

Contact Blocks	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	+	Button	=	Completed Unit
----------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	--------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator.
- IEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style		Plastic Bezel
	Momentary	HW2B-M0
	Maintained	HW2B-A0



- For nameplates and accessories, see pages 680 and 683.
- For dimensions, see page 685.

Buttons

Style	Part Number
Square Flush 	HW2A-B1-①
Square Extended 	HW2A-B2-①



- In place of ①, specify the Button Color Code from table.

① Button Color Code

Color	Code	Color	Code
Black	B	Blue	S
Green	G	White	W
Red	R	Yellow	Y

Non-Illuminated E-Stop Pushbuttons (Assembled)



Contacts	Ø29mm Head Pushlock Turn Reset		Ø40mm Head Pushlock Turn Reset	
	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Operator Only	HW1B-V3Ⓢ†	HW4B-V3Ⓢ†	HW1B-V4Ⓢ†	HW4B-V4Ⓢ†
1NO	HW1B-V3F10-Ⓢ†	HW4B-V3F10-Ⓢ†	HW1B-V4F10-Ⓢ†	HW4B-V4F10-Ⓢ†
1NC	HW1B-V3F01-Ⓢ†	HW4B-V3F01-Ⓢ†	HW1B-V4F01-Ⓢ†	HW4B-V4F01-Ⓢ†
1NO-1NC	HW1B-V3F11-Ⓢ†	HW4B-V3F11-Ⓢ†	HW1B-V4F11-Ⓢ†	HW4B-V4F11-Ⓢ†
2NO	HW1B-V3F20-Ⓢ†	HW4B-V3F20-Ⓢ†	HW1B-V4F20-Ⓢ†	HW4B-V4F20-Ⓢ†
2NC	HW1B-V3F02-Ⓢ†	HW4B-V3F02-Ⓢ†	HW1B-V4F02-Ⓢ†	HW4B-V4F02-Ⓢ†



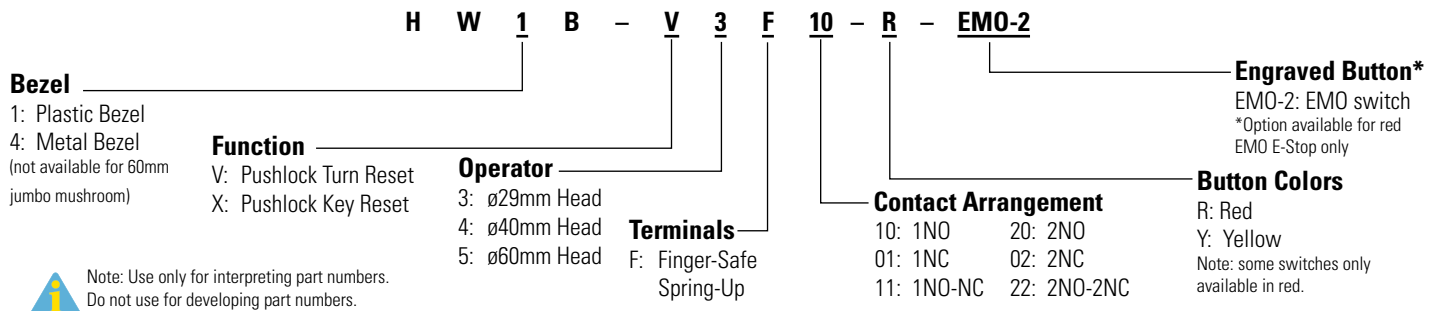
Contacts	Ø40mm Head EMO Pushlock Turn Reset		Ø40mm Head Pushlock Key Reset	
	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Operator Only	HW1B-V4R-EMO-2*	HW4B-V4R-EMO-2*	HW1B-X4R*	HW4B-X4R*
1NO	HW1B-V4F10-R-EMO-2*	HW4B-V4F10-R-EMO-2*	HW1B-X4F10-R*	HW4B-X4F10-R*
1NC	HW1B-V4F01-R-EMO-2*	HW4B-V4F01-R-EMO-2*	HW1B-X4F01-R*	HW4B-X4F01-R*
1NO-1NC	HW1B-V4F11-R-EMO-2*	HW4B-V4F11-R-EMO-2*	HW1B-X4F11-R*	HW4B-X4F11-R*
2NO	HW1B-V4F20-R-EMO-2*	HW4B-V4F20-R-EMO-2*	HW1B-X4F20-R*	HW4B-X4F20-R*
2NC	HW1B-V4F02-R-EMO-2*	HW4B-V4F02-R-EMO-2*	HW1B-X4F02-R*	HW4B-X4F02-R*



1. * Available in Red only.
2. † Available in red or yellow. Insert color code in place of Ⓢ (R: Red, Y: Yellow).
2. For accessories, see page 683.
3. For dimensions, see page 685.
5. For nameplates and shrouds, see page 685.
4. For contact assembly part numbers, see page 685.
7. All HW series E-stops comply with EN60947-5-5, the IEC "E-Stop Addendum to the Low Voltage Directive," this includes "tamper proof" operation whereby a change of contact state is not possible by "teasing" or "floating" the operator.
8. All assembled part numbers in catalog include standard finger-safe spring-up (HW-U...) contacts.
9. Operator only models include operator and button.
10. Additional contact configurations available (up to 6 total contacts).

Contacts	ø60mm Head Pushlock Turn Reset
	Plastic Bezel
Operator Only	HW1B-V5R*
1NO	HW1B-V5F10-R*
1NC	HW1B-V5F01-R*
1NO-1NC	HW1B-V5F11-R*
2NO	HW1B-V5F20-R*
2NC	HW1B-V5F02-R*

Part Number Structure



Non-Illuminated E-Stop Pushbuttons (Replacement Parts)

Contact Blocks	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	=	Completed Unit
----------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Plastic		Metal
ø29mm Head Pushlock Turn Reset 	red	HW1B-V3R	HW4B-V3R
	yellow	HW1B-V3Y	HW4B-V3Y
ø40mm Head Pushlock Turn Reset 	red	HW1B-V4R	HW4B-V4R
	yellow	HW1B-V4Y	HW4B-V4Y
ø40mm Head EMO Pushlock Turn Reset* 		HW1B-V4R-EMO-2	HW4B-V4R-EMO-2
ø40mm Head Pushlock Key Reset* 		HW1B-X4R	HW4B-X4R
ø60mm Head Pushlock Turn Reset* 		HW1B-V5R	—



1. * Available in red only.
 2. All E-Stop buttons are not removable from the operator.



Note: Determine mounting centers to ensure proper spacing.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



1. Used to mount contact blocks to operator.
 2. IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Push Pull & Unibody E-Stop Pushbuttons (Assembled)



Contacts	ø40mm Head Push-Pull	
	Plastic Bezel	Metal Bezel
Operator Only (Red)	HW1B-Y2R	HW4B-Y2R
Operator Only (Yellow)	HW1B-Y2Y	HW4B-Y2Y
1NO	HW1B-Y2F10-①†	HW4B-Y2F10-①†
1NC	HW1B-Y2F01-①†	HW4B-Y2F01-①†
1NO-1NC	HW1B-Y2F11-①†	HW4B-Y2F11-①†
2NC	HW1B-Y2F02-①†	HW4B-Y2F02-①†
2NO	HW1B-Y2F20-①†	HW4B-Y2F20-①†

Contacts	ø40mm Unibody Pushlock Turn Reset*	
	Plastic Bezel	
1NO-1NC	HW1E-BV4F11-R	
2NC	HW1E-BV4F02-R	
1NO-2NC*	HW1E-BV412R-TK2093-1	



* NO contact is used as a monitoring contact



Contacts	Unibody Illuminated E-Stops*	
	LED	
1NO-1NC	HW1E-LV4F11QD-R-③	
2NC	HW1E-LV4F02QD-R-③	
2NC (with push-on illumination)	HW1E-TV4F02QD-R-③	
1NO-1NC (with push-on illumination)	HW1E-TV4F11QD-R-③	

③ Full Voltage LED Code

Voltage	Code
6VAC/DC	6V
12VAC/DC	12V
24VAC/DC	24V
120V AC	120V
240V AC	240V

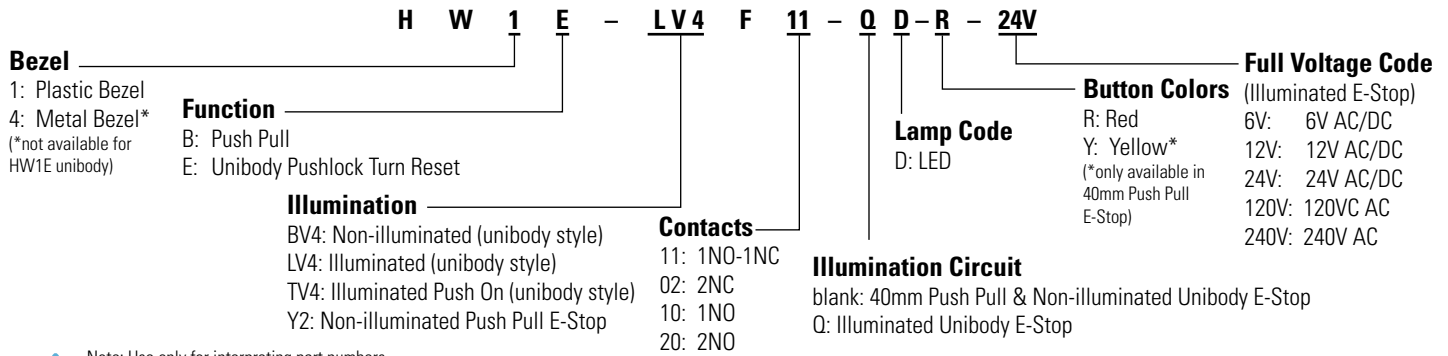
Terminal Numbering (Unibody only)

Models	Terminal Number
1NO-1NC	NO = 13/14, NC = 11/12
2NC	NC = 11/12, NC = 21/22
HW1E-L HW1E-T	LED + = X2, LED - = X1



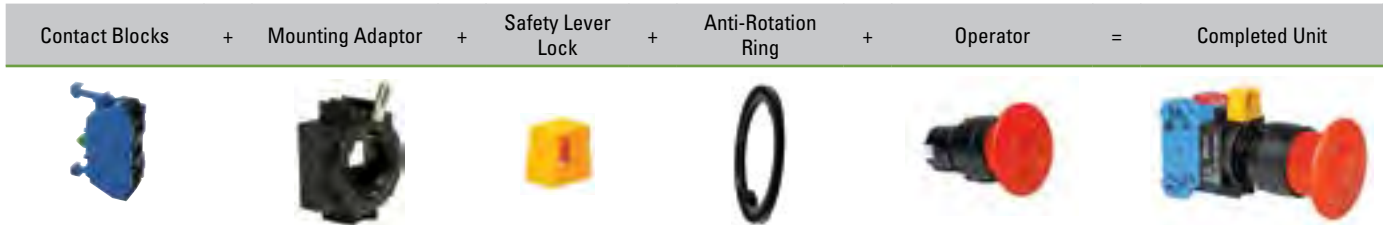
- * Available in Red only.
- † Available in red or yellow. Insert color code in place of ① (R: Red, Y: Yellow).
- In place of ③, specify Full Voltage LED Code.
- With single unit construction, the positive action contacts are integrated in the body of the switch. This provides an extra degree of safety and reliability for critical emergency stop functions.
- In the illuminated version, the light is independent of the switch action (except push-on LED model).
- For accessories, see page 683.
- For dimensions, see page 685.
- For nameplates and shrouds, see page 683.
- For contact assembly part numbers, see page 683.
- All HW Series E-Stop operators include non-removable color caps.
- All HW series E-Stops comply with EN60947-5-5, the IEC "E-Stop Addendum to the Low Voltage Directive," this includes "tamper proof" operation whereby a change of contact state is not possible by "teasing" or "floating" the operator.
- All HW series E-Stop switches comply with SEMI S2 standards.
- All assembled part numbers in catalog include standard finger-safe spring-up (HW-U...) contacts.
- Additional contact configurations available (up to 6 total contacts).

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Illuminated & Non-Illuminated E-Stop Pushbuttons (Replacement Parts)



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	



- There are no replacement parts for the HW1E unibody E-Stop.
- For illuminated unibody E-Stop, see page 685 for replacement lens.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator.
- IEDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style		Part Number
ø40mm Head Push-Pull	Plastic	HW1B-Y2R
		HW4B-Y2R
	Metal	HW1B-Y2Y
		HW4B-Y2Y



All E-Stop Buttons are not removable from the operator.

E-Stop Stations



	29mm Pushlock Turn Reset		40mm Pushlock Turn Reset	
Contacts	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
1NO-1NC	FB1W-HW1B-V311R	FB1W-HW4B-V311R	FB1W-HW1B-V411R	FB1W-HW4B-V411R
2NC	FB1W-HW1B-V302R	FB1W-HW4B-V302R	FB1W-HW1B-V402R	FB1W-HW4B-V402R



	40mm Push-Pull Reset		40mm Pushlock Key Reset	
Contacts	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
1NO-1NC	FB1W-HW1B-Y211R	FB1W-HW4B-Y211R	FB1W-HW1B-X411R	FB1W-HW4B-X411R
2NC	FB1W-HW1B-Y202R	FB1W-HW4B-Y202R	FB1W-HW1B-X402R	FB1W-HW4B-X402R



	40mm EMO Pushlock Turn Reset	
Contacts	Plastic Bezel	Metal Bezel
1NO-1NC	FB1W-HW1B-V411R-EMO-2	FB1W-HW4B-V411R-EMO-2
2NC	FB1W-HW1B-V402R-EMO-2	FB1W-HW4B-V402R-EMO-2

-
1. Maximum of two contact blocks.

2. Box is supplied with yellow top and black bottom only.

Jumbo Dome Pilot Lights



Plastic Bezel

Actual Size



Jumbo Dome

LED

Operator Only

HW1P-5Q0

Full Voltage
24V AC/DC

HW1P-5Q4-②



1. In place of ②, specify the Lens/LED Color Code.
2. Spring-Up terminals with 24V LED.
3. For nameplates and accessories, see page 680 and 683.
4. For dimensions, see page 685.

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y



Jumbo Dome Replacement Parts

Item	Appearance	Description	Part Number
Lens		Polycarbonate Lens	HW1A-P5②
LED Diffusing Lens			HW9Z-PP5C
LED Lamps		LED Lamp	LSTDB-2②



1. In place of ②, specify the Lens/LED Color Code.
2. Use white LED for yellow lens.

Lamp Ratings

	Part Number	Operating Voltage	Rated Current	Power Consumption
LED	LSTDB-2	24V AC/DC ±10%	15mA	0.36W



Pilot Lights (Assembled)



		Round Flush		Dome	
		Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Operator Only		HW1P-1FQ0-②	HW4P-1FQ0-②	HW1P-2FQ0-②	HW4P-2FQ0-②
Full Voltage		HW1P-1FQD-②-③	HW4P-1FQD-②-③	HW1P-2FQD-②-③	HW4P-2FQD-②-③
Transformer	120V AC	HW1P-1FH2D-②	HW4P-1FH2D-②	HW1P-2FH2D-②	HW4P-2FH2D-②
	240V AC	HW1P-1FM4D-②	HW4P-1FM4D-②	HW1P-2FM4D-②	HW4P-2FM4D-②
	480V AC	HW1P-1FT8D-②	HW4P-1FT8D-②	HW1P-2FT8D-②	HW4P-2FT8D-②
DC-DC Converter*	110V DC	HW1P-1D2D-②	—	HW1P-2D2D-②	—



		Square Flush
		Plastic Bezel
Operator Only		HW2P-1FQ0-②
Full Voltage		HW2P-1FQD-②-③
Transformer	120V AC	HW2P-1FH2D-②
	240V AC	HW2P-1FM4D-②
	480V AC	HW2P-1FT8D-②
DC-DC Converter*	110V DC	HW2P-1D2D-②

 * DC-DC converter voltage input from 90-140V DC.

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

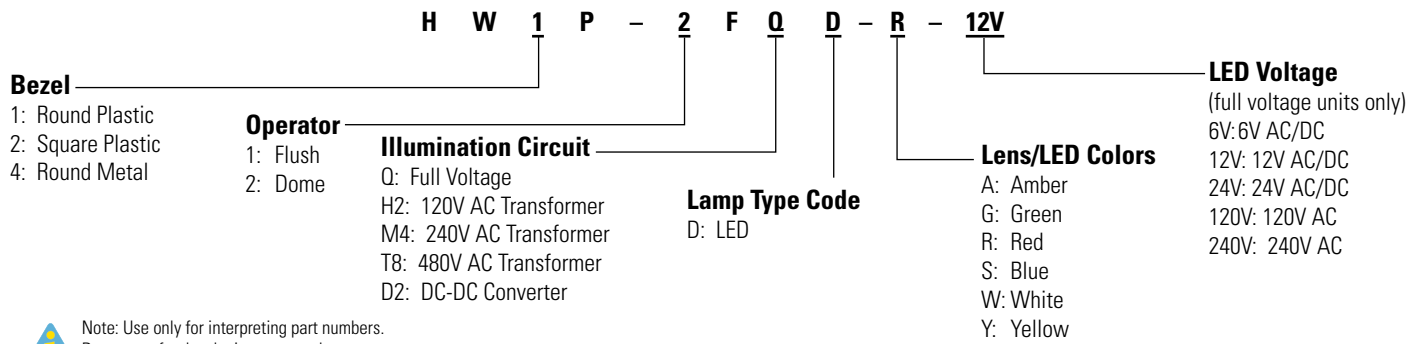
③ LED Full Voltage Code

Voltage	Code
6VAC/DC	6V
12VAC/DC	12V
24VAC/DC	24V
120V AC	120V
240V AC	240V



- 1. In place of ②, specify the Lens/LED Color Code from table below.
- 2. In place of ③ specify the Full Voltage Code from table below.
- 3. For nameplates and accessories, see page 680 and 683.
- 4. For dimensions, see page 685.
- 5. **Pilot lights do not come with anti-rotation ring.**
- 6. Operator models come with operator and lens.
- 7. **Yellow pilot light comes with white LED.**

Part Number Structure



Pilot Lights (Replacement Parts)

Transformer*	+	LED	+	Operator	+	Lens	=	Completed Unit
--------------	---	-----	---	----------	---	------	---	----------------



(not applicable for full voltage units)

Transformer Units

Style	Voltage	Part Number
LED	120V AC	HW-FH20
	240V AC	HW-FM40
	480V AC	HW-FT80
	110V DC†	HW-RD0*



(6V secondary voltage)

1. *DC-DC converter can only be used with HW1P-100 and HW2P-100 operators
2. † DC-DC converter voltage input from 90-140V DC.

LED Lamps

Style	Voltage	Part Number
LED	6V AC/DC	LSTD-6Ⓢ
	12V AC/DC	LSTD-1Ⓢ
	24V AC/DC	LSTD-2Ⓢ
	120V AC	LSTD-H2Ⓢ
	240V AC	LSTD-M4Ⓢ



1. In place of Ⓢ, specify the LED Color Code.
2. The LED contains a current-limiting resistor and reverse polarity protection diodes.

② LED Color Code

Color	Code	Color	Code
Amber	A	Blue	S
Green	G	White	W
Red	R		



For yellow lens use white LED.

Operators

Style	Type	Plastic Bezel	Metal Bezel
Round Flush	Full Voltage	HW1P-1FQ0	HW4P-1FQ0
	Finger-Safe	HW1P-10	HW4P-10
	Used for DC-DC convertor only	HW1P-100	-
Dome	Full Voltage	HW1P-2FQ0	HW4P-2FQ0
	Finger-Safe	HW1P-20	HW4P-20
	Used for DC-DC convertor only	HW1P-200	-
Square Flush	Full Voltage	HW2P-1FQ0	-
	Finger-Safe	HW2P-10	-
	Used for DC-DC convertor only	HW2P-100	-



1. Transformer type requires separate transformer & LED. Must select correct transformer bases. Use 6V LEDs.
2. Full voltage type only requires LED.

Lenses

Style	Part Number
Round/Flush	HW1A-P1-③
Dome	HW1A-P2-③
Square/Flush	HW2A-P1-③



In place of ③, specify the Lens Color Code.

③ Lens Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y



For yellow lens use white LED.

Illuminated Round Pushbuttons (Assembled)



Illuminated Full Voltage Pushbuttons



	Contacts	Flush		Extended		Extended w/ Full Shroud	
		Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Momentary	Operator Only	HW1L-M1-②	HW4L-M1-②	HW1L-M2-②	HW4L-M2-②	HW1L-MF2-②	HW4L-MF2-②
	1NO	HW1L-M1F10QD-②-③	HW4L-M1F10QD-②-③	HW1L-M2F10QD-②-③	HW4L-M2F10QD-②-③	HW1L-MF2F10QD-②-③	HW4L-MF2F10QD-②-③
	1NC	HW1L-M1F01QD-②-③	HW4L-M1F01QD-②-③	HW1L-M2F01QD-②-③	HW4L-M2F01QD-②-③	HW1L-MF2F01QD-②-③	HW4L-MF2F01QD-②-③
	1NO-1NC	HW1L-M1F11QD-②-③	HW4L-M1F11QD-②-③	HW1L-M2F11QD-②-③	HW4L-M2F11QD-②-③	HW1L-MF2F11QD-②-③	HW4L-MF2F11QD-②-③
	2NO	HW1L-M1F20QD-②-③	HW4L-M1F20QD-②-③	HW1L-M2F20QD-②-③	HW4L-M2F20QD-②-③	HW1L-MF2F20QD-②-③	HW4L-MF2F20QD-②-③
Maintained	Operator Only	HW1L-A1-②	HW4L-A1-②	HW1L-A2-②	HW4L-A2-②	HW1L-AF2-②	HW4L-AF2-②
	1NO	HW1L-A1F10QD-②-③	HW4L-A1F10QD-②-③	HW1L-A2F10QD-②-③	HW4L-A2F10QD-②-③	HW1L-AF2F10QD-②-③	HW4L-AF2F10QD-②-③
	1NC	HW1L-A1F01QD-②-③	HW4L-A1F01QD-②-③	HW1L-A2F01QD-②-③	HW4L-A2F01QD-②-③	HW1L-AF2F01QD-②-③	HW4L-AF2F01QD-②-③
	1NO-1NC	HW1L-A1F11QD-②-③	HW4L-A1F11QD-②-③	HW1L-A2F11QD-②-③	HW4L-A2F11QD-②-③	HW1L-AF2F11QD-②-③	HW4L-AF2F11QD-②-③
	2NO	HW1L-A1F20QD-②-③	HW4L-A1F20QD-②-③	HW1L-A2F20QD-②-③	HW4L-A2F20QD-②-③	HW1L-AF2F20QD-②-③	HW4L-AF2F20QD-②-③

Illuminated Transformer Pushbuttons



	Contacts	Flush		Extended		Extended w/ Full Shroud	
		Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel	Plastic Bezel	Metal Bezel
Momentary	Operator Only	HW1L-M1-②	HW4L-M1-②	HW1L-M2-②	HW4L-M2-②	HW1L-MF2-②	HW4L-MF2-②
	1NO-1NC	HW1L-M1F11-③D-②	HW4L-M1F11-③D-②	HW1L-M2F11-③D-②	HW4L-M2F11-③D-②	HW1L-MF2F11-③D-②	HW4L-MF2F11-③D-②
	2NO	HW1L-M1F20-③D-②	HW4L-M1F20-③D-②	HW1L-M2F20-③D-②	HW4L-M2F20-③D-②	HW1L-MF2F20-③D-②	HW4L-MF2F20-③D-②
Maintained	Operator Only	HW1L-A1-②	HW4L-A1-②	HW1L-A2-②	HW4L-A2-②	HW1L-AF2-②	HW4L-AF2-②
	1NO-1NC	HW1L-A1F11-③D-②	HW4L-A1F11-③D-②	HW1L-A2F11-③D-②	HW4L-A2F11-③D-②	HW1L-AF2F11-③D-②	HW4L-AF2F11-③D-②
	2NO	HW1L-A1F20-③D-②	HW4L-A1F20-③D-②	HW1L-A2F20-③D-②	HW4L-A2F20-③D-②	HW1L-AF2F20-③D-②	HW4L-AF2F20-③D-②



1. In place of ②, specify Lens/LED Color Code from table.
2. In place of ③ specify Voltage Code from table.
3. Light independent of switch position.
4. For replacement part numbers, see page 651.
5. For nameplates and accessories, see page 680 and 683.
6. For dimensions, see page 685.
7. For contact assembly part numbers, see page 685.
8. Full voltage and transformer models use the same operator.
9. Additional contact configurations available (up to 6 total contacts).
10. Yellow pushbutton comes with white LED.

② Lens/LED Color Code

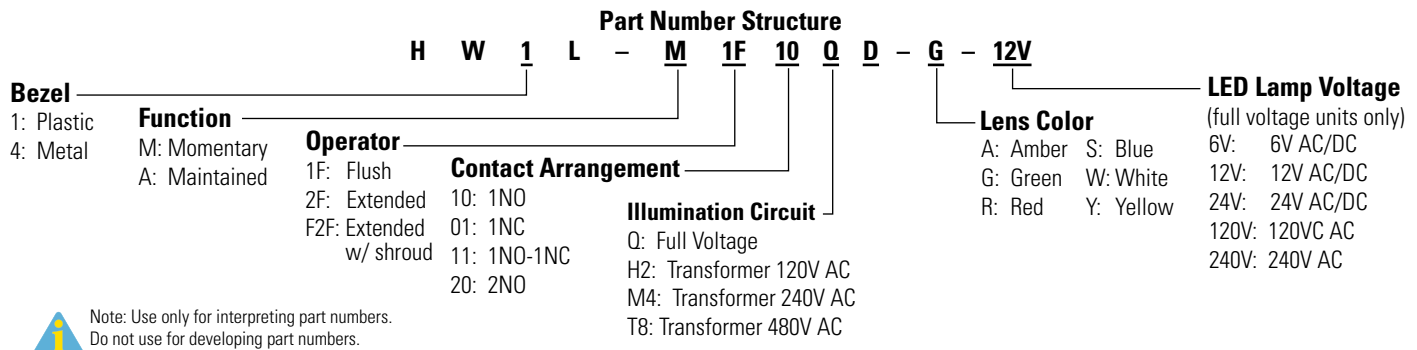
Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y



Yellow LED not available. Use white LED for yellow lens.

③ Voltage Code

Full Voltage Models		Transformer Models	
Voltage	Code	Voltage	Code
6V AC/DC	6V	120V AC	H2
12V AC/DC	12V	240V AC	M4
24V AC/DC	24V	480V AC	T8
120V AC	120V		
240V AC	240V		



Illuminated Round Pushbuttons (Replacement Parts)

Transformer*	Contact Blocks	Lead Holder	Mounting Adaptor	Safety Lever Lock	Lamp	Anti-Rotation Ring	Operator	Lens	Completed Unit

*Transformer not needed with full voltage models.

Lamp Circuit Components

Style	Description	Terminals	Part Number
Lead Holder 	For use with HW-CBL on all illuminated pushbutton units. One required for each deck (pair) of contacts.		HW-LH3
Dummy Block with Full Voltage Adaptor 	For use with odd number of contacts.	Finger-Safe	HW-DA1FBN
Full Voltage Adaptor 	For use with even number of contacts.	Finger-Safe	TW-DA1FB
Transformer Unit (6V secondary voltage) 	120VAC 240VAC 480VAC	Finger-Safe	TW-F126B TW-F246B TW-F486B
DC-DC Converter 	110VDC		HW-L16D

1. *With spring-up terminals - to use spring-up terminal type, must use transformer type operator designed for spring-up transformer.
2. ** DC-DC converter voltage input from 90-140V DC.

Operators

Style	Plastic Bezel	Metal Bezel
Round Flush/Extended 	Momentary HW1L-M0 Maintained HW1L-A0	Momentary HW4L-M0 Maintained HW4L-A0
Extended with Full Shroud 	Momentary HW1L-MF0 Maintained HW1L-AF0	Momentary HW4L-MF0 Maintained HW4L-AF0

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F HW-U10R-F (early make)	HW-U01-F HW-U01R-F (late break)

1. All assembled part numbers in catalog include standard finger-safe spring-up (HW-U...) contacts.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CBL

1. Used to mount contact blocks to operator (first pair only).
2. IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Lenses

Style	Part Number
Round Flush 	HW1A-L1-Ⓢ
Round Extended 	HW1A-L2-Ⓢ

- In place of Ⓢ, specify the Lens Color Code from previous page.

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL

- Use with notched panel cutout to prevent unit rotation.

LED Lamps

Style	Voltage	Part Number
LED 	6V AC/DC	LSTD-6Ⓢ
	12V AC/DC	LSTD-1Ⓢ
	24V AC/DC	LSTD-2Ⓢ
	120V AC	LSTD-H2Ⓢ
	240V AC	LSTD-M4Ⓢ

1. In place of Ⓢ, specify the LED Color Code.
2. The LED contains a current-limiting resistor and reverse polarity protection diodes.
3. Yellow LED not available, use white LED when using yellow lens.

Illuminated Mushroom & Square Pushbuttons (Assembled)



			40mm Mushroom Head		Square Flush
			Plastic Bezel	Metal Bezel	Plastic Bezel
Full Voltage	Momentary	<i>Operator Only[†]</i>	HW1L-M4-②	HW4L-M4-②	HW2L-M1-②
		1NO	HW1L-M4F10QD-②-③	HW4L-M4F10QD-②-③	HW2L-M1F10QD-②-③
		1NC	HW1L-M4F01QD-②-③	HW4L-M4F01QD-②-③	HW2L-M1F01QD-②-③
		1NO-1NC	HW1L-M4F11QD-②-③	HW4L-M4F11QD-②-③	HW2L-M1F11QD-②-③
		2NO	HW1L-M4F20QD-②-③	HW4L-M4F20QD-②-③	HW2L-M1F20QD-②-③
	Maintained	<i>Operator Only[†]</i>	HW1L-A4-②	HW4L-A4-②	HW2L-A1-②
		1NO	HW1L-A4F10QD-②-③	HW4L-A4F10QD-②-③	HW2L-A1F10QD-②-③
		1NC	HW1L-A4F01QD-②-③	HW4L-A4F01QD-②-③	HW2L-A1F01QD-②-③
		1NO-1NC	HW1L-A4F11QD-②-③	HW4L-A4F11QD-②-③	HW2L-A1F11QD-②-③
		2NO	HW1L-A4F20QD-②-③	HW4L-A4F20QD-②-③	HW2L-A1F20QD-②-③
Transformer	Momentary	1NO-1NC	HW1L-M4F11③D-②	HW4L-M4F11③D-②	HW2L-M1F11③D-②
		2NO	HW1L-M4F20③D-②	HW4L-M4F20③D-②	HW2L-M1F20③D-②
	Maintained	1NO-1NC	HW1L-A4F11③D-②	HW4L-A4F11③D-②	HW2L-A1F11③D-②
		2NO	HW1L-A4F20③D-②	HW4L-A4F20③D-②	HW2L-A1F20③D-②



- [†] Full voltage and transformer units use the same operator.
- In place of ②, specify the Lens/LED Color Code from table.
- In place of ③ specify the Voltage Code from table.
- Light independent of switch position
- For nameplates and accessories, see page 680. and 683.
- For dimensions, see page 685.
- For contact assembly part numbers, see page 685.
- Additional contact configurations available (up to 6 total contacts).
- Yellow pushbutton comes with white LED.**

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y*

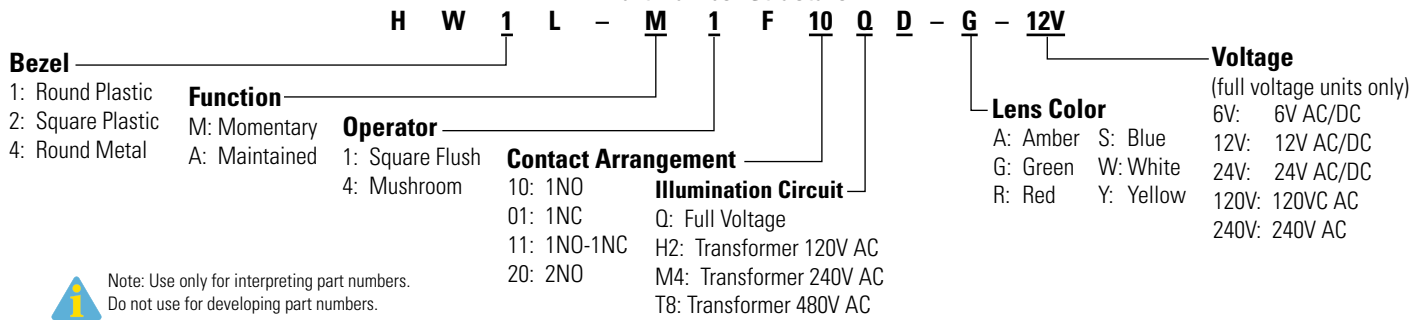


- *40mm mushroom lenses not available in yellow.
- Yellow LED not available. Use white LED for yellow lens.

③ Voltage Code

Full Voltage Models		Transformer Models	
Voltage	Code	Voltage	Code
6V AC/DC	6V	120V AC	H2
12V AC/DC	12V	240V AC	M4
24V AC/DC	24V	480V AC	T8
120V AC	120V		
240V AC	240V		

Part Number Structure



Illuminated Mushroom & Square Pushbuttons (Replacement Parts)

Transformer*	+	Contact Blocks	+	Lead Holder	+	Adaptor†	+	Safety Lever Lock	+	LED	+	Anti-Rotation Ring	+	Operator	+	Lens	=	Completed Unit
																		



*Transformer not needed with full voltage models.

Lamp Circuit Components

Style	Description	Terminals	Part Number
Lead Holder 	For use with HW-CBL on all illuminated pushbutton units. One required for each deck (pair) of contacts.		HW-LH3
Dummy Block with Full Voltage Adaptor 	For use with odd number of contacts.	Finger-Safe	HW-DA1FBN
Full Voltage Adaptor 	For use with even number of contacts.	Finger-Safe	TW-DA1FB
Transformer Unit (6V secondary voltage) 	120VAC 240VAC 480VAC	Finger-Safe	TW-F126B TW-F246B TW-F486B
DC-DC Converter 	110VDC		HW-L16D

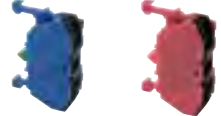


- *With spring-up terminals - to use spring-up terminal type, must use transformer type operator designed for spring-up transformer.
- ** DC-DC converter voltage input from 90-140V DC.

Operators

Style			Plastic Bezel	Metal Bezel
ø40mm Mushroom 	Momentary		HW1L-M0L	HW4L-M0L
	Maintained		HW1L-A0L	HW4L-A0L
Square 	Momentary		HW2L-M0	—
	Maintained		HW2L-A0	—

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F HW-U10R-F (early make)	HW-U01-F HW-U01R-F (late break)



- All assembled part numbers in catalog include standard finger-safe spring-up contacts (HW-U...).

Contact Block Mounting Adaptor

Style	Part Number
	HW-CBL



- Used to mount contact blocks to operator (first pair only).
- IEEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Lenses

Style	Part Number
ø40mm Mushroom Lens 	ALW4BLU-⊙*
Square Flush 	HW2A-L1-⊙



- In place of ⊙, specify the Lens Color Code.
- *Mushroom lens not available in yellow.

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

LED Lamps

Style	Voltage	Part Number
	6V AC/DC	LSTD-6⊙
	12V AC/DC	LSTD-1⊙
	24V AC/DC	LSTD-2⊙
	120V AC	LSTD-H2⊙
	240V AC	LSTD-M4⊙



- In place of ⊙, specify the LED Color Code.
- The LED contains a current-limiting resistor and reverse polarity protection diodes.
- Yellow LED not available, use white LED when using yellow lens.

Selector Switches 2-Position (Assembled)



2-Position Selector Switches

Contact	Mounting	Operator Position		Handle	Maintained	Spring Return from Right
						
Operator Only				Knob Lever	HWⓈS-2T HWⓈS-2L	HWⓈS-21T HWⓈS-21L
1NO	1	0	X	Knob Lever	HWⓈS-2TF10 HWⓈS-2LF10	HWⓈS-21TF10 HWⓈS-21LF10
1NO-1NC	1	0	X	Knob Lever	HWⓈS-2TF11 HWⓈS-2LF11	HWⓈS-21TF11
	2	X	0			HWⓈS-21LF11
2NO	1	0	X	Knob Lever	HWⓈS-2TF20 HWⓈS-2LF20	HWⓈS-21TF20
	2	0	X			HWⓈS-21LF20
2NO-2NC	1	X	0	Knob Lever	HWⓈS-2TF22 HWⓈS-2LF22	HWⓈS-21TF22 HWⓈS-21LF22
	2	0	X			
	3	X	0			
	4	0	X			

-
1. In place of Ⓢ enter 1 for plastic bezel or 4 for metal bezel.

2. For nameplates, see page 680.

3. All assembled part numbers in catalog include standard finger-safe spring-up (HW-U...) contacts.

4. Standard color for knob and lever is black.

5. Optional colors available for lever type. Must order in components. See next page for part numbers.

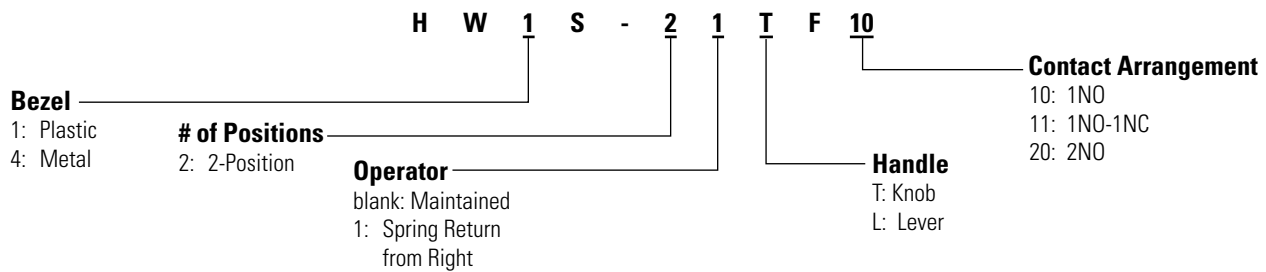
6. Additional contact configurations available (up to 6 total contacts).

7. For Truth Tables see page 693.

Ⓢ Bezel Type

Type	Code
Plastic	1
Metal	4

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Selector Switches 2-Position (Replacement Parts)

Contact Blocks	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	=	Completed Unit
----------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Description	Handle	Plastic Bezel	Metal Bezel
	Maintained	Knob	HW1S-2T	HW4S-2T
		Lever	HW1S-2	HW4S-2
	Spring Return from Right	Knob	HW1S-21T	HW4S-21T
		Lever	HW1S-21	HW4S-21



- Knob operator comes with black handle.
- To order lever type, lever and inserts must be ordered separately, along with lever operator. See part numbers below.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IEDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Levers & Inserts

Style	Part Number
	ASWHHL-①
	TW-HC1-①



Standard lever color is black. Standard insert color is white.

① Handle/Insert Color Code

Color	Code
Black*	B
Blue	S
Green	G
Red	R
Yellow	Y
White†	W



- * Lever color inserts not available in black.
- † Lever not available in white.

Selector Switches 3-Position (Assembled)



3-Position Selector Switches

Contact	Mounting	Operator Position			Handle	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
		L	C	R					
<i>Operator Only</i>					<i>Knob Lever</i>	<i>HW⊙S-3T* HW⊙S-3L</i>	<i>HW⊙S-31T HW⊙S-31L</i>	<i>HW⊙S-32T HW⊙S-32L</i>	<i>HW⊙S-33T HW⊙S-33L</i>
1NO-1NC	1	0	X	X	Knob Lever	HW⊙S-3TF11 HW⊙S-3LF11	HW⊙S-31TF11 HW⊙S-31LF11	HW⊙S-32TF11 HW⊙S-32LF11	HW⊙S-33TF11 HW⊙S-33LF11
	2	0	0	X					
2NO	1	X	0	0	Knob Lever	HW⊙S-3TF20 HW⊙S-3LF20	HW⊙S-31TF20 HW⊙S-31LF20	HW⊙S-32TF20 HW⊙S-32LF20	HW⊙S-33TF20 HW⊙S-33LF20
	2	0	0	X					
2NC	1	0	X	X	Knob Lever	HW⊙S-3TF02 HW⊙S-3LF02	HW⊙S-31TF02 HW⊙S-31LF02	HW⊙S-32TF02 HW⊙S-32LF02	HW⊙S-33TF02 HW⊙S-33LF02
	2	X	X	0					
2NO-1NC	1	X	0	0	Knob	HW⊙S-3JTF21N1	—	—	—
	2	0	0	X					
	3	0	X	0					
2NO-2NC	1	X	0	0	Knob	HW⊙S-3TF22	HW⊙S-31TF22	HW⊙S-32TF22	HW⊙S-33TF22
	2	0	0	X					
	3	0	X	X					
	4	X	X	0					
2NO-2NC	1	0	0	X	Knob	HW⊙S-3STF22N9	—	—	—
	2	X	0	0					
	3	X	X	0					
	4	0	0	X					
4NO	1	X	0	0	Knob	HW⊙S-3TF40	HW⊙S-31TF40	HW⊙S-32TF40	HW⊙S-33TF40
	2	0	0	X					
	3	X	0	0					
	4	0	0	X					
4NO	1	X	0	0	Knob	HW⊙S-3STF40N2	—	—	—
	2	0	X	X					
	3	X	0	0					
	4	0	0	X					
4NC	1	0	X	X	Knob	HW⊙S-3TF04	HW⊙S-31TF04	HW⊙S-32TF04	HW⊙S-33TF04
	2	X	X	0					
	3	0	X	X					
	4	X	X	0					

⑤ Bezel Type

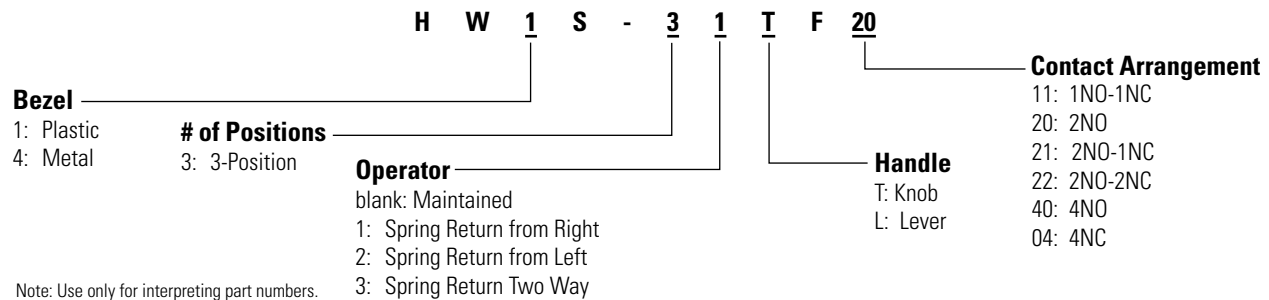
Type	Code
Plastic	1
Metal	4



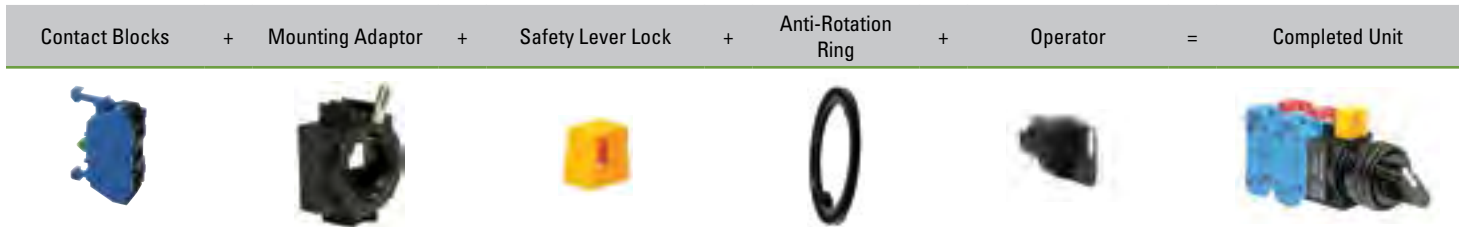
1. In place of ⊙ enter 1 for plastic bezel or 4 for metal bezel.
2. Knob operator includes black knob/lever operator includes black lever.
3. * Three position operator is available with three different cams.
HW⊙S-3T: Maintained (standard cam)
HW⊙S-3ST: Maintained (S cam)
HW⊙S-3JT: Maintained (J cam)
4. Operator cams are color coded (white=standard cam, red=S cam, black=J cam).
5. For nameplates, see page 680.
6. For contact assembly part numbers, see page 685

7. All assembled part numbers in catalog include standard finger-safe spring-up (HW-U...).
8. Standard color for knob and lever is black.
9. Optional colors available for lever type. Must order in components. See next page for part numbers.
10. Additional contact configurations available (up to 6 total contacts).
11. For Truth Tables see page 693.

Part Number Structure



Selector Switches 3-Position (Replacement Parts)



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C

1. Used to mount contact blocks to operator (first pair only).
2. IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Description	Handle	Plastic Bezel	Metal Bezel
	Maintained (standard cam)	Knob	HW1S-3T	HW4S-3T
		Lever	HW1S-3	HW4S-3
	Maintained (S cam)	Knob	HW1S-3ST	HW4S-3ST
	Maintained (J cam)	Knob	HW1S-3JT	HW4S-3JT
	Spring Return from Right (standard cam)	Knob	HW1S-31T	HW4S-31T
		Lever	HW1S-31	HW4S-31
	Spring Return from Left (standard cam)	Knob	HW1S-32T	HW4S-32T
		Lever	HW1S-32	HW4S-32
	2-Way Spring Return (standard cam)	Knob	HW1S-33T	HW4S-33T
		Lever	HW1S-33	HW4S-33

1. Knob operator comes with black handle.
2. Three position knob operator is available with three different cams.
3. Operator cams are color coded (white=standard cam, red=S cam, black=J cam).
4. To order lever type, lever and inserts must be ordered separately, along with lever operator. See part numbers below.

Levers & Inserts

Style	Part Number
	ASWHHL-①
	TW-HC1-①



Standard lever color is black. Standard insert color is white.

① Handle/Insert Color Code

Color	Code
Black*	B
Blue	S
Green	G
Red	R
Yellow	Y
White [†]	W

1. * Lever color inserts not available in black.
2. [†]Lever not available in white.

Selector Switches 4- & 5-Position (Assembled)



4-Position Selector Switches

Contact	Mounting	Operator Position				Handle	Maintained
		1	2	3	4		
Operator Only						Knob Lever	HWⓈS-4T HWⓈS-4L
1NO- 2NC	1	X	0	0	0	Knob Lever	HWⓈS-4TF12 HWⓈS-4LF12
	2	0	X	0	0		
	3	0	0	X	0		
	4	0	0	0	0		
1NO- 3NC	1	0	X	X	X	Knob Lever	HWⓈS-4TF13N6 HWⓈS-4LF13N6
	2	0	X	0	0		
	3	0	0	X	0		
	4	0	0	0	X		
2NO- 2NC	1	X	0	0	0	Knob Lever	HWⓈS-4TF22N3 HWⓈS-4LF22N3
	2	0	X	0	0		
	3	0	0	X	0		
	4	0	0	0	X		

5-Position Selector Switch

Contact	Mounting	Operator Position					Handle	Maintained
		1	2	3	4	5		
Operator Only							Knob Lever	HWⓈS-5T HWⓈS-5L
2NO- 2NC	1	X	0	0	0	0	Knob Lever	HWⓈS-5TF22N3 HWⓈS-5LF22N3
	2	0	X	0	0	0		
	3	0	0	0	X	0		
	4	0	0	0	0	X		

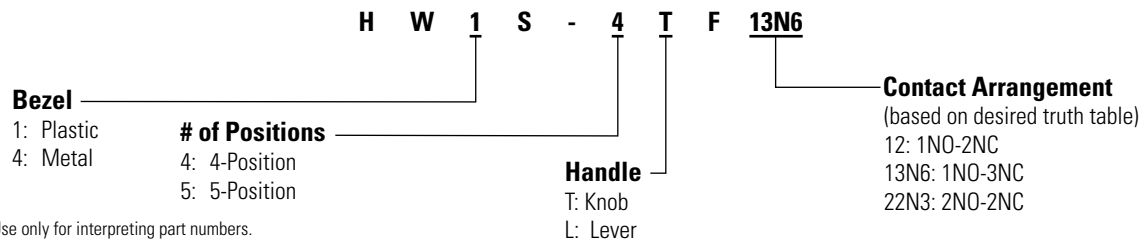


- 1. In place of Ⓢ enter 1 for plastic bezel or 4 for metal bezel.
- 2. Knob operator includes black knob/lever operator includes black lever.
- 3. For nameplates, see page 680.
- 4. For contact assembly part numbers, see page 685.
- 5. Five position circuit cannot be made to make five independent contact closures.
- 6. All assembled part numbers in catalog include standard finger-safe spring-up (HW-U...) contacts.
- 7. Standard color for knob and lever is black.
- 8. Optional colors available for lever type. Must order in components. See next page for part numbers.
- 9. Additional contact configurations available (up to 6 total contacts).
- 10. For Truth Tables see page 693.

Ⓢ Bezel Type

Type	Code
Plastic	1
Metal	4

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Selector Switches 4- & 5-Position (Replacement Parts)

Contact Blocks	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	=	Completed Unit
----------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Position	Description	Handle	Plastic Bezel	Metal Bezel
	4	Maintained	Knob	HW1S-4T	HW4S-4T
			Lever	HW1S-4	HW4S-4
	5	Maintained	Knob	HW1S-5T	HW4S-5T
			Lever	HW1S-5	HW4S-5



- Knob operator comes with black handle.
- To order lever type, lever and inserts must be ordered separately, along with lever operator. See part numbers below.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Levers & Inserts

Style	Part Number
	ASWHHL-①
	TW-HC1-①



Standard lever color is black. Standard insert color is white.

① Handle/Insert Color Code

Color	Code
Black*	B
Blue	S
Green	G
Red	R
Yellow	Y
White†	W



- * Lever color inserts not available in black.
- † Lever not available in white.

Key Switches 2-Position (Assembled)



2-Position Key Switches

Contact	Mounting	Operator Position		Maintained	Spring Return from Right
					
Operator Only				HW⊙K-2A	HW⊙K-21B
1NO	1	0	X	HW⊙K-2AF10	HW⊙K-21BF10
1NO-1NC	1	0	X	HW⊙K-2AF11	HW⊙K-21BF11
	2	X	0		
2NO	1	0	X	HW⊙K-2AF20	HW⊙K-21BF20
	2	0	X		
2NO-2NC	1	0	X	HW⊙K-2AF22	HW⊙K-21BF22
	2	X	0		
	3	0	X		
	4	X	0		

- ⚠ 1. In place of ⊙ enter 1 for plastic bezel or 4 for metal bezel.
2. Key is removable in all maintained positions. Other key removable options available.
3. Two keys are supplied with all switches.
4. All standard operators are keyed alike.
5. Other key removable options available. See table below
6. For nameplates, see page 680.
7. For contact assembly part numbers, see page 685.
8. Key is retained in "Spring Return" position.
9. All assembled part numbers in catalog include finger-safe spring-up (HW-U...) contacts.
10. Additional contact configurations available (up to 6 total contacts).
11. For Truth Tables see page 685.

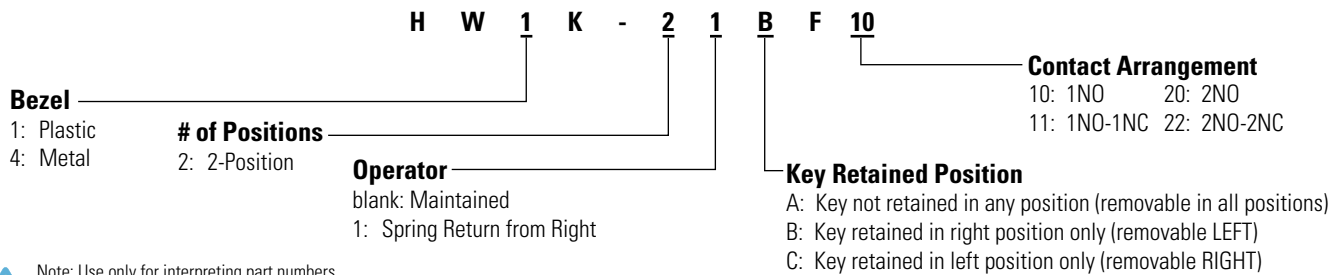
⊙ Bezel Type

Type	Code
Plastic	1
Metal	4

Key Removable Option Codes

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only (removable LEFT)
C	Key retained in left position only (removable RIGHT)

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Key Switches 2-Position (Replacement Parts)

Contact Assembly + Mounting Adaptor + Safety Lever Lock + Anti-Rotation Ring + Operator = Completed Unit



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe	HW-U10-F	HW-U01-F
	Spring-Up Terminal	HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Operators

Style	Description	Plastic Bezel	Metal Bezel
	Maintained	HW1K-2A	HW4K-2A
	Maintained, key removed left only	HW1K-2B	HW4K-2B
	Spring Return from Right	HW1K-21B	HW4K-21B
	Maintained, key removed right only	HW1K-2C	HW4K-2C



- Operator includes two keys.
- All standard operators are keyed alike.

Key Switches 3-Position (Assembled)



3-Position Key Switches

Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two Way
								
Operator Only					HW⊙K-3A*	HW⊙K-31B	HW⊙K-32C	HW⊙K-33D
1NO-1NC	1	0	X	X	HW⊙K-3AF11	HW⊙K-31BF11	HW⊙K-32CF11	HW⊙K-33DF11
	2	0	0	X				
2NO	1	X	0	0	HW⊙K-3AF20	HW⊙K-31BF20	HW⊙K-32CF20	HW⊙K-33DF20
	2	0	0	X				
2NC	1	0	X	X	HW⊙K-3AF02	HW⊙K-31BF02	HW⊙K-32CF02	HW⊙K-33DF02
	2	X	X	0				
2NO-1NC	1	X	0	0	HW⊙K-3JAF21N1	—	—	—
	2	0	0	X				
	3	0	X	0				
2NO-2NC	1	X	0	0	HW⊙K-3AF22	HW⊙K-31BF22	HW⊙K-32CF22	HW⊙K-33DF22
	2	0	0	X				
	3	0	X	X				
	4	X	X	0				
2NO-2NC	1	0	0	X	HW⊙K-3SAF22N9	—	—	—
	2	X	0	0				
	3	X	X	0				
	4	0	0	X				
4NO	1	X	0	0	HW⊙K-3AF40	HW⊙K-31BF40	HW⊙K-32CF40	HW⊙K-33DF40
	2	0	0	X				
	3	X	0	0				
	4	0	0	X				
4NO	1	X	0	0	HW⊙K-3SAF40N2	—	—	—
	2	0	X	X				
	3	X	0	0				
	4	0	0	X				
4NC	1	0	X	X	HW⊙K-3AF04	HW⊙K-31BF04	HW⊙K-32CF04	HW⊙K-33DF04
	2	X	X	0				
	3	0	X	X				
	4	X	X	0				

⑤ Bezel Type

Type	Code
Plastic	1
Metal	4

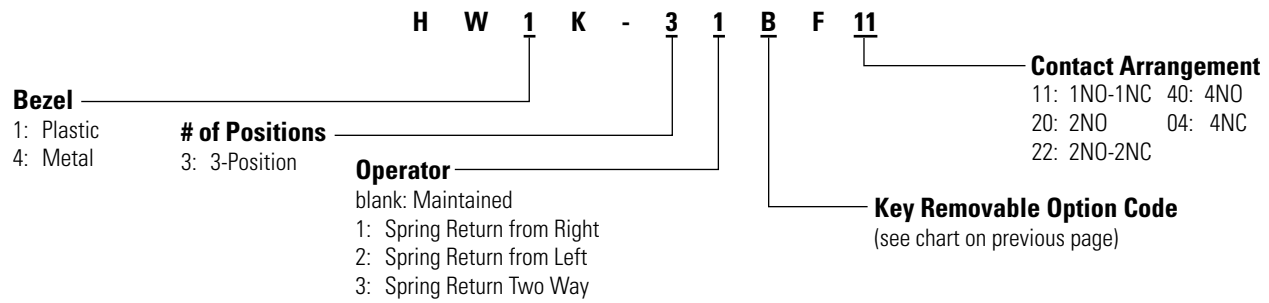


- In place of ⑤ enter 1 for plastic bezel or 4 for metal bezel.
- Key is removable in all maintained positions. Other key removable options available.
- Two keys are supplied with all switches.
- All standard operators are keyed alike.
- Other key removable options available. See table to the right.
- * Operator is available with three different cams.
HW⊙K-3A: Maintained (standard cam)
HW⊙K-3SA: Maintained (Cam S)
HW⊙K-3JA: Maintained (Cam J)
- For nameplates, see page 680.
- For contact assembly part numbers, see page 685.
- All assembled part numbers in catalog include standard Finger-Safe spring-up (HW-U...) contacts.
- Additional contact configurations available (up to 6 total contacts).
- For Truth Tables see page 693.

Key Removable Option Codes

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only
C	Key retained in left position only
D	Key retained in left and right (3 position only)
E	Key retained in center only (3 position only)
G	Key retained right and center (3 position only)
H	Key retained left and center (3 position only)

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Key Switches 3-Position (Replacement Parts)

Contact Assembly	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	=	Completed Unit
------------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IEDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Operators

Style	Description	Plastic Bezel	Metal Bezel
	Maintained (standard cam)	HW1K-3A	HW4K-3A
	Maintained (S cam)	HW1K-3SA	HW4K-3SA
	Maintained (J cam)	HW1K-3JA	HW4K-3JA
	Spring Return from Right (standard cam)	HW1K-31B	HW4K-31B
	Spring Return from Left (standard cam)	HW1K-32C	HW4K-32C
	2-Way Spring Return (standard cam)	HW1K-33D	HW4K-33D



- Operator includes two keys.
- All standard operators are keyed alike.
- Other key removable options available. See table on previous page.
- Key not removable from spring-returned position

Illuminated Selector Switches 2-Position (Assembled)



2-Position Illuminated Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position		Type	Maintained	Spring Return from Right	
		L 	R 				L 
Operator Only					HWⓈF-2②	HWⓈF-21②	
1NO-1NC	1 2	O X	X O	Full Voltage	HWⓈF-2F11QD-②-③	HWⓈF-21F11QD-②-③	
				Transformer	120V	HWⓈF-2F11H2D-②	HWⓈF-21F11H2D-②
					240V	HWⓈF-2F11M4D-②	HWⓈF-21F11M4D-②
					480V	HWⓈF-2F11T8D-②	HWⓈF-21F11T8D-②
2NO	1 2	X O	O X	Full Voltage	HWⓈF-2F20QD-②-③	HWⓈF-21F20QD-②-③	
				Transformer	120V	HWⓈF-2F20H2D-②	HWⓈF-21F20H2D-②
					240V	HWⓈF-2F20M4D-②	HWⓈF-21F20M4D-②
					480V	HWⓈF-2F20T8D-②	HWⓈF-21F20T8D-②
2NO-2NC	1 2 3 4	O X O X	X O X O	Full Voltage	HWⓈF-2F22QD-②-③	HWⓈF-21F22QD-②-③	
				Transformer	120V	HWⓈF-2F22H2D-②	HWⓈF-21F22H2D-②
					240V	HWⓈF-2F22M4D-②	HWⓈF-21F22M4D-②
					480V	HWⓈF-2F22T8D-②	HWⓈF-21F22T8D-②



1. In place of ② specify Lens/LED color code.
2. In place of ③ specify Full Voltage code.
3. In place of ⑤ enter 1 for plastic bezel or 4 for metal bezel.
4. For nameplates, see page 680.
5. For contact assembly part numbers, see page 685.
6. Light is independent of switch position.
7. All assembled part numbers in catalog include standard Finger-Safe spring-up (HW-U...) contacts.
8. **Yellow selector switch comes with white LED.**
9. Additional contact configurations available (up to 6 total contacts).
10. For Truth Tables see page 693.

② Lens/LED Color Code

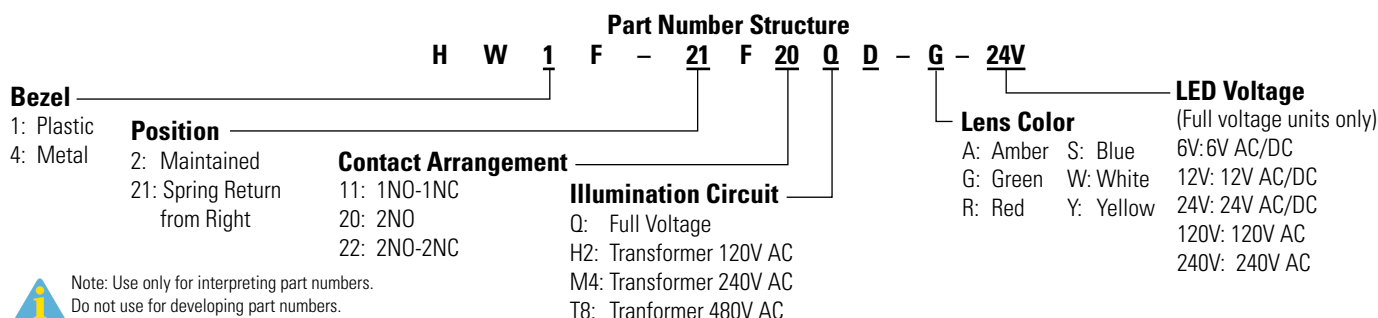
Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Code

Full Voltage Models	
Voltage	Code
6VAC/DC	6V
12VAC/DC	12V
24VAC/DC	24V
120V AC	120V
240V AC	240V

⑤ Bezel Code

Type	Code
Plastic	1
Metal	4



Illuminated Selector Switches 2-Position (Replacement Parts)

Transformer*	+	Contact Blocks	+	Lead Holder	+	Mounting Adaptor	+	Safety Lever Lock	+	LED	+	Anti-Rotation Ring	+	Operator	+	Lens	=	Completed Unit
																		

*Transformer not needed with full voltage models.

Lamp Circuit Components

Style	Description	Terminals	Part Number
Lead Holder	For use with HW-CBL on all illuminated pushbutton units. One required for each deck (pair) of contacts.		HW-LH3
Dummy Block with Full Voltage Adaptor	For use with odd number of contacts.	Finger-Safe	HW-DA1FBN
Full Voltage Adaptor	For use with even number of contacts.	Finger-Safe	TW-DA1FB
Transformer Unit (6V secondary voltage)	120VAC 240VAC 480VAC	Finger-Safe	TW-F126B TW-F246B TW-F486B
DC-DC Converter	110VDC		HW-L16D

1. DC-DC convertor features spring-up terminals.
2. DC-DC convertor applicable voltage range 90-140V DC.

Operators

Style	Description	Plastic Bezel	Metal Bezel
	Maintained	HW1F-2	HW4F-2
	Spring return from right	HW1F-21	HW4F-21

Illuminated knobs must be ordered separately.

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F HW-U10R-F (early make)	HW-U01-F HW-U01R-F (late break)

Contact Block Mounting Adaptor

Style	Part Number
	HW-CBL

1. Used to mount contact blocks to operator (first pair only).
2. IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Illuminated Knob

Appearance	Part Number
	HW9Z-FDY-Ⓢ

In place of Ⓢ, specify the Color Code.

② Lens/LED Color Code

Color	Code	Color	Code
Amber	A	Blue	S
Green	G	White	W
Red	R	Yellow	Y

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL

Use with notched panel cutout to prevent unit rotation.

Lamps

Style	Voltage	Part Number
	6V AC/DC	LSTD-6Ⓢ
	12V AC/DC	LSTD-1Ⓢ
	24V AC/DC	LSTD-2Ⓢ
	120V AC	LSTD-H2Ⓢ
	240V AC	LSTD-M4Ⓢ

1. In place of Ⓢ, specify the LED Color Code.
2. The LED contains a current-limiting resistor and reverse polarity protection diodes.
3. Use white LED for yellow lens. Yellow LED not available.

Illuminated Selector Switches 3-Position (Assembled)



3-Position Illuminated Selector Switches

Style						Part Number				
Contact	Mounting	Operator Position			Type		Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
		L 	C 	R 						
Operator Only							HWⓄF-3②	HWⓄF-31②	HWⓄF-32②	HWⓄF-33②
1NO-1NC	1 2	0 0	X 0	X X	Full Voltage		HWⓄF-3F11QD-②-③	HWⓄF-31F11QD-②-③	HWⓄF-32F11QD-②-③	HWⓄF-33F11QD-②-③
					Transformer	120V	HWⓄF-3F11H2D-②	HWⓄF-31F11H2D-②	HWⓄF-32F11H2D-②	HWⓄF-33F11H2D-②
						240V	HWⓄF-3F11M4D-②	HWⓄF-31F11M4D-②	HWⓄF-32F11M4D-②	HWⓄF-33F11M4D-②
						480V	HWⓄF-3F11T8D-②	HWⓄF-31F11T8D-②	HWⓄF-32F11T8D-②	HWⓄF-33F11T8D-②
2NO	1 2	X 0	0 0	0 X	Full Voltage		HWⓄF-3F20QD-②-③	HWⓄF-31F20QD-②-③	HWⓄF-32F20QD-②-③	HWⓄF-33F20QD-②-③
					Transformer	120V	HWⓄF-3F20H2D-②	HWⓄF-31F20H2D-②	HWⓄF-32F20H2D-②	HWⓄF-33F20H2D-②
						240V	HWⓄF-3F20M4D-②	HWⓄF-31F20M4D-②	HWⓄF-32F20M4D-②	HWⓄF-33F20M4D-②
						480V	HWⓄF-3F20T8D-②	HWⓄF-31F20T8D-②	HWⓄF-32F20T8D-②	HWⓄF-33F20T8D-②
2NC	1 2	0 X	X X	X 0	Full Voltage		HWⓄF-3F02QD-②-③	HWⓄF-31F02QD-②-③	HWⓄF-32F02QD-②-③	HWⓄF-33F02QD-②-③
					Transformer	120V	HWⓄF-3F02H2D-②	HWⓄF-31F02H2D-②	HWⓄF-32F02H2D-②	HWⓄF-33F02H2D-②
						240V	HWⓄF-3F02M4D-②	HWⓄF-31F02M4D-②	HWⓄF-32F02M4D-②	HWⓄF-33F02M4D-②
						480V	HWⓄF-3F02T8D-②	HWⓄF-31F02T8D-②	HWⓄF-32F02T8D-②	HWⓄF-33F02T8D-②
2NO-2NC	1 2 3 4	X 0 0 X	0 0 X X	0 X X 0	Full Voltage		HWⓄF-3F22QD-②-③	HWⓄF-31F22QD-②-③	HWⓄF-32F22QD-②-③	HWⓄF-33F22QD-②-③
					Transformer	120V	HWⓄF-3F22H2D-②	HWⓄF-31F22H2D-②	HWⓄF-32F22H2D-②	HWⓄF-33F22H2D-②
						240V	HWⓄF-3F22M4D-②	HWⓄF-31F22M4D-②	HWⓄF-32F22M4D-②	HWⓄF-33F22M4D-②
						480V	HWⓄF-3F22T8D-②	HWⓄF-31F22T8D-②	HWⓄF-32F22T8D-②	HWⓄF-33F22T8D-②
4NO	1 2 3 4	X 0 X 0	0 0 0 0	0 X 0 X	Full Voltage		HWⓄF-3F40QD-②-③	HWⓄF-31F40QD-②-③	HWⓄF-32F40QD-②-③	HWⓄF-33F40QD-②-③
					Transformer	120V	HWⓄF-3F40H2D-②	HWⓄF-31F40H2D-②	HWⓄF-32F40H2D-②	HWⓄF-33F40H2D-②
						240V	HWⓄF-3F40M4D-②	HWⓄF-31F40M4D-②	HWⓄF-32F40M4D-②	HWⓄF-33F40M4D-②
						480V	HWⓄF-3F40T8D-②	HWⓄF-31F40T8D-②	HWⓄF-32F40T8D-②	HWⓄF-33F40T8D-②
4NC	1 2 3 4	0 X 0 X	X X X X	X 0 X 0	Full Voltage		HWⓄF-3F04QD-②-③	HWⓄF-31F04QD-②-③	HWⓄF-32F04QD-②-③	HWⓄF-33F04QD-②-③
					Transformer	120V	HWⓄF-3F04H2D-②	HWⓄF-31F04H2D-②	HWⓄF-32F04H2D-②	HWⓄF-33F04H2D-②
						240V	HWⓄF-3F04M4D-②	HWⓄF-31F04M4D-②	HWⓄF-32F04M4D-②	HWⓄF-33F04M4D-②
						480V	HWⓄF-3F04T8D-②	HWⓄF-31F04T8D-②	HWⓄF-32F04T8D-②	HWⓄF-33F04T8D-②



- In place of ② specify Lens/LED color code.
- In place of ③ specify Full Voltage code.
- In place of ④ enter 1 for plastic bezel or 4 for metal bezel.
- For nameplates, see page 680.
- For contact assembly part numbers, see page 685.
- Light is independent of switch position.
- All assembled part numbers in catalog include standard Finger-Safe spring-up (HW-U...) contacts.

- Yellow selector switch comes with white LED.**
- Additional contact configurations available (up to 6 total contacts).
- For Truth Tables see page 693.

② Lens/LED Color

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Code

Full Voltage Models	
Voltage	Code
6VAC/DC	6V
12VAC/DC	12V
24VAC/DC	24V
120V AC	120V
240V AC	240V

⑤ Bezel Code

Type	Code
Plastic	1
Metal	4

Part Number Structure

H W 1 F - 31 F 20 Q D - G - 24V

Bezel

1: Plastic
4: Metal

Position

3: Maintained
31: Spring Return
from Right
32: Spring Return
from Left
33: Spring Return 2-Way

Contact Arrangement

11: 1NO-1NC 22: 2NO-2NC
20: 2NO 40: 4NO
02: 2NC 04: 4NC

Illumination Circuit

Q: Full Voltage
H2: Transformer 120V AC
M4: Transformer 240V AC
T8: Transformer 480V AC

Lens Color

A: Amber S: Blue
G: Green W: White
R: Red Y: Yellow

Full Voltage Code

6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V: 120V AC
240V: 240V ACNote: Use only for interpreting part numbers.
Do not use for developing part numbers.

Illuminated Selector Switches 3-Position (Replacement Parts)

Transformer* + Contact Blocks + Lead Holder + Mounting Adaptor + Safety Lever Lock + LED + Anti-Rotation Ring + Operator + Lens = Completed Unit



*Transformer not needed with full voltage models.

Lamp Circuit Components

Style	Description	Terminals	Part Number
Lead Holder	For use with HW-CBL on all illuminated pushbutton units. One required for each deck (pair) of contacts.		HW-LH3
Dummy Block with Full Voltage Adaptor	For use with odd number of contacts.	Finger-Safe	HW-DA1FBN
Full Voltage Adaptor	For use with even number of contacts.	Finger-Safe	TW-DA1FB
Transformer Unit (6V secondary voltage)	120VAC 240VAC 480VAC	Finger-Safe	TW-F126B TW-F246B TW-F486B
DC-DC Converter	110VDC		HW-L16D



1. DC-DC converter features spring-up terminals.
2. DC-DC converter applicable voltage range 90-140V DC.

Operators

Style	Description	Plastic Bezel	Metal Bezel
	Maintained	HW1F-3	HW4F-3
	Spring return from right	HW1F-31	HW4F-31
	Spring return from left	HW1F-32	HW4F-32
	2-Way spring return	HW1F-33	HW4F-33



Illuminated knobs must be ordered separately.

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F HW-U10R-F (early make)	HW-U01-F HW-U01R-F (late break)

Contact Block Mounting Adaptor

Style	Part Number
	HW-CBL



1. Used to mount contact blocks to operator (first pair only).
2. IDEC strongly recommends using the safety lever lock to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Illuminated Knob

Appearance	Part Number
	HW9Z-FDY-②



In place of ②, specify the Color Code.

② Lens/LED Color Code

Color	Code	Color	Code
Amber	A	Blue	S
Green	G	White	W
Red	R	Yellow	Y

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Lamps

Style	Voltage	Part Number
	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②



1. In place of ②, specify the LED Color Code.
2. The LED contains a current-limiting resistor and reverse polarity protection diodes.
3. Use white LED for yellow lens. Yellow LED not available.

Mono Lever Switches 2-Position (Assembled)



2-Position Mono Lever Switches

Style	Part Number	Description
HW1M Standard Lever	HW1M-F1010-20	Maintained up and down
	HW1M-F2020-20	Spring return up and down
	HW1M-F1010-40	Maintained up and down
	HW1M-F2020-40	Spring return up and down
	HW1M-F0101-20	Maintained right and left
	HW1M-F0202-20	Spring return right and left
	HW1M-F0101-40	Maintained right and left
	HW1M-F0202-40	Spring return right and left
HW1M-L Interlocking Lever	HW1M-LF1010-20	Maintained up and down
	HW1M-LF2020-20	Spring return up and down
	HW1M-LF1010-40	Maintained up and down
	HW1M-LF2020-40	Spring return up and down
	HW1M-LF0101-20	Maintained right and left
	HW1M-LF0202-20	Spring return right and left
	HW1M-LF0101-40	Maintained right and left
	HW1M-LF0202-40	Spring return right and left

 All Assembled units with Finger-Safe spring-up (HW-U...) contacts

Circuit Diagrams

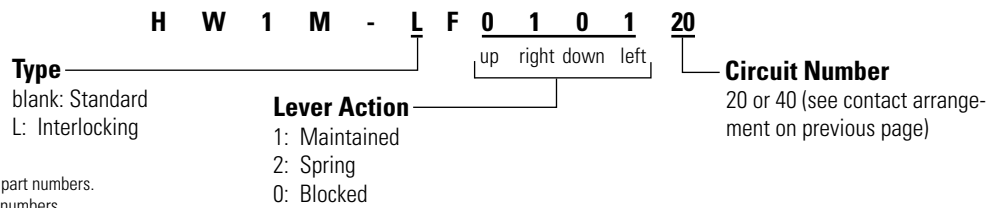
2 Position Left/Right

Circuit Number	Contact Mounting		Position		
	No.		Left	Center	Right
20	1	HW-U10-F	X	0	0
	2	HW-U10-F	0	0	X
40	1	HW-U10-F	X	0	0
	2	HW-U10-F	0	0	X
	3	HW-U10-F	X	0	0
	4	HW-U10-F	0	0	X

2 Position Up/Down

Circuit Number	Contact Mounting		Position		
	No.		Down	Center	Up
20	1	HW-U10-F	X	0	0
	2	HW-U10-F	0	0	X
40	1	HW-U10-F	X	0	0
	2	HW-U10-F	0	0	X
	3	HW-U10-F	X	0	0
	4	HW-U10-F	0	0	X

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Mono Lever Switches 2-Position (Sub-assembled) Part Numbers

Contact Assembly	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	=	Completed Unit
------------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IDEC strongly recommends using the safety lever lock (included) to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Description	Part Number
	Maintained Up/Down	HW1M-1010
	Spring return Up/Down	HW1M-2020
	Maintained Left/Right	HW1M-0101
	Spring return Left/Right	HW1M-0202
	Maintained Up/Down	HW1M-L1010
	Spring return Up/Down	HW1M-L2020
	Maintained Left/Right	HW1M-L0101
	Spring return Left/Right	HW1M-L0202

Replacement Parts

Item	Part Number
Black Cap	HW9Z-CPM
Boot	HW9Z-BLM (fits standard operator only)

Mono Lever Switches 3- & 4-Position (Assembled)



3-Position

Style	Part Number	Description
HW1M Standard Lever	HW1M-F0121-12N3	Maintained right and left, spring return down
	HW1M-F0222-12N3	Spring return right, down, left
HW1M-L Interlocking Lever	HW1M-LF0121-12N3	Maintained right and left, spring return down
	HW1M-LF0222-12N3	Spring return right, down, left

Circuit Diagram

Circuit Number	Contact Mounting		Position				
	No.		Down	Left	Center	Up	Right
12N3	1	HW-U01-F	0	0	0	0	X
	2	HW-U01-F	X	0	0	0	0
	3	HW-U10-F	0	X	0	0	0

4-Position

Style	Part Number	Description
HW1M Standard Lever	HW1M-F1111-22N9	Maintained all positions
	HW1M-F1212-22N9	Maintained up and down, spring left and right
	HW1M-2121-22N9	Spring up and down, maintained left and right
	HW1M-2222-22N9	Spring return all positions
HW1M-L Interlocking Lever	HW1M-LF1111-22N9	Maintained all positions
	HW1M-LF1212-22N9	Maintained up and down, spring left and right
	HW1M-LF2121-22N9	Spring up and down, maintained left and right
	HW1M-LF2222-22N9	Spring return all positions

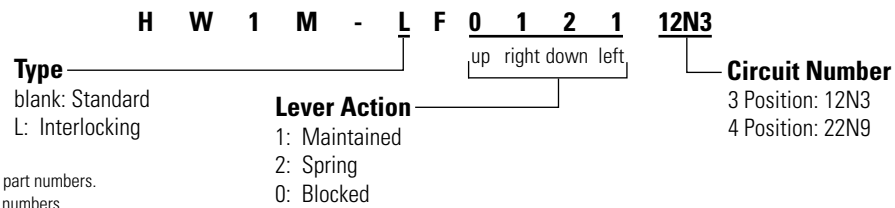
Circuit Diagram

Circuit Number	Contact Mounting		Position				
	No.		Down	Left	Center	Up	Right
22N9	1	HW-U01-F	0	0	0	0	X
	2	HW-U01-F	X	0	0	0	0
	3	HW-U10-F	0	X	0	0	0
	4	HW-U10-F	0	0	0	X	0



All assembled part numbers in catalog include Finger-Safe spring-up (HW-U...) contacts.

Part Number Structure



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Mono Lever Switches 3 & 4-Position (Sub-assembled) Part Numbers

Contact Assembly	+	Mounting Adaptor	+	Safety Lever Lock	+	Anti-Rotation Ring	+	Operator	=	Completed Unit
------------------	---	------------------	---	-------------------	---	--------------------	---	----------	---	----------------



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Description	Part Number
	Combination, 3 position	HW1M-0121
	Spring return, 3 position	HW1M-0222
	Maintained, 4 position	HW1M-1111
	Combination, 4 position	HW1M-1212
	Combination, 4 position	HW1M-2121
	Spring return, 4 position	HW1M-2222
	Combination, 3 position	HW1M-L0121
	Spring return, 3 position	HW1M-L0222
	Maintained, 4 position	HW1M-L1111
	Combination, 4 position	HW1M-L1212
	Combination, 4 position	HW1M-L2121
	Spring return, 4 position	HW1M-L2222

Contact Block Mounting Adaptor

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IDEC strongly recommends using the safety lever lock (included) to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Replacement Parts

Item	Part Number
Black Cap	HW9Z-CPM
Boot	HW9Z-BLM (fits standard operator only)

Pushbutton Selectors (Assembled)



2-Position Pushbutton Selectors

				Operator Position				
				Left		Right		
Cam	Contacts	Mounting		Normal	Push	Normal	Push	Part Number
A	Operator Only							HW1R-2A-①
	1NO-1NC	1 2	HW-U10-F HW-U01-F	0 X	X 0	0 0	X 0	HW1R-2AF11-①
	2NO	1 2	HW-U10-F HW-U10-F	0 0	X X	0 X	X X	HW1R-2AF20-①
	2NO-2NC	1 2 3 4	HW-U10-F HW-U01-F HW-U10-F HW-U01-F	0 X 0 X	X 0 X 0	0 0 0 0	X 0 X 0	HW1R-2AF22-①
D	Operator Only							HW1R-2D-①
	2NO	1 2	HW-U10-F HW-U10-F	0 0	X 0	0 0	0 X	HW1R-2DF20-①
	2NO-2NC	1 2 3 4	HW-U10-F HW-U10-F HW-U01-F HW-U01-F	0 0 X X	X 0 0 X	0 0 X X	0 X X 0	HW1R-2DF22N1-①
	Operator Only							HW1R-2E-①
E	2NO-2NC	1 2 3 4	HW-U10-F HW-U10-F HW-U01-F HW-U01-F	0 0 0 X	X 0 0 X	0 0 X 0	0 X X 0	HW1R-2EF22N1-①
	Operator Only							HW1R-2F-①
	2NO-2NC	1 2 3 4	HW-U10-F HW-U10-F HW-U01-F HW-U01-F	0 0 0 X	0 X 0 0	0 0 X 0	X 0 0 0	HW1R-2FF22N1-①
	Operator Only							HW1R-2N-①
N	2NO-2NC	1 2 3 4	HW-U01-F HW-U10-F HW-U01-F HW-U10-F	0 0 0 0	0 X 0 X	X 0 X 0	0 X 0 X	HW1R-2NF22N2-①
	Operator Only							HW1R-2T-①
	2NO-2NC	1 2 3 4	HW-U10-F HW-U10-F HW-U01-F HW-U01-F	0 0 X X	X X 0 0	X X 0 0	Blocked	HW1R-2TF22N1-①

① Button Color Code

Color	Code	Color	Code
Black	B	White	W
Green	G	Yellow	Y
Red	R		
Blue	S		



1. All assembled part numbers in catalog include Finger-Safe spring-up (HW-U...) contacts.
2. Operator only models come with operator and button.

Part Number Structure

H W 1 R - 2 D F 22N1 - R

Operator

A: Cam A
D: Cam D
E: Cam E
F: Cam F
N: Cam N
T: Cam T

Contact Arrangement Code

11: 1NO-1NC
20: 2NO
(For additional contact codes see previous page)

Button Colors

B: Black
G: Green
R: Red
S: Blue
W: White
Y: Yellow



Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Pushbutton Selectors (Sub-assembled)

Contact Blocks + Mounting Adaptor + Safety Lever Lock + Anti-Rotation Ring + Operator + Button = Completed Unit



Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

Contact Block Mounting Adaptor

(safety lever lock included)

Style	Part Number
	HW-CB2C



- Used to mount contact blocks to operator (first pair only).
- IEEC strongly recommends using the safety lever lock (included) to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Style	Part Number
	HW9Z-RL



Use with notched panel cutout to prevent unit rotation.

Operators

Style	Description	Part Number
	Cam A	HW1R-2A
	Cam D	HW1R-2D
	Cam E	HW1R-2E
	Cam F	HW1R-2F
	Cam N	HW1R-2N
	Cam T	HW1R-2T

Buttons

Style	Part Number
Round Flush	HW1A-B1-①



In place of ①, specify the Button Color Code from table below.

① Button Color Code

Color	Code	Color	Code
Black	B	White	W
Green	G	Yellow	Y
Red	R		
Blue	S		

Dual Pushbutton Switches

Key features:

- Two pushbuttons and a pilot light are integrated into one space-saving ø22 mm control unit.
- Momentary and interlock types are available for pushbuttons. Interlock type prevents both buttons from being pressed at the same time.
- Pilot lights are available in full voltage and transformer with LED.
- IP40 protection, IP65 when using silicon boot.



Applications:

- Ideal for use as power switches and start/stop switches (available with I/ON and O/OFF markings on the buttons and a pilot light in the center).
- Interlock type prevents two pushbuttons from being pressed at the same time.

Dual Pushbutton Switches (Assembled) Part Numbers

Without Center Pilot Light

Operation Type	Button Style		Contact Arrangement		Part Number	④Button Color Code	⑤Legend Code
			Top Button	Bottom Button			
Momentary	Flush (top) Flush (bottom)		1NO	1NC	HW7D-B11F1001-④⑤	GR: Green (top) Red (bottom)	Blank: Without legend
			1NO	1NO	HW7D-B11F1010-④⑤		
			1NO-1NC	1NO-1NC	HW7D-B11F1111-④⑤		
			2NO	2NC	HW7D-B11F2002-④⑤		
			2NO	2NO	HW7D-B11F2020-④⑤		
	Flush (top) Extended (bottom)		1NO	1NC	HW7D-B12F1001-④⑤		
			1NO	1NO	HW7D-B12F1010-④⑤		
			1NO-1NC	1NO-1NC	HW7D-B12F1111-④⑤		
			2NO	2NC	HW7D-B12F2002-④⑤		
			2NO	2NO	HW7D-B12F2020-④⑤		
Interlock*	Flush (top) Flush (bottom)		1NO	1NC	HW7D-B21F1001-④⑤	WB: White (top) Black (bottom)	1: I/ON (top) O/OFF (bottom)
			1NO	1NO	HW7D-B21F1010-④⑤		
			1NO-1NC	1NO-1NC	HW7D-B21F1111-④⑤		
			2NO	2NC	HW7D-B21F2002-④⑤		
			2NO	2NO	HW7D-B21F2020-④⑤		
	Flush (top) Extended (bottom)		1NO	1NC	HW7D-B22F1001-④⑤		
			1NO	1NO	HW7D-B22F1010-④⑤		
			1NO-1NC	1NO-1NC	HW7D-B22F1111-④⑤		
			2NO	2NC	HW7D-B22F2002-④⑤		
			2NO	2NO	HW7D-B22F2020-④⑤		

 1. *Interlock type prevents both top and bottom buttons from being pressed simultaneously.
2. Clear silicon rubber cover part number HW9Z-D7D.
3. Additional contact configurations available (up to 6 total contacts).

With Center Pilot Light

Operation Type	Button Style		Top Button	Bottom Button	Part Number
Momentary	Flush (Top) Flush (Bottom)	Flush (top) Flush (bottom)	1NO	1NC	HW7D-L11F1001②③-④⑤
			1NO	1NO	HW7D-L11F1010②③-④⑤
			1NO-1NC	1NO-1NC	HW7D-L11F1111②③-④⑤
			2NO	2NC	HW7D-L11F2002②③-④⑤
			2NO	2NO	HW7D-L11F2020②③-④⑤
	Flush (Top) Extended (Bottom)	Flush (top) Extended (bottom)	1NO	1NC	HW7D-L12F1001②③-④⑤
			1NO	1NO	HW7D-L12F1010②③-④⑤
			1NO-1NC	1NO-1NC	HW7D-L12F1111②③-④⑤
			2NO	2NC	HW7D-L12F2002②③-④⑤
			2NO	2NO	HW7D-L12F2020②③-④⑤
Interlock*	Flush (Top) Flush (Bottom)	Flush (top) Extended (bottom)	1NO	1NC	HW7D-L21F1001②③-④⑤
			1NO	1NO	HW7D-L21F1010②③-④⑤
			1NO-1NC	1NO-1NC	HW7D-L21F1111②③-④⑤
			2NO	2NC	HW7D-L21F2002②③-④⑤
			2NO	2NO	HW7D-L21F2020②③-④⑤
	Flush (Top) Extended (Bottom)	Flush (top) Extended (bottom)	1NO	1NC	HW7D-L22F1001②③-④⑤
			1NO	1NO	HW7D-L22F1010②③-④⑤
			1NO-1NC	1NO-1NC	HW7D-L22F1111②③-④⑤
			2NO	2NC	HW7D-L22F2002②③-④⑤
			2NO	2NO	HW7D-L22F2020②③-④⑤



- *Interlock type prevents both top and bottom buttons from being pressed simultaneously.
- Clear silicon rubber cover part number HW9Z-D7D.
- All assembled part numbers in catalog include Finger-Safe spring-up (HW-U...) contacts.

② Pilot Light Illumination & Voltage Code

Full Voltage	
Voltage	Code
6V AC/DC, LED	Q2
12V AC/DC, LED	Q3
24V AC/DC, LED	Q4
120V AC, LED	Q8
Step-Down Transformer (6V Secondary LED Voltage)	
Voltage	Code
120V AC, LED	H22
240V AC, LED	M42
480V AC, LED	T82

③ Pilot Lamp Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

④ Pushbutton Color Code

Color	Code
Top	Green
Bottom	Red
Top	White
Bottom	Black
	WB

⑤ Engraving Codes

Engraving	Code
No Engraving	Blank
I/ON	Top
O/OFF	Bottom
	1

Pilot Light

- Without Center Pilot Light
- With Center Pilot Light

Button Arrangement

- 1: Momentary (Flush/Flush)
- 12: Momentary (Flush/Extended)
- 21: Interlock (Flush/Flush)
- 22: Interlock (Flush/Extended)

Contact Arrangement

- Top Button**
- 01: 1NC
 - 02: 2NC
 - 10: 1NO
 - 20: 2NO
- Bottom Button**
- 01: 1NC
 - 02: 2NC
 - 10: 1NO
 - 20: 2NO

Part Number Structure

H W 7 D - L 21 F 20 20 H22 R - GR 1

Voltage Code
blank: without center pilot light

Full Voltage*
02: 6V LED

Transformer*
H22: 120V AC LED

Pilot Lamp Color
A: Amber
G: Green
R: Red
S: Blue
W: White

Engraving Code
blank: No Engraving
1: Top: I/ON
Bottom: O/OFF

Pushbutton Color
GR: Top: Green
Bottom: Red
WB: Top: White
Bottom: Black

*For additional voltage codes, please see previous page

Note: Use only for interpreting part numbers.
Do not use for developing part numbers.

Dual Pushbutton Switches (Sub-assembled) Part Numbers

Contact Blocks + Mounting Adaptor + Safety Lever Lock + Operator + Lens = Completed Unit



Lamp Circuit Components with Finger-Safe Terminals

Style	Description	Part Number
Lead Holder	For use with HW-CBL on all illuminated pushbutton units. One required for each deck (pair) of contacts.	HW-LH3
Dummy Block with Full Voltage Adaptor	For use with odd number of contacts.	HW-DA1FBN
Full Voltage Adaptor	For use with even number of contacts.	TW-DA1FB
Transformer Unit (6V secondary voltage)	120VAC 240VAC 480VAC	TW-F126B TW-F246B TW-F486B

Contact Blocks

Style	Contacts	1NO	1NC
Finger-Safe Spring-Up Terminal		HW-U10-F (early make)	HW-U01-F (late break)
Dummy Block		HW-DB	

Contact Block Mounting Adaptor

Style	Part Number
Non-illuminated	HW-CB2C
Illuminated (with Pilot Light)	HW-CBL

- Used to mount contact blocks to operator (first pair only).
- IEC strongly recommends using the safety lever lock (included) to prevent heavy vibration or maintenance personnel from inadvertently unlocking contacts.

Safety Lever Lock

Style	Part Number
	HW9Z-LS

Anti-Rotation Ring

Appearance	Part Number
	HW9Z-RL

Use with notched panel cutout to prevent unit rotation.

Engraving Codes

Engraving	Code
No Engraving	Blank
I/ON	Top
O/OFF	Bottom

Lamps/Lens

Style	Voltage	Part Number
	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Non-illuminated		HW9Z-B7B
Illuminated		HW9Z-L7W

- In place of ②, specify the LED Color Code.
- The LED contains a current-limiting resistor and reverse polarity protection diodes.

LED Color Code

Color	Code	Color	Code
Amber	A	Blue	S
Green	G	White	W
Red	R		

Operators

Style	Button	Part Number
Momentary	Flush (top)	HW7D-*11④-⑤
	Flush (bottom)	
	Flush (top)	HW7D-*12④-⑤
	Extended (bottom)	
Interlock	Flush (top)	HW7D-*21④-⑤
	Flush (bottom)	
	Flush (top)	HW7D-*22④-⑤
	Extended (bottom)	

Instead of * insert:
B: Non-illuminated
L: Illuminated

Pushbutton Color Code

Color	Code	Color	Code
Top	Green	Top	White
Bottom	Red	Bottom	Black

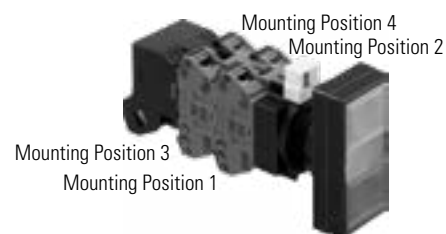
Contact Arrangement Chart

Contact Block Mounting Position Example

Contact Arrangement			Contact Block		Top Button		Bottom Button	
Top Button	Bottom Button	Contact Code	Mounting Position	Type	Normal	Push	Normal	Push
1NO	1NO	1010	1	NO		X		
			2	NO				X
1NO	1NC	1001	1	NO		X		
			2	NC			X	
1NC	1NO	0110	1	NC	X			
			2	NO				X
1NC	1NC	0101	1	NC	X			
			2	NC			X	
1NO	2NO	1020	1	NO		X		
			2	NO				X
			3	Dummy				
			4	NO				X
1NO	1NO-1NC	1011	1	NO		X		
			2	NO				X
			3	Dummy				
			4	NC			X	
1NO	2NC	1002	1	NO		X		
			2	NC			X	
			3	Dummy				
			4	NC			X	
1NC	2NO	0120	1	NC	X			
			2	NO				X
			3	Dummy				
			4	NO				X
1NC	1NO-1NC	0111	1	NC	X			
			2	NO				X
			3	Dummy				
			4	NC			X	
1NC	2NC	0102	1	NC	X			
			2	NC			X	
			3	Dummy				
			4	NC			X	
2NO	1NO	2010	1	NO		X		
			2	NO				X
			3	NO		X		
			4	Dummy				
2NO	1NC	2001	1	NO		X		
			2	NC			X	
			3	NO		X		
			4	Dummy				
1NO-1NC	1NO	1110	1	NO		X		
			2	NO				X
			3	NC	X			
			4	Dummy				
1NO-1NC	1NC	1101	1	NO		X		
			2	NC			X	
			3	NC	X			
			4	Dummy				



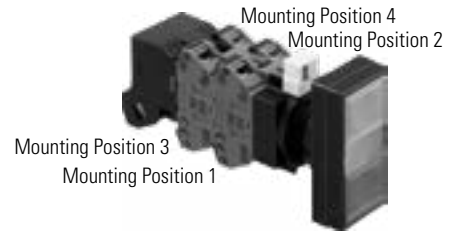
- Transformers can have two or four contact blocks only.
- Contact blocks 1 and 3 are actuated by the top button. Contact blocks 2 and 4 are actuated by the bottom button.



Contact Arrangement Chart (con't)

Contact Arrangement			Contact Block		Top Button		Bottom Button	
Top Button	Bottom Button	Contact Code	Mounting Position	Type	Normal	Push	Normal	Push
2NC	1NO	0210	1	NC	X			
			2	NO				X
			3	NC	X			
			4	Dummy				
2NC	1NC	0201	1	NC	X			
			2	NC			X	
			3	NC	X			
			4	Dummy				
2NO	2NO	2020	1	NO		X		
			2	NO				X
			3	NO		X		
			4	NO				X
2NO	1NO-1NC	2011	1	NO		X		
			2	NO				X
			3	NO		X		
			4	NC			X	
2NO	2NC	2002	1	NO		X		
			2	NC			X	
			3	NO		X		
			4	NC			X	
1NO-1NC	2NO	1120	1	NO		X		
			2	NO				X
			3	NC	X			
			4	NO				X
1NO-1NC	1NO-1NC	1111	1	NO		X		
			2	NO				X
			3	NC	X			
			4	NC			X	
1NO-1NC	2NC	1102	1	NO		X		
			2	NC			X	
			3	NC	X			
			4	NC			X	
2NC	2NO	0220	1	NC	X			
			2	NO				X
			3	NC	X			
			4	NO				X
2NC	1NO-1NC	0211	1	NC	X			
			2	NO				X
			3	NC	X			
			4	NC			X	
2NC	2NC	0202	1	NC	X			
			2	NC			X	
			3	NC	X			
			4	NC			X	

Contact Block Mounting Position Example



Contactor Reset Button



Reset Buttons (Assembled)

	Plastic Bezel	Metal Bezel
(Blank)	HW1B-M1RS-①T	HW4B-M1RS-①T
Engraved "R"	HW1B-M1RS-①T-ENG-R	HW4B-M1RS-①T-ENG-R

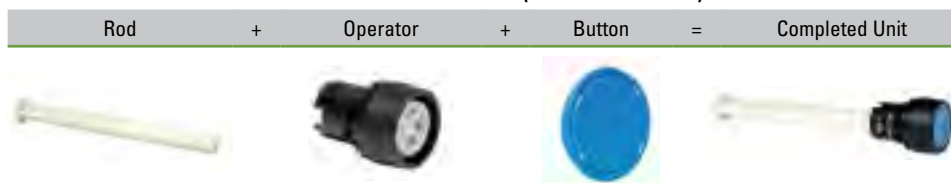


1. In place of ① specify Button Color Code.
2. 130mm (5.1") overall length.
3. 16mm flat base for easy alignment

① Button Color Code

Color	Code	Color	Code
Black	B	White	W
Green	G	Yellow	Y
Red	R		
Blue	S		

Contactor Reset Button (Sub-assembled)



Rod

Style	Part Number
	HW9Z-RS-TK2141

Operator

Style	Plastic	Metal
 	HW1B-M0	HW4B-M0

Button

Style	Part Number
	HW1A-B1-①

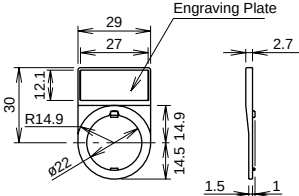
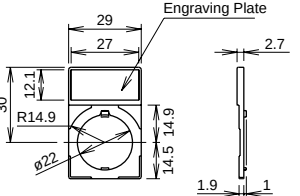
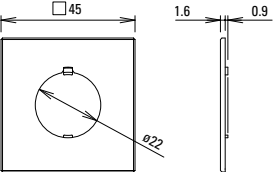
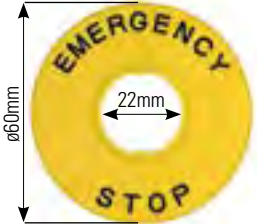


In place of ①, specify the Button Color Code from table.

① Button Color Code

Color	Code	Color	Code
Black	B	White	W
Green	G	Yellow	Y
Red	R		
Blue	S		

Nameplates - HW Series

	HWAM-Black Plastic	HWAQ-Black Plastic	HWAS-Black Plastic	HWAV-Yellow Plastic
				
Nameplate (blank engraving plate included)	HWAM-OB	HWAQ-OB	HWAS-OB	HWAV-0 HWAV5-0†
Nameplate (engraved)	HWAM-①	HWAQ-①	HWAS-①	HWAV-27* HWAV5-27†
Additional Insert (blank)	HWNP-0	HWNP-0	HWNP Dimensions 	
Additional Insert (engraved)	HWNP-①	HWNP-①		



1. In place of ①, insert either the standard legend code from table below or custom engraving delimited by " ".
2. Standard engravings are available at no charge.
3. * HWAV-27 comes engraved "Emergency Stop" as shown in drawing.
4. † HWAV5-27 and HWAV5-0 for 60mm diameter E-Stops (80mm diameter nameplate).

Standard Legend Codes

Pushbuttons				Pushbuttons/Selector Switches				Selector Switches	
Legend	Code	Legend	Code	Legend	Code	Legend	Code	Legend	Code
AUTO	101	OPEN	116	AUTO-MAN	201	REV-FOR	216	AUTO-MAN-OFF	301
CLOSE	102	OUT	117	CLOSE-OPEN	202	RUN-JOG	217	AUTO-OFF-MAN	302
DOWN	103	RAISE	118	DOWN-UP	203	RUN-SAFE	218	CLOSE-OFF-OPEN	303
EMERG.STOP	104	RESET	119	FAST-SLOW	204	SAFE-RUN	219	DOWN-OFF-SLOW	304
FAST	105	REVERSE	120	FOR-REV	205	SLOW-FAST	220	FAST-OFF-SLOW	305
FORWARD	106	RUN	121	HAND-AUTO	206	START-STOP	221	FOR-OFF-REV	306
HAND	107	SLOW	122	HIGH-LOW	207	STOP-START	222	LEFT-OFF-RIGHT	307
HIGH	108	START	123	JOG-RUN	208	UP-DOWN	223	LOWER-OFF-RAISE	308
IN	109	STOP	125	LEFT-RIGHT	209	Ol (Int'l OFF ON)	250	OFF-MAN-AUTO	309
INCH	110	TEST	126	LOWER-RAISE	210			OFF-SLOW-FAST	310
JOG	111	UP	127	MAN-AUTO	211			OFF-1-2	311
LOW	112	I (Int'l On)	150	OFF-ON	212			OPEN-OFF-CLOSE	312
LOWER	113	O (Int'l Off)	151	ON-OFF	213			SLOW-OFF-FAST	313
OFF	114	EMO	152	OPEN-CLOSE	214			SUMMER-OFF-WINTER	314
ON	115			RAISE-LOWER	215			UP-OFF-DOWN	315
								1-OFF-2	316
								HAND-OFF-AUTO	317



1. To order engraved nameplates, add legend code to nameplate part number.
2. Character height based on the number of characters and size of nameplate. Standard character size is 3/16".
3. Nameplates with standard legends are the same list price as blank nameplates.
4. Nameplates have built-in anti-rotation feature for use with notched panel cut-outs. Additional anti-rotation ring (HW9Z-RL) is not necessary.

Nameplates Order Form — HW Series

Copy this order form and use it to specify Letter Height, Custom Engravings, Location of Engraving on Nameplate, and Quantity Desired.

To ensure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company:

Name:

Telephone:

Fax & Email:

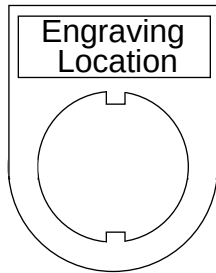
IDEC Rep/Distributor Contact:

PO number (if known):

IDEC Rep/Distributor Phone:

IDEC Rep/Distributor Fax & Email:

HWAM Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below the check boxes. Note: 1/8" size letters cannot exceed 9 characters.

7/64"
Letter
Size

☐

11 characters maximum
(for 7/64" size letters)

1/8"
Letter
Size

☐

9 characters maximum
(for 7/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

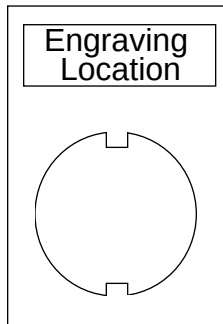
1	2	3	4	5	6	7	8	9	10	11

Sample Letter Sizes

7/64" Letters: A B C D

1/8" Letters: A B C D

HWAQ Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below the check boxes. Note: 1/8" size letters cannot exceed 9 characters.

7/64"
Letter
Size

☐

11 characters maximum
(for 7/64" size letters)

1/8"
Letter
Size

☐

9 characters maximum
(for 1/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

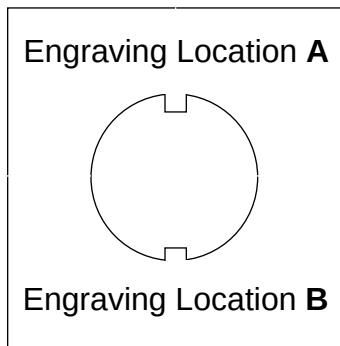
1	2	3	4	5	6	7	8	9	10	11

Sample Letter Sizes

7/64" Letters: A B C D

1/8" Letters: A B C D

HWAS Nameplate



Step 1.

Choose Letter Size - 3/32" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below the check boxes. Note: 1/8" size letters cannot exceed 14 characters.

3/32"
Letter
Size

☐

20 characters maximum
(for 3/32" size letters)

1/8"
Letter
Size

☐

14 characters maximum
(for 1/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

Step 3.

Specify Location.

Enter the location of engraving (A or B or Both), in box on the right.

Location

A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Sample Letter Sizes

3/32" Letters: A B C D

1/8" Letters: A B C D

Switch Engraving Order Form – HW Series

Copy this order form and use it to specify Letter Height, Maximum Number of Lines and Text to be engraved.
To ensure engraving accuracy, fax it to your IDEC representative or Distributor.

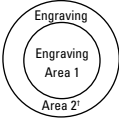
Your Company: _____
Name: _____
Address: _____
PO: _____

Telephone: _____
Fax: _____
Email: _____
Part Number to be Engraved: _____

Please check one of the boxes below to indicate your choice of engraving options:



ø29mm, ø40mm Mushroom Head



	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	5
☐		1/8	6
☐	2	5/32	5
☐		1/8	6
☐	3	1/8	6
☐	4	3/32	5

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	5
☐		1/8	5
☐	2	5/32	5
☐		1/8	6
☐	3	1/8	5
☐	4	3/32	5

		# of Lines	Letter Height	Max. Characters Per Line
☐	Engraving Area 1	1	5/32	5
☐			1/8	5
☐	Engraving Area 2	1	5/32	7
☐			1/8	7



- 1. Above mentioned specifications hold true for standard size pushbuttons (round and square).
- 2. *Engraving Area 2 can be engraved for 40mm mushroom Head non-Illuminated push button only.
- 3. Engraving is done on the button itself for non-Illuminated push buttons and on marking plate for illuminated push buttons and pilot lights.
- 4. Please enter text exactly how you want it engraved, take care to emphasize capital or small letters.

Enter text to be engraved:

Line 1: _____
Line 2: _____
Line 3: _____
Line 4: _____

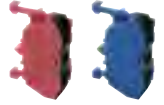
Sample Letter Sizes

1/8 Letters: OPEN
5/32 Letters: OPEN

For IDEC Internal Use Only:
Work Order #: _____

Accessories

Item	Appearance	Description/Usage	Part Number	
Locking Ring Wrench		Metallic tool used to tighten the plastic locking ring when installing the HW series in a panel	MW9Z-T1	
Lamp/LED Removal Tool		Rubber tool makes lamp/LED removal easier.	OR-55	
Anti-Rotation Ring		Prevents rotation of switches in panel. (included with all assembled switches except pilot lights)	for notched panel cutout (standard)	HW9Z-RL
			for round panel cutout	LW9Z-L
Rubber Mounting Hole Plug		Black rubber plug fills unused 7/8" mounting holes in panel.	OB-31	
Metallic Mounting Hole Plug		For plugging unused 7/8" mounting holes in the panel. Tighten the attached locking ring to a torque of 12 kfg-cm maximum Degree of protection: IP66	LW9Z-BM	
Pushbutton Clear Boot		Used to cover and protect pushbuttons Operating temperature: -50 to +60°C	Flush Pushbuttons	OC-31
			Extended Pushbuttons	OC-32
Padlock Cover		Plastic hinged padlockable cover to protect pushbuttons or selector switches. (Not intended for E-Stops) Degree of protection: IP65	HW9Z-KL1	
Tab Terminal Adapter		Tab #250 (6.35 x 0.8mm): Single tab	TW-FA4	
Mounting Adaptor		Used to mount round HW series (except Jumbo Mushroom, unibody, and square units) into a larger panel cut-out. (includes both pieces)	22 to 30mm	HW9Z-A30
			22 to 25mm	HW9Z-A25
Replacement Safety Lever Lock		Used to prevent contact mounting lever from moving due to heavy vibration or panel maintenance.	HW9Z-LS	
Reset Rod for Contactors Overload		5" rod used with HW1B-M0.	HW9Z-RS-TK2141	
Replacement Operator Washer		Provided with operator. Insert between bezel and locking ring.	HWM-WASHER	
Replacement Locking Ring		Plastic locking nut comes with all HW operators & assemblies.	Standard (plastic)	HW9Z-LN
			Optional (metal)	HW9Z-LNM
Switch Cover (Square)		Used only with round or square flush pushbuttons.	HW9Z-K1 (spring return) HW9Z-K11 (maintained cover)	
Replacement Keys		Pair of Keys (#231)	HW9Z-SKP	
Replacement Lens		HW Illuminated Unibody Replacement Lens	HWLV-LENSR	

Item	Appearance	Description/Usage	Part Number	
Replacement Jumbo Dome Lens		Polycarbonate Replacement Lens (If using yellow lens, use white LED.)	HW1A-P5① ① = (A, G, R, S, W, Y))	
Replacement Jumbo LED Diffusing Lens			HW9Z-PP5C	
Replacement LED Lamps for HW Jumbo Dome		Replacement LED Lamp - applicable for jumbo pilot lights only	LSTD8-2① ① = (A, G, R, S, W)	
Rubber Cover for Dual Pushbuttons		Clear Silicon rubber cover	HW9Z-D7D	
Barrier for Dual Pushbuttons		Plastic barrier. Used when mounting the HW7 units on 30mm horizontal centers, to prevent possible interconnections between adjoining terminals.	HW-VU1	
EMO Sticker		Emergency stop nameplate sticker	HW9Z-EMO-NP-TK2120	
Contact Blocks (with side entry)		These contacts are applicable for wires terminated by ring, fork, terminals, not recommended for bare wire connections.	1NC	1NO
			HW-U01 HW-U01-MAU HW-U01R HW-U01R-MAU (with side entry)	HW-U10 HW-U10-MAU HW-U10R HW-U10R-MAU (with side entry)
Contact Blocks (without side entry)		These contacts are applicable for wires terminated by ring, fork, or ferule terminals, and also bare wire connections.	HW-U01-F HW-U01-MAU-F HW-U01R-F HW-U01R-MAU-F (no side entry)	HW-U10-F HW-U10-MAU-F HW-U10R-F HW-U10R-MAU-F (no side entry)

E-Stop Shrouds

Style	Part Numbers	E-Stop Types	Applicable Standards
	HW9Z-KG1	40mm Mushroom Head	SEMI S2-0703, 12.5.1 Compliant
	HW9Z-KG2	40mm Mushroom Head	SEMI S2-0703, 12.5.1 & SEMATECH Compliant

Style	Part Numbers	E-Stop Types	Applicable Standards
	HW9Z-KG3	40mm Mushroom Head	SEMI S2 Compliant (Approved by TUV) ISO 13850
	HW9Z-KG4	40mm Mushroom Head	SEMI S2 Compliant (Approved by TUV) & SEMATECH ISO 13850

Contact Assemblies

Standard Contact Assemblies

For use with Non-Illuminated Pushbuttons & E-Stops

Style	Contacts	Part Number
	1NO	HW-CBF10
	1NC	HW-CBF01
	1NO/1NC	HW-CBF11
	2NO	HW-CBF20
	2NC	HW-CBF02
	2NO/2NC	HW-CBF22



Gold contact option is available. Add suffix "MAU" to end of part number. For example, HW-CBF20 becomes HW-CBF20-MAU.

Full Voltage Contact Assemblies

For use with Illuminated Pushbuttons.

Style	Contacts	Part Number
	1NO	HW-FL10Q0
	2NO	HW-FL20Q0
	1NO/1NC	HW-FL11Q0
	1NC	HW-FL01Q0
	2NC	HW-FL02Q0



Order LED separately.

Transformer Contact Assemblies

For use with Illuminated Pushbuttons.

Style	Contacts	Part Number
	120V AC with LED	1NO 2NO 1NC 1NO/1NC
	240V AC with LED	1NO 2NO 1NC 1NO/1NC
	480V AC with LED	1NO 2NO 1NC 1NO/1NC
		HW-FL10H2-② HW-FL20H2-② HW-FL01H2-② HW-FL11H2-② HW-FL10M4-② HW-FL20M4-② HW-FL01M4-② HW-FL11M4-② HW-FL10T8-② HW-FL20T8-② HW-FL01T8-② HW-FL11T8-②

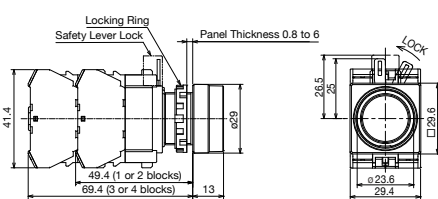


1. In place of ②, specify the LED Color Code.
② = A, G, R, S, or W
2. 6V LED included.

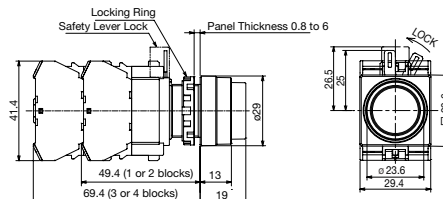
Dimensions (mm)

Non-Illuminated Pushbuttons

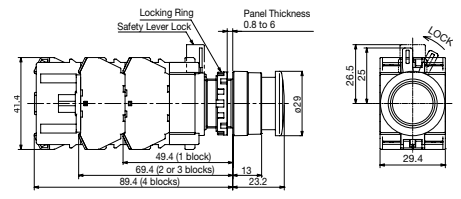
Flush (HW1B-M1, -A1)



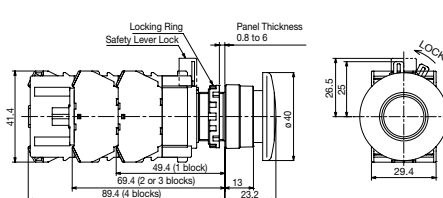
Extended (HW1B-M2, -A2)



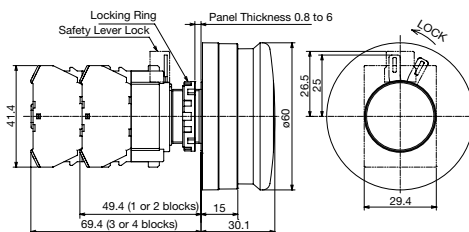
ø29mm Mushroom (HW1B-M3 -A3)



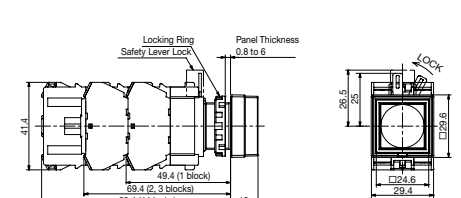
ø40mm Mushroom (HW1B-M4, -A4)



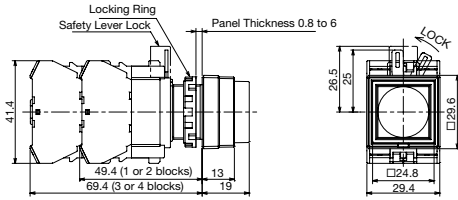
ø60mm Mushroom (HW1B-M5)



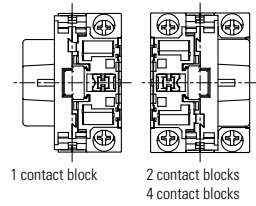
Square Flush (HW2B-M1, -A1)



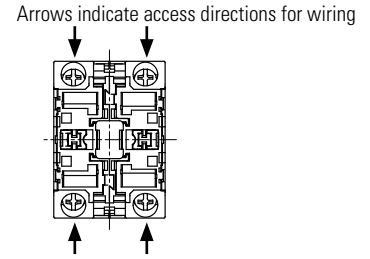
Square Extended (HW2B-M2, -A2)



Contact Block (Bottom View)

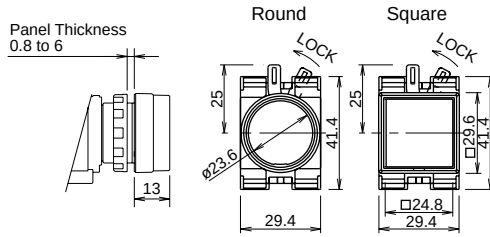


Terminal Wiring

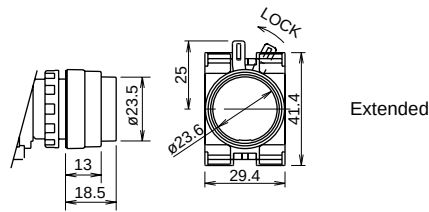


Operators

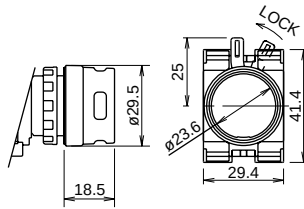
Flush (Round & Square)



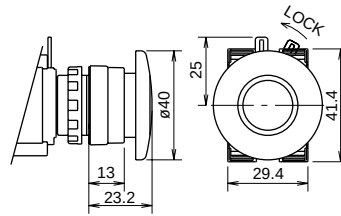
Extended



Extended with Full Shroud



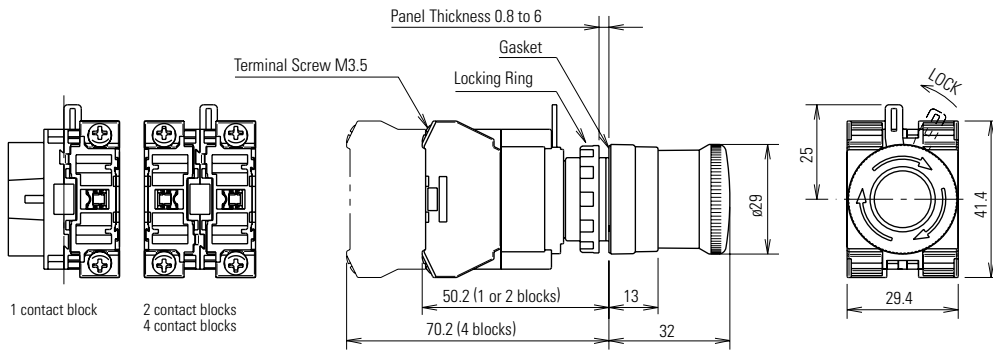
ø40mm Mushroom



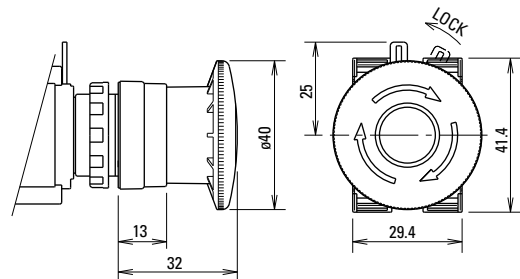
Dimensions (mm)

Emergency Stop Pushbuttons

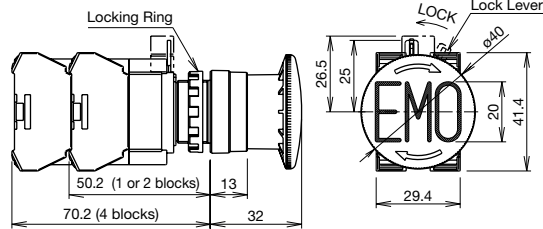
ø29mm Head Pushlock Turn Reset (HW1B-V3)



ø40mm Head Pushlock Turn Reset (HW1B-V4)

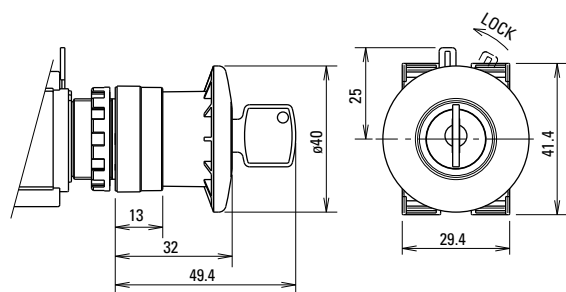


ø40mm Head EMO Pushlock Turn Reset (HW1B-V4)

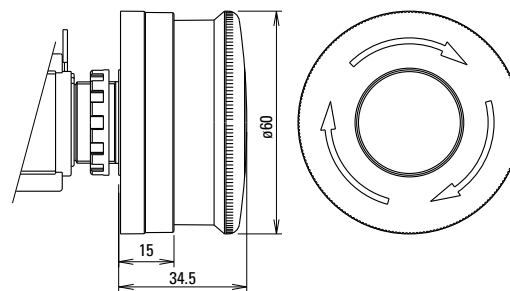


Dimensions (mm)

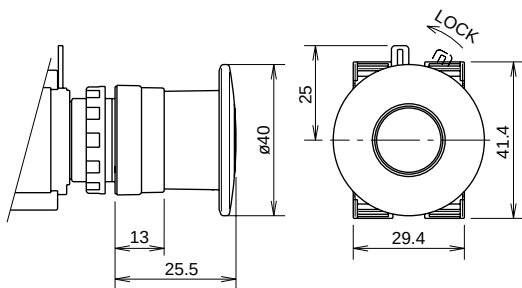
ø40mm Head Pushlock Key Reset (HW1B-X4)



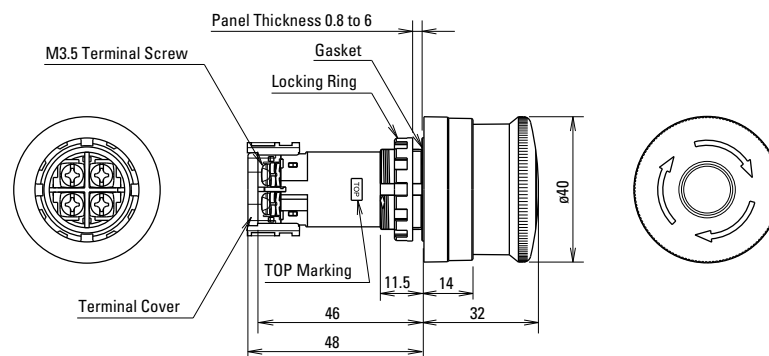
ø60mm Head Pushlock Turn Reset (HW1B-V5)



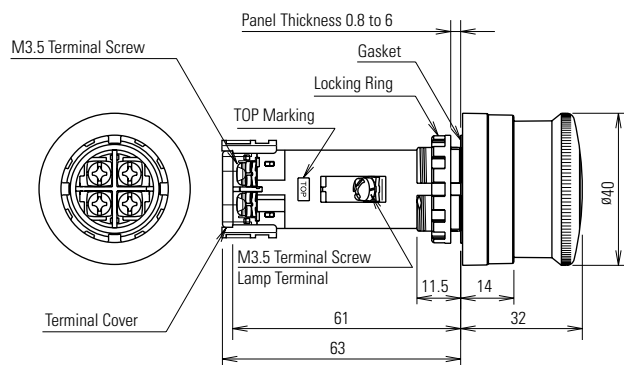
ø40mm Head Push-Pull (HW1B-Y2)



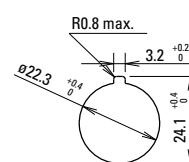
ø40mm Head Unibody Pushlock Turn Reset (HW1B-BV4)



Illuminated E-Stop Pushbuttons (HW1E-LV4)



Mounting Hole

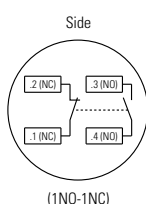


The minimum mounting centers shown below are applicable to E-Stop switches with one layer of contact blocks (two contact blocks). When two layers of contact blocks are mounted, determine the minimum mounting centers for ease of wiring.

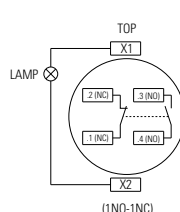
Unit	Vertical Spacing	Horizontal Spacing
HW1B-V3 HW1B-V4 HW1B-X4 HW1B-Y2	50 mm	50 mm
HW1B-V5	60 mm	60 mm

Terminal Arrangement (Bottom View)

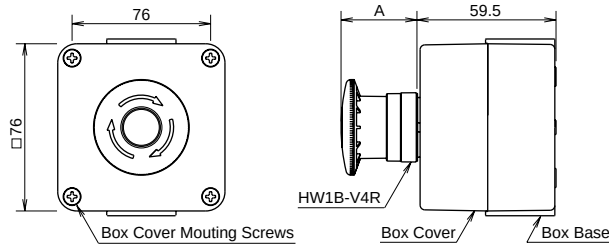
HW1E-BV4



HW1E-LV4

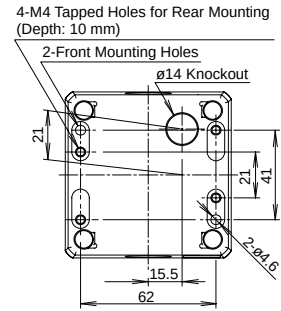


Emergency Stop Stations



Operator	Dimension A (mm)
Pushlock Turn Reset	32
Pushlock Key Reset	32 (Key inserted: 49.4)
Push Pull	25.5

Mounting Hole Layout



Dimensions (mm)

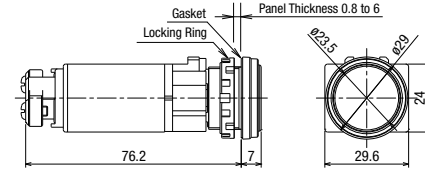
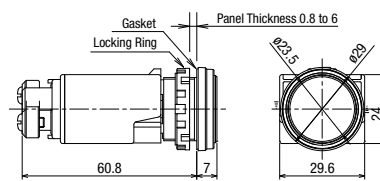
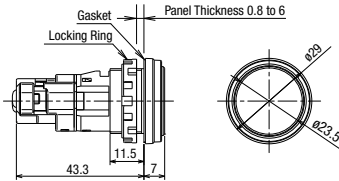
Pilot Lights

Round Flush Terminal screws: M3.5, integrated terminal cover

6, 12, 24V AC/DC, Without LED lamp

100/110V AC, 200/220V AC (240V AC maximum)

110V DC, 380V AC minimum



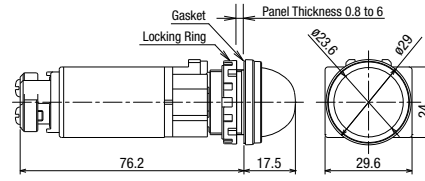
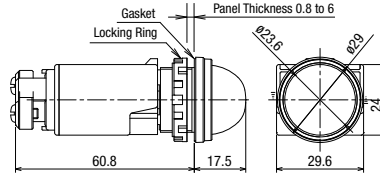
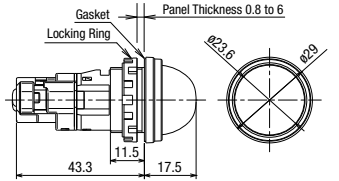
Dimensions (mm)

Extended Terminal screws: M3.5, integrated terminal cover

6, 12, 24V AC/DC, Without LED lamp

100/110V AC, 200/220V AC (240V AC maximum)

110V DC, 380V AC minimum

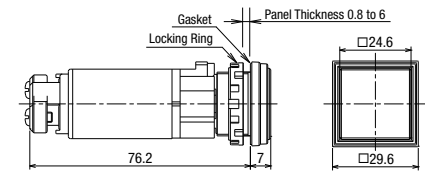
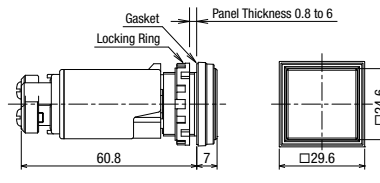
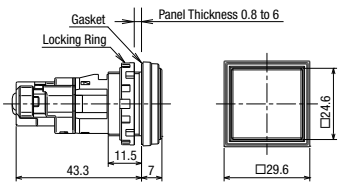


Square Flush Terminal screws: M3.5, integrated terminal cover

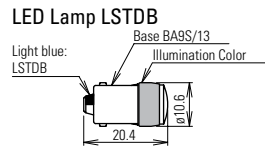
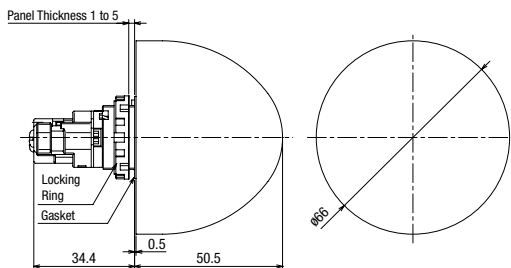
6, 12, 24V AC/DC, Without LED lamp

100/110V AC, 200/220V AC (240V AC maximum)

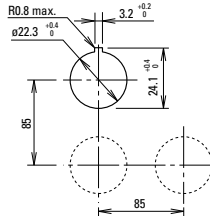
110V DC, 380V AC minimum



Jumbo Dome Pilot Light Terminal screws: M3.5, integrated terminal cover

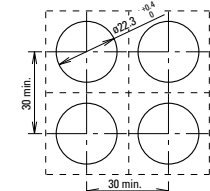


Mounting Hole Layout



Mounting Hole Layout

Close mounting on 30mm centers
Degree of protection: IP65

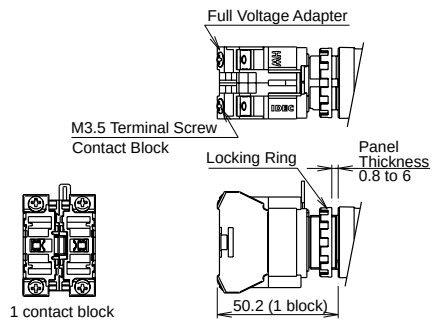


When mounting transformer or DC-DC converter type units on 30mm centers vertically and horizontally, keep the ambient temperature below 40°C.

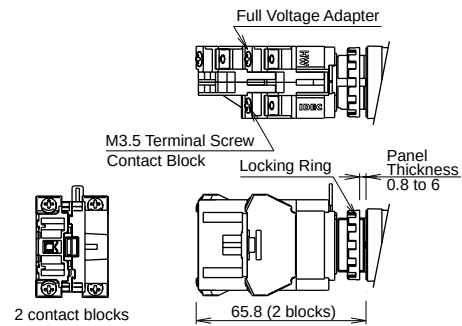
Illuminated Pushbuttons

Full Voltage Models

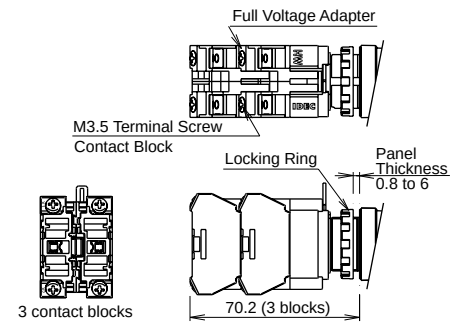
1 Contact Block



2 Contact Blocks

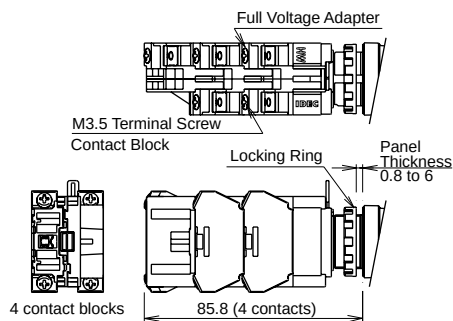


3 Contact Blocks



Illuminated Pushbuttons con't

4 Contact Blocks

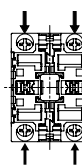


Terminal Wiring

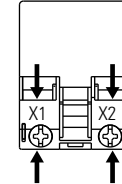
Arrows indicate access directions for wiring.

Contact Block

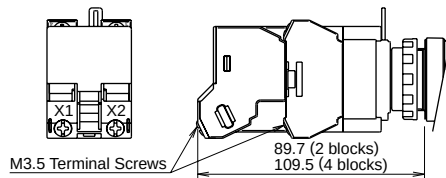
Full Voltage Adaptor



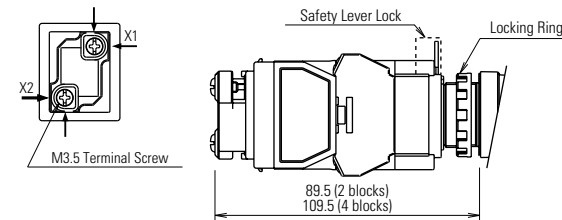
Transformer



Transformer Models



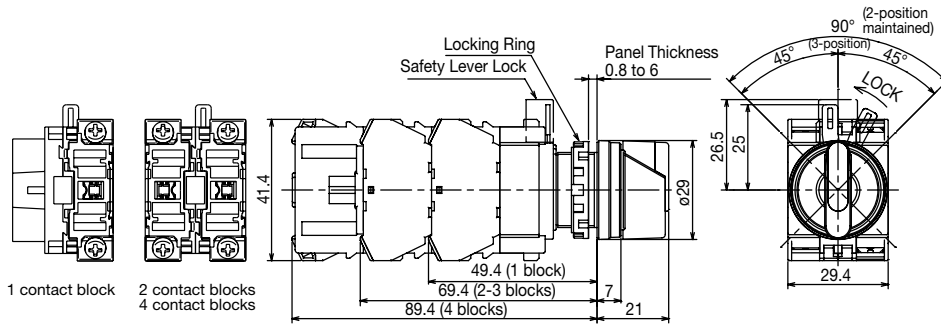
DC-DC Converter Models



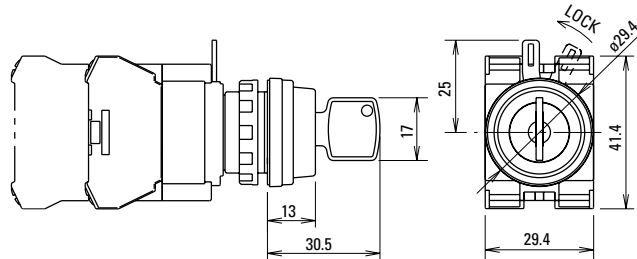
Dimensions (mm)

Non-Illuminated Selector & Key Switches

Knob Operator

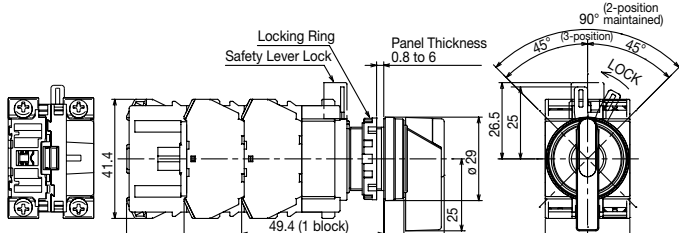


Key Operator

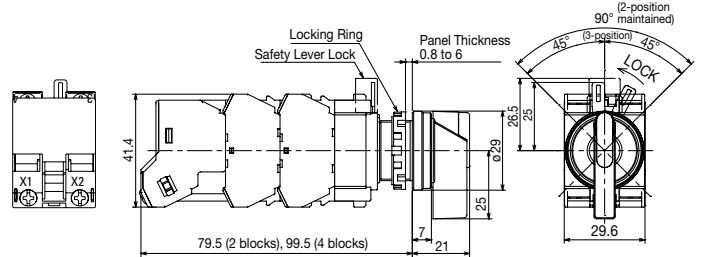


Illuminated Selector Switches

Full Voltage Model



Transformer Model

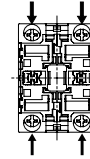


Dimensions (mm)

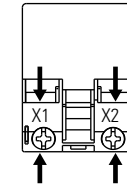
Terminal Wiring

Arrows indicate access directions for wiring.

Contact Block Full Voltage Adaptor

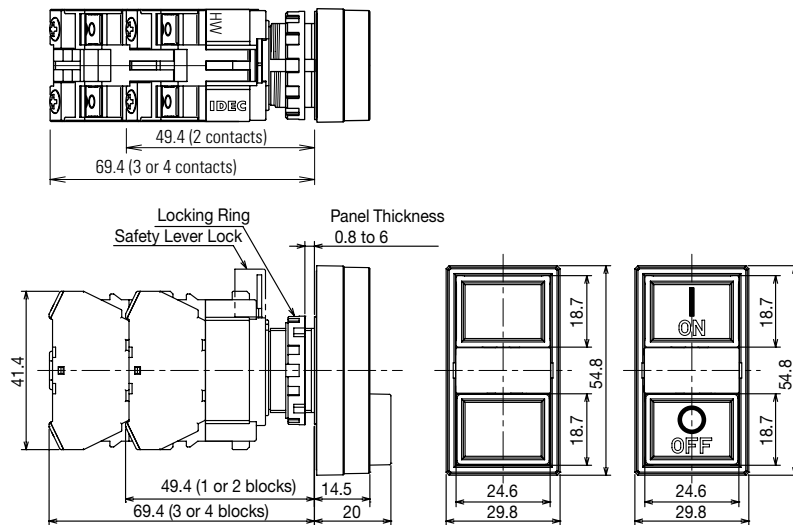


Transformer



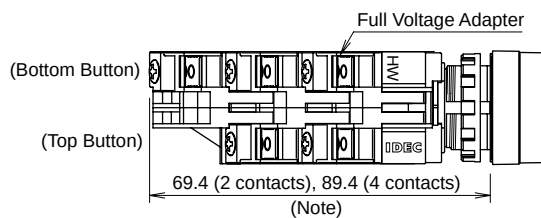
Dual Pushbutton

Without Pilot Light



With Pilot Light

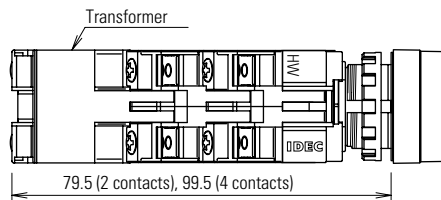
Full Voltage



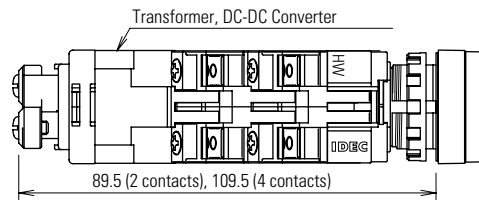
The depth of a 3-contact model depends on the combination of contact blocks at top and bottom pushbuttons.

Top Button	1 contact block	2 contact blocks
Bottom Button	2 contact blocks	1 contact block
Depth	89.4 mm	69.4 mm

Transformer (240V minimum)

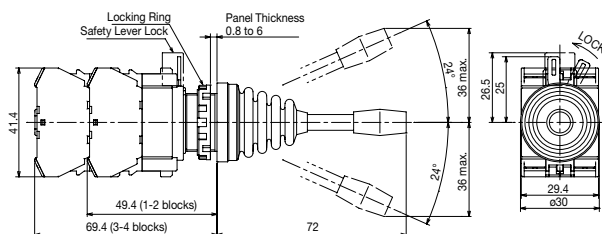


Transformer (480V)

**Monolever**

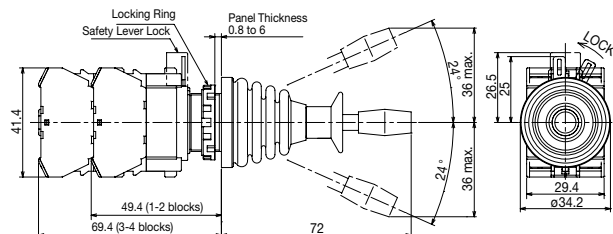
Dimensions

Standard Lever



Interlocking Lever

All dimensions in mm.

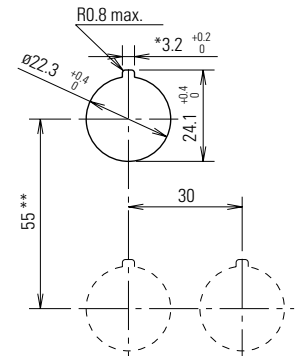


Terminal Screws M3.5

Integrated Terminal Cover

Dimensions (mm)

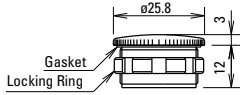
Mounting Hole Layout



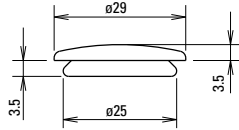
-The 3.2 mm recess is for preventing rotation and is not necessary when a nameplate or anti-rotation ring is not used.
 -When using the safety lever lock, determine the vertical spacing in consideration of convenience for installing and removing the safety lever lock.
 -Recommended vertical spacing: 100 mm
 -The minimum mounting centers are applicable to switches with one layer of contact blocks (two contact blocks). When two layers of contact blocks are mounted, determine the minimum mounting centers for ease of wiring.

Accessory Dimensions

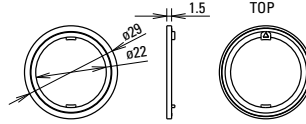
LW9Z-BM
Metallic Mounting Hole Plug



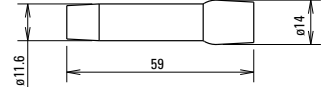
OB-31
Rubber Mounting Hole Plug



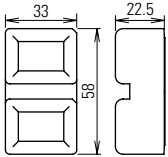
HW9Z-RL
Anti-Rotation Ring



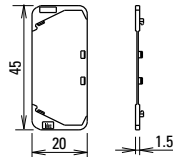
OR-55
Lamp/LED Removal Tool



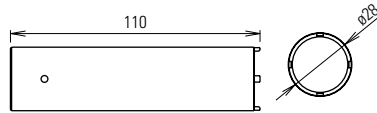
HW9Z-D7D
Dual Pushbutton Rubber Cover



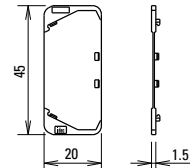
HW-VU1
Dual Pushbutton Barrier



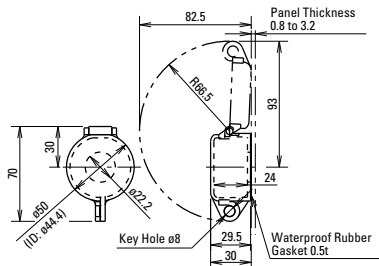
MW9Z-T1
Locking Ring Wrench



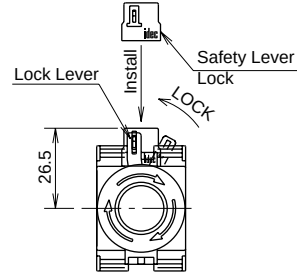
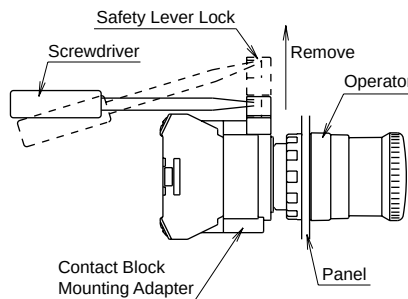
HW-VL1
Barrier



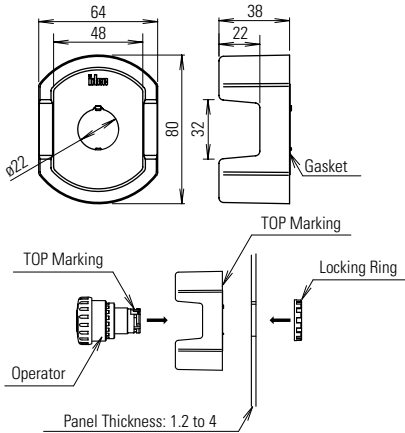
HW9Z-KL1
Padlock Cover



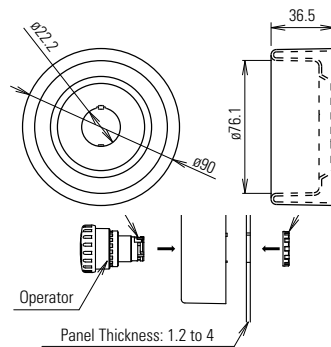
HWLS-TK1971
Safety Lever Lock



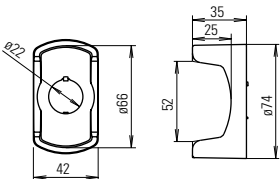
HW9Z-KG1



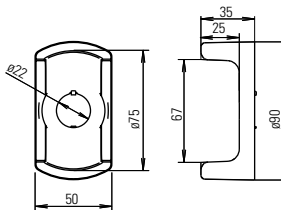
HW9Z-KG2



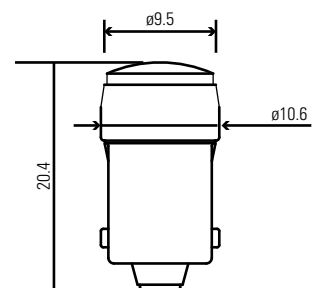
HW9Z-KG3



HW9Z-KG4



LSTD



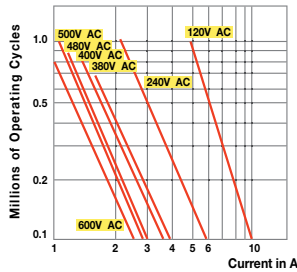
Specification Charts

INDUCTIVE

DC Voltages

Voltage V	24	48	110
Current A	4	2	1.1

AC Voltages

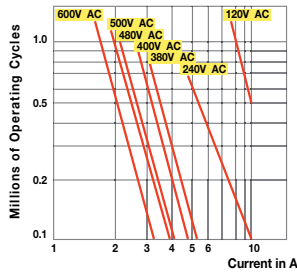


RESISTIVE

DC Voltages

Voltage V	24	48	110
Current A	8	4	2.2

AC Voltages



Conforming to IEC 947-5-1 Appendix C.
Utilization categories AC-15 and DC-13.

Operation rate: 1,800 op. hour

Load factor:

Inductive 0.4 ± 0.05

Resistive 0.9 ± 0.05

2 Position Selector Switches

	Contact	Mounting Position	Operator Position	
			Left	Right
HW1S-2T HW1K-2* HW1F-2	HW-U10-F (NO)	L	0	X
		R	0	X
	HW-U01-F (NC)	L	X	0
		R	X	0
	HW-U10R-F (NO-EM)	L	0	X
		R	0	X
	HW-U01R-F (NC-LB)	L	X	0
		R	X	0

Operator Truth Tables

3 Position Selector Switches con't

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
HW1S-3JT HW1K-3J*	HW-U10-F (NO)	L	X	0	0
		R	0	0	X
	HW-U01-F (NC)	L	0	X	0
		R	0	X	0
	HW-U10R-F (NO-EM)	L	X	0	X
		R	X	0	X
	HW-U01R-F (NC-LB)	L	0	X	X
		R	X	X	0

3 Position Selector Switches

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
HW1S-3T HW1K-3* HW1F-3	HW-U10-F (NO)	L	X	0	0
		R	0	0	X
	HW-U01-F (NC)	L	0	X	X
		R	X	X	0
	HW-U10R-F (NO-EM)	L	X	0	0
		R	0	0	X
	HW-U01R-F (NC-LB)	L	0	X	X
		R	X	X	0

4 Position Selector Switches

	Contact	Mounting Position	Operator Position			
			1	2	3	4
HW1S-4T	HW-U10-F (NO)	L	X	0	0	0
		R	0	0	0	X
	HW-U01-F (NC)	L	0	0	X	0
		R	0	X	0	0
	HW-U10R-F (NO-EM)	L	X	X	0	X
		R	X	0	X	X
	HW-U01R-F (NC-LB)	L	0	X	X	X
		R	X	X	X	0

5 Position Selector Switches

	Contact	Mounting Position	Operator Position				
			1	2	3	4	5
HW1S-5T	HW-U10-F (NO)	L	X	0	0	0	0
		R	0	0	0	0	X
	HW-U01-F (NC)	L	0	0	0	X	0
		R	0	X	0	0	0
	HW-U10R-F (NO-EM)	L	X	X	X	0	X
		R	X	0	X	X	X
	HW-U01R-F (NC-LB)	L	0	X	X	X	X
		R	X	X	X	X	0



1. Mounting position indicates which side of operator each contact should be mounted (as viewed from the front of the panel).
2. *For key removable code see page 663.

3. HW1S-3T is identified by white plungers on the operator.
4. HW1S-3ST is identified by red plungers on the operator.
5. HW1S-3JT is identified by black plungers on the operator.

HW Safety Precautions

Turn off power to HW series control units before starting installation, removal, wiring, maintenance, and inspection of the products. Failure to turn power off may cause electrical shocks or fire hazard.

To avoid the possibility of burning yourself, use the lamp holder tool when replacing lamps.

For wiring, use wires of a proper size to meet voltage and current requirements.

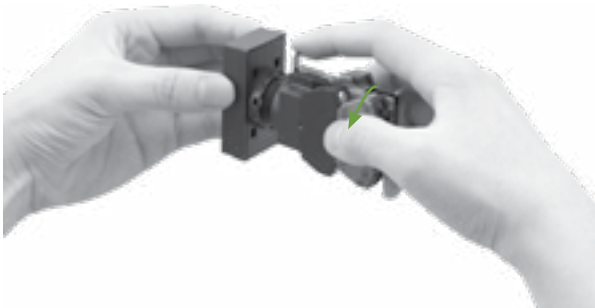
HW General Instructions

Panel Mounting

Remove the contact block assembly from the operator (for transformer type pilot lights, remove the transformer from the illumination unit). Remove the locking ring from the operator. Insert the operator into the panel cut-out from the front, tighten the locking ring from the back, then install the contact block assembly to the operator.

Removing and Installing the Contact Block Assembly

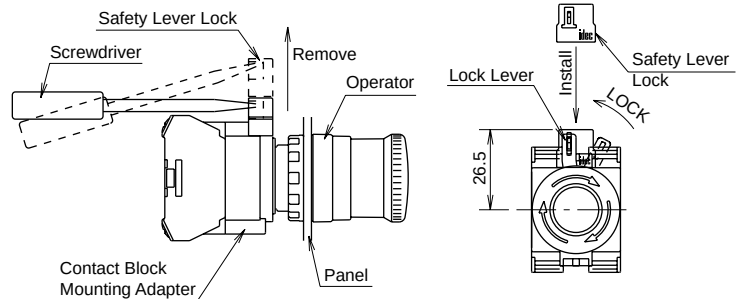
1. To remove the operator from the contact block, turn the locking lever in the direction of the arrow shown below. The operator can now be removed.
2. To reinstall, place the TOP markings on the operator and the contact block mounting adapter in the same direction, and insert the operator into the contact block mounting adapter. Then turn the locking lever in the opposite direction.



Safety Lever Lock

IEEC strongly recommends using the safety lever lock (HW9Z-LS, yellow) to prevent heavy vibration or maintenance personnel from unlocking the contact assembly.

1. HW series can be mounted vertically with a minimum spacing of 55 mm but spacing should be determined to ensure easy operation (recommended minimum spacing: 100 mm).
2. Mount the control unit onto the panel, lock the lever, and push in the safety lever lock to install.
3. When the spacing is narrower than the recommended value, with the lever unlocked, mount the safety lever lock and insert the contact unit to the operator. Then, lock the lever and strongly push in the safety lever lock to install.
4. To remove the safety lever lock, insert a flat screwdriver into the safety lever and push upwards.



Notes for Panel Mounting

1. When mounting the operator onto a panel, use the optional locking ring wrench (MW9Z-T1) to tighten the locking ring. Tightening torque must not exceed 2.0 N·m. Do not use pliers. Excessive tightening will damage the locking ring.
2. For the contact blocks and transformers housing LED lamps, make sure not to press the lamps too hard, otherwise the lamp socket may be damaged.

Dual Pushbutton Instructions

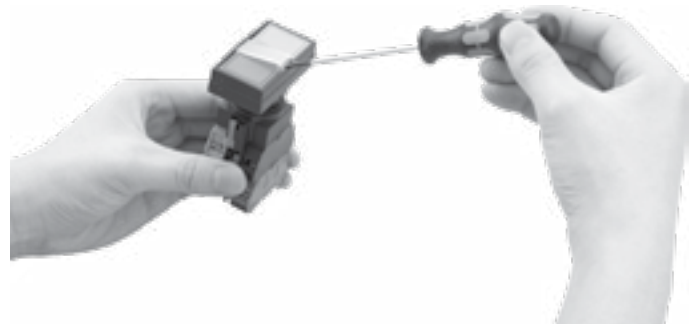
Replacement of Lens

Removing

Remove the lens by inserting a screwdriver into the recess of the lens through the bezel.

Installing

Install the lens in the recess between the buttons by pressing against the bezel.



Dual Pushbuttons Instructions continued

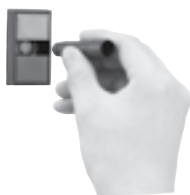
Replacement of Lamps

LED lamps can be replaced by using the lamp holder tool (OR-55) from the front of the panel, or by removing the contact block assembly from the operator unit.

Removing the Lamps from the Front of the Panel

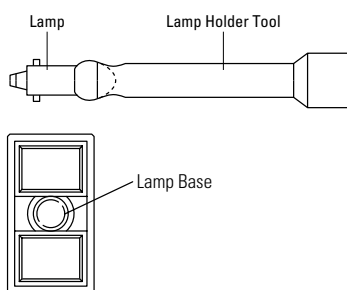
Removal

1. To remove, slip the lamp holder tool onto the lamp head lightly. Then push slightly, and turn the lamp holder tool counterclockwise.



Installation

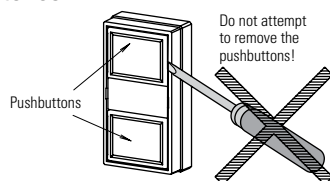
1. To install, insert the lamp head into the lamp holder tool, and hold the lamp as shown in the figure below.
2. Place the pins on the lamp base to the grooves in the lamp socket. Insert the lamp and turn it clockwise.



About Dual Pushbutton Switches

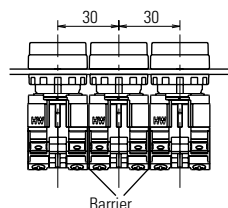
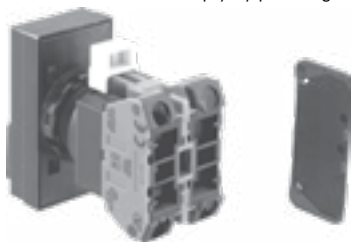
The dual pushbuttons cannot be removed or replaced!

Do not attempt to remove using a flat screwdriver or pincers, otherwise the dual pushbuttons may be damaged.

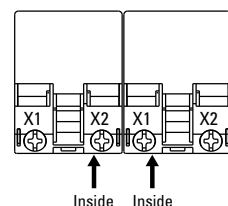


Narrow Mounting

When mounting the units closely in a horizontal row on 30mm centers, use optional barriers to prevent interconnection between adjoining terminals. The barriers can be attached simply by pressing them onto the sides of contact blocks.



When mounting transformer type illuminated units closely in a horizontal row on 30-mm centers, insert solid wires or stranded wires into inside of the terminal screw on the transformer (see figure on the right) to prevent short circuit between adjoining terminals.



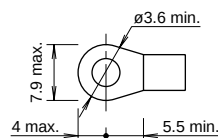
Installation of LED Illuminated Units

When using full voltage type LED illuminated units, provide protection against electrical noise, if necessary.

Applicable Wiring

The applicable wire size is 2 mm² maximum. (solid wire ø1.6mm² maximum) One or two wires can be connected.

Applicable Crimping Terminal

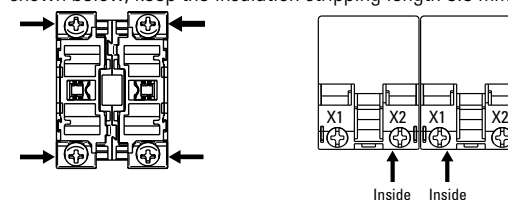


Be sure to use an insulation tube or cover on the crimping part of the crimping terminal to prevent electrical shocks.

Solid Wire



Note: When connecting wires to contact blocks or transformers in the direction shown below, keep the insulation stripping length 6.6 mm at the maximum.



Installing the Rubber Boot

When using the HW7D pushbuttons in places where the pushbuttons are subjected to water splash or an excessive amount of dust, make sure to use the HW9Z-D7D rubber boot (IP65) which is ordered separately.

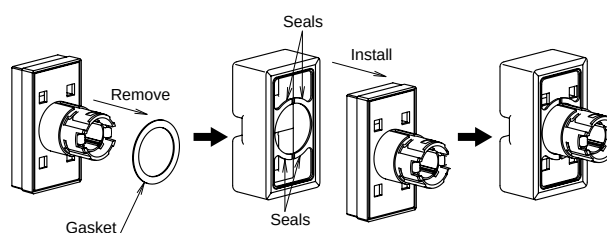
Notes for Installing the Rubber Boot

Remove the gasket from the operator, and install the rubber boot on the operator. Pull out the seals of the rubber boot and place them around the operator sleeve as shown. Make sure that the seals are not twisted or tucked inside and that the gasket does not remain, otherwise the normal waterproof and dustproof characteristics are not ensured.

Remove the gasket.

Install the rubber boot on the pushbuttons.

Rubber boot is installed.



TW Series — 22mm NEMA Style Pushbuttons



Key features:

- TW NEMA Style Switches with snap-on contacts
- Corrosion resistant octagonal chrome plated locking bezel
- Snap-on 10A contact blocks
- LED illumination
- Slow make, double break, contacts
- Modular construction for maximum flexibility
- Type 4X and IP65 watertight/oiltight panel
- Available assembled or as sub-components
- Finger-Safe - Spring-Up
- Large M3.5 screw terminals with captive sems plate

IDEC has your 22mm switching needs covered.

Button styles include flush, extended, mushroom, or square and all bodies are crafted from fracture-resistant nylon.

All illuminated units feature two lens styles, one that maximizes light dispersion, the other accommodates direct lens engraving.

Contact mechanism allow for a wide current rating, 5mA to 10A, which reduces the need for various contact materials.

When looking for a 22mm switch that is durable, easy to use, and versatile, then IDEC's TW series is your solution.



UL Listed
File No. E68961



TUV Rheinland



CSA Approved
File No. LR21451



File No. DK95-01696



Certificate No.
2030010305027380



Specifications	Conforming to Standards		EN60947-1, EN60947-5-1, VDE0660-200, UL508, CSA C22-2 No.14									
	Approvals		 File No. E68961  File No. LR21451  Certificate No. 2030010305027380  TÜV Rheinland  Registration No: J9551802 (E-Stops) Registration No: J9551803 (All other switches) Registration No: J9551804 (Pilot Lights)									
	Operating Temperature		Operation: −25 to +50°C (without freezing), Storage: −40 to +80°C (without freezing)									
	Vibration Resistance		5 to 55Hz, 100m/sec ² (10g) conforming to IEC6068-2-6									
	Shock Resistance		1000m/sec ² (100g) conforming to IEC6068-2-7									
	Electric Shock Protection		Class 2 conforming to IEC60664-7									
	Degree of Protection (conforming to IEC60529) (conforming to NEMA ICS6-110)		IP65 from front of the panel; (IP54 for key switches) IP20 (Type HW-U contact block) Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (Type 1, 2, 3R, 5, 12, 13 for key switches)									
	Mechanical Life		Momentary pushbuttons: 5,000,000 (1800 operations per hour) All other switches: 500,000									
	Pollution Degree (conforming to IEC60947-1)		3									
	Rated Operational Characteristics		AC-15: A600 or Ue = 250V, Ie = 3A (NO, NC, NO-EM, NC-LB) DC-13: P600 or Ue = 125V, Ie = 1.1A (NO, NC) DC-13: Q600 or Ue = 125V, Ie = 0.9A (NO-EM, NC-LB)									
	Rated Insulation Voltage		600V									
	Rated Switching Over-Voltage		Less than 4kV, conforming to IEC60947-1									
	Rated Impulse Withstanding Voltage		4kV for contact circuit, 2.5kV for lamp circuit									
	Rated Thermal Current		10 Amp									
	Minimum Switching Capacity		5 mA at 3V AC/DC									
	Contact Operation		Slow break NC or slow make NO, self-cleaning									
	Recommended Terminal Torque		Unit		Wire		Number of Wires		Recommended Tightening Torque (Nm)		Terminal Screw	
			HW-U Contact Block	Crimping Terminal			2		1.0 to 1.3		M3.5	
					Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)		2		1.0 to 1.3		
				Stranded Wire		ø1.7 to 2.0 mm (AWG12)		1		1.2 to 1.3		
					0.3 to 2.0 mm ² (AWG14 to 22)		2		1.0 to 1.3			
					2.1 to 3.5 mm ² (AWG12)		1		1.2 to 1.3			
			Illuminated Unit (*1)	Crimping Terminal			2		1.0 to 1.3		M3.5	
					Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)						
				Stranded Wire		0.3 to 2.0 mm (AWG14 to 22)						
	Applicable Wire Size		Pilot Light	Crimping Terminal			2		0.6 to 1.0 (M3.0)			
					Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)		1.0 to 1.3 (M3.5)				
						Stranded Wire	ø0.3 to 2.0 mm (AWG14 to 22)					
			 1. * refers to the lamp terminals of the illuminated push buttons and selector switches.									
	External Short-Circuit Protection		10A 250V fuse conforming to IEC60269-1									
	Applicable Wire Size		Minimum 1 x 22 AWG, max. 2 x 14 AWG or 1 x 12 AWG									
	Contact Resistance		Initial contact resistance of 50mΩ or less									
	Contact Gap		4mm (NO and NC), 2mm (NO-EM and NC-LB)									
	Electrical Reliability		MTBF < 1 fault for 10 million operation cycles (3V DC, 5mA)									
	Lamp Ratings		LEDs: 6V: 17mA max, 12/24V: 11mA max, 120/240V: 10mA max									
	Horsepower Rating		1/4 HP @ 120V (single-phase, non-reversing motor); 1 HP @ 240V (3 phase, non-reversing motor)									
	Contact Material		Silver									
Contact Ratings	Pushbuttons Illuminated Pushbuttons Selector Switches Illuminated Selector Switches Pushbutton Selectors		Contact Block				Type HW-U					
			Rated Insulation Voltage				600V					
			Rated Continuous Current				10A					
			Contact Ratings by Utilization Category IEC 60947-5-1				AC-15 (A600) DC-13 (P600)					
Characteristics	Contact Ratings by Utilization Category											
	Operational Voltage				24V	48V	50V	110V	220V	440V		
	Operational Current	AC50/60Hz	AC-12 Control of resistive loads and solid state loads		10A	—	10A	10A	6A	2A		
			AC-15 Control of electromagnetic loads (> 72VA)		10A	—	7A	5A	3A	1A		
		DC	DC-12 Control of resistive loads and solid state loads		10A	5A	—	2.2A	1.1A	—		
			DC-13 Control of electromagnets		5A	2A	—	1.1A	0.6A	—		

Non-Illuminated Pushbuttons (Assembled)



Assembled Pushbuttons

Function

B: Momentary
O: Maintained
K: Key On/Off Lock

Bezel Shape

Blank: Octagonal
F: Full Shroud
G: Mushroom Shroud
Q: Square

Button Color

B: Black G: Green W: White
R: Red S: Blue Y: Yellow

Contact Arrangement

10: 1NO 01: 1NC
20: 2NO 02: 2NC
11: 1NO-1NC 22: 2NO-2NC

Button Shape

1: Flush
2: Extended
3: Mushroom Head Ø 29mm
4: Mushroom Head Ø 40mm

Series Designation

W: TW Series



To be used for interpreting part numbers only, not for part number development.

Non-Illuminated Pushbuttons (Assembled) continued

Non-Illuminated Pushbuttons

Style	Contacts	Momentary Action	Maintained Action
Flush	1NO	ABW110-①	AOW110-①
	1NC	ABW101-①	AOW101-①
	1NO-1NC	ABW111-①	AOW111-①
	2NO	ABW120-①	AOW120-①
	2NC	ABW102-①	AOW102-①
Extended	1NO	ABW210-①	AOW210-①
	1NC	ABW201-①	AOW201-①
	1NO-1NC	ABW211-①	AOW211-①
	2NO	ABW220-①	AOW220-①
	2NC	ABW202-①	AOW202-①
Recessed	1NO	ABFW110-①	AOFW110-①
	1NC	ABFW101-①	AOFW101-①
	1NO-1NC	ABFW111-①	AOFW111-①
	2NO	ABFW120-①	AOFW120-①
	2NC	ABFW102-①	AOFW102-①
Extended with Full Shroud	1NO	ABFW210-①	AOFW210-①
	1NC	ABFW201-①	AOFW201-①
	1NO-1NC	ABFW211-①	AOFW211-①
	2NO	ABFW220-①	AOFW220-①
	2NC	ABFW202-①	AOFW202-①
Ø 29mm Mushroom Head	1NO	ABW310-①	AOW310-①
	1NC	ABW301-①	AOW301-①
	1NO-1NC	ABW311-①	AOW311-①
	2NO	ABW320-①	AOW320-①
	2NC	ABW302-①	AOW302-①
Ø 40mm Mushroom Head	1NO	ABW410-①	AOW410-①
	1NC	ABW401-①	AOW401-①
	1NO-1NC	ABW411-①	AOW411-①
	2NO	ABW420-①	AOW420-①
	2NC	ABW402-①	AOW402-①
Ø 40mm Mushroom Head with Full Shroud	1NO	ABGW410-①	AOGW410-①
	1NC	ABGW401-①	AOGW401-①
	1NO-1NC	ABGW411-①	AOGW411-①
	2NO	ABGW420-①	AOGW420-①
	2NC	ABGW402-①	AOGW402-①
Square Flush	1NO	ABQW110-①	AQW110-①
	1NC	ABQW101-①	AQW101-①
	1NO-1NC	ABQW111-①	AQW111-①
	2NO	ABQW120-①	AQW120-①
	2NC	ABQW102-①	AQW102-①
Square Extended	1NO	ABQW210-①	AQW210-①
	1NC	ABQW201-①	AQW201-①
	1NO-1NC	ABQW211-①	AQW211-①
	2NO	ABQW220-①	AQW220-①
	2NC	ABQW202-①	AQW202-①
Keylock Push On/ Off	1NO	AKW210	—
	1NC	AKW201	
	1NO-1NC	AKW211	
	2NO	AKW220	
	2NC	AKW202	

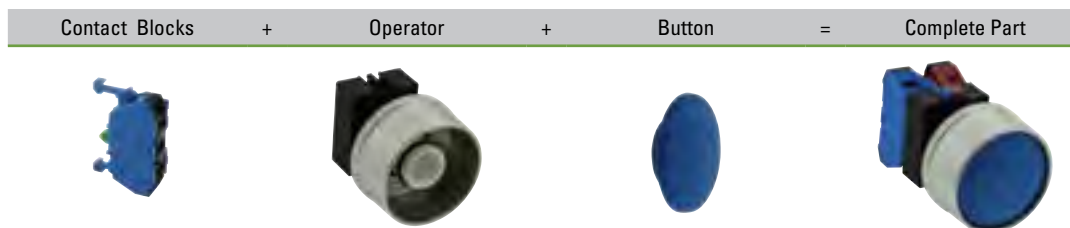
① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y
White	W



1. In place of ①, specify the Button Color Code from table.
2. For sub-assembled part numbers, see next page.
3. For accessories, see page 728.
4. For dimensions, see page 730.
5. Keyed switches are supplied with two keys. All units are keyed alike.

Non-Illuminated Pushbuttons (Sub-Assembled)



Operators

Style	Part Number	
	Momentary	Maintained
Round Flush/Extended	ABW-100	AOW-100
Round with Full Shroud/Recessed	ABFW-200	AOFW-200
Ø 40mm, Ø 29mm Mushroom Head	ABW-300	AOW-300
Ø 40mm Mushroom Head with Full Shroud	ABGW-400	AOGW-400
Square Flush/Extended	ABQW-100	AQW-100
Keylock Push On/Off	—	AKW-200

Buttons

Style	Part Number
Round Flush	ABW1B-①
Round Extended	ABW2B-①
Ø 29mm Mushroom	ABW3B-①
Ø 40mm Mushroom	ABW4B-①
Square Flush	ABQW1B-①
Square Extended	ABQW2B-①



In place of ① specify the button color code from table

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Use of early and late break contacts creates a make before break function

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y
White	W

Stop Switches (Assembled)



To be used for interpreting part numbers only, not for part number development.

Assembled Stop Switches

A V (L) W 4 (B) (99) 11 (D) - R - (24V)

Function

V: Pushlock Turn Reset
Y: Push-Pull
X: Pushlock Key Reset

Illumination

Blank: None
L: Illuminated

Series Designation

W: TW Series

Button/Lens Size

3: 29mm Mushroom
4: 40mm Mushroom

Lens Type

(illuminated units only)
Blank: Standard (ribbed)
B: Engravable (smooth with insert)

Illuminated Circuit

(illuminated unit only)
99: Full Voltage (LED determines voltage)
126: 120V AC Step Down Transformer
246: 240V AC Step Down Transformer
486: 480V AC Step Down Transformer

Lamp Voltage

(full voltage illuminated units only)

6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V: 120V AC
240V: 240V AC

Button/Lens Color

A: Amber R: Red W: White
G: Green S: Blue Y: Yellow
B: Black

Lamp Type

(illuminated units only)

D: LED

Contact Arrangement

10: 1NO 01: 1NC
20: 2NO 02: 2NC
11: 1NO/1NC 22: 2NO/2NC

Stop Switches (Assembled), continued

Non-Illuminated Stop Switches

Style	Contacts	Part Number
 Ø 40mm Pushlock Turn Reset*	1NO	AVW410-R*
	1NC	AVW401-R*
	1NO-1NC	AVW411-R*
	2NO	AVW420-R*
	2NC	AVW402-R*
 Ø 29mm Pushlock Turn Reset*	1NO	AVW310-R*
	1NC	AVW301-R*
	1NO-1NC	AVW311-R*
	2NO	AVW320-R*
	2NC	AVW302-R*
 Ø 40mm Push-Pull	1NO	AYW410-①
	1NC	AYW401-①
	1NO-1NC	AYW411-①
	2NO	AYW420-①
	2NC	AYW402-①
 Ø 40mm Pushlock Key Reset*	1NO	AXW410- R*
	1NC	AXW401- R*
	1NO-1NC	AXW411- R*
	2NO	AXW420- R*
	2NC	AXW402- R*

-  1. *Available in Red only.
 2. In place of ①, specify the Button Color Code from table.
 3. For sub-assembled part numbers, see next page.
 4. For accessories, see page 728.
 5. For dimensions, see page 730.

Illuminated Stop Switches

Style	Type	Contacts	Part Number
 Ø 40mm Pushlock Turn Reset Type	Transformer	1NO-1NC	AVLW4 ④ 11D-R*
		2NO	AVLW4 ④ 20D-R*
		2NC	AVLW4 ④ 02D-R*
	Full Voltage	1NO-1NC	AVLW49911D-R*-③
		2NO	AVLW49920D-R*-③
		2NC	AVLW49902D-R*-③
 Ø 29mm Pushlock Turn Reset	Transformer	1NO-1NC	AVLW3④11D-R*
		2NO	AVLW3④20D-R*
		2NC	AVLW3④02D-R*
	Full Voltage	1NO-1NC	AVLW39911D-R*-③
		2NO	AVLW39920D-R*-③
		2NC	AVLW39902D-R*-③
 Ø 40mm Push-Pull	Transformer	1NO-1NC	AYLW4 ④ 11D-②
		2NO	AYLW4 ④ 20D-②
		2NC	AYLW4 ④ 02D-②
	Full Voltage	1NO-1NC	AYLW49911D-②-③
		2NO	AYLW49920D-②-③
		2NC	AYLW49902D-②-③

-  1. *Available in red only.
 2. In place of ②, specify the Lens Color Code (see table above).
 3. In place of ③, specify the Full Voltage Code (lamp voltage) (see table above).
 4. In place of ④, specify the Transformer Voltage Code (see table above).
 5. For sub-assembly part numbers, see next page.
 6. For accessories, see page 728.
 7. For dimensions, see page 730.

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486

 Transformers step down to 6V.

Stop Switches (Sub-Assembled)

Transformer/ Adaptor*	+	Contacts	+	Lamp Holder	+	Operator	+	Lamp	+	Button or Lens	=	Complete Part
--------------------------	---	----------	---	-------------	---	----------	---	------	---	----------------	---	---------------



*Not applicable for full voltage units

Operators

Style	Part Number	
	Non-Illuminated	Illuminated
Ø 29/Ø 40mm Pushlock Turn Reset 	AVW-300	AVLW3-0600
Ø 40mm Push-Pull 	AYW-400	AYLW4-0600
Ø 40mm Pushlock Key Reset 	AXW-300	—

Buttons

Style	Part Number
Ø 40mm Pushlock Turn Reset 	AVW4B-R*
Ø 29mm Pushlock Turn Reset 	AVW3B-R*
Ø 40mm Push-Pull 	AYW4B-①
Ø 40mm Pushlock Key Reset 	AXW4B-R*



- *Available in Red only
- In place of ①, specify the button color code from table.

Lamps

Style	Voltage	Part Number
LED 	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②



- In place of ②, specify the LED color code.
- The LED contains a current-limiting resistor and a protection diode.

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

Illuminated Stop Switches (Sub-Assembled) continued

Lenses

Style	Part Number	
	Standard	Engravable
Ø 29mm Head Pushlock Turn Reset	AVLW3LU-R*	AVLW3BLU-R*
		
Ø 40mm Head Pushlock Turn Reset	AVLW4LU-R*	AVLW4BLU-R*
		
Ø 40mm Head Push Pull	AYLW4LU-②	AYLW4BLU-②
		

-  1. In place of ②, specify the lens color code from table on previous page.
 2. *Available only in red
 3. Standard lenses have ribbed pattern, Engravable lenses are smooth and include an engravable insert.

Lamp Circuit Components

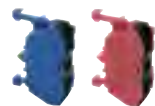
Style	Application	Part Number
Long Lamp Holder	Used with Full-size Transformer and two contact blocks	TW-LH2
		
Lead Holder	Used with TW-LH2 holder when using four contact blocks and transformer	HW-LH3
		

Transformers/Full Voltage Modules

Style	Description	Part Number
Full Size Transformer	120V AC	TW-F126B
	240V AC	TW-F246B
	480V AC	TW-F486B
	Finger-Safe	
Dummy Block with Full Voltage Adaptor	For use with odd number of contacts.	HW-DA1FBN
		
Full Voltage Adaptor	For use with even number of contacts.	TW-DA1FB
		

-  All Transformers step down to 6V (use 6V LED).

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe	HW-U10-F	HW-U01-F
	Spring-Up Terminal	HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

-  1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
 2. Use of early and late break contacts creates a make before break function

Pilot Lights (Assembled)



Assembled Pilot Lights

A P (Q) W 1 (B) (99) (D) - R - (24V)

Function

P: Pilot Light

Bezel Shape

Blank: Octagonal (round lenses)

Q: Square

Series Designation

W: TW Series

Lens Shape

1: Flat

2: Dome

Lens Type

Blank: Standard (ribbed)

B: Engravable (smooth with insert included)

Illumination Circuit

99: Full Voltage (lamp determines voltage)

126: 120V AC Step Down Transformer

246: 240V AC Step Down Transformer

486: 480V AC Step Down Transformer

Lamp Voltage

(Full Voltage Units Only)

6V: 6V AC/DC

12V: 12V AC/DC

24V: 24V AC/DC

120V: 120V AC

240V: 240V AC

Lens Color Code

A: Amber

G: Green

R: Red

S: Blue

W: White

Y: Yellow

Lamp

D: LED



1. Use only when interpreting part numbers. Do not use for developing part numbers.

2. All transformers step down to 6V.

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Pilot Lights (Assembled) continued

Assembled Pilot Lights

Style	Type	Voltage	Part Number
 Round Flat	Transformer	120VAC 240VAC 480VAC	APW1126D-② APW1246D-② APW1486D-②
	Full Voltage	—	APW199D-②-③
 Dome	Transformer	120VAC 240VAC 480VAC	APW2126D-② APW2246D-② APW2486D-②
	Full Voltage	—	APW299D-②-③
 Square Flat	Transformer	120VAC 240VAC 480VAC	APQW1B126D-② APQW1B246D-② APQW1B486D-②
	Full Voltage	—	APQW1B99D-②-③



- 1. In place of ②, specify the Lens Color Code from table below.
- 2. In place of ③, specify the Full Voltage Code from table below.
- 3. For accessories, see page 728.
- 4. For dimensions, see page 730.
- 5. For sub-assembly part numbers, see next page.
- 6. Yellow pilot light comes with white LED.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V

Pilot Lights (Sub-Assembled)

Transformer	+	Operator	+	Lamp	+	Lens	=	Complete Part
-------------	---	----------	---	------	---	------	---	---------------



* Transformer not required for full voltage units.

Operators

Style	Part Number
Round Dome/Flat	APW-199
	
Square	UPQW-199
	



Same operator is used for full voltage as for transformer completed units.

Lamps

Style	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②



1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.
3. Yellow LED not available. Use white LED.

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y



If clear lens is desired, use white marking lens and remove engraving insert.

Transformers

Style	Description	Part Number
	120V AC	TW-F126B
	240V AC	TW-F246B
	480V AC	TW-F486B



All Transformers step down to 6V (use 6V LED).

Lenses

Style	Part Number	
	Standard	Engravable
Dome	APW2LU-②	—
		
Round Flat	APW1LU-②	APW1BLU-②
		
Square Flat	—	APQW1BLU-②
		

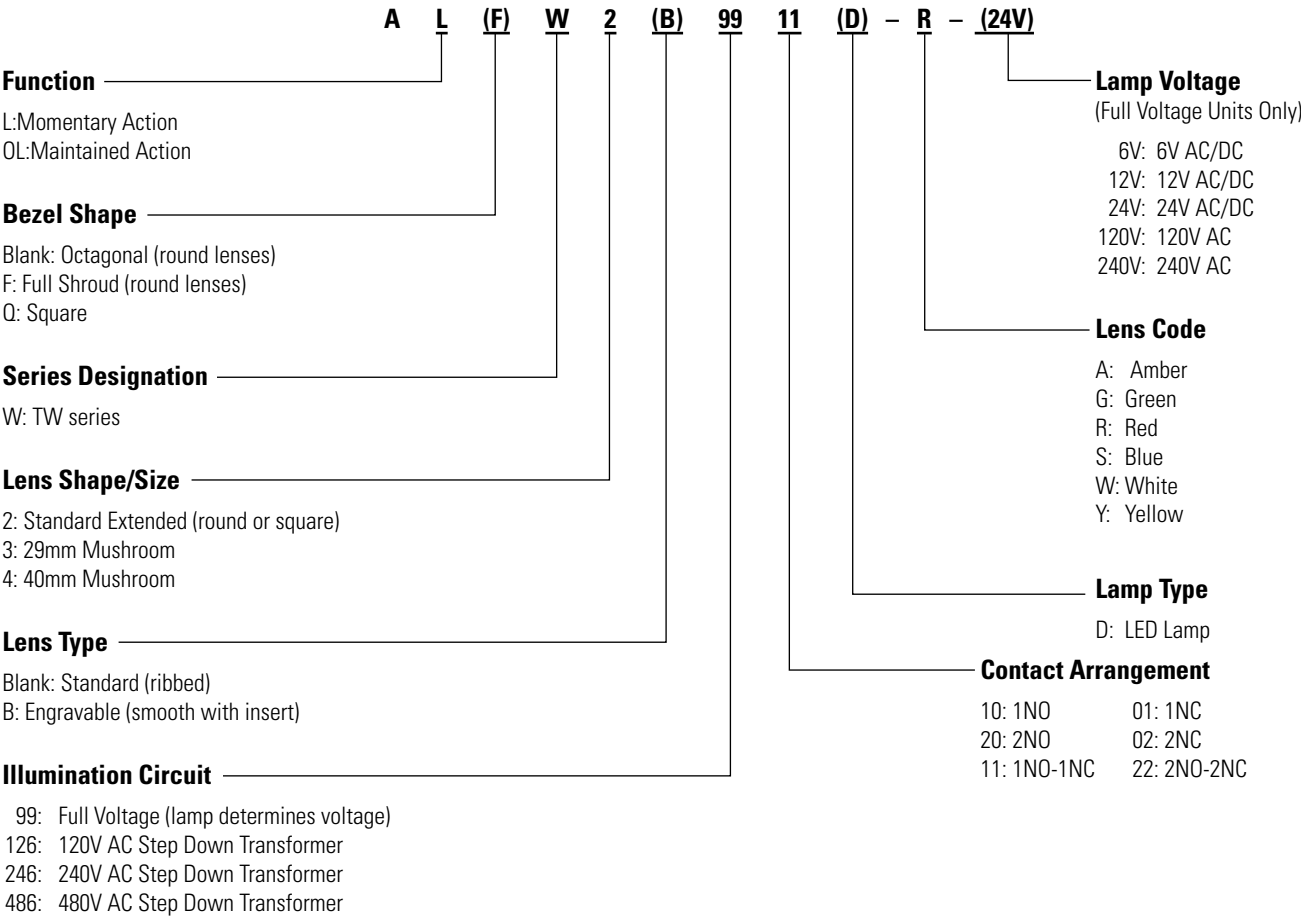


1. In place of ②, specify the Lens Color Code from table.
2. Standard lenses have a ribbed lens to enhance light dispersion. Marking lenses are smooth and include an engraving insert.

Illuminated Pushbuttons (Assembled)



Assembled Illuminated Pushbuttons



1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Transformers step down to 6V.

Illuminated Pushbuttons (Assembled)

Illuminated Pushbuttons

Style		Contacts	Part Number	
			Momentary	Maintained
Extended Lens 	Transformer	1NO-1NC 2NO 2NC	ALW2 ④ 11D-② ALW2 ④ 20D-② ALW2 ④ 02D-②	AOLW2 ④ 11D-② AOLW2 ④ 20D-② AOLW2 ④ 02D-②
	Full Voltage	1NO-1NC 2NO 2NC	ALW29911D-②-③ ALW29920D-②-③ ALW29902D-②-③	AOLW29911D-②-③ AOLW29920D-②-③ AOLW29902D-②-③
Extended Lens with Full Shroud 	Transformer	1NO-1NC 2NO 2NC	ALFW2 ④ 11D-② ALFW2 ④ 20D-② ALFW2 ④ 02D-②	AOLFW2 ④ 11D-② AOLFW2 ④ 20D-② AOLFW2 ④ 02D-②
	Full Voltage	1NO-1NC 2NO 2NC	ALFW29911D-②-③ ALFW29920D-②-③ ALFW29902D-②-③	AOLFW29911D-②-③ AOLFW29920D-②-③ AOLFW29902D-②-③
ø29mm Mushroom Button 	Transformer	1NO-1NC 2NO 2NC	ALW3 ④ 11D-② ALW3 ④ 20D-② ALW3 ④ 02D-②	AOLW3 ④ 11D-② AOLW3 ④ 20D-② AOLW3 ④ 02D-②
	Full Voltage	1NO-1NC 2NO 2NC	ALW39911D-②-③ ALW39920D-②-③ ALW39902D-②-③	AOLW39911D-②-③ AOLW39920D-②-③ AOLW39902D-②-③
ø40mm Mushroom Button 	Transformer	1NO-1NC 2NO 2NC	ALW4 ④ 11D-② ALW4 ④ 20D-② ALW4 ④ 02D-②	AOLW4 ④ 11D-② AOLW4 ④ 20D-② AOLW4 ④ 02D-②
	Full Voltage	1NO-1NC 2NO 2NC	ALW49911D-②-③ ALW49920D-②-③ ALW49902D-②-③	AOLW49911D-②-③ AOLW49920D-②-③ AOLW49902D-②-③
Square Extended 	Transformer	1NO-1NC 2NO 2NC	ALQW2B ④ 11D-② ALQW2B ④ 20D-② ALQW2B ④ 02D-②	AOLQW2B ④ 11D-② AOLQW2B ④ 20D-② AOLQW2B ④ 02D-②
	Full Voltage	1NO-1NC 2NO 2NC	ALQW2B9911D-②-③ ALQW2B9920D-②-③ ALQW2B9902D-②-③	AOLQW2B9911D-②-③ AOLQW2B9920D-②-③ AOLQW2B9902D-②-③

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y



1. Mushroom lenses not available in yellow.
2. Yellow pushbutton comes with white LED.

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486



Transformers step down to 6V (use 6V LED).



1. In place of ②, specify the Lens Color Code (see table). Mushroom lenses not available in yellow.
2. In place of ③, specify the Full Voltage Code (lamp voltage) (see table).
3. In place of ④, specify the Transformer Voltage Code (see table).
4. For sub-assembly part numbers, see next page.
5. For accessories, see page 728.
6. For dimensions, see page 730.
7. Light is independent of switch position.
8. Yellow pushbutton comes with white LED.

Illuminated Pushbuttons (Sub-Assembled)

Transformer/ Adaptor*	+	Contacts	+	Lamp Holder	+	Operator	+	Lamp	+	Lens	=	Complete Part
--------------------------	---	----------	---	-------------	---	----------	---	------	---	------	---	---------------



*Not applicable for full voltage units

Operators

Style		Part Number	
		Momentary	Maintained
Extended		ALW-0600	AOLW-0600
Extended with Full Shroud		ALFW-0600	AOLFW-0600
ø29mm/ø40mm Mushroom		ALW3-0600	AOLW3-0600
Square/Extended		ALQW-2B0600	AOLQW-2B0600

Lenses

Style		Part Number	
		Standard	Engravable
Round Extended		ALW2LU-②	ALW2BLU-②
ø 29mm Mushroom Head*		ALW3LU-②	ALW3BLU-②
ø 40mm Mushroom Head*		ALW4LU-②	ALW4BLU-②
Square Extended		—	ALQW2BLU-②

- ① In place of ②, specify the lens color code from table on the bottom right.
 ② *Mushroom lens not available in yellow.
 ③ Standard lenses have ribbed pattern, Engravable lenses are smooth and include an engravable insert.

Lamps

Style	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②



- ① In place of ②, specify the LED color code.
 ② The LED contains a current-limiting resistor and a protection diode.

Lamp Circuit Components

Style	Application	Part Number
Long Lamp Holder	 Used with Full-size Transformer and two contact blocks	TW-LH2
Lead Holder	 Used with TW-LH2 holder when using four contact blocks and transformer	HW-LH3

② LED/Lens Color Codes

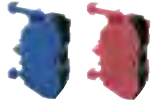
Color	Code	Color	Code
Amber	A	Blue	S
Green	G	White	W
Red	R	Yellow	Y



Yellow LED not available. Use white LED.

Illuminated Pushbuttons (Sub-Assembled) continued

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Use of early and late break contacts creates a make before break function

Transformers/Full Voltage Modules

Style	Description	Part Number
Full Size Transformer 	120V AC	TW-F126B
	240V AC	TW-F246B
	480V AC	TW-F486B
Dummy Block with Full Voltage Adaptor 	Finger-Safe	HW-DA1FBN
Full Voltage Adaptor 	Finger-Safe	TW-DA1FB



All Transformers step down to 6V (use 6V LED).

Non-Illuminated Selector Switches (Assembled)



Assembled Selector Switches

A S W 3 (1) (L) 20 - 304

Function

S: Selector Switch

Series Designation

W: TW Series

Number of Positions

- 2: 2-Position
- 3: 3-Position
- 4: 4-Position
- 5: 5-Position

Spring Return Action

- Blank: Maintained
- 1: Spring return from Right (2 or 3 position)
- 2: Spring return from Left (2 or 3 position)
- 3: 2-Way spring return from Left and Right (3 position only)

Circuit Number

(Standard circuits shown on following pages and 720.)

Contact Arrangement Code

- 10: 1NO 01: 1NC
- 20: 2NO 02: 2NC
- 40: 4NO 04: 4NC
- 11: 1NO-1NC 22: 2NO-2NC

Operator Style Code

- Blank: Knob Operator
- L: Lever Operator
- K: Key Operator



- 1. Use only when interpreting part numbers. Do not use for developing part numbers.
- 2. Custom contact configurations available.
- 3. Custom key removable codes available.
- 4. Portions of part number inside () are optional.

Non-Illuminated Selector Switches (Assembled) continued

2-Position Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left
		L	R		L  R	L  R	L  R
1NO	1	0	X	Knob Lever Key	ASW210	ASW2110	ASW2210
	2	0	0		ASW2L10	ASW21L10	ASW22L10
					ASW2K10	ASW21K10	ASW22K10
1NC	1	X	0	Knob Lever Key	ASW201-116	ASW2101-116	ASW2201-116
	2	0	0		ASW2L01-116	ASW21L01-116	ASW22L01-116
					ASW2K01-116	ASW21K01-116	ASW22K01-116
1NO 1NC	1	X	0	Knob Lever Key	ASW211	ASW2111	ASW2211
	2	0	X		ASW2L11	ASW21L11	ASW22L11
					ASW2K11	ASW21K11	ASW22K11
2NO	1	0	X	Knob Lever Key	ASW220	ASW2120	ASW2220
	2	0	X		ASW2L20	ASW21L20	ASW22L20
					ASW2K20	ASW21K20	ASW22K20
2NC	1	X	0	Knob Lever Key	ASW202-104	ASW2102-104	ASW2202-104
	2	X	0		ASW2L02-104	ASW21L02-104	ASW22L02-104
					ASW2K02-104	ASW21K02-104	ASW22K02-104
2NO 2NC	1	0	X	Knob Lever Key	ASW222	ASW2122	ASW2222
	2	X	0		ASW2L22	ASW21L22	ASW22L22
	3	0	X		ASW2K22	ASW21K22	ASW22K22
2NO 2NC	1	0	X	Knob Lever Key	ASW222-111	ASW2122-111	ASW2222-111
	2	0	X		ASW2L22-111	ASW21L22-111	ASW22L22-111
	3	X	0		ASW2K22-111	ASW21K22-111	ASW22K22-111



Non-Illuminated Selector Switches (Assembled) continued

3-Position Selector Switches

Style		Operator Position				Part Number			
						Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
Contact	Mounting	L	C	R					
2NO	1	X	0	0	Knob	ASW320	ASW3120	ASW3220	ASW3320
	2	0	0	X		ASW3L20	ASW31L20	ASW32L20	ASW33L20
						ASW3K20	ASW31K20	ASW32K20	ASW33K20
2NC	1	0	X	X	Knob	ASW302	ASW3102	ASW3202	ASW3302
	2	X	X	0		ASW3L02	ASW31L02	ASW32L02	ASW33L02
						ASW3K02	ASW31K02	ASW32K02	ASW33K02
2NO 2NC	1	X	0	0	Knob	ASW322	ASW3122	ASW3222	ASW3322
	2	0	0	X		ASW3L22	ASW31L22	ASW32L22	ASW33L22
	3	0	X	X		ASW3K22	ASW31K22	ASW32K22	ASW33K22
	4	X	X	0					
2NO 2NC	1	X	0	X	Knob	ASW322-309	ASW3122-309	ASW3222-309	ASW3322-309
	2	X	X	0		ASW3L22-309	ASW31L22-309	ASW32L22-309	ASW33L22-309
	3	0	X	0		ASW3K22-309	ASW31K22-309	ASW32K22-309	ASW33K22-309
	4	0	0	X					
2NO 2NC	1	0	X	0	Knob	ASW322-310	ASW3122-310	ASW3222-310	ASW3322-310
	2	0	0	X		ASW3L22-310	ASW31L22-310	ASW32L22-310	ASW33L22-310
	3	0	X	0		ASW3K22-310	ASW31K22-310	ASW32K22-310	ASW33K22-310
	4	0	0	X					
4NO	1	X	0	0	Knob	ASW340	ASW3140	ASW3240	ASW3340
	2	0	0	X		ASW3L40	ASW31L40	ASW32L40	ASW33L40
	3	X	0	0		ASW3K40	ASW31K40	ASW32K40	ASW33K40
	4	0	0	X					
4NC	1	0	X	X	Knob	ASW304	ASW3104	ASW3204	ASW3304
	2	X	X	0		ASW3L04	ASW31L04	ASW32L04	ASW33L04
	3	0	X	X		ASW3K04	ASW31K04	ASW32K04	ASW33K04
	4	X	X	0					



- The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (closed contacts)
0 = Off (open contacts)
X—X = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these two positions.
- All knob and lever selector switches come in black. Other colors are available by ordering the knob or lever separately.
- Every key selector switch uses an identical key. The key is removable in any maintained position.
- Custom contact configurations are available, see page 720.

4-Position Selector Switch

Style		Operator Position				Maintained
						Part Number
Contact	Mounting	1	2	3	4	
2NO 2NC	1	X	0	0	0	Knob
	2	0	X	0	0	
	3	0	0	X	0	
	4	0	0	0	X	

5-Position Selector Switch

Style		Operator Position					Maintained
							Part Number
Contact	Mounting	1	2	3	4	5	
2NO 2NC	1	X	0	0	0	0	Knob
	2	0	X	0	0	0	
	3	0	0	0	X	0	
	4	0	0	0	0	X	

Non-Illuminated Selector Switches (Sub-Assembled)



- *Not needed with key type switches.
- *Knob type shown.

Operators

Style	Positions	Description	Part Number
 Knob/Lever	2	Maintained	ASW200
		Spring return from right	ASW2100
		Spring return from left	ASW2200
	3	Maintained, Cam 1	ASW300-1
		Maintained, Cam 2	ASW300-2
		Maintained, Cam 3	ASW300-3
		Spring return from right, Cam 1	ASW3100-1
		Spring return from right, Cam 2	ASW3100-2
		Spring return from left, Cam 1	ASW3200-1
		Spring return from left, Cam 2	ASW3200-2
	4	Spring return from left/right, Cam 1	ASW3300-1
		Spring return from left/right, Cam 2	ASW3300-2
 Key	2	Maintained	ASW2K00
		Spring return from right	ASW21K00
		Spring return from left	ASW22K00
	3	Maintained, Cam 1	ASW3K00-1
		Maintained, Cam 2	ASW3K00-2
		Maintained, Cam 3	ASW3K00-3
		Spring return from right, Cam 1	ASW31K00-1
		Spring return from right, Cam 2	ASW31K00-2
		Spring return from left, Cam 1	ASW32K00-1
		Spring return from left, Cam 2	ASW32K00-2
	4	Spring return from left/right, Cam 1	ASW33K00-1
		Spring return from left/right, Cam 2	ASW33K00-2



- Two keys are supplied with every key switch, all are keyed alike, and removable from any maintained position.
- Locking rings are included with all operators. Order knobs, levers, and color inserts separately.
- Different cams produce different contact actions. For details, see page 720.
- Key switch operator supplied with black sleeve.

① Handle/Insert Color Codes

Color	Code
Black*	B
Blue	S
Green	G
Red	R
Yellow	Y
White†	W



- *Color inserts not available in black.
†Knob and lever not available in white.

Replacement Parts

Key Switch Black Sleeve	AKW2B-B
-------------------------	---------

Handles and Inserts

Style	Part Number
 Knob	ASWHHY-①
 Lever	ASWHHL-①
 Color Insert	TW-HC1-①

Contact Blocks

Style	Contacts	1NO	1NC
 Finger-Safe Spring-Up Terminal		HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
 Dummy Block		HW-DB	



- Push rod color code:
Green = NO contact block
Red = NC contact block.
- Dummy blocks (no contacts) are used with an odd number of contact blocks.

Illuminated Selector Switches (Assembled)



Assembled Illuminated Selector Switches

A SL W 2 (2) 99 11 (D) - (103) - R - (24V)

Function

SL: Illuminated Selector Switch

Series Designation

W: TW series

Number of Positions

2: 2-Position
3: 3-Position

Spring Return Action

Blank: Maintained
1: Spring return from Right
2: Spring return from Left
3: Two-Way spring return from Left and Right

Illumination Circuit

99: Full Voltage (lamp determines voltage)
126: 120V AC Step Down Transformer
246: 240V AC Step Down Transformer
486: 480V AC Step Down Transformer

Lamp Voltage

(Full Voltage Units Only)

6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V: 120V AC
240V: 240V AC

Lens Color Code

A: Amber
G: Green
R: Red
S: Blue
W: White
Y: Yellow

Contact Circuit Number

Standard circuits are listed on the following pages and 720.

Lamp Type

D: LED Lamp

Contact Arrangement

10: 1NO	01: 1NC
20: 2NO	02: 2NC
40: 4NO	04: 4NC
11: 1NO-1NC	22: 2NO-2NC



1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. All transformers step down to 6V (use 6V lamp).

Illuminated Selector Switches(Assembled) continued

Illuminated 2-Position Selector Switches

Style				Lamp Circuit Type	Part Number		
Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left
							
1NO 1NC	1 2	O X	X O	Transformer Full Voltage	ASLW2 ① 11D-② ASLW29911D-②-③	ASLW21 ① 11D-② ASLW219911D-②-③	ASLW22 ① 11D-② ASLW229911D-②-③
2NO	1 2	O O	X X	Transformer Full Voltage	ASLW2 ① 20D-② ASLW29920D-②-③	ASLW21 ① 20D-② ASLW219920D-②-③	ASLW22 ① 20D-② ASLW229920D-②-③
2NC	1 2	X X	O O	Transformer Full Voltage	ASLW2 ① 02D-104-② ASLW29902D-104-②-③	ASLW21 ① 02D-104-② ASLW219902D-104-②-③	ASLW22 ① 02D-104-② ASLW229902D-104-②-③
2NO 2NC	1 2 3 4	O X O X	X O X O	Transformer Full Voltage	ASLW2 ① 22D-② ASLW29922D-②-③	ASLW21 ① 22D-② ASLW219922D-②-③	ASLW22 ① 22D-② ASLW229922D-②-③

① Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486



Transformers step down to 6V (use 6V LED).

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Illuminated 3-Position Selector Switches, Maintained and Spring Return from Right

Style					Lamp Circuit Type	Part Number			
Contact	Mounting	Operator Position				Maintained	Spring Return From Right	Spring Return from Left	Spring Return Two-Way
		L 	C 	R 			C 	R 	
2NO	1 2	X O	O O	O X	Transformer Full Voltage	ASLW3 ① 20D-② ASLW39920D-②-③	ASLW31 ① 20D-② ASLW319920D-②-③	ASLW32 ① 20D-② ASLW329920D-②-③	ASLW33 ① 20D-② ASLW339920D-②-③
2NC	1 2	O X	X X	X O	Transformer Full Voltage	ASLW3 ① 02D-② ASLW39902D-②-③	ASLW31 ① 02D-② ASLW319902D-②-③	ASLW32 ① 02D-② ASLW329902D-②-③	ASLW33 ① 02D-② ASLW339902D-②-③
2NO 2NC	1 2 3 4	X O O X	O O X X	O X X O	Transformer Full Voltage	ASLW3 ① 22D-② ASLW39922D-②-③	ASLW31 ① 22D-② ASLW319922D-②-③	ASLW32 ① 22D-② ASLW329922D-②-③	ASLW33 ① 22D-② ASLW339922D-②-③
2NO 2NC	1 2 3 4	X X O O	O X X O	X O O X	Transformer Full Voltage	ASLW3 ① 22D-309-② ASLW39922D-309-②-③	ASLW31 ① 22D-309-② ASLW319922D-309-②-③	ASLW32 ① 22D-309-② ASLW329922D-309-②-③	ASLW33 ① 22D-309-② ASLW339922D-309-②-③
2NO 2NC	1 2 3 4	O O O O	X O X O	O X O X	Transformer Full Voltage	ASLW3 ① 22D-310-② ASLW39922D-310-②-③	ASLW31 ① 22D-310-② ASLW319922D-310-②-③	ASLW32 ① 22D-310- ② ASLW329922D-310- ② -③	ASLW33 ① 22D-310-② ASLW339922D-310-②-③
4NO	1 2 3 4	X O X O	O O O O	O X O X	Transformer Full Voltage	ASLW3 ① 40D-② ASLW39940D-②-③	ASLW31 ① 40D-② ASLW319940D-②-③	ASLW32 ① 40D-② ASLW329940D-②-③	ASLW33 ① 40D-② ASLW339940D-②-③
4NC	1 2 3 4	O X O X	X X X X	X O X O	Transformer Full Voltage	ASLW3 ① 04D-② ASLW39904D-②-③	ASLW31 ① 04D-② ASLW319904D-②-③	ASLW32 ① 04D-② ASLW329904D-②-③	ASLW33 ① 04D-② ASLW339904D-②-③



1. In place of ①, specify the Transformer Voltage Code.
2. In place of ②, specify the Lens/LED Color Code.
3. In place of ③, specify the Full Voltage Code.
4. For custom contact configurations, see page 720.
5. Light is independent of switch position.
6. Yellow selector switch comes with white LED.

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V

Illuminated Selector Switches (Sub-Assembled)

Transformer*	+	Contact Block	+	Operator	+	Lamp/Lead Holder [†]	+	LED	+	Lens	=	Complete Part
--------------	---	---------------	---	----------	---	-------------------------------	---	-----	---	------	---	---------------



-  *Full voltage units use a full voltage adaptor TW-DA1FB (even number of blocks) OR HW-DA1FBN (odd number of blocks) instead of a transformer.
[†]Lamp holder is not included with operators, order separately.

Operators

Style	Positions	Description	Part Number
	2	Maintained	ASLW200
		Spring return from right	ASLW2100
		Spring return from left	ASLW2200
	3	Maintained, cam 1	ASLW300-1
		Maintained, cam 2	ASLW300-2
		Maintained, cam 3	ASLW300-3
	3	Spring return from right, cam 1	ASLW3100-1
		Spring return from right, cam 2	ASLW3100-2
	3	Spring return from left, cam 1	ASLW3200-1
		Spring return from left, cam 2	ASLW3200-2
	3	Spring return from left/right, cam 1	ASLW3300-1
		Spring return from left/right, cam 2	ASLW3300-2

-  Different cams produce different contact action. For details, see Contact Arrangements on page 720.

Lenses (Knobs)

Style	Part Number
Knob  	ASLWLU-②

-  In place of ②, specify the lens color code from table.

Lamps

Style	Voltage	Part Number
	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②

-  1. In place of ②, specify the LED color code.
 2. The LED contains a current-limiting resistor and a protection diode.

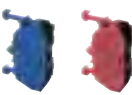
② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

-  Yellow LED not available. Use white LED

Illuminated Selector Switches (Sub-Assembled) continued

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Use of early and late break contacts creates a make before break function

Lamp Circuit Components

Style	Application	Part Number
Short Lamp Holder 	Used with full voltage adaptor and one contact block	TW-LH1
Long Lamp Holder 	Used with Full-size Transformer and two contact blocks	TW-LH2
Lead Holder 	Used with TW-LH2 holder when using four contact blocks and full size transformer	HW-LH3

Transformers/Full Voltage Modules

Style	Description	Part Number
Full Size Transformer 	120V AC	TW-F126B
	240V AC	TW-F246B
	480V AC	TW-F486B
Dummy Block with Full Voltage Adaptor 	Finger-Safe For use with odd number of contacts.	HW-DA1FBN
Full Voltage Adaptor 	Finger-Safe For use with even number of contacts.	TW-DA1FB

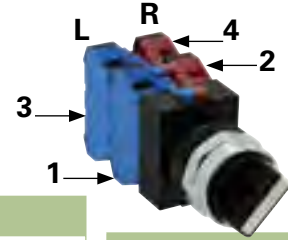
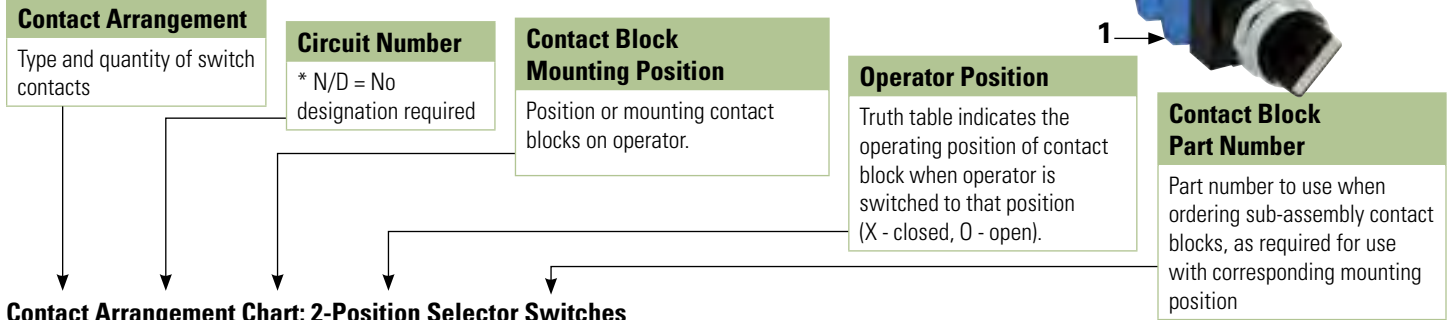


All Transformers step down to 6V (use 6V lamp).

Contact Arrangement Charts

How to Read Contact Arrangement Charts

To determine contact block mounting position, first make sure the selector switch is oriented as shown on the right

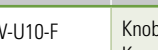
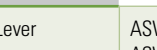
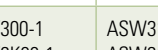


Contact Arrangement Chart: 2-Position Selector Switches

Style		Mounting Position	Operator Position		Contact Block Part Number	Description	Operator Part Number		
Contact	Circuit Number						Maintained	Spring Ret. from Rt.	Spring Ret. from Lt.
									
1NO	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	O	O	HW-DB	Illuminated Knob			
1NC	116	1	X	O	HW-U01-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	O	O	HW-DB	Illuminated Knob			
1NO 1NC	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	X	O	HW-U01-F	Illuminated Knob			
	103	1	X	O	HW-U01-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	O	X	HW-U10-F	Illuminated Knob			
1NO-EM 1NC-LB	600	1	O	X	HW-U10R-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	X	O	HW-U01R-F	Illuminated Knob			
	601	1	X	O	HW-U01R-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	O	X	HW-U10R-F	Illuminated Knob			
2NO	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	O	X	HW-U10-F	Illuminated Knob			
2NC	104	1	X	O	HW-U01-F	Knob/Lever Key	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	X	O	HW-U01-F	Illuminated Knob			
2NO 2NC	N/D	1	O	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	X	O	HW-U01-F				
		3	O	X	HW-U10-F				
		4	X	O	HW-U01-F				
	111	1	O	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW200 ASW2K00 ASLW200	ASW2100 ASW21K00 ASLW2100	ASW2200 ASW22K00 ASLW2200
		2	O	X	HW-U10-F				
		3	X	O	HW-U01-F				
		4	X	O	HW-U01-F				

1. NO-EM, NC-LB = Early Make, Late Break.
N/D = No circuit number designation required in assembled selector switch part number.
2. X = On (closed contacts) O = Off (Open contacts)

Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number							Maintained	Spring Return from Right	Spring Return from Left	Two-Way
											
1NO 1NC	202	1	X	0	0	HW-U10-F	Knob/Lever Key	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	X	X	0	HW-U01-F	Illuminated Knob				
	203	1	0	X	X	HW-U01-F	Knob/Lever Key	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	0	0	X	HW-U10-F	Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASLW3100-1	ASW3200-1 ASLW3200-1	ASW3300-1 ASLW3300-1
	302	1	X	0	X	HW-U10-F	Knob/Lever Key	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	X	X	0	HW-U01-F	Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASLW3100-2	ASW3200-2 ASLW3200-2	ASW3300-2 ASLW3300-2
	303	1	0	X	0	HW-U01-F	Knob/Lever Key	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	0	0	X	HW-U10-F	Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASLW3100-2	ASW3200-2 ASLW3200-2	ASW3300-2 ASLW3300-2
2NO	N/D	1	X	0	0	HW-U10-F	Knob/Lever Key	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	0	0	X	HW-U10-F	Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1	ASW3200-1 ASLW3200-1	ASW3300-1 ASLW3300-1
	301	1	X	0	X	HW-U10-F	Knob/Lever Key	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	0	0	X	HW-U10-F	Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2	ASW3200-2 ASLW3200-2	ASW3300-2 ASLW3300-2
2NC	304	1	0	X	0	HW-U01-F	Knob/Lever Key	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	X	X	0	HW-U01-F	Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2	ASW3200-2 ASLW3200-2	ASW3300-2 ASLW3300-2
	N/D	1	0	X	X	HW-U01-F	Knob/Lever Key	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	X	X	0	HW-U01-F	Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1	ASW3200-1 ASLW3200-1	ASW3300-1 ASLW3300-1
2NO 2NC	N/D	1	X	0	0	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	0	0	X	HW-U10-F					
		3	0	X	X	HW-U01-F					
		4	X	X	0	HW-U01-F					
	210	1	0	X	X	HW-U01-F	Knob/Lever Key Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	0	0	X	HW-U10-F					
		3	0	X	X	HW-U01-F					
		4	0	0	X	HW-U10-F					
	308	1	X	0	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	X	X	0	HW-U01-F					
		3	X	0	X	HW-U10-F					
		4	X	X	0	HW-U01-F					
	309	1	X	0	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	X	X	0	HW-U01-F					
		3	0	X	0	HW-U01-F					
		4	0	0	X	HW-U10-F					
	310	1	0	X	0	HW-U01-F	Knob/Lever Key Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	0	0	X	HW-U10-F					
		3	0	X	0	HW-U01-F					
		4	0	0	X	HW-U10-F					



- Each operator sub-assembly is available as a "-1" and a "-2" for 3-position selector switches. The internal cam of a "-1" is different from that of a "-2". This results in designated combinations of open and closed contacts in the various operator positions.
- N/D = No circuit number designation required in assembled part number.
- X = On (closed contacts) 0 = Off (open contacts). X-X Overlapping contacts remain on (closed) when switch is moved between these two positions.

Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number		L 	C 	R 			Maintained	Spring Return from Right	Spring Return from Left	Two-Way
											
4NO	N/D	1	X	0	0	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	0	0	X	HW-U10-F					
		3	X	0	0	HW-U10-F					
		4	0	0	X	HW-U10-F					
	305	1	X	0	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	0	0	X	HW-U10-F					
		3	X	0	X	HW-U10-F					
		4	0	0	X	HW-U10-F					
4NC	N/D	1	0	X	X	HW-U01-F	Knob/Lever Key Illuminated Knob	ASW300-1 ASW3K00-1 ASLW300-1	ASW3100-1 ASW31K00-1 ASLW3100-1	ASW3200-1 ASW32K00-1 ASLW3200-1	ASW3300-1 ASW33K00-1 ASLW3300-1
		2	X	X	0	HW-U01-F					
		3	0	X	X	HW-U01-F					
		4	X	X	0	HW-U01-F					
	314	1	0	X	0	HW-U01-F	Knob/Lever Key Illuminated Knob	ASW300-2 ASW3K00-2 ASLW300-2	ASW3100-2 ASW31K00-2 ASLW3100-2	ASW3200-2 ASW32K00-2 ASLW3200-2	ASW3300-2 ASW33K00-2 ASLW3300-2
		2	X	X	0	HW-U01-F					
		3	0	X	0	HW-U01-F					
		4	X	X	0	HW-U01-F					

-  1. Each operator sub-assembly is available as a "-1" and a "-2" for 3-position selector switches. The internal cam of a "-1" is different from that of a "-2". This results in designated combinations of open and closed contacts in the various operator positions.
2. N/D = No circuit number designation required in assembled part number.
3. X = On (closed contacts) 0 = Off (open contacts). X-X Overlapping contacts remain on (closed) when switch is moved between these two positions.

Custom Selector Switch Building Guide

To build a custom selector switch, follow these steps.

Step 1

How many positions of the switch are needed?

of positions
(2, 3, 4, 5)

Step 2

How many contacts should there be?

of isolated contacts
(maximum 6)

Step 3

Fill in the Truth Table

(X = closed, 0 = open)

		Knob Position				
		1	2	3	4	5
Contacts	1					
	2					
	3					
	4					
	5					
	6					

Step 4

If building a 2 position selector, skip this step. (2 position selectors have only one cam)

If building a 3, 4, or 5 position selector, determine appropriate cam as follows:

- Look at Row 1 from above table and locate an identical row in the operator truth tables (See next page).
- Repeat for all rows. The user must find one operator that contains all rows from above table.
- Record the operator cam version.

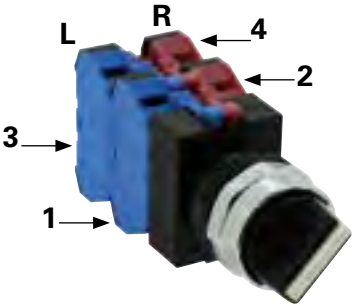
Step 5

Build by placing appropriate contact in appropriate mounting position for each desired row on operator cam truth table. "L" and "R" refer to mounting on left or right side of operator as viewed from the front of the panel.

Step 6

Develop an assembly part number (if necessary) as follows: follow standard numbering nomenclature for selector switches (see pages 712 or 716. In place of the "Circuit Number" indicate the cam number and contact arrangement as such ASW322-3-OELCXX, where "3" is the cam number, and contact arrangement "OELCXX" calls out individual contact mounting locations in order (see diagram above). O=NO, C=NC, E=NO-EM, L=NC-LB, X= no contact. Part number must designate all 6 possible mounting locations.

Mounting Positions



 Caution: Before putting any custom selector switch into use, the user should use an ohmmeter to test for desired performance.
1. For Operator Truth Tables, see next page.

Operator Truth Tables

Use the following tables to build custom selector switches.

2 Position Selector Switches

	Contact	Mounting Position	Operator Position	
			Left	Right
ASW200 ASLW200 ASW2K00	HW-U10-F (NO)	L	0	X
		R	0	X
	HW-U01-F (NC)	L	X	0
		R	X	0
	HW-U10R-F (NO-EM)	L	0	X
		R	0	X
	HW-U01R-F (NC-LB)	L	X	0
		R	X	0

3 Position Selector Switches

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
ASW300-1 ASW3K00-1 ASLW300-1	HW-U10-F (NO)	L	X	0	0
		R	0	0	X
	HW-U01-F (NC)	L	0	X	X
		R	X	X	0
	HW-U10R-F (NO-EM)	L	X	0	0
		R	0	0	X
	HW-U01R-F (NC-LB)	L	0	X	X
		R	X	X	0

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
ASW300-2 ASW3K00-2 ASLW300-2	HW-U10-F (NO)	L	X	0	X
		R	0	0	X
	HW-U01-F (NC)	L	0	X	0
		R	X	X	0
	HW-U10R-F (NO-EM)	L	X	0	X
		R	0	0	X
	HW-U01R-F (NC-LB)	L	0	X	0
		R	X	X	0

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
ASW300-3 ASW3K00-3 ASLW300-3	HW-U10-F (NO)	L	X	0	0
		R	0	0	X
	HW-U01-F (NC)	L	0	X	0
		R	0	X	0
	HW-U10R-F (NO-EM)	L	X	0	X
		R	X	0	X
	HW-U01R-F (NC-LB)	L	0	X	X
		R	X	X	0

4 Position Selector Switches

	Contact	Mounting Position	Operator Position			
			1	2	3	4
ASW400	HW-U10-F (NO)	L	X	0	0	0
		R	0	X	0	0
	HW-U01-F (NC)	L	0	X	X	X
		R	X	0	X	X
	HW-U10R-F (NO-EM)	L	X	0	0	0
		R	0	X	0	0
	HW-U01R-F (NC-LB)	L	0	X	X	X
		R	X	0	X	X

	Contact	Mounting Position	Operator Position			
			1	2	3	4
ASW400-1	HW-U10-F (NO)	L	X	0	0	0
		R	0	0	0	X
	HW-U01-F (NC)	L	0	0	X	0
		R	0	X	0	0
	HW-U10R-F (NO-EM)	L	X	X	0	X
		R	X	0	X	X
	HW-U01R-F (NC-LB)	L	0	X	X	X
		R	X	X	X	0

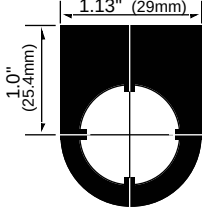
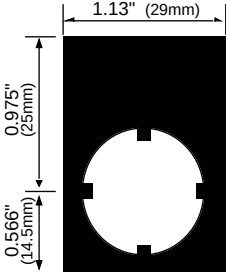
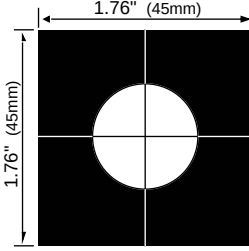
5 Position Selector Switches

	Contact	Mounting Position	Operator Position				
			1	2	3	4	5
ASW500	HW-U10-F (NO)	L	X	0	0	0	0
		R	0	X	0	0	0
	HW-U01-F (NC)	L	0	0	X	X	X
		R	0	0	0	X	X
	HW-U10R-F (NO-EM)	L	X	0	0	0	0
		R	0	X	0	0	0
	HW-U01R-F (NC-LB)	L	0	X	X	X	X
		R	X	0	X	X	X

	Contact	Mounting Position	Operator Position				
			1	2	3	4	5
ASW500-1	HW-U10-F (NO)	L	X	0	0	0	0
		R	0	0	0	0	X
	HW-U01-F (NC)	L	0	0	0	X	0
		R	0	X	0	0	0
	HW-U10R-F (NO-EM)	L	X	X	X	0	X
		R	X	0	X	X	X
	HW-U01R-F (NC-LB)	L	0	X	X	X	X
		R	X	X	X	X	0

Nameplates — TW Series

Faceplates

	NWAL	NWAQL	NWAS	EMERGENCY STOP
				
	Part Number			
Nameplate (blank)	NWAL-OB (black) NWAL-OR (red)	NWAQL-OB (black) NWAQL-OR (red)	NWAS-OB	NWAR-O
Nameplate (engraved)	NWAL-Ⓢ	NWAQL-Ⓢ	NWAS-Ⓢ	NWAR-27†



1. In place of Ⓢ, insert either the Standard Legend Code from table below or custom engraving delimited by " ".
2. Standard engravings are available at no charge.
3. NWAR-27 comes marked "Emergency Stop" as shown in drawing.

Standard Legend Codes

Pushbuttons				Pushbuttons/Selector Switches				Selector Switches	
Legend	Code	Legend	Code	Legend	Code	Legend	Code	Legend	Code
AUTO	101	OPEN	116	AUTO-MAN	201			AUTO-MAN-OFF	301
CLOSE	102	OUT	117	CLOSE-OPEN	202			AUTO-OFF-MAN	302
DOWN	103	RAISE	118	DOWN-UP	203			CLOSE-OFF-OPEN	303
EMERG.STOP	104	RESET	119	FAST-SLOW	204			DOWN-OFF-SLOW	304
FAST	105	REVERSE	120	FOR-REV	205	REV-FOR	216	FAST-OFF-SLOW	305
FORWARD	106	RUN	121	HAND-AUTO	206	RUN-JOG	217	FOR-OFF-REV	306
HAND	107	SLOW	122	HIGH-LOW	207	RUN-SAFE	218	LEFT-OFF-RIGHT	307
HIGH	108	START	123	JOG-RUN	208	SAFE-RUN	219	LOWER-OFF-RAISE	308
IN	109	STOP	124	LEFT-RIGHT	209	SLOW-FAST	220	OFF-MAN-AUTO	309
INCH	110	STOP	125	LOWER-RAISE	210	START-STOP	221	OFF-SLOW-FAST	310
JOG	111	TEST	126	MAN-AUTO	211	STOP-START	222	OFF-1-2	311
LOW	112	UP	127	OFF-ON	212	UP-DOWN	223	OPEN-OFF-CLOSE	312
LOWER	113	I (Int'l On)	150	ON-OFF	213			SLOW-OFF-FAST	313
OFF	114	O (Int'l Off)	151	OPEN-CLOSE	214			SUMMER-OFF-WINTER	314
ON	115	EMO	152	RAISE-LOWER	215			UP-OFF-DOWN	315
								1-OFF-2	316
								HAND-OFF-AUTO	317



1. To order engraved nameplates, add legend code to nameplate part number.
Character height based on the number of characters and size of nameplate. Standard character size is 3/16".
2. Nameplates with standard legends are the same list price as blank nameplates.

Nameplate Order Form on next page.

Custom Engraved Nameplates Order Form — TW Series

Copy this order form and use it to specify Letter Height, Custom Engravings, Location of Engraving on Nameplate, and Quantity Desired. To ensure engraving accuracy, fax it to your IDEC representative. or Distributor.

Your Company Name: _____

IDEC Rep/Distributor Contact: _____

Your Name: _____

PO number (if known): _____

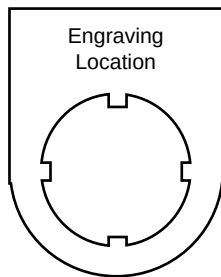
Telephone: _____

IDEC Rep/Distributor Phone: _____

Fax & Email: _____

IDEC Rep/Distributor Fax & Email: _____

NWAL



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 9 characters.

7/64" Letter Size

☐

11 characters max
(for 7/64" size letters)

1/8" Letter Size

☐

9 characters max
(for 1/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

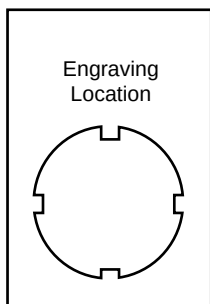
1234567891011

Sample Letter Sizes

7/64" Letters: A B C D

1/8" Letters: A B C D

NWAQL



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 9 characters.

7/64" Letter Size

☐

11 characters max
(for 7/64" size letters)

1/8" Letter Size

☐

9 characters max
(for 1/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

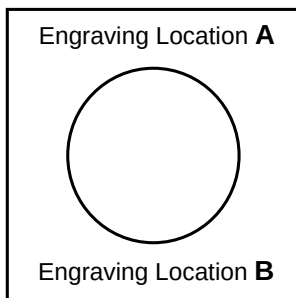
1234567891011

Sample Letter Sizes

7/64" Letters: A B C D

1/8" Letters: A B C D

NWAS



Step 1.

Choose Letter Size - 1/8" or 3/32".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 14 characters.

3/32" Letter Size

☐

20 characters max
(for 3/32" size letters)

1/8" Letter Size

☐

14 characters max
(for 1/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

Step 3.

Specify Location.

Enter the location of engraving (A or B), in the box on the right.

Location

Sample Letter Sizes

3/32" Letters: A B C D

1/8" Letters: A B C D

1234567891011121314151617181920

Switch Engraving Order Form – TW Series

Copy this order form and use it to specify Letter Height, Maximum Number of Lines and Text to be engraved.

To ensure engraving accuracy, fax it to your IDEC representative or Distributor.

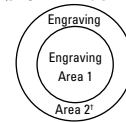
Your Company: _____
 Name: _____
 Address: _____
 PO: _____

Telephone: _____
 Fax: _____
 Email: _____
 Part Number to be Engraved: _____

Please check one of the boxes below to indicate your choice of engraving options:



ø29mm, ø40mm Mushroom Head



	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	6
☐		1/8	6
☐	2	5/32	6
☐		1/8	5
☐	3	1/8	6
☐	4	3/32	5

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	5
☐		1/8	6
☐	2	5/32	5
☐		1/8	6
☐	3	1/8	5
☐	4	3/32	5

		# of Lines	Letter Height	Max. Characters Per Line
☐	Engraving Area 1	1	5/32	5
☐			1/8	5
☐	Engraving Area 2	1	5/32	7
☐			1/8	7



- Above mentioned specifications hold true for standard size pushbuttons (round and square).
- *Engraving Area 2 can be engraved for 40mm mushroom Head non-Illuminated push button only.
- Engraving is done on the button itself for non-Illuminated push buttons and on marking plate for illuminated push buttons and pilot lights.
- Please enter text exactly how you want it engraved, take care to emphasize capital or small letters.

Enter text to be engraved:

Line 1: _____
 Line 2: _____
 Line 3: _____
 Line 4: _____

Sample Letter Sizes

1/8 Letters: **OPEN**

5/32 Letters: **OPEN**

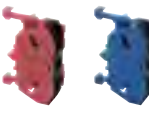
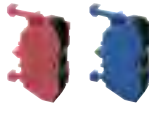
For IDEC Internal Use Only:

Work Order #: _____

Accessories

TW Series Accessories

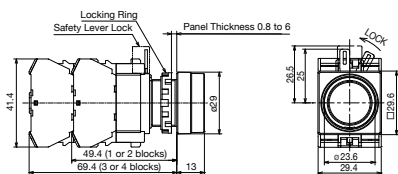
Item	Appearance	Description/Usage		Part Number
Lamp Removal Tool		Rubber tool used to install or remove LED's		OR-55
Contact Block Remover		Used to remove contact blocks, transformers, lenses, and adaptors. Can also be used to determine panel thickness adjustment.		TW-KC1
Nut Locking Wrench		Used in OR-14 locking wrench to tighten locking nuts inside square bezel		TW-KQ2
Metal Bezel		Chrome plated bezels tighten onto operator (replacement for damaged bezels)	Standard octagonal units (chrome-pl.)	AW-R8
			Full shroud octagonal units (chrome-pl.)	AW-RF8
			Full shroud mushroom head units Ø 40mm	AW-G4
Plastic Bezel		Black plastic bezels for square buttons (replacement for damaged bezels)	Round flush units (black plastic)	AW-RP1B
			Round extended units (black plastic)	AW-FP1B
			Square units (black plastic)	AW-Q1B
			Square units with full shroud (black plastic)	AW-QF1B
Boot/Cover		Used to cover and protect pushbuttons	Waterproof lens cover for square pilot lights	APW00LN
			Waterproof lens cover for square illuminated buttons	APW00L
			Clear boot for round flush units	OC-31
			Clear boot for round extended units	OC-32
			In place of asterisk, specify Rubber Boot color: B (black), G (green), R (red), Y (yellow) - (nitril rubber)	OCW-11
Anti-Rotation Ring		Ring to prevent operator base from rotating in the mounting hole. Used when nameplate is not used		OGL-31
Mounting Hole Plug		Black rubber plug fills unused mounting holes in panel.		OB-31
Metallic Mounting Hole Plug		For plugging unused mounting holes in the panel. Tighten the attached locking ring to a torque of 12 kfg-cm maximum Degree of protection: IP66		LW9Z-BM
Replacement Keys		Replacement keys (#0)		TW-SK
Replacement Black Sleeve for Keyswitch				AKW2B-B

Item	Appearance	Description/Usage		Part Number	
Metal Button Guard		Used on flush buttons to prevent inadvertent actuation		OLW-C	
Terminal Tab Adaptor		Quick- connect terminals	#250 (17/64" x 3/64") single tab	TW-FA4	
Lock-out Adaptor		Used to provide lock-out protection for pushbuttons and knob selector switches: • Up to Ø 40mm mushroom head size (Padlock not included.) Not applicable for e-stops.		HW9Z-KL1	
22mm to 30mm Adaptor		Used to mount TW series control unit (except square units) Ø 7/8" (22mm) into a Ø 1-13/64" (30mm) panel cut-out.		TWN-A1R8	
Contact Blocks (with side entry)		These contacts are applicable for wires terminated by ring, fork, not recommended for bare wire connections.		1NC	1NO
				HW-U01 HW-U01-MAU HW-U01R HW-U01R-MAU (with side entry)	HW-U10 HW-U10-MAU HW-U10R HW-U10R-MAU (with side entry)
Contact Blocks (without side entry)		These contacts are applicable for wires terminated by ring, fork, or ferule terminals, and also bare wire connections.		1NC	1NO
				HW-U01-F HW-U01-MAU-F HW-U01R-F HW-U01R-MAU-F (no side entry)	HW-U10-F HW-U10-MAU-F HW-U10R-F HW-U10R-MAU-F (no side entry)

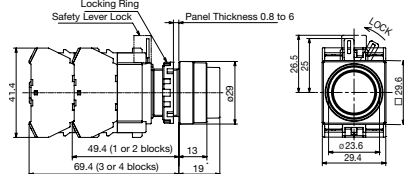
Dimensions

Pushbuttons

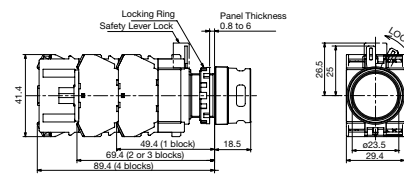
Flush



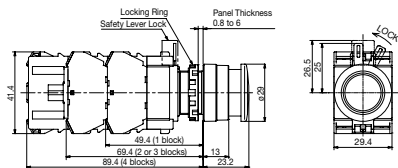
Extended



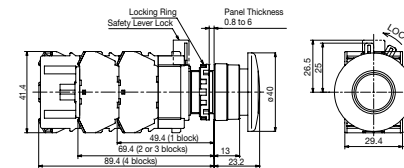
Extended with Full Shroud



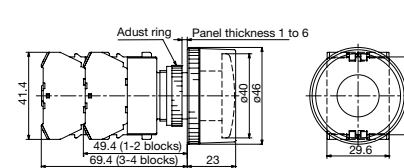
29mm Mushroom



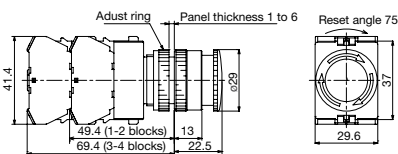
40mm Mushroom



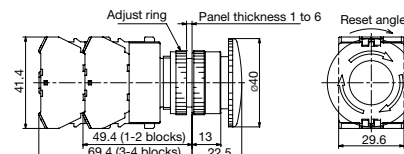
Mushroom with Full Shroud



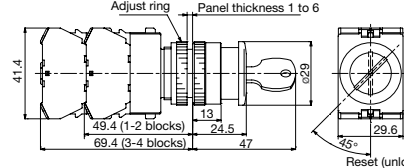
29mm Push-Lock-Turn-Reset



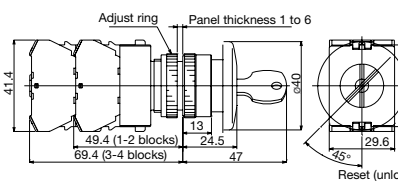
40mm Push-Lock-Turn-Reset



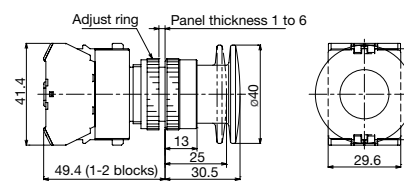
Keylock Push On/Off



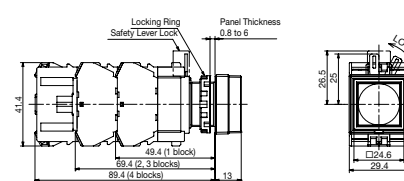
40mm Pushlock Key reset



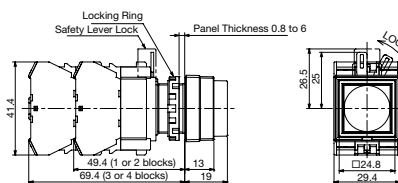
40mm Push-Pull



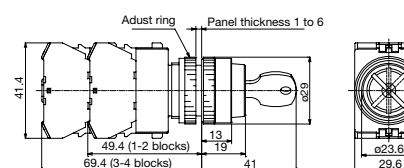
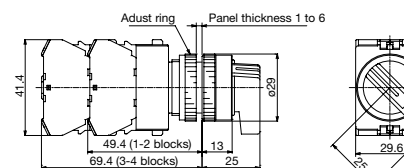
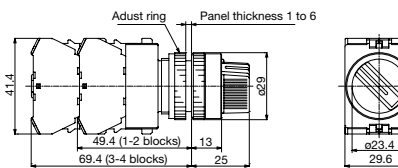
Square Flush



Square Extended



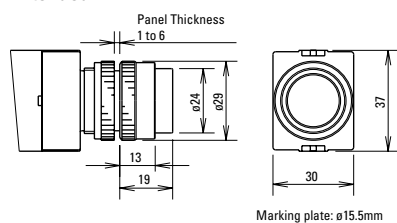
Selector Switches



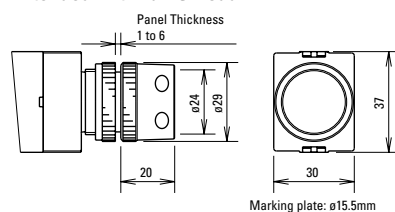
Dimensions continued

Illuminated Pushbuttons

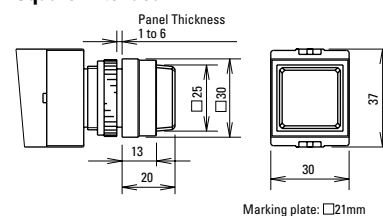
Extended



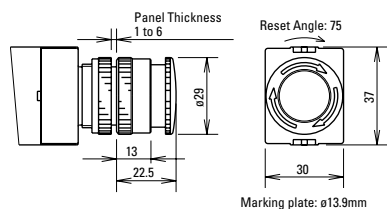
Extended with Full Shroud



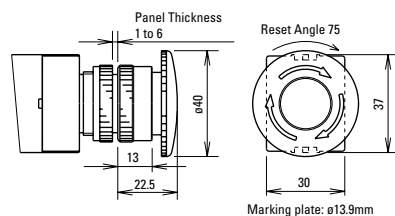
Square Extended



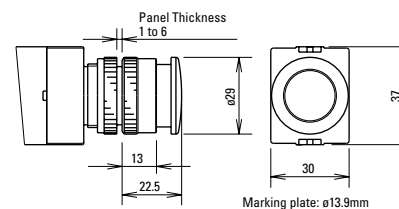
29mm Push-Turn-Reset



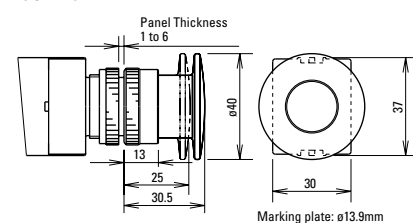
40mm Push-Turn-Reset



Mushroom

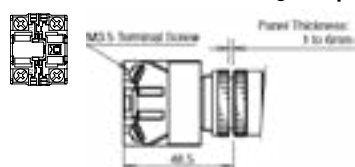


Push-Pull

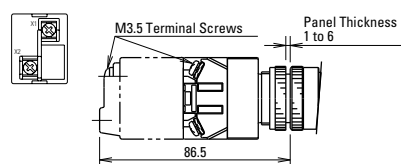


Illuminated Selector Switches

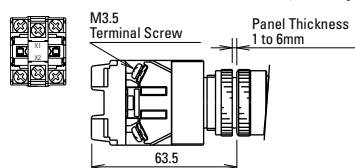
1 Contact Block with Full Voltage Adaptor



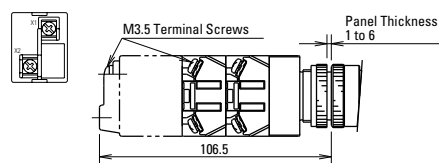
Transformer (2 blocks)



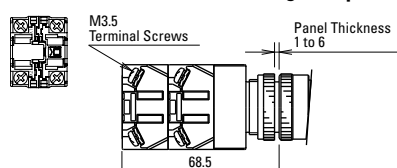
2 Contact Blocks with Full Voltage Adaptor



Transformer (4 blocks)



3 Contact Blocks with Full Voltage Adaptor



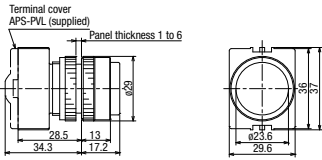
4 Contact Blocks with Full Voltage Adaptor



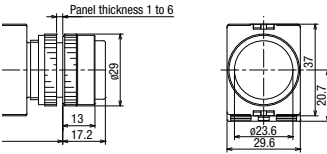
Dimensions continued

Pilot Lights

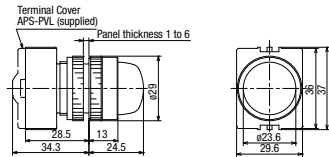
Round Flush APW1 Full Voltage



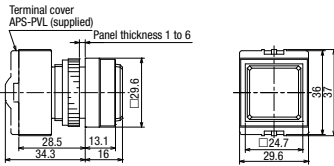
Round Flush Marking Type APW1B Full Voltage



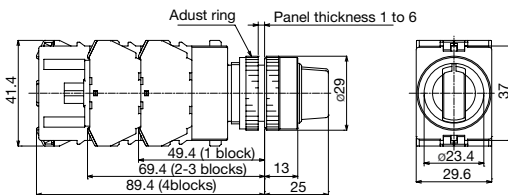
Dome APW2 Full Voltage



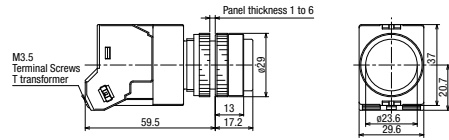
Square Flush Marking Type APQW1B Full Voltage



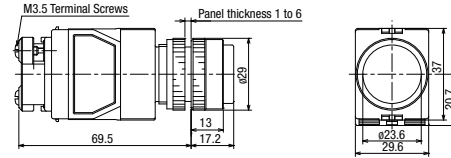
Illuminated Selector Switches



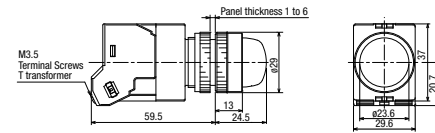
Round Flush APW1 Transformer



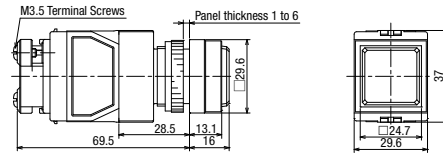
Round Flush Marking Type APW1B Transformer



Dome APW2 Transformer



Square Flush Marking Type APQW1B Transformer



Dimensions continued

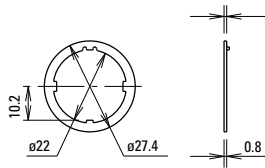
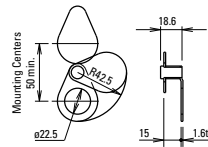
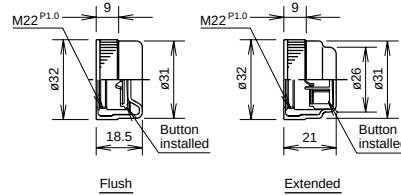
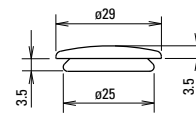
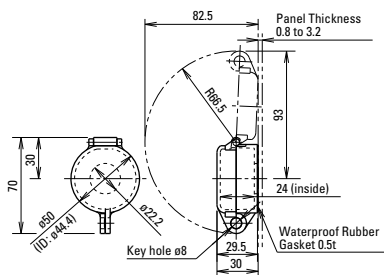
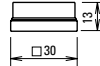
Panel Cut-Out

Diagram	Part	Dimension
	Pushbuttons	- The minimum mounting centers are applicable to switches with one layer of contact blocks (one to two contact blocks). When two layers of contact blocks are mounted, determine the minimum mounting centers in consideration of convenience for wiring. 1*) ø40 mm mushroom button type: 40 mm minimum 1*) 2-position, 3-position lever selector switch: 39 mm minimum 1*) 4-position, 5-position lever selector switch: 50 mm minimum - When high temperature is expected, take necessary measures such as securing sufficient mounting centers or using a cooling fan. - The ☆3.2 $\begin{smallmatrix} +0.2 \\ 0 \end{smallmatrix}$ mm recess is for preventing rotation and is not necessary when the nameplate or anti-rotation ring is not used. All dimensions in mm.
	Pilot Light	
	Illuminated Pushbuttons	
	Selector Switches	
	Illuminated Selector Switches	



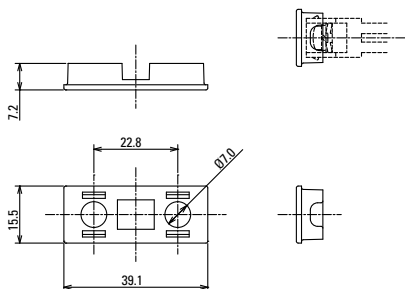
1. The $\varnothing 0.137''$ ($\varnothing 3.5$ mm) recess is necessary when either the nameplate or anti-rotation ring is used.
2. *1) $>1.404''$ (36mm) for 2- or 3-position.
 $>1.95''$ (50mm) for 4- or 5-position.

Accessory Dimensions

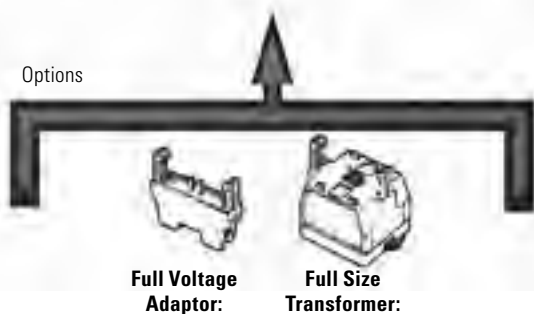
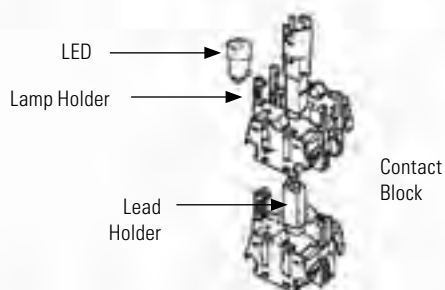
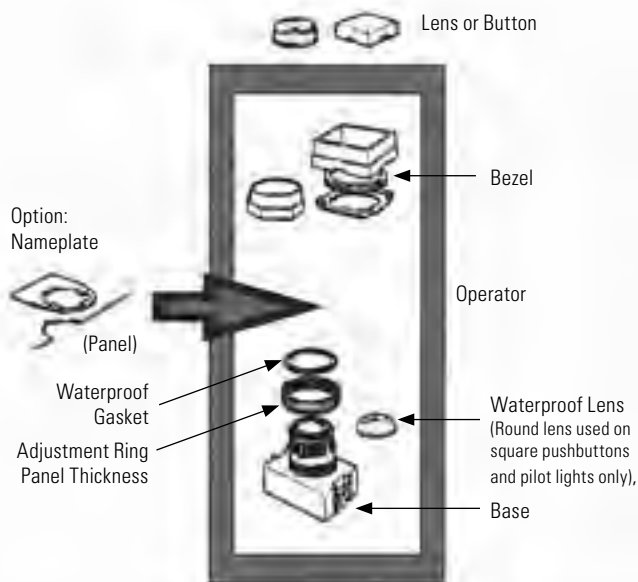
OGL-31
Anti-Rotation RingOLW-C
Metal Button GuardOCW-11
Pushbutton Rubber BootOB-31
Mounting Hole Rubber PlugHW9Z-KL1
Lock-out AdaptorAW-RP1B
Round Plastic BezelAW-QF1B
Square Full ShroudAW-FP1B
Round Plastic w/Full Shroud

Finger-Safe Cover Dimensions

APS-PVL



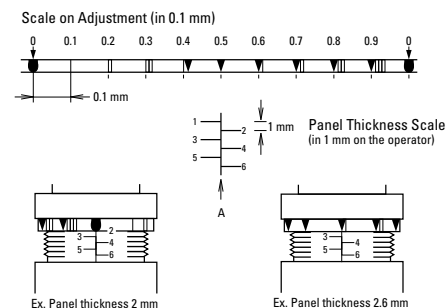
Component Construction and General Instructions — TW Series



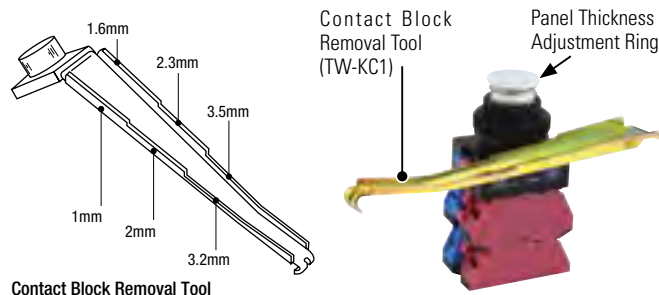
Instructions for Switches and Pilot Devices

TW Series: Adjustment for Panel Thickness

The panel thickness ring provides adjustment from 0.04" to 0.24" (1 to 6mm) in 0.004" (0.1mm) increments. Rotate the ring until the markings around the periphery are aligned for the desired thickness, as shown below.



An adjustment for panel thicknesses shown below can be made quickly by using the contact block remover tool.



Instructions continued

Pilot Lights and Pushbuttons

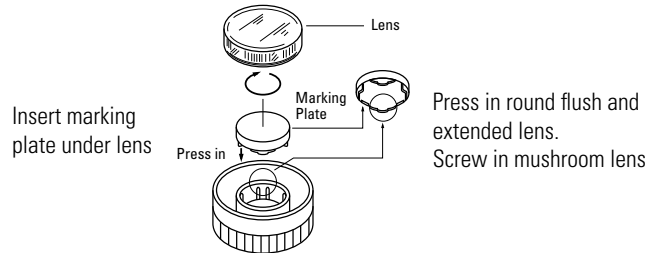
IMPORTANT: Install the body of the TW control unit with the panel thickness scale facing up.

Octagonal and Round Bezels

Octagonal and round bezels screw into the operator. Use a locking ring wrench (optional) for secure tightening and easy removal. Round flush and extended buttons snap onto the operator base. Mushroom buttons screw onto the operator base.

Every round lens can be used with or without legend markings. Engraving can be done on a white translucent plate which is placed in the lens, or clear mylar can be printed and placed in the lens.

Round Marking Unit

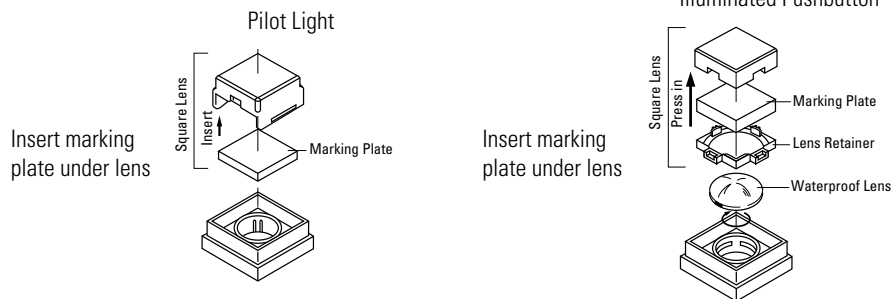


Square Bezels

Square bezels are installed in a 3-step procedure. First install the base plate from the front. Then install the lock nut using the nut locking wrench (optional). Finally, install the square bezel, which snap-fits onto the base plate. Square buttons also snap onto the operator base.

Every square lens can be used with or without legend markings. Engraving can be done on a white translucent plate which is placed in the lens, or clear mylar can be printed and placed in the lens. Square units include a round waterproof lens which screws into the operator. The square outer lens snaps on.

Square Marking Units



To remove square lens from operator, place a screwdriver under the indentation on the side of the lens. To remove the marking plate, place a screwdriver under the indentation and lift out the plate. The lens retainer can be removed by pressing a 3/16" screwdriver into one of the recesses.



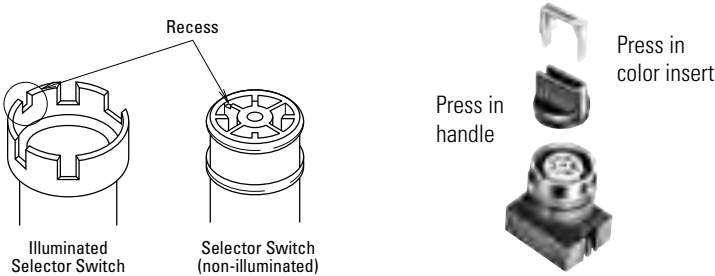
Marking Plate Engraving Area

Shape	Engraving Area	Used With	Part Number
Round	Ø 0.55" (14mm)	Illuminated pushbuttons	ALW2B
	Ø 0.55" (14mm)	Pilot lights	APW2B
Mushroom	Ø 0.55" (14mm)	Illuminated mushroom	ALW3B
Square	□ 0.83" (21mm)	Square pilot lights	APQW1B
Square	□ 0.83" (21mm)	Square illuminated pushbuttons	ALQW2B

Instructions, continued

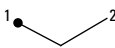
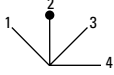
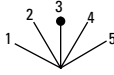
Selector Switches

The operator shaft of each unit has a recess to identify in which direction to install the handle. Align the handle with the recess. Press color insert (TW-HC1) into the handle and then press handle into the operator, as shown below.

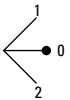


 Remove color insert before pulling out the handle.

Standard Operating Positions

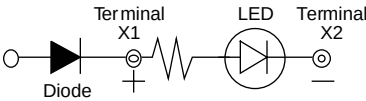
2-Postion, 90°	3-Postion, 45°	4-Postion, 45°	5-Postion, 30°
			

Positions: Non-Illuminated 3-Position Operators

		
--	--	--

Installation of LED Illuminated Units

Transformers are recommended for use in areas subjected to inductive noise. When using full voltage types, install a protection diode as shown below. (Diode with DC power supply to protect against surges and noise.)



Enclosures for XW, HW & TW 22mm Switches and Pilot Devices

Key features:

- Three compact sizes (mm): 76 x 76, 140 x 76 and 200 x 76
- Available in 1, 2, 3, 4 or 5 mounting hole configurations
- Easy installation: panel, wall or frame mountable
- Polycarbonate enclosure cover and base, stainless steel screws
- UL Listed, RoHS Compliant
- IP65 and Type 4X rated (when installed with IP65 or Type 4X unit)
- Class II electric shock protection (when installed with applicable unit)
- Ideal for high temperatures (-25 to +60°C) and corrosive environments



Specifications

Operating Conditions	Ambient temperature	-25 to +60°C (no freezing)
	Relative humidity	45 to 85%RH (no condensation)
	Storage temperature	-40 to +80°C (no freezing)
	Degree of pollution	3
Degree of Protection	IP65 (when IP65 switches and pilot devices are installed) Type 4X (when Type 4X switches and pilot devices are installed)	
Electric Shock Protection	Class II (when class II switches and pilot devices are installed)	
Material	Cover and base	Polycarbonate
	Cover mounting screws	Stainless steel
Applicable Switches and Pilot Devices	HW, TW and XW series switches, pilot devices and accessories (see note below)	
Weight (approx.)	76mm type: 125g (FB1W-111Z)	
	140mm type: 184g (FB2W-211Z)	
	200mm type: 243g (FB3W-311Z)	



Choose switches, pilot devices and accessories that match the mounting hole centers, effective depth behind the cover, and the thickness of the cover where switches and pilot devices are installed (3 mm). Enclosures with 30 or 36mm mounting hole centers may limit the knob orientation of selector switches because the contact blocks can be mounted in one direction only on these mounting centers.

Enclosure Part Numbers

Size (mm)	Description	Part Number	Distance Between Hole Centers (mm)
76 x 76 x 59.5	Enclosure 1 hole, Yellow	FB1W-111Y	—
	Enclosure 1 hole, Beige	FB1W-111Z	—
140 x 76 x 59.5	Enclosure 2 hole, Beige	FB2W-211Z	50
	Enclosure 3 hole, Beige	FB2W-312Z	30
200 x 76 x 59.5	Enclosure 3 hole, Beige	FB3W-311Z	50
	Enclosure 4 hole, Beige	FB3W-413Z	36
	Enclosure 5 hole, Beige	FB3W-512Z	30



Accessories

Description	Part Number
Plug Adaptor 13.5mm	HW9Z-PG135
Mounting Bracket	FB9Z-PK1

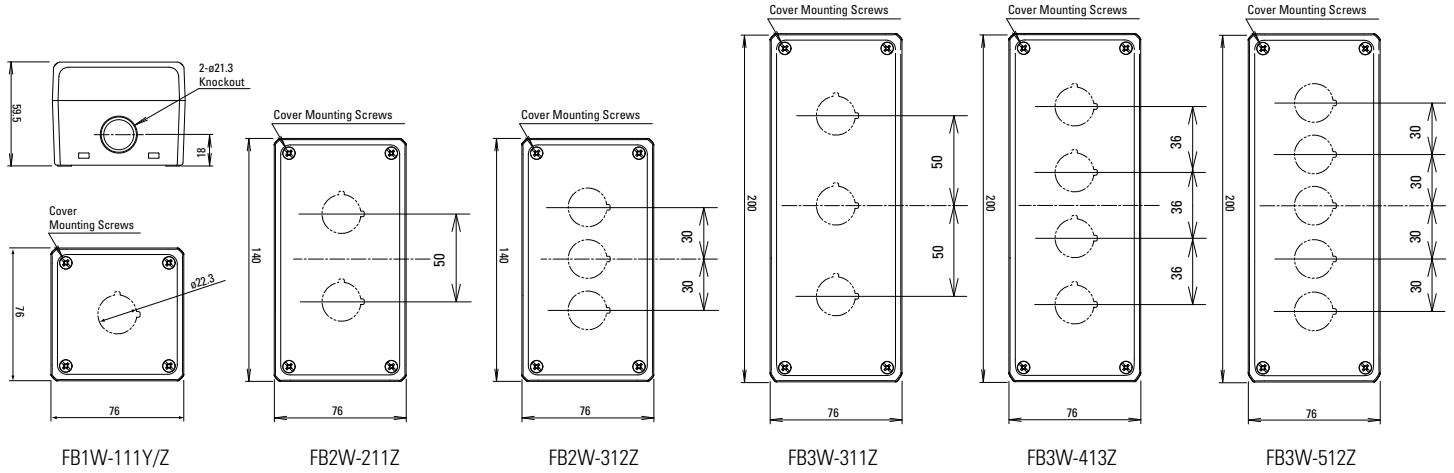


Connectors and nuts are not supplied with accessories.

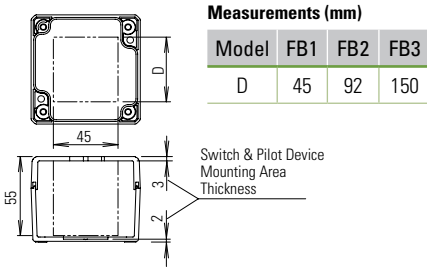
Switch and Pilot Device Accessories

Series	Description	Part Number
HW Series	Nameplate	HWAM, HWAQ, HWAS, HWAV
	Marking plate for nameplate	HWNP
	Anti-rotation ring	HW9Z-RL
	EMO switch guard	HW9Z-KG1, HW9Z-KG2, HW9Z-KG3, HW9Z-KG4
	Switch cover	HW9Z-K1, HW9Z-K11
	Pushbutton clear boot	OC-31, OC-32
	Padlock cover	HW9Z-KL1
	Nameplate	HWAV
XW Series E-Stops	EMO switch guard	HW9Z-KG1, HW9Z-KG2, HW9Z-KG3, HW9Z-KG4
	Anti-rotation ring	HW9Z-RL
TW Series	Nameplate	NWA, NWAQ, NWA-S-0, NWAL-0, NWAQL-0, NWAV
	Anti-rotation ring	OGI-31
	Metal button guard	OLW-C
	Pushbutton clear boot	OC-31, OC-32
	Button cover	OCW-11
	Padlock cover	HW9Z-KL1

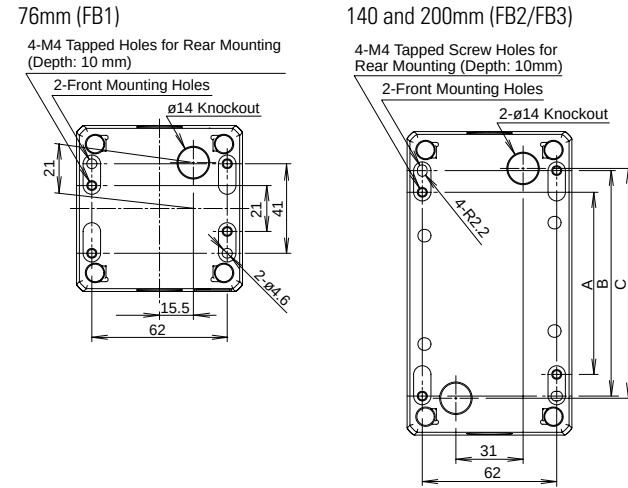
External Dimensions (mm)



Internal Dimensions (mm)



External Back Dimensions (mm)

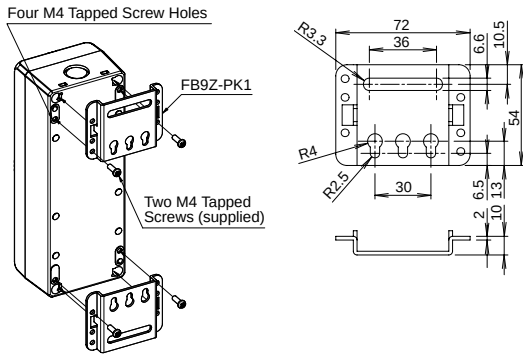


Measurements (mm)

Model	FB2	FB3
A	84	144
B	104	164
C	106	166

Mounting

FB9Z-PK1 Frame Mounting Adapter



Mounting Hole Dimensions

Model	FB1	FB2	FB3	FB2/FB3
		50mm Mounting Centers	36/50mm Mounting Centers	30mm Mounting Centers
Shape				

30mm XN E-Stops

Key features:

- Plastic bezel, metallic padlock and flush bezel available
- Install up to 20 padlocks (XN4E)
- ø40, ø44 or ø60mm Mushroom heads available
- IDEC's original "safe break action" ensures that the contacts stay open when the contact block is detached from the operator.
- Safety-lock mechanism (IEC60947-5-5, 6.2)
- 2-in-1: Push-to-lock, Pull/Turn-to-Reset
- Push-ON LED model allows E-Stops to be illuminated only when latched
- Direct Opening Action mechanism (IEC60947-5-5, 5.2, IEC60947-5-1, Annex K)
- Very short panel depth
- Degree of protection IP65 (IEC60529)
- RoHS compliant (EU directive 2002/95/EC).
- XN4E series complies with OSHA and ISO 12100-2:2003 standards
- UL, c-UL listed, EN compliant
- UL NISD category emergency type device (File# E305148)



Specifications

Applicable Standards	IEC60947-5-1, EN60947-5-1, IEC60947-5-5, EN60947-5-5, UL508, UL991, CSA C22.2 No. 14	
Operating Temperature	Non-illuminated: -25 to +60°C (no freezing), Illuminated: -25 to +55°C (no freezing)	
Operating Humidity	45 to 85% RH (no condensation)	
Storage Temperature	-45 to +80°C no freezing	
Operating Force	XN1E, XN5E Push-to-lock: 32N Pull-to-reset: 21N Turn-to-reset: 0.27 N·m	XN4E Push-to-lock: 32N Pull-to-reset: N/A Turn-to-reset: 0.4 N·m
Minimum Force Required for Direct Opening Action	80N	
Min Operator Stroke Required for Direct Opening Action	4mm	
Maximum Operator Stroke	4.5mm	
Contact Resistance	50mΩ maximum (initial value)	
Contact Material	Gold plated silver	
Insulation Resistance	100MΩ minimum (500V DC megger)	
Impulse Withstand Voltage	2.5kV	
Pollution Degree	3	
Operation Frequency	900 operations/hour	
Shock Resistance	Operating extremes: 150m/s ² (15G), Damage limits: 1000m/s ² (100G)	
Vibration Resistance	Operating extremes: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ² Damage limits: 10 to 500Hz, amplitude 0.35mm acceleration 50m/s ²	
Mechanical Life	250,000 operations minimum	
Electrical Life	100,000 operations minimum, (250,000 operations minimum @ 24V AC/DC, 100mA)	
Degree of Protection	Operator: IP65 (IEC60529) Terminal: IP20 (when XW9Z-VL2MF is installed)	
Terminal Style	M3.0 screw terminal	
Recommended Tightening Torque for Locking Ring	2.5N·m	
Wire Size	16 AWG max	
Weight	XN1E: Plastic bezel: 83g (ø40 mm), 93g (ø60 mm) 0.75 to 1.25 mm ² XN5E: Flush bezel: 89g XN4E: Padlock type: 120g	

Part Numbers

XN1E Plastic Bezel Type E-Stops (push-pull/twist reset)

Style	Operator Type	Main Contact	Monitor Contact	Part Number
Non-Illuminated 	40mm Mushroom	1NC	1NO	XN1E-BV411MR
		2NC	–	XN1E-BV402MR
		2NC	2NO	XN1E-BV422MR
		3NC	1NO	XN1E-BV413MR
	60mm Mushroom 	4NC	–	XN1E-BV404MR
		1NC	1NO	XN1E-BV511MR
		2NC	–	XN1E-BV502MR
		2NC	2NO	XN1E-BV522MR
Illuminated 	40mm Mushroom LED (24V AC/DC)	3NC	1NO	XN1E-BV513MR
		4NC	–	XN1E-BV504MR
	40mm Mushroom Push-ON LED (24V AC/DC)	1NC	1NO	XN1E-LV411Q4MR
		2NC	–	XN1E-LV402Q4MR
		2NC	2NO	XN1E-LV422Q4MR
		3NC	1NO	XN1E-LV413Q4MR
		4NC	–	XN1E-LV404Q4MR
		2NC	1NO	XN1E-TV412Q4MR

XN4E Padlock Type E-Stops (push twist reset only)

Style	Operator Type	Main Contact	Monitor Contact	Part Number
Non-Illuminated 	44mm Mushroom	1NC	1NO	XN4E-BL411MR
		2NC	-	XN4E-BL402MR
		2NC	2NO	XN4E-BL422MR
		3NC	1NO	XN4E-BL413MR
		4NC	-	XN4E-BL404MR
Illuminated 	44mm Mushroom LED (24V AC/DC)	1NC	1NO	XN4E-LL411Q4MR
		2NC	-	XN4E-LL402Q4MR
		2NC	2NO	XN4E-LL422Q4MR
		3NC	1NO	XN4E-LL413Q4MR
		4NC	-	XN4E-LL404Q4MR
	44mm Mushroom Push-ON LED (24V AC/DC)	2NC	1NO	XN4E-TL412Q4MR

XN5E Flush Bezel Type E-Stops (push-pull/twist reset)

Style	Operator Type	Main Contact	Monitor Contact	Part Number
Non-Illuminated 	40mm Mushroom	1NC	1NO	XN5E-BV411MR
		2NC	-	XN5E-BV402MR
		2NC	2NO	XN5E-BV422MR
		3NC	1NO	XN5E-BV413MR
		4NC	-	XN5E-BV404MR
Illuminated 	40mm Mushroom LED (24V AC/DC)	1NC	1NO	XN5E-LV411Q4MR
		2NC	-	XN5E-LV402Q4MR
		2NC	2NO	XN5E-LV422Q4MR
		3NC	1NO	XN5E-LV413Q4MR
		4NC	-	XN5E-LV404Q4MR
	40mm Mushroom Push-ON LED (24V AC/DC)	2NC	1NO	XN5E-TV412Q4MR

Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Rated Current (Ith)				5A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current	Main Contacts (NC)	AC 50/60Hz	Resistive Load (AC-12)	—	5A	3A
			Inductive Load (AC-15)	—	3A	1.5A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Monitor Contacts (NO)	AC 50/60Hz	Resistive Load (AC-12)	—	1.2A	0.6A
			Inductive Load (AC-14)	—	0.6A	0.3A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A



1. Minimum applicable load: 5V AC/DC, 1mA (reference value).
2. The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.

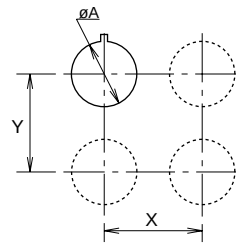
Illuminated Unit LED Ratings

Model	Operating Voltage	Current
XN	24V AC/DC ±10%	15mA

Depth Behind the Panel

Model	Depth (mm)	Description
XN1E	47.7	1 - 4 contacts, plastic bezel
XN5E	60.4	1 - 4 contacts, flush bezel
XN4E	61.4	1 - 4 contacts, padlock

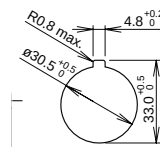
Mounting Hole Layout



Measurements

Size	øA	X & Y
XN1E, XN5E	30.5 ^{+0.5}	70mm min
XN4E	30.5 ^{+0.5}	For XN4E, determine the values according to the size and number of padlocks and hasp.

Panel Cutout



Part Numbers

XN1E - L V 4 02 Q4 MR

Bezel

- 1: Plastic Bezel
- 4: Padlock
- 5: Flush Bezel

Illumination

XN1E, XN5E

- BV: Non-Illuminated
- LV: Illuminated LED
- TV: Illuminated Push-ON LED

XN4E

- BL: Non-Illuminated
- LL: Illuminated LED
- TL: Illuminated Push-ON LED

Mushroom Size

- 4: ø40mm: XN1E, XN5E
- ø44mm: XN4E
- 5: ø60mm
- (XN1E non-illuminated only)

Contact Configuration*

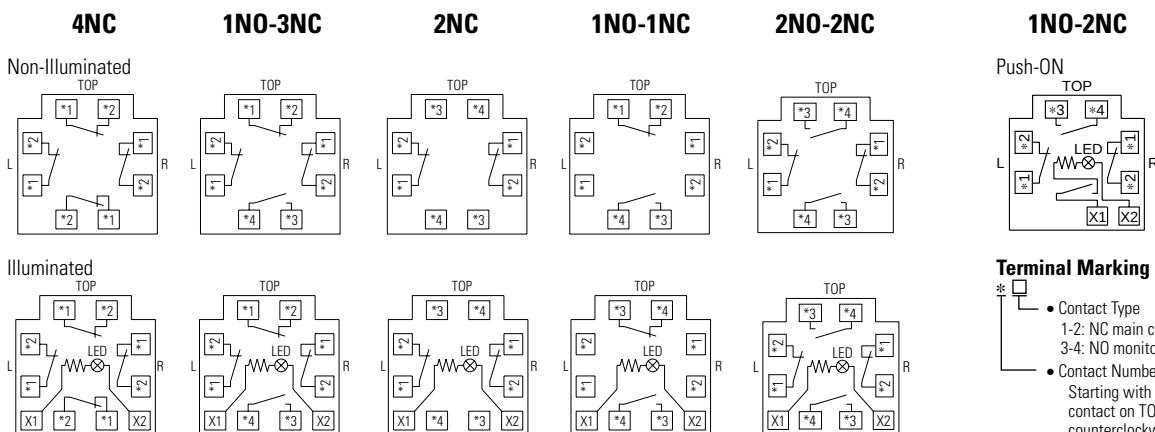
- 11: 1NO - 1NC
- 02: 2NC
- 13: 1NO - 3NC
- 22: 2NO - 2NC
- 04: 4NC
- 12: 1NO-2NC (Push-ON LED only)

Voltage Code

- Blank: Non-Illuminated
- Q4: 24V AC/DC (Illuminated & Push-ON LED type)

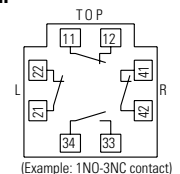
*Contact IDEC for additional configurations.

Terminal Arrangements (Bottom View)



Terminal Marking Description

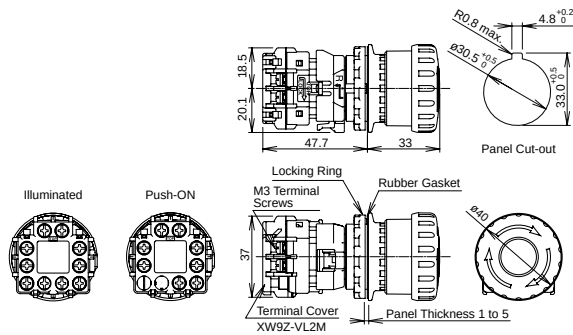
- Contact Type
 - 1-2: NC main contact
 - 3-4: NO monitor contact
- Contact Number (1-4)
 - Starting with the contact on TOP in a counterclockwise direction.
 - Note:
 - 1: contact on the TOP
 - 2: contact on the Left
 - 3: contact on the Bottom
 - 4: contact on the Right



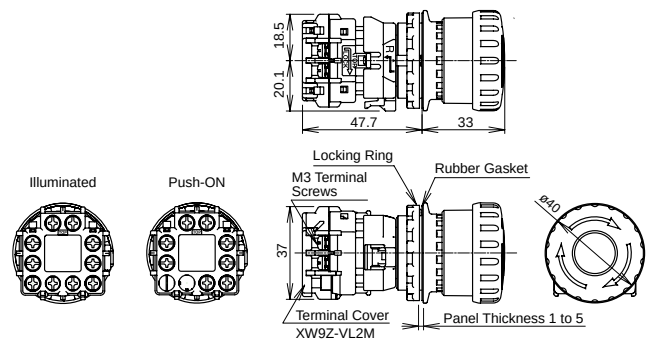
(Example: 1NO-3NC contact)

Dimensions (mm)

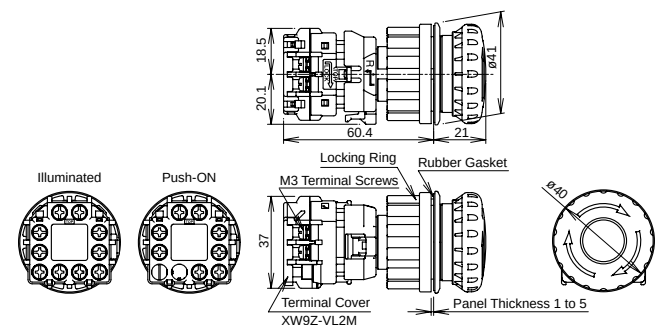
XN1E Non-Illuminated (with terminal cover)



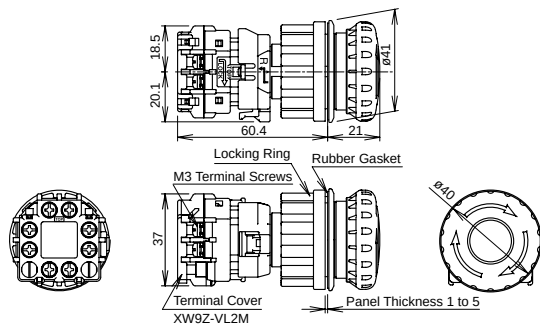
XN1E Illuminated/Push-ON (with terminal cover)



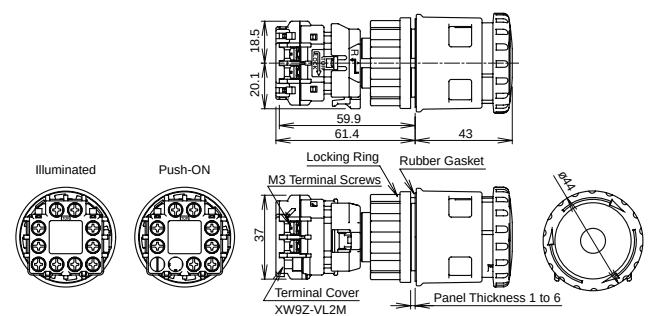
XN5E Illuminated (with terminal cover)



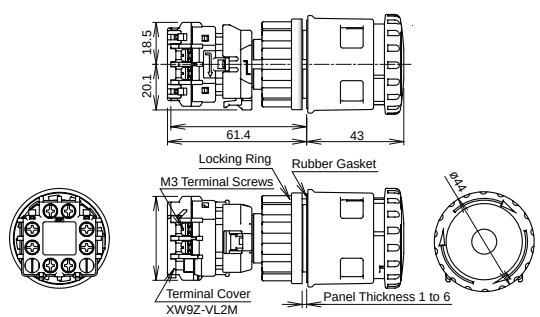
XN5E Non-Illuminated (with terminal cover)



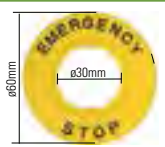
XN4E Illuminated (with terminal cover)



XN4E Non-Illuminated (with terminal cover)



Nameplates

Item	Part No.	Legend	Mounting Panel Thickness
	HNAV-0	(blank)	XN4E: 1.0 to 4.5 mm
	HNAV-27	EMERGENCY STOP	XN1E, XN5E: 1.0 to 3.5 mm

Accessories

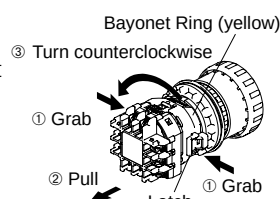
Item	Description	Part Number
	Locking Ring Wrench	XN9Z-T1
	Locking Ring Twist Wrench	TWST-T1
	Lockout Hasp	XN9Z-HASP421

Item	Description	Part Number
	Terminal Cover for Contact Block	XW9Z-VL2M
	IP20 Fingersafe Cover	XW9Z-VL2MF

Operating Instructions

Removing the Contact Block

First unlock the operator button. Grab the yellow bayonet ring ① and pull back the bayonet ring until the latch pin clicks ②, then turn the contact block counterclockwise and pull out ③.

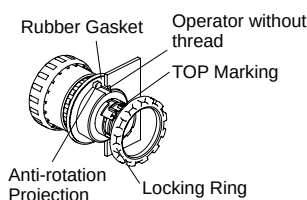


Notes for removing the contact block

1. Do not attempt to remove the contact block while the operator is latched, otherwise the switch may be damaged.
2. When the contact block is removed, the monitor contact (NO contact) is closed.
3. While removing the contact block, do not use excessive force, otherwise the switch may be damaged.
4. An LED lamp is built into the contact block for illuminated pushbuttons. When removing the contact block, pull the contact block straight to prevent damage to the LED lamp. If excessive force is used, the LED lamp may be damaged and fail to light.

Panel Mounting

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side without thread on the operator with TOP marking upward, and tighten the locking ring using ring wrench XN9Z-T1 or TWST-T1 to a torque of 2.5 N·m maximum.



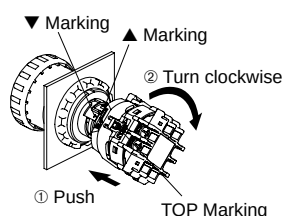
When using a nameplate

When using a nameplate HNAV-□, break the projection from the nameplate using pliers.



Installing the Contact Block

First unlock the operator button. Align the small ▼ marking on the edge of the operator with the small ▲ marking on the yellow bayonet ring. Hold the contact block, not the bayonet ring. Press the contact block onto the operator and turn the contact block clockwise until the bayonet ring clicks.



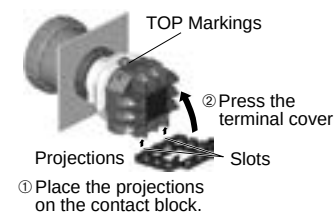
Notes for installing the contact block

1. Do not attempt to install the contact block when the operator is latched, otherwise the switch may be damaged.
2. Make sure that the bayonet ring is in the locked position.

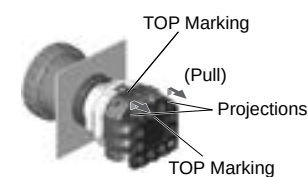
Installing & Removing Terminal Covers

XW9Z-VL2M

To install the terminal cover, align the TOP marking on the terminal cover with the TOP marking on the contact block. Place the two projections on the bottom side of the contact block into the slots in the terminal cover. Press the terminal cover toward the contact block.



To remove the terminal cover, pull out the two latches on the top side of the terminal cover. Do not exert excessive force to the latches, otherwise the latches may break.



IP20 Fingersafe Terminal Cover XW9Z-VL2MF

To install the IP20 fingersafe terminal cover, align the TOP marking on the cover with the TOP marking on the contact block, and press the cover toward the contact block.



1. Once installed, the XW9Z-VL2MF cannot be removed.
2. With the XW9Z-VL2MF installed, crimping terminals cannot be used.
3. The XW9Z-VL2MF cannot be installed after wiring.
4. Make sure that the XW9Z-VL2MF is securely installed. IP20 cannot be achieved when installed loosely, and electric shock may occur.

Notes for Operation

When using the XN emergency stop switches in safety-related part of a control system, observe safety standards and regulations of the relevant country or region. Also be sure to perform a risk assessment before operation.

Wiring

Tighten the M3 terminal screws to a torque of 0.6 to 1.0 N·m.

Contact Bounce

When the button is reset by pulling or turning, the NC main contacts will bounce. When pressing the button, the NO monitor contacts will bounce.

When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms).

LED Illuminated Switches

LED lamp is built into the contact block and cannot be replaced.

Handling

Do not expose the switch to excessive shocks and vibrations, for example by operating the switch with tools. Otherwise the switch may be deformed or damaged, causing malfunction or operation failure.

Screw Terminal Type

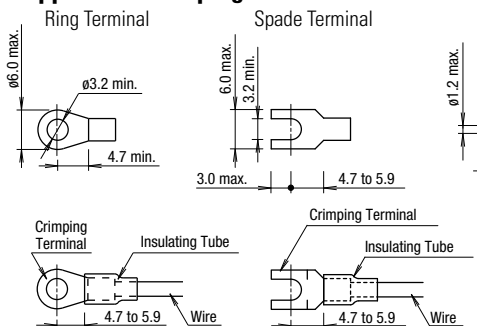
1. AWG18 to 16
2. Tighten the M3 terminal screw to a tightening torque of 0.6 to 1.0 N·m.

Operating Instructions, continued

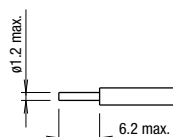
Screw Terminal Type

1. Wire thickness: 0.75 to 1.25 mm² (AWG18 to 16)

Applicable Crimping Terminals



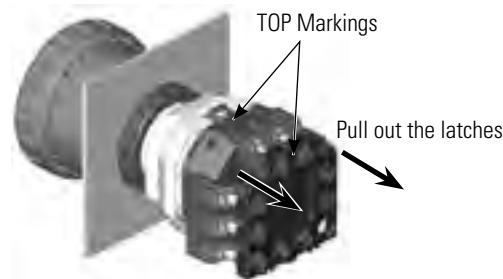
Solid Wire



Be sure to install an insulating tube on the crimping terminal.

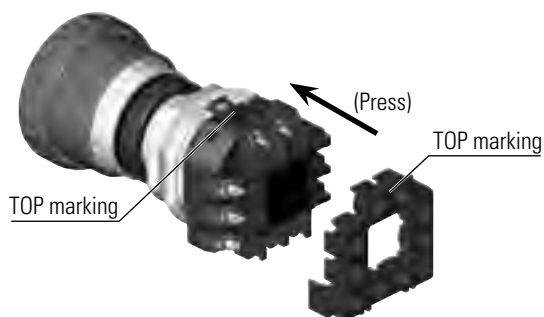
2. Tighten the M3 terminal screw to a tightening torque of 0.6 to 1.0 N·m.

To remove the terminal cover, pull out the two latches on the top side of the terminal cover. Do not exert excessive force to the latches, otherwise the latches may break.



IP20 Protection Terminal Cover XW9Z-VL2MF

To install the IP20 protection cover, align the TOP marking on the cover with the TOP marking on the contact block, and press the cover toward the contact block.



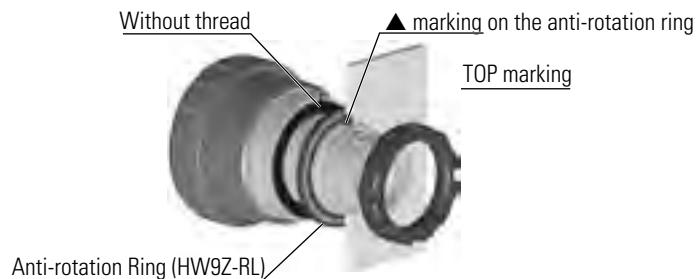
1. Once installed, the XW9Z-VL2MF cannot be removed.
2. The XW9Z-VL2MF cannot be installed after wiring. Use solid wires.
3. With the XW9Z-VL2MF installed, crimping terminals cannot be used. Use solid wires.
4. Make sure that the XW9Z-VL2MF is securely installed. IP20 cannot be achieved when installed loosely, and electric shocks may occur.

LED Illuminated Switches

An LED lamp is built into the contact block and cannot be replaced.

Installing the Anti-rotation Ring HW9Z-RL

Align the side without thread on the operator with TOP marking, the small s mark marking on the anti-rotation ring, and the recess on the mounting panel.



New TWND Series — Full Size NEMA Pushbuttons



New! TWND Series: Heavy duty switches built to last

Key features:

- Variety of button sizes up to 2 9/16" (65mm)
- Rugged construction includes chrome plated zinc locking ring die cast zinc mounting thread
- LED illumination
- Transformer or full voltage
- Slow make, double break wiping contacts
- Modular construction for maximum flexibility
- Available assembled or as sub-components
- UL Type 4X, 13 and IP65 watertight/oiltight panel

The rugged series of TWND switches offers both variety and durability in an attractive design.

With button sizes up to 2 9/16" (65mm), chrome plated zinc locking rings, die cast zinc mounting threads, steel anti-rotation rings, and self cleaning contacts, the TWNDs are here to stay.

The TWND series also offers LED illumination in full voltage and transformer models.

Regardless of your switching needs, the NEW TWND series provides the kind of long lasting, industrial strength quality you've come to expect from IDEC.



UL Listed
File No. E68961



File No. LR21451



R 50363567



Certificate No.
2016010305902410

Specifications

Conforming to Standards	EN60947-5-1, UL508, CSA C22-2 No.14
Approvals	CSA: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) UL: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) TÜV: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)
Operating Temperature	Operation: -25 to +50°C (illuminated versions) -25 ~ +70°C non-illuminated Storage: -40 to +80°C (without freezing) C-> °C
Vibration Resistance	5 to 55Hz, 98m/sec ² (10g) conforming to IEC60068-2-6
Shock Resistance	980m/sec ² (100g) conforming to IEC60068-2-27
Electric Shock Protection	Class 2 conforming to IEC60664-1
Degree of Protection	IP65 (from front of the panel) (conforming to IEC60529) UL Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)
Mechanical Life	Momentary pushbuttons: 5,000,000 (1800 operations per hour) All other switches: 500,000
Pollution Degree (conforming to IEC60947-1)	3

Mechanical-Electrical Specifications

Rated Operational Characteristics	AC-15: A600					
Rated Insulation Voltage	600V					
Rated Impulse Withstanding Voltage Dielectric Strength	Between live and dead metal parts 2.5kV AC, 1 minute					
Rated Thermal Current	10 Amp					
Minimum Switching Capacity	5 mA at 3V AC/DC (applicable range may vary with operating conditions and load types)					
Contact Operation	Slow break NC or NO					
Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 9.0±1.5N Additional contacts—1NO or 1NC: +3.0N					
Recommended Terminal Torque	Unit	Wire	Number of Wires	Recommended Tightening Torque (Nm)	Terminal Screw	
	HW-U Contact Block	Crimping Terminal	2	1.0 to 1.3	M3.5	
		Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	2		1.0 to 1.3
			ø1.7 to 2.0 mm (AWG12)	1		1.2 to 1.3
		Stranded Wire	0.3 to 2.0 mm² (AWG14 to 22)	2		1.0 to 1.3
			2.1 to 3.5 mm² (AWG12)	1		1.2 to 1.3
	Illuminated Unit (*1)	Crimping Terminal	2	1.0 to 1.3	M3.5	
		Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)			
		Stranded Wire	0.3 to 2.0 mm (AWG14 to 22)			
Applicable Wire Size	Pilot Light	Crimping Terminal	2	0.6 to 1.0 (M3.0)		
		Solid Wire		ø0.5 to 1.6 mm (AWG14 to 22)		1.0 to 1.3 (M3.5)
		Stranded Wire		ø0.3 to 2.0 mm (AWG14 to 22)		
	 1. * refers to the lamp terminals of the illuminated push buttons and selector switches.					
Contact Resistance	Initial contact resistance of 50mΩ or less					
Contact Gap	4mm (NO and NC) 2mm (NO-EM and NC-LB)					
LED Ratings	LEDs: 6V: 8mA, 12V: 11mA, 24V: 11mA, 120V: 8.8mA, 240V: 8.6mA					
Contact Material	Silver					

Contact Ratings

Contact Ratings by Utilization Category IEC 60947-5-1			AC-15 (A600)					
			DC-13 (P600)					
Contact Ratings by Utilization Category								
Operational Voltage			24V	48V	50V	110V	220V	440V
Operation Current	AC 50/60 Hz	AC-12 Control of resistive loads & solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads & solid state loads	10A	5A	—	2.2A	1.1A	—
		DC-13 Control of electromagnets	5A	2A	—	1.1A	0.6A	—

Non-Illuminated Pushbuttons (Assembled)



Assembled Pushbuttons

Function

B: Momentary
O: Maintained
V: Pushlock Turn Reset
Y: Push-Pull

Bezel Shape

Blank: Octagonal
F: Full Shroud
G: Mushroom Shroud
P: Neoprene Boot

Series Designation

D: TWND Series

Button Color

B: Black G: Green W: White
R: Red S: Blue Y: Yellow

Contact Arrangement

10: 1NO 01: 1NC
20: 2NO 02: 2NC
11: 1NO-1NC 22: 2NO-2NC

Button Shape

1: Flush
2: Extended
3: Mushroom ø 40mm
4: Jumbo Mushroom ø 65mm

A **B** **()** **D** **1** **10** **NU** **R**

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom contact configurations available, contact IDEC for details.

Non-Illuminated Pushbuttons (Assembled)

Non-Illuminated Pushbuttons

Style	Contacts	Momentary	Maintained
Flush	1NO 1NC 1NO-1NC 2NO 2NC	ABD110NU① ABD101NU① ABD111NU① ABD120NU① ABD102NU①	AOD110NU① AOD101NU① AOD111NU① AOD120NU① AOD102NU①
Extended	1NO 1NC 1NO-1NC 2NO 2NC	ABD210NU① ABD201NU① ABD211NU① ABD220NU① ABD202NU①	AOD210NU① AOD201NU① AOD211NU① AOD220NU① AOD202NU①
Extended with Neoprene Boot [†]	1NO 1NC 1NO-1NC 2NO 2NC	ABPD210NU① ABPD201NU① ABPD211NU① ABPD220NU① ABPD202NU①	AOPD210NU① AOPD201NU① AOPD211NU① AOPD220NU① AOPD202NU①
Recessed	1NO 1NC 1NO-1NC 2NO 2NC	ABFD110NU① ABFD101NU① ABFD111NU① ABFD120NU① ABFD102NU①	AOFD110NU① AOFD101NU① AOFD111NU① AOFD120NU① AOFD102NU①
Extended with Full Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABFD210NU① ABFD201NU① ABFD211NU① ABFD220NU① ABFD202NU①	AOFD210NU① AOFD201NU① AOFD211NU① AOFD220NU① AOFD202NU①
ø 40mm Mushroom Head	1NO 1NC 1NO-1NC 2NO 2NC	ABD310NU① ABD301NU① ABD311NU① ABD320NU① ABD302NU①	AOD310NU① AOD301NU① AOD311NU① AOD320NU① AOD302NU①
ø 40mm Mushroom Head with Full Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABGD310NU① ABGD301NU① ABGD311NU① ABGD320NU① ABGD302NU①	AOGD310NU① AOGD301NU① AOGD311NU① AOGD320NU① AOGD302NU①
ø 65mm Jumbo Mushroom Head	1NO 1NC 1NO-1NC 2NO 2NC	ABD410NU① ABD401NU① ABD411NU① ABD420NU① ABD402NU①	AOD410NU① AOD401NU① AOD411NU① AOD420NU① AOD402NU①
ø 65mm Jumbo Mushroom Head with Shallow Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABGD410NU① ABGD401NU① ABGD411NU① ABGD420NU① ABGD402NU①	AOGD410NU① AOGD401NU① AOGD411NU① AOGD420NU① AOGD402NU①
ø 65mm Jumbo Mushroom Head With Deep Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABFD410NU① ABFD401NU① ABFD411NU① ABFD420NU① ABFD402NU①	AOFD410NU① AOFD401NU① AOFD411NU① AOFD420NU① AOFD402NU①

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y
White	W

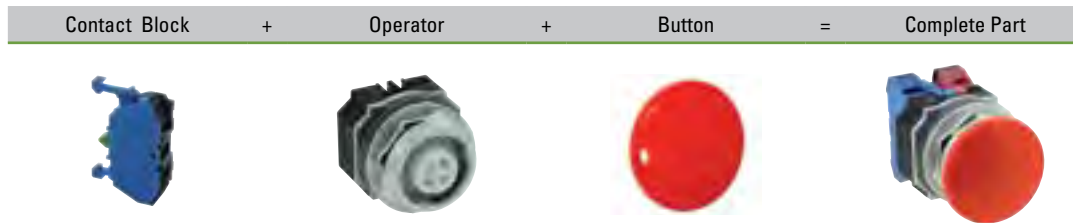


- 65mm Jumbo mushroom not available in white.
- Neoprene boot is not available in blue or white.



- In place of ①, specify the Button Color Code.
- For sub-assembly part numbers, see next page.
- *Neoprene boot available only in Black (B), Green (G), Red (R) and Yellow (Y).

Non-Illuminated Pushbuttons (Sub-Assembled)



Operators

Style		Part Number	
		Momentary	Maintained
Flush/Extended		ABD1200T8	AOD1200T8
Extended with Full Shroud		ALFD2300T8	AOLFD2300T8
ø 40mm Mushroom/ø 65mm Jumbo Mushroom		ABD3400T8	AOD3400T8
ø 40mm Mushroom with Full Shroud		ABGD-300T	AOGD-300T
ø 65mm Jumbo Mushroom with Shallow Shroud		ABGD-400T	AOGD-400T
ø 65mm Jumbo Mushroom with Deep Shroud		ABFD-400T	AOFD-400T

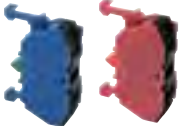
Buttons and Lenses

Style	Part Number
Flush	ABD1BN-①
Extended	ABD2BN-①
ø 40mm Mushroom	ABD3BN-①
ø 65mm Jumbo Mushroom	ABD4BN-①



In place of ①, specify the Button Color Code. (See table previous page)

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units		HW-U10-F HW-U10R-F (early make)	HW-U01-F HW-U01R-F (late break)
Dummy Block		HW-DB	



- Dummy blocks (no contacts) are used with an odd number of contact blocks.
- Combining HW-U10R-F and HW-U01R-F result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Stop Switches (Assembled)



Assembled Stop Switches

	A	V	(L)	D	3	22	11	D	NU	R	
Function		V: Pushlock Turn Reset Y: Push-Pull									Button/Lens Color Code
Illumination											A: Amber G: Green R: Red S: Blue W: White Y: Yellow
Series Designation				D: TWND Series							(illuminated units only) D: LED
Button/Lens Size					3: 40mm Mushroom						Contact Arrangement
Illumination Circuit											10: 1NO 01: 1NC 20: 2NO 02: 2NC 11: 1NO-1NC 22: 2NO-2NC

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom contact configurations available, contact IDEC for details.

Stop Switches (Assembled)

Stop Switches

Style	Contacts	Part Number
ø 40mm Pushlock Turn Reset 	1NO 1NC 1NO-1NC 2NO 2NC	AVD310NUR* AVD301NUR* AVD311NUR* AVD320NUR* AVD302NUR*
ø 40mm Illuminated Pushlock Turn Reset 	1NO-1NC 2NO 2NC	AVLD3③11DNUR* AVLD3③20DNUR* AVLD3③02DNUR*
ø 40mm Push-Pull 	1NO 1NC 1NO-1NC 2NO 2NC	AYD310NU① AYD301NU① AYD311NU① AYD320NU① AYD302NU①
ø 40mm Illuminated Push-Pull 	1NO-1NC 2NO 2NC	AYLD3③11DNU② ** AYLD3③20DNU② ** AYLD3③02DNU② **
	1NO-1NC 2NO 2NC	AYLD3④11DNU② ** AYLD3④20DNU② ** AYLD3④02DNU② **

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	66
12V AC/DC	11
24V AC/DC	22
120V AC	QH2
240V AC	QM4

④ Transformer Voltage Codes

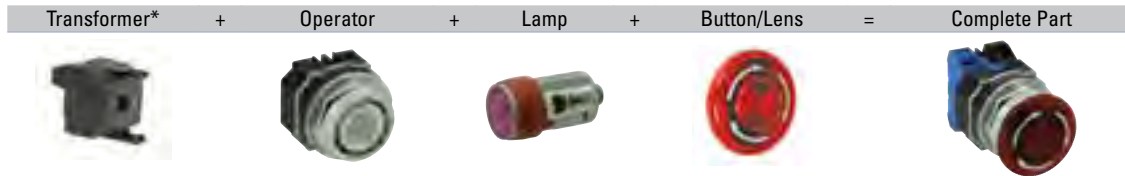
Voltage	Code
120VAC	126
240VAC	246
480VAC	486



Transformers step down to 6V.

1. In place of ①, specify the button color code.
2. In place of ②, specify the lens color code.
3. In place of ③, specify the Full Voltage (lamp voltage) Code.
4. * Only available in red.
5. In place of ④, specify the transformer voltage code.
6. **Not available in blue.
7. For sub-assembly part numbers, see next page.
8. For nameplates and accessories, see page 769 and page 767.
9. For dimensions, see page 772.

Stop Switches (Sub-Assembled)



* Not required for full voltage units.

Operators

Style		Part Number
ø40mm Illuminated and Non-illuminated Pushlock Turn Reset		AVD000T8
ø 40mm Illuminated and Non-illuminated Push-Pull		AYD000T8

Buttons and Lenses

Style		Part Number
Button for Pushlock Turn Reset Stop Switches (ø40mm, red only)		AVN3B-R
Lens for Illuminated Pushlock Turn Reset Stop Switches (ø40mm, red only)		AVLN3LU-R
Button for Push-Pull Stop Switches (ø40mm)		AYD3BN-①
Lens for Illuminated Push-Pull Stop Switches (ø40mm)		AYLD3L-②

1. In place of ①, specify the Button Color Code. (See table below)
2. In place of ②, specify the LED Color Code.
3. *Not available in blue.

Lamp Circuit Components

Style	Application	Part Number
Long Lamp Holder	Used with Full-size Transformer and two contact blocks	TW-LH2
	Used with Full Voltage Adaptor and two contact blocks	
Lead Holder	Used with TW-LH2 holder when using four contact blocks	HW-LH3

Lamps

Style	Voltage	Part Number
	6V AC/DC	LSTD-6③
	12V AC/DC	LSTD-1③
	24V AC/DC	LSTD-2③
	120V AC	LSTD-H2③
	240V AC	LSTD-M4③



1. In place of ③, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

③ LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units		HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
Dummy Block		HW-DB	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining HW-U10R-F and HW-U01R-F result in overlapping contacts.

Transformers

Style	Primary Voltage (50/60Hz)	Part Number
	120V AC	TW-F126B
	240V AC	TW-F246B
	480V AC	HW-L486



6V secondary voltage (uses 6V LED).

Full Voltage Modules

Style		Description	Part Number
Dummy Block with Full Voltage Adaptor		For use with odd number of contacts.	Finger-Safe HW-DA1FBN
Full Voltage Adaptor		For use with even number of contacts.	Finger-Safe TW-DA1FB



All Transformers step down to 6V (use 6V lamp).

Pilot Lights (Assembled)



Assembled Pilot Lights

Function	A	P	D	1	126	D	NU	R	Lens Color Code
P: Pilot Light									A: Amber
Series Designation									G: Green
D: TWND Series									R: Red
Lens Shape									S: Blue
1: Dome									W: White
Rated Operational Voltage (Primary)									Y: Yellow
Transformer Type									D: LED
126: 120V AC									
246: 240V AC									
486: 480V AC									
Full Voltage Type									
66: 6VAC/DC									
11: 12VAC/DC									
22: 24VAC/DC									
QH2: 120VAC									
QM4: 240VAC									



Use only when interpreting part numbers. Do not use for developing part numbers.

LED Pilot Lights

Style	Operating Voltage	Part Number
		LED
Transformer Dome	120V AC 240V AC 480V AC	APD1126DNU② APD1246DNU② APD1486DNU②
Full Voltage Dome	—	APD1③DNU②



1. In place of ②, specify the Lens/LED Color Code.
2. In place of ③, specify the Full Voltage Code (LED voltage).
3. Yellow pilot light comes with white LED.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	66
12V AC/DC	11
24V AC/DC	22
120V AC	QH2
240V AC	QM4

Pilot Lights (Sub-Assembled)

Transformer*	+	Operator	+	Lamp	+	Lens	=	Complete Part
--------------	---	----------	---	------	---	------	---	---------------



* Not required for full voltage units.

One Each from Left Column	plus	One Selection from Right Column
---------------------------	------	---------------------------------

Operators

Style	Part Number
Transformer or FULL Voltage	APD09ST8

Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
	APD-F



Required for all full voltage models. Two pieces each.
2 clips required for full voltage pilot lights

Transformers (only for Pilot Lights)

Style	Primary Voltage (50/60Hz)	Part Number
LED		120V AC TWD-0126
		240V AC TWD-0246
		480V AC TWD-0486



6V secondary voltage (use 6V lamp).

Lenses

Style	Part Number
Dome Lens	APN106LN-②



1. In place of ②, specify the Lens Color Code.

Lamps

Style	Voltage	Part Number
LED	6V AC/DC	LSTD-6③
	12V AC/DC	LSTD-1③
	24V AC/DC	LSTD-2③
	120V AC	LSTD-H2③
	240V AC	LSTD-M4③



1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

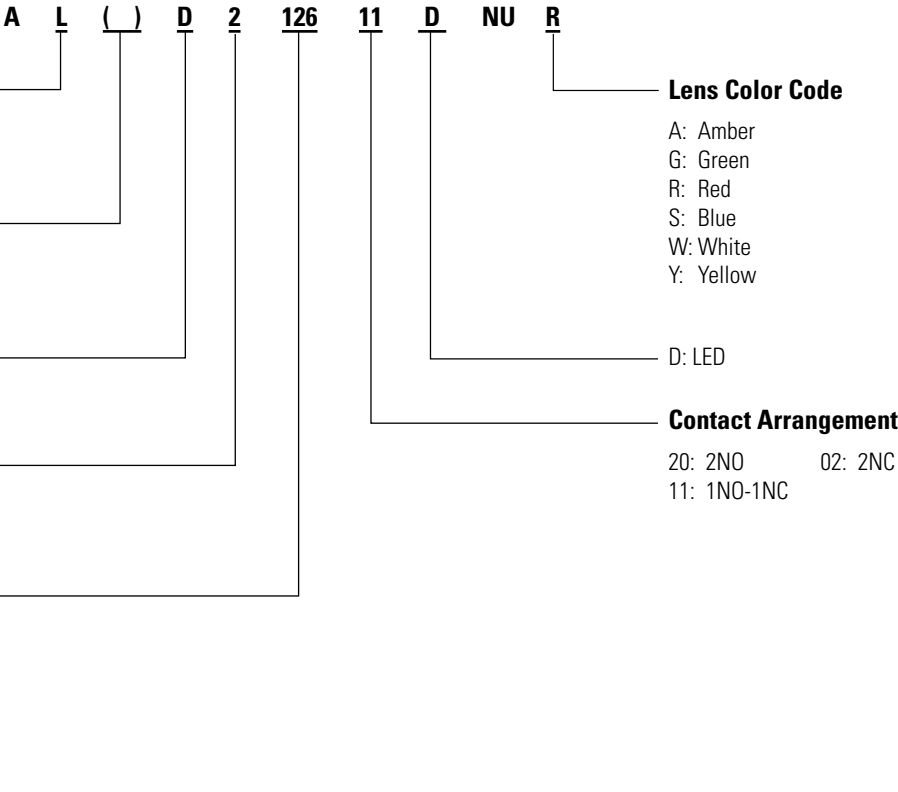


Yellow LED not available, use white LED with Yellow lens.

Illuminated Pushbuttons (Assembled)



Assembled Illuminated Pushbuttons



1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. All transformers step down to 6V.

Illuminated Pushbuttons (Assembled)

Illuminated Pushbuttons

Style		Contacts	Part Number	
			Momentary	Maintained
Extended Lens 	Full Voltage	1NO-1NC 2NO 2NC	ALD2③11DNU② ALD2③20DNU② ALD2③02DNU②	AOLD2③11DNU② AOLD2③20DNU② AOLD2③02DNU②
	Transformer	1NO-1NC 2NO 2NC	ALD2 ④ 11DNU② ALD2 ④ 20DNU② ALD2 ④ 02DNU②	AOLD2 ④ 11DNU② AOLD2 ④ 20DNU② AOLD2 ④ 02DNU②
Extended Lens with Full Shroud 	Full Voltage	1NO-1NC 2NO 2NC	ALFD2③11DNU② ALFD2③20DNU② ALFD2③02DNU②	AOLFD2③11DNU② AOLFD2③20DNU② AOLFD2③02DNU②
	Transformer	1NO-1NC 2NO 2NC	ALFD2 ④ 11DNU② ALFD2 ④ 20DNU② ALFD2 ④ 02DNU②	AOLFD2 ④ 11DNU② AOLFD2 ④ 20DNU② AOLFD2 ④ 02DNU②
ø 40mm Mushroom Lens 	Full Voltage	1NO-1NC 2NO 2NC	ALD3③11DNU② ALD3③20DNU② ALD3③02DNU②	AOLD3③11DNU② AOLD3③20DNU② AOLD3③02DNU②
	Transformer	1NO-1NC 2NO 2NC	ALD3 ④ 11DNU② ALD3 ④ 20DNU② ALD3 ④ 02DNU②	AOLD3 ④ 11DNU② AOLD3 ④ 20DNU② AOLD3 ④ 02DNU②

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	66
12V AC/DC	11
24V AC/DC	22
120V AC	QH2
240V AC	QM4

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486

 6V secondary voltage (uses 6V LED).

-  1. In place of ②, specify the Lens Color Code.
 2. In place of ③, specify the Full Voltage Code (LED voltage).
 3. In place of ④, specify the Transformer Voltage Code.
 4. Light is independent of switch position.
 5. Yellow pushbutton comes with white LED only.

Illuminated Pushbuttons (Sub-Assembled)

Transformer* + Contact Block + Operator + LED + Lens = Complete Part



*Not required for full voltage types.

Operators

Style		Part Number	
		Momentary	Maintained
Extended		ALD2300T8	AOLD2300T8
Extended with Full Shroud		ALFD2300T8	AOLFD2300T8
40mm Mushroom		ALD2300T8	AOLD2300T8

Lenses

Style		Part Number
Extended		ALN06LU-②
ø 40mm Mushroom		ALN3LU-②



In place of ②, specify the Lens Color Code.

Lamp Circuit Components

Style	Application	Part Number
Long Lamp Holder 	Used with Full-size Transformer and two contact blocks Used with Full Voltage Adaptor and two contact blocks	TW-LH2
Lead Holder 	Used with TW-LH2 holder when using four contact blocks	HW-LH3

Lamps

Style	Voltage	Part Number
	6V AC/DC	LSTD-6③
	12V AC/DC	LSTD-1③
	24V AC/DC	LSTD-2③
	120V AC	LSTD-H2③
	240V AC	LSTD-M4③



1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W



Yellow lens only. Yellow LED not available, use white LED.

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units 		HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
Dummy Block 		HW-DB	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining HW-U10R-F and HW-U01R-F result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Transformers

Style	Primary Voltage (50/60Hz)	Part Number
	120V AC	TW-F126B
	240V AC	TW-F246B
	480V AC	HW-L486



6V secondary voltage (use 6V LED).

Full Voltage Modules

Style	Description	Part Number
Dummy Block with Full Voltage Adaptor 	For use with odd number of contacts. Finger-Safe	HW-DA1FBN
Full Voltage Adaptor 	For use with even number of contacts. Finger-Safe	TW-DA1FB



All Transformers step down to 6V (use 6V lamp).

Non-Illuminated Selector Switches (Assembled)



Assembled Selector Switches

A S D 2 () () 11 NU - ()

Function

S: Selector Switch

Series Designation

D: TWND Series

Number of Positions

2: 2-Position
3: 3-Position

Spring Return Action

Blank: Maintained
1: Spring return from Right
2: Spring return from Left
3: 2-Way spring return from Left and Right

Circuit Number

(See Circuit # column of Selector Switch Contact Arrangement Chart on beginning on page 764.)

Contact Arrangement Code

10: 1NO 01: 1NC
20: 2NO 02: 2NC
40: 4NO 04: 4NC
11: 1NO-1NC 22: 2NO-2NC

Operator Style Code

Blank: Knob Operator
L: Lever Operator
K: Key Operator

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom key removal codes available. Please contact IDEC for details.

Non-Illuminated Selector Switches (Assembled)

Non-Illuminated 2-Position Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left
		L 	R 				
1NO	1	0	X	Knob Lever Key	ASD210NU	ASD2110NU	ASD2210NU
	2	0	0		ASD2L10NU	ASD21L10NU	ASD22L10NU
					ASD2K10NU	ASD21K10NU	ASD22K10NU
1NC	1	X	0	Knob Lever Key	ASD201NU	ASD2101NU	ASD2201NU
	2	0	0		ASD2L01NU	ASD21L01NU	ASD22L01NU
					ASD2K01NU	ASD21K01NU	ASD22K01NU
1NO 1NC	1	0	X	Knob Lever Key	ASD211NU	ASD2111NU	ASD2211NU
	2	X	0		ASD2L11NU	ASD21L11NU	ASD22L11NU
					ASD2K11NU	ASD21K11NU	ASD22K11NU
2NO	1	0	X	Knob Lever Key	ASD220NU	ASD2120NU	ASD2220NU
	2	0	X		ASD2L20NU	ASD21L20NU	ASD22L20NU
					ASD2K20NU	ASD21K20NU	ASD22K20NU
2NC	1	X	0	Knob Lever Key	ASD202NU	ASD2102NU	ASD2202NU
	2	X	0		ASD2L02NU	ASD21L02NU	ASD22L02NU
					ASD2K02NU	ASD21K02NU	ASD22K02NU
2NO 2NC	1	0	X	Knob Lever Key	ASD222NU	ASD2122NU	ASD2222NU
	2	X	0		ASD2L22NU	ASD21L22NU	ASD22L22NU
	3	0	X		ASD2K22NU	ASD21K22NU	ASD22K22NU
2NO 2NC	1	0	X	Knob Lever Key	ASD222NU-111	ASD2122NU-111	ASD2222NU-111
	2	0	X		ASD2L22NU-111	ASD21L22NU-111	ASD22L22NU-111
	3	X	0		ASD2K22NU-111	ASD21K22NU-111	ASD22K22NU-111



- The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (closed contacts) 0 = Off (open contacts)
X-X = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these two positions.
- All knob and lever selector switches come in black. Other colors are available by ordering the knob or lever separately.
- Custom contact arrangements available, see page 764.

Non-Illuminated 3-Position Selector Switches

Contact		Style				Part Number			
		Operator Position				Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
Mounting									
2NO	1	X	0	0	Knob Lever Key	ASD320NU	ASD3120NU	ASD3220NU	ASD3320NU
	2	0	0	X		ASD3L20NU	ASD31L20NU	ASD32L20NU	ASD33L20NU
2NC	1	0	X	X	Knob Lever Key	ASD302NU	ASD3102NU	ASD3202NU	ASD3302NU
	2	X	X	0		ASD3L02NU	ASD31L02NU	ASD32L02NU	ASD33L02NU
2NO 2NC	1	X	0	0	Knob Lever Key	ASD322NU	ASD3122NU	ASD3222NU	ASD3322NU
	2	0	0	X		ASD3L22NU	ASD31L22NU	ASD32L22NU	ASD33L22NU
	3	0	X	X		ASD3K22NU	ASD31K22NU	ASD32K22NU	ASD33K22NU
	4	X	X	0					
2NO 2NC	1	X	0	X	Knob Lever Key	ASD322NU-309	ASD3122NU-309	ASD3222NU-309	ASD3322NU-309
	2	X	X	0		ASD3L22NU-309	ASD31L22NU-309	ASD32L22NU-309	ASD33L22NU-309
	3	0	X	0		ASD3K22NU-309	ASD31K22NU-309	ASD32K22NU-309	ASD33K22NU-309
	4	0	0	X					
2NO 2NC	1	0	X	0	Knob Lever Key	ASD322NU-310	ASD3122NU-310	ASD3222NU-310	ASD3322NU-310
	2	0	0	X		ASD3L22NU-310	ASD31L22NU-310	ASD32L22NU-310	ASD33L22NU-310
	3	0	X	0		ASD3K22NU-310	ASD31K22NU-310	ASD32K22NU-310	ASD33K22NU-310
	4	0	0	X					
4NO	1	X	0	0	Knob Lever Key	ASD340NU	ASD3140NU	ASD3240NU	ASD3340NU
	2	0	0	X		ASD3L40NU	ASD31L40NU	ASD32L40NU	ASD33L40NU
	3	X	0	0		ASD3K40NU	ASD31K40NU	ASD32K40NU	ASD33K40NU
	4	0	0	X					
4NC	1	0	X	X	Knob Lever Key	ASD304NU	ASD3104NU	ASD3204NU	ASD3304NU
	2	X	X	0		ASD3L04NU	ASD31L04NU	ASD32L04NU	ASD33L04NU
	3	0	X	X		ASD3K04NU	ASD31K04NU	ASD32K04NU	ASD33K04NU
	4	X	X	0					

Non-Illuminated Selector Switches (Sub-Assembled)

Contact Blocks + Operator + Knob or Lever* + Color Insert* = Complete Part†



- *Not needed with key type switches.
- †Knob type shown.

Operators

Style	Position	Description	Part Number
Knob/Lever	2	Maintained	ASD0201T8
		Spring return from right	ASD0213T8
		Spring return from left	ASD0224T8
	3	Maintained, Cam 1	ASD0302T8
		Maintained, Cam 2	ASD0306T8
		Spring return from right, Cam 1	ASD0314T8
		Spring return from right, Cam 2	ASD0310T8
		Spring return from left, Cam 1	ASD0323T8
		Spring return from left, Cam 2	ASD0328T8
		Spring return from left/right, Cam 1	ASD0335T8
		Spring return from left/right, Cam 2	ASD0339T8
Key	2	Maintained	ASD0201KT8
		Spring return from right	ASD0213KT8
		Spring return from left	ASD0224KT8
	3	Maintained, Cam 1	ASD0302KT8
		Maintained, Cam 2	ASD0306KT8
		Spring return from right, Cam 1	ASD0302KT8B
		Spring return from right, Cam 2	ASD0310KT8B
		Spring return from left, Cam 1	ASD0323KT8
		Spring return from left, Cam 2	ASD0310KT8B
		Spring return from left/right, Cam 1	ASD0335KT8
		Spring return from left/right, Cam 2	ASD3K339KT8



- Order knobs, levers, color inserts separately (see below).
- For key switches, keys are removable in all maintained positions. Other options available, contact IDEC for details.
- See page 766 "Operator Truth Tables" for details of difference between cams.

① Color Codes

Knob/Lever Color	Code
Black	B
Blue	S
Green	G
Red	R
Yellow	Y
White	W



- Knob/Lever not available in white.
- Color inserts not available in Black.
- Lever not available in yellow.

Handles and Inserts

Style	Part Number
Knob	ASDHHY-①
Lever	ASDHHL-①*
Color Insert	TW-HC1-①



- In place of ①, specify the Color Code.
*Not available in yellow.

Contact Blocks

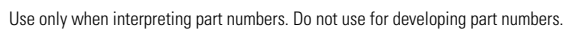
Style		Part Number	
		1NO	1NC
All Control Units		HW-U10-F HW-U10R-F (early make)	HW-U01-F HW-U01R-F (late break)
Dummy Block		HW-DB	



- Dummy blocks (no contacts) are used with an odd number of contact blocks.
- Combining HW-U10R-F and HW-U01R-F result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

The diagram illustrates the structure of a selector switch code. The code is represented as a sequence of characters: **A** **SL** **D** **2** **(2)** **22** **11** **DN** **U** **-** **111** **-** **R**. Lines connect these characters to their respective descriptions:

- Function:** A: Illuminated Selector Switch
- Series Designation:** D: TWND series
- Number of Positions:** 2: 2-Position; 3: 3-Position
- Spring Return Action:** Blank: Maintained; 1: Spring return from Right; 2: Spring return from Left; 3: Two-Way spring return from Left and Right
- Rated Operational Voltage (Primary):** Transformer Type: 136: 120V AC; 256: 240V AC; 486: 480V AC. Full Voltage Type: 66: 6VAC/DC; 11: 12VAC/DC; 22: 24VAC/DC; QH2: 120VAC; QM4: 240VAC
- Contact Arrangement Code:** 20: 2NO; 40: 4NO; 11: 1NO-1NC; 02: 2NC; 04: 4NC; 22: 2NO-2NC
- Lens Color Code:** A: Amber; G: Green; R: Red; S: Blue; W: White; Y: Yellow
- Circuit Code Number:** See Circuit # column of Selector Switch Contact Arrangement Charts on page 764.
- LED Lamp:** D: LED Lamp



Illuminated Selector Switches (Assembled)

Illuminated 2-Position Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position		Lamp Circuit Type	Maintained	Spring Return from Right	Spring Return from Left
		L	R				
1NO	1	O	X	Transformer Full Voltage	ASLD2 ④11DNU②	ASLD21 ④11DNU②	ASLD22 ④11DNU②
1NC	2	X	O		ASLD2③11DNU②	ASLD21③11DNU②	ASLD22③11DNU②
2NO	1	O	X	Transformer Full Voltage	ASLD2 ④20DNU②	ASLD21 ④20DNU②	ASLD22 ④20DNU②
	2	O	X		ASLD2③20DNU②	ASLD21③20DNU②	ASLD22③20DNU②
2NC	1	X	O	Transformer Full Voltage	ASLD2 ④02DNU-②	ASLD21 ④02DNU-②	ASLD22 ④02③DNU-②
	2	X	O		ASLD2③02DNU-104-②	ASLD21③02DNU-②	ASLD22③02DNU-②
2NO	1	O	X	Transformer Full Voltage	ASLD2 ④22DNU②	ASLD21 ④22DNU②	ASLD22 ④22DNU②
2NC	2	X	O				
	3	O	X				
	4	X	O	Transformer Full Voltage	ASLD2③22DNU②	ASLD21③22DNU②	ASLD22③22DNU②
2NO	2	O	X				
2NC	3	X	O				
	4	X	O	Transformer Full Voltage	ASLD2 ④22DNU-111-②	ASLD21 ④22DNU-111-②	ASLD22 ④22DNU-111-②
	2	O	X				
	3	X	O				
	4	X	O	Transformer Full Voltage	ASLD2③22DNU-111-②	ASLD21③22DNU-111-②	ASLD22③22DNU-111-②
	2	O	X				
	3	X	O				

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	66
12V AC/DC	11
24V AC/DC	22
120V AC	QH2
240V AC	QM4

Illuminated 3-Position Selector Switches, Maintained and Spring Return

Style					Part Number			
Contact	Mounting	Operator Position			Lamp Circuit Type	Maintained	Spring Return From Right	Spring Return from Left
		L	C	R				
2NO	1	X	O	O	Transformer Full Voltage	ASLD3 ④ 20DNU②	ASLD31 ④ 20DNU②	ASLD32 ④ 20DNU②
	2	O	O	X		ASLD3③20DNU②	ASLD31③20DNU②	ASLD32③20DNU②
2NC	1	O	X	X	Transformer Full Voltage	ASLD3 ④ 02DNU②	ASLD31 ④ 02DNU②	ASLD32 ④ 02DNU②
	2	X	X	O		ASLD3③02DNU②	ASLD31③02DNU②	ASLD32③02DNU②
2NO	1	X	O	O	Transformer Full Voltage	ASLD3 ④ 22DNU②	ASLD31 ④ 22DNU②	ASLD32 ④ 22DNU②
2NC	2	O	O	X				
	3	O	X	X				
	4	X	X	O				
2NO	1	X	O	X	Transformer Full Voltage	ASLD3 ④ 22DNU-309-②	ASLD31 ④ 22DNU-309-②	ASLD32 ④ 22DNU-309-②
2NC	2	X	X	O				
	3	O	X	O				
	4	O	O	X	Transformer Full Voltage	ASLD3③22DNU-309-②	ASLD31③22③DNU-309-②	ASLD32③22DNU-309-②
2NO	2	O	X	O				
2NC	3	O	O	X				
	4	O	O	X	Transformer Full Voltage	ASLD3 ④ 22DNU-310-②	ASLD31 ④ 22DNU-310-②	ASLD32 ④ 22DNU-310-②
2NO	2	O	O	X				
2NC	3	O	X	O				
	4	O	O	X	Transformer Full Voltage	ASLD3③22DNU-310-②	ASLD31③22DNU-310-②	ASLD32③22DNU-310-②
4NO	1	X	O	O				
	2	O	O	X				
	3	X	O	O	Transformer Full Voltage	ASLD3 ④ 40DNU②	ASLD31 ④ 40DNU②	ASLD32 ④ 40DNU②
	4	O	O	X				
4NC	1	O	X	X	Transformer Full Voltage	ASLD3 ④ 04DNU②	ASLD31 ④ 04DNU②	ASLD32 ④ 04DNU②
	2	X	X	O				
	3	O	X	X				
	4	X	X	O				

- In place of ②, specify the Lens/LED Color Code, in place of ③, specify the Full Voltage (LED voltage) Code, in place of ④, specify the Transformer Voltage Code.
- The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (Closed Contacts) O = Off (Open Contacts)
X—X = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these positions
- Yellow selector switch comes with white LED.

④ Transformer Voltage Codes

Voltage	Code
120VAC	136
240VAC	256
480VAC	486



Transformers step down to 6V (use 6V LED).

Illuminated Selector Switches (Sub-Assembled)

Transformer*	+	Contact Block	+	Operator	+	Lamp	+	Lens	=	Complete Part
--------------	---	---------------	---	----------	---	------	---	------	---	---------------



*Not required for full voltage units.

Operators

Style	Position	Description	Part Number
Operator 	2	Maintained	ASLD0201T8
	3	Maintained, Cam 1	ASLD0302T8
		Maintained, Cam 2	ASLD0306T8
	2	Spring return from right	ASLD0213T8
		Spring return from left	ASLD0224T8
	3	Spring return from right, Cam 1	ASLD0314T8
		Spring return from right, Cam 2	ASLD0310T8
		Spring return from left, Cam 1	ASLD0323T8
		Spring return from left, Cam 2	ASLD0328T8
		Spring return from left/right, Cam 1	ASLD0335T8
		Spring return from left/right, Cam 2	ASLD0339T8

Lenses

Style	Part Number
Knob 	ASLNHU-③ ②

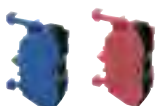
Lamps

Style	Voltage	Part Number
LED 	6V AC/DC	LSTD-6③
	12V AC/DC	LSTD-1③
	24V AC/DC	LSTD-2③
	120V AC	LSTD-H2③
	240V AC	LSTD-M4③



1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units 		HW-U10-F	HW-U10-F
		HW-U10R-F (early make)	HW-U10R-F (late break)
Dummy Block 		HW-DB	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining HW-U10R-F and HW-U01R-F result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Lamp Circuit Components

Style	Application	Part Number
Long Lamp Holder 	Used with Full-size Transformer and two contact blocks	TW-LH2
Lead Holder 	Used with Full Voltage Adaptor and two contact blocks	
	Used with TW-LH2 holder when using four contact blocks	HW-LH3

Full Voltage Modules

Style	Description	Part Number
Dummy Block with Full Voltage Adaptor 	For use with odd number of contacts. Finger-Safe	HW-DA1FBN
Full Voltage Adaptor 	For use with even number of contacts. Finger-Safe	TW-DA1FB



All Transformers step down to 6V (use 6V lamp).

Transformers

Style	Primary Voltage (50/60Hz)	Part Number
Transformers 	120V AC	TW-F126B
	240V AC	TW-F126B
	480V AC	HW-L486



6V secondary voltage.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

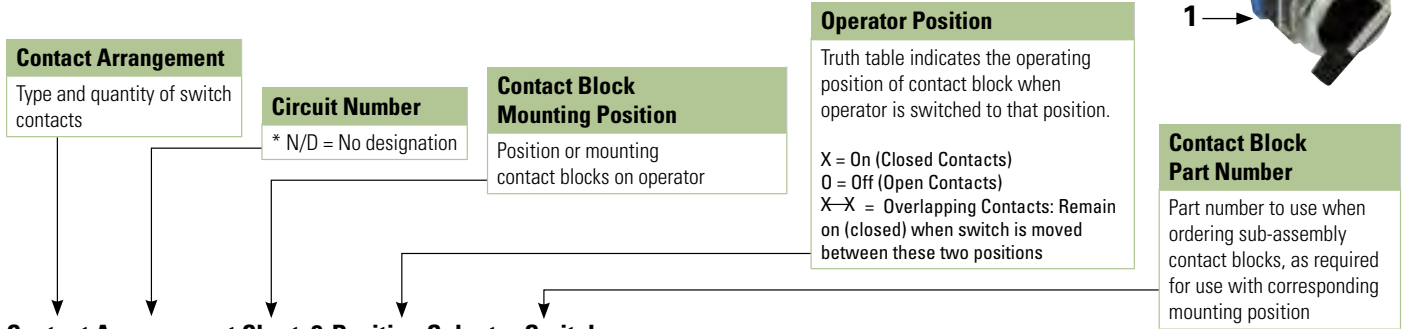


Yellow lens only. Yellow LED not available, use white LED.

Contact Arrangement Charts

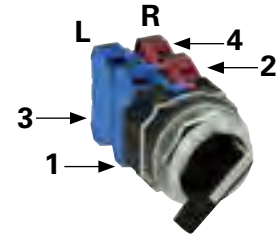
How to Read Contact Arrangement Charts

To determine contact block mounting position, first make sure the selector switch is oriented as shown on the right

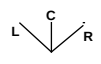


Contact Arrangement Chart: 2-Position Selector Switches

Style		Mounting Position	Operator Position		Contact Block Part Number	Description	Operator Part Number		
Contact	Circuit Number		L 	R 			Maintained	Spring Return from Right	Spring Return from Left
							L 	R 	L 
1NO	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	O	HW-DB	Illuminated Knob			
1NC	N/D	1	X	O	HW-U01-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	O	HW-DB	Illuminated Knob			
1NO 1NC	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	X	O	HW-U01-F	Illuminated Knob			
	103	1	X	O	HW-U01-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	X	HW-U10-F	Illuminated Knob			
1NO-EM 1NC-LB	600	1	O	X	HW-U10R-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	X	O	HW-U01R-F	Illuminated Knob			
	601	1	X	O	HW-U01R-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	X	HW-U10R-F	Illuminated Knob			
2NO	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	X	HW-U10-F	Illuminated Knob			
2NC	N/D	1	X	O	HW-U01-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	X	O	HW-U01-F	Illuminated Knob			
2NO 2NC	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	X	O	HW-U01-F	Illuminated Knob			
		3	O	X	HW-U10-F	Illuminated Knob			
		4	X	O	HW-U01-F	Illuminated Knob			
	110	1	X	O	HW-U01-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	X	HW-U10-F	Illuminated Knob			
		3	X	O	HW-U01-F	Illuminated Knob			
		4	O	X	HW-U10-F	Illuminated Knob			
	111	1	O	X	HW-U10-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	X	HW-U10-F	Illuminated Knob			
		3	X	O	HW-U01-F	Illuminated Knob			
		4	X	O	HW-U01-F	Illuminated Knob			
4NO	N/D	1	O	X	HW-U10-F	Knob/Lever Key	ASD0201T8 ASD0201KT8 ASLD0201T8	ASD0213T8 ASD0213KT8 ASLD0213T8	ASD0224T8 ASD0224KT8 ASLD0224T8
		2	O	X	HW-U10-F	Illuminated Knob			
		3	O	X	HW-U10-F	Illuminated Knob			
		4	O	X	HW-U10-F	Illuminated Knob			



Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number		L 	C 	R 			Maintained 	Spring Return from Right 	Spring Return from Left 	Two-Way 
1NO 1NC	202	1	X	O	O	HW-U10-F	Knob/Lever Key	ASD0302T8 ASD0302KT8 ASLD0302T8	ASD0314T8 ASD0314KT8 ASLD0314T8	ASD0323T8 ASD0323KT8 ASLD0323T8	ASD0335T8 ASD0335KT8 ASLD0335T8
		2	X	X	O	HW-U01-F	Illuminated Knob				
	203	1	O	X	X	HW-U01-F	Knob/Lever Key	ASD0302T8 ASD0302KT8 ASLD0302T8	ASD0314T8 ASD0314KT8 ASLD0314T8	ASD0323T8 ASD0323KT8 ASLD0323T8	ASD0335T8 ASD0335KT8 ASLD0335T8
		2	O	O	X	HW-U10-F	Illuminated Knob				
	302	1	X	O	X	HW-U10-F	Knob/Lever Key	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8
		2	X	X	O	HW-U10-F	Illuminated Knob				
	303	1	O	X	O	HW-U01-F	Knob/Lever Key	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8
		2	O	O	X	HW-U10-F	Illuminated Knob				
2NO	N/D	1	X	O	O	HW-U10-F	Knob/Lever Key	ASD0302T8 ASD0302KT8 ASLD0302T8	ASD0314T8 ASD0314KT8 ASLD0314T8	ASD0323T8 ASD0323KT8 ASLD0323T8	ASD0335T8 ASD0335KT8 ASLD0335T8
		2	O	O	X	HW-U10-F	Illuminated Knob				
	301	1	X	O	X	HW-U10-F	Knob/Lever Key	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8
		2	O	O	X	HW-U10-F	Illuminated Knob				
2NC	304	1	O	X	O	HW-U01-F	Knob/Lever Key	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8
		2	X	X	O	HW-U01-F	Illuminated Knob				
	N/D	1	O	X	X	HW-U01-F	Knob/Lever Key	ASD0302T8 ASD0302KT8 ASLD0302T8	ASD0314T8 ASD0314KT8 ASLD0314T8	ASD0323T8 ASD0323KT8 ASLD0323T8	ASD0335T8 ASD0335KT8 ASLD0335T8
		2	X	X	O	HW-U01-F	Illuminated Knob				
2NO 2NC	N/D	1	X	O	O	HW-U10-F	Knob/Lever Key Illuminated Knob	ASD0302T8 ASD0302KT8 ASLD0302T8	ASD0314T8 ASD0314KT8 ASLD0314T8	ASD0323T8 ASD0323KT8 ASLD0323T8	ASD0335T8 ASD0335KT8 ASLD0335T8
		2	O	O	X	HW-U10-F					
		3	O	X	X	HW-U01-F					
		4	X	X	O	HW-U01-F					
	210	1	O	X	X	HW-U01-F	Knob/Lever Key Illuminated Knob	ASD0302T8 ASD0302KT8 ASLD0302T8	ASD0314T8 ASD0314KT8 ASLD0314T8	ASD0323T8 ASD0323KT8 ASLD0323T8	ASD0335T8 ASD0335KT8 ASLD0335T8
		2	O	O	X	HW-U10-F					
		3	O	X	X	HW-U01-F					
		4	O	O	X	HW-U10-F					
	308	1	X	O	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8
		2	X	X	O	HW-U01-F					
		3	X	O	X	HW-U10-F					
		4	X	X	O	HW-U01-F					
	309	1	X	O	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8
		2	X	X	O	HW-U01-F					
		3	O	X	O	HW-U01-F					
		4	O	O	X	HW-U10-F					
310	1	O	X	O	HW-U01-F	Knob/Lever Key Illuminated Knob	ASD0306T8 ASD0306KT8 ASLD0306T8	ASD0310T8 ASD0301KT8 ASLD0310T8	ASD0328T8 ASD0328KT8 ASLD0328T8	ASD0339T8 ASD0339KT8 ASLD0339T8	
	2	O	O	X	HW-U10-F						
	3	O	X	O	HW-U01-F						
	4	O	O	X	HW-U10-F						

1. Each operator sub-assembly is available as an "02" and an "06" for 3-position selector switches. The internal cam of an "02" is different from that of an "06". This results in designated combinations of open and closed contacts in the various operator positions.
2. N/D = No circuit number designation required in assembled part number.
3. X = On (closed contacts) O = Off (open contacts). X-X Overlapping contacts remain on (closed) when switch is moved between these two positions.

Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number		L 	C 	R 			Maintained	Spring Return from Right	Spring Return from Left	Two-Way
											
4NO	N/D	1	X	O	O	HW-U10-F	Knob/Lever Key Illuminated Knob	ASD0302T8	ASD0314T8	ASD0323T8	ASD0335T8
		2	O	O	X	HW-U10-F		ASD0302KT8	ASD0314KT8	ASD0323KT8	ASD0335KT8
		3	X	O	O	HW-U10-F		ASLD0302T8	ASLD0314T8	ASLD0323T8	ASD0335T8
		4	O	O	X	HW-U10-F					
	305	1	X	O	X	HW-U10-F	Knob/Lever Key Illuminated Knob	ASD0306T8	ASD0310T8	ASD0328T8	ASD0339T8
		2	O	O	X	HW-U10-F		ASD0306KT8	ASD0301KT8	ASD0328KT8	ASD0339KT8
		3	X	O	X	HW-U10-F		ASLD0306T8	ASLD0310T8	ASLD0328T8	ASLD0339T8
		4	O	O	X	HW-U10-F					
4NC	N/D	1	O	X	X	HW-U01-F	Knob/Lever Key Illuminated Knob	ASD0302T8	ASD0314T8	ASD0323T8	ASD0335T8
		2	X	X	O	HW-U01-F		ASD0302KT8	ASD0314KT8	ASD0323KT8	ASD0335T8
		3	O	X	X	HW-U01-F		ASLD0302T8	ASLD0314T8	ASLD0323T8	ASD0335T8
		4	X	X	O	HW-U01-F					
	314	1	O	X	O	HW-U01-F	Knob/Lever Key Illuminated Knob	ASD0306T8	ASD0310T8	ASD0328T8	ASLD0339T8
		2	X	X	O	HW-U01-F		ASD0306KT8	ASD0301KT8	ASD0328KT8	ASD0339KT8
		3	O	X	O	HW-U01-F		ASLD0306T8	ASLD0301T8	ASLD0328T8	ASLD0339T8
		4	X	X	O	HW-U01-F					

- Each operator sub-assembly is available as an "02" and an "06" for 3-position selector switches. The internal cam of an "02" is different from that of an "06". This results in designated combinations of open and closed contacts in the various operator positions.
- N/D = No circuit number designation required in assembled part number.
- X = On (closed contacts) O = Off (open contacts). X—X Overlapping contacts remain on (closed) when switch is moved between these two positions.

Operator Truth Tables

Use the following tables to build custom selector switches.

2 Position Selector Switches

	Contact	Mounting Position	Operator Position	
			Left	Right
ASLD0201T8	HW-U10-F (NO)	L	O	X
		R	O	X
	HW-U01-F (NC)	L	X	O
		R	X	O
	HW-U10R-F (NO-EM)	L	O	X—
		R	O	X—
	HW-U01R-F (NC-LB)	L	X—	O
		R	X—	O

3 Position Selector Switches

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
ASD0302T8 ASLD0302T8 ASD0302KT8	HW-U10-F (NO)	L	X	O	O
		R	O	O	X
	HW-U01-F (NC)	L	O	X—X	
		R	X—X	O	
	HW-U10R-F (NO-EM)	L	X—	O	O
		R	O	O	X
	HW-U10R-F (NC-LB)	L	O	X—X	
		R	X—X	O	

	Contact	Mounting Position	Operator Position		
			Left	Center	Right
ASD0306T8 ASLD0306T8 ASD0306KT8	HW-U10-F (NO)	L	X	O	X
		R	O	O	X
	HW-U01-F (NC)	L	O	X	O
		R	X—X	O	
	HW-U10R-F (NO-EM)	L	X—	O	X—
		R	O	O	X
	HW-U01R-F (NC-LB)	L	O	X—	O
		R	X—X	O	

Accessories — TWND Series

Item	Appearance	Description/Usage		Part Number
Lamp Removal Tool		Rubber tool used to install or remove LED's		OR-55
Metal Bezel		Replacement locking ring/bezel	Standard octagonal units (chrome-pl.).	OG-81
			Extended, non-illuminated (chrome-pl.).	OG-82
			Extended, illuminated (chrome-pl.).	OG-83L
			Jumbo Mushroom Shallow Shroud	ABN4G
			Jumbo Mushroom Deep Shroud	ABN4F
Plastic Bezel		Black plastic locking ring/bezel		OGP11B
Boot/Cover		Used to cover and protect pushbuttons	In place of ①, specify Neoprene Rubber Boot color: B (black), G (green), R (red), Y (yellow)	OC-11 ①
			Flush units (clear plastic -40° to +60°C).	OC-121
			Extended units (clear plastic -40° to +60°C).	OC-122
Anti-Rotation Ring		Plastic washer For nameplates or panels that should not be scratched.		OGL-D1T
		Thrust washer/Anti-rotation ring for use with notched panel cutout.		OGL-D1S
Mounting Hole Plug		Plugs used to fill unused 30mm panel cutouts.	Plastic with locking nut attached.	OBP-11
			Metal with locking nut attached	OB-11
			Grey rubber (-5° to +60°C)	OB-13
Terminal Tab Adaptor		Tab #250 17/64" x 3/64" (6.35mm x 0.8mm): Single tab		TW-FA4
Long Lamp Holder		Used with Transformer and two contact blocks Used with Full Voltage Adaptor and two contact blocks		TW-LH2
Lead Holder		Used with TW-LH2 holder when using four contact blocks		HW-LH3
Lock Out Adaptor		Used to provide lockout protection for TWTD pushbuttons and knob selectors. ø 1-13/64" (30mm)		OL-KL1
Full Voltage Clips		Primary Voltage (50/60Hz) Required for all full voltage pilot lights. Two pieces each. 2 clips required for full voltage pilot lights.		APD-F
Replacement Keys		Pair of keys (#0)		TW-SK

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

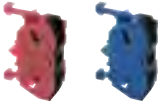
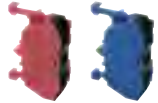
Timers

Contactors

Terminal Blocks

Circuit Breakers

Accessories TWND Series continued

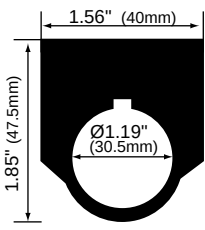
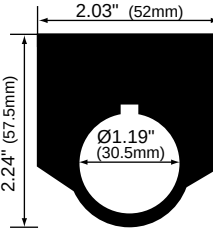
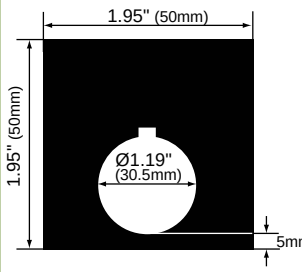
Item	Appearance	Description/Usage	Part Number	
			1NC	1NO
Contact Blocks (with side entry)		These contacts are applicable for wires terminated by ring, fork, terminals, not recommended for bare wire connections.	HW-U01 HW-U01-MAU HW-U01R HW-U01R-MAU (with side entry)	HW-U10 HW-U10-MAU HW-U10R HW-U10R-MAU (with side entry)
Contact Blocks (without side entry)		These contacts are applicable for wires terminated by ring, fork, or ferule terminals, and also bare wire connections.	HW-U01-F HW-U01-MAU-F HW-U01R-F HW-U01R-MAU-F (no side entry)	HW-U10-F HW-U10-MAU-F HW-U10R-F HW-U10R-MAU-F (no side entry)

Fingersafe Covers for TWND Series

Item	Description	Used with	Part Number
	Fingersafe terminal cover, for full voltage pilot lights, adds 3mm to overall depth	Full voltage pilot lights	APD-PVL
	Fingersafe terminal cover, adds 1.5mm to overall depth	Transformer pilot lights	N-VL3

Nameplates — TWND Series

Faceplates

	NALD	NAKD	NAQD
Dimensions			
Description	Part Number		
Nameplate (blank)	NALD-B (black) NALD-R (red)	NAKD-B (black) NAKD-R (red)	NAQD-B (black) NAQD-R (red)
Nameplate (engraved)	NALD-①	NAKD-①	NAQD-①



- Nameplates are made of 0.031" aluminum. Lettering is white letters engraved on black background.
- In place of ①, insert either the standard legend code from table below or custom engraving delimited by " ".

Standard Legend Codes

Pushbuttons				Pushbuttons/Selector Switches				Selector Switches	
Legend	Code	Legend	Code	Legend	Code	Legend	Code	Legend	Code
AUTO	101	OPEN	116	AUTO-MAN	201			AUTO-MAN-OFF	301
CLOSE	102	OUT	117	CLOSE-OPEN	202			AUTO-OFF-MAN	302
DOWN	103	RAISE	118	DOWN-UP	203			CLOSE-OFF-OPEN	303
EMERG.STOP*	104	RESET	119	FAST-SLOW	204			DOWN-OFF-SLOW	304
FAST	105	REVERSE	120	FOR-REV	205	REV-FOR	216	FAST-OFF-SLOW	305
FORWARD	106	RUN	121	HAND-AUTO	206	RUN-JOG	217	FOR-OFF-REV	306
HAND	107	SLOW	122	HIGH-LOW	207	RUN-SAFE	218	LEFT-OFF-RIGHT	307
HIGH	108	START	123	JOG-RUN	208	SAFE-RUN	219	LOWER-OFF-RAISE	308
IN	109	STOP*	124	LEFT-RIGHT	209	SLOW-FAST	220	OFF-MAN-AUTO	309
INCH	110	STOP	125	LOWER-RAISE	210	START-STOP	221	OFF-SLOW-FAST	310
JOG	111	TEST	126	MAN-AUTO	211	STOP-START	222	OFF-1-2	311
LOW	112	UP	127	OFF-ON	212	UP-DOWN	223	OPEN-OFF-CLOSE	312
LOWER	113	I (Int'l On)	150	ON-OFF	213			SLOW-OFF-FAST	313
OFF	114	O (Int'l Off)	151	OPEN-CLOSE	214			SUMMER-OFF-WINTER	314
ON	115	EMO	152	RAISE-LOWER	215			UP-OFF-DOWN	315
								1-OFF-2	316
								HAND-OFF-AUTO	317



- *Available in Red as standard legend code 104 and 124. To order engraved nameplate and codes, add legend code to nameplate part number. Character height based on the number of characters, space and size of nameplate. Standard character size is 3/16".
- Nameplates with standard legends are the same list price as blank nameplates. Special engravings, additional cost.

To specify engraving instructions, use the Nameplate order form on next page.

Custom engraved Nameplates Order Form — TWND Series

Copy this order form and use it to specify Letter Height, Custom Engravings, Location of Engraving on Nameplate, and Quantity Desired.

To ensure engraving accuracy, fax it to your IDEC representative. or Distributor.

Your Company Name: _____

IDEC Rep/Distributor Contact: _____

Your Name: _____

PO number (if known): _____

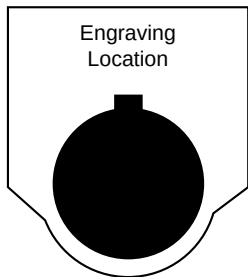
Telephone: _____

IDEC Rep/Distributor Phone: _____

Fax & Email: _____

IDEC Rep/Distributor Fax & Email: _____

NALD Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 13 characters.

Sample Letter Sizes

7/64" Letters: A B C D

1/8" Letters: A B C D

7/64"

Letter Size

☐

16 characters max
(for 7/64" size letters)

1/8"

Letter Size

☐

13 characters max
(for 1/8" size letters)

Step 2.

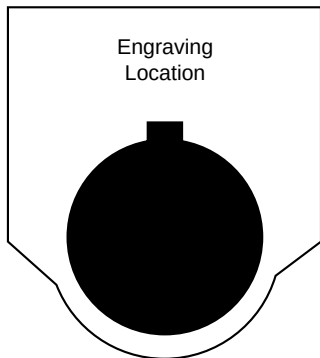
Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			

NAKD Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 9 characters.

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

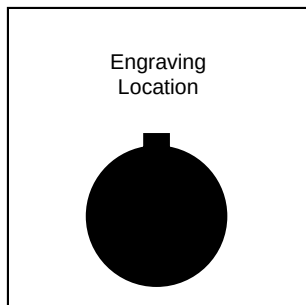
Qty

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		

Sample Letter Sizes

1/8" Letters: A B C D

NAQD Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes.

Note: 1/8" size letters cannot exceed 16 characters.

7/64"

Letter Size

☐

20 characters max
(for 7/64" size letters)

1/8"

Letter Size

☐

16 characters max
(for 1/8" size letters)

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Sample Letter Sizes

3/32" Letters: A B C D

1/8" Letters: A B C D

Switch Engraving Order Form – TWND Series

Copy this order form and use it to specify Letter Height, Maximum Number of Lines and Text to be engraved.

To insure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company: _____
 Name: _____
 Address: _____
 PO: _____

Telephone: _____
 Fax: _____
 Email: _____
 Part Number to be Engraved: _____

Please check one of the boxes below to indicate your choice of engraving options:



	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	7
☐		1/8	8
☐	2	5/32	7
☐		1/8	8
☐	3	1/8	8
☐	4	Custom*	

*Engraving is possible, but character size will be smaller than standard sizes.



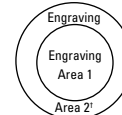
	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	7
☐		1/8	8
☐	2	5/32	7
☐		1/8	8
☐	3	1/8	8
☐	4	Custom*	

*Engraving is possible, but character size will be smaller than standard sizes.



	# of Lines	Letter Height	Max. Characters Per Line
☐	1	3/4	4
☐		5/16	5
☐	2	5/16	5
☐		1/4	6
☐		5/32	8
☐	3	5/32	8
☐		1/8	9
☐	4	1/8	9

ø29mm, ø40mm Mushroom Head



	# of Lines	Letter Height	Max. Characters Per Line
☐	Engraving Area 1	5/32	5
☐		1/8	5
☐	Engraving Area 2	5/32	7
☐		1/8	7



- Above mentioned specifications hold true for standard size push-buttons (round and square).
- *Engraving Area 2 can be engraved for 40mm mushroom head non-illuminated pushbutton only.
- Engraving is done on the button itself for non-illuminated push buttons and on marking plate for illuminated push buttons and pilot lights.
- Please enter text exactly how you want it engraved, take care to emphasize capital or small letters.

Enter text to be engraved:

Line 1: _____
 Line 2: _____
 Line 3: _____
 Line 4: _____

Sample Letter Sizes

1/8 Letters: **OPEN**

5/32 Letters: **OPEN**



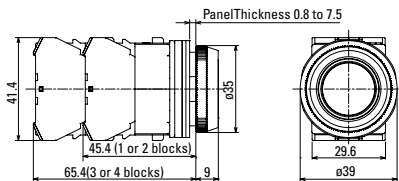
All engraving is 5/8mm wide.

For IDEC Internal Use Only:

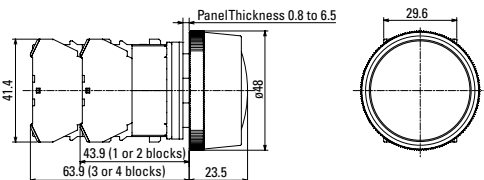
Work Order #: _____

Dimensions (mm)

Pushbutton



Mushroom Pushbutton w/Full Shroud



Pushbuttons	Dimension A	Dimension B
Flush	0.351" (9mm)	ø 0.975" (25mm)
Extended	0.566" (14.5mm)	ø 0.975" (25mm)
Extended w/Full Shroud	0.663" (17mm)	ø 1.11" (28.5mm)
Mushroom	0.858" (22mm)	ø 1.56" (40mm)
Mushroom w/Full Shroud	0.936" (24mm)	ø 1.87" (48mm)
Jumbo Mushroom	1.13" (29mm)	ø 2.54" (65mm)
Mushroom, Pushlock Turn Reset and Push-Pull	*0.975" (25mm) **0.975" (25mm)	ø 1.56" (40mm) ø 1.56" (40mm)

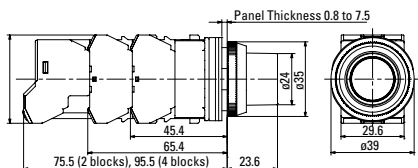


*Dimension when operator is in reset position.

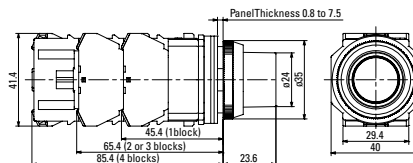
**Dimension when operator is in pull position.

Illuminated Pushbuttons

w/Transformer

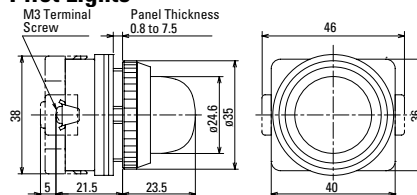


Full Voltage



Illuminated Pushbuttons	Dimension A	Dimension B
Flush w/Full Shroud	0.975" (25mm) 0.995" (25.5mm)	ø 0.936" (24mm) ø 0.936" (24mm)
Extended w/Full Shroud	0.741" (19mm) 0.761" (19.5mm)	ø 0.936" (24mm) ø 0.936" (24mm)
ø 1.56" (40mm) Mushroom Pushlock Turn Reset, Push-Pull	*0.975" (25mm) **0.975" (25mm)	ø 1.56" (40mm) ø 1.56" (40mm)

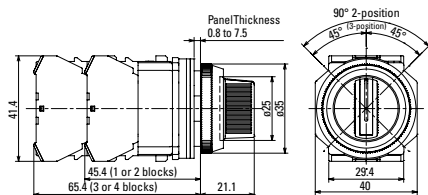
Pilot Lights



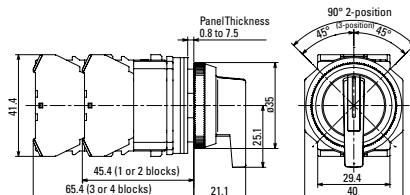
*Dimension when operator is in reset position.
**Dimension when operator is in pull position.

Selector Switches

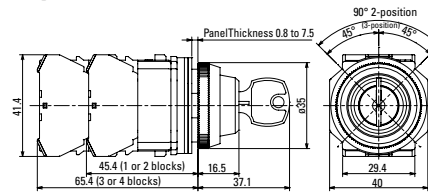
Knob



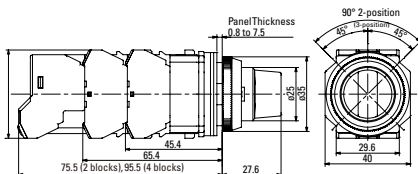
Lever



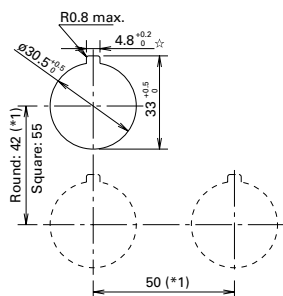
Key



Illuminated Knob



Selector Switches Panel Cut-Out

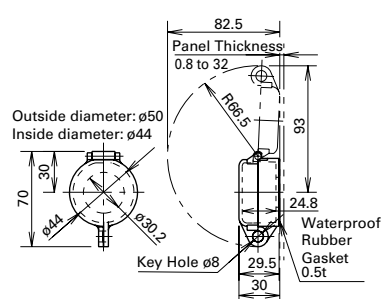


1. *Jumbo Mushroom < 2.61" (66mm)
2. Minimum mounting centers are applicable to switches with one stack of contact blocks. When mounting two stacks of contact blocks, minimum centers should allow for access to wiring.
3. The $\phi 0.195$ " ($\phi 5$ mm) recess is necessary when either the nameplate or anti-rotation ring is used.

Illuminated Selector Switches

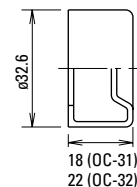
OL-KL1

Lock-Out Adaptor



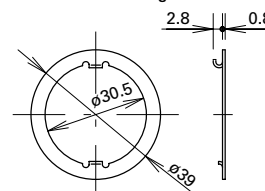
OC-31

Pushbutton Clear Boot



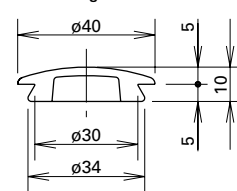
OGL-31

Anti-Rotation Ring



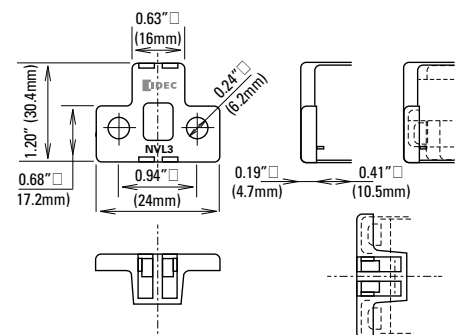
OB-31

Mounting Hole Rubber Plug

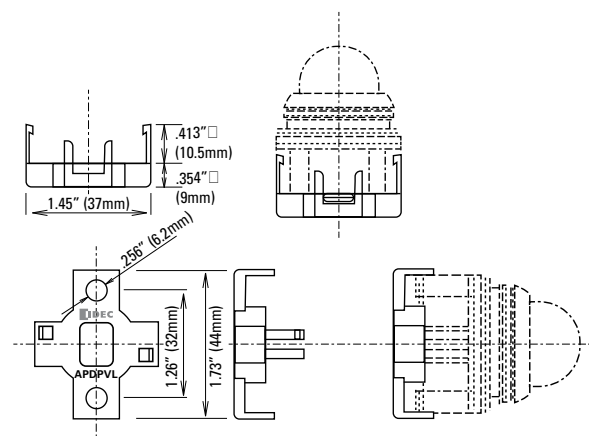


Finger-Safe Cover

N-VL3



APD-PVL



Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

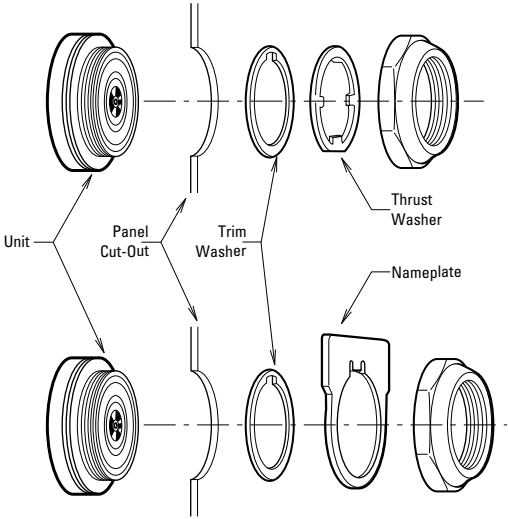
Terminal Blocks

Circuit Breakers

Operating Instructions

Adjustment for Panel Thickness

Each unit is shipped with several waterproof gaskets which are 0.06" (1.5mm) and 0.12" (3mm) thick. Combine the gaskets for a dimension approximately equal to panel thickness and install between the bezel and the body of the unit.



A trim washer must be used with a thrust washer or a nameplate to prevent the control unit from rotating in the mounting hole. When using anti-rotation rings (trim washer with thrust washer or nameplate), install as shown below.

Selector Switches

The operator shaft of each unit has a recess to identify in which direction to install the handle. Align the handle with the recess. Press color insert (TW-HC1) into the Standard Operating Positions.

Standard Operation Positions

2-Position, 90°	3-Position, 45°

Non-Illuminated 3-Position Operators

--	--	--

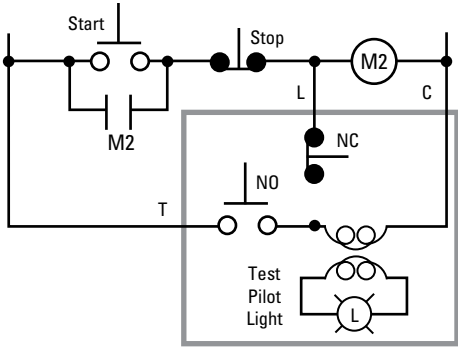
Insallation of LED Illuminated Units

Transformer units are recommended for use in areas subjected to inductive noise.

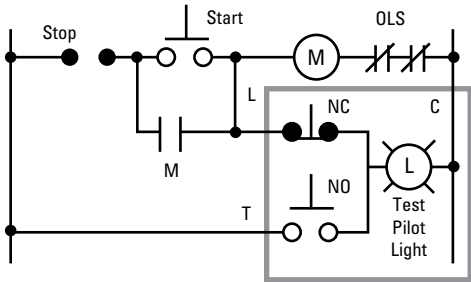
Application Example For Push-To-Test Pilot Light

A typical application of illuminated pushbuttons is a push-to-test pilot light which can be used to check the lamp/LED circuit.

Transformer/AC-Adapter Circuit



Full Voltage Circuit



TWTD Series — Full Size NEMA Pushbuttons



TWTD Series: Heavy duty switches built to last

Key features:

- Variety of button sizes up to 2 9/16" (65mm)
- Rugged construction includes chrome plated zinc locking ring die cast zinc mounting threads, screw mounted contact blocks
- LED or incandescent illumination
- Transformer or full voltage
- Transparent contact windows
- Slow make, double break self-clearing contacts
- Modular construction for maximum flexibility
- Double nickel plated terminal screws
- Available assembled or as sub-components
- Type 4x and IP65 watertight/oiltight panel
- Large M3.5 screw terminals with captive sems plate

The rugged series of TWTD switches offers both variety and durability in an attractive design.

With button sizes up to 2 9/16" (65mm), chrome plated zinc locking rings, die cast zinc mounting threads, steel anti-rotation rings, and self cleaning contacts, the TWTDs are here to stay.

The TWTD series also offers either LED or incandescent illumination in full voltage and transformer models.

Transparent contact windows allow the viewing of IDEC's self cleaning slow-make/slow-break contacts.

Regardless of your switching needs, the TWTD series provides the kind of long lasting, industrial strength quality you've come to expect from IDEC.



UL Listed
File No. E68961



File No. LR21451



Ref No. 117617MC



Certificate No.
2005010305145658

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Specifications

Conforming to Standards	EN60947-1, EN60947-5-1, VDE0660-200, UL508, CSA C22-2 No.14
Approvals	CSA: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) UL: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) TÜV: pushbuttons and selector switches: A600-P600 (NO, NC)/Q600 (NO-EM, NC-LB) pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)
Operating Temperature	Operation: -25 to +50°C (without freezing) Storage: -40 to +70°C (without freezing)
Vibration Resistance	10 to 55Hz, 98m/sec ² (10g) conforming to IEC6068-2-6
Shock Resistance	980m/sec ² (100g) conforming to IEC6068-2-7
Electric Shock Protection	Class 0 conforming to IEC60536
Degree of Protection	IP65 (from front of the panel) (conforming to IEC60529) IP54 (key switches) Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)
Mechanical Life	Momentary pushbuttons: 5,000,000 (900 operations per hour) All other switches: 500,000
Pollution Degree (conforming to IEC60947-1)	3 for switches not using a transformer 2 for switches using a transformer

Mechanical-Electrical Specifications

Rated Operational Characteristics	AC-15: A600 or Ue = 250V, Ie = 3A (NO, NC, NO-EM, NC-LB) DC-13: P600 or Ue = 125V, Ie = 1.1A (NO, NC) DC-13: Q600 or Ue = 125V, Ie = 0.9A (NO-EM, NC-LB)
Rated Insulation Voltage	600V
Rated Switching Overvoltage	Less than 4kV, conforming to IEC60947-1
Rated Impulse Withstanding Voltage	4kV for contact circuit 2.5kV for lamp circuit
Rated Thermal Current	10 Amp
Minimum Switching Capacity	5 mA at 3V AC/DC
Contact Operation	Slow break NC or NO, self-cleaning
Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 7.0±2N (maintained) Additional contacts—1NO or 1NC: +3.2N (momentary), + 3.3N (maintained)
Terminal Referencing	Conforming to CENELEC EN50005
Recommended Terminal Torque	0.8 N m (7.1 in lb.)
External Short-Circuit Protection	10A 250V fuse conforming to IEC60269-1
Applicable Wire Size	Minimum 1 x 22 AWG, max. 2 x 14 AWG or 1 x 12 AWG
Contact Resistance	Initial contact resistance of 50mΩ or less
Contact Gap	4mm (NO and NC) 2mm (NO-EM and NC-LB)
Lamp Ratings	Incandescent: 1 W LEDs: 6V: 17mA, 12V: 11mA, 24V: 11mA, / 120, 240V: 10mA
Maximum Inrush Current	40 A (40 msec)
Contact Material	Silver

Contact Ratings

Contact Ratings by Utilization Category IEC 60947-5-1			AC-15 (A600)					
			DC-13 (P600)					
Contact Ratings by Utilization Category								
Operational Voltage			24V	48V	50V	110V	220V	440V
Operation Current	AC 50/60 Hz	AC-12 Control of resistive loads & solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads & solid state loads	8A	5A	—	2.2A	1.1A	—
		DC-13 Control of electromagnets	5A	2A	—	1.1A	0.6A	—

Non-Illuminated Pushbuttons (Assembled)



Assembled Pushbuttons

A **B** **()** **D** **1** **10** **N - R**

Function

B: Momentary
O: Maintained
V: Pushlock Turn Reset
Y: Push-Pull

Bezel Shape

Blank: Octagonal
F: Full Shroud
G: Mushroom Shroud
P: Neoprene Boot

Series Designation

D: TWTD Series

Button Color

B: Black G: Green W: White
R: Red S: Blue Y: Yellow

Contact Arrangement

10: 1NO 01: 1NC
20: 2NO 02: 2NC
11: 1NO-1NC 22: 2NO-2NC

Button Shape

1: Flush
2: Extended
3: Mushroom ø 40mm
4: Jumbo Mushroom ø 65mm



1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom contact configurations available, contact IDEC for details.

Non-Illuminated Pushbuttons (Assembled)

Non-Illuminated Pushbuttons

Style	Contacts	Momentary	Maintained
Flush	1NO	ABD110N-①	AOD110N-①
	1NC	ABD101N-①	AOD101N-①
	1NO-1NC	ABD111N-①	AOD111N-①
	2NO	ABD120N-①	AOD120N-①
	2NC	ABD102N-①	AOD102N-①
Extended	1NO	ABD210N-①	AOD210N-①
	1NC	ABD201N-①	AOD201N-①
	1NO-1NC	ABD211N-①	AOD211N-①
	2NO	ABD220N-①	AOD220N-①
	2NC	ABD202N-①	AOD202N-①
Extended with Neoprene Boot*	1NO	ABPD210N-①	AOPD210N-①
	1NC	ABPD201N-①	AOPD201N-①
	1NO-1NC	ABPD211N-①	AOPD211N-①
	2NO	ABPD220N-①	AOPD220N-①
	2NC	ABPD202N-①	AOPD202N-①
Recessed	1NO	ABFD110N-①	AOFD110N-①
	1NC	ABFD101N-①	AOFD101N-①
	1NO-1NC	ABFD111N-①	AOFD111N-①
	2NO	ABFD120N-①	AOFD120N-①
	2NC	ABFD102N-①	AOFD102N-①
Extended with Full Shroud	1NO	ABFD210N-①	AOFD210N-①
	1NC	ABFD201N-①	AOFD201N-①
	1NO-1NC	ABFD211N-①	AOFD211N-①
	2NO	ABFD220N-①	AOFD220N-①
	2NC	ABFD202N-①	AOFD202N-①
ø 40mm Mushroom Head	1NO	ABD310N-①	AOD310N-①
	1NC	ABD301N-①	AOD301N-①
	1NO-1NC	ABD311N-①	AOD311N-①
	2NO	ABD320N-①	AOD320N-①
	2NC	ABD302N-①	AOD302N-①
ø 40mm Mushroom Head with Full Shroud	1NO	ABGD310N-①	AOGD310N-①
	1NC	ABGD301N-①	AOGD301N-①
	1NO-1NC	ABGD311N-①	AOGD311N-①
	2NO	ABGD320N-①	AOGD320N-①
	2NC	ABGD302N-①	AOGD302N-①
ø 65mm Jumbo Mushroom Head	1NO	ABD410N-①	AOD410N-①
	1NC	ABD401N-①	AOD401N-①
	1NO-1NC	ABD411N-①	AOD411N-①
	2NO	ABD420N-①	AOD420N-①
	2NC	ABD402N-①	AOD402N-①
ø 65mm Jumbo Mushroom Head with Shallow Shroud	1NO	ABGD410N-①	AOGD410N-①
	1NC	ABGD401N-①	AOGD401N-①
	1NO-1NC	ABGD411N-①	AOGD411N-①
	2NO	ABGD420N-①	AOGD420N-①
	2NC	ABGD402N-①	AOGD402N-①
ø 65mm Jumbo Mushroom Head With Deep Shroud	1NO	ABFD410N-①	AOFD410N-①
	1NC	ABFD401N-①	AOFD401N-①
	1NO-1NC	ABFD411N-①	AOFD411N-①
	2NO	ABFD420N-①	AOFD420N-①
	2NC	ABFD402N-①	AOFD402N-①

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y
White	W



1. 65mm Jumbo mushroom not available in white.
2. Neoprene boot is not available in blue or white.



1. In place of ①, specify the Button Color Code.
2. For sub-assembly part numbers, see next page.
3. *Neoprene boot available only in Black (B), Green (G), Red (R) and Yellow (Y).

Non-Illuminated Pushbuttons (Sub-Assembled)

Contact Block	+	Operator	+	Button	=	Complete Part
						

Operators

Style		Part Number	
		Momentary	Maintained
Flush/Extended		ABD-100	AOD-100
Extended with Full Shroud		ABFD-200	AOFD-200
ø 40mm Mushroom/ø 65mm Jumbo Mushroom		ABD-300	AOD-300
ø 40mm Mushroom with Full Shroud		ABGD-300	AOGD-300
ø 65mm Jumbo Mushroom with Shallow Shroud		ABGD-400	AOGD-400
ø 65mm Jumbo Mushroom with Deep Shroud		ABFD-400	AOFD-400

Buttons and Lenses

Style	Part Number
Flush	ABD1BN-①
Extended	ABD2BN-①
ø 40mm Mushroom	ABD3BN-①
ø 65mm Jumbo Mushroom	ABD4BN-①



In place of ①, specify the Button Color Code. (See table previous page)

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units		BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Block		BST-D	



- Dummy blocks (no contacts) are used with an odd number of contact blocks.
- Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Stop Switches (Assembled)



Assembled Stop Switches

A V (L) D 3 (99) 11 (D) N - R - (24V)

Function

V: Pushlock Turn Reset
Y: Push-Pull

Illumination

Blank: None
L: Illuminated

Series Designation

D: TWTD Series

Button/Lens Size

3: 40mm Mushroom

Illumination Circuit

- 99: Full Voltage (lamp determines voltage)
- 126: 120V AC Step Down Transformer
- 246: 240V AC Step Down Transformer
- 486: 480V AC Step Down Transformer

Lamp Voltage

(full voltage illuminated units only)

- 6V: 6V AC/DC
- 12V: 12V AC/DC
- 24V: 24V AC/DC
- 120V: 120V AC (LED only)
- 240V: 240V AC (LED only)

Button/Lens Color Code

- A: Amber
- G: Green
- R: Red
- S: Blue
- W: White
- Y: Yellow

Lamp Type

(illuminated units only)

- Blank: Incandescent
- D: LED

Contact Arrangement

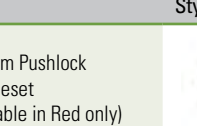
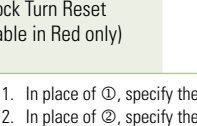
- 10: 1NO 01: 1NC
- 20: 2NO 02: 2NC
- 11: 1NO-1NC 22: 2NO-2NC



- 1. Use only when interpreting part numbers. Do not use for developing part numbers.
- 2. Custom contact configurations available, contact IDEC for details.

Stop Switches (Assembled)

Stop Switches

Style	Contacts	Part Number
ø 40mm Pushlock Turn Reset  Non-Illuminated	1NO 1NC 1NO-1NC 2NO 2NC	AVD310N-R* AVD301N-R* AVD311N-R* AVD320N-R* AVD302N-R*
ø 40mm Illuminated Pushlock Turn Reset  Full Voltage	1NO-1NC 2NO 2NC	AVLD39911ⓈN-R-③* AVLD39920ⓈN-R-③* AVLD39902ⓈN-R-③*
ø 40mm Push-Pull  Non-Illuminated	1NO 1NC 1NO-1NC 2NO 2NC	AYD310N-① AYD301N-① AYD311N-① AYD320N-① AYD302N-①
ø 40mm Push-Pull  Full Voltage	1NO-1NC 2NO 2NC	AYLD39911ⓈN-②-③** AYLD39920ⓈN-②-③** AYLD39902ⓈN-②-③**
ø 40mm Push-Pull  Transformer	1NO-1NC 2NO 2NC	AYLD3 ④ 11ⓈN-②** AYLD3 ④ 20ⓈN-②** AYLD3 ④ 02ⓈN-②**
ø 40mm Momentary Push-Pull (3-position)  Full Voltage	1NO-1NC 1NC-1LB†	AYLD229911ⓈN-②-③-TK962 AYLD229902ⓈN-②-③-TK962
ø 40mm Momentary Push-Pull (3-position)  Transformer	1NO-1NC 1NC-1LB†	AYLD22 ④ 11ⓈN-②-TK962 AYLD22 ④ 02ⓈN-②-TK962

Unibody E-Stops

Style	Contacts	Part Number
ø 40mm Pushlock Turn Reset (available in Red only) 	1NO-1NC 2NC	HN1E-BV4F11-R* HN1E-BV4F02-R*
Illuminated ø 40mm Pushlock Turn Reset (available in Red only) 	1NO-1NC 2NC	HN1E-LV4F11QⓈ-R-③ HN1E-LV4F02QⓈ-R-③



- In place of ①, specify the button color code
- In place of ②, specify the lens color code.
- In place of ③, specify the Full Voltage (lamp voltage) Code.
- In place of ④, specify the transformer voltage code.
- In place of ⑤, specify the Lamp Type code.
- With single unit construction, the positive action contacts are integrated in the body of the switch. This provides an extra degree of safety and reliability for critical emergency stop functions.
- HN1E series E-stops comply with the IEC "E-Stop Addendum to the Low Voltage Directive," this includes "tamper proof" operation whereby a change of contact state is not possible by "teasing" or "floating" the operator.
- 3 position push-pull available in spring return to center only.
- *Available in red only.
- **Not available in blue.
- †The most common configuration for motor starting applications.
- For sub-assembly part numbers, see next page.
- For nameplates and accessories, see page 799 and page 797.
- For dimensions, see page 802.

3 Position Push-Pull†

Contact	Push	Center	Pull
NC (BST-001)	0	0	X
NC-LB (BST-001S)	0	X	X
NO (BST-010)	X	0	0
NO-EM (BST-010S)	X	X	0

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V (LED only)

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486



Transformers step down to 6V.

⑤ Lamp Type Codes

Lamp	Code
Incandescent	Blank
LED	D

Stop Switches (Sub-Assembled)

Transformer*	+	Operator	+	Lamp	+	Button/Lens	=	Complete Part
								

* Not required for full voltage units (full voltage clips used instead).

Operators

Style	Part Number
ø40mm Pushlock Turn Reset	AVD-300
Illuminated ø40mm Pushlock Turn Reset	AVLD3-0600N
ø40mm Push-Pull	AYD-3100
Illuminated ø 40mm Push-Pull	2 pos AYLD-0600 3 pos AYLD22TK9C2-0B01

Buttons and Lenses

Style	Part Number
Button for Pushlock Turn Reset Stop Switches (ø40mm, red only)	AVN3B-R
Lens for Illuminated Pushlock Turn Reset Stop Switches (ø40mm, red only)	AVLN3LU-R
Button for Push-Pull Stop Switches (ø40mm)	AYD3BN-①
Lens for Illuminated Push-Pull Stop Switches (ø40mm)	2 pos* AYLD3L-② 3 pos AYLD2L-②

1. In place of ①, specify the Button Color Code. (See table below)
2. In place of ②, specify the LED Color Code.
3. *Not available in blue.

Lamps

Style	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent	6V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120V AC	L-120L

1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y

② LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

Contact Blocks

Style	Part Number	
	1NO	1NC
All Control Units	BST-010	BST-001
	BST-010S (early make)	BST-001S (late break)
Dummy Block	BST-D	

1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts.

Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
Full Voltage Clips (2 required for each unit)	APD-F

Transformers

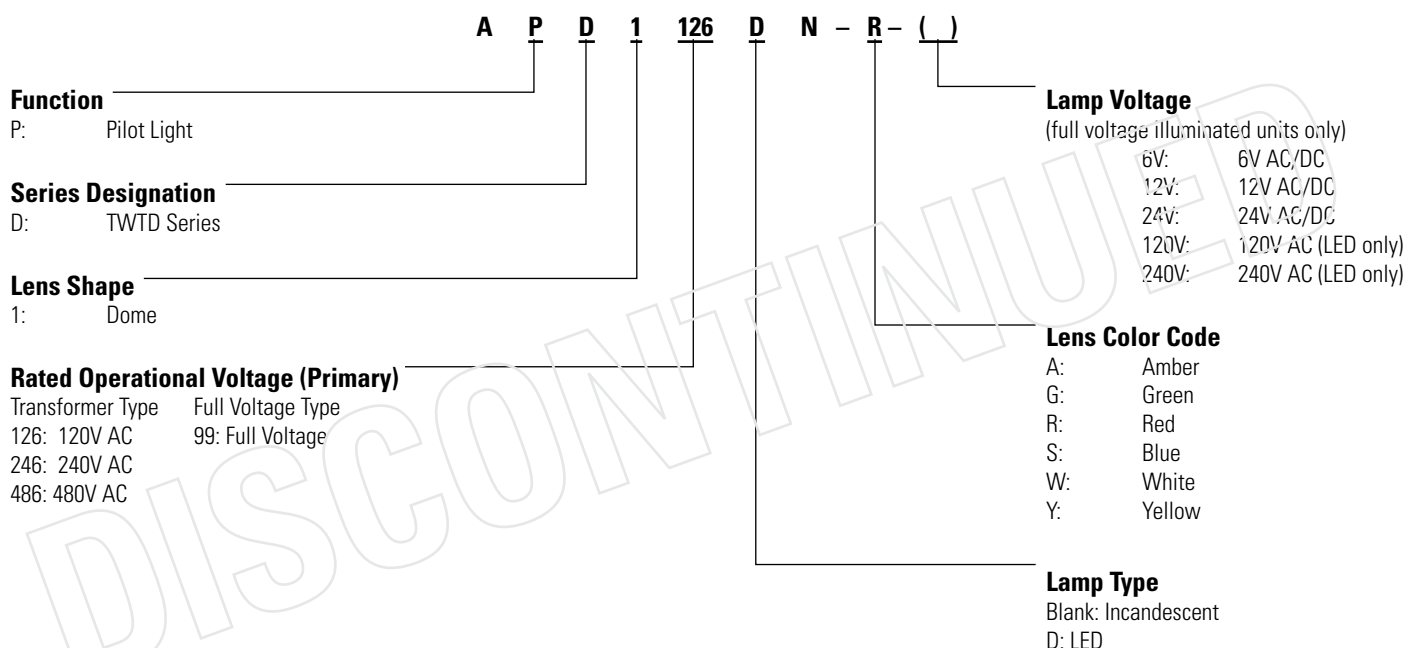
Style	Primary Voltage (50/60Hz)	Part Number
	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486

1. 6V secondary voltage (uses 6V lamp).

Pilot Lights (Assembled)



Assembled Pilot Lights



Use only when interpreting part numbers. Do not use for developing part numbers.

LED and Incandescent Pilot Lights

Style	Operating Voltage	Part Number	
		LED	Incandescent
Transformer Dome	120V AC 240V AC 480V AC	APD1126DN-② APD1246DN-② APD1486DN-②	APD1126N-② APD1246N-② APD1486N-②
Full Voltage Dome	—	APD199DN-②-③	APD199N-②-③

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V (LED only)



1. In place of ②, specify the Lens/LED Color Code.
2. In place of ③, specify the Full Voltage Code (lamp voltage).
3. Yellow pilot light comes with white LED.

Pilot Lights (Sub-Assembled)

Transformer*	+	Operator	+	Lamp	+	Lens	=	Complete Part
								



* Not required for full voltage units (full voltage clips used instead).

One Each from Left Column	plus	One Selection from Right Column
---------------------------	------	---------------------------------

Operators

Style	Part Number
Transformer	APD-006
Full Voltage	APD-199



Full voltage operator comes with full voltage clips.

Lenses

Style	Part Number
Dome Lens	APN106LN-②



1. In place of ②, specify the Lens Color Code.
2. LED and incandescent lenses differ in shade only. Some colors have only one shade.

Lamps

Style	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent	6V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120V AC	L-120L



1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
	APD-F



Required for all full voltage models. Two pieces each.

Transformers

Style	Primary Voltage (50/60Hz)	Part Number
LED	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486



6V secondary voltage (use 6V lamp).

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y



Yellow lens only. Yellow LED not available, use white LED.

Illuminated Pushbuttons (Assembled)



Assembled Illuminated Pushbuttons

A L () D 2 126 11 (D) N - R - ()

Function

L: Momentary Action
OL: Maintained Action

Bezel Shape

Blank: Octagonal
F: Full Shroud

Series Designation

D: TWTD Series

Lens Shape

2: Extended
3: Mushroom ø 40mm

Rated Operational Voltage (Primary)

Transformer Type	Full Voltage Type
126: 120V AC	99: Full Voltage
246: 240V AC	
486: 480V AC	

Lamp Voltage

(full voltage only)

6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V: 120V AC
240V: 240V AC (LED only)

Lens Color Code

A: Amber
G: Green
R: Red
S: Blue
W: White
Y: Yellow

Lamp Type

Blank: Incandescent
D: LED

Contact Arrangement

20: 2NO 02: 2NC
11: 1NO-1NC



1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. All transformers step down to 6V.

Switches & Pilot Devices
Signaling Lights
Relays & Sockets
Timers
Contactors
Terminal Blocks
Circuit Breakers

Illuminated Pushbuttons (Assembled)

Illuminated Pushbuttons

Style	Contacts	Part Number	
		Momentary	Maintained
Extended Lens 	Full Voltage	1NO-1NC 2NO 2NC	ALD29911⑤N-②-③ ALD29920⑤N-②-③ ALD29902⑤N-②-③ AOLD29911⑤N-②-③ AOLD29920⑤N-②-③ AOLD29902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	ALD2 ④ 11⑤N-② ALD2 ④ 20⑤N-② ALD2 ④ 02⑤N-② AOLD2 ④ 11⑤N-② AOLD2 ④ 20⑤N-② AOLD2 ④ 02⑤N-②
Extended Lens with Full Shroud 	Full Voltage	1NO-1NC 2NO 2NC	ALFD29911⑤N-②-③ ALFD29920⑤N-②-③ ALFD29902⑤N-②-③ AOLFD29911⑤N-②-③ AOLFD29920⑤N-②-③ AOLFD29902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	ALFD2 ④ 11⑤N-② ALFD2 ④ 20⑤N-② ALFD2 ④ 02⑤N-② AOLFD2 ④ 11⑤N-② AOLFD2 ④ 20⑤N-② AOLFD2 ④ 02⑤N-②
ø 40mm Mushroom Lens 	Full Voltage	1NO-1NC 2NO 2NC	ALD39911⑤N-②-③ ALD39920⑤N-②-③ ALD39902⑤N-②-③ AOLD39911⑤N-②-③ AOLD39920⑤N-②-③ AOLD39902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	ALD3 ④ 11⑤N-② ALD3 ④ 20⑤N-② ALD3 ④ 02⑤N-② AOLD3 ④ 11⑤N-② AOLD3 ④ 20⑤N-② AOLD3 ④ 02⑤N-②

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V (LED only)

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486

 6V secondary voltage (uses 6V lamp).

⑤ Lamp Type Codes

Lamp	Code
Incandescent	Blank
LED	D

-  1. In place of ②, specify the Lens Color Code.
 2. In place of ③, specify the Full Voltage Code (lamp voltage).
 3. In place of ④, specify the Transformer Voltage Code.
 4. In place of ⑤, specify the Lamp Type Code.
 5. Light is independent of switch position.
 6. Yellow pushbutton comes with white LED only.

Illuminated Pushbuttons (Sub-Assembled)

Transformer* + Contact Block + Operator + Lamp + Lens = Complete Part



*Not required for full voltage types (full voltage types use APD-F full voltage clips).

Operators

Style		Part Number	
		Momentary	Maintained
Extended		ALD-0600	AOLD-0600
Extended with Full Shroud		ALFD-0600	AOLFD-0600
40mm Mushroom		ALD-0600	AOLD-0600

Lenses

Style		Part Number
Extended		ALN06LU-②
ø 40mm Mushroom		ALN3LU-②

In place of ②, specify the Lens Color Code.

Full Voltage Clips

Style		Part Number
Full Voltage Clips (2 required for each unit)		APD-F

Required for all full voltage models.

Lamps

Style	Voltage	Part Number	Color	Code
	6V AC/DC	LSTD-6②	Amber	A
	12V AC/DC	LSTD-1②	Green	G
	24V AC/DC	LSTD-2②	Red	R
	120V AC	LSTD-H2②	Blue	S
	240V AC	LSTD-M4②	White	W
	6V AC/DC	IS-6	Yellow	Y
	12V AC/DC	IS-12		
	24V AC/DC	IS-24		
	120V AC	L-120L		

② LED/Lens Color Codes

Yellow lens only. Yellow LED not available, use white LED.

1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units		BST-010	BST-001
		BST-010S (early make)	BST-001S (late break)
Dummy Block		BST-D	

1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Transformers

Style		Primary Voltage (50/60Hz)	Part Number
		120V AC	TWD-0126
		240V AC	TWD-0246
		480V AC	TWD-0486

6V secondary voltage (use 6V lamp).

Non-Illuminated Selector Switches (Assembled)



Assembled Selector Switches

A S D 2 () () 11 N - ()

Function

S: Selector Switch

Series Designation

D: TWTD Series

Number of Positions

- 2: 2-Position
- 3: 3-Position

Spring Return Action

- Blank: Maintained
- 1: Spring return from Right
- 2: Spring return from Left
- 3: 2-Way spring return from Left and Right

Circuit Number

(See Circuit # column of Selector Switch Contact Arrangement Chart on beginning on page 794.)

Contact Arrangement Code

- 10: 1NO 01: 1NC
- 20: 2NO 02: 2NC
- 40: 4NO 04: 4NC
- 11: 1NO-1NC 22: 2NO-2NC

Operator Style Code

- Blank: Knob Operator
- L: Lever Operator
- K: Key Operator

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom key removal codes available. Please contact IDEC for details.



Non-Illuminated Selector Switches (Assembled)

Non-Illuminated 2-Position Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left
		L 	R 				
1NO	1	0	X	Knob	ASD210N	ASD2110N	ASD2210N
	2	0	0	Lever	ASD2L10N	ASD21L10N	ASD22L10N
				Key	ASD2K10N	ASD21K10N	ASD22K10N
1NC	1	X	0	Knob	ASD201N-116	ASD2101N-116	ASD2201N-116
	2	0	0	Lever	ASD2L01N-116	ASD21L01N-116	ASD22L01N-116
				Key	ASD2K01N-116	ASD21K01N-116	ASD22K01N-116
1NO 1NC	1	0	X	Knob	ASD211N	ASD2111N	ASD2211N
	2	X	0	Lever	ASD2L11N	ASD21L11N	ASD22L11N
				Key	ASD2K11N	ASD21K11N	ASD22K11N
2NO	1	0	X	Knob	ASD220N	ASD2120N	ASD2220N
	2	0	X	Lever	ASD2L20N	ASD21L20N	ASD22L20N
				Key	ASD2K20N	ASD21K20N	ASD22K20N
2NC	1	X	0	Knob	ASD202N-104	ASD2102N-104	ASD2202N-104
	2	X	0	Lever	ASD2L02N-104	ASD21L02N-104	ASD22L02N-104
				Key	ASD2K02N-104	ASD21K02N-104	ASD22K02N-104
2NO 2NC	1	0	X	Knob Lever Key	ASD222N	ASD2122N	ASD2222N
	2	X	0		ASD2L22N	ASD21L22N	ASD22L22N
	3	0	X		ASD2K22N	ASD21K22N	ASD22K22N
	4	X	0				
2NO 2NC	1	0	X	Knob Lever Key	ASD222N-111	ASD2122N-111	ASD2222N-111
	2	0	X		ASD2L22N-111	ASD21L22N-111	ASD22L22N-111
	3	X	0		ASD2K22N-111	ASD21K22N-111	ASD22K22N-111
	4	X	0				



- The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (closed contacts) 0 = Off (open contacts)
X-X = Overlapping Contacts: remain on (closed contacts) when switch is moved between these two positions.
- All knob and lever selector switches come in black. Other colors are available by ordering the knob or lever separately.
- Custom contact arrangements available, see page 764.

Non-Illuminated 3-Position Selector Switches

Style						Part Number			
Contact	Mounting	Operator Position				Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
		L	C	R					
2NO	1	X	0	0	Knob Lever Key	ASD320N	ASD3120N	ASD3220N	ASD3320N
	2	0	0	X		ASD3L20N	ASD31L20N	ASD32L20N	ASD33L20N
						ASD3K20N	ASD31K20N	ASD32K20N	ASD33K20N
2NC	1	0	X	X	Knob Lever Key	ASD302N	ASD3102N	ASD3202N	ASD3302N
	2	X	X	0		ASD3L02N	ASD31L02N	ASD32L02N	ASD33L02N
						ASD3K02N	ASD31K02N	ASD32K02N	ASD33K02N
2NO	1	X	0	0	Knob Lever Key	ASD322N	ASD3122N	ASD3222N	ASD3322N
	2	0	0	X		ASD3L22N	ASD31L22N	ASD32L22N	ASD33L22N
2NC	3	0	X	X	Knob Lever Key	ASD3K22N	ASD31K22N	ASD32K22N	ASD33K22N
	4	X	X	0					
2NO	1	X	0	X	Knob Lever Key	ASD322N-309	ASD3122N-309	ASD3222N-309	ASD3322N-309
	2	X	X	0		ASD3L22N-309	ASD31L22N-309	ASD32L22N-309	ASD33L22N-309
2NC	3	0	X	0	Knob Lever Key	ASD3K22N-309	ASD31K22N-309	ASD32K22N-309	ASD33K22N-309
	4	0	0	X					
2NO	1	0	X	0	Knob Lever Key	ASD322N-310	ASD3122N-310	ASD3222N-310	ASD3322N-310
	2	0	0	X		ASD3L22N-310	ASD31L22N-310	ASD32L22N-310	ASD33L22N-310
2NC	3	0	X	0	Knob Lever Key	ASD3K22N-310	ASD31K22N-310	ASD32K22N-310	ASD33K22N-310
	4	0	0	X					
4NO	1	X	0	0	Knob Lever Key	ASD340N	ASD3140N	ASD3240N	ASD3340N
	2	0	0	X		ASD3L40N	ASD31L40N	ASD32L40N	ASD33L40N
	3	X	0	0	Knob Lever Key	ASD3K40N	ASD31K40N	ASD32K40N	ASD33K40N
	4	0	0	X					
4NC	1	0	X	X	Knob Lever Key	ASD304N	ASD3104N	ASD3204N	ASD3304N
	2	X	X	0		ASD3L04N	ASD31L04N	ASD32L04N	ASD33L04N
	3	0	X	X	Knob Lever Key	ASD3K04N	ASD31K04N	ASD32K04N	ASD33K04N
	4	X	X	0					

Non-Illuminated Selector Switches (Sub-Assembled)

Contact Blocks + Operator + Knob or Lever* + Color Insert* = Complete Part†



1. *Not needed with key type switches.
2. †Knob type shown.

Operators

Style	Position	Description	Part Number
Knob/Lever	2	Maintained	ASD200
		Spring return from right	ASD2100
		Spring return from left	ASD2200
	3	Maintained, Cam 1	ASD300-1
		Maintained, Cam 2	ASD300-2
		Spring return from right, Cam 1	ASD3100-1
		Spring return from right, Cam 2	ASD3100-2
		Spring return from left, Cam 1	ASD3200-1
		Spring return from left, Cam 2	ASD3200-2
Key	2	Maintained	ASD2K00-RA
		Spring return from right	ASD21K00-RL
		Spring return from left	ASD22K00
	3	Maintained, Cam 1	ASD3K00-1
		Maintained, Cam 2	ASD3K00-2
		Spring return from right, Cam 1	ASD31K00-1-RLC
		Spring return from right, Cam 2	ASD31K00-2-RLC
		Spring return from left, Cam 1	ASD32K00-1-RLC
		Spring return from left, Cam 2	ASD32K00-2-RLC
	3	Spring return from left/right, Cam 1	ASD33K00-1-RC
		Spring return from left/right, Cam 2	ASD33K00-2-RC

1. Order knobs, levers, color inserts separately (see below).
2. For key switches, keys are removable in all maintained positions. Other options available, contact IDEC for details.
3. See page 796 "Operator Truth Tables" for details of difference between cams.

① Color Codes

Knob/Lever Color	Code
Black	B
Blue	S
Green	G
Red	R
Yellow	Y
White	W

1. Knob/Lever not available in white.
2. Color inserts not available in Black.
3. Lever not available in yellow.

Handles and Inserts

Style	Part Number
Knob	ASDHHY-①
Lever	ASDHHL-①*
Color Insert	TW-HC1-①



1. In place of ①, specify the Color Code.
*Not available in yellow.

Contact Blocks

Style	Part Number	
	1NO	1NC
All Control Units	BST-010	BST-001
	BST-010S (early make)	BST-001S (late break)
Dummy Block	BST-D	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Illuminated Selector Switches (Assembled)



Assembled Illuminated Selector Switches

A **SL** **D** **2** **(2)** **99** **11** **D** **N** - **111** - **R** - **24**

Function

SL: Illuminated Selector Switch

Series Designation

D: TWTD series

Number of Positions

2: 2-Position

3: 3-Position

Spring Return Action

Blank: Maintained

1: Spring return from Right

2: Spring return from Left

3: Two-Way spring return from Left and Right

Rated Operational Voltage (Primary)

Transformer Type Full Voltage Type

126: 120V AC

99: Full Voltage

246: 240V AC

486: 480V AC

Contact Arrangement Code

20: 2NO 02: 2NC

40: 4NO 04: 4NC

11: 1NO-1NC 22: 2NO-2NC

Lamp Voltage

(Full Voltage Units Only)

6V: 6V AC/DC

12V: 12V AC/DC

24V: 24V AC/DC

120V: 120V AC

240V: 240V AC (LED only)

Lens Color Code

A: Amber

G: Green

R: Red

S: Blue

W: White

Y: Yellow

Circuit Code Number

See Circuit # column of Selector Switch Contact Arrangement Charts on page 794.

Lamp Type

Blank: Incandescent Lamp

D: LED Lamp



Use only when interpreting part numbers. Do not use for developing part numbers.

Illuminated Selector Switches (Assembled)

Illuminated 2-Position Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position		Lamp Circuit Type	Maintained	Spring Return from Right	Spring Return from Left
		L	R				
1NO	1	O	X	Transformer	ASLD2 ④11⑤N-②	ASLD21 ④11⑤N-②	ASLD22 ④11⑤N-②
1NC	2	X	O	Full Voltage	ASLD29911⑤N-②-③	ASLD219911⑤N-②-③	ASLD229911⑤N-②-③
2NO	1	O	X	Transformer	ASLD2 ④20⑤N-②	ASLD21 ④20⑤N-②	ASLD22 ④20⑤N-②
	2	O	X	Full Voltage	ASLD29920⑤N-②-③	ASLD219920⑤N-②-③	ASLD229920⑤N-②-③
2NC	1	X	O	Transformer	ASLD2 ④02⑤N-104-②	ASLD21 ④02⑤N-104-②	ASLD22 ④02⑤N-104-②
	2	X	O	Full Voltage	ASLD29902⑤N-104-②-③	ASLD219902⑤N-104-②-③	ASLD229902⑤N-104-②-③
2NO	1	O	X	Transformer	ASLD2 ④22⑤N-②	ASLD21 ④22⑤N-②	ASLD22 ④22⑤N-②
2NC	2	X	O	Full Voltage	ASLD29922⑤N-②-③	ASLD219922⑤N-②-③	ASLD229922⑤N-②-③
	3	O	X				
	4	X	O				
2NO	1	O	X	Transformer	ASLD2 ④22⑤N-111-②	ASLD21 ④22⑤N-111-②	ASLD22 ④22⑤N-111-②
2NC	2	O	X	Full Voltage	ASLD29922⑤N-111-②-③	ASLD219922⑤N-111-②-③	ASLD229922⑤N-111-②-③
	3	X	O				
	4	X	O				

② LED/Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V (LED only)

Illuminated 3-Position Selector Switches, Maintained and Spring Return

Style					Part Number				
Contact	Mounting	Operator Position			Lamp Circuit Type	Maintained	Spring Return From Right	Spring Return from Left	Spring Return Two-Way
		L	C	R					
2NO	1	X	O	O	Transformer Full Voltage	ASLD3 ④ 20⑤N-②	ASLD31 ④ 20⑤N-②	ASLD32 ④ 20⑤N-②	ASLD33 ④ 20⑤N-②
	2	O	O	X		ASLD39920⑤N-②-③	ASLD319920⑤N-②-③	ASLD329920⑤N-②-③	ASLD339920⑤N-②-③
2NC	1	O	X	X	Transformer Full Voltage	ASLD3 ④ 02⑤N-②	ASLD31 ④ 02⑤N-②	ASLD32 ④ 02⑤N-②	ASLD33 ④ 02⑤N-②
	2	X	X	O		ASLD39902⑤N-②-③	ASLD319902⑤N-②-③	ASLD329902⑤N-②-③	ASLD339902⑤N-②-③
2NO 2NC	1	X	O	O	Transformer Full Voltage	ASLD3 ④ 22⑤N-② ASLD39922⑤N-②-③	ASLD31 ④ 22⑤N-② ASLD319922⑤N-②-③	ASLD32 ④ 22⑤N-② ASLD329922⑤N-②-③	ASLD33 ④ 22⑤N-② ASLD339922⑤N-②-③
	2	O	O	X					
3	O	X	X	X					
	4	X	X	O					
2NO 2NC	1	X	O	X	Transformer Full Voltage	ASLD3 ④ 22⑤N-309-② ASLD39922⑤N-309-②-③	ASLD31 ④ 22⑤N-309-② ASLD319922⑤N-309-②-③	ASLD32 ④ 22⑤N-309-② ASLD329922⑤N-309-②-③	ASLD33 ④ 22⑤N-309-② ASLD339922⑤N-309-②-③
	2	X	X	O					
	3	O	X	O					
	4	O	O	X					
2NO 2NC	1	O	X	O	Transformer Full Voltage	ASLD3 ④ 22⑤N-310-② ASLD39922⑤N-310-②-③	ASLD31 ④ 22⑤N-310-② ASLD319922⑤N-310-②-③	ASLD32 ④ 22⑤N-310-② ASLD329922⑤N-310-②-③	ASLD33 ④ 22⑤N-310-② ASLD339922⑤N-310-②-③
	2	O	O	X					
	3	O	X	O					
	4	O	O	X					
4NO	1	X	O	O	Transformer Full Voltage	ASLD3 ④ 40⑤N-② ASLD39940⑤N-②-③	ASLD31 ④ 40⑤N-② ASLD319940⑤N-②-③	ASLD32 ④ 40⑤N-② ASLD329940⑤N-②-③	ASLD33 ④ 40⑤N-② ASLD339940⑤N-②-③
	2	O	O	X					
	3	X	O	O					
	4	O	O	X					
4NC	1	O	X	X	Transformer Full Voltage	ASLD3 ④ 04⑤N-② ASLD39904⑤N-②-③	ASLD31 ④ 04⑤N-② ASLD319904⑤N-②-③	ASLD32 ④ 04⑤N-② ASLD329904⑤N-②-③	ASLD33 ④ 04⑤N-② ASLD339904⑤N-②-③
	2	X	X	O					
	3	O	X	X					
	4	X	X	O					

1. In place of ②, specify the Lens/LED Color Code, in place of ③, specify the Full Voltage (lamp voltage) Code, in place of ④, specify the Transformer Voltage Code and in place of ⑤ specify the Lamp Type Code.
2. The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (Closed Contacts) O = Off (Open Contacts)
X-X = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these positions
3. Yellow selector switch comes with white LED.

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486



Transformers step down to 6V (use 6V lamp).

⑤ Lamp Type Codes

Lamp	Code
Incandescent	Blank
LED	D

Light is independent of switch position.

Illuminated Selector Switches (Sub-Assembled)

Transformer*	+	Contact Block	+	Operator	+	Lamp	+	Lens	=	Complete Part
--------------	---	---------------	---	----------	---	------	---	------	---	---------------



*Not required for full voltage units (use APD-F full voltage clips instead).

Operators

Style	Position	Description	Part Number
Operator 	2	Maintained	ASLD200
	3	Maintained, Cam 1 Maintained, Cam 2	ASLD300-1 ASLD300-2
	2	Spring return from right	ASLD2100
		Spring return from left	ASLD2200
	3	Spring return from right, Cam 1	ASLD3100-1
		Spring return from right, Cam 2	ASLD3100-2
		Spring return from left, Cam 1	ASLD3200-1
		Spring return from left, Cam 2	ASLD3200-2
		Spring return from left/right, Cam 1	ASLD3300-1
		Spring return from left/right, Cam 2	ASLD3300-2

Lenses

Style	Part Number
Knob 	ASLNHU-①

Lamps

Style	Voltage	Part Number
LED 	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent 	6V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120V AC	L-120L



1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

Contact Blocks

Style		Part Number	
		1NO	1NC
All Control Units 		BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Block		BST-D	



1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Full Voltage Clips

Style	Part Number
Full Voltage Clips (2 required for each unit) 	APD-F



Required for all full voltage models.

Transformers

Style	Primary Voltage (50/60Hz)	Part Number
Transformers 	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486



6V secondary voltage.

② LED/Lens Color Codes

Color	Code	Color	Code
Amber	A	Blue	S
Green	G	White	W
Red	R	Yellow	Y

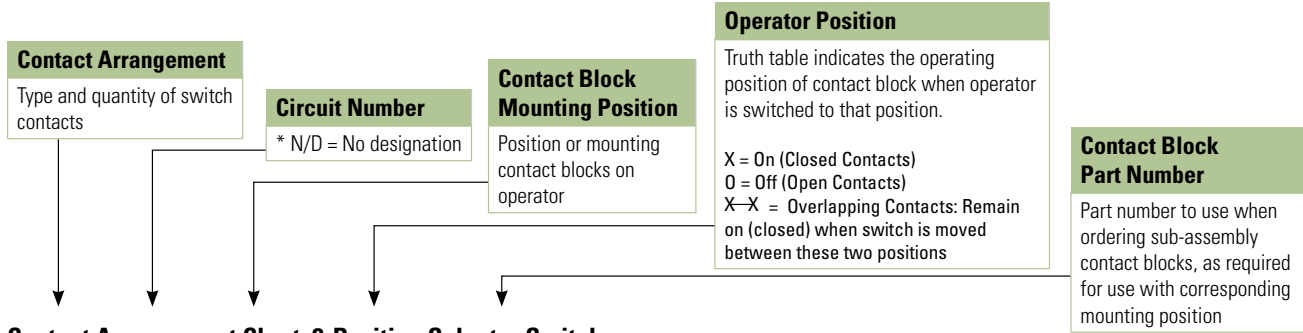


Yellow lens only. Yellow LED not available, use white LED.

Contact Arrangement Charts

How to Read Contact Arrangement Charts

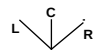
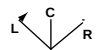
To determine contact block mounting position, first make sure the selector switch is oriented as shown on the right



Contact Arrangement Chart: 2-Position Selector Switches

Style		Mounting Position	Operator Position		Contact Block Part Number	Description	Operator Part Number		
Contact	Circuit Number		L 	R 			Maintained	Spring Return from Right	Spring Return from Left
									
1NO	N/D	1	O	X	BST-010	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	O	BST-D	Illuminated Knob			
1NC	116	1	X	O	BST-001	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	O	BST-D	Illuminated Knob			
1NO 1NC	N/D	1	O	X	BST-010	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001	Illuminated Knob			
	103	1	X	O	BST-001	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010	Illuminated Knob			
1NO-EM 1NC-LB	600	1	O	X	BST-010S	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001S	Illuminated Knob			
	601	1	X	O	BST-001S	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010S	Illuminated Knob			
2NO	N/D	1	O	X	BST-010	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010	Illuminated Knob			
2NC	104	1	X	O	BST-001	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001	Illuminated Knob			
2NO 2NC	N/D	1	O	X	BST-010	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001				
		3	O	X	BST-010				
		4	X	O	BST-001	Illuminated Knob			
	110	1	X	O	BST-001	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
		3	X	O	BST-001				
		4	O	X	BST-010	Illuminated Knob			
	111	1	O	X	BST-010	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
		3	X	O	BST-001				
		4	X	O	BST-001	Illuminated Knob			
4NO	N/D	1	O	X	BST-010	Knob/Lever Key	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
		3	O	X	BST-010				
		4	O	X	BST-010	Illuminated Knob			

Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number		L 	C 	R 			Maintained	Spring Return from Right	Spring Return from Left	Two-Way
											
1NO 1NC	202	1	X	O	O	BST-010	Knob/Lever Key	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	X	X	O	BST-001	Illuminated Knob				
	203	1	O	X	X	BST-001	Knob/Lever Key	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	O	O	X	BST-010	Illuminated Knob				
	302	1	X	O	X	BST-010	Knob/Lever Key	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	X	X	O	BST-001	Illuminated Knob				
	303	1	O	X	O	BST-001	Knob/Lever Key	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	O	O	X	BST-010	Illuminated Knob				
2NO	N/D	1	X	O	O	BST-010	Knob/Lever Key	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	O	O	X	BST-010	Illuminated Knob				
	301	1	X	O	X	BST-010	Knob/Lever Key	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	O	O	X	BST-010	Illuminated Knob				
2NC	304	1	O	X	O	BST-001	Knob/Lever Key	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	X	X	O	BST-001	Illuminated Knob				
	N/D	1	O	X	X	BST-001	Knob/Lever Key	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	X	X	O	BST-001	Illuminated Knob				
2NO 2NC	N/D	1	X	O	O	BST-010	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	O	O	X	BST-010					
		3	O	X	X	BST-001					
		4	X	X	O	BST-001					
	210	1	O	X	X	BST-001	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	O	O	X	BST-010					
		3	O	X	X	BST-001					
		4	O	O	X	BST-010					
	308	1	X	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	X	X	O	BST-001					
		3	X	O	X	BST-010					
		4	X	X	O	BST-001					
	309	1	X	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	X	X	O	BST-001					
		3	O	X	O	BST-001					
		4	O	O	X	BST-010					
310	1	O	X	O	BST-001	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2	
	2	O	O	X	BST-010						
	3	O	X	O	BST-001						
	4	O	O	X	BST-010						

1. Each operator sub-assembly is available as a "-1" and a "-2" for 3-position selector switches. The internal cam of a "-1" is different from that of a "-2". This results in designated combinations of open and closed contacts in the various operator positions.
2. N/D = No circuit number designation required in assembled part number.
3. X = On (closed contacts) O = Off (open contacts) X—X Overlapping contacts remain on (closed) when switch is moved between these two positions.

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number							Maintained	Spring Return from Right	Spring Return from Left	Two-Way
											
4NO	N/D	1	X	O	O	BST-010	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	O	O	X	BST-010					
		3	X	O	O	BST-010					
		4	O	O	X	BST-010					
	305	1	X	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	O	O	X	BST-010					
		3	X	O	X	BST-010					
		4	O	O	X	BST-010					
4NC	N/D	1	O	X	X	BST-001	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	X	X	O	BST-001					
		3	O	X	X	BST-001					
		4	X	X	O	BST-001					
	314	1	O	X	O	BST-001	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	X	X	O	BST-001					
		3	O	X	O	BST-001					
		4	X	X	O	BST-001					

- Each operator sub-assembly is available as a "-1" and a "-2" for 3-position selector switches. The internal cam of a "-1" is different from that of a "-2". This results in designated combinations of open and closed contacts in the various operator positions.
- N/D = No circuit number designation required in assembled part number.
- X = On (closed contacts) O = Off (open contacts). X—X Overlapping contacts remain on (closed) when switch is moved between these two positions.

Operator Truth Tables

Use the following tables to build custom selector switches.

2 Position Selector Switches

Contact	Mounting Position	Operator Position	
		Left	Right
ASD200	BST-010 (NO)	O	X
		O	X
	BST-001 (NC)	X	O
		X	O
	BST-010S (NO-EM)	O	X—
		O	X—
	BST-001S (NC-LB)	X—	O
		X—	O

3 Position Push/Pull Switches

Contact	Operator Position		
	Pull	Normal	Push
AYLD22	BST-010 (NO)	O	X
	BST-001 (NC)	X	O
	BST-010S (NO-EM)	O	X
	BST-001S (NC-LB)	X	O

3 Position Selector Switches

Contact	Mounting Position	Operator Position		
		Left	Center	Right
ASD300-1 ASLD300-1 ASD3K00-1	BST-010 (NO)	X	O	O
		O	O	X
	BST-001 (NC)	O	X—X	
		X—X	O	
	BST-010S (NO-EM)	X—	O	O
		O	O	X
	BST-001S (NC-LB)	O	X—X	
		X—X	O	

Contact	Mounting Position	Operator Position		
		Left	Center	Right
ASD300-2 ASLD300-2 ASD3K00-2	BST-010 (NO)	X	O	X
		O	O	X
	BST-001 (NC)	O	X	O
		X—X	O	
	BST-010S (NO-EM)	X—	O	X—
		O	O	X
	BST-001S (NC-LB)	O	X—	O
		X—X	O	

Accessories — TWTD Series

TWTD Series Accessories

Item	Appearance	Description/Usage		Part Number
Lamp Removal Tool		Rubber tool used to install or remove LED's and incandescent lamps		OR-55
Metal Bezel		Replacement locking ring/bezel	Standard octagonal units (chrome-pl.).	OG-81
			Extended, non-illuminated (chrome-pl.).	OG-82
			Extended, illuminated (chrome-pl.).	OG-83L
			Jumbo Mushroom Shallow Shroud	ABN4G
			Jumbo Mushroom Deep Shroud	ABN4F
Plastic Bezel		Black plastic locking ring/bezel		OGP11B
Boot/Cover		Used to cover and protect pushbuttons	In place of ☉, specify Neoprene Rubber Boot color: B (black), G (green), R (red), Y (yellow)	OC-11 ☉
			Flush units (clear plastic -40° to +60°C).	OC-121
			Extended units (clear plastic -40° to +60°C).	OC-122
Anti-Rotation Ring		Plastic washer For nameplates or panels that should not be scratched.		OGL-D1T
		Thrust washer/Anti-rotation ring for use with notched panel cutout.		OGL-D1S
Mounting Hole Plug		Plugs used to fill unused 30mm panel cutouts.	Plastic with locking nut attached.	OBP-11
			Metal with locking nut attached	OB-11
			Grey rubber (-5° to +60°C)	OB-13
Terminal Tab Adaptor		Tab #250 17/64" x 3/64" (6.35mm x 0.8mm): Single tab		TW-FA1
Full Voltage Adaptor		Used on all full voltage illuminated units. Two required per unit. (M3.5 screw and saddle)		APD-F
Lock Out Adaptor		Used to provide lockout protection for TWTD pushbuttons and knob selectors. ø 1-13/64" (30mm)		OL-KL1
Replacement Keys		Pair of keys (#0)		TW-SK

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

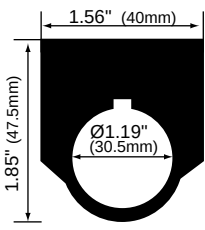
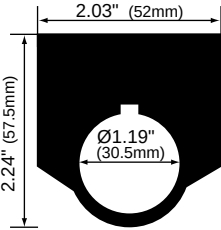
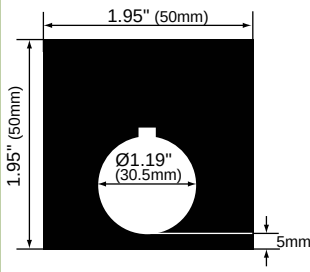
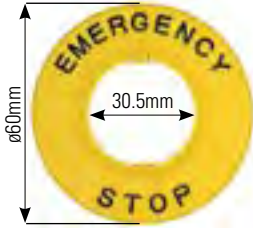
Circuit Breakers

Fingersafe Covers for TWTD Series

Item	Description	Used with	Part Number
	Fingersafe terminal cover, for full voltage pilot lights, adds 3mm to overall depth	APD199... full voltage pilot lights	APD-PVL
	Fingersafe terminal cover, for contact blocks, adds 3mm to overall depth	Non-Illuminated pushbuttons ABD..., and AOD...	N-VL2
	Fingersafe terminal cover, adds 1.5mm to overall depth	Transformer pilot lights and illuminated units	N-VL3
	Fingersafe terminal cover, adds 4 mm to depth	Full voltage illuminated pushbuttons	N-VL4

Nameplates — TWTD Series

Faceplates

	NALD	NAKD	NAQD	HNAV
Dimensions				
Description	Part Number			
Nameplate (blank)	NALD-B (black) NALD-R (red)	NAKD-B (black) NAKD-R (red)	NAQD-B (black) NAQD-R (red)	HNAV-0
Nameplate (engraved)	NALD-①	NAKD-①	NAQD-①	HNAV-27 "Emergency Stop"



- Nameplates are made of 0.031" aluminum. Lettering is white letters engraved on black background.
- In place of ①, insert either the standard legend code from table below or custom engraving delimited by " ".
- HNAV available in yellow only.

Standard Legend Codes

Pushbuttons				Pushbuttons/Selector Switches				Selector Switches	
Legend	Code	Legend	Code	Legend	Code	Legend	Code	Legend	Code
AUTO	101	OPEN	116	AUTO-MAN	201			AUTO-MAN-OFF	301
CLOSE	102	CUT	117	CLOSE-OPEN	202			AUTO-OFF-MAN	302
DOWN	103	RAISE	118	DOWN-UP	203			CLOSE-OFF-OPEN	303
EMERG. STOP*	104	RESET	119	FAST-SLOW	204			DOWN-OFF-SLOW	304
FAST	105	REVERSE	120	FOR-REV	205	REV-FOR	216	FAST-OFF-SLOW	305
FORWARD	106	RUN	121	HAND-AUTO	206	RUN-JOG	217	FOR-OFF-REV	306
HAND	107	SLOW	122	HIGH-LOW	207	RUN-SAFE	218	LEFT-OFF-RIGHT	307
HIGH	108	START	123	JOG-RUN	208	SAFE-RUN	219	LOWER-OFF-RAISE	308
IN	109	STOP*	124	LEFT-RIGHT	209	SLOW-FAST	220	OFF-MAN-AUTO	309
INCH	110	STOP	125	LOWER-RAISE	210	START-STOP	221	OFF-SLOW-FAST	310
JOG	111	TEST	126	MAN-AUTO	211	STOP-START	222	OFF-1-2	311
LOW	112	UP	127	OFF-ON	212	UP-DOWN	223	OPEN-OFF-CLOSE	312
LOWER	113	I (Int'l On)	150	ON-OFF	213			SLOW-OFF-FAST	313
OFF	114	O (Int'l Off)	151	OPEN-CLOSE	214			SUMMER-OFF-WINTER	314
ON	115	EMO	152	RAISE-LOWER	215			UP-OFF-DOWN	315
								1-OFF-2	316
								HAND-OFF-AUTO	317



- *Available in Red as standard legend code 104 and 124. To order engraved nameplate and codes, add legend code to nameplate part number. Character height based on the number of characters, space and size of nameplate. Standard character size is 3/16".
- Nameplates with standard legends are the same list price as blank nameplates. Special engravings, additional cost.

To specify engraving instructions, use the Nameplate order form on next page.

Custom engraved Nameplates Order Form — TWTD Series

Copy this order form and use it to specify Letter Height, Custom Engravings, Location of Engraving on Nameplate, and Quantity Desired.

To ensure engraving accuracy, fax it to your IDEC representative, or Distributor.

Your Company Name: _____

IDEC Rep/Distributor Contact: _____

Your Name: _____

PO number (if known): _____

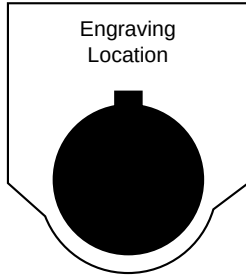
Telephone: _____

IDEC Rep/Distributor Phone: _____

Fax & Email: _____

IDEC Rep/Distributor Fax & Email: _____

NALD Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 13 characters.

Sample Letter Sizes

7/64" Letters: A B C D

1/8" Letters: A B C D

7/64"

Letter Size



16 characters max
(for 7/64" size letters)

1/8"

Letter Size



13 characters max
(for 1/8" size letters)

Step 2.

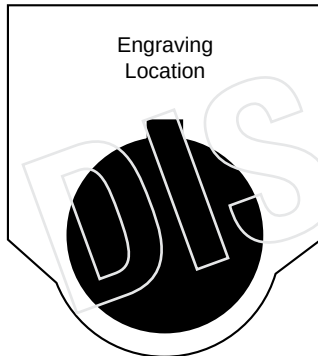
Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
---	--

NAKD Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 9 characters.

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

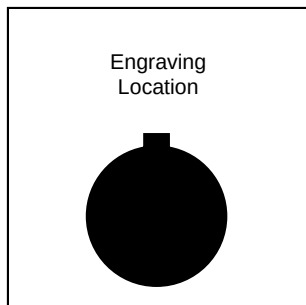
Qty

	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
---	---

Sample Letter Sizes

1/8" Letters: A B C D

NAQD Nameplate



Step 1.

Choose Letter Size - 7/64" or 1/8".

Check the box for the letter size you want. Then write your lettering in box below checkboxes.

Note: 1/8" size letters cannot exceed 16 characters.

7/64"

Letter Size



20 characters max
(for 7/64" size letters)

1/8"

Letter Size



16 characters max
(for 1/8" size letters)

	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
--	--

Step 2.

Specify Quantity.

Enter the number of nameplates desired in the box on the right.

Qty

Sample Letter Sizes

3/32" Letters: A B C D

1/8" Letters: A B C D

Switch Engraving Order Form – TWTD Series

Copy this order form and use it to specify Letter Height, Maximum Number of Lines and Text to be engraved.

To insure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company: _____
 Name: _____
 Address: _____
 PO: _____

Telephone: _____
 Fax: _____
 Email: _____
 Part Number to be Engraved: _____

Please check one of the boxes below to indicate your choice of engraving options:

Square
Switch

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	7
☐		1/8	8
☐	2	5/32	7
☐		1/8	8
☐	3	1/8	8
☐	4	Custom*	

*Engraving is possible, but character size will be smaller than standard sizes.

Round
Switch

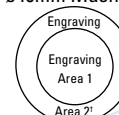
	# of Lines	Letter Height	Max. Characters Per Line
☐	1	5/32	7
☐		1/8	8
☐	2	5/32	7
☐		1/8	8
☐	3	1/8	8
☐	4	Custom*	

*Engraving is possible, but character size will be smaller than standard sizes.

65mm
Jumbo
Mushroom

	# of Lines	Letter Height	Max. Characters Per Line
☐	1	3/4	4
☐		5/16	5
☐	2	5/16	5
☐		1/4	6
☐	3	5/32	8
☐		5/32	8
☐	4	1/8	9
☐		1/8	9

ø29mm, ø40mm Mushroom Head



	# of Lines	Letter Height	Max. Characters Per Line
☐	Engraving Area 1	5/32	5
☐		1/8	5
☐	Engraving Area 2	5/32	7
☐		1/8	7



- Above mentioned specifications hold true for standard size push-buttons (round and square).
- *Engraving Area 2 can be engraved for 40mm mushroom head non-illuminated pushbutton only.
- Engraving is done on the button itself for non-illuminated push buttons and on marking plate for illuminated push buttons and pilot lights.
- Please enter text exactly how you want it engraved, take care to emphasize capital or small letters.

Enter text to be engraved:

Line 1: _____
 Line 2: _____
 Line 3: _____
 Line 4: _____

Sample Letter Sizes

1/8 Letters: **OPEN**

5/32 Letters: **OPEN**



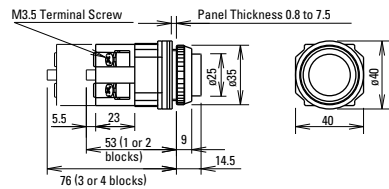
All engraving is 5/8mm wide.

For IDEC Internal Use Only:

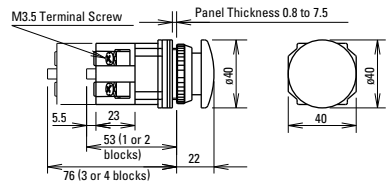
Work Order #: _____

Dimensions (mm)

Pushbutton



Mushroom Pushbutton w/Full Shroud



Pushbuttons	Dimension A	Dimension B
Flush	0.351" (9mm)	ø 0.975" (25mm)
Extended	0.566" (14.5mm)	ø 0.975" (25mm)
Extended w/Full Shroud	0.663" (17mm)	ø 1.11" (28.5mm)
Mushroom	0.858" (22mm)	ø 1.56" (40mm)
Mushroom w/Full Shroud	0.936" (24mm)	ø 1.87" (48mm)
Jumbo Mushroom	1.13" (29mm)	ø 2.54" (65mm)
Mushroom, Pushlock Turn Reset and Push-Pull	*0.975" (25mm) **0.975" (25mm)	ø 1.56" (40mm) ø 1.56" (40mm)

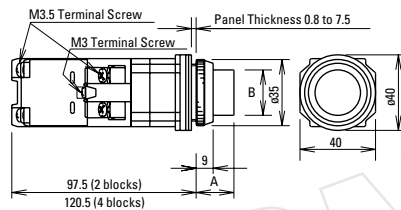


*Dimension when operator is in reset position.

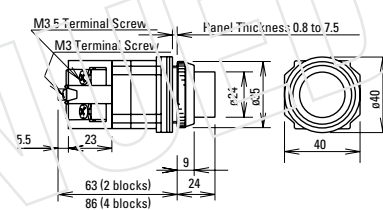
**Dimension when operator is in pull position.

Illuminated Pushbuttons

w/Transformer



Full Voltage



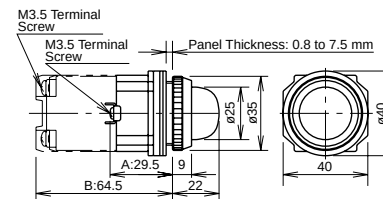
Illuminated Pushbuttons	Dimension A	Dimension B
Flush w/Full Shroud	0.375" (25mm) 0.935" (25.5mm)	ø 0.936" (24mm) ø 0.936" (24mm)
Extended w/Full Shroud	0.741" (19mm) 0.761" (19.5mm)	ø 0.936" (24mm) ø 0.936" (24mm)
ø 1.56" (40mm) Mushroom Pushlock Turn Reset, Push-Pull	*0.975" (25mm) **0.975" (25mm)	ø 1.56" (40mm) ø 1.56" (40mm)



*Dimension when operator is in reset position.

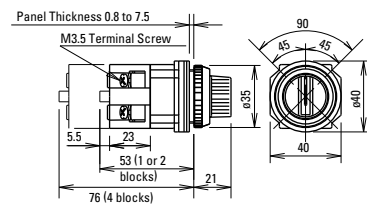
**Dimension when operator is in pull position.

Pilot Lights

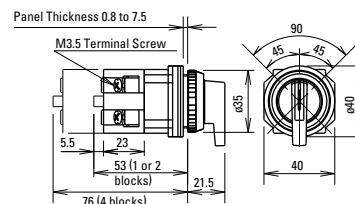


Selector Switches

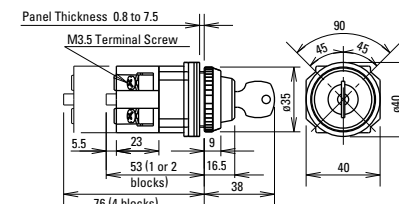
Knob



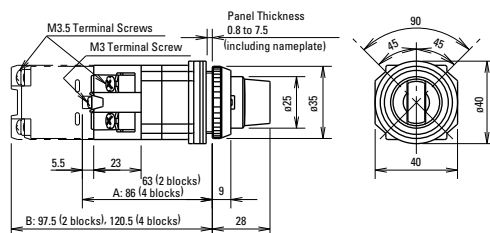
Lever



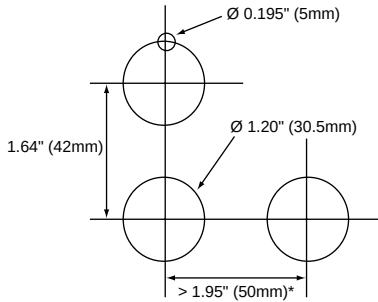
Key



Illuminated Knob



Selector Switches Panel Cut-Out

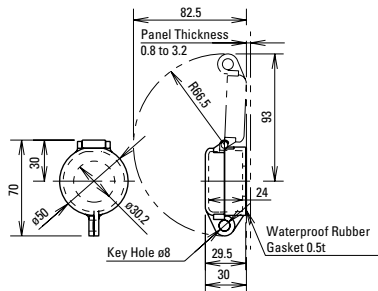


1. *Jumbo Mushroom < 2.61" (66mm)
2. Minimum mounting centers are applicable to switches with one stack of contact blocks. When mounting two stacks of contact blocks, minimum centers should allow for access to wiring.
3. The ø 0.195" (ø 5mm) recess is necessary when either the nameplate or anti-rotation ring is used.

Illuminated Selector Switches

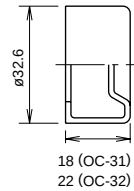
OL-KL1

Lock-Out Adaptor



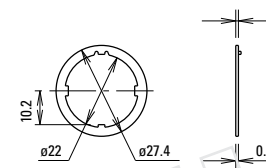
OC-31

Pushbutton Clear Boot



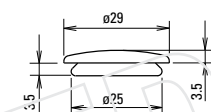
OGL-31

Anti-Rotation Ring



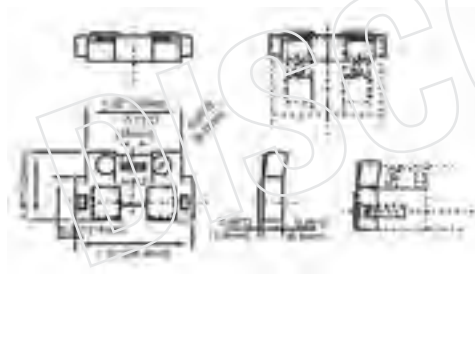
OB-31

Mounting Hole Rubber Plug

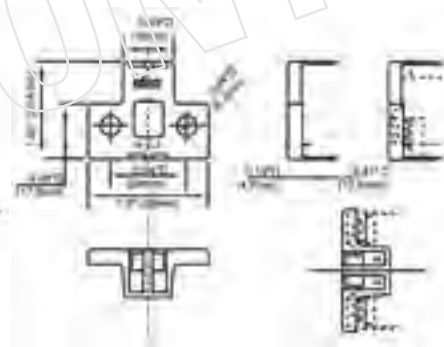


Finger-Safe Cover

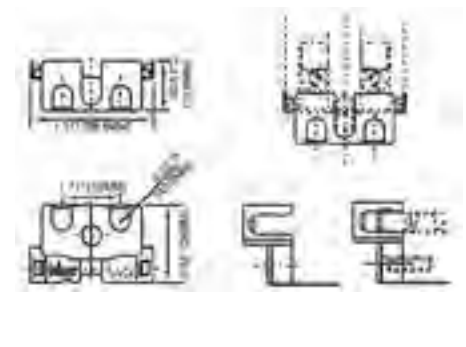
N-VL2



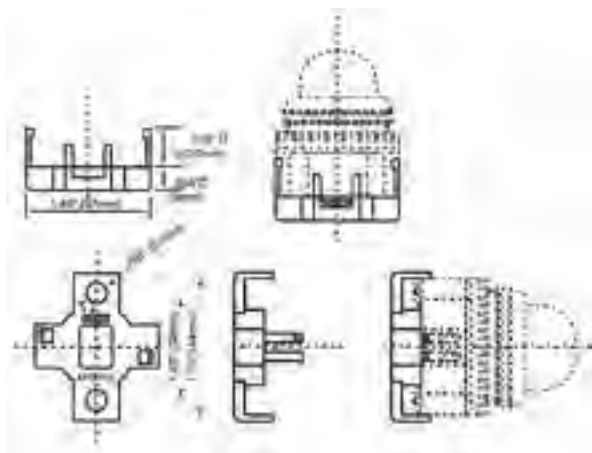
N-VL3



N-VL4



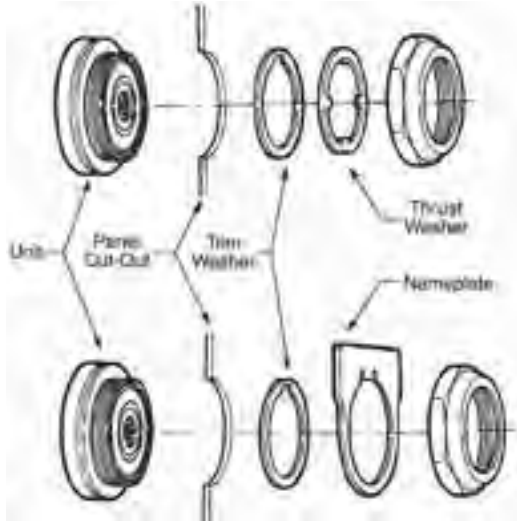
APD-PVL



Operating Instructions

Adjustment for Panel Thickness

Each unit is shipped with several waterproof gaskets which are 0.06" (1.5mm) and 0.12" (3mm) thick. Combine the gaskets for a dimension approximately equal to panel thickness and install between the bezel and the body of the unit.



A trim washer must be used with a thrust washer or a nameplate to prevent the control unit from rotating in the mounting hole. When using anti-rotation rings (trim washer with thrust washer or nameplate), install as shown below.

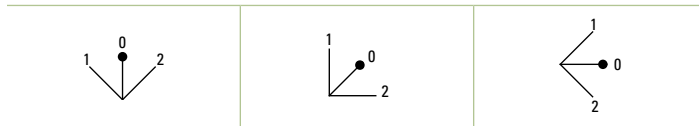
Selector Switches

The operator shaft of each unit has a recess to identify in which direction to install the handle. Align the handle with the recess. Press color insert (TW-HC1) into the Standard Operating Positions.

Standard Operation Positions



Non-Illuminated 3-Position Operators



Installation of TWTD Series Units

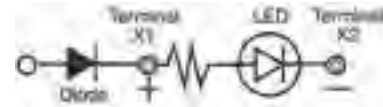
TWTD Pilot Lights

TWTD Illuminated Pushbuttons
TWTD Selector Switches
(Transformer or Full Voltage)

Terminal X1 = Positive
Terminal X2 = Negative

Installation of LED Illuminated Units

Transformer units are recommended for use in areas subjected to inductive noise. When using full voltage types, install a protection diode as shown below. Use diode with DC power supply to protect against surges and noise.

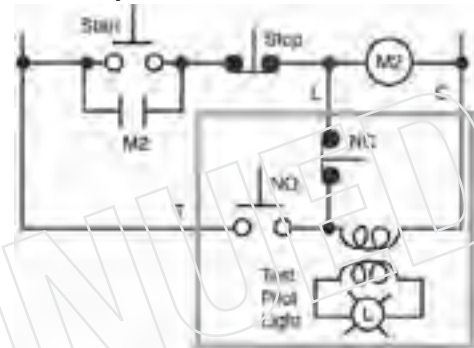


Make sure that LED illuminated units are installed with correct polarity, as indicated at the terminals.

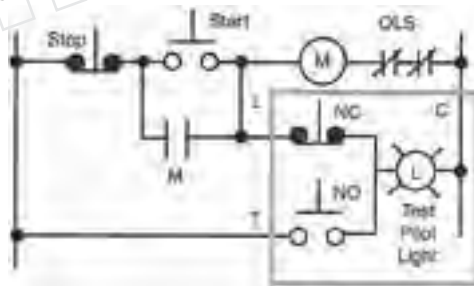
Application Example For Push-To-Test Pilot Light

A typical application of illuminated pushbuttons is a push-to-test pilot light which can be used to check the lamp/LED circuit.

Transformer/AC-Adapter Circuit



Full Voltage Circuit



30mm Hazardous Location Switches EU2B Series: 30mm Hazardous Location Switches EC2B Series: Hazardous Location Control Stations

Key features:

- Pre-configured stations
- Custom-configured stations
- Open control boxes
- Mounting holes for up to 18 control units
- Class I, Zone 1/Division 2
- Applicable in explosive gas atmospheres (AEx de IIC T6 Gb)
- UL Type 4X rated
- Up to 3 contact blocks
- Selector switches available with lever or key
- Selector switches available with overlapping contacts
- Exposed and finger-safe (IP20) screw terminals available
- Corrosion resistant stainless steel enclosure (SUS304)
- Melamine coating
- NPT and Metric reducer options



Specifications

Standards Compliance

	Switches	Pilot Lights	Meters	Control Boxes
UL	Class I, Zone 1 AEx d e IIC T6 Gb Class I Div 2, Groups A, B, C and D			
c-UL	Class I, Zone 1, Ex de IIC T6 Gb Class I, Div 2, Groups A, B, C and D	Class I, Zone 1, Ex de IIB T6 Gb Class I, Div 2, Groups C and D	Class I, Zone 1, Ex de IIC T6 Gb Class I, Div 2, Groups A, B, C and D	
ATEX	 			Ex d e IIC T6 Gb Ex tb IIIC T80°C Db (dust)
IECEx	Ex de IIC Gb Ex tb IIIC Db IP65			Ex de IIC T6 Gb Ex tb IIIC T80°C Db (dust)

Certificate Numbers

UL/c-UL	ATEX	IECEx
E347230	PTB 08 ATEX 1053 U PTB 08 ATEX 1003 U PTB 08 ATEX 1048	IECEx PTB 15.0006U IECEx PTB 15.0007U IECEx PTB 15.0032

Applicable Standards

Control Units	Standards	Mark
Pushbuttons Selector Switches Key Selector Switches Pilot Lights Meters	EN60947-5-1	CE
	UL60079-0 UL60079-1 UL60079-7	UL US LISTED
	CAN/CSA C22.2 No. 60079-0 CAN/CSA C22.2 No. 60079-1 CAN/CSA C22.2 No. 60079-7	
	EN60079-0 EN60079-1 EN60079-7 EN60079-31	Ex
	IEC60079-0 IEC60079-1 IEC60079-7 IEC60079-31	IECEx
Emergency Stop Switches	EN60947-5-5	TUV

General Specifications

Degree of Protection	IP65 (IEC60529), Type 4X	
Insulation Resistance	100 MΩ minimum (500V DC megger)	
Operating Temperature	-20 to +50°C (no freezing)	
Operating Humidity	45 to 85% (no condensation)	
Altitude	2,000m Maximum	
Pollution Degree	3	
Shock Resistance	Operating Extremes	100-m/s ² Emergency Stop Switch: 150-m/s ² (without Meter)
	Damage Limits	1000-m/s ²
Vibration Resistance	Operating Extremes	5 to 55-Hz, amplitude 0.5 mm Emergency Stop Switch: 5 to 500-Hz, amplitude 0.35-mm, acceleration 50-m/s ² (without Meter)
	Damage Limits	30Hz, amplitude 1.5-mm Emergency Stop Switch: 5 to 500-Hz, amplitude 0.35-mm, acceleration 50-m/s ²

Switches

Rated Insulation Voltage		600V
Contact Resistance		50mΩ maximum (initial value)
Impulse Withstand Voltage (Uimp)		6kV
Insulation Resistance		100MΩ minimum (500V DC megger)
Short-Circuit Protection		250V/10A fuse (Type aM IEC60269-1/IEC60269-2)
Conditional Short-Circuit Current		1,000A
Mechanical Life	Pushbutton	1,000,000 operations minimum
	Selector Switch	500,000 operations minimum
	Key Selector Switch	500,000 operations minimum
	Emergency Stop Switch	50,000 operations minimum
Electrical Life	Pushbutton	250,000 (switching frequency 1800 operations/hr)
	Selector Switch	250,000 (switching frequency 900 operations/hr)
	Key Selector Switch	250,000 (switching frequency 900 operations/hr)
	Emergency Stop Switch	50,000 (switching frequency 900 operations/hr)
Minimum Operator Stroke Required for Direct Opening Action		Emergency Stop Switch 7.0mm
Maximum Operator Stroke		Emergency Stop Switch 9.0mm

Note: Contacts will bounce during operation of pushbuttons and selector switches (reference value: 20-ms). Be sure to take contact bounce time into consideration when designing a control circuit.

Contact Rating (Switches)

Rated Insulation Voltage (Ui)			600V			
Rated Thermal Current (Ith)			10A*			
Rated Operating Voltage (Ue)			24V	120V	240V	500V
Rated Operating Current (Ie)	AC 50/60Hz	Resistive Load (AC12)	10A*	10A*	6A	2.8A
		Inductive Load (AC15)	10A*	6A	3A	1.4A
	DC	Resistive Load (DC12)	8A	2.2A	1.1A	—
		Inductive Load (DC13)	4A	1.1A	0.55A	—

Note: Up to 2 contacts (per control unit); 10A 3 contacts (per control unit); 9A Minimum applicable load: 3V AC/DC, 5mA Applicable operating locations may vary according to operating conditions and load types.

Contact Rating Code Designation	Thermal Continuous Test Current Amperes	Maximum current, Amperes								Maximum Volt-Amperes	
		120 Volt		240 Volt		480 Volt		600 Volt		600 Volt	
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	10	60	6.00	30	3.00	15	1.5	12	1.2	7200	720

Pilot Lights

Rated Insulation Voltage (Ui)		500V
Rated Operating Voltage (Ue)	Voltage	6V, 12V, 24V AC/DC
	Transformer	120V, 230V, 240V, 380V, 480V AC
Impulse Withstand Voltage (Uimp)		4kV
Insulation Resistance		100 MΩ minimum (500V DC)
Frequency		50/60Hz
Power Consumption (approx.)	Full Voltage	0.3W
	Transformer	1.5W
Life (reference value)		Approx. 40,000 hours

Note: Because the built-in LED lamp is a high-brightness version, the lamp may light dimly due to induction even when power is off.

Meters

Accuracy Class		2.5
Insulation Resistance		100 MΩ minimum (500V DC megger)
AC ammeter	Rated Insulation Voltage (Ui)	300V
	Operation	Moving core
	Impulse Withstand Voltage (Uimp)	4kV
	Power Consumption	1VA
	Measurement	5A, 10A, 30A, 50A, etc
	Input (CT Ratio)	1A, 5A
	Extended Memory	3 times, etc
DC input meter	Rated Insulation Voltage (Ui)	150V
	Operation	Moving coil
	Impulse Withstand Voltage (Uimp)	2.5kV
	Input	0 to 10V DC, 4 to 20mA, etc.
	Power Consumption (DC ammeter)	0.01W
	Consumption Current (DC voltmeter)	1mA

Note: Use a commercially available CT (current transformer) for all AC ammeters, and install the CT in a non-hazardous location.

Control Boxes

Degree of protection	IP65 (IEC60529), Type 4X	Agency Approvals		UL/c-UL, IECEx/ATEX certified
Housing Material	Stainless steel (SUS304)	Applicable Enclosure		All enclosures except for 6 Control Units x 3 Column
Standard Coating	Melamine	Mounting Style		Wall Mount
	1-column: Outside coating 2-, 3-column: Inside and outside coating	Control Unit	Pilot Light	Yes ¹
Rated Insulation Voltage	600V (with pilot light or ET2A-8PE screw terminal block: 500V) Meter AC input: 300V Meter DC input: 150V		Pushbutton	Yes
			Emergency Pushbutton	Yes
			Selector Switch	Yes
			Key Selector Switch	Yes
Insulation Resistance	100 MΩ minimum (500V DC megger)			Meter
Operating Temperature	−20 to +50°C (no freezing)	Reducer Screw		NPT Thread (standard)
Operating Humidity	45 to 85% (no condensation)			Metric Thread
Altitude	2000m maximum	Degree of Protection		IP65, TYPE4X (UL)
		Grounding Terminal Screw Material		Stainless Steel
		Applicable Wire	Stranded Wire (mm2)	1.5 to 2.5
			Solid Wire (mm2)	1.2 to 1.6
			Solid/Stranded Wire (AWG)	16-14

1: c-UL explosion protection is different when pilot light is installed.

Switches (Control Units)



Pushbuttons Emergency Stop Switches Pilot Lights Selector Switches Key Selector Switches Meters

Pushbuttons

EU2B - YB1 11 F S - D

Operator (style / function)
B1 : Flush pushbutton / Momentary
B2 : Extended pushbutton / Momentary
B3 : Mushroom pushbutton / Momentary

Contact arrangement
10 : 1NO 01 : 1NC
20 : 2NO 02 : 2NC
30 : 3NO 03 : 3NC
11 : 1NO-1NC 12 : 1NO-2NC
21 : 2NO-1NC

Button color
Blank: Red, Green, Black, and White included
Y : Yellow S : Blue

Terminals
F : Finger-safe terminal (IP20)
C : Exposed screw terminal

Pilot Lights

EU2B - YL1 22 F D R

Operator (style / function)
L1 : Pilot Light / dome

Operating voltage
126 : AC 120V (Transformer type)
246 : AC 240V (Transformer type)
386 : AC 380V (Transformer type)
486 : AC 480V (Transformer type)

Lens/LED Colors
R : Red G : Green A : Amber
Y : Yellow PW : White S : Blue

Terminals
F : Finger-safe terminal (IP20)
C : Exposed screw terminal

Part Number	Style and Function	Contact Arrangement	Weight (Approx.)	① Button Color
EU2B-YB110④①-D	Flush Momentary	1NO	68g	① Blank - supplied with red, green, black, and white buttons
EU2B-YB101④①-D		1NC		
EU2B-YB111④①-D		1NO-1NC	92g	
EU2B-YB120④①-D		2NO		
EU2B-YB102④①-D		2NC	116g	
EU2B-YB121④①-D		2NO-1NC		
EU2B-YB112④①-D		1NO-2NC		
EU2B-YB130④①-D		3NO		
EU2B-YB103④①-D		3NC		
EU2B-YB210④①-D		Extended Momentary	1NO	70g
EU2B-YB201④①-D	1NC			
EU2B-YB211④①-D	1NO-1NC		94g	
EU2B-YB220④①-D	2NO			
EU2B-YB202④①-D	2NC		118g	
EU2B-YB221④①-D	2NO-1NC			
EU2B-YB212④①-D	1NO-2NC			
EU2B-YB230④①-D	3NO			
EU2B-YB203④①-D	3NC			
EU2B-YB310④①-D	Mushroom Momentary		1NO	76g
EU2B-YB301④①-D		1NC		
EU2B-YB311④①-D		1NO-1NC	101g	
EU2B-YB320④①-D		2NO		
EU2B-YB302④①-D		2NC	125g	
EU2B-YB321④①-D		2NO-1NC		
EU2B-YB312④①-D		1NO-2NC		
EU2B-YB330④①-D		3NO		
EU2B-YB303④①-D		3NC		

Note: ① Button Color. Specify a contact terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

Note: ① Illumination Color. Specify a contact terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

Emergency Stop Switches

EU2B - YBV3 11 F R

Operator (style / function)

BV3 : 40mm mushroom/push, pull or twist release

Contact arrangement

01 : 1NC
11 : 1NO-1NC
02 : 2NC
03 : 3NC
12 : 1NO-2NC

Button color

R : Red

Terminals

F : Finger-safe terminal (IP20)
C : Exposed screw terminal

Part Number	Operator	Contact Arrangement	Weight (Approx.)	Button Color
EU2B-YBV301④R	ø40 Mushroom	1NC	96g	R : Red
EU2B-YBV311④R		1NO-1NC	120g	
EU2B-YBV302④R		2NC		
EU2B-YBV312④R		1NO-2NC	144g	
EU2B-YBV303④R		3NC		

Specify a terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

Meters

EU2B - YM 53 A 10 F R

Function

M : Meter

Input current

1 : 1A 5 : 5A

Specification of overload scale

3 : 3 times 2 : 2 times 5 : 5 times N : Non

Type of meter

A : AC ammeter

Measuring range

Direct measuring

For current transformers: 10 : 10A 15 : 15A 20 : 20A 30 : 30A 50 : 50A
60 : 60A 75 : 75A 100 : 100A 150 : 150A

Set pointer

blank : non -R : with set pointer

Terminals

F : Finger-safe terminal (IP20)
C : Exposed screw terminal

EU2B - YM 010 VD F-PER-R

Function

M : Meter

Input voltage or current

010 : 0-10V
001 : 0-1mA
420 : 4-20mA etc.

Type of meter

VD : DC voltmeter
MD : DC ammeter

Terminals

F : Finger-safe terminal (IP20)
C : Exposed screw terminal

Set pointer

blank : non -R : with set pointer

Specification of scale

-PER : 0-100%
-60HZ : 0-60Hz
-80HZ : 0-80Hz

Input	Part Number	Description	Weight (approx.)
AC input meter (ammeter)	EU2B-YM53A5④	Capacity: 5A Expansion scale: x3	270g
	EU2B-YM53A10④	Capacity: 10/5A Expansion scale: x3	
	EU2B-YM13A10④	Capacity: 10/1A Expansion scale: x3	
	EU2B-YM53A15④	Capacity: 15/5A Expansion scale: x3	
	EU2B-YM13A15④	Capacity: 15/1A Expansion scale: x3	
	EU2B-YM13A20④	Capacity: 20/1A Expansion scale: x3	
	EU2B-YM53A30④	Capacity: 30/5A Expansion scale: x3	
	EU2B-YM13A30④	Capacity: 30/1A Expansion scale: x3	
	EU2B-YM53A50④	Capacity: 50/5A Expansion scale: x3	
	EU2B-YM53A60④	Capacity: 60/5A Expansion scale: x3	
	EU2B-YM53A75④	Capacity: 75/5A Expansion scale: x3	
	EU2B-YM53A100④	Capacity: 100/5A Expansion scale: x3	
DC input meter	EU2B-YM010VD④-PER	0-10V DC Input Scale: 0 to 100%	270g
	EU2B-YM010VD④-60HZ	0-10V DC Input Scale: 0 to 60Hz	
	EU2B-YM001MD④-PER	0-1mA DC Input Scale: 0 to 100%	
	EU2B-YM001MD④-60HZ	0-1mA DC Input Scale: 0 to 60Hz	
	EU2B-YM001MD④-80HZ	0-1mA DC Input Scale: 0 to 80Hz	
	EU2B-YM420MD④-PER	4-20mA DC Input Scale: 0 to 100%	
	EU2B-YM420MD④-60HZ	4-20mA DC Input Scale: 0 to 60Hz	

Specify a terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

2 Position Selector Switches

EU2B - YSK 3 11 N1 F A

Operator (style / function)

S : Selector (Knob operator)
SK : Key selector (Key operator)

Number of Positions / Spring Return Action

2 : 2-position / Maintained
2R : 2-position / Maintained (Overlap)
2J : 2-position / Maintained (Special function)
21 : 2-position / Spring return from right
3 : 3-position / Maintained
31 : 3-position / Spring return from right
32 : 3-position / Spring return from left
33 : 3-position / Spring return two-way

Contact arrangement

10 : 1NO 03 : 3NC
11 : 1NO-1NC 02 : 2NC
01 : 1NC 21 : 2NO-1NC
30 : 3NO 12 : 1NO-2NC
20 : 2NO

Key Removable Position

See option codes below

Terminals

F : Finger-safe terminal (IP20)
C : Exposed screw terminal

Circuit Number

Blank : No Designation
N* : See charts

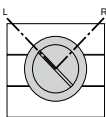
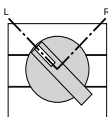
Selector Switches				Key Selector Switches			
Contact	Mounting	Operator Position		Maintained	Spring Return from Right	Maintained	Spring Return from Right
		L	R	L R	L R	L R	L R
NO	1		●	EU2B-YS210④	EU2B-YS2110④	EU2B-YSK210④③	EU2B-YSK2110④③
				EU2B-YS201④	EU2B-YS2101④	EU2B-YSK201④③	EU2B-YSK2101④③
NC	3	●					
NO	1		●	EU2B-YS220④	EU2B-YS2120④	EU2B-YSK220④③	EU2B-YSK2120④③
NO	3		●				
NC	1	●		EU2B-YS202④	EU2B-YS2102④	EU2B-YSK202④③	EU2B-YSK2102④③
NC	3	●					
NO	1		●	EU2B-YS211④	EU2B-YS2111④	EU2B-YSK211④③	EU2B-YSK2111④③
NC	3	●					
NO	1		●	EU2B-YS230④	EU2B-YS2130④	EU2B-YSK230④③	EU2B-YSK2130④③
NO	2		●				
NO	3		●				
NC	1	●		EU2B-YS203④	EU2B-YS2103④	EU2B-YSK203④③	EU2B-YSK2103④③
NC	2	●					
NC	3	●					
NO	1		●	EU2B-YS221④	EU2B-YS2121④	EU2B-YSK221④③	EU2B-YSK2121④③
NO	2		●				
NC	3	●					
NO	1		●	EU2B-YS212④	EU2B-YS2112④	EU2B-YSK212④③	EU2B-YSK2112④③
NC	2	●					
NC	3	●					
NO	1		●	EU2B-YS2R11④	N/A	EU2B-YSK2R11④③	N/A
NC	2		●				

Key is removable in all maintained positions. Specify key removal position in place of ③ in the part number. See table.
Specify a terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal).

2-position, 2-position/inverse cam

Selector Switch

Key Selector Switch



				Selector Switches	Key Selector Switches
Contact	Mounting	Operator Position		Maintained	Maintained
		L	R	L R	L R
NO	1	●		EU2B-YS2J10④	EU2B-YSK2J10④③
				EU2B-YS2J01④	EU2B-YSK2J01④③
NC	3		●		
NO	1	●		EU2B-YS2J20④	EU2B-YSK2J20④③
NO	3	●			
NC	1		●	EU2B-YS2J02④	EU2B-YSK2J02④③
NC	3		●		
NO	1	●		EU2B-YS2J11④	EU2B-YSK2J11④③
NC	3		●		
NO	1	●		EU2B-YS2J30④	EU2B-YSK2J30④③
NO	2	●			
NO	3	●			
NC	1		●	EU2B-YS2J03④	EU2B-YSK2J03④③
NC	2		●		
NC	3		●		
NO	1	●		EU2B-YS2J21④	EU2B-YSK2J21④③
NO	2	●			
NC	3		●		
NO	1	●		EU2B-YS2J12④	EU2B-YSK2J12④③
NC	2		●		
NC	3		●		

③ Key Removable Option Codes (2-position)

A	Key removable in any position
B	Key removable in left position
C	Key removable in right position

3 Position Selector Switches

Selector Switches								Key Selector Switches				
Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two Way	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two Way
		L 	C 	R 	L C R 	L C R 	L C R 	L C R 	L C R 	L C R 	L C R 	L C R 
NO	1	●			EU2B-YS320④	EU2B-YS3120④	EU2B-YS3220④	EU2B-YS3320④	EU2B-YSK320④③	EU2B-YSK3120④③	EU2B-YSK3220④③	EU2B-YSK3320④③
NO	3			●								
NO	2	●		●	EU2B-YS320N1④	EU2B-YS3120N1④	EU2B-YS3220N1④	EU2B-YS3320N1④	EU2B-YSK320N1④③	EU2B-YSK3120N1④③	EU2B-YSK3220N1④③	EU2B-YSK3320N1④③
NO	3			●								
NC	1			■	EU2B-YS302④	EU2B-YS302④	EU2B-YS3202④	EU2B-YS3302④	EU2B-YSK302④③	EU2B-YSK302④③	EU2B-YSK3202④③	EU2B-YSK3302④③
NC	3		■	■								
NC	2		●		EU2B-YS302N1④	EU2B-YS3102N1④③	EU2B-YS3202N1④③	EU2B-YS3302N1④	EU2B-YSK302N1④③	EU2B-YSK3102N1④③	EU2B-YSK3202N1④③	EU2B-YSK3302N1④③
NC	3		■	■								
NO	1	●			EU2B-YS311④	EU2B-YS311④	EU2B-YS3211④	EU2B-YS3311④	EU2B-YSK311④③	EU2B-YSK311④③	EU2B-YSK3211④③	EU2B-YSK3311④③
NC	3		■	■								
NC	1		■	■								
					EU2B-YS311N1④	EU2B-YS311N1④	EU2B-YS3211N1④	EU2B-YS3311N1④	EU2B-YSK311N1④③	EU2B-YSK311N1④③	EU2B-YSK3211N1④③	EU2B-YSK3311N1④③
NO	3			●								
NO	1	●			EU2B-YS311N2④	EU2B-YS311N2④	EU2B-YS3211N2④	EU2B-YS3311N2④	EU2B-YSK311N2④③	EU2B-YSK311N2④③	EU2B-YSK3211N2④③	EU2B-YSK3311N2④③
NC	2		●									
NC	2		●		EU2B-YS311N3④	EU2B-YS311N3①	EU2B-YS3211N3①	EU2B-YS3311N3①	EU2B-YSK311N3④③	EU2B-YSK311N3④③	EU2B-YSK3211N3④③	EU2B-YSK3311N3④③
NO	3			●								
NO	2	●		●	EU2B-YS311N4④	EU2B-YS311N4④	EU2B-YS3211N4④	EU2B-YS3311N4④	EU2B-YSK311N4④③	EU2B-YSK311N4④③	EU2B-YSK3211N4④③	EU2B-YSK3311N4④③
NC	3		■	■								
NO	1	●			EU2B-YS330④	EU2B-YS3130④	EU2B-YS3230④	EU2B-YS3330④	EU2B-YSK330④③	EU2B-YSK3130④③	EU2B-YSK3230④③	EU2B-YSK3330④③
NO	2	●		●								
NO	3			●								
NC	1		■	■	EU2B-YS303④	EU2B-YS3103④	EU2B-YS3203④	EU2B-YS3303④	EU2B-YSK303④③	EU2B-YSK3103④③	EU2B-YSK3203④③	EU2B-YSK3303④③
NC	2		●									
NC	3		■	■								
NO	1	●			EU2B-YS321N1④	EU2B-YS3121N1④	EU2B-YS3221N1④	EU2B-YS3321N1④	EU2B-YSK321N1④③	EU2B-YSK3121N1④③	EU2B-YSK3221N1④③	EU2B-YSK3321N1④③
NC	2		●									
NO	3			●								
NC	1		■	■	EU2B-YS312N1④	EU2B-YS3112N1④	EU2B-YS3212N1④	EU2B-YS3312N1④	EU2B-YSK312N1④③	EU2B-YSK3112N1④③	EU2B-YSK3212N1④③	EU2B-YSK3312N1④③
NO	2	●		●								
NC	3		■	■								

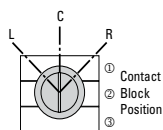
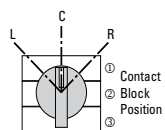
Specify a terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal).

Key is removable in all maintained positions. Specify key removal position in place of ③ in the part number. See table.

3-position, 3-position/inverse cam

Selector Switch

Key Selector Switch



③ Key Removable Option Codes (3-Position)

A	Key removable in any position
B	Key removable in left and center positions
C	Key removable in center and right positions
D	Key removable in center position
E	Key removable in left and right positions
G	Key removable in left position
H	Key removable in right position

Control Boxes

1Column

1 control unit	2 control units	3 control units	4 control units	5 control units
EC2B-B21B011N2①-U	EC2B-B21B021N2①-U	EC2B-B31B031N2①-U	EC2B-B51B041N3①-U	EC2B-B51B051N3①-U
				

2 Columns

4 control units	6 control units	8 control units	10 control units
EC2B-B32B042N2①-U	EC2B-B32B062N2①-U	EC2B-B52B082N3①-U	EC2B-B52B102N3①-U
			

3 Columns

6 control units	9 control units	12 control units	15 control units	18 control units
EC2B-B33B063N2①-U	EC2B-B33B093N2①-U	EC2B-B53B123N3①-U	EC2B-B53B153N3①-U	EC2B-B63B183N3①-U
				

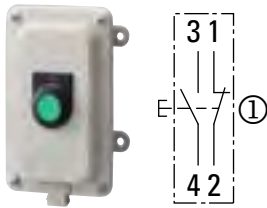
Thread Size		① Terminal Block Style	
Code	Description	Code	Description
M1	M16	blank	no terminal block
M2	M20	C	Exposed screw terminals
M3	M25	F	Finger-safe terminals
M4	M32		
M5	M40		
N1	NPT1/2		
N2	NPT3/4		
N3	NPT1		
N4	NPT1 1/4		

Other thread size options available. To specify different thread sizes, use table at left to select a code to use in place of N2 or N3 in the part number.
Specify terminal block style in place of ① in part number (standard versions do not contain a terminal block).

Standard Control Stations

1 Control Unit × 1 Column

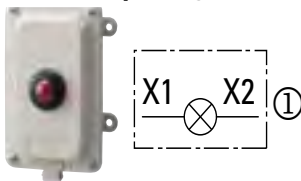
1 Flash Pushbutton



	EC2B-1102BN2N□1-U	EC2B-1102BN2N□2-U
①	Flush momentary 1NO contact Nameplate ON Button color: black, green, red, and white 1NO-1NC contact	Flush momentary 1NC contact Nameplate OFF Button color: black, green, red, and white

	EC2B-1102BN2N□3-U	EC2B-1102BN2N□4-U
①	Flush momentary 1NO-1NC contact Nameplate ON Button color: black, green, red, and white	Flush momentary 1NO-1NC contact Nameplate OFF Button color: black, green, red, and white

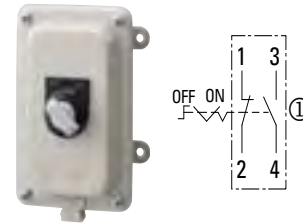
1 pilot light



	EC2B-1101BN2□11-U	EC2B-1101BN2□12-U	EC2B-1101BN2□3-U
①	120V AC Illumination color: red	240V AC Illumination color: red	24V AC/DC Illumination color: red

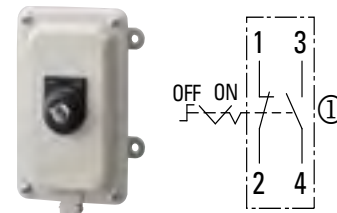
	EC2B-1101BN2□13-U	EC2B-1101BN2□14-U	EC2B-1101BN2□6-U
①	120V AC Illumination color: green	240V AC Illumination color: green	24V AC/DC Illumination color: green

1 selector switch



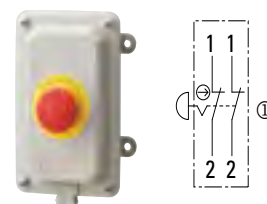
	EC2B-1106BN2N□1-U
①	Knob selector 2-position maintained 1NO-1NC contact Name plate OFF-ON

1 key selector switch



	EC2B-1106BN2N□4-U
①	Key selector 2-position maintained (removable at all positions) 1NO-1NC contact Nameplate OFF-ON

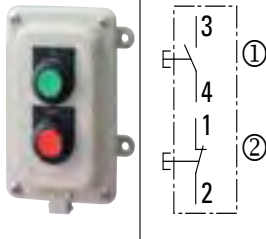
1 e-stop switch



	EC2B-1102BN2N□7-U
①	Emergency stop switch 2NC contact Nameplate EMERGENCY STOP Button color (red)

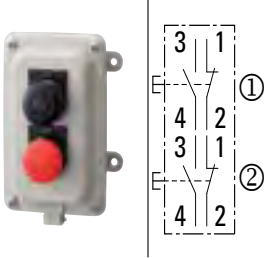
2 Control Units × 1 Column

2 flush pushbuttons



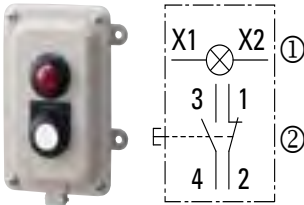
	EC2B-2102BN2N□1-U
①	Flush momentary 1NO contact, Nameplate ON Button color (black, green, red, white)
②	Flush momentary 1NC contact, Nameplate OFF Button color (black, green, red, white)

2 Mushroom Pushbuttons



	EC2B-2102BN2N□4-U
①	Mushroom momentary 1NO-1NC contact, Nameplate ON Button color (black)
②	Mushroom momentary 1NO-1NC contact, Nameplate OFF Button color (red)

1 pilot light/1 pushbutton

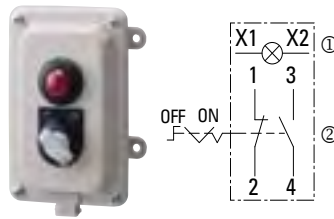


	EC2B-2110BN2N□5-U	EC2B-2110BN2N□6-U	EC2B-2110BN2N□3-U
①	120V AC Illumination color: red	240V AC Illumination color: red	24V AC/DC Illumination color: red
②	Flush momentary 1NO-1NC contact Name plate STOP Button color (black, green, red, white)	Flush momentary 1NO-1NC contact Name plate STOP Button color (black, green, red, white)	Flush momentary 1NO-1NC contact Name plate STOP Button color (black, green, red, white)

Specify terminal style code in place of □ in part no. C (standard screw terminal), F (finger-safe screw terminal)

2 Control Units × 1 Column

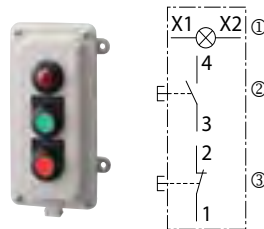
1 pilot light / 1 selector switch



	EC2B-2117BN2N□3-U		EC2B-2117BN2N□4-U
①	120V AC Illumination color: red		240V AC Illumination color: red
②	Knob, 2-position, 1NO-1NC contact Maintained, Name plate OFF-ON		

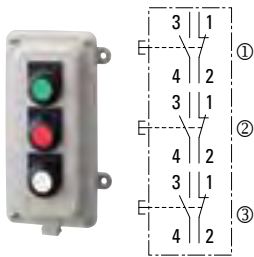
3 Control Units × 1 Column

1 pilot light / 2 pushbuttons



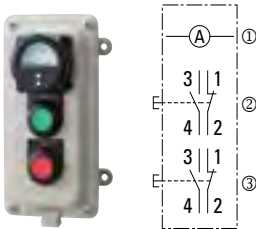
	EC2B-3110BN2N□5-U	EC2B-3110BN2N□6-U	EC2B-3110BN2N□3-U
①	120V AC Illumination color: red	240V AC Illumination color: red	24V AC/DC Illumination color: red
②	Flush momentary 1NO contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO contact, Nameplate ON Button color (black, green, red, white)
③	Flush momentary 1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NC contact, Nameplate OFF Button color (black, green, red, white)

3 pushbuttons



	EC2B-3102BN2N□1-U
①	Flush momentary 1NO-1NC contact, Blank nameplate Button color (black, green, red, white)
②	
③	

1 meter / 2 pushbuttons

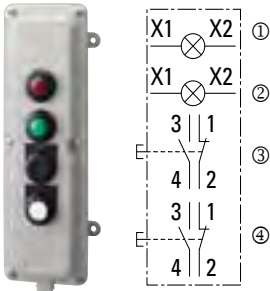


	EC2B-3152BN2N□1△-U
①	Specify input, capacity, and scale
②	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)
③	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)

Specify the meter's capacity and scale in place of △ in the part number

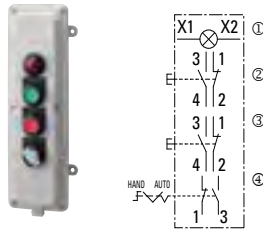
4 Control Units × 1 Column

2 pilot lights / 2 pushbuttons



	EC2B-4110BN3N□5-U	EC2B-4110BN3N□6-U	EC2B-4110BN3N□3-U
①	120V AC, Illumination color: red	240V AC, Illumination color: red	24V AC/DC, Illumination color: red
②	120V AC, Illumination color: green	240V AC, Illumination color: green	24V AC/DC, Illumination color: green
③	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)
④	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)

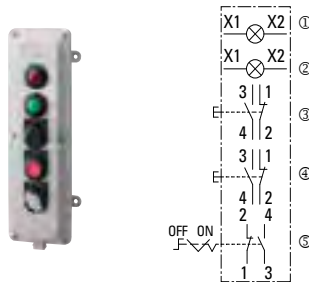
1 pilot light / 2 pushbuttons / 1 selector switch



	EC2B-4113BN3N□5-U	EC2B-4113BN3N□6-U	EC2B-4113BN3N□3-U
①	120V AC, Illumination color: red	240V AC, Illumination color: red	24V AC/DC, Illumination color: red
②	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)
③	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)
④	Knob, 2-position, maintained 1NO-1NC contact Nameplate HAND-AUTO 	Knob, 2-position, maintained 1NO-1NC contact Nameplate HAND-AUTO 	Knob, 2-position, maintained 1NO-1NC contact Nameplate HAND-AUTO 

5 Control Units × 1 Column

2 pilot lights / 2 pushbuttons / 1 selector switch



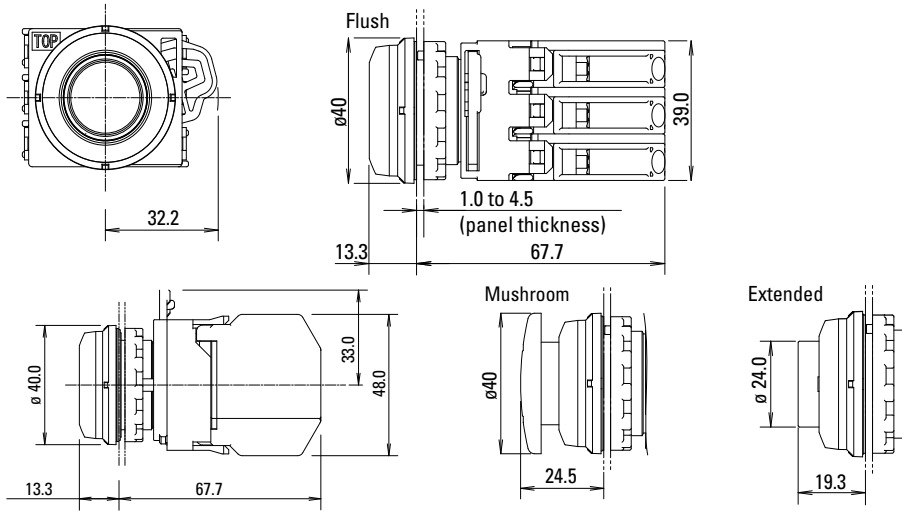
	EC2B-5113BN3N□5-U	EC2B-5113BN3N□6-U	EC2B-5113BN3N□3-U
①	120V AC, Illumination color: red	240V AC, Illumination color: red	24V AC/DC, Illumination color: red
②	120V AC, Illumination color: green	240V AC, Illumination color: green	24V AC/DC, Illumination color: green
③	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate ON Button color (black, green, red, white)
④	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate OFF Button color (black, green, red, white)	Flush momentary 1NO-1NC contact, Nameplate OFF Button color black, green, red, white)
⑤	Knob, 2-position, Main- tained, 1NO-1NC contact, Name plate HAND-AUTO 	Knob, 2-position, Main- tained, 1NO-1NC contact Name plate HAND-AUTO 	Knob, 2-position, Main- tained, 1NO-1NC contact Name plate HAND-AUTO 

Specify terminal style code in place of □ in part no. C (standard screw terminal), F (finger-safe screw terminal)

Dimensions

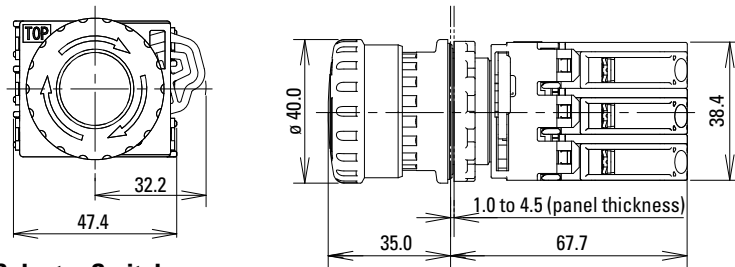
Pushbuttons

Shown with finger-safe contacts



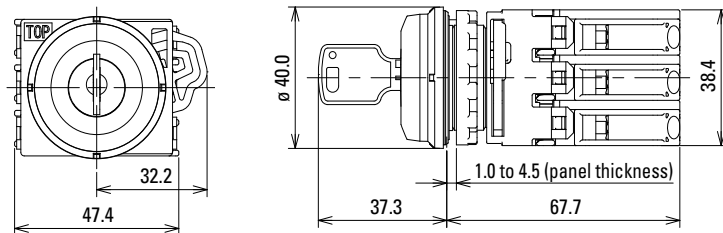
Emergency Stop Switches

Shown with finger-safe contacts



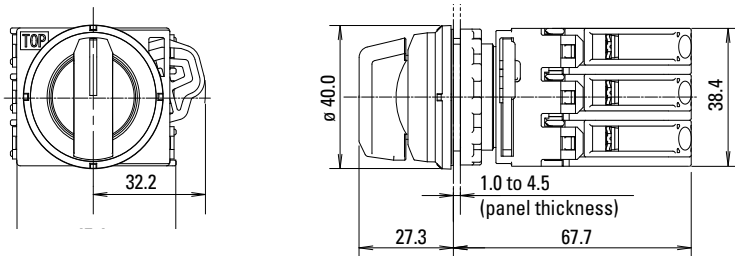
Selector Switches

Shown with finger-safe contacts



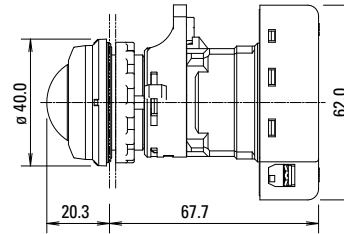
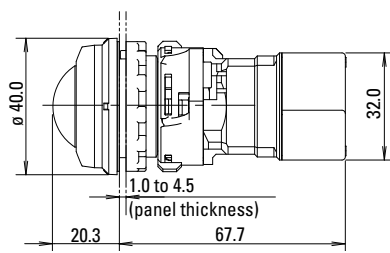
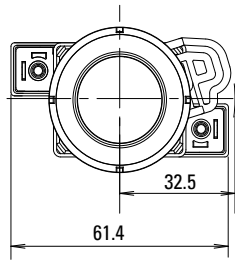
Key Selector Switches

Shown with finger-safe contacts



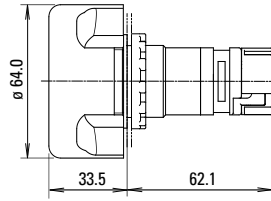
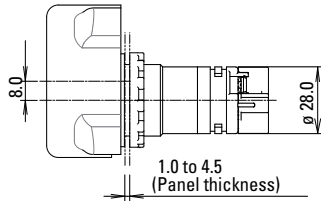
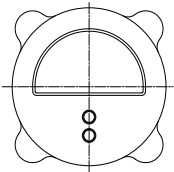
Pilot Lights

Shown with finger-safe contacts

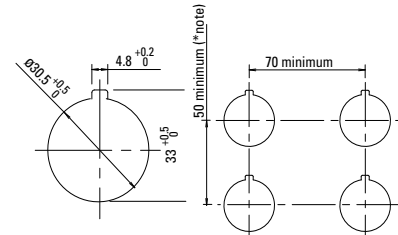


Meters

Shown with finger-safe contacts



Mounting Hole Dimensions

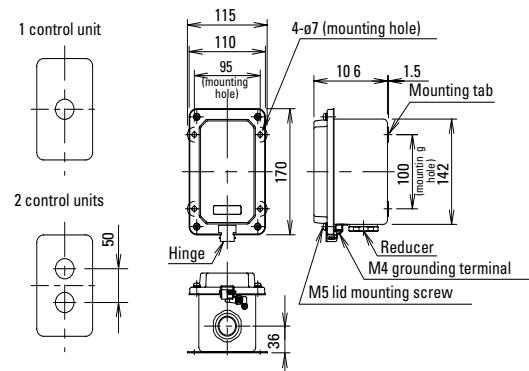


Panel thickness: 1.0 to 4.5 mm.

*Note: The meter can be mounted on the top mounting holes of a standard 50mm mounting centers. The meter can be mounted on any mounting hole with a 70mm or larger mounting center.

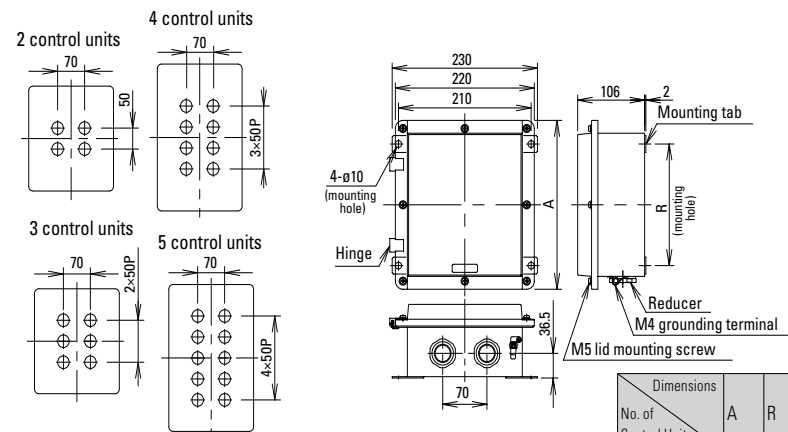
1, 2 control units x 1 column

weight: 1.2kg/1.4kg



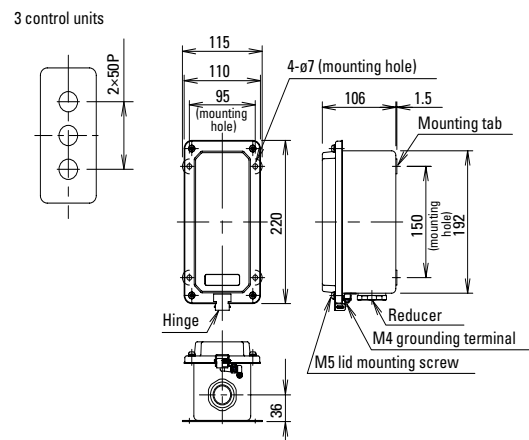
2, 3, 4, 5 control units x 2 columns

weight: 3.8/4.2/4.6/5.0 kg



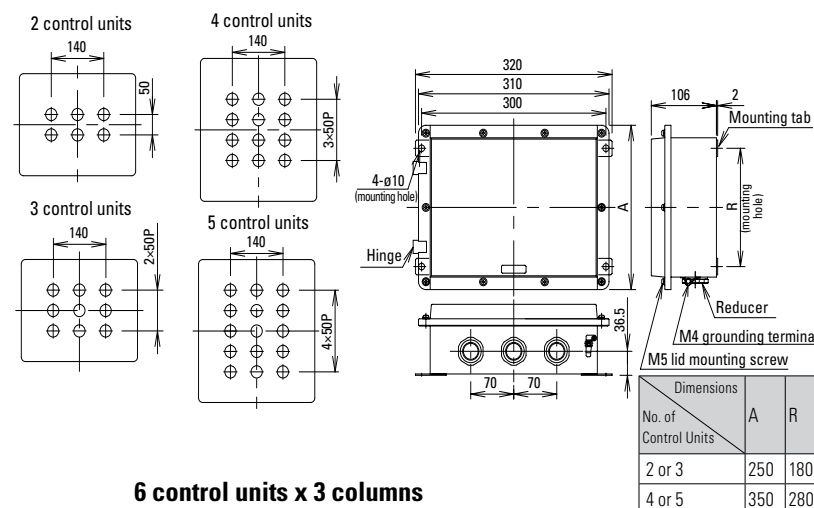
3 control units x 1 column

weight: 1.8kg



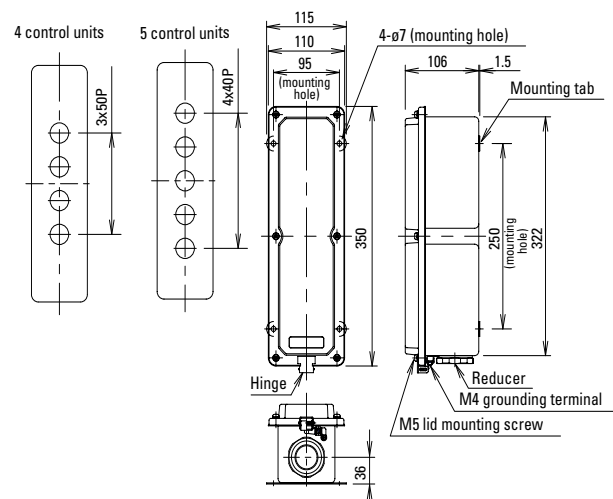
2, 3, 4, 5 control units x 3 columns

weight: 4.8/5.2/6.5/7.1 kg



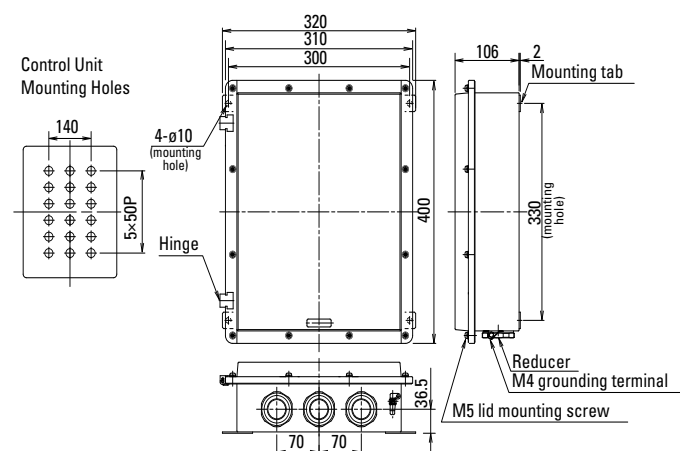
4, 5 control units x 1 column

weight: 2.4kg



6 control units x 3 columns

weight: 8.1kg



Dimensions	A	R
No. of Control Units		
2 or 3	250	180
4 or 5	350	280

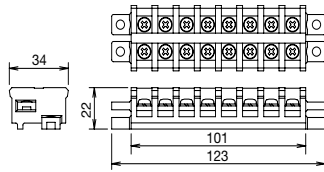
Dimensions	A	R
No. of Control Units		
2 or 3	250	180
4 or 5	350	280

Terminal Blocks

Terminal blocks are not supplied with the standard control boxes (without wiring). When wiring inside the control box is required, specify the wiring circuit. The terminal block type used on the control boxes with wiring depends on the terminal style of the control unit.

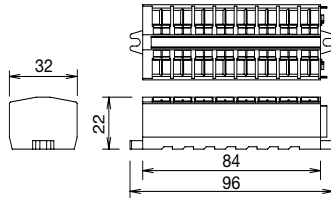
C terminal style

exposed screw terminal
ET2A-8PE
polyamide
IECEx TUR 15.0043U,
TÜV 15 ATEX 7799U

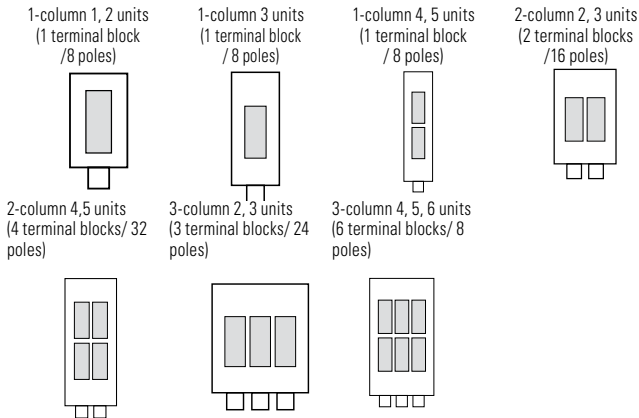


F terminal style

finger-safe spring clamp terminal
IP20 clamp terminal: 264-238 (WAGO)
polyamide
IECEx PTB 04.0003U, PTB 98 ATEX
3129U



The number of terminal blocks, poles, and the installation direction that can be installed on the control box are as follows:



Fittings and Reducers

Reducers installed at the bottom of the control box are as follows: 1 column: 1 reducer, 2 columns: 2 reducers, 3 columns: 3 reducers. Material is nickel-plated brass. Use cable lead-in fittings that are commercially available. See the following table for optional reducers.

Control Box Style	Part No.	Thread Size	Symbol	UL c-UL
1 column (1 to 3 control units) 2, 3 columns (2, 3 control units)	EC9E-H3M16E-UL	M16	M1	○
	EC9E-H3M20E-UL	M20	M2	○
	EC9E-H3M25E-UL	M25	M3	○
	EC9E-H3M32E-UL	M32	M4	○
	EC9E-H3NPT1E-UL	NPT 1/2	N1	○
	EC9E-H3NPT2E-UL	NPT 3/4	N2	●
1, 2, 3 columns (4, 5 control units) 3 columns (6 control units)	EC9E-H3NPT3E-UL	NPT 1	N3	○
	EC9E-H4M25E-UL	M25	M3	○
	EC9E-H4M32E-UL	M32	M4	○
	EC9E-H4M40E-UL	M40	M5	○
	EC9E-H4NPT2E-UL	NPT 3/4	N2	○
	EC9E-H4NPT3E-UL	NPT 1	N3	●
	EC9E-H4NPT4E-UL	NPT 1 1/4	N4	○

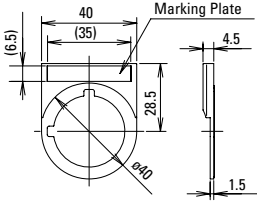
●: Standard reducer ○: non-standard reducer

The reducers in the table above are for replacement use only. All EC2B boxes are supplied with a reducer that has been secured to the housing per UL regulations. If it is necessary to replace a reducer, the user should follow appropriate UL standards for securing to EC2B housing.

Accessories

Nameplates

Used for pilot light, pushbutton, selector switch, and key selector switch.

Appearance	Part Number	Dimensions
	EU9Z-NM	

All dimensions in mm

Rubber Boots

Appearance	Description/Usage	Part Number
	For Flush Pushbuttons Not for use with name plate	EU9Z-DB1
	For Flush Pushbuttons For use with name plate	EU9Z-DB1N
	For Extended Pushbuttons Not for use with name plate	EU9Z-DB2
	For Extended Pushbuttons For use with name plate	EU9Z-DB2N

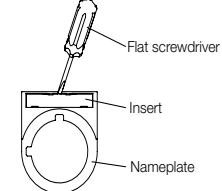
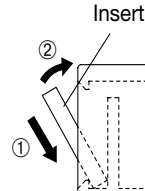
Nameplate Inserts

Appearance	Legend	Part Number
	Blank	EU9Z-NP0
	ON	EU9Z-NP1
	OFF	EU9Z-NP2
	START	EU9Z-NP3
	STOP	EU9Z-NP4
	OFF-ON	EU9Z-NP31
	HAND-AUTO	EU9Z-NP35
	HAND-OFF-AUTO	EU9Z-NP53

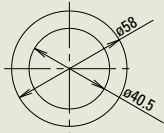
Material: Aluminum

Installing the insert to the nameplate

Removing the insert from the nameplate



Emergency Stop Switch Nameplate Stickers

Appearance	Legend	Part Number	Dimensions
	Blank	EU9Z-NVS0	
	Emergency Stop	EU9Z-NVS27	

Material: yellow synthetic paper Legend: black

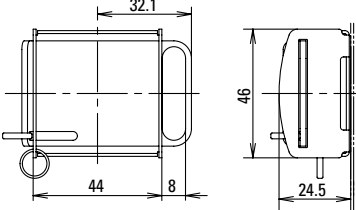
Emergency Stop Switch Padlock Cover

Used with EU2B-YBV emergency stop switch to maintain the switch in the latched status.

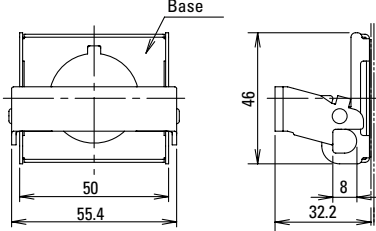
Padlock Cover

EU2B-YB2 extended pushbutton: to maintain latched status

EU2B-YB1 flush pushbutton/EU2B-YSK key selector switch: to prevent operation

Appearance	Part Number	Dimensions
	EU9Z-PC	

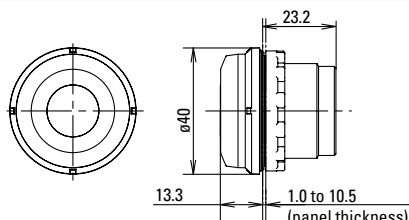
Note: mounted to outside of enclosure with screws, not provided by IDEC
Material: Stainless Steel

Appearance	Part Number	Dimensions
	EU9Z-PCE	

Coating: yellow Material: Stainless Steel

Mounting Hole Plug

Used to plug unused mounting holes (ø30.5) on the mounting panel.

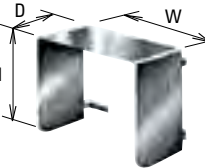
Appearance	Part Number	Dimensions / Usage
	EU9Z-BP	

Lenses

Appearance	Lens Color	Part Number
	Red	EU9Z-LR
	Green	EU9Z-LG
	Amber	EU9Z-LA
	Yellow	EU9Z-LY
	White	EU9Z-LW
	Blue	EU9Z-LS

Material: AS resin (gasket supplied)

Control Box Shade

Shape	Part No.	Applicable Control Box	Dimensions (mm)		
			H	W	D
 Material: stainless steel Thickness: 1mm Photo: Part No. EC9Z-F2A52	EC9Z-F2A21M	EC2B-11*B	180	160	160
		EC2B-21*B			
	EC9Z-F2A31M	EC2B-31*B	230	160	160
	EC9Z-F2A51	EC2B-41*B	360	160	160
		EC2B-51*B			
	EC9Z-F2A32	EC2B-22*B	260	420	160
		EC2B-32*B			
	EC9Z-F2A52	EC2B-42*B	360	420	160
		EC2B-52*B			
	EC9Z-F2A33	EC2B-23*B	260	510	160
		EC2B-33*B			
	EC9Z-F2A53	EC2B-43*B	360	510	160
		EC2B-53*B			
	EC9Z-F2A63	EC2B-63*B	410	510	160

Protects control units from direct sunlight and rain. The surface of the control box shade is uncoated.
Can be installed by tightening to the mounting tabs on the control box.

Buttons

Appearance	Style	Part Number	Button Color Code
	Flush	HW1A-B1①	Specify a color code in place of ① in the Ordering Number. R : red G : green B : black Y : yellow W : white S : blue
	Extended	HW1A-B2①	
	ø40 Mushroom	HW1A-B4①	

Material: Polyacetal

Operating Instructions

Installation Area

Do not install the EC2B control box in an environment where more than IP65 protection degree (more than Type 4X in North America) is required.

Use the EC2B control box under ambient temperature of -20 to +50°C. If the control box is exposed to direct sunlight and the surface temperature may rise above 50°C, provide a shade to keep the surface temperature below 50°C.

Installation

Use four M6 bolts for 1-column, four M8 bolts for 2- and 3-column, or other methods with equivalent strength to install the control box. Mounting tab thickness is 1.5mm for 1 column and 2mm for 2 and 3 columns.

If bolts become may loose due to vibration, use spring washers.

If bolt corrosion is anticipated, use anti-corrosion bolts or other countermeasures.

Notes on Emergency Stop Switches

When using the emergency stop switches on safety-related parts of the control system, observe safety standards and regulations of the relevant country or region. Also be sure to perform a risk assessment before operation.

Opening/Closing the Lid

Use a Philips screwdriver to loosen lid mounting screws. While holding the unhinged side, open the lid slowly without exerting excessive force on the hinge.

Before closing the lid, make sure of the following:

No foreign substances are on the packing or joint surfaces.

No displacement of the waterproof packing.

Wires are not caught between the joint surfaces.

Next, close the lid slowly and tighten the screws to a proper torque of 1.6 to 2.4 N·m.

Limitation of the Operating Current

Major heat sources comes from the wiring which is connected to the control box. Therefore, not only the operating current but wiring conditions (size, no. of wires, no. of wire bundles) may cause temperature rise. When wiring, observe the following conditions.

Stranded wire: 1.5 to 2.5 mm² (UL-c-UL certified) / Solid wire: ø1.2 to ø1.6 mm (16 to 14 AWG)

Maximum no. of wires per bundle: 16

Maximum operating current: 10A

When using the control box under an operating environment of 40°C minimum, use a heat resistant cable of 70°C minimum.

Determine the operating current so that the total heat value of 1 wire bundle is below 300 [A²×wires]. Also, when calculating the heat value, take the current fluctuation (10%) into consideration. [calculation example: EC2B-41**B (8 circuit)]

① Apply 10A to 1 circuit, 1A to the remaining 7 circuits:

$\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(1A \times 1.1)^2 \times 14 \text{ wires}\} \approx 259$ (can be used because < 300)

② Apply 10A to 1 circuit, 2A to the remaining 7 circuits:

$\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(2A \times 1.1)^2 \times 14 \text{ wires}\} \approx 310$ (cannot be used because > 300)

See the table below for the allowable operating current when applying current evenly to each control box.

Allowable Operating Current

Control Box Part No.	Max. No. of Circuits	Max No. of Wires per Bundle (*1) [wires] ([wires]×[bundle])		Allowable Operating Current (reference) (*2)
		Without terminal-blocks	With terminal blocks	
EC2B-11	3	16 (16×1)	8 (8×1)	7A
EC2B-21	6	16 (16×1)	8 (8×1)	5A
EC2B-31	9	16 (16×1)	8 (8×1)	4A
EC2B-41	12	16 (16×1)	16 (16×1)	3A
EC2B-51	15	16 (16×1)	16 (16×1)	3A
EC2B-22	12	32 (16×2)	16 (8×2)	5A
EC2B-32	18	32 (16×2)	16 (8×2)	4A
EC2B-42	24	32 (16×2)	32 (16×2)	3A
EC2B-52	30	32 (16×2)	32 (16×2)	3A
EC2B-23	18	48 (16×3)	24 (8×3)	5A
EC2B-33	27	48 (16×3)	24 (8×3)	4A
EC2B-43	36	48 (16×3)	48 (16×3)	3A
EC2B-53	45	48 (16×3)	48 (16×3)	3A
EC2B-63	54	48 (16×3)	48 (16×3)	3A

*1: Make sure that the number of wires per bundle is a maximum of 16 by reducing the wiring or by jumper wiring. The maximum number of wires per bundle may need to be further reduced depending on the wire size, lead-in fitting, or conduit size.

*2: The allowable current value (reference) when applying current evenly to all circuits of the maximum number of circuits.

Wiring

Wiring Construction

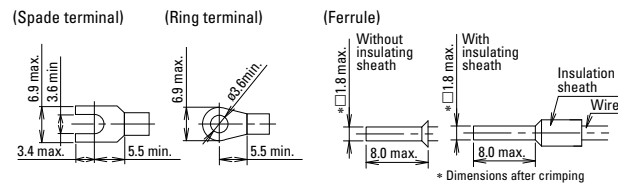
Observe the laws and regulations in each country concerning wiring construction. Use cable wiring or metal conduit wiring for installation in hazardous locations. If foreign objects or water may enter the box, install a sealing fitting near the cable entry of the box and seal the control box using a compound. Standard type control boxes do not contain a terminal block. Wire the control units directly.

Applicable Wires

Stranded wire: 1.25 to 2.5 mm², solid wire: ø1.2 to ø1.6 mm (AWG16 to 14). Do not connect more than 2 wires to the same terminal.

Applicable crimping terminal

Ring and spade terminals cannot be used for EU2B control units with IP20 finger-safe terminals. Ring and spade terminals cannot be used for IP20 clamp type terminal blocks. When connecting two ferrules to an EU2B control unit, use ferrules without insulating sheath.



For screw terminal ET2A-8PE

For IP20 clamp terminal
(WAGO: 264-238)



Recommended crimping terminal (WAGO) Ferrule with insulating sheath: 216-204
Ferrule without insulating sheath: 216-104 Crimping plier: 206-204

Recommended Tightening Torque

EU2B control units (M3.5) and ET2A-8PE terminal block (M4): 1.0 to 1.3 N·m

Warning

Incorrect wiring may cause fire hazard. Observe the following conditions.

Be sure to install an insulating sheath on the crimping terminal or the crimping terminal with insulation.

When connecting solid wires or stranded wires directly, strip the insulation as mentioned below, and insert the wire all the way in.

EU2B Control units: 8.6 mm maximum

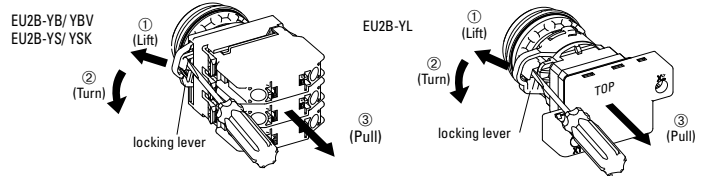
IP20 crimping terminal: 8 to 9 mm

When using stranded wires, make sure that there are no wire whiskers. Make sure that the spade crimping terminals and ferrules are inserted all the way in.

Use insulated ring terminals for the ET2A-8PE terminal block. Use only applicable crimping terminals and do not directly connect stranded wires or solid wires.

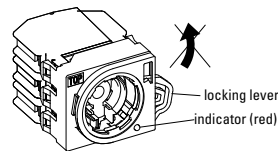
Removing and Installing the Contact Unit / Lamp Unit

To remove the contact unit or the lamp unit from the operator, pull the protruding yellow part of the locking lever outwards as shown in the figure below using a screwdriver, and turn it to the left. The contact unit or lamp unit can be removed.



When the contact unit is removed from the emergency stop switch operator, the NO contact closes and the NC contact opens.

Do not turn the locking lever when the contact unit is removed from the operator (the red indicator protruding out, see the figure below) or the switch can be damaged.



Panel mounting for the operator, lens unit and meter

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from the panel front into the panel hole. Place the projection on the operator with TOP marking upward and the recess on the mounting panel in the same direction. Meters have no projection.

Tighten the locking ring using ring wrench XN9Z-T1 to a torque of 2.5 Nm. When using a nameplate or padlocking cover, install it between the operator and panel. Make sure that the groove of the nameplate or padlocking cover and the projection on the TOP marking of the operator are in the same direction.

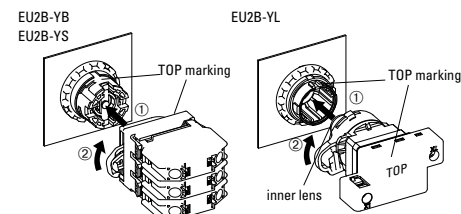
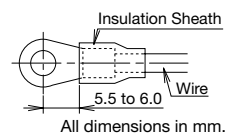
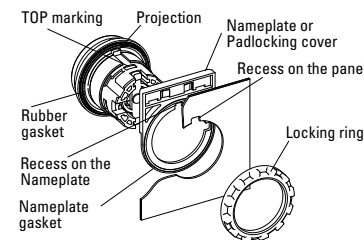
Note: The locking ring for emergency stop switches and meter is metallic. The meter can't mount the nameplate or padlocking cover.

Installing the contact unit and lamp unit

To install the contact unit, place the TOP marking on the operator and the TOP marking on the contact block adapter in the same direction, and then attach the contact unit to the operator. Then turn the locking lever to the right. Follow the same procedure when installing the lamp unit.

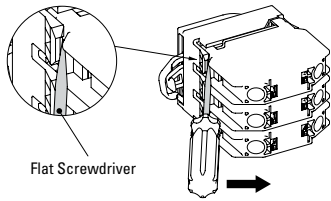
When installing the lamp unit, check that the inner lens is not loose.

The contact block adapters for emergency stop switches cannot be used for pushbuttons, selector, or key selector switches.



Removing the Contact Block

To remove the contact block, insert a flat screwdriver under the latch of the contact block adaptor and disengage the latch as shown in the figure below.



Installing the Contact block

When installing the contact block after maintenance or wiring, make sure that the contact configuration is correct. Installing the contact block in the incorrect position or incomplete installation may cause malfunction of the switch.

Remove the contact block from the operator before installing the contact block to the contact block adaptor. Also make sure that the contact block is correctly installed to the contact block adaptor before attaching the operator. Do not install the contact block adaptor with the operator attached. Otherwise, malfunction may result.

Protective Grounding

Protective grounding must be performed according to the installation environment and rating requirements. Observe laws and regulations set by each country.

Connect the M4 grounding terminal of the EC2B control box to a proper ground (grounding resistance 10Ω maximum). When operating the EC2B control box by connecting to circuits of 300V or below, the grounding resistance must be 100Ω maximum.

When using cables, connect one of the cable cores to the grounding terminal in the enclosure.

If the grounding terminal in the enclosure cannot be used, use the M4 grounding terminal on the outside of the enclosure.

Recommended tightening torque: M4: 1.0 to 1.3 Nm, M6: 3.9 to 5.4 Nm
For grounding, use appropriate wires (size, material, insulation) that can tolerate the expected maximum grounding current. Be sure to protect the grounding wire with protection, such as metal conduit, from external damage.

Accessories

Padlock Cover

The following padlocks and hasps can be used.

(Padlock Size)	a	b	c
Flush/extended pushbutton/key selector switch	ø3.5 to 7.0 mm	15 mm min.	70 mm max.
Emergency Stop Switch	ø5.5 to 7.0 mm	—	—

Recommended Hasp

Manufacturer	Part No.
Panduit	PSL-1, PSL-1A, PSL-1.5, PSL-1.5A, PSL-HD1
Master Lock	420, 421

Padlock and hasp are available in various shapes and sizes. Make sure that they do not interfere with the control units. Note: Not supplied by IDEC. Keep the total weight of padlock and hasp under 1500g max, otherwise the switch may malfunction or result in failure. No vibration should be applied when padlock or hasp are installed. When padlock or hasp are disfigured, stop usage immediately.

Ensure that no shock or electric sparks are generated.

When using the plate lock padlock cover with the extended pushbutton, the switch contact may turn on/off when the cover is being installed. Ensure to

provide functional safety measure to prevent unexpected startup.

When using the padlock cover on the safety-related part of the control system, observe safety standards and regulations of the relevant country or region. Also be sure to perform risk assessment before operation.

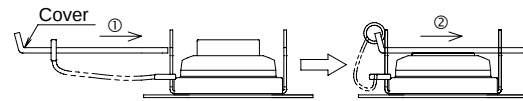
Installing EU9Z-PC Padlock Cover

(Flush/extended pushbutton/key selector switch)

EU9Z-PC can be installed in the following two ways.

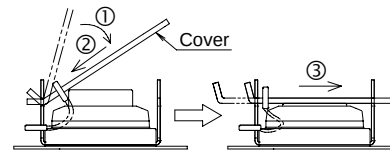
Remove the cover in the reverse step of installing the cover. Do not install or remove the cover forcefully, or it will cause failure.

[Installation A]



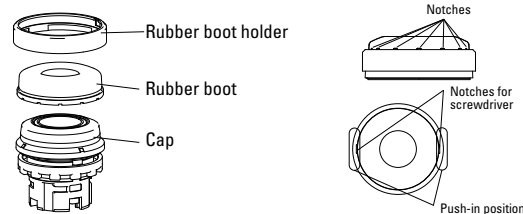
[Installation B]

This method is effective when the neighboring control unit interferes when installing in method A.



Installing EU9Z-DB Rubber Boots

To install the rubber boot on flush and extended pushbuttons, place the rubber boot on the cap and push the rubber boot holder straight. The notches around the rubber boot must show evenly.

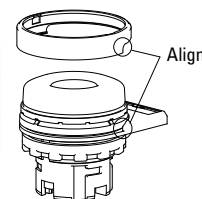


Push the rubber boot holder further around on the two notches on the holder so that the holder fits the button completely.

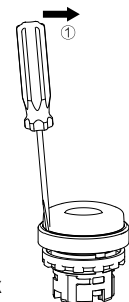
Make sure that the rubber boot and rubber boot holder are installed straight.

On Nameplate Types, the EU2B and the rubber boot holder must be aligned so that when installed, the anti-rotation projection on the EU2B comes to the center of the groove on the holder.

Make sure that the rubber boot is installed completely, otherwise water droplets might enter the rubber boot, but no water will enter the control box.



To remove the rubber boot from the flush and extended pushbuttons, gently insert the slotted screwdriver (0.5t x 4w or below) inside a notch on the rubber boot holder and tilt to the direction shown by the arrow ①. To prevent damage, do not apply excessive force to the EU2B when removing the rubber boot.



Maintenance and Inspection

EU2B switches should be installed in an appropriate control box.

Maintenance and Inspection Method

Perform daily or periodical maintenance and inspection for items such as damage and temperature rise of the EU2B switches listed in the Maintenance and Inspection table below.

Observe laws and regulations set by each country. Do not open the lid when inspecting the EC2B while it is energized. Never disassemble the control box. Do not use tools that cause sparks during maintenance and inspection. When using measuring devices, use explosion-protected types. When the EC2B needs to be disassembled or assembled for maintenance or repair, contact IDEC.

Maintenance and Inspection

Inspection Items	Inspection Method	Inspections	Measures
Enclosure base	Visual	No rusting No damages	Cleaning Rust-resistant treatment
Tightening bolt, screws	Visual, tactile	No loosening No rusting	Tightening Cleaning
Packings	Visual	No cracks No apparent deformation	Replacement
Connecting parts	Visual, tactile	No loosening of screws No dirt on insulation materials	Tightening Cleaning
Temperature rise	Thermometer, tactile	Surface temperature 80°C max.	Investigate the cause

Disposal

Observe laws and regulations set by each country concerning refuse disposal.

Safety Precautions

EU2B Control Units

Use EU2B switches that are applicable for use in hazardous areas (potentially explosive atmosphere where explosive gas or vapor may exist), otherwise explosion or fire hazard may result.

EU2B switches can be installed only in zones 1 and 2. Do not use in zone 0.

Turn power off to the EU2B switches before installation, removal, wiring, or maintenance, otherwise explosion, fire hazard, or electric shock may result.

Do not disassemble, repair, or modify, otherwise damage or accident may result.

Do not use damaged EU2B switches, otherwise damage or accident may result.

When connecting external devices, make sure that each cable is connected to the correct terminal, otherwise electric shock, fire hazard, or explosion may result.

Use wires of a proper size to meet voltage and current requirements. Incorrect wiring may cause abnormal temperature rise and lead to fire hazard and explosion.

Connect the grounding terminal to a proper ground, otherwise electric shock, fire hazard, or explosion may result.

Operate the EU2B switches at the rated current and voltage specified in this catalog, otherwise short-circuiting, fire hazard, or explosion may result.

Stop operation immediately if abnormal operation occurs. Otherwise, a secondary accident may occur.

Use explosion-proof electrical equipment that are applicable for use in hazardous areas (potentially explosive atmosphere where explosive gas or vapor may exist), otherwise explosion or fire hazard may result.

EC2B Control Boxes

EC2B control boxes can be installed only in zones 1 and 2. Do not use in zone 0. In North America, the EC2B can be installed in Division 2 areas, but cannot be installed in Division 1 areas.

Turn power off to the EC2B control box before installation, removal, wiring, or maintenance, otherwise explosion, fire hazard, or electric shock may result.

Special skills and knowledge of explosion protection, electric system installation, and relevant laws/regulations are required to transport, install, wire, operate, repair, and inspect the EC2B control box. People without such expertise must not use the EC2B control box, otherwise damage or accident may result.

Do not modify the EC2B, otherwise damage or accident may result.

Do not use a damaged EC2B control box, otherwise damage or accident may result.

When connecting external devices, make sure that each cable is connected to the correct terminal, otherwise electric shock, fire hazard, or explosion may result.

Use wires of a proper size to meet voltage and current requirements. Incorrect wiring may cause abnormal temperature rise and lead to fire hazard and explosion.

Connect the grounding terminal to a proper ground, otherwise electric shock, fire hazard, or explosion may result.

Do not sit on or hang from the EC2B control box, otherwise damage, personal injury, or accident may result.

Do not open the lid of the EC2B control box when it is energized, otherwise electric shock, fire hazard, or explosion may result.

Operate the EC2B control box at the rated current and voltage specified in this catalog, otherwise short-circuiting, fire hazard, or explosion may result.

When measuring the insulation resistance of the EC2B control box, make sure that potentially explosive atmosphere of explosive gas or vapor does not exist in the vicinity, otherwise explosion may result. Also, do not touch the terminals without paying attention, otherwise electric shock will result.

Do not place any obstacles in front of the nameplate.

Do not remove the nameplate.

When opening the lid for wiring, maintenance or inspection, make sure that substances such as dust, concrete powder, or metal powder do not enter inside the box, otherwise contact failure or insulation failure may result.

Do not drop the EC2B control box during transportation.

Be sure to open the carton the right way up, otherwise damage or personal injury may result.

Check that the product is what you have ordered. Using an incorrect model might result in malfunction or accident.

Stop operation immediately if abnormal operation occurs. Otherwise, a secondary accident may occur.

The surface temperature of the EC2B control box may become extremely hot during operation. Before maintenance or inspection of the EC2B, be sure to wear gloves to prevent burning your hand.

CS Series — Heavy Duty Cam Switches

Key features:

- Wide variety of heavy-duty oiltight cam switches
- Operators available up to 12 positions
- Switches made with a double circuit contact block
- Contact blocks rated 600V, 10A
- Ideal for ammeter/voltmeter applications
- Built to order — not available in subcomponents
- UL listed and CSA certified
- Type 12, 13



UL Listed
File No. E68961



CSA Certified
File No. LR48366

Contact Ratings

Rated Thermal Current			10A			
AC	Break Current		120V/5A	240V/3A	480V/2A	600V/1A
DC	Resistive	Break Current	24V/8A	110V/3A	220V/1A	440V/0.45A
	Inductive	Break Current	24V/5A	110V/1.2A	220V/0.45A	440V/0.20A
		Make Current (A)	Rated amperage x 1.1			
Electrical Life			500,000 operations minimum (at full rated load)			
Mechanical Life			5,000,000 (at no load)			

CS Series

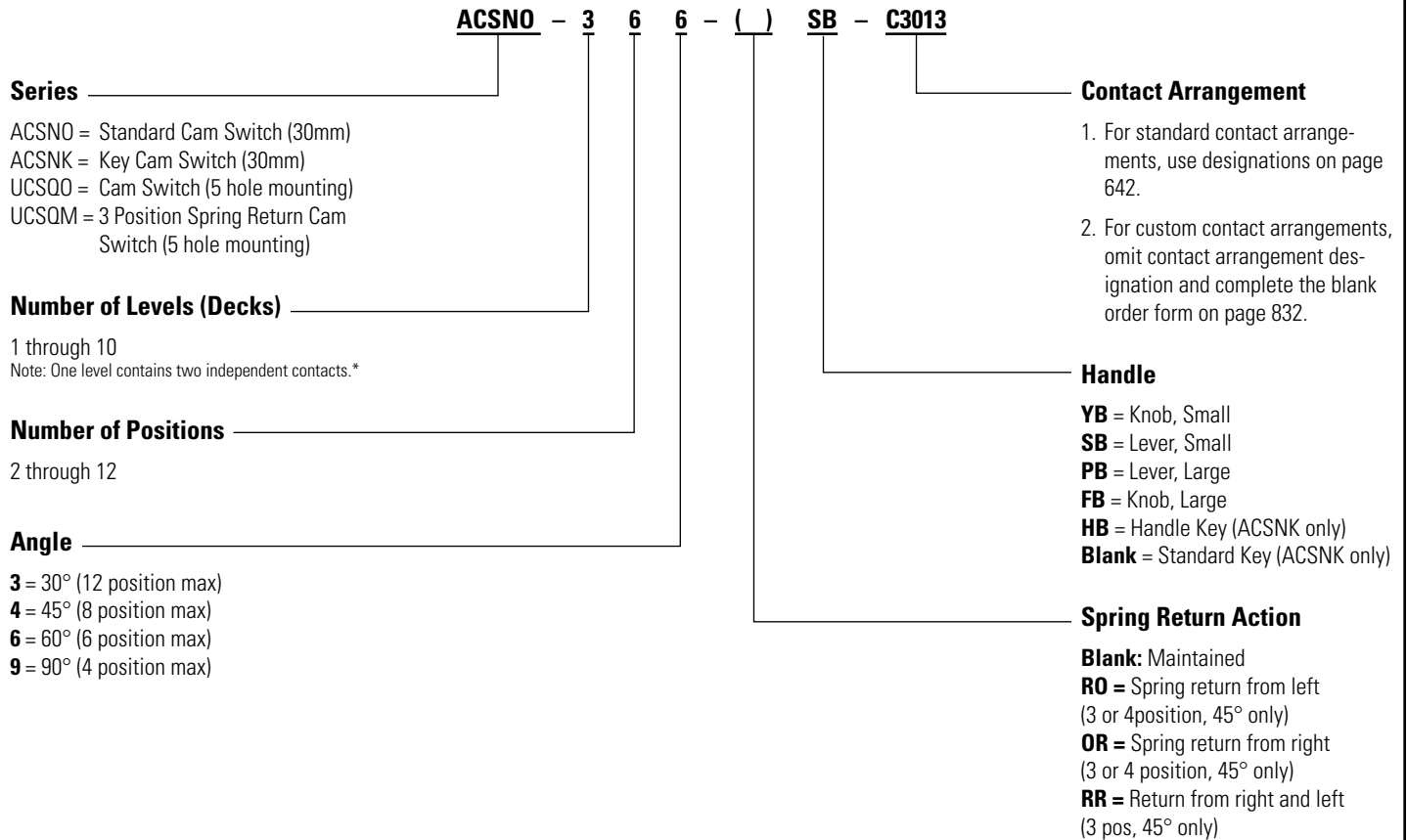
Operator					
Series	Style	Cam Angle	Position	Maximum Contacts To Be Mounted	Handle Styles
ACSNO		30°	Up to 12	1 to 10 decks; Up to 20 contacts	YB, SB, PB, FB
		45°	Up to 8		
		60°	Up to 6		
		90°	Up to 4		
ACSNK		30°	Up to 12	1 to 10 decks; Up to 20 contacts	HB or standard key
		45°	Up to 8		
		60°	Up to 6		
		90°	Up to 4		
UCSQO		30°	Up to 12	1 to 10 decks; Up to 20 contacts	YB, SB, PB, FB
		45°	Up to 8		
		60°	Up to 6		
		90°	Up to 4		
UCSQM		45° Spring return	Only 3	1 to 3 decks; Up to 6 contacts	YB, SB, PB, FB

-
1. Do not use spring return (SR) for more than six contacts.

2. Two identical keys come with ACSNK unit. Specify "H" for handle key option.

Selector Switches (Assembled)

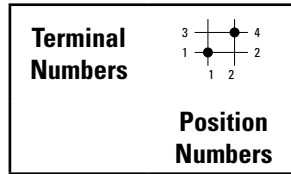
Assembled Selector Switches



- *Contact blocks may contain two independent contacts, (a four position switch with four independent contacts only requires two contact blocks).
- *Caution: switches with 180° or more of rotation may require separate blocks for each contact due to cam overlapping.
- Key retainable in every 45° position (45, 90, 180, 225, 270, 315, 360).

Contact Arrangements

Standard Arrangements



C-1001



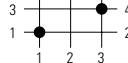
C-1002



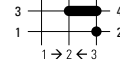
C-1014



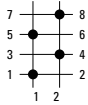
C-1005



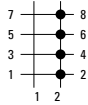
C-1008



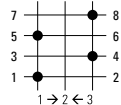
C-2001



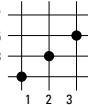
C-2002



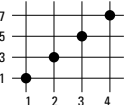
C-2006



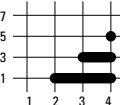
C-2004



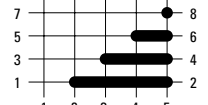
C-2008



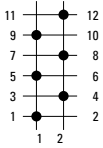
C-2009



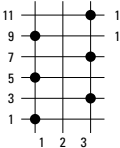
C-2027



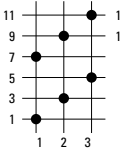
C-3001



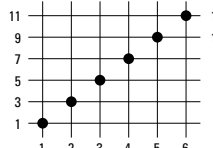
C-3002



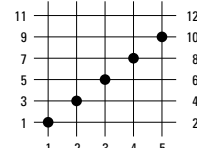
C-3005



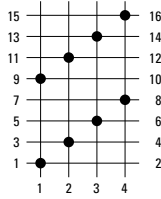
C-3013



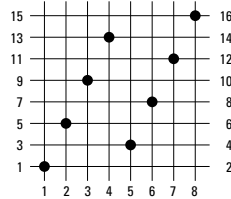
C-3016



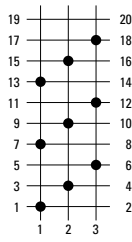
C-4001



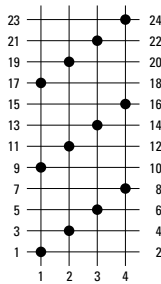
C-4002



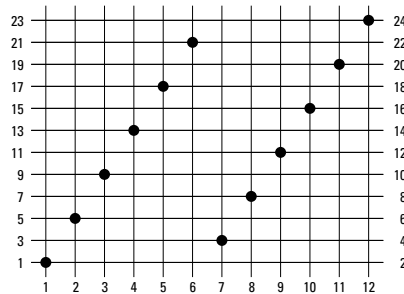
C-5001



C-6001



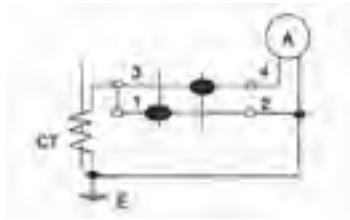
C-6002



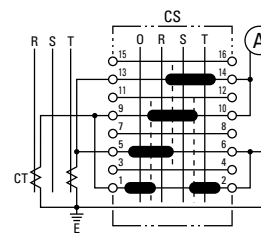
Contact Arrangements continued

Ammeter Switching

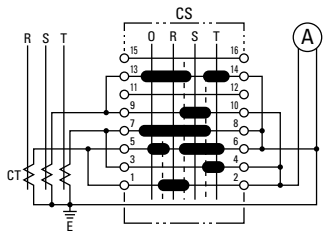
C-1012



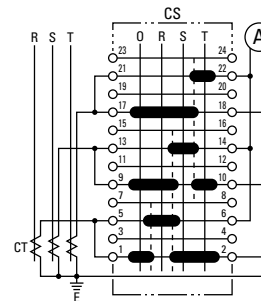
C-4007



C-4003

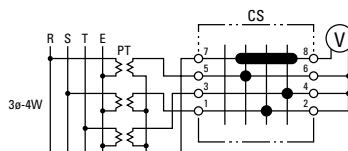


C-6003

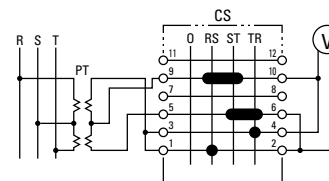


Voltmeter Switching

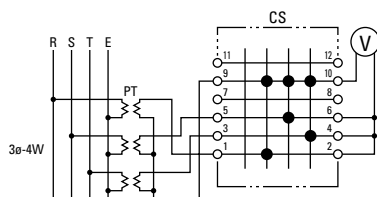
C-2022



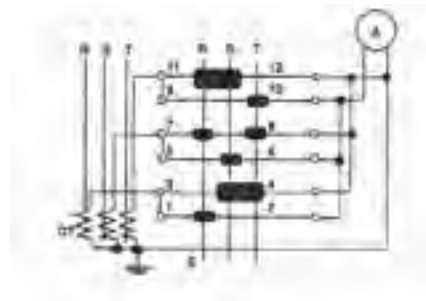
C-3008



C-3009



C-3007



Order Form (Custom Contact Arrangement)

Series

ACSNO
ACS NK
UCSQO
UCSQM

*Number of Decks

Specify Qty = 1, 2, 3, 4,
5, 6, 7, 8, 9, or 10

*Note: One Deck can drive two independent contacts.

Number of Positions

Unit	Angle	Positions
ACSNO ACS NK* UCSQO	30° only	9, 10, 11, 12
	30° or 45° only	7 or 8
	30°, 45° or 60°	5 or 6
	30°, 45°, 60°, 90°	2, 3, or 4
UCSQM	45° only	3 only

Angle

3 = 30°
4 = 45°
6 = 60°
9 = 90°

Handle

ACSNO, UCSQO, UCSQM:

YB = Knob, Small
SB = Lever, Small
PB = Lever, Large
FB = Knob, Large

ACS NK:

HB = Handle Key (option)
Blank = Standard Key

Spring Return

Blank = Maintained
RO = Spring return from left
(3 or 4 position, 45°)
OR = Spring return from right
(3 or 4 position, 45°)
RR = Return from right and left
(3 position, 45°)

UCSQM is available in spring-return
version only.

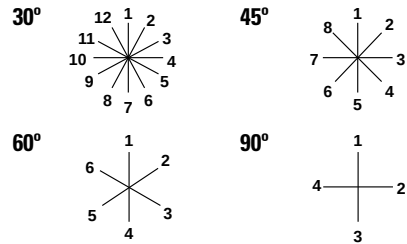
For handle styles, see page 833.

Contact Arrangement Table

Cams	Terminal Numbers	Position											
		1	2	3	4	5	6	7	8	9	10	11	12
Deck 1	1 and 2												
	3 and 4												
Deck 2	5 and 6												
	7 and 8												
Deck 3	9 and 10												
	11 and 12												
Deck 4	13 and 14												
	15 and 16												
Deck 5	17 and 18												
	19 and 20												
Deck 6	21 and 22												
	23 and 24												
Deck 7	25 and 26												
	27 and 28												
Deck 8	29 and 30												
	31 and 32												
Deck 9	33 and 34												
	35 and 36												
Deck 10	37 and 38												
	39 and 40												

To specify non-standard arrangements (designation not on preceding pages), fill in this table using the following symbols.
X = Closed contact (break before make) O = Open contact X-X = Overlapping contact (remain on when switch is moved between two positions)

Specifying Nameplate (Optional)



Specifying Legends

Position

1

2

3

4

5

6

If no engraving information is provided, a blank nameplate will be supplied.

1

2

3

4

5

6

Accessories — CS Series

Replacement Handles

					
Part Number	CSH-YB	CSH-SB	CSH-PB	CSH-FB	CSH-H2B
Dimensions	0.79"D x 1.61"H	0.79"D x 1.97"H	1.58"D x 1.97"H	1.58"D x Ø 1.97"	0.95"D x 2.28"H
Applicable Models	ACSNO, UCSQO, UCSQM				ACSNK

Replacement Nameplates

Size & Shape □ 2.52" (64mm) Black Aluminum			
Part Number	CQ	CQM	CQN
Applicable Models	UCSQO	UCSQM	ACSNO, ACSNK



1. Extra cost for engraving, 3/16" min. letter height, Legends maximum ten characters.
2. Blank nameplates are supplied with all cam switches (they need not be ordered separately).

Wiring Clips

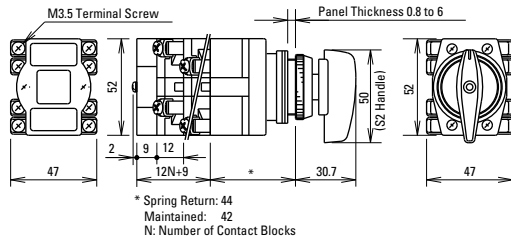
Part Number	Contact Block Jumpers
CJ-1 	Between decks
CJ-2 	Same deck

Replacement Keys

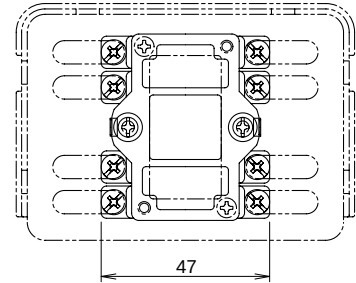
Part Number	Description
K301 	Pair of keys (#301)

Dimensions/Terminal Arrangements/Mounting Holes

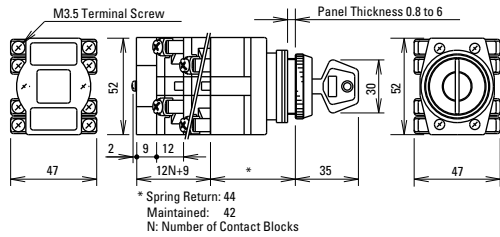
ACSNO



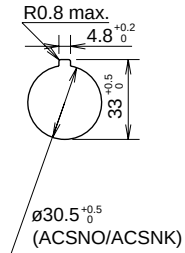
Terminal Arrangement



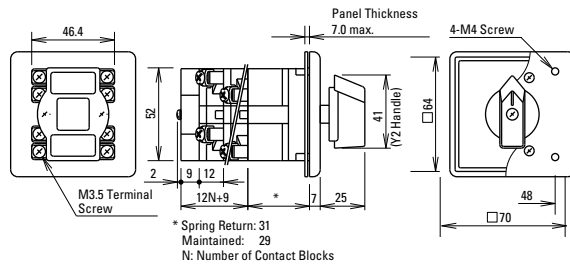
ACS NK



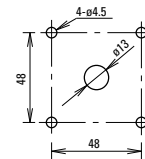
Mounting Holes



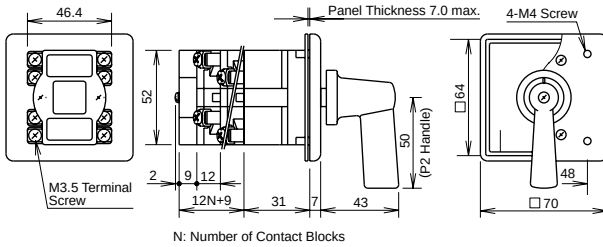
UCSQO



UCSQO UCSQM



UCSQM



ARN Series — Mono-Lever Switches

Key features:

- Mono-Lever Switches Ø 1-13/64" (30mm)
- Contact Blocks Rated for 600V, 10A
- Available in 2-, 3-, and 4-positions.
- Maintained and spring-return modes available.
- Models available with interlock mechanism to prevent inadvertent actuation.



UL Listed
File No. E68961



CSA Certified
File No. LR48366

Specifications

Operating Temperature		-25° to 50°C (without freezing)
Insulation Resistance		100MΩ
Contact Rating	Rated Voltage: Current	110VDC: 3A
		24V AC/DC: 10A
		120VAC: 10A
		240VAC: 6A
		480VAC: 2A
	Insulation Voltage	600V AC/DC
	Rated Thermal Current	10A
	Electrical Life	Over 500,000 operations

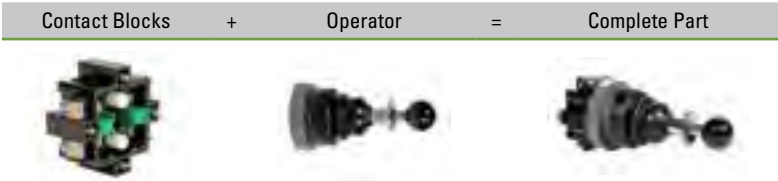
Part Numbering Guide (Assembled)

ARN	4	—	1012	—	10.00.02.11
① Style	② Number of Contact Blocks		③ Lever Action		④ Contact Arrangement

	Description	Code	Remarks
① Style	Standard Lever	ARN	Interlocking lever prevents inadvertent operation.
	Short Lever	ARNS	
	Interlocking Lever	ARNL	
② No. of Contact Blocks	—	1	Each contact block contains two independent contacts.
		2	
		3	
		4	
③ Lever Action	Blocked	0	Specify in this order: Up.Right.Down.Left
	Maintained	1	
	Spring Return	2	
④ Contact Arrangement	No contacts	00	Specify the number of contacts to be activated in all active (non-blocked) positions: Up.Right.Down.Left For blocked positions use code: 00
	1 NO contact	10	
	1 NC contact	01	
	1 NO and 1 NC contact	11	
	2 NO contacts	20	
	2 NC contacts	02	



Mono-Lever Switches (Sub-Assembled)



Standard Mono-Lever Operators

Style	Lever Operation Mode	Part Number
Standard Lever	2-Position manual return	ARN0-1010-B
	3-Position manual return	ARN0-1110-B
	4-Position manual return	ARN0-1111-B
	2-Position spring return	ARN0-2020-B
Short Lever	3-Position spring return	ARN0-2220-B
	4-Position spring return	ARN0-2222-B
Interlocking Lever	2-Position manual return	ARNS0-1010-B
	3-Position manual return	ARNS0-1110-B
	4-Position manual return	ARNS0-1111-B
	2-Position spring return	ARNS0-2020-B
Interlocking Lever	3-Position spring return	ARNS0-2220-B
	4-Position spring return	ARNS0-2222-B
Interlocking Lever	2-Position manual return	ARNL0-1010-B
	3-Position manual return	ARNL0-1110-B
	4-Position manual return	ARNL0-1111-B
	2-Position spring return	ARNL0-2020-B
Interlocking Lever	3-Position spring return	ARNL0-2220-B
	4-Position spring return	ARNL0-2222-B

Contact Blocks

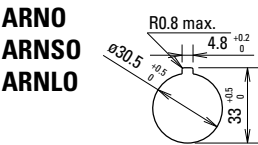
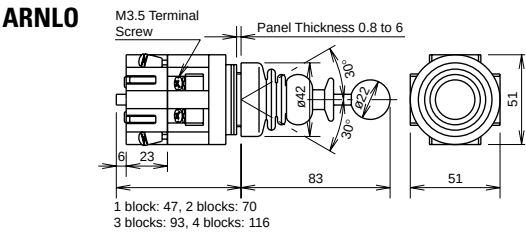
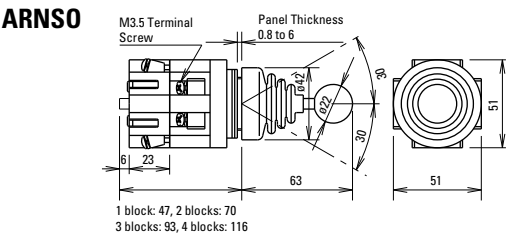
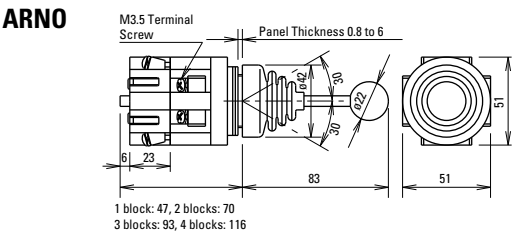
Style	Contact Arrangement	Part Number
	2NO contacts	BR-1E
	1NO & 1NC contact	BR-2E
	2NC contacts	BR-3E
	1NO early make contact	BR-1EM

To calculate the number of contact blocks required, add the number of NO and NC contacts on each pair of adjoining positions (up + right, right + down, down + left, and left + up). The largest of the four sums is the number of contact blocks required. Up to four contact blocks can be mounted.

Replacement Parts

Style	Part Number
Bellows	ARN0, ARNS0 (standard & short lever) ARN-BL
	ARNL0 (Interlocking) ARNL-BL (comes in 2 pieces)
Knob (ball)	All Models Knob (ball) ARNB-B

Dimensions — ARN Series



Piezo Switches

Product Description

Designed for demanding applications where reliability is critical, Piezo switches are based on solid-state outputs allowing for an exceptionally long lifespan. The flat metal surface is completely closed, preventing ingress of liquids and other contaminants, and is perfect for surface cleaning, required in medical and food processing industries. High performance sealing up to IP68 and IP69K is achieved with the single piece construction of the switch.

The Piezo switch series includes a choice of 22mm or 30mm diameter housings with ring or dot illumination, various LED color options (including dual color).

Key features:

- 22 or 30mm diameter stainless steel 316L housing
- Sealing up to IP68 & IP69K (switches mounted on panel)
- Flush mount bezel
- Easy to clean metal surface
- Solid state switch, no moving parts
- Over 50 million lifecycles
- Dot or ring illumination options
- Side viewable illumination models
- Single or dual illumination color
- Short uni-body construction



PW1L-R6AFB002
22mm with LED dot
& finger guide



PW1L-RYAFB002
22mm chamfer
with LED ring



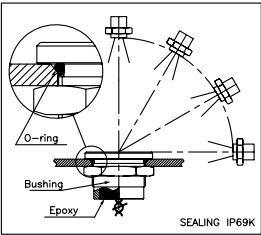
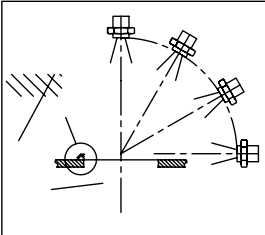
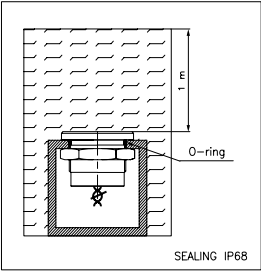
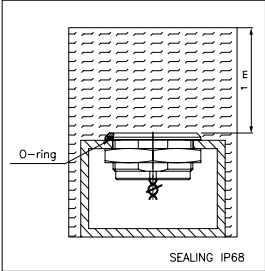
PN1L-M2AFB002
30mm flush
with LED ring



PN1L-M4AFB002
30mm with side-
viewable LED ring

Specifications

PART NUMBER		PW1L-R6AFB002 ①②	PW1L-RYAFB002 ①②	PN1L-M2AFB002 ①②	PN1L-M4AFB002 ①②
Construction		Momentary, solid state pushbutton, dot LED indicator, 3mm mount bezel with finger guide	Momentary, solid state pushbutton, LED ring illumination, 4.5mm chamfered bezel	Momentary, solid state pushbutton, LED ring illumination, 2.5mm flush mount bezel	Momentary, solid state pushbutton, LED side-viewable ring illumination, 5.5mm mount bezel
Housing diameter		22mm	22mm	30mm	30mm
MATERIALS	Housing	Stainless steel 316L	Stainless steel 316L	Stainless steel 316L	Stainless steel 316L
	Wire sealing	Epoxy	Epoxy	Epoxy	Epoxy
	Illuminated ring		Polycarbonate (translucent when off)	Polycarbonate (translucent when off)	Polycarbonate (translucent when off)
	Locking nut	Stainless steel	Stainless steel	PA6.6 nylon - black	PA6.6 nylon - black
ELECTRICAL	Switch effect	Pulse once activated (pulse duration depending on actuation force and speed)			
	Electrical function	1 Normally Open (NO) contact			
	Maximum ratings	1A@ 24V AC or DC			
	Electrical life	50 million cycles			
	Switch resistance ON / OFF	ON: 10 ohms max / OFF: 5 M ohms min			
	LED consumption	10mA @ 12VDC or 24VDC			20mA @ 12VDC or 24VDC
	Insulation resistance	1000 Mohms minimum at 500VDC			
Dielectric strength		500 Vrms 50Hz min between outputs and housing			
MECHANICAL	Torque	2.5Nm (1.8lb-ft) min - 3.0Nm (2.2lb-ft) max applied to locking nut		1.5Nm (1.1lb-ft) min - 10.0Nm (7.4lb-ft) max applied to locking nut	
	Operating force	2.00N (0.45lb) - 6.00N (1.35lb)		6.00N (1.35lb) - 12.00N (2.70lb)	
	Panel thickness	1.5mm min to 6.5mm max		1.5mm min to 6mm max	
Temperature range		-40°C to +75°C (-40°F to +167°F)			
Sealing		IP68 according to IEC 60529; IP69K according to DIN 40050-9			
Vibration resistance		10-500Hz / 10g per IEC 60068-2-6			
EMC		EN61000-4 & EN61000-6-2			

IP69K SEALING	TEST CONDITIONS: • Pressure: 80-120 bars • Distance: 150mm • Temperature: 80°C ± 5° • Flow: 14-16 l/m • Duration: 30 seconds per position		
IP68 SEALING	TEST CONDITIONS: Continuous immersion in water		

Part Numbers

Part Number	Description	Panel cut size	LED voltage ①	LED color ②
PW1L-R6AFB002①②	22mm Piezo switch with LED dot & finger guide	Ø22mm	P: Dot / 12VDC J: Dot / 24VDC	OB: Blue OG: Green OS: Red OY: Yellow OW: White SG: Red/Green ¹
PW1L-RYAFB002①②	22mm Piezo switch with LED ring	Ø22mm	D: Ring / 12VDC E: Ring / 24VDC	OB: Blue OG: Green OS: Red OY: Yellow OW: White 2A: Red/Green ²
PN1L-M2AFB002①②	30mm flush Piezo switch with LED ring	Ø30mm	D: Ring / 12VDC E: Ring / 24VDC	OB: Blue OG: Green OS: Red OY: Yellow OW: White 2A: Red/Green ²
PN1L-M4AFB002①②	30mm Piezo switch with side viewable LED ring	Ø30mm	D: Ring / 12VDC E: Ring / 24VDC	OB: Blue OG: Green OS: Red OY: Yellow OW: White 2A: Red/Green ²

Replacement Parts

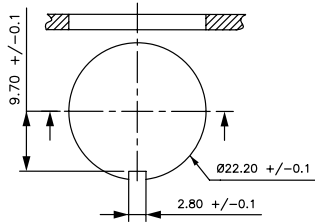
Part Number	Description	Size	Material
PW9Z-LNM	Spare 22mm Piezo Switch Hex Locking Nut	M22x1	Metal
PN9Z-LN	Spare 30mm Piezo Switch Hex Locking Nut	M30x1.5	Plastic

Note:
1. See Equivalent Circuit Diagram-2 on page 837 for details.
2. See Equivalent Circuit Diagram-4 on page 837 & 838 for details.

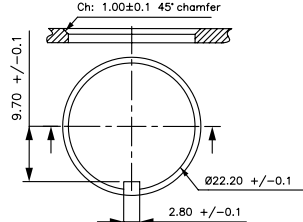
PIEZO SWITCH PW1L-R6AFB002

PANEL CUT OUT

All dimensions in mm



IP68 PANEL CUT OUT

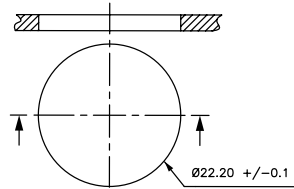


IP69K PANEL CUT OUT

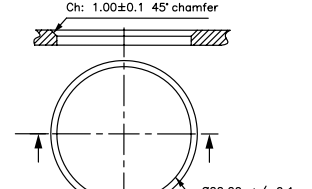
PIEZO SWITCH PW1L-RYAFB002

PANEL CUT OUT

All dimensions in mm

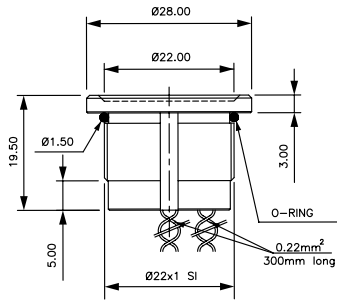


IP68 PANEL CUT OUT

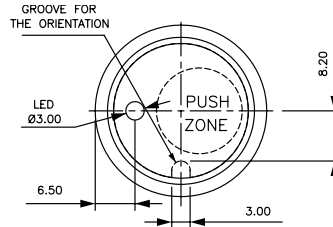
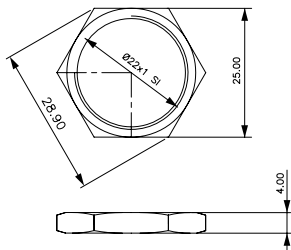


IP69K PANEL CUT OUT

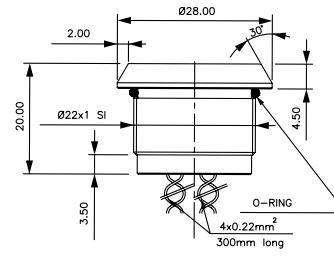
DIMENSIONS



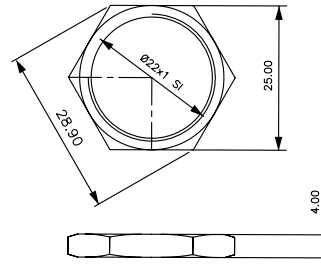
PW9Z-LNM



DIMENSIONS



PW9Z-LNM

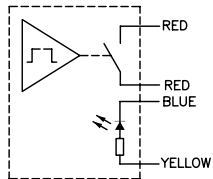


PW1L-RYAFB002

PW1L-R6AFB002

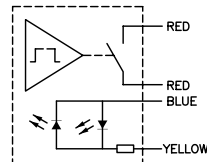
Type of Illumination-Voltage	
P	DOT - 12V
J	DOT - 24V

LED COLORS	DIAGRAM TYP.
OB	BLUE
OG	GREEN
OS	RED
OY	YELLOW
OW	WHITE
SG	RED/GREEN



EQUIVALENT CIRCUIT DIAGRAM-1

LED COLOR	RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
RED	RED WIRE	LED +12V DC or +24V DC
BLUE	BLUE WIRE	LED GND

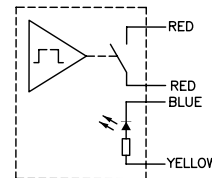


EQUIVALENT CIRCUIT DIAGRAM-2

LED COLOR	RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
RED	RED WIRE	LED +12V DC or +24V DC
GREEN	GREEN WIRE	LED +12V DC or +24V DC
YELLOW	YELLOW WIRE	LED GND
BLUE	BLUE WIRE	LED +12V DC or +24V DC

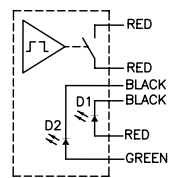
Type of Illumination-Voltage	
D	Thin ring 12V
E	Thin ring 24V

LED COLORS	DIAGRAM TYP.
OB	BLUE
OG	GREEN
OS	RED
OY	YELLOW
OW	WHITE
2A	RED/GREEN



EQUIVALENT CIRCUIT DIAGRAM-3

LED COLOR	RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
RED	RED WIRE	LED +12V DC or +24V DC
BLUE	BLUE WIRE	LED GND

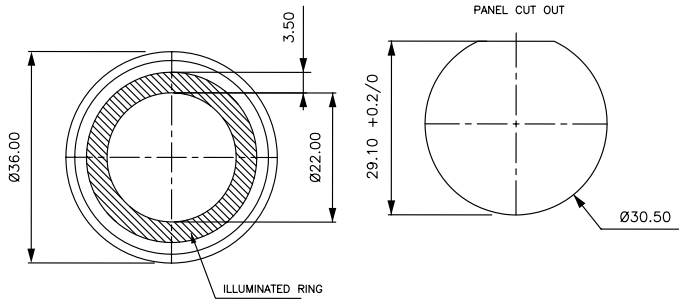
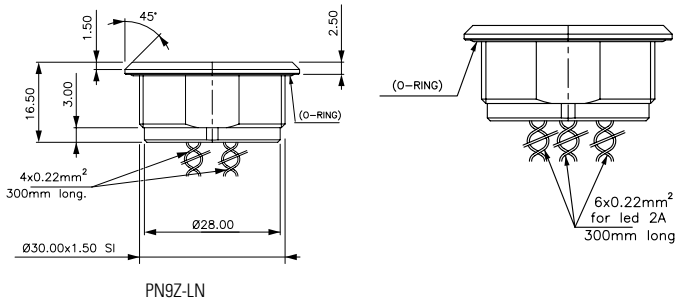


EQUIVALENT CIRCUIT DIAGRAM-4

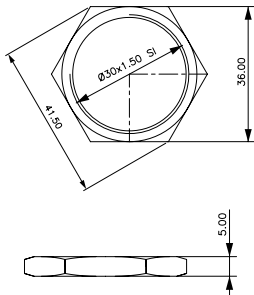
LED COLOR	RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
RED	RED WIRE	LED +12V DC or +24V DC
GREEN	GREEN WIRE	LED +12V DC or +24V DC
BLACK	BLACK WIRE	LED GND
RED	RED WIRE	LED +12V DC or +24V DC

PIEZO SWITCH PN1L-M2AFB002**PANEL CUT OUT**

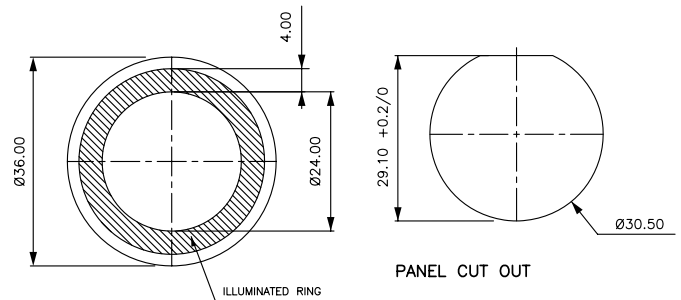
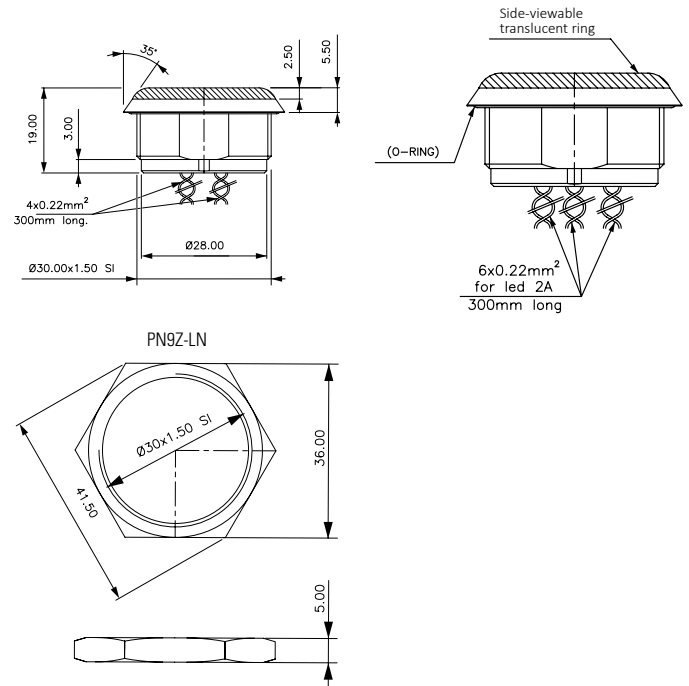
All dimensions in mm

**DIMENSIONS**

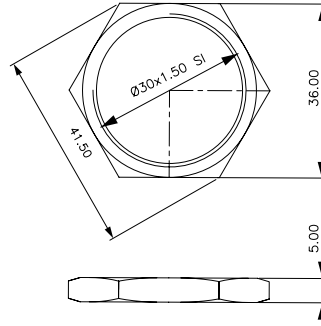
PN9Z-LN

**PIEZO SWITCH PN1L-M4AFB002****PANEL CUT OUT**

All dimensions in mm

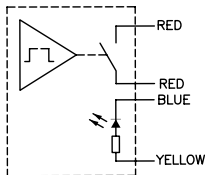
**DIMENSIONS**

PN9Z-LN

**PN1L-M2AFB002**

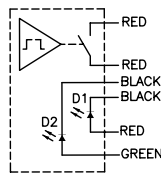
Type of Illumination-Voltage	
D	12V
E	24V

LED COLORS	DIAGRAM TYP.
OB BLUE	1
OG GREEN	1
OS RED	1
OY YELLOW	1
OW WHITE	1
2A RED/GREEN	2



EQUIVALENT CIRCUIT DIAGRAM-1

RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
YELLOW WIRE	LED +12V DC or +24V DC
BLUE WIRE	LED GND



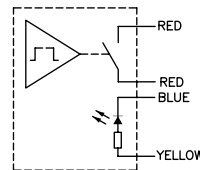
EQUIVALENT CIRCUIT DIAGRAM-2

RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
GREEN WIRE	LED +12V DC or +24V DC
BLACK WIRE	LED GND
BLACK WIRE	LED GND
RED WIRE	LED +12V DC or +24V DC

PN1L-M4AFB002

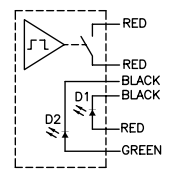
Type of Illumination-Voltage	
D	12V
E	24V

LED COLORS	DIAGRAM TYP.
OB BLUE	1
OG GREEN	1
OS RED	1
OY YELLOW	1
OW WHITE	1
2A RED/GREEN	2



EQUIVALENT CIRCUIT DIAGRAM-3

RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
YELLOW WIRE	LED +12V DC or +24V DC
BLUE WIRE	LED GND



EQUIVALENT CIRCUIT DIAGRAM-4

RED WIRES	N.O. CONTACT Max.rating: 1A 24V AC/DC
GREEN WIRE	LED +12V DC or +24V DC
BLACK WIRE	LED GND
BLACK WIRE	LED GND
RED WIRE	LED +12V DC or +24V DC

Selection Guide.....	842
SignalLight Towers.....	844
LD6A LED SignalLight Towers.....	844
LT7 LED Series Light Towers.....	853
Surface Mount Indicators	856
LH Series Surface Mount Indicators.....	856
Jumbo Dome Pilot Lights.....	861
Panel Mounted Annunciators	862
30mm SLC30 Series	862
30mm SLC30-IPS Series	870
40mm SLC40 Series.....	878

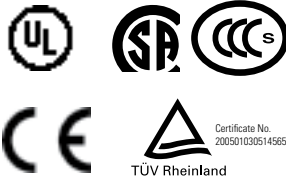
Signaling Lights



www.IDEC.com/signalinglights



Selection Guide

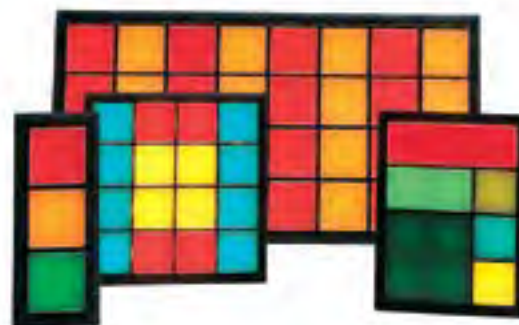
Series	SignalLight Towers		Surface Mount Indicators	
	LD6A	LT7	LH1D	Jumbo Dome Pilot Lights
Appearance				
Page	844	853	856	861
Description	LED Steady or Flashing Light with Buzzer	LED Steady or Flashing Light with Buzzer	LED One-color, Two-color, or Three-color Alternate Illumination	Incandescent or LED
Features	- Unique oval lens shape provides clear distinction between LED colors - Color coded wires	- Ultra bright LEDs - Fast and easy assembly - Optional adjustable alarm - Color-coded wiring terminals - LED strobe modules	Flat lens, dome, or jumbo dome lenses	Large dome lens
Nominal Voltage	24V AC/DC	24V DC, 90-250V AC	24V AC/DC	24V AC/DC
Lamp Style	Lens LED Modules	Lens LED modules	LED	LED or Incandescent
Lens Colors	Red, Yellow, Blue, Green, White	Red, Amber, Green, Blue, White, Lemon Yellow	Cool White, Blue, Green, Yellow, Warm White, Amber, Red	Amber, Green, Red, Blue, White, Yellow
Degree of Protection	IP65, IP54, IP23	IP65, Type 4, 4X, 13	IP67, Type 4X	IP65
Mounting	Frame mount Wall mount Direct mount Pole mount with base Pole mount with L-shaped bracket	Base-mounting with stud L-angle bracket with pole Base-mount with pole Wall mount bracket	Direct mount Surface mount	22mm panel cut-out
Lens Shape/Size	Oval / 40mm x 60mm	Round / 70mm (2.75")	Dome / ø37mm Flat / 35mm x 34mm Jumbo Dome / ø66mm	Dome / ø66mm
Ratings/Approvals				

SLC Series — Panel Mount Annunciators

Series	SLC30 1.18" (30mm)		SLC30-IPS 1.18" (30mm)	SLC40 1.57" (40mm)	
Appearance	Full Voltage 		Available with integrated control unit pushbuttons and key switches 	Full Voltage 	
	Transformer 			Transformer 	
Page	862		870	878	
Features	• Custom-built, multiple combination windows • Custom illumination color combinations • Optional legend engraving				
Illumination Face Size	Style F: 1.181" x 1.181" (30 x 30mm) Style H: 1.181" x 2.362" (30 x 60mm) Style L: 1.181" x 3.543" (30 x 90mm) Style V: 2.362" x 1.181" (60 x 30mm) Style G: 2.362" x 2.362" (60 x 60mm)			Style F: 1.575" x 1.575" (40 x 40mm) Style H: 1.575" x 3.150" (40 x 80mm) Style L: 1.575" x 4.724" (40 x 120mm) Style V: 3.150" x 1.575" (80 x 40mm) Style G: 3.150" x 3.150" (80 x 80mm)	
Light Source	LED cluster or bayonet base incandescent (1W)			LED cluster or screw base incandescent (2W)	
Illumination Colors	LED: Amber, Blue, Green, Red, Yellow, White, Red/Green 2-color alternate* Incandescent: Amber, Blue, Green, Red, Yellow, White				
Input Type/Voltage	LED	Full voltage	6, 12, 24V DC		
		Transformer	120V, 240V AC		
		DC-DC converter	110V DC		
	Incandescent	Full voltage	6.3, 18, 24, 30V DC		
		Transformer	120V, 240V AC (50/60Hz)		
Terminations	M3.5 screw with captive sems plate (M3 screw check terminals on applicable units) LED models feature M3.5 spring-up terminals				
Approvals	 Cert No. B970213332375  UL Recognized File No. E68961   CSA Certified File No. LR48366  ABS American Bureau of Shipping				



*Red/Green 2-color alternate available in 24V LED only.



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

LD6A LED SignalLight Towers

Unique Striped Design Improves Visibility

Key features of the LD6A LED SignalLight Towers include:

- The striped design with non-illuminated area between the lenses makes the illuminated color very visible.
- Unique oval lens shape provides high-visibility from different directions.
- Five different mounting styles available: frame mount, wall mount, direct mount and pole mount (round or L-shaped bracket).
- Clear lens models available to clearly distinguish between illuminated and non-illuminated lenses.
- Custom configuration is possible.
- Flashing cycle: 1.75Hz (approx. 105 flashes per minute) conforms to international standard IEC 60073.
- Alarm (3.3kHz, 2 different styles) can be heard in 360° degrees. Adjustable volume (70 to 90dB).
- Degree of protection: IP65 Steady units and IP54 Flashing units (using frame, wall, direct and pole mount with round base), IP23 Steady and Flashing units using pole mount with L-shaped bracket.



Assembled Products

Mounting Style	Tiers	LED Color Code	Steady		Steady/Flashing/Alarm	
			Part Number	Weight (approx.)	Part Number	Weight (approx.)
G: Frame Mount	1	R, Y, S, G, W	LD6A-1GQ*-□	220g	LD6A-1GZQ*-□	310g
	2	RY, RG	LD6A-2GQ*-□	260g	LD6A-2GZQ*-□	350g
	3	RYS, RYG	LD6A-3GQ*-□	300g	LD6A-3GZQ*-□	390g
	4	RYSG	LD6A-4GQ*-□	340g	LD6A-4GZQ*-□	430g
	5	RYSGW	LD6A-5GQ*-□	380g	LD6A-5GZQ*-□	470g
W: Wall Mount	1	R, Y, S, G, W	LD6A-1WQ*-□	225g	LD6A-1WZQ*-□	315g
	2	RY, RG	LD6A-2WQ*-□	265g	LD6A-2WZQ*-□	355g
	3	RYS, RYG	LD6A-3WQ*-□	305g	LD6A-3WZQ*-□	395g
	4	RYSG	LD6A-4WQ*-□	345g	LD6A-4WZQ*-□	435g
	5	RYSGW	LD6A-5WQ*-□	385g	LD6A-5WZQ*-□	475g
D: Direct Mount	1	R, Y, S, G, W	LD6A-1DQ*-□	185g	LD6A-1DZQ*-□	275g
	2	RY, RG	LD6A-2DQ*-□	225g	LD6A-2DZQ*-□	315g
	3	RYS, RYG	LD6A-3DQ*-□	265g	LD6A-3DZQ*-□	355g
	4	RYSG	LD6A-4DQ*-□	305g	LD6A-4DZQ*-□	395g
	5	RYSGW	LD6A-5DQ*-□	345g	LD6A-5DZQ*-□	435g
P: Pole Mount (with base)	1	R, Y, S, G, W	LD6A-1PQ*-□	645g	LD6A-1PZQ*-□	735g
	2	RY, RG	LD6A-2PQ*-□	685g	LD6A-2PZQ*-□	775g
	3	RYS, RYG	LD6A-3PQ*-□	725g	LD6A-3PZQ*-□	815g
	4	RYSG	LD6A-4PQ*-□	765g	LD6A-4PZQ*-□	855g
	5	RYSGW	LD6A-5PQ*-□	805g	LD6A-5PZQ*-□	895g
K: Pole Mount (with L-shaped bracket)	1	R, Y, S, G, W	LD6A-1KQ*-□	640g	LD6A-1KZQ*-□	730g
	2	RY, RG	LD6A-2KQ*-□	680g	LD6A-2KZQ*-□	770g
	3	RYS, RYG	LD6A-3KQ*-□	720g	LD6A-3KZQ*-□	810g
	4	RYSG	LD6A-4KQ*-□	760g	LD6A-4KZQ*-□	850g
	5	RYSGW	LD6A-5KQ*-□	800g	LD6A-5KZQ*-□	890g



Specify housing color code in place of *: B (black), W (light gray)

Specify illumination color in place of □ starting with the top tier. State the LED color code from the left.

R (red), Y (yellow), S (blue), G (green), W (pure white)
Example: When the LED color is RYGSW => **LD6A-5GQW-RYGSW**

Clear lens type also available.

Specify "C" after the LED color code.

Example:

LD6A-5GQW-RYGSW => LD6A-5GQW-RYGSWC

Combination of LED Color and Lens Color

LED Color	Color Lens Type	Clear Lens Type
R: Red	Red lens	Clear lens
Y: Yellow	Yellow lens	Clear lens
S: Blue	Blue lens	Clear lens
G: Green	Green lens	Clear lens
W: White	Clear lens	



For white (W) LED, a clear lens is used in both color and clear lens configurations.

Mounting Parts Included

Mounting Style	Supplied Parts
G: Frame mount	M4 screw (4 pcs)*, M4 spring washer (4 pcs)*, M4 plain washer (4 pcs)*, M5 screw (2 pcs), M5 spring washer (2 pcs), M5 plain washer (2 pcs), bracket (1 pc)
W: Wall mount	M4 screw (20 mm) (4 pcs), M4 screw (8 mm) (4 pcs)*, M4 spring washer (8 pcs)*, M4 plain washer (8 pcs)*, M4 nut (4 pcs), bracket (1 pc), gasket (1 pc)
D: Direct mount	M5 screw (4 pcs)*, M5 spring washer (4 pcs)*, M5 plain washer (4 pcs)*, M5 nut (4 pcs)*, O-ring (4 pcs), gasket (1 pc)
P: Pole mount (with base)	M5 screw (4 pcs), M5 spring washer (4 pcs), M5 plain washer (4 pcs), M5 nut (4 pcs), O-ring (4 pcs), gasket (1 pc)
K: Pole mount (with L-shaped bracket)	M22 plain washer 2 (pcs), M22 nut (2 pcs), bracket (1 pc)



*For black housing, black screws and washers are supplied. For light gray housing, silver screws and washers are supplied.

Base Module

Style	Mounting Style	Part Number		Notes
		Steady	Steady/Flashing/Alarm	
	Frame Mount	LD6A-0GQ*	LD6A-0GZQ*	A top cap is supplied.
	Wall Mount	LD6A-0WQ*	LD6A-0WZQ*	
	Direct Mount	LD6A-0DQ*	LD6A-0DZQ*	
	Pole Mount (with base)	LD6A-0PQ*	LD6A-0PZQ*	
	Pole Mount (with L-shaped bracket)	LD6A-0KQ*	LD6A-0KZQ*	



Specify a housing color code in place of *: B (black), W (light gray)
Do not supply power to the base module without connecting LED modules.

LED Module

Style		Lens	Part Number	LED Color Code
	Black	Color lens	LD9Z-6ALB-□	R, Y, S, G, W
		Clear lens	LD9Z-6ALB- □ C	R, Y, S, G
	Light gray	Color lens	LD9Z-6ALW- □	R, Y, S, G, W
		Clear lens	LD9Z-6ALW- □ C	R, Y, S, G



Specify an LED color code in place of □: R (red), Y (yellow), S (blue), G (green), W (white)
When using white (W) with a clear lens, order LD9Z-6ALB-W (black housing) or LD9Z-6ALW-W (light gray housing).

Center Set Screw

Item		Part Number	Notes
	1 tier	LD9Z-6AC1	A plain washer and spring washer are supplied.
	2 tiers	LD9Z-6AC2	
	3 tiers	LD9Z-6AC3	
	4 tiers	LD9Z-6AC4	
	5 tiers	LD9Z-6AC5	

Ordering Examples

- [Ex. 1]

When ordering LD6A-3PQW-RYG as sub-component parts, specify the following:

Pole mount (with base), steady, light gray housing, 3 tiers, color lens LED modules with Red, Yellow, and Green LED

Base module (pole mount with base, steady, light gray housing)

LD6A-0PQW

1 piece

LED module (red LED with color lens, light gray housing)

LD9Z-6ALW-R

1 piece

LED module (yellow LED with color lens, light gray housing)

LD9Z-6ALW-Y

1 piece

LED module (green LED with color lens, light gray housing)

LD9Z-6ALW-G

1 piece

Center screw set (3 tiers)

LD9Z-6AC3

1 piece
- [Ex. 2]

When ordering LD6A-5WZQB-RYSGWC as sub-component parts, specify the following:

Wall mount, steady/flashing/alarm, black housing, 5 tiers, clear lens LED modules with Red, Yellow, Blue, Green, and Pure white LED

Base module (wall mount, steady/flashing/alarm, black housing)

LD6A-0WZQB

1 piece

LED module (red LED with clear lens, black housing)

LD9Z-6ALB-RC

1 piece

LED module (yellow LED with clear lens, black housing)

LD9Z-6ALB-YC

1 piece

LED module (blue LED with clear lens, black housing)

LD9Z-6ALB-SC

1 piece

LED module (green LED with clear lens, black housing)

LD9Z-6ALB-GC

1 piece

LED module (pure white LED with clear lens, black housing)

LD9Z-6ALB-W

1 piece

Center screw set (5 tiers)

LD9Z-6AC5

1 piece

Replacement Parts

Item	Description		Part Number	Notes
	Top Cap	Black	LD9Z-6ATB	A top cap is supplied with a base module.
		Light gray	LD9Z-6ATW	
	L-shaped Bracket	Metal (chrome-plated)	LD9Z-6AK	Two plain washers and two nuts are supplied.

Specifications

Specifications

Safety Standards	IEC60947-5-1, EN60947-5-1, UL508, CSA C22.2 No.14		
Operating Temperature	-25 to +55°C (no freezing)		
Operating Humidity	45 to 85% RH (no condensation)		
Storage Temperature	-40 to +75°C (no freezing)		
Overvoltage Category	III (IEC60664-1)		
Impulse Withstand Voltage	800V (IEC60947-1)		
Insulation Resistance	100 MΩ minimum (500V DC megger)		
Dielectric Strength	Between live and dead parts: 1000V AC, 1 minute		
Pollution Degree	3		
Corrosion Immunity	Atmosphere free from corrosive gases		
Vibration Resistance	Operating extremes: 10 to 55Hz, amplitude 0.5 mm		
Shock Resistance	Operating extremes: 147 m/s ² , 6 shocks each in 6 axes		
Degree of Protection (IEC60529)	Steady	frame mount, wall mount, direct mount, pole mount with base	IP65
	Steady	pole mount with L-shaped bracket	IP23
	Flashing/Alarm	frame mount, wall mount, direct mount, pole mount with base	IP54
	Flashing/Alarm	pole mount with L-shaped bracket	IP23
Housing Color	Black, Light gray		
Material	Housing: ABS resin Lens: AS resin Pole: Steel (nickel-chrome plated) Pole base: Diecast aluminum		
Wire	22AWG		

Functional Specifications

Rated Insulation Voltage		60V		
Operating Voltage		24V AC/DC ±10%		
Rated Voltage (Ue)		24V AC/DC		
LED Color Code		R (red), Y (yellow), S (blue), G (green), W (white)		
LED	Illumination Color	R, Y	S, G	W
	Rated Current (per tier)	25mA	30mA	20mA
	Power Consumption (per tier)	0.6W	0.75W	0.5W
LED Life (Note)		Approx. 30,000 hours (until brightness is reduced to 50% of the initial value in a 25°C operating environment)		
Flashing Cycle (IEC60073)		Approx. 105 flashes per minute (1.75 Hz)		
Alarm	Alarm Cycle	Alarm 1: approx. 700 times per minute Alarm 2: approx. 35 times per minute		
	Current Draw	110mA max.		
	Inrush Current	AC: 400mA max. DC: 250mA max.		
	Alarm Volume	70 to 90dB, at 1m (volume adjustable)		
	Acoustic Frequency	Approx. 3.3kHz		

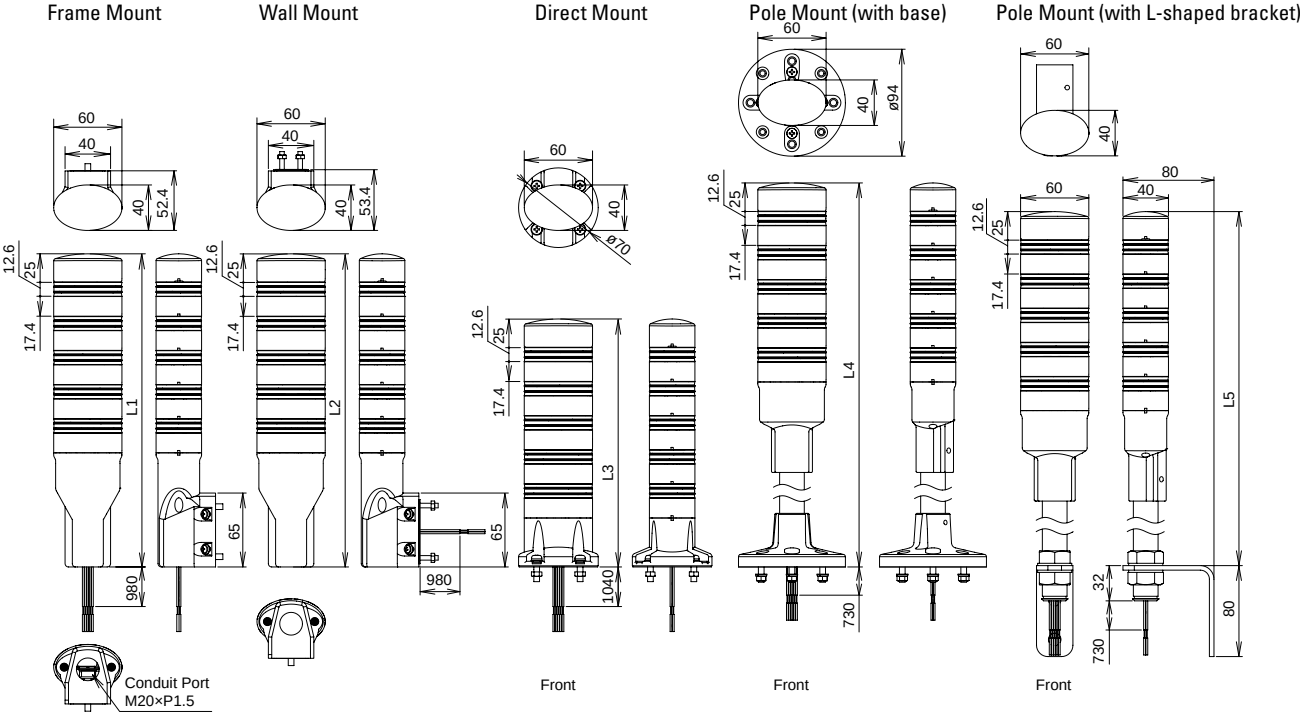


Note: Life of the LED varies according to operating conditions and environment.

External Contact Ratings

LED	AC Contact Capacity (per tier)	Current Capacity	100mA min.
		Dielectric Strength	35V AC min.
	DC Contact Capacity, Transistor Capacity (per tier)	Current Capacity	100mA min.
		Dielectric Strength	35V min.
Alarm	AC Contact Capacity (per alarm)	Leakage Current	0.1mA max.
		Current Capacity	400mA min.
	DC Contact Capacity, Transistor Capacity (per alarm)	Dielectric Strength	35V AC min.
		Current Capacity	300mA min.
		Dielectric Strength	35V min.
		Leakage Current	0.1mA max.

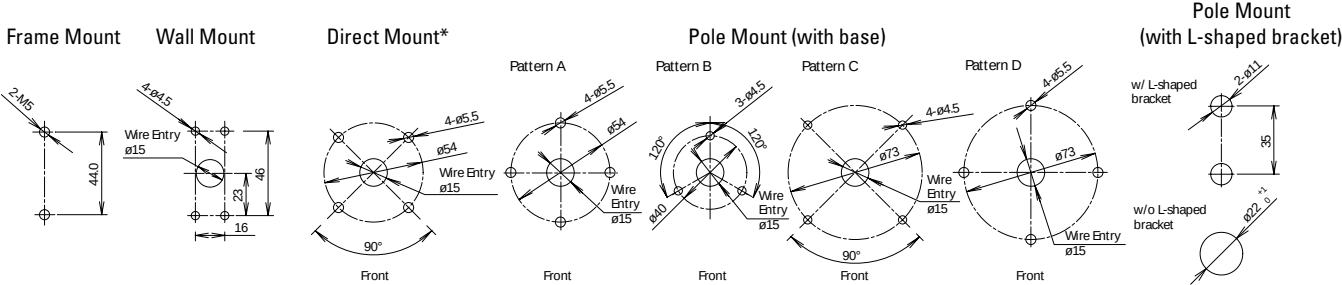
Dimensions (Steady Light)



Dimension Table

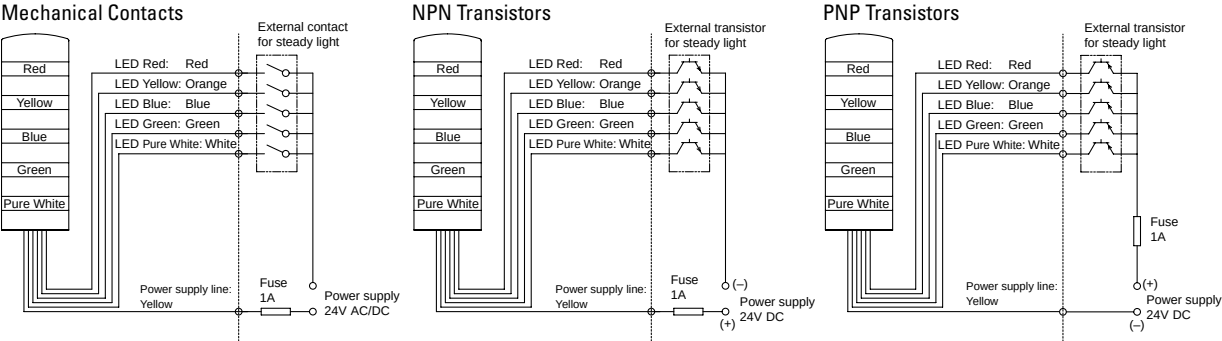
Tiers	Frame Mount (L1)	Wall Mount (L2)	Direct Mount (L3)	Pole Mount	
				w/ base (L4)	w/ L-shaped bracket (L5)
1	156	156	98	408	372
2	186	186	128	438	402
3	216	216	158	468	432
4	246	246	188	498	462
5	276	276	218	528	492

Panel Cut-Out

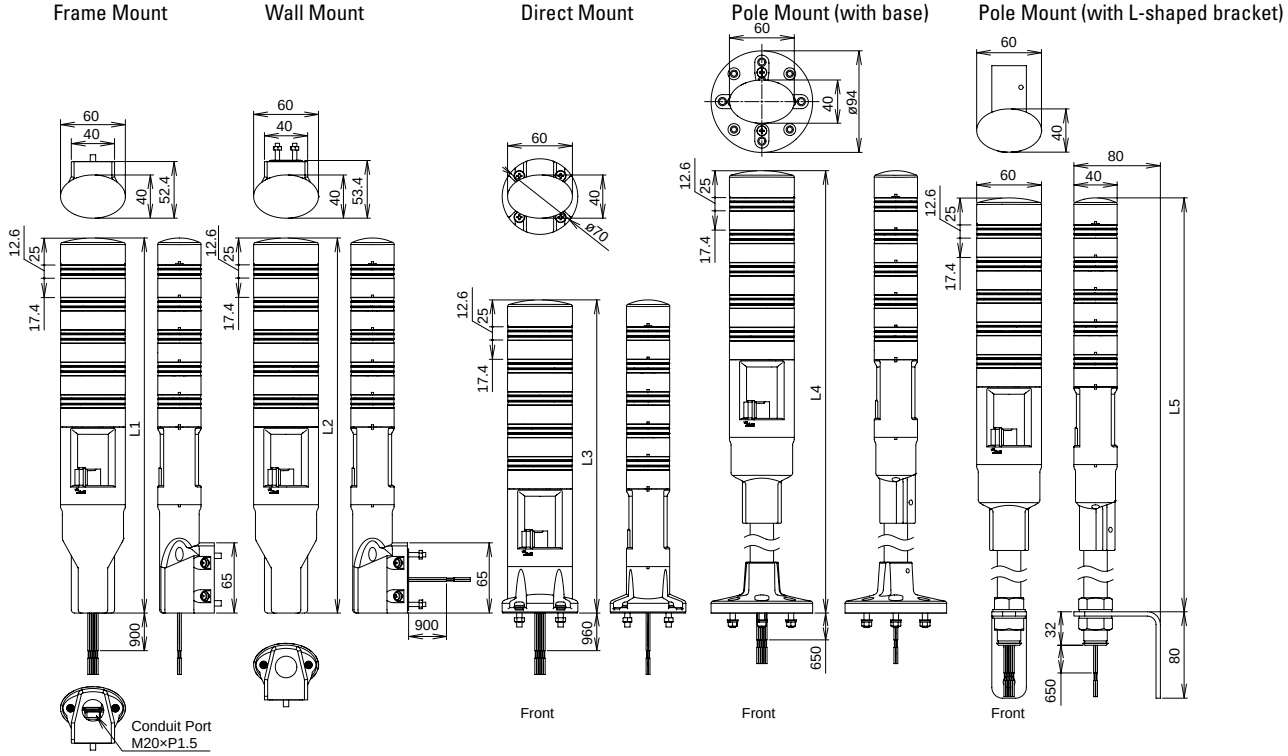


*Complies with IEC60947-5-1.

Wiring Example (Steady Light)



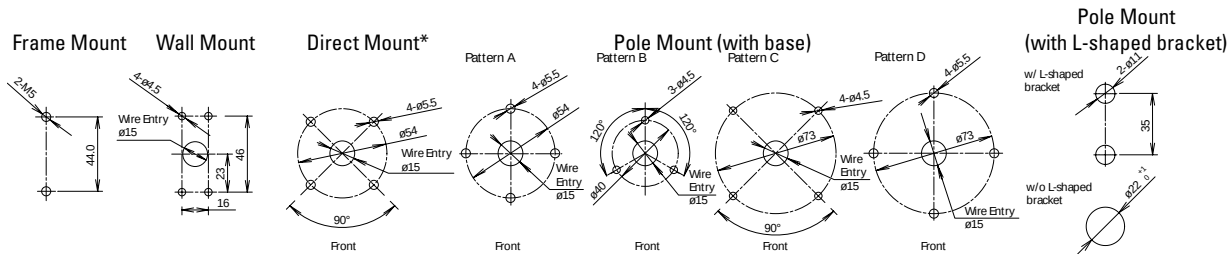
Dimensions (Steady/Flashing/Alarm)



Dimension Table

Tiers	Frame Mount (L1)	Wall Mount (L2)	Direct Mount (L3)	Pole Mount	
				w/ base (L4)	w/ L-shaped bracket (L5)
1	228	228	170	480	444
2	258	258	200	510	474
3	288	288	230	540	504
4	318	318	260	570	534
5	348	348	290	600	564

Panel Cut-Out



*Complies with IEC60947-5-1.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

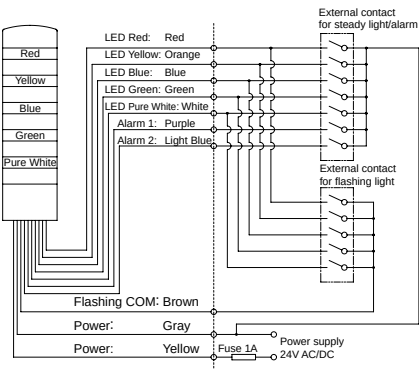
Terminal Blocks

Circuit Breakers

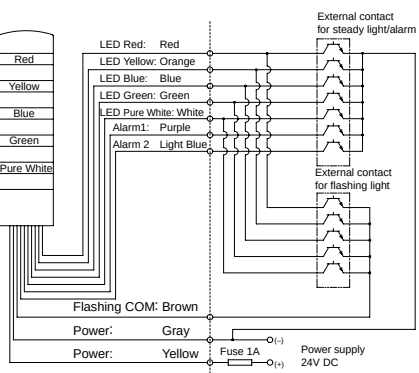
Switches & Pilot Lights
Signaling Lights
Relays & Sockets
Timers
Contactors
Terminal Blocks
Circuit Breakers

Wiring Example (Flashing Light and Alarm)

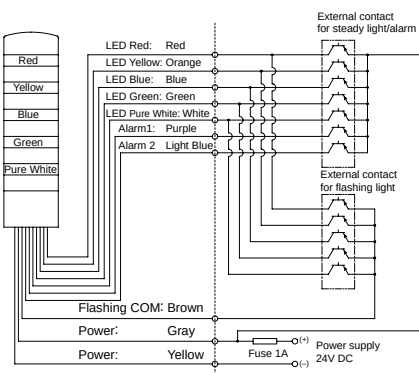
Mechanical Contacts



NPN Transistors



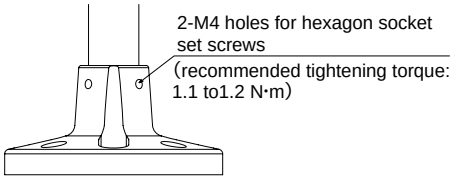
PNP Transistors



Safety Precautions

- Turn off the power to the LD6A before mounting, removing, wiring or assembling the LED module. Make sure the wiring is done correctly otherwise electrical shock or fire may result.
- Mount the LD6A on a solid surface not subject to vibrations.
- Do not mount the LD6A upside-down or horizontally.
- Do not leave the LD6A without a cap or unassembled.
- Install the supplied gasket, otherwise the waterproof seal will be compromised.
- Do not apply any chemicals that may corrode the plastic materials.
- If the LD6A is subjected to strong vibrations, the hexagon socket may

become loose. Take measures to prevent loosening. (See the figure below.)



- Do not loosen any screws if the tightening torque is not specified.

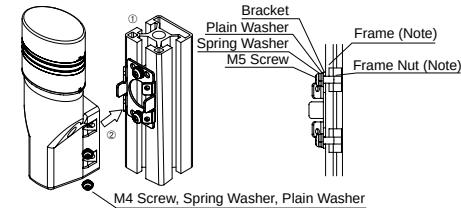
Instructions

Mounting

- See drawing below regarding the mounting of the LD6A.
- For panel cut-out dimensions, see pages 9 and 10.
- Position the LD6A to make sure the alarm sound is the loudest. (Steady/flash-ing/alarm type)

Frame Mounting

1. Insert two nuts in the frame, and attach the bracket using two M5 screws.
Recommended tightening torque: 2.6 to 2.7 N·m
2. Mount the LD6A to the bracket using four M4 screws.
Recommended tightening torque: 1.6 to 1.7 N·m



Note: See table below for typical examples of frames and nuts. Consult the manufacturer of the frame for the installation method of the frame nut.

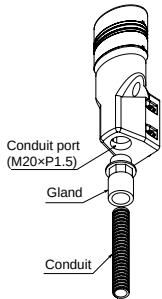
Examples of recommended frames and frame nuts

Frame Size	Frame	Frame Nut	Manufacturer
□ 30 mm*	SFF-302	SFB-001 SFB-4B5 SFB-101	SUS Corporation (Japan)
□ 40 mm	SFF-402	SFB-008 SFB-4A5 SFB-108	

*The mounting bracket for the housing is 40 mm.

When using a frame mount type, be sure to use flexible conduit, otherwise the waterproof seal will be compromised.

Refer to the "Example of Flexible Conduit" shown on the right.

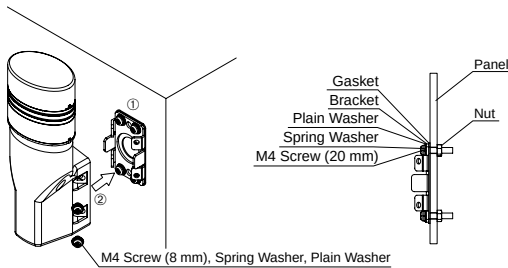


Example of Flexible Conduit

Conduit Port Size	M20
Gland	AL16/M20/A/BL
Conduit	PAFS16BL
Manufacturer	Adaptaflex

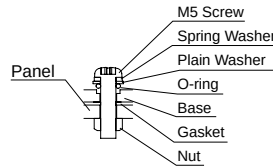
Wall Mounting

1. Make four tapped holes in the mounting panel and mount the bracket and gasket using four screws (M4 x 20).
Recommended tightening torque: 1.6 to 1.7 N·m
2. Mount the LD6A to the bracket using four screws (M4 x 8).
Recommended tightening torque: 1.6 to 1.7 N·m



Direct Mounting

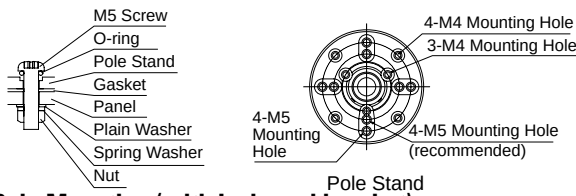
Recommended tightening torque: 2.6 to 2.7 N·m



Pole Mounting (with base)

The pole mount type can be installed in four ways. The recommended mounting method (pattern A from page 9 or 10) is described below.

Recommended tightening torque: 2.6 to 2.7 N·m (M5 screw)



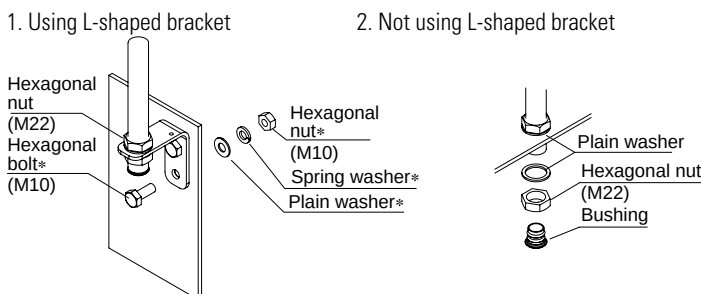
Pole Mounting (with L-shaped bracket)

1. Using L-shaped bracket

Recommended tightening torque: 10 to 11 N·m (M10)
Recommended tightening torque: 25 to 26 N·m (M22)

2. Not using L-shaped bracket

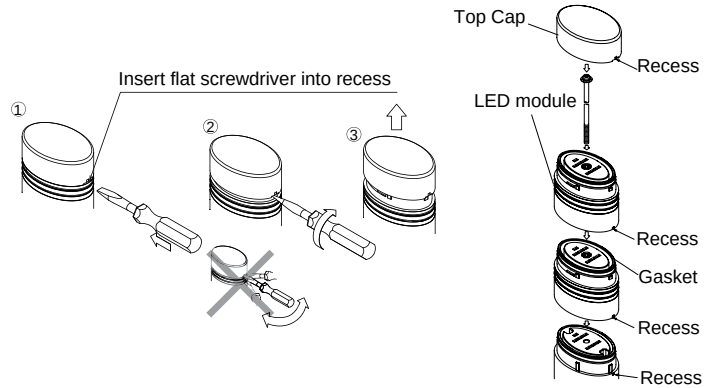
Remove the bushing, hexagonal nut (M22), plain washer, and L-shaped bracket from the LD6A and install in the following order: plain washer, hexagonal nut (M22), and bushing.
Recommended tightening torque: 25 to 26 N·m (M22)



The parts marked with * are not supplied and should be provided by the user.

Replacement and Addition of LED Modules

- Make sure to turn power off.
- Insert a flat screwdriver into the cap recess as shown below, lift up the cap, and remove with your hands. Use a flat screwdriver with maximum 1-mm thick and 7-mm wide tip.
- Remove the center screw before reassembling the LED modules.
- When assembling the LED modules, make sure to align the recess of the cap with the recess of the LED module. Otherwise, damage may result.
Recommended tightening torque: 0.4 to 0.5 N·m.



- Note the correct orientation when assembling the LED modules.
- Tighten the screws to the recommended tightening torque. The LED module may be damaged if the screw is loose during operation.
- Do not touch the metal plug on the LED module. Otherwise, LED elements may be damaged due to static electricity.
- Use a maximum of 5 tiers.
- Select the correct screw length depending on the number of tiers.
- Do not remove the gasket from the LED module. Otherwise, the waterproof seal will be compromised.

Wiring

- For wiring, see the wiring diagrams on pages 848 and 850.
- Incorrect wiring may damage the internal circuit.
- Be sure to insulate unused wires.
- Connect a 1A fuse to the power line as shown in the Wiring Examples on pages 848 and 850.
- Use a UL listed external fuse holder.
- Use a class 2 power supply only.
- When using LED modules of the same color for two or more tiers, determine contact capacity in reference to the LED current, because only one wire is used to light all tiers of the same color.
- Do not apply voltage to flashing (brown) lines.
- Do not connect flashing (brown) line to the power lines. The internal circuit may be damaged.
- Do not turn on steady and flashing circuits simultaneously.
- Do not turn on alarms 1 and 2 simultaneously.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Wire Color

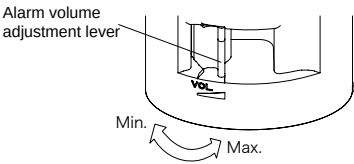
Wire Color	Steady	Steady, Flashing, Alarm
Red	LED Module – Red	LED Module – Red
Orange	LED Module – Yellow	LED Module – Yellow
Blue	LED Module – Blue	LED Module – Blue
Green	LED Module – Green	LED Module – Green
White	LED Module – White	LED Module – White
Purple	—	Alarm 1
Light Blue	—	Alarm 2
Brown	—	Flashing COM
Gray	—	Power Line
Yellow	Power Line	Power Line



For information on external contacts, see “External Contact Ratings” on page 847.

Alarm Volume Adjustment

- Move the volume adjustment to the right or left to change the volume.
- When the adjustment lever is all the way to the right the volume is at its maximum.
- The adjustment lever may be damaged if forced open or closed.



High Temperature Limitations

The external temperature cannot exceed 50°C when all tiers are lit at the same time in the following combinations:

1. Three tiers
Two or more tiers of blue and green (example: Red-Green-Blue, Green-Green-Red)
2. Four or five tiers (example: Red-Yellow-Green-White, Red-Yellow-Blue-Green-White)

LT7 Series Light Towers

Easily build or modify the combination that works for you!

The LT7 light tower combines innovative LED technology with modular style assembly. This enables the towers to meet the extensive requirements seen in most status indicating applications. The simple design uses only 9 modular components to make a five color tower complete with alarm and flashing functions.

Using the latest and brightest LEDs, the LT7 product range provides brilliant illumination for all the lens colors. The unique prism cut design enhances the brightness and ensures outstanding levels of visibility from any direction and distance.

Key features of the LT7 series light towers include:

- 70mm diameter
- Ultra bright LEDs
- LED strobe modules
- Unique interlocking construction
- Fast and easy assembly
- Optional adjustable alarm
- Lead-free design, RoHS compliant
- IP65 environment protection, NEMA 4, 4X, 13
- Color-coded wiring terminals
- Only nine modular components with 5 lens colors & 4 base units
- UL/c-UL Listed, CE marked



Part Numbers

Part Numbers: Base Units

Voltage	Steady	Flashing/Buzzer
24V DC	LT7B-D24	LT7B-D24FB
	LT7B-D24SB*	
90-250V AC	LT7B-A250	LT7B-A250FB

1. Base unit comes with top cap.
2. *Short body, black base type.

Part Numbers: Lens/LED Units

Color	Part Number
Red	LT7A-R
Amber Yellow	LT7A-Y
Green	LT7A-G
Blue	LT7A-S
White	LT7A-C
Lemon Yellow	LT7A-LY*

- *Maximum 5 LED color variations per base. Lemon yellow LED module and amber yellow LED module share same signal and both will light if stacked together.

Part Numbers: LED-Strobe Units

Color	Part Number
Red	LT7A-XE-R
Amber Yellow	LT7A-XE-Y
Green	LT7A-XE-G
Blue	LT7A-XE-S
White	LT7A-XE-C

- (for 24V DC base only)



Lemon Yellow LED module



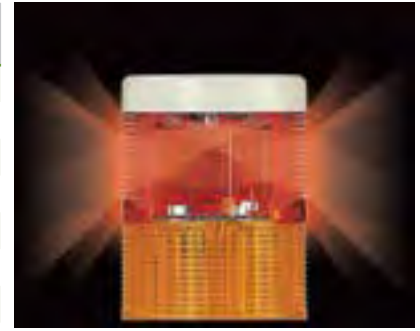
Short body type

LT7 Specifications

Base Units

Base Units			LT7B-D24 LT7B-D24SB	LT7B-D24FB		LT7B-A250	LT7B-A250FB	
Specifications	Operation/Function		Steady	Flashing/Steady		Steady	Flashing/Steady	
	Rated Voltage		24V DC			90~250V AC (50/60Hz)		
	Operating Voltage		24V $\pm$ 10% (21.6~26.4V)			90~250V AC (50/60Hz)		
	Alarm		—	Alarm 1*	Alarm 2**	—	Alarm 1*	Alarm 2**
	Current Consumption		—	50mA $\pm$ 10mA	24mA $\pm$ 10mA	—	50mA $\pm$ 10mA	24mA $\pm$ 10mA
	Power Consumption		—	1.2W $\pm$ 0.25W	0.58W $\pm$ 0.25W	—	1.8W $\pm$ 0.25W	1.3W $\pm$ 0.25W
	Alarm Sound Level	Max	—	90dB $\pm$ 5 (at 1m)		—	90dB $\pm$ 5 (at 1m)	
		Min	—	70dB or less (at 1m)		—	70dB or less (at 1m)	
	Flashing Cycle		—	60 flashes per minute		—	60 flashes per minute	
	Operating Temperature Range		-30°C~+60°C			-25°C~+55°C		
	Mounting		Upright, indoor only			Upright, indoor only		
	Protection		IP65, Type 4, 4X, 13			IP65, Type 4, 4X, 13		
Weight		250g	280g		310g	340g		
Open Collector		PNP/NPN			NPN			

*Alarm 1: continuous sound
*Alarm 2: intermittent sound



Ultra-bright LEDs



Color Coded Wiring Terminals

Specifications	LED Unit Type	Steady/Flashing						Strobe					
	LED Unit Color	Red	Amber Yellow	Green	Blue	White	Lemon Yellow	Red	Amber Yellow	Green	Blue	White	
	Current/Power	52mA/1.25W		42mA/1.0W				280mA/6.96W		130mA/3.36W		260mA/6.48W	270mA/6.72W
	Operating Temperature Range	-30°C~+60°C						-10°C~+60°C					
	Weight	60g						70g					

*Operate with all voltage base units listed on previous page.

1. Strobe units pulse 77 times per minute
2. Strobe units suitable only for BASE unit [LT7B-D24(FB)]. Units do NOT work with BASE unit [LT7B-A250(FB)].
3. Strobe units should be operated in 'Continuous light' mode. If it is operated in flashing mode, it will NOT operate correctly.
4. Do not substitute parts of units from other products.
5. This product can be used only indoors. Do not use outdoors.
6. Do not use without LED unit or top cover installed.

Accessories & Replacement Parts

LT9Z-7T	LT9Z-7L	LT9Z-SZ007	LT9Z-SZ020*	LT9Z-SZ018	LT9Z-SZ50NPT	LT9Z-HCLT7	LT9Z-M4NUTSLT7	LT9Z-ORINGLT7
mounting pole with base mount	mounting pole with L-angle bracket	90 degree angle mounting bracket	wall mounting bracket (pole required)	wall mounting bracket (direct mount)	1/2" NPT aluminum mounting adapter	replacement top cap (1 piece)	Replacement M4 mounting nuts (1 piece)	Replacement O-ring gasket (1 piece)

Must use LT9Z-7L pole mount with LT9Z-SZ020 wall mount bracket.

LH Series Surface Mount Indicators

Innovative indicators in a slim & stylish design.
Reduces installation space.

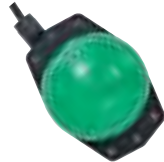
Key features of the LH series include:

- Direct mounting on surfaces such as panels, aluminum frames, and walls.
- Surface mount style does not affect the placement of other components. Requires only a small space behind the mounting surface for screws and nuts.
- Slim design well suited for installation in small spaces.
- Direct cable wiring style ensures waterproof characteristics. 1m, 3m, and 5m cables available.
- IP67, Type 4X
- Excellent visibility from the front and from the side.
- Legends and symbols can be printed on marking film to customize flat type.
- Red/Green two-color alternate illumination available.
- Three-color alternate illumination available with jumbo-dome models.
- Jumbo dome models available with connector.



Part Numbers

Dome ø37 One Color		1m	LH1D-D2HQ4C10-①
		3m	LH1D-D2HQ4C30-①
		5m	LH1D-D2HQ4C50-①
Dome ø37 Red/Green 2-color Alternate		1m	LH1D-D2HQ4C10-RG
		3m	LH1D-D2HQ4C30-RG
		5m	LH1D-D2HQ4C50-RG
Flat One Color Full		1m	LH1D-H2HQ4C10-①
		3m	LH1D-H2HQ4C30-①
		5m	LH1D-H2HQ4C50-①
Flat Red/Green 2-color Alternate		1m	LH1D-H2HQ4C10-RG
		3m	LH1D-H2HQ4C30-RG
		5m	LH1D-H2HQ4C50-RG

Jumbo Dome (one color)		Cable	1m	LH1D-D3HQ4C10-②
			3m	LH1D-D3HQ4C30-②
			5m	LH1D-D3HQ4C50-②
	Connector		LH1D-D3HQ4CN1-②	

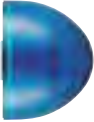
Jumbo Dome (two color)		Cable	1m	LH1D-D3HQ4C10-③
			3m	LH1D-D3HQ4C30-③
			5m	LH1D-D3HQ4C50-③
	Connector		LH1D-D3HQ4CN1-③	

Jumbo Dome (three color)		Cable	1m	LH1D-D3HQ4C10-④
			3m	LH1D-D3HQ4C30-④
			5m	LH1D-D3HQ4C50-④
	Connector		LH1D-D3HQ4CN1-④	



1. Specify a color code in place of ① in the Part No.: **A**: amber, **G**: green, **PW**: cool white, **R**: red, **S**: blue, **W**: warm white, **Y**: yellow
 2. Specify a color code in place of ② in the Part No.: **A**: amber, **G**: green, **R**: red, **S**: blue, **W**: warm white, **Y**: yellow
 3. Specify a color code in place of ③ in the Part No.: **AG**: amber/green, **AW**: amber/warm white, **APW**: amber/cool white, **RG**: red/green, **RW**: red/warm white, **RPW**: red/cool white, **GW**: green/warm white, **GPW**: green/cool white
 4. Specify a color code in place of ④ in the Part No.: **RGW**: red/green/warm white, **RGPW**: red/green/cool white
 5. **RG**: R (red) / G (green) 2-color alternate illumination
- Note: Dual- and tri-color units use a white lens.

Replacement Parts

Style	Material	Part Number	② Lens Color
Lens (flat) 	Polyarylate	LH9Z-1DLH2-①	For flat lens. Specify a color code in place of ① in the Part No. A: amber G: green C: clear R: red S: blue Y: yellow Note: Use C (clear) lens for R/G (red/green alternate), W (warm white), or PW (cool white) illumination.
Lens (jumbo dome) 	Polycarbonate	HW1A-P5②	For jumbo dome lens. Specify a color code in place of ② in the Part No. A: amber G: green R: red S: blue W: white Y: yellow Note: Dual- and tri-color units use a white lens.

LH Specifications

Applicable Standards	IEC 60947-1, IEC 60947-5-1, EN 60598-2-1, EN 60947-5-1 UL508, CSA C22.2 No.14
Operating Temperature	-20 to +55°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Storage Temperature	-30 to +80°C (no freezing)
Impulse Withstand Voltage (illuminating part)	800V
Insulation Resistance	Between live and dead parts: 100 MΩ minimum
Dielectric Strength	Between live and dead parts: 2000V, 50/60Hz, 1 minute
Pollution Degree	3
Vibration Resistance	60m/s², 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	1000m/s²
Cable Tensile Strength	90N minimum
Degree of Protection	IP67, Type 4X
Housing Color	Black
Cable	24 AWG 2-core (one-color) 3-core (2-color alternate) 4-core (3-color alternate)
Cable Outside Diameter	ø4.1mm
Allowable Cable Bending Radius	24.6mm minimum
Weight (1m cable)	50g (dome type, flat type) 140g (jumbo dome type)

Standards

Standards	Marks	File No. or Organization
EN 60598-2-1		TÜV SÜD
EN 60598-2-1 EN 60947-5-1		EC Low Voltage Directive
UL508		UL, cUL

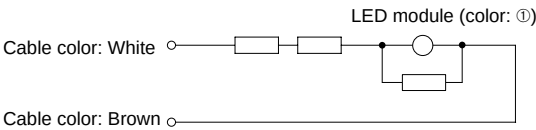


LH series surface mount indicators are approved by TÜV as class III lighting fixtures.

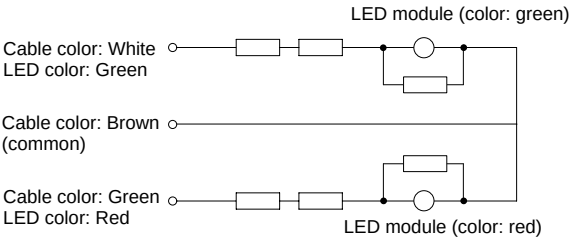
Specifications

Rated Insulation Voltage (Ui)	32V
Rated Voltage	24V AC/DC
Operating Voltage Range	24V AC/DC ±10%
Rated Current	17 mA
Maximum Power/Current	0.6W (25 mA)
Illumination Color	A (amber), G (green), PW (cool white), R (red), S (blue), W (warm white), Y (yellow) R (red) /G (green) alternate
LED Lamp Life	Approx. 50,000 hours (When used on complete DC at 25°C, brightness reduces to 50% of the initial intensity.)

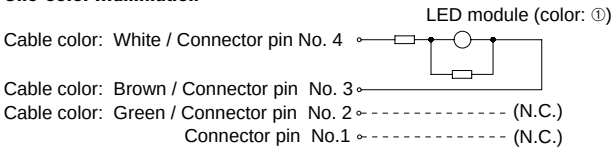
Internal Circuit
One-color Illumination (Dome)



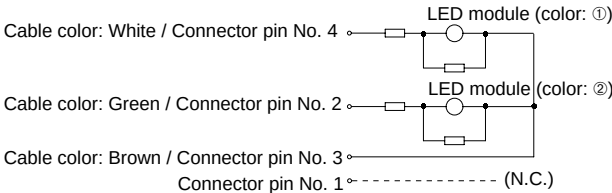
Two-color (Dome)



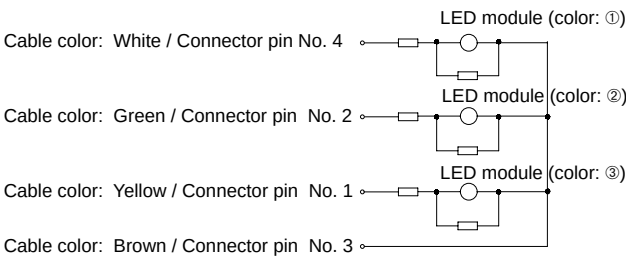
Internal Circuit
One-color Illumination



Two-color Alternate Illumination

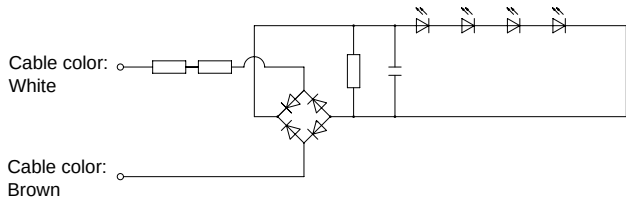


Three-color Alternate Illumination

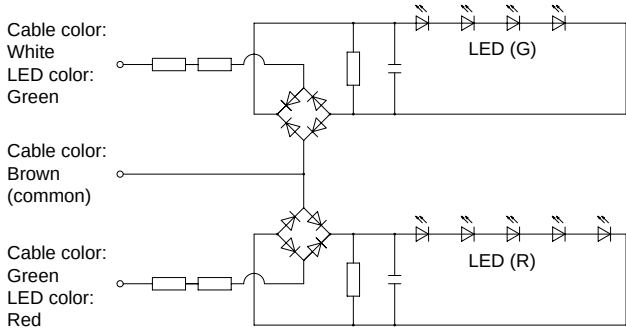


 Note: For the schematic of the LED module, see "LED Module Internal Circuit" on the right.
N.C. means No connection

One-color Illumination (Flat)

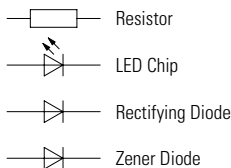


(Flat)



Lens Colors

	Illumination Type	Illumination Color	White Lens Color
Dome/Flat	One Color	Amber	Amber
		Blue	Blue
		Green	Green
		Cool White	Clear (Note)
		Red	Red
		Warm White	Clear (Note)
Jumbo Dome	Two-color Alternate	Yellow	Yellow
	One Color	Red/Green	Clear (Note)
		Amber	Amber
		Green	Green
		Red	Red
		Blue	Blue
	Two-color Alternate	White	White
		Yellow	Yellow
		Red/Green	White
		Green/White	White
		Red/White	White
		Amber/Green	White
		Amber/White	White
		Red/Pure White	White
		Green/Pure White	White
		Amber/Pure White	White
	Three-color Alternate	Red/Green/White	White
		Red/Green/Pure White	White

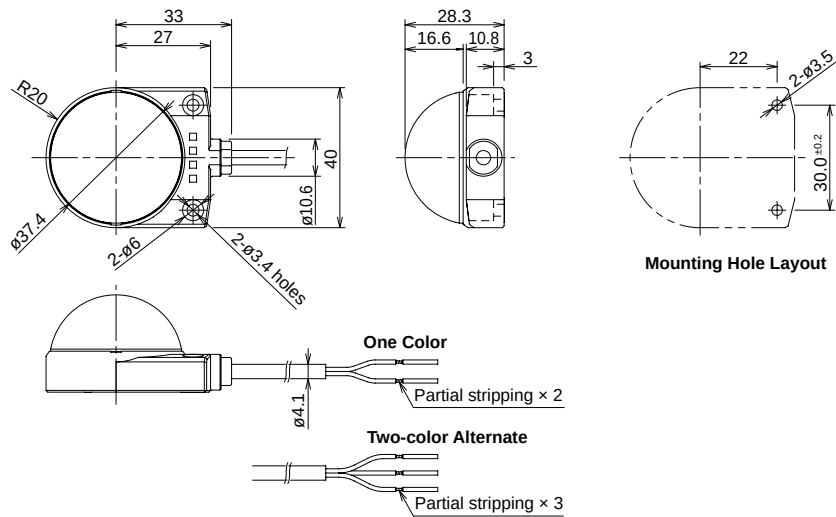


 Note: Because lenses have a white diffusion cover inside, cool white, warm white, and red/green types look white when the light is off.

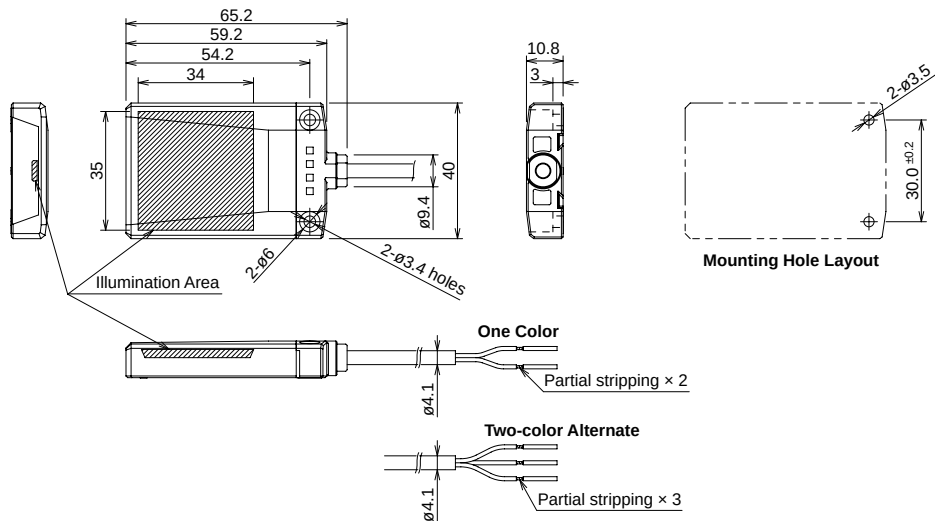
Dimensions (mm)

Dome

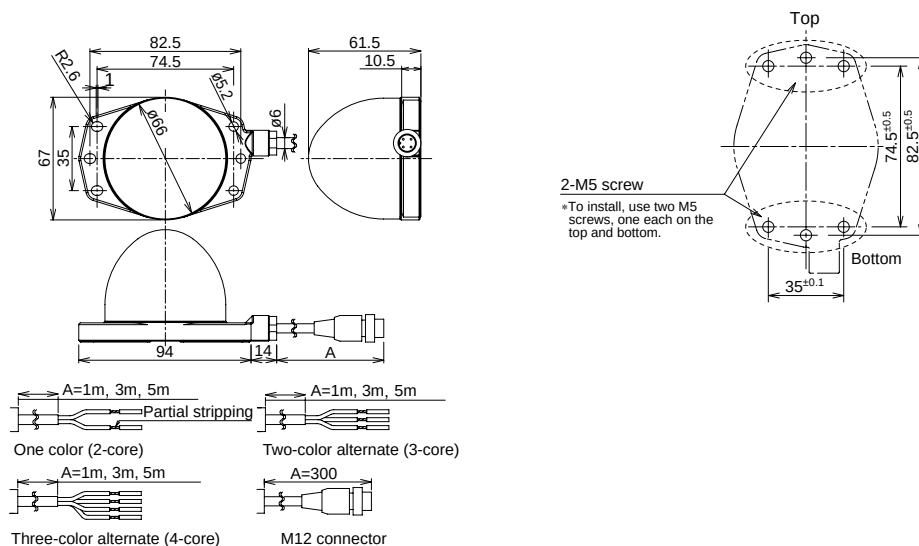
Not to scale.



Flat



Jumbo Dome



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

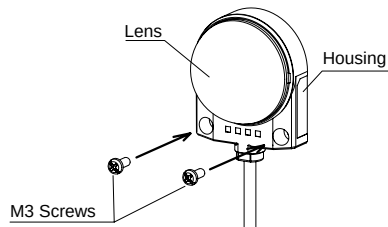
Terminal Blocks

Circuit Breakers

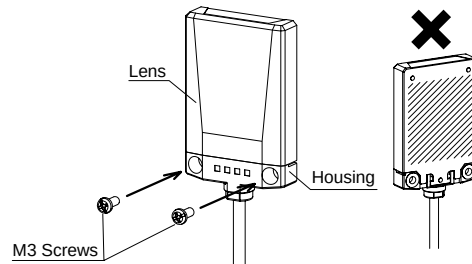
Instructions

Panel Mounting

Using two M3 screws, install the LH indicator to a mounting surface. Tighten the screws to a torque of 0.6 N·m maximum. Mounting screws are not provided and must be supplied by the user.



Note: The standard dome lens is not removable. Do not attempt to remove or damage may occur. However, the jumbo dome lens is removable and replaceable.

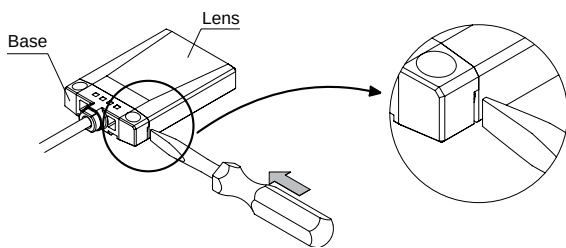


Note 1: Do not install the LH indicator by attaching the lens only, such as by taping down on the lens as the internal components may come loose.

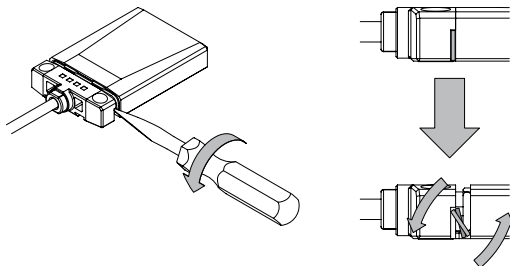
Note 2: Make sure that the back of the indicator is securely attached to the mounting surface so that the lens cannot be easily removed.

Inserting Marking Film into Flat Type Lens

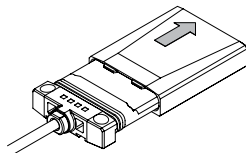
1. Insert a flat screwdriver into the groove between the base and lens.



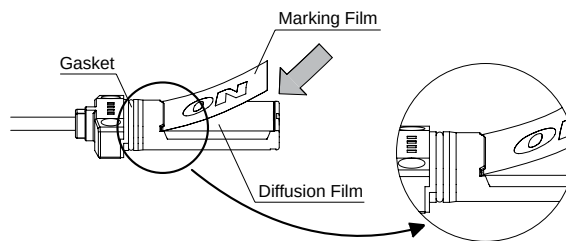
2. Twist the screwdriver and disengage the lens from the base.



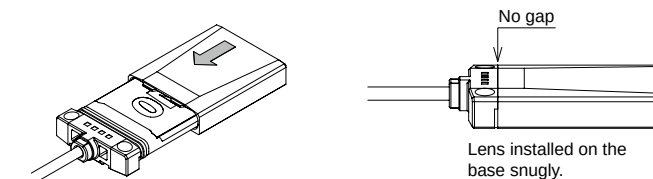
3. Remove the lens from the base.



4. Insert the edge of a marking film into the gap between the base and the diffusion plate, and place the marking film on top of the diffusion plate.



5. Replace the lens. Ensure that the lens is installed snugly.



Note 1: Do not touch the gasket, as this may affect its waterproof characteristics.

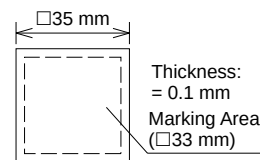
Note 2: Do not touch the diffusion plate.

Markings

Legends and symbols can be printed on marking film that can be used with the flat lens. One 0.1mm-thick film can be inserted.

Marking films are not included and must be supplied by the user.

Recommended marking film: Polyester



Jumbo Dome Pilot Lights



Plastic Bezel

Jumbo Dome	LED	Operator Only	HW1P-5Q0
		Full Voltage 24V AC/DC	HW1P-5Q4-②
	Incandescent	Operator Only	HW1P-5Q7*
		Full Voltage 24V AC/DC	HW1P-5Q7-②

Actual Size



1. In place of ②, specify the Lens/LED Color Code.
2. *Incandescent operator comes with bulb.
3. Available with spring-up terminals and 24V only.
4. For nameplates and accessories, see page 546 and 549.
5. For dimensions, see page 551.

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	PW
Yellow	Y

Jumbo Dome Replacement Parts

Item	Appearance	Description	Part Number
Lens		Polycarbonate Lens	HW1A-P5②
LED Diffusing Lens*			HW9Z-PP5C
LED Lamps		LED Lamp	LSTDB-2②



1. In place of ②, specify the Lens/LED Color Code.
2. *Diffusing lens for LED models only.
3. Use white LED for yellow lens.

Lamp Ratings

	Part Number	Operating Voltage	Rated Current	Power Consumption
LED	LSTDB-2	24V AC/DC ±10%	15mA	0.36W
Incandescent	LSB-2		150mA	3.6W



SLC30 Series — Panel Mounted Annunciators

SLC Series Panel Mounted Annunciators — an Ideal Alternative to Mounting Multiple Pilot Devices

Cluster mounting simplifies panel cutouts and offers a variety of window combination sizes!

Available with incandescent or Superbright LED illumination.

Key features of the SLC30 series include:

- Custom configurations with up to 200 windows
- Five window sizes based on a 30mm grid
- Non-reflective clear lenses
- Incandescent or Superbright LED illumination
- Wide variety of input voltages
- Two color alternate illumination in Red/Green LED



UL Recognized
File No. E68961



CSA Certified
File No.
LR48366



Cert No.
B970213332375

ABS
American
Bureau of
Shipping



Style F
(30mm x 30mm)



Style H
(30mm x 60mm)



Style L
(30mm x 90mm)



Style V
(60mm x 30mm)



Style G
(60mm x 60mm)



Staggered Terminals:
increased safety
and serviceability

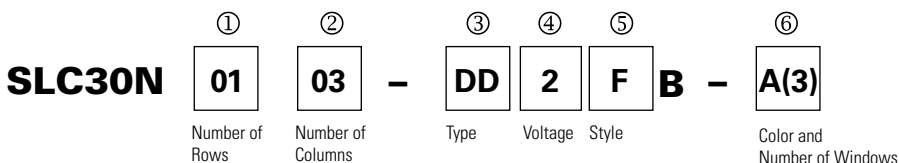
Specifications

Light Source		LED	Incandescent
Nominal Voltages	Full Voltage	6, 12, 24V AC/DC	6, 12, 18, 24, 30V AC/DC
	Transformer	120, 240V AC	120, 240V AC
	DC-DC Conv.	110V DC	110V DC
Colors		Amber, Green, Red, Yellow, Blue (24V only), White, dual color Red/Green (24V only)	Amber, Green, Red, Yellow, Blue, White
Lamp Type		Surface (Chip type) LED cluster	BA9S/13 (T3-1/4) bayonet base (1W)
Current Consumption	6V DC	Red (R), Green (G), Yellow (Y), Amber (A), White (W): 80mA	
	12V DC	Red (R), Green (G), Yellow (Y), Amber (A), White (W): 40mA	
	24V DC	Red (R), Green (G), Yellow (Y), Amber (A), White (W), Blue (S): 20mA	
Available Window Sizes		"F"  30x30mm "H"  30x60mm "L"  30x90mm "V"  60x30mm "G"  60x60mm	
Insulation Resistance		More than 100 MΩ by a 500V DC megger	
Degree of Protection		IP20 (for indoor use only)	
Dielectric Strength		2,000V AC direct (2,500V AC transformer, 1 minute)	
Operating Temperature		- 20° to +40°C; 15–90% relative humidity (– 10° to +40°C DC-DC converter)	
Material of Marking Plate and Color Screen		Polycarbonate	
Termination		M3.5 screw with captive sems plate (Check terminals: M3 screw with captive sems plate on applicable units)	
Maximum Size		Full voltage 10 rows, 20 columns (200 windows) Transformer and DC/DC converter (50 windows)	
Recommended Wire Size		22-14 AWG x2 (2mm ² x 2)	
Approvals		 Cert. No. B970213332375  UL Recognized File No. E68961  CSA Certified File No. LR48366 ABS American Bureau of Shipping	



Part Numbers (assembled)

Part Number Guide



Description			Code	Remark
① Number of Rows			01, 02, 03, 04, 05, 06, 07, 08, 09, 10	10 row maximum (always expressed in terms of "F" size windows)
② Number of Columns			01, 02, 03, 04, 05, 06, 07, 08, 09, 10 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	20 column maximum (always expressed in terms of "F" size windows)
③ Type	LED	Full voltage	DD	6V, 12V, 24V
		Full voltage with check terminal	DHM	24V only
		Full voltage 2 color (Red/Green)	DW	24V only
		Transformer	TD	120V, 240V AC
		DC-DC converter	CD	110V DC only
	Incandescent	Full voltage	DS	6V, 12V, 18V, 24V, 30V
		Transformer	TS	120V, 240V
④ Voltage	6V AC/DC		6	Type DD or DS
	12V AC/DC		1	With Type DD or DS
	18V AC/DC		8	Type DS only
	24V AC/DC		2	Type DD, DW, DS or DHM
	30V AC/DC		3	Type DS only
	120V AC		12	Type TD or TS
	240V AC		24	Type TD or TS
	110V DC		1	With Type CD
	No lamp		99	Type DS only
⑤ Style	Square		F	 30x30mm
	Horizontal rectangle		H	 30x60mm
	Horizontal rectangle with barrier		H2	
	Large horizontal rectangle		L	 30x90mm
	Vertical rectangle		V	 60x30mm
	Large square		G	 60x60mm
	Combination		M	Fill out order form on next page
⑥ Color (number of windows)	Amber		A	After each color, specify the number of windows Example... A(3), G(2), R(1)
	Green		G	
	Red		R	
	Blue		S (LED version: 24V only)	
	White		W	
	Yellow		Y	

1. Secondary voltage on transformers and DC-DC converters is 24V.
 2. To specify arrangement of varying window sizes and colors, use the order form on the next page.
 3. Drawing required for any units ordered with engraving.
 4. Incandescent models use color screen and marking plate, LED models use 2 marking plates (no color screen).

F = One Window
H = Two Windows Wide
L = Three Windows Wide
V = Two Windows High
G = Two x Two
M = Multiple Combination

Note: Convert all window styles to the style F (basic unit size).

First Window
(upper, left-hand
corner of panel)

Basic Unit Size
(style F)

THIS SIDE UP

COLUMNS

← ROWS

Quantity

Note: All units ordered with one order form must be identical

For engraving information, see page 715.

For information on how to complete the order form or to view examples, see the following page.

1. For part number development, see the previous page.
2. Panel cutout dimensions are on page 697.
3. Additional ordering information is on page 696.

How to complete SLC30N Series annunciator order form:

1. Draw the SLC30N layout in the Order Form as per customer requirements. Define the boundaries of each window (F, V, H, L or G Style) and of complete annunciator panel by heavy border lines. Specify each window color with appropriate designation (eg: G for Green, R for Red, etc). See Example 1 below:

Example 1

	1	2	3	4	5
1		R			
2		Y			
3		G			
4					
5					

2. Count number of rows and columns. eg: Example 1, Rows: 03 and Columns: 03

SLC30N-0303

3. Determine the type of illumination required. eg: "DD" for LED full voltage type illumination.

SLC30N-0303-DD

4. Determine the voltage code. eg: "2" for 24V AC/DC.

SLC30N-0303-DD2

5. Determine window style. eg: "L" style windows as shown in Example 1.

SLC30N-0303-DD2LB*

*B denotes black frame

6. Count the number of different colored windows in the annunciator. Example 1 has 1 Red L-style (30x90mm) window, 1 Yellow L-style window and 1 Green L-style window.

SLC30N-0303-DD2LB-R(1)Y(1)G(1)

7. Now your part number is complete, please fill out contact information and fax or email the form to IDEC Customer Service for order processing. If you would like to get annunciator windows engraved, please see the information on page 887 and send us your engraving information. If you have any questions, please contact IDEC Technical Support or for additional information, view examples 2 and 3:

Example 2

Rows=03; Columns= 03; F Style Windows (30x30mm); LED Full Voltage 24V AC/DC Illumination. Part number **SLC30N-0303-DD2FB-R(3)Y(3)G(3)**.

	1	2	3	4
1	R	R	R	
2	Y	Y	Y	
3	G	G	G	
4				

Example 3:

Rows = 04; Columns = 05; M = combination of various window styles(F, H, L V and G Style) ; LED Full Voltage 24V AC/DC Illumination.

Part number **SLC30N-0405-DD2MB-A(1)R(2)Y(1)G(1)W(2)S(2)**.

	1	2	3	4	5
1		R	W		
2	Y		A		S
3	W				
4	S		R		G
5					

Dimensions

Panel Cut-Out Dimensions

No. of Rows	No. of Columns			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Overall Panel Width Dimension →			1.654" (42mm)	2.853" (72mm)	4.016" (102mm)	5.197" (132mm)	6.378" (162mm)	7.559" (192mm)	8.740" (222mm)	9.921" (252mm)	11.102" (282mm)	12.283" (312mm)	13.465" (342mm)	14.646" (372mm)	15.827" (402mm)	17.008" (432mm)	18.189" (462mm)	19.370" (492mm)	20.551" (522mm)	21.732" (552mm)	22.913" (582mm)	24.094" (612mm)
	Overall Height ↓	Cut-out Ht ↓	Cut-out Wd ↓	1.378" (35mm)	2.559" (65mm)	3.740" (95mm)	4.921" (125mm)	6.102" (155mm)	7.283" (185mm)	8.465" (215mm)	9.646" (245mm)	10.827" (275mm)	12.008" (305mm)	13.189" (335mm)	14.370" (365mm)	15.551" (395mm)	16.732" (425mm)	17.913" (455mm)	19.094" (485mm)	20.276" (515mm)	21.457" (545mm)	22.638" (575mm)	23.819" (605mm)
1	1.654" (42mm)	1.378" (35mm)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2.853" (72mm)	2.559" (65mm)		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	4.016" (102mm)	3.740" (95mm)		3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	5.197" (132mm)	4.921" (125mm)		4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	6.378" (162mm)	6.102" (155mm)		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	7.559" (192mm)	7.283" (185mm)		6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	8.740" (222mm)	8.465" (215mm)		7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	9.921" (252mm)	9.646" (245mm)		8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	11.102" (282mm)	10.827" (275mm)		9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	12.283" (312mm)	12.008" (305mm)		10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200

Total Number of Windows (equivalent to style F—basic unit size)



1. The number of rows and columns refers to styles equivalent to style F (basic unit size).

For styles H, L, V, and G, convert into style F (basic unit size) equivalents.

Style H: 1 window high (1 row) x 2 windows wide (2 columns)

Style V: 2 windows high (2 rows) x 1 window wide (1 column)

Style L: 1 window high (1 row) x 3 windows wide (3 columns)

Style G: 2 windows high (2 rows) x 2 windows wide (2 columns)

Example: 18 windows = 3 windows high (3 rows) x 6 windows wide (6 columns)

Overall dimension (H x W): 4.016" x 7.559" (102 x 192mm)

Panel cut-out (H x W): 3.740" x 7.283" (95 x 185mm)

Tolerance: +0.039" (1mm), -0

2. For part numbering information, see page 864.

Window Dimensions

Window Style		Style F	Style H	Style L	Style V	Style G
Appearance						
Window Size	Illumination Face (H x W)	1.181" x 1.181" (30 x 30mm)	1.181" x 2.362" (30 x 60mm)	1.181" x 3.543" (30 x 90mm)	2.362" x 1.181" (60 x 30mm)	2.362" x 2.362" (60 x 60mm)
	Lens (H x W)	1.102" x 1.102" (28 x 28mm)	1.102" x 2.283" (28 x 58mm)	1.102" x 3.432" (28 x 88mm)	2.283" x 1.102" (58 x 28mm)	2.283" x 2.283" (58 x 58mm)
	Marking Plate (H x W x t)	1.062" x 1.062" x 0.04" (27 x 27 x 1.0mm)	1.062" x 2.244" x 0.04" (27 x 57 x 1.0mm)	1.062" x 3.425" x 0.04" (27 x 87 x 1.0mm)	2.244" x 1.062" x 0.04" (57 x 27 x 1.0mm)	2.244" x 2.244" x 0.04" (57 x 57 x 1.0mm)
	Color Screen (H x W x t)	1.062" x 1.062" x 0.04" (27 x 27 x 1.0mm)	1.062" x 2.244" x 0.04" (27 x 57 x 1.0mm)	1.062" x 3.425" x 0.04" (27 x 87 x 1.0mm)	2.244" x 1.062" x 0.04" (57 x 27 x 1.0mm)	2.244" x 2.244" x 0.04" (57 x 57 x 1.0mm)
	Engraving Area	0.984" x 0.984" (25 x 25mm)	0.984" x 2.165" (25 x 55mm)	0.984" x 3.346" (25 x 85mm)	2.165" x 0.984" (55 x 25mm)	2.165" x 2.165" (55 x 55mm)

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

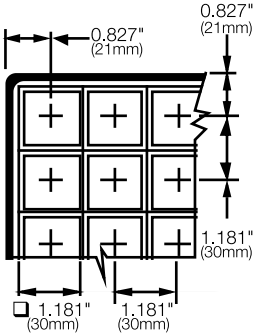
Dimensions, continued

Single Window

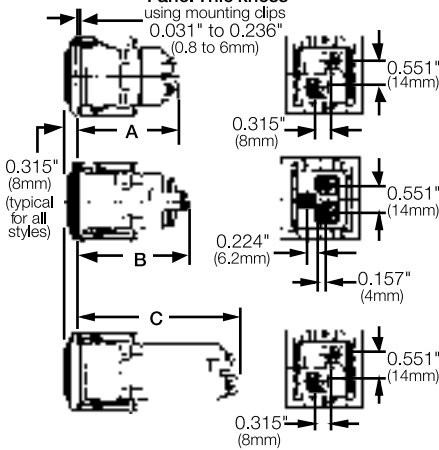


Style F
(basic unit size)

Multiple Windows



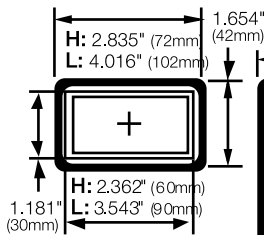
Panel Thickness
using mounting clips
0.031" to 0.236"
(0.8 to 6mm)



Styles F, H, L, V, G:
Single Window (right)
Multiple Windows (below)

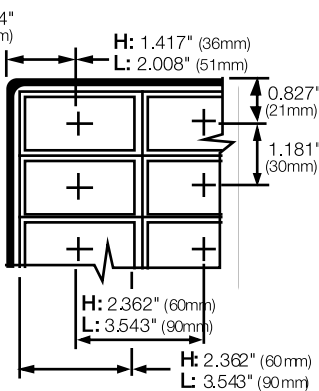
	Description	LED	Incandescent
A	Full voltage	2.146" (54.5mm)	2.264" (57.5mm)
B	Full voltage LED 2-color alternate	2.343" (59.5mm)	—
C	Transformer	3.228" (82mm)	—
	DC-DC converter	3.228" (82mm)	—
	Transformer	—	3.228" (82mm)
Terminals (X1, X2)		M3.5 screw	
Check terminal (C)		M3 screw	
Same terminals, adjacent windows		1.181" (30mm) centers	

Single Window

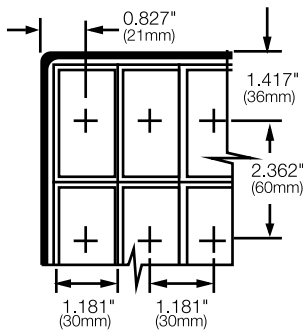
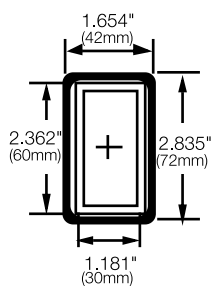


Styles
H and L

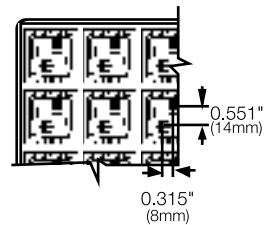
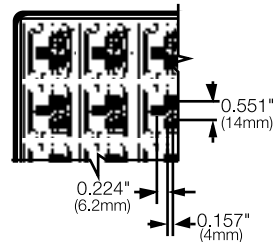
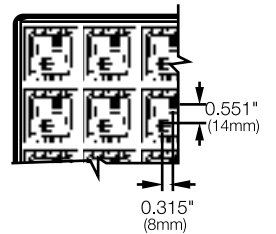
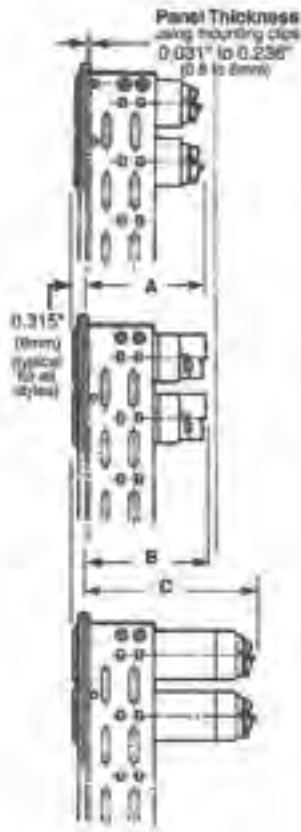
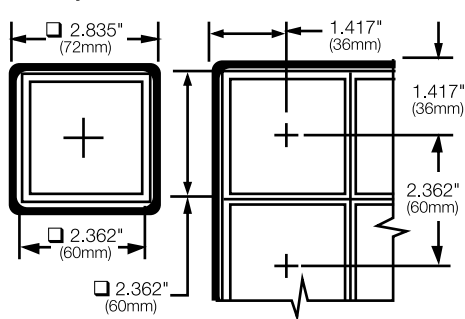
Multiple Windows



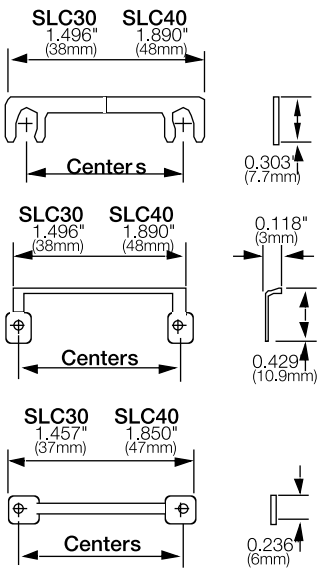
Style V



Style G

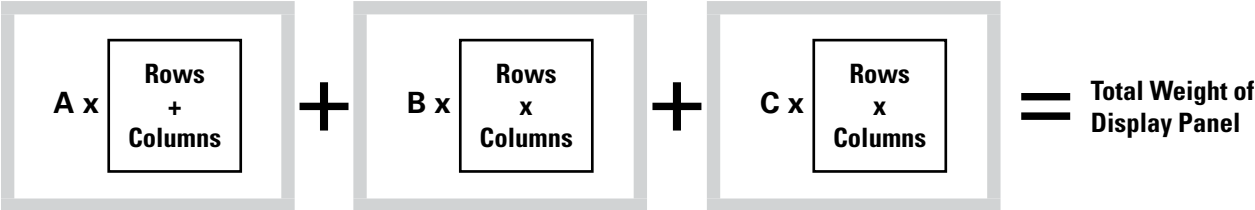


Dimensions, continued



Instructions

Estimating Weights



1. Make sure that the panel thickness is sufficient to support the total weight of the display panel(s).

A Frame Weight	B Housing Weight	Full Voltage	Transformer (incandescent/LED)	DC-DC Converter (LED only)
		C Lamp/LED Weight (includes lamp/LED)		
0.68oz (22g)	0.53oz (17g)	0.65oz (21g)	2.36oz (76g)	1.77oz (52g)

2. Weights are approximate.

Example:
SLC30N-0304-DD2FB
Total weight = A (rows + columns) + B (rows x columns) + C (rows x columns)
Total weight = 0.68 (3+4) + 0.53 (3x4) + 0.65 (3x4) = 19.92 oz

Switches & Pilot Lights
Signaling Lights
Relays & Sockets
Timers
Contactors
Terminal Blocks
Circuit Breakers

SLC30-IPS Series — Panel Mounted Annunciators

SLC Series Panel Mounted Annunciators — an Ideal Alternative to Mounting Multiple Pilot Devices

SLC30-IPS combination display lights with control units combine display lights with control units such as pushbuttons, illuminated pushbuttons, selector switches and keylock selector switches.

This results in savings of both space and installation time, since mounting separate switches becomes unnecessary. SLC30-IPS combination display lights can be custom built to meet your specifications.

Key features of the SLC30-IPS series include:

- Switches are integrated into an assembled SLC matrix, requiring only one panel cutout
- Illuminated, non-illuminated, selector, and key-switches are available
- Five window sizes based on a 30mm grid
- Non-reflective clear lenses
- Incandescent or Superbright LED illumination
- Momentary pushbuttons only

Momentary Illuminated Pushbuttons
Square or Round with Square Bezel

Momentary Non-Illuminated Pushbuttons
Square or Round with Square Bezel

Selector Switches
2-Position or 3-Position



Specifications

Light Source		LED	Incandescent
Nominal Voltages	Full Voltage	6, 12, 24V AC/DC	6, 12, 18, 24, 30V AC/DC
	Transformer	120, 240V AC	120, 240V AC
	DC-DC Conv.	110V DC	110V DC
Maximum Voltage		250V AC/DC	
Contact Thermal Current		3A (gold contact), 5A (silver contact)	
Contact Operating Current		Gold contact: 125V AC/0.1A, 30V DC/0.1A (resistive load) Silver contact: 125V AC/3A, 250V AC/2.0A (resistive load), 30V DC/2A, 125V DC/0.4A (resistive load)	
Control Unit Types		Pushbuttons: Square or round, illuminated or non-illuminated (momentary only)	
		Selector switches: 2-position or 3-position, maintained	
		Keylock switches: 2-position or 3-position, maintained	
Colors		Amber, Green, Red, Yellow, Blue (24V only), White, dual color Red/Green (24V only)	Amber, Green, Red, Yellow, Blue, White
Lamp Type		Surface (Chip type) LED cluster	BA9S/13 (T3-1/4) bayonet base (1W)
Available Window Sizes		“F”  30x30mm “H”  30x60mm “L”  30x90mm “V”  60x30mm “G”  60x60mm	
Insulation Resistance		More than 100 MΩ by a 500V DC megger	
Degree of Protection		IP20 (for indoor use only), Type 1	
Dielectric Strength		2,000V AC direct (2,500V AC transformer, 1 minute)	
Operating Temperature		– 20° to +40°C; 15–90% relative humidity (– 10° to +40°C DC-DC converter)	
Material of Marking Plate and Color Screen		Polycarbonate	
Termination		M3.5 screw with captive sems plate (Check terminals: M3 screw with captive sems plate on applicable units)	
Maximum Size		Full voltage: 10 rows, 20 columns (200 windows) Transformer and DC/DC converter: 50 windows	
Recommended Wire Size		22-14 AWG x2 (2mm² x 2)	
Approvals		 Cert. No. B970213332375  UL Recognized File No. E68961  CSA Certified File No. LR48366	

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Part Number Guide

Part Numbers (assembled)

①

SLC30N-

01

Number of Rows

②

03

Number of Columns

-

③

DD

Type

④

2

Voltage

MLB

① Number of Rows				01, 02, 03, 04, 05, 06, 07, 08, 09, 10	10 row maximum (number of base unit (F-style) windows)
② Number of Columns				01, 02, 03, 04, 05, 06, 07, 08, 09, 10 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	20 column maximum (number of base unit (F-style) windows)
③ Type	LED	Full voltage	Standard	DD	6V, 12V, 24V
			With check terminal	DHM	24V only
			2 color (Red/Green)	DW	24V only
	Incandescent	Transformer		TD	120V, 240V AC
		DC-DC converter		CD	110V DC only
		Full voltage		DS	6V, 12V, 18V, 24V, 30V
		Transformer		TS	120V, 240V

Description		Code	Remark
④ Voltage	6V AC/DC	6	Type DD or DS
	12V AC/DC	1	With Type DD, DHM or DS
	18V AC/DC	8	Type DS only
	24V AC/DC	2	Type DD, DHM, DW, or DS
	30V AC/DC	3	Type DS only
	120V AC	12	Type TD or TS
	240V AC	24	Type TD or TS
	110V DC	1	With Type CD
	No lamp	99	Type DS only



1. Secondary voltage on transformers and DC-DC converters is 24V.
2. To specify arrangement of varying window sizes and colors, use the order form on the next page.
3. Drawing required.

SLC30-IPS Order Form Instructions

How to order a SLC30-IPS display light:

Example 1: Specifying a window color

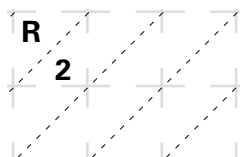
Enter the lens illumination color code in each square. Use the table below for color codes.



This example would place a Red window in this location

Example 2: Specifying a control unit

Enter the lens illumination color code in each square. Use the table below for color codes.



This example would place a Red, square, illuminated pushbutton with silver contacts in this location

For assistance with developing part numbers or completing the order form on the next page, contact IDEC technical support.

Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Control Unit Codes

Type	Contact Type	
	Gold	Silver
Square illuminated pushbutton (DPDT)	1	2
Round illuminated pushbutton (DPDT)	3	4
Square pushbutton (DPDT)	5	6
Round pushbutton (DPDT)	7	8
Selector switch (2-position)	9	10
Selector switch (3-position)	11	12
Keylock selector switch (2-position)	13	14
Keylock selector switch (3-position)	15	16

Purchase Order No.	Date	Sheet	of
--------------------	------	-------	----

Fill in Part Number Below:

Contact _____

Company _____

Phone # _____

Ship to _____

State/Zip _____

Number of Rows	Number of Columns	Type Code	Lamp Voltage	MLB Black Frame

Note: Convert all window styles to the style F (basic unit size).

Remarks:

City/State/Zip

First Window
(upper, left-hand
corner of panel)

THIS SIDE UP

A diagram showing a square box with two horizontal arrows pointing outwards from its center. Above the box is a horizontal line, and above that line is the text "Basic Unit Size (style F)".

COLUMNS

↓ ROWS

Quantity_____

Note: All units ordered with one order form must be identical

For engraving information, see page 715.

Order Form

For information on how to complete the order form or to view examples, see the following page.

1. For SLC30-IPS ordering form instruction, see previous page.
2. See engraving information page 715.
3. See panel cutout dimensions on page 705.
4. Additional ordering information is on page 702 and 704.

How to complete SLC30N-IPS Series annunciator order form:

- Determine the type of switches you would like to include in the annunciator panel. For this example, we will include the following 3 types of switches:
 - Red Square illuminated pushbutton DPDT with silver contacts.
 - Yellow round non-illuminated push button DPDT with silver contacts.
 - 2 Position keylock selector switch with silver contacts.

2. From chart shown on page 872,

CODE DESCRIPTION

R/2 Red Square Illuminated Push Button DPDT with Silver Contacts.

Y/8 Yellow Round Non-illuminated Push Button DPDT with Silver contacts

14 2 Position Keylock Selector Switch with Silver contacts.

Enter the above mentioned CODE designation in the layout window (on the previous page), where you would like the respective switch to be installed.

- Determine the type of 30x30mm illuminated windows you would like to include. For the current example, we will assume 3 F-Style (30x30mm) windows in Yellow, Green and White color. Specify each window color in the Order Form with appropriate designation: "Y" for Yellow, "G" for Green and "W" for White.

- Define the boundaries of each window (F, V, H, L or G Style) and of complete annunciator panel by heavy border lines, as shown below.

	1	2	3	4
1	Y	G	W	
2	R/2	Y/8	14	
3				
4				

- Count the number of rows and columns in the SLC30N diagram. eg: For the current example, we have, Rows: 02 and Columns: 03.

SLC30N-0203

- Determine the type of illumination for SLC30N annunciator. eg: For the current example, we use, "DD" for LED Full Voltage type illumination.

SLC30N-0203-DD

- Determine the voltage code; for the current example, we will use 24V AC/DC for all illuminated windows and illuminated switches. This is designated by using the number "2".

SLC30N-0203-DD2

- The complete part number would be:

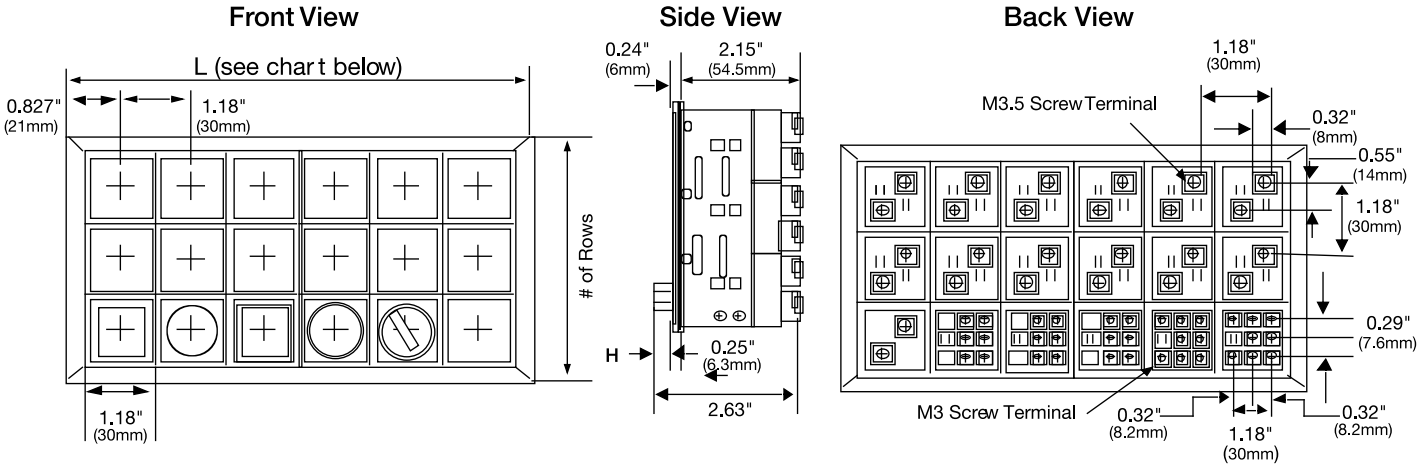
SLC30N-0203-DD2MLB

- A drawing must be provided for each of these parts ordered.**

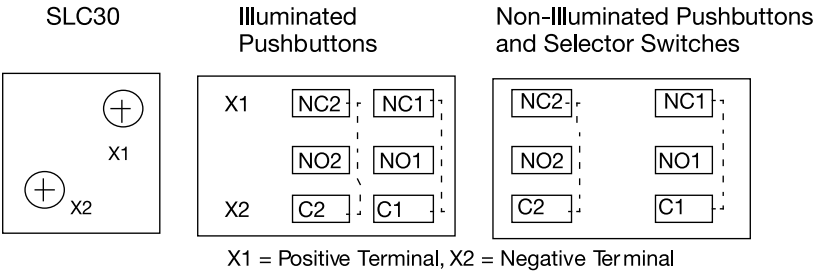


Note: Buttons and switches are only available in 'F' (30 x 30mm) window sizes.

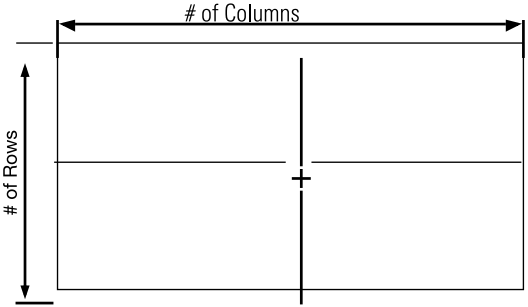
Dimensions



Bottom View



Panel Cut-Out Size

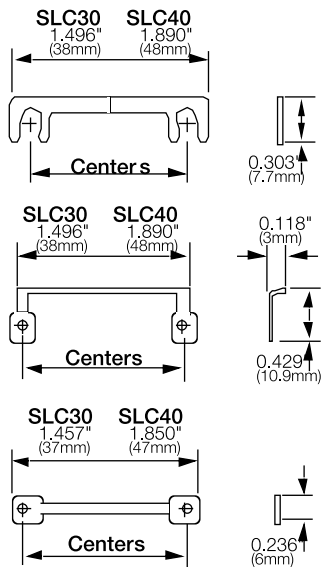


Panel Cut-Out Dimensions

No. of Columns		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No. of Rows	Overall Panel Width Dimension →	1.654" (42mm)	2.853" (72mm)	4.016" (102mm)	5.197" (132mm)	6.378" (162mm)	7.559" (192mm)	8.740" (222mm)	9.921" (252mm)	11.102" (282mm)	12.283" (312mm)	13.465" (342mm)	14.646" (372mm)	15.827" (402mm)	17.008" (432mm)	18.189" (462mm)	19.370" (492mm)	20.551" (522mm)	21.732" (552mm)	22.913" (582mm)	24.094" (612mm)
	Overall Height ↓ Cut-out Ht ↓ Cut-out Wd ↓	1.378" (35mm) 2.559" (65mm) 3.740" (95mm)	2.559" (65mm) 3.740" (95mm) 4.921" (125mm)	3.740" (95mm) 4.921" (125mm) 6.102" (155mm)	4.921" (125mm) 6.102" (155mm) 7.283" (185mm)	6.102" (155mm) 7.283" (185mm) 8.465" (215mm)	7.283" (185mm) 8.465" (215mm) 9.646" (245mm)	8.465" (215mm) 9.646" (245mm) 10.827" (275mm)	9.646" (245mm) 10.827" (275mm) 12.008" (305mm)	10.827" (275mm) 12.008" (305mm) 13.189" (335mm)	12.008" (305mm) 13.189" (335mm) 14.370" (365mm)	13.189" (335mm) 14.370" (365mm) 15.551" (395mm)	14.370" (365mm) 15.551" (395mm) 16.732" (425mm)	15.551" (395mm) 16.732" (425mm) 17.913" (455mm)	16.732" (425mm) 17.913" (455mm) 19.094" (485mm)	17.913" (455mm) 19.094" (485mm) 20.276" (515mm)	19.094" (485mm) 20.276" (515mm) 21.457" (545mm)	20.276" (515mm) 21.457" (545mm) 22.638" (575mm)	21.457" (545mm) 22.638" (575mm) 23.819" (605mm)	22.638" (575mm) 23.819" (605mm)	23.819" (605mm)
1	1.654" (42mm) 1.378" (35mm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2.853" (72mm) 2.559" (65mm)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	4.016" (102mm) 3.740" (95mm)	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	5.197" (132mm) 4.921" (125mm)	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	6.378" (162mm) 6.102" (155mm)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	7.559" (192mm) 7.283" (185mm)	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	8.740" (222mm) 8.465" (215mm)	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	9.921" (252mm) 9.646" (245mm)	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	11.102" (282mm) 10.827" (275mm)	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	12.283" (312mm) 12.008" (305mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200

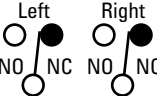
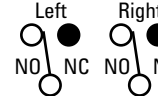
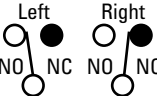
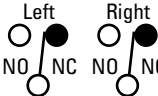
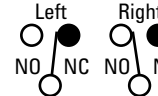
Total Number of Windows (equivalent to style F—basic unit size)

Dimensions, continued



Contact Operations

Selector Switches and Keylock Selector Switches

		Operator Position and Contact Operation (top view)				
		Position	Contacts	Left	Center	Right
Contact Operation	90° 2-position maintained 		DPDT 2-position		—	
	45° 3-position maintained 		DPDT 3-position			

SLC40 Series — Panel Mounted Annunciators

SLC 40 Series Annunciators

SLC series panel mounted annunciators are an ideal alternative to mounting multiple pilot devices.

Cluster mounting simplifies panel cutouts and offers a variety of window combination sizes.

Available with incandescent or Superbright LED illumination.

Key features of the SLC40 series include:

- Custom configurations with up to 105 windows
- Four window sizes based on a 40mm grid
- Non-reflective clear lenses that can be extended (angled) for better visibility when mounted in higher locations
- Incandescent or Superbright LED illumination
- Wide variety of input voltages



Cert No.
B970213332375



UL Recognized
File No. E68961



CSA Certified
File No.
LR48366



Extended Windows



Style F
(40mm x 40mm)



Style G
(80mm x 80mm)



Style H
(40mm x 80mm)



Style L
(40mm x 120mm)



Style V
(80mm x 40mm)



Staggered Terminals:
increased safety
and serviceability

Specifications

Light Source		LED	Incandescent
Nominal Voltages	Full Voltage	6, 12, 24V AC/DC	6, 12, 18, 24, 30V AC/DC
	Transformer	120, 240V AC	120, 240V AC
	DC-DC Conv.	110V DC	—
Colors		Full voltage: Amber, Green, Red, Yellow, Blue (24V only), White, dual color Red/Green (24V only)	Amber, Green, Red, Yellow, Blue, White
Lamp Type		Surface (Chip type) LED cluster	E12/15 Screw terminal base (2W)
Current Consumption	24V AC/DC	40mA	80mA
	12V AC/DC	80mA	160mA
	6V AC/DC	160mA	330mA
Available Window Sizes		"F"  40x40mm "H"  40x80mm "L"  40x120mm "V"  80x40mm "G"  80x80mm	
Insulation Resistance		100MW minimum (with 500V DC megger), between live and dead parts	
Degree of Protection		IP20 (for indoor use only), Type 1	
Dielectric Strength		Full voltage: 2,000V AC direct Adaptor/transformer 2,500V AC (1 minute)	
Operating Temperature		– 20° to +40°C; (45-85% relative humidity)	
Material of Marking Plate and Color Screen		Polycarbonate	
Termination		X1 and X2 terminals: M3.5 screw with a captive wire clamp washer (Check terminal: M3 screw on applicable models)	
Maximum Size		Full voltage: 7 rows, 15 columns (105 windows) Others: 50 windows maximum	
Recommended Wire Size		22-14 AWG x2 (2mm ² x 2)	
Approvals		 Cert. No. B970213332375  UL Recognized File No. E68961  American Bureau of Shipping  CSA Certified File No. LR48366	



Part Numbers (assembled)

Part Number Guide

SLC40N

①

01

Number of Rows

②

03

Number of Columns

-

③

DD

Type

④

2

Voltage

⑤

F

Style

B

-

⑥

A(3)

Color and Number of Windows

Part Numbers: Assembled Parts

Description			Code	Remark
① Number of Rows			01, 02, 03, 04, 05, 06, 07	7 row maximum (always expressed in terms of "F" size windows)
② Number of Columns			01, 02, 03, 04, 05, 06, 07, 08, 09, 10 11, 12, 13, 14, 15	15 column maximum (always expressed in terms of "F" size windows)
③ Type	LED	Full voltage	DD	6V, 12V, 24V
		Full voltage with check terminal	DHM	24V only
		Full voltage 2 color (Red/Green)	DW	24V only
		Transformer	TD	120V, 240V AC
		DC-DC converter	CD	110V DC only
	Incandescent	Full voltage	DE	6V, 12V, 18V, 24V, 30V
		Full voltage with check terminal	DEM	6V, 12V, 18V, 24V, 30V
		Transformer	TE	120V, 240V
④ Voltage	6V AC/DC		6	Type DD, DE, or DEM
	12V AC/DC		1	Type DD, DE or DEM
	18V AC/DC		8	Type DE or DEM
	24V AC/DC		2	Type DD, DHM, DW, DE, or DEM
	30V AC/DC		3	Type DE or DEM
	120V AC		12	Type TD or TE
	240V AC		24	Type TD or TE
	110V DC		1	Type CD
	No lamp		99	Type DE or DEM
⑤ Style	Square		F	 40x40mm
	Horizontal rectangle		H	 40x80mm
	Large horizontal rectangle		L	 40x120mm
	Vertical rectangle		V	 80x40mm
	Large square		G	 80x80mm
	Combination		M	Fill out order form on next page
⑥ Color (number of windows)	Amber		A	After each color, specify the number of windows Example... A(3), G(2), R(1)
	Green		G	
	Red		R	
	Blue		S (LED version: 24V only)	
	White		W	
	Yellow		Y	

- 

1. Secondary voltage on transformers and DC-DC converters is 24V.

2. To specify the arrangement of varying window sizes and colors, use the order form on the next page.
3. Drawing required for any units ordered with engraving.

4. Incandescent models use color screen and marking plate, LED models use 2 marking plates (no color screen).

F = One Window
H = Two Windows Wide
L = Three Windows Wide
V = Two Windows High
G = Two x Two
M = Multiple Combination

Remarks:

ROWS

Quantity

Note: All units ordered with one order form must be identical

For engraving information, see page 715.

For information on how to complete the order form or to view examples, see the following page.

A 10x10 grid of squares. On the left side, a vertical double-headed arrow spans the height of the grid, with the text "First Window (upper, left-hand corner of panel)" to its left. At the top of the grid, a horizontal double-headed arrow spans the width of the grid, with the text "THIS SIDE UP" above it. On the right side, a vertical double-headed arrow spans the height of the grid, with the text "COLUMNS" to its right. At the bottom of the grid, a horizontal double-headed arrow spans the width of the grid, with the text "Basic Unit Size (style F)" below it.

1. The part number guide is on the previous page.
2. Panel cutout dimensions are on page 712.

THIS SIDE UP

How to complete SLC40N Series annunciator order form:

1. Draw the layout of SLC40N annunciator in the Order Form as per customer requirements. Define the boundaries of each window (F, V, H or L Style) and of complete annunciator panel by heavy border lines. Specify each window color with appropriate designation: eg: G for Green, R for Red, etc.

Example 1

	1	2	3	4
1				
2	R	Y	G	
3				
4				

2. Count number of rows and columns. Eg: Example 1 has 02 rows and 03 columns.

SLC40N-0203

3. Determine the type of illumination required. Eg: "DD" for LED full voltage type illumination.

SLC40N-0203-DD

4. Determine the voltage code. Eg: "2" for 24V AC/DC, as in Example 1.

SLC40N-0203-DD2

5. Determine window style. Eg: "V" style windows as shown in Example 1.

SLC40N-0203-DD2VB*

*B denotes black frame.

6. Count the number of different colored windows. Eg: Example 1 has 1 Red V-style (80mmx40mm) window, 1 Yellow V-style window and 1 Green V-style window. Therefore to complete the part number for example 1, you would illustrate this by: R(1)Y(1)G(1)

SLC40N-0203-DD2VB-R(1)Y(1)G(1)

7. Now your part number is complete, please fill out contact information and fax or email the form to IDEC Customer Service for order processing. If you would like to get annunciator windows engraved, please see the examples on page 887 and send us your engraving information. If you have any questions please contact IDEC Technical Support.

Here are two more examples of your order form and the subsequent SLC40N layout you will receive.

Example 2

Rows=02; Columns= 03; F Style Windows (40x40mm); LED Full Voltage 24V AC/DC Illumination. Part number **SLC40N-0203-DD2FB-R(2)Y(2)G(2)**.

	1	2	3	4
1	R	Y	G	
2	R	Y	G	
3				
4				

Example 3

Rows=3; Columns= 4; M = combination of various window styles (F, H, L and V Style); LED Full Voltage 24V AC/DC Illumination.

Part number **SLC40N-0304-DD2MB-R(1)Y(1)G(1)W(1)S(1)**.

	1	2	3	4
1	S		R	
2			G	
3	Y	R	W	
4				

Dimensions

Panel Cut-Out Dimensions

No. of Rows	No. of Columns			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Overall Panel Width Dimension →			2.205" (56mm)	3.780" (96mm)	5.354" (136mm)	6.929" (176mm)	8.504" (216mm)	10.079" (256mm)	11.654" (296mm)	13.228" (336mm)	14.804" (376mm)	16.378" (416mm)	17.953" (456mm)	19.528" (496mm)	21.102" (536mm)	22.677" (576mm)	24.252" (616mm)
	Overall Height ↓	Cut-out Ht ↓	Cut-out Wd ↓	1.772" (45mm)	3.346" (85mm)	4.921" (125mm)	6.496" (165mm)	8.071" (205mm)	9.646" (245mm)	11.220" (285mm)	12.795" (325mm)	14.370" (365mm)	15.945" (405mm)	17.520" (445mm)	19.094" (485mm)	20.669" (525mm)	22.244" (565mm)	23.819" (605mm)
1	2.205" (56mm)	1.772" (45mm)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	3.780" (96mm)	3.346" (85mm)		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	5.354" (136mm)	4.921" (125mm)		3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	6.929" (176mm)	6.496" (165mm)		4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	8.504" (216mm)	8.071" (205mm)		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	10.079" (256mm)	9.646" (245mm)		6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	11.654" (296mm)	11.220" (285mm)		7	14	21	28	35	42	49	56	63	70	77	84	91	98	105

Total Number of Windows (equivalent to style F—basic unit size)



- The number of rows and columns refers to styles equivalent to style F (basic unit size).
For styles H, L, V, and G, convert into style F (basic unit size) equivalents.
Style H: 1 window high (1 row) x 2 windows wide (2 columns)
Style V: 2 windows high (2 rows) x 1 window wide (1 column)
Style L: 1 window high (1 row) x 3 windows wide (3 columns)
Style G: 2 windows high (2 rows) x 2 windows wide (2 columns)
Example: 18 windows = 3 windows high (3 rows) x 6 windows wide (6 columns)
Overall dimension (H x W): 5.354" x 10.079" (136 x 256mm)
Panel cut-out (H x W): 4.921" x 9.646" (125 x 245mm)
Tolerance: +0.039" (1mm), -0
- See page 880 for part numbering information.

Window Dimensions

Window Style		Style F	Style H	Style L	Style V
Appearance					
Window Size	Illumination Face (H x W)	1.575" x 1.575" (40 x 40mm)	1.575" x 3.150" (40 x 80mm)	1.575" x 4.724" (40 x 120mm)	3.150" x 1.575" (80 x 40mm)
	Lens (H x W)	1.457" x 1.457" (37 x 37mm)	1.457" x 3.031" (37 x 77mm)	1.457" x 4.606" (37 x 117mm)	3.031" x 1.457" (77 x 37mm)
	Marking Plate (H x W x t)	1.409" x 1.409" x 0.04" (35.8 x 35.8 x 1.0mm)	1.409" x 2.984" x 0.04" (35.8 x 75.8 x 1.0mm)	1.409" x 4.559" x 0.04" (35.8 x 115.8 x 1.0mm)	2.984" x 1.409" x 0.04" (75.8 x 35.8 x 1.0mm)
	Color Screen (H x W x t)	1.409" x 1.409" x 0.04" (35.8 x 35.8 x 1.0mm)	1.409" x 2.984" x 0.04" (35.8 x 75.8 x 1.0mm)	1.409" x 4.559" x 0.04" (35.8 x 115.8 x 1.0mm)	2.984" x 1.409" x 0.04" (75.8 x 35.8 x 1.0mm)
	Engraving Area	1.339" x 1.339" (34 x 34mm)	1.339" x 2.913" (34 x 55mm)	1.339" x 4.488" (34 x 85mm)	2.913" x 1.339" (55 x 34mm)

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

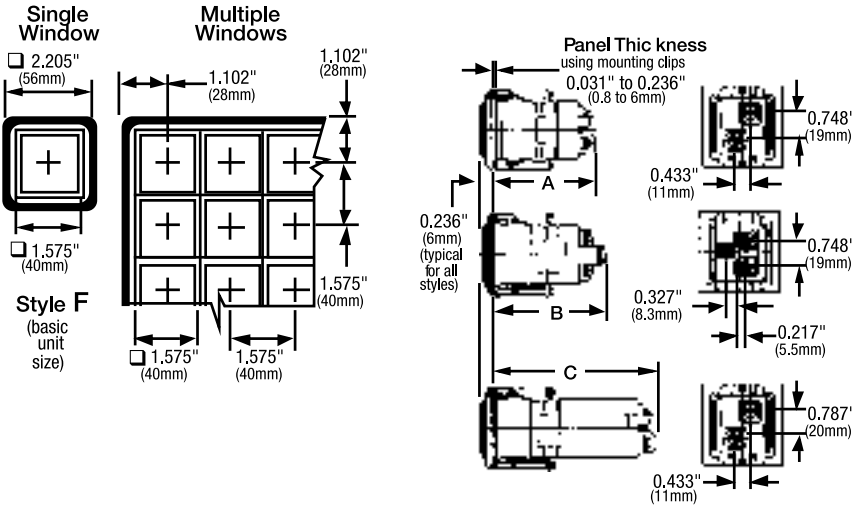
Timers

Contactors

Terminal Blocks

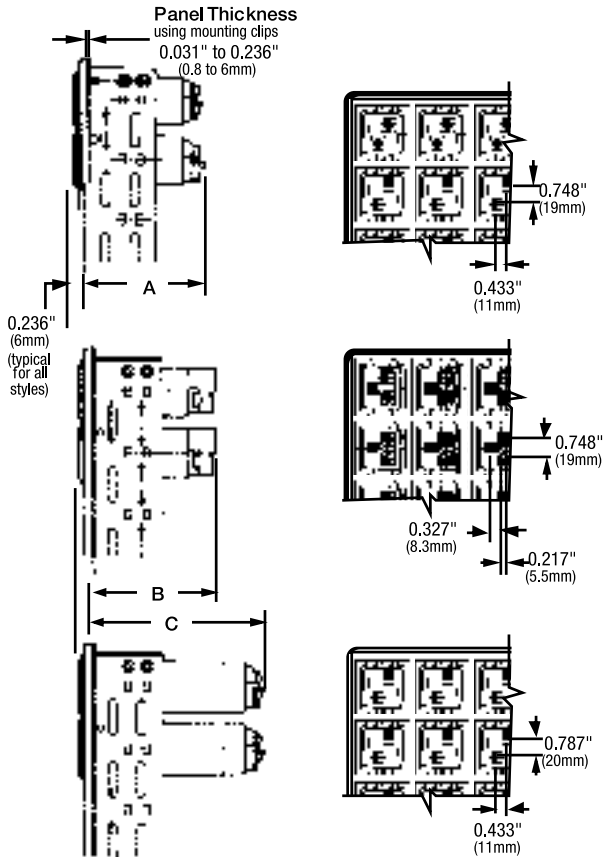
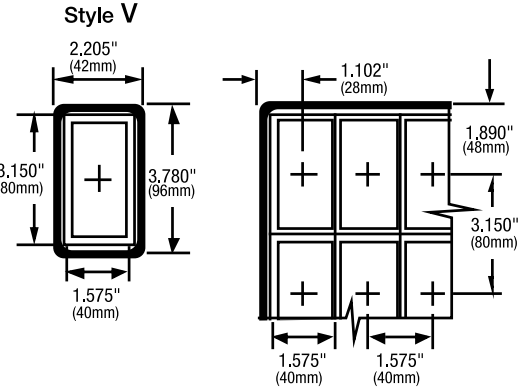
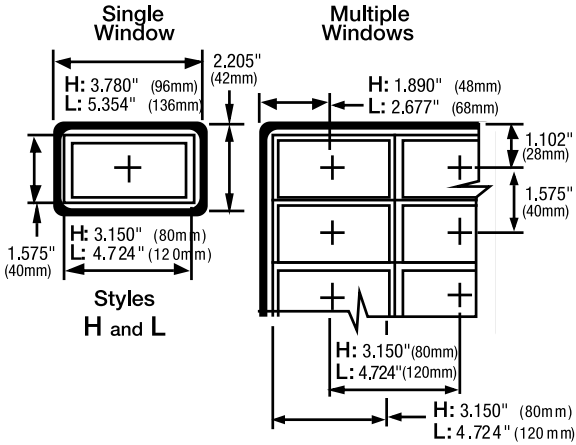
Circuit Breakers

Dimensions, continued



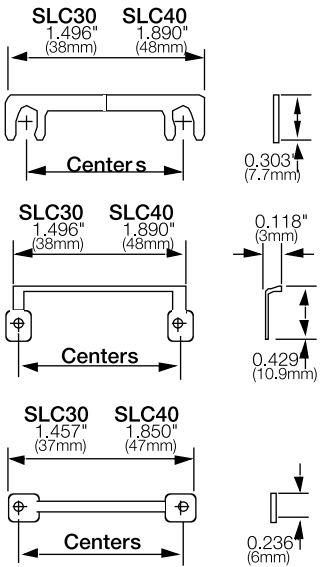
Styles F, H, L, V, G:
Single Window (right)
Multiple Windows (below)

	Description	LED	Incandescent
A	Full voltage	2.618" (66.5mm)	2.539" (64.5mm)
B	Full voltage LED 2-color alternate	2.874" (73mm)	—
C	Transformer	3.327" (84.5mm)	—
	DC-DC converter	3.327" (84.5mm)	—
	Transformer	—	2.854" (72.5mm)
Terminals (X1, X2)		M3.5 screw	
Check terminal (C)		M3 screw	
Same terminals, adjacent windows		1.575" (40mm) centers	



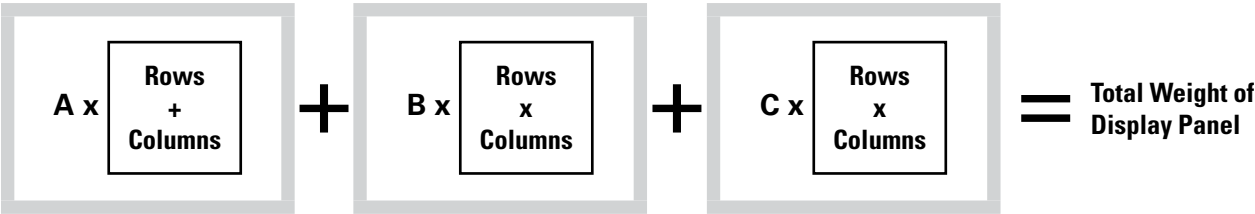
- Switches & Pilot Lights
- Signaling Lights
- Relays & Sockets
- Timers
- Contactors
- Terminal Blocks
- Circuit Breakers

Dimensions, continued



Instructions

Estimating Weights



1. Make sure that the panel thickness is sufficient to support the total weight of the display panel(s).

A	B	C		
		Full Voltage	Transformer (incandescent) AC Adapter (LED)	DC-DC Converter (LED only)
Frame Weight	Housing Weight	Lamp/LED Weight (includes lamp/LED)		
0.93oz (30g)	0.93oz (30g)	0.93oz (30g)	2.98oz (96g)	1.92oz (62g)

2. Weights are approximate.

Example:
SLC40N-0304-DD2FB
Total weight = A (rows + columns) + B (rows x columns) + C (rows x columns)
Total weight = 0.93 (3+4) + 0.93 (3x4) + 0.93 (3x4) = 28.83 oz

Engraving Information

Part Numbers: SLC30 Engraving Plates

Window Type	Part No.	Character Size	Maximum Characters per Line	Maximum Lines
F  30x30mm	SLC-3PF	7/32	9	4
		3/16	10	4
		5/32	11	5
		9/64	12	6
		1/8	13	7
H  30x60mm	SLC-3PH	5/16	10	3
		7/32	15	4
		5/32	19	6
L  30x90mm	SLC-3PL	5/16	16	3
		7/32	22	4
		5/32	28	6
V  60x30mm	SLC-3PV	5/16	6	7
		7/32	8	9
		5/32	10	13
G  60x60mm	SLC-3PG	5/16	12	7
		7/32	15	10
		5/32	18	14

Part Numbers SLC40 Engraving Plates

F  40x40mm	SLC-4PF	5/16	8	4
		7/32	11	6
		5/32	14	8
H  40x80mm	SLC-4PH	5/16	17	4
		7/32	20	6
		5/32	24	8
L  40x120mm	SLC-4PL	5/16	22	4
		7/32	30	6
		5/32	34	8
V  80x40mm	SLC-4PV	5/16	7	8
		7/32	10	9
		5/32	12	14
G  80x80mm	SLC-4PG	5/16	12	7
		7/32	15	10
		5/32	18	14

Engraving Size Samples

5/16" size

7/32" size

3/16" size

5/32" size

9/64" size

1/8" size

Engraving Size Samples

5/16" size

7/32" size

5/32" size

Engraving Example

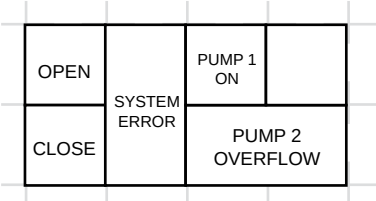
Engraving information can be provided in two ways:

Method 1

If you have created your own SLC annunciator layout and there is enough space to write engraving information, please print out a copy of the layout and write what you would like to be engraved in respective window. Attach this with the Order Form and send it to IDEC Customer Service for processing.



Engraving Layout



SLC Annunciator Layout

Method 2

If you are using the Order Form from the IDEC Automation Catalog and do not have enough space to list engraving information, you can number the top right corner of the window you would like to be engraved.

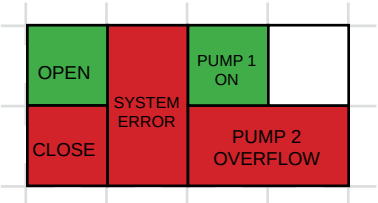


Keeping engraving window type, character size, maximum character per line and maximum number of lines in perspective, create a table (see Engraving Table Example shown below). Please attach the Table along with SLC annunciator layout and send it to IDEC Customer Service for processing.

Engraving Table Example

1	7/32"	"OPEN"
2	7/32"	"CLOSE"
3	7/32"	"SYSTEM" "ERROR "
4	3/16"	"PUMP 1" "ON"
5		NO ENGRAVING
6	5/32"	"PUMP 2" "OVERFLOW"

Using method 1 or 2, the final engraved panel will look as below:



Final Engraved Panel

Accessories

Description		Application		Part No.	Remarks	
Lenses		SLC30 incandescent, LED	F	SLC-3LF-(UL)	A lens is included with each window on assembled units	
			H and V	SLC-3LH-(UL)		
			L	SLC-3LL-(UL)		
			G	SLC-3LG-(UL)		
		SLC40 incandescent, LED	F	SLC-4LF-(UL)		
			H and V	SLC-42H-(UL)		
			L	SLC-4LL-(UL)		
			G	SLC-4LG		
Color Screens		SLC30 incandescent	F	SLC-3PF-*(UL)	Specify color code in place of asterisk (*): A = Amber C = Transparent G = Green (incandescent) R = Red S = Blue W = White Y = Yellow	A color screen and marking plate are included with each window of assembled incandescent units
			H and V	SLC-3PH-*(UL)		
			L	SLC-3PL-*(UL)		
			G	SLC-3PG-*		
		SLC40 incandescent	F	SLC-4PF-*(UL)		
			H and V	SLC-4PH-*		
			L	SLC-4PL-*(UL)		
			G	SLC-4PG		
Marking Plates		SLC30 incandescent, LED	F	SLC-3PF-□-(UL)	Specify color code in place of square (□): C = Transparent (LED) W = White (incandescent) WL = White (LED)	Two marking plates are included with each window of assembled LED units; LED units do not use color screens
			H and V	SLC-3PH-□-(UL)		
			L	SLC-3PL-□-(UL)		
			G	SLC-3PG-□-(UL)		
		SLC40 incandescent, LED	F	SLC-4PF-□-(UL)		
			H and V	SLC-4PH-□-(UL)		
			L	SLC-4PL-□-(UL)		
			G	SLC-4PG		
Lens Frames		SLC30 incandescent only	F	SLC-3WF-B	A lens frame is included with each window on assembled units Lens frame for LED modules has the inner walls painted white, while the incandescent frame is completely black.	
			H	SLC-3WH-B		
			V	SLC-3WV-B		
			L	SLC-3WL-B		
			G	SLC-3WG-B		
		SLC30 LED only	F	SLC-3WF-BL		
			H	SLC-3WH-BL		
			V	SLC-3WV-BL		
			L	SLC-3WL-BL		
			G	SLC-3WG-BL		
		SLC40 incandescent only	F	SLC-4WF-B		
			H	SLC-4WH-B		
			V	SLC-4WV-B		
			L	SLC-4WL-B		
			G	SLC-4WG-B		
		SLC40 LED only	F	SLC-4WF-BL		
			V	SLC-4WV-BL		
			L	SLC-4WL-BL		
			G	SLC-4WG-BL		

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Description		Application		Part No.	Remarks	
Incandescent Lamps	BA9S/13 (1W) 	SLC30 incandescent only	BA9S/13 lamp base	IS-6	6.3V, 1W; operating voltage: 5 to 6V AC/DC	Unless "no lamp" (99) is specified, a lamp is included with each style F window equivalent One part number is specified for one replacement bulb
				IS-12	12V, 1W; operating voltage: 9 to 12V AC/DC	
				IS-24	24V, 1W; operating voltage: 18 to 24V AC/DC	
				IS-30	30V, 1W; operating voltage: 24 to 30V AC /DC	
	E12/15 (2W) 	SLC40 incandescent only	E12/15 lamp base	LE-6	6.3V, 2W; operating voltage: 5 to 6V AC/DC	
				LE-8	18V, 2W; operating voltage: 12 to 18V AC/DC	
				LE-2	24V, 2W; operating voltage: 18 to 24V AC/DC	
				LE-3	30V, 2W; operating voltage: 24 to 30V AC/DC	
LED Lamps		SLC30 LED only 1-color	6V AC/DC	SLDN-36M-*	Specify color code in place of asterisk (*): A = Amber G = Green R = Red S = Blue (available in 24V version only) W = White Y = Yellow	
			12V AC/DC	SLDN-31M-*		
			24V AC/DC	SLDN-32M-*		
		SLC30 LED only 2-color: Red/Green	24V AC/DC	SLDN-32MW-RG		
		SLC40 LED only 1-color	24V AC/DC	SLCN-42M-*		
		SLC40 LED only 2-color: Red/Green	24V AC/DC	SLCN-42MW-RG		

Replacement Parts

Full Voltage Models			Description	Type	Part Number
SLC30 	Incandescent		Incandescent	DS	SLC-3DS
			Standard LED	DD	SLDN-3DH
	LED		LED w/ Check Terminal	DHM	SLD-3DHM
			Dual Color LED	DW	SLD-3DW
SLC 40 	Incandescent		Incandescent	DE	SLC-4DE
			Incandescent w/ Check Terminal	DEM	SLC-4DEM
			Standard LED	DD	SLDN-4DH
	LED		LED w/ Check Terminal	DHM	SLD-4DHM
			Dual Color LED	DW	SLD-4DW
Step Down Models			Description	Type	Part Number
SLC30 	Incandescent		Incandescent xfrmr, 120V AC	TS12	SLC-3TS120
			Incandescent xfrmr, 240V AC	TS24	SLC-3TS240
	LED		LED xfrmr, 120V AC	TD12	SLDN-3TH12
			LED xfrmr, 240V AC	TD24	SLDN-3TH24
			LED DC-DC converter, 110V DC	CD1	SLDN-3CH1
SLC40 	Incandescent		Incandescent xfrmr, 120V AC	TE12	SLC-4TE12
			Incandescent xfrmr, 240V AC	TE24	SLC-4TE240
			LED xfrmr, 120V AC	TD12	SLDN-4TH120
	LED		LED xfrmr, 240V AC	TD24	SLDN-4TH240
			LED DC-DC converter, 110V DC	CD1	SLDN-4CH1

Description	Application	Part No.	Remarks
Lamp Holder Tool	SLC30 and SLC40 incandescent	OR-55	Rubber tool eases the removal of incandescent lamps
Tab Terminal Adaptors 	Used for wiring quick-connect terminals	TW-FA1	#250 tab terminal (W x H): 0.250" x 0.031" (6.35 x 0.8mm) single tab
Jumpers 	SLC30	X1 terminal (spade) SLC-JP30 X2 terminal (ring) SLCN-JP34 C terminal (ring) SLC-JP32	Total number of jumpers equals total number of style F window equivalents
	SLC40	X1 terminal (spade) SLC-JP40 X2 terminal (ring) SLCN-JP44 C terminal (ring) SLC-JP42	
Mounting Clip 	All SLCs	SLC-3K1	Mounting clips are included with the panel (see page 894 for details about quantity and placement).
Finger-Safe Terminal Covers 	Use with SLC30 types DD, TD, CD, DS and TS	SLC30-VL3	
	Use with all SLC30 types DHM and DW	SLC30-VL6	
	Use with SLC40 types DD, TD, CD, DE and TE	HW-VL3	
	Use with SLC40 types DHM, DW, and DEM	SLC40-VL6	

Color Screen

(Incandescent only)

Amber
Blue
Green
Red
White
Yellow



Clear Non-Reflective Lens

Marking Plate

Standard: Transparent
Special: White (white LED only)

Lens Frame

Black

LED Housing

Amber
Blue
Green
Red
White
Yellow

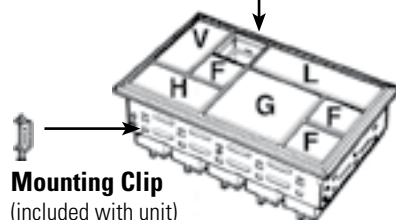


Incandescent Lamps

BA9S/13
Base (1W)



SLC30 Series



Mounting Clip
(included with unit)

Cover Frame
Black

SLC Series Installation Instructions

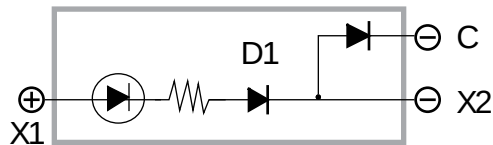
Installation Notes

1. Since lamps generate heat, it is recommended that ventilation be provided for cooling when more than ten lamps are lit continuously.
2. A lower number of windows is specified for multiple transformer and DC-DC converter units (50 maximum, instead of 200 as for full voltage only). This is done to avoid damage which may result from excessive heat generation when all lamps are lit simultaneously.
3. When multiple units are panel mounted, determine panel thickness so that the combined weight of all units and connecting wires can be supported.
4. Multiple units are not designed for continuous, simultaneous lighting of all lamps. However, it is possible to conduct a lamp test with all lamps lit simultaneously for a period of up to 40 minutes.
5. Before removing the LED unit, turn the power supply off.
6. DC-rated voltages for LED units are complete direct current voltages. Make sure to check the measuring instruments and compensate for any error in the measured, full-wave rectified or pulsating voltages.
7. To ensure brightness and long life of LED units, keep the DC power voltage within the operating voltage range.

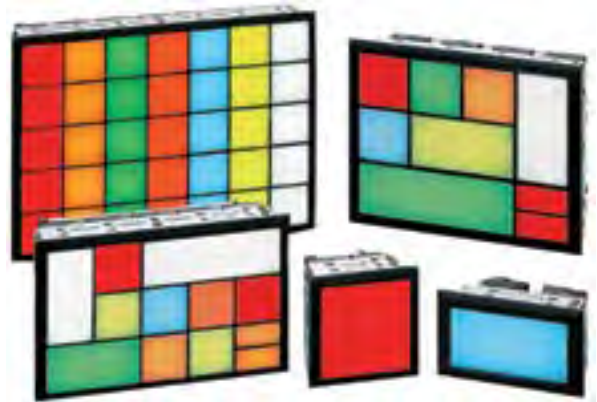
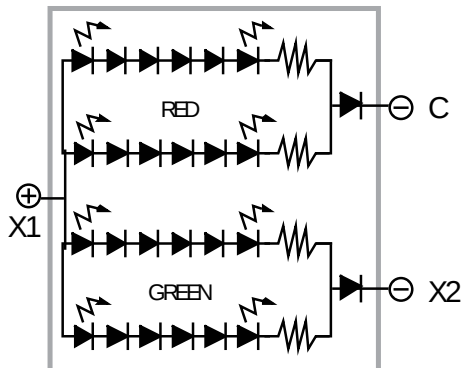
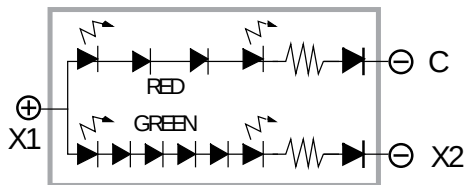
LED Operating Voltage Range: 24V AC/DC $\pm$ 10%

Terminal Arrangements (LED units)

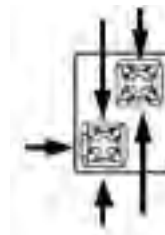
For full voltage (1- and 2-color) and DC-DC converter LED units, terminal X1 is positive and terminal X2 is negative. Make sure to observe polarity when wiring.



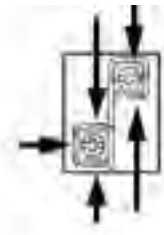
For 2-color alternate units, terminal X1 is positive, and terminals X2 and C (check terminal) are negative.



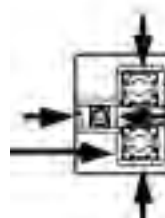
SLC30/SLC40
Full Voltage
DC-DC Converter



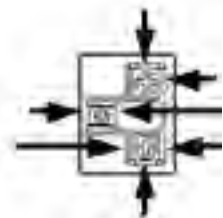
SLC30/SLC40
Transformer



SLC30/SLC40
Full Voltage
with Check Terminal



SLC30/40
2-color LED
(alternating)



SLC30



SLC40



Installation Instructions, continued

Removing Windows

SLC30: To remove a window, insert the tip of a small screwdriver into the slot under the lens frame and gently press down on the screwdriver.

SLC40: To remove an extended window, pull on the top as if to extend the unit; then continue pulling until the unit comes out of the housing. All units are shipped with windows retracted. When transporting units, make sure windows are pushed in fully. After windows are installed, they can be extended as shown in Figure 1.

Removing Lens, Color Screen, and Marking Plate

The lens has two retaining projections on the right and two on the left. To remove the lens, color screen, and marking plate from the lens frame, push open the lens frame with both hands as shown in Figure 2.

The lens can also be removed by inserting a screwdriver into one of the sides with recesses. Since the lens has an orientation, be sure to insert the screwdriver in the direction shown in Figures 3 and 4.



Figure 3: SLC30



Figure 4: SLC40

Installing Lens, Color Screen, and Marking Plate

First, install the marking plate and color screen into the lens frame. To install the lens, insert its retaining projections into the recesses inside the lens frame, and press the lens into the lens frame as shown in Figure 5.

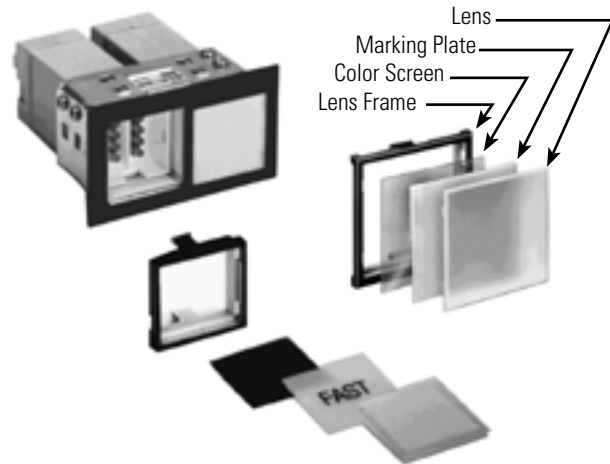


Figure 5: SLC30 and SLC40

Replacing the LED Unit

To remove: Insert the tip of a screwdriver into one of the two slots inside the LED unit. Pull the LED unit straight out without pressing on the LED terminals, as shown in Figure 6.

To install: Make sure that the junction inside the LED unit is aligned in the same direction as the junction of the LED housing. Push the LED unit into the LED housing as shown in Figure 7.



Figure 6: Remove LED



Figure 7: Install LED

Installing Units into a Panel

Single units: With leaf springs installed, push the SLC housing from the front of the panel. Secure the SLC housing with two mounting clips. Tighten the mounting clip screws to a torque of 4 to 5 kgf-cm as shown in Figure 8.



Figure 8: SLC40

Multiple combination units: Insert the units into the panel cut-out from the front. Install the attached mounting clips into the openings on the frame, and tighten the screws as shown in Figure 9. After tightening, use Loctite to prevent loosening. The number of mounting clips included with each multiple unit varies with the number of windows as shown in the table below.

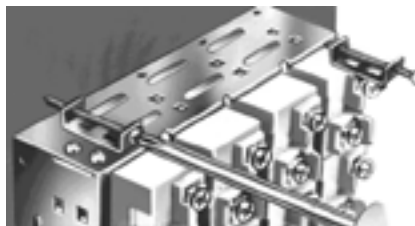


Figure 9: Multiple Combination

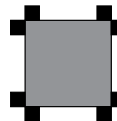
Number of Mounting Clips Included

Columns	1 or 2		3 to 8		9 to 15	16 to 20 *
Rows	Full Voltage	Others	Full Voltage	Others	All Types	All Types
1 or 2	2		4		6	8
3 to 6	4	6	6	8	8	10
7 to 10 (SLC30 only)	6	8	8		10	12

* SLC30 series only



Recommended Mounting Clip Positions

Columns	1 or 2		3 to 8		9 to 15		16 to 20*	
Rows	Full Voltage	Others	Full Voltage	Others	All Types		All Types	
1 or 2	2 Clips		4 Clips		6 Clips		8 Clips	
								
3 to 6	4 Clips	6 Clips	6 Clips	8 Clips	8 Clips		10 Clips	
								
7 to 10 (SLC30 only)	6 Clips	8 Clips	8 Clips		10 Clips		12 Clips	
								

Lamp On: Amber, Blue Green, Red, Yellow				Lamp On: White				Lamp On: Red/Green			
Lamp Off: Desired Color		Lamp Off: White		Lamp Off: White		Lamp Off: White					
Matte Surface (non-shiny)		Matte Surface (non-shiny)		Matte Surface (non-shiny)		Matte Surface (non-shiny)					
Lens	Color Screen:	Marking Plate:	Lens	Marking Plate:	Color Screen:	Lens	Marking Plate:	Color Screen:	Lens	Marking Plate:	Color Screen:
Any Color			White			White			White		
Light Source			Light Source			Light Source			Light Source (LED only)		

Selection Guide.....	896
General Purpose Relays.....	898
RV8H Series 6mm Interface Relays.....	898
RV8S Series 6mm Interface Relays.....	898
RV8H Series 14mm Interface Relays.....	898
RJ Series Slim Power Relays.....	911
RL Series Power Relays.....	921
RQ Series PCB Relays.....	927
RH Series Compact Power Relays.....	931
RR Series Power Relays.....	941
RU Series Universal Relays.....	948
RY/RM Series Miniature Relays.....	957
RF1V Force Guided Relays.....	968
RF2V Force Guided Relays.....	974
Solid State Relays.....	982
RSC Series Solid State Relays.....	982
RSS Series Panel Mount Solid State Relays.....	985

Relays

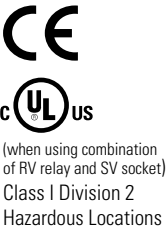


www.IDEC.com/relays



Selection Guide

General Purpose Relays

Series	RV8 6mm Series	RV8H 14mm Series	RJ Series	RQ Series	RH Series	RL Series
Appearance						
Page	898	899	911	926	931	920
Contact Configuration	1 form C (SPDT)	1-pole : 1C (SPDT) 2-pole: 2C (DPDT)	SPDT, SPST, DPDT, DPST	SPDT, DPDT	SPDT, DPDT, 3PDT, 4PDT	RL1: 1X (SPST, Double Make) RL2: 2X (DPST, Double Make)
Terminal	Screw, Spring-clamp	Screw, Spring Clamp	Blade or PCB	PCB	Blade or PCB	Quick Connect/Screw
Contact Rating (resistive)	6A 30V DC/250V AC	1-pole screw: 16A 1-pole spring: 12A 2-pole screw: 8A 2-pole spring: 6A	SPDT: 12A/16A, 30V DC/250V AC DPDT: 8A, 30V DC/250V AC	SPDT: 12A, 16A DPDT: 8A	10A, 30V DC/240V AC 1/3HP, 240V AC 1/6HP, 120V AC	1-pole: 250V AC 30A 2-pole: 250V AC 25A
Contact Material	Silver-Nickel with gold plating	1-pole: Silver-Nickel 2-pole: Silver-Nickel with gold plating	Silver-Nickel alloy	Silver-Nickel alloy	Silver-Cadmium Oxide	Ag Alloy
Approvals						

Series	RR Series	RU Series	RY/RM Series	RF1V Series
Appearance				
Page	941	948	957	968
Contact Configuration	SPDT, DPDT, 3PDT	DPDT, 4PDT	DPDT, 4PDT	4PDT or 6PDT
Terminal	Pin or Blade	Blade or PCB	Blade or PCB	
Contact Rating (resistive)	10A, 30V DC/ 240V AC 1/3HP, 240V AC 1/4HP, 120V AC	DPDT: 10A, 30V DC/250V AC 4PDT: 6A, 30V DC/250V AC 1/10 HP, 240V AC	RY: DPDT: 3A, 30V DC/240V AC 4PDT: 5A, 30V DC/240V AC	5A, 30V DC/240V AC
Contact Material	Silver	DPDT: Silver Tin Oxide Indium 4PDT: Gold-Silver Alloy on Silver	Gold plated silver	Silver alloy
Approvals				

Selection Guide con't

Bifurcated Contacts Relays

Series	RJ22 Series	RU42 Series
Appearance		
Page	911	948
Contact Configuration	DPDT	4PDT
Terminal	Blade or PCB	Blade or PCB
Contact Rating (resistive)	1A 250V AC/30V DC	3A 250V AC/30V DC
Contact Material	Gold clad	Gold Silver Alloy on Silver
Approvals		

Latching Relays

Series	RR2KP Series	RY2KS Series
Appearance		
Page	visit www.IDEC.com/relays	
Contact Configuration	DPDT	DPDT
Terminal	Pin	Blade
Contact Rating (resistive)	10A, 30V DC 10A, 240V AC	3A, 30V DC 3A, 240V AC
Contact Material	Silver	Silver, gold-plated
Approvals		

Solid State Relays

Series	RV8S Series	RSC Series	RSS Series
Appearance			
Page	898	982	985
Output Configuration	1 Form A (SPST-NO)	1 Form A (SPST-NO)	1 Form A (SPST-NO)
Output Rating	24V: 3.5A, 48V DC: 100mA, 280 V AC: 2A	20A, 30A, 45A 48 - 600V AC	10A, 25A, 50A, 75A, 90A 48 - 660V AC
Output	24V - MOSFET, 48V DC Photo-transistor, 280V AC: Triac	Dual SCR (zero crossing)	
Approvals			

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

6mm and 14mm Slim Interface Relay

Key features:

- Class I, Division 2 and Class I, Zone 2 Hazardous Location options (electromechanical relays only)
- Solid State relay versions available (6mm only)
- Only 70mm in height from DIN rail
- Gold-plated contacts (electrical mechanical relays only)
- Pre-assembled relay and DIN mount socket
- Universal screw terminals (flat and phillips) or spring clamp terminals
- Universal AC/DC socket with built-in surge suppression and green LED
- 6A-16A contact rating (electromechanical relays only)
- Lever for easy locking and removal of relay
- Operating temperature of -40°C ~ +70°C (-20°C ~ +60°C for SSR)
- RoHS compliant



Electromechanical Screw Terminal

Solid State Spring Clamp Terminal



6mm wide

6mm wide

General Specifications

		Electromechanical Standard/ Hazardous Location C1D2	Solid State
Ratings		Class I, Division 2, Groups A, B, C, D, T4A Class I, Zone 2 AEx nA nC IIC T4 Class I, Zone 2 Ex nA nC IIC T4 X Gc UL/c-UL Listed	UL/c-UL Listed,
	Number of Poles	1 Pole	1 Pole
Contact Configuration		1C (SPDT)	1A (SPST)
	Contact Material	AgNi (Au plating)	MOSFET, Transistor or Triac
Degree of Protection		IP20	IP20
	Dielectric Strength	Between Contact and Coil 4,000V AC for 1 minute Between Pole 1,000V AC for 1 minute	2,500V AC for 1 minute -
Vibration Resistance	Operating Extremes	Frequency 10 to 55Hz, Amplitude 0.5mm (NO contact), 0.2mm (NC contact)	Frequency 10 to 55Hz, Amplitude 1.0mm
	Damage Limits		
Shock Resistance	Operating Extremes	NO: 49m/s ² NC: 29.4m/s ²	980m/s ²
	Damage Limits	980m/s ²	
Mechanical Life (no load)		Over 10,000,000 operations (operation frequency 18,000 operations per hour)	-
Operating Temperature		-40 to +70°C no freezing (-40 to +55°C for AD110 and AD220 coil voltages)	-20 to +60°C
Operating Humidity		5 to 85% (no condensation)	5 to 85% (no condensation)
Weight (approx.)		Screw Terminal: 30g, Spring Clamp Terminal: 26g	Screw Terminal: 30g, Spring Clamp Terminal: 26g

RV8 Series 14mm Width

Top View
with
Marking
Plate



Screw Terminal



Spring Clamp Terminal



Key features:

- Class I, Division 2 and Class I, Zone 2 Hazardous Location options
- Space-saving 14mm width.
- Universal AC/DC socket with surge suppression and green LED Indicator
- Gold plated contacts (2-pole model only)
- Pre-assembled relay and DIN mount socket
- Universal screw terminals (flat and Philips) or spring clamp terminals
- Only 70 mm in height from DIN rail
- Release lever for easy locking and removal of relay
- Wide input voltage range: 6 to 240V
- High dielectric strength and impulse withstand voltages.
- Reverse polarity protected
- RoHS compliant

Specifications

Number of Poles		1 Pole	2 Pole
Ratings		Class I, Division 2, Groups A, B, C, D, T4 Class I, Zone 2 AEx nA nC IIC T4 Class I, Zone 2 Ex nA nC IIC T4 X Gc UL/c-UL Listed CE	
Contact Configuration		1C (SPDT)	2C (DPDT)
Contact Material		AgNi	AgNi (Au-plated)
Degree of Protection		IP20	IP20
Dielectric strength	Between contact and coil	5,000V AC for 1 minute	
	Between contacts of the same pole	1,000V AC for 1 minute	
	Between contact sets	-	2,500V AC for 1 minute
Vibration Resistance	Operating extremes	Frequency 10 to 55Hz, Amplitude 0.75mm (NO contact), 0.175mm (NC contact)	
	Damage limits	Frequency 10 to 55Hz, Amplitude 0.75mm (NO contact), 0.1mm (NC contact)	
Shock Resistance	Operating extremes	NO: 98m/s ² NC: 24.5m/s ²	
	Damage limits	980m/s ²	
Electrical Life - Screw terminal		AC load:30,000 operations minimum (250V AC, 16A resistive load, operation frequency 360 operation per hour)	AC load:100,000 operations minimum (250V AC, 8A resistive load, operation frequency 360 operation per hour)
Electrical Life - Spring Clamp terminal		AC load:30,000 operations minimum (250V AC, 12A resistive load, operation frequency 360 operation per hour)	AC load:100,000 operations minimum (250V AC, 6A resistive load, operation frequency 360 operation per hour)
Mechanical Life (no load)		Over 10,000,000 operations (Operation frequency 18,000 operations per hour)	Over 10,000,000 operations (Operation frequency 18,000 operations per hour)
Operating Temperature		RV8H-1L1-D6, D9, D12, D18, D24, AD12, AD18, AD24, AD48, AD60, AD110 : -40 to +70°C (Contact current 12A max, 6A per terminal) no freezing : -40 to +55°C (Contact current 16A max, 8A per terminal) no freezing	RV8H-2L-D6, D9, D12, D18, D24, AD12, AD18, AD24, AD48, AD60, AD110 : -40 to +70°C (Contact current 6A max) no freezing : -40 to +55°C (Contact current 8A max) no freezing
		RV8H-1L1- AD220 : -40 to +55°C (Contact current 16A max, 8A per terminal) no freezing	RV8H-2L- AD220 : -40 to +55°C (Contact current 8A max) no freezing
		RV8H-1S1-D6, D9, D12, D18, D24, AD12, AD18, AD24, AD48, AD60, AD110 : -40 to +70°C (Contact current 12A max, 6A per terminal) no freezing	RV8H-2S-D6, D9, D12, D18, D24, AD12, AD18, AD24, AD48, AD60, AD110 : -40 to +70°C (Contact current 6A max) no freezing
Operating Humidity		5 to 85% (no condensation)	5 to 85% (no condensation)
Weight (approx.)		Screw Terminal: 52g Spring Clamp Terminal: 49g	Screw Terminal: 52g Spring Clamp Terminal: 49g

Part Numbers

6mm Electromechanical Relay

		Screw Terminal		Spring Clamp Terminal	
					
Input Voltage		General Purpose	Hazardous Location (C1D2)	General Purpose	Hazardous Location (C1D2)
DC	6V	RV8H-L-D6	RV8H-L-D6-C1D2	RV8H-S-D6z	RV8H-S-D6-C1D2
	9V	RV8H-L-D9	RV8H-L-D9-C1D2	RV8H-S-D9	RV8H-S-D9-C1D2
	12V	RV8H-L-D12	RV8H-L-D12-C1D2	RV8H-S-D12	RV8H-S-D12-C1D2
	18V	RV8H-L-D18	RV8H-L-D18-C1D2	RV8H-S-D18	RV8H-S-D18-C1D2
	24V	RV8H-L-D24	RV8H-L-D24-C1D2	RV8H-S-D24	RV8H-S-D24-C1D2
AC/ DC	12V	RV8H-L-AD12	RV8H-L-AD12-C1D2	RV8H-S-AD12	RV8H-S-AD12-C1D2
	18V	RV8H-L-AD18	RV8H-L-AD18-C1D2	RV8H-S-AD18	RV8H-S-AD18-C1D2
	24V	RV8H-L-AD24	RV8H-L-AD24-C1D2	RV8H-S-AD24	RV8H-S-AD24-C1D2
	48V	RV8H-L-AD48	RV8H-L-AD48-C1D2	RV8H-S-AD48	RV8H-S-AD48-C1D2
	60V	RV8H-L-AD60	RV8H-L-AD60-C1D2	RV8H-S-AD60	RV8H-S-AD60-C1D2
	110V - 125V	RV8H-L-AD110	RV8H-L-AD110-C1D2	RV8H-S-AD110	RV8H-S-AD110-C1D2
	220V - 240V	RV8H-L-AD220	RV8H-L-AD220-C1D2	RV8H-S-AD220	RV8H-S-AD220-C1D2

6mm Solid State Relay

		Screw Terminal		Spring Clamp Terminal	
					
Input Voltage	Output Voltage	Part Number		Part Number	
DC	6V	24V DC, 3.5A		RV8S-L-D24-D6	
		48V DC, 0.1A		RV8S-L-D48-D6	
		240V AC, 2A zero cross		RV8S-L-A240Z-D6	
		240V AC, 2A random		RV8S-S-A240-D6	
	24V	24V DC, 3.5A		RV8S-L-D24-D24	
		48V DC, 0.1A		RV8S-L-D48-D24	
		240V AC, 2A zero cross		RV8S-L-A240Z-D24	
		240V AC, 2A random		RV8S-S-A240-D24	
AC	120V	24V DC, 3.5A		RV8S-L-D24-A120	
		48V DC, 0.1A		RV8S-L-D48-A120	
		240V AC, 2A zero cross		RV8S-S-A240Z-A120	
		240V AC, 2A random		RV8S-S-A240-A120	
	240V	24V DC, 3.5A		RV8S-L-D24-A240	
		48V DC, 0.1A		RV8S-L-D48-A240	
		240V AC, 2A zero cross		RV8S-S-A240Z-A240	
		240V AC, 2A random		RV8S-S-A240-A240	

14 mm Electromechanical Relay

		Screw Terminal				Spring Clamp Terminal			
									
		General Purpose		Hazardous Location (C1D2)		General Purpose		Hazardous Location (C1D2)	
Input voltage		1 Pole	2 Pole	1 Pole	2 Pole	1 Pole	2 Pole	1 Pole	2 Pole
DC	6V	RV8H-1L1-D6	RV8H-2L-D6	RV8H-1L1-D6-C1D2	RV8H-2L-D6-C1D2	RV8H-1S1-D6	RV8H-2S-D6	RV8H-1S1-D6-C1D2	RV8H-2S-D6-C1D2
	9V	RV8H-1L1-D9	RV8H-2L-D9	RV8H-1L1-D9-C1D2	RV8H-2L-D9-C1D2	RV8H-1S1-D9	RV8H-2S-D9	RV8H-1S1-D9-C1D2	RV8H-2S-D9-C1D2
	12V	RV8H-1L1-D12	RV8H-2L-D12	RV8H-1L1-D12-C1D2	RV8H-2L-D12-C1D2	RV8H-1S1-D12	RV8H-2S-D12	RV8H-1S1-D12-C1D2	RV8H-2S-D12-C1D2
	18V	RV8H-1L1-D18	RV8H-2L-D18	RV8H-1L1-D18-C1D2	RV8H-2L-D18-C1D2	RV8H-1S1-D18	RV8H-2S-D18	RV8H-1S1-D18-C1D2	RV8H-2S-D18-C1D2
	24V	RV8H-1L1-D24	RV8H-2L-D24	RV8H-1L1-D24-C1D2	RV8H-2L-D24-C1D2	RV8H-1S1-D24	RV8H-2S-D24	RV8H-1S1-D24-C1D2	RV8H-2S-D24-C1D2
AC/DC	12V	RV8H-1L1-AD12	RV8H-2L-AD12	RV8H-1L1-AD12-C1D2	RV8H-2L-AD12-C1D2	RV8H-1S1-AD12	RV8H-2S-AD12	RV8H-1S1-AD12-C1D2	RV8H-2S-AD12-C1D2
	18V	RV8H-1L1-AD18	RV8H-2L-AD18	RV8H-1L1-AD18-C1D2	RV8H-2L-AD18-C1D2	RV8H-1S1-AD18	RV8H-2S-AD18	RV8H-1S1-AD18-C1D2	RV8H-2S-AD18-C1D2
	24V	RV8H-1L1-AD24	RV8H-2L-AD24	RV8H-1L1-AD24-C1D2	RV8H-2L-AD24-C1D2	RV8H-1S1-AD24	RV8H-2S-AD24	RV8H-1S1-AD24-C1D2	RV8H-2S-AD24-C1D2
	48V	RV8H-1L1-AD48	RV8H-2L-AD48	RV8H-1L1-AD48-C1D2	RV8H-2L-AD48-C1D2	RV8H-1S1-AD48	RV8H-2S-AD48	RV8H-1S1-AD48-C1D2	RV8H-2S-AD48-C1D2
	60V	RV8H-1L1-AD60	RV8H-2L-AD60	RV8H-1L1-AD60-C1D2	RV8H-2L-AD60-C1D2	RV8H-1S1-AD60	RV8H-2S-AD60	RV8H-1S1-AD60-C1D2	RV8H-2S-AD60-C1D2
	110V - 125V	RV8H-1L1-AD110	RV8H-2L-AD110	RV8H-1L1-AD110-C1D2	RV8H-2L-AD110-C1D2	RV8H-1S1-AD110	RV8H-2S-AD110	RV8H-1S1-AD110-C1D2	RV8H-2S-AD110-C1D2
	220V - 240V	RV8H-1L1-AD220	RV8H-2L-AD220	RV8H-1L1-AD220-C1D2	RV8H-2L-AD220-C1D2	RV8H-1S1-AD220	RV8H-2S-AD220	RV8H-1S1-AD220-C1D2	RV8H-2S-AD220-C1D2

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Ratings

6mm Electromechanical Coil Ratings

Rated Voltage	Rated Current ±15% (mA) ¹ (at 23°C)	Circuit AC Resis- tance ±15% (Ω) ¹ (at 23°C)	Circuit DC Resis- tance ±15% (Ω) ¹ (at 23°C)	Operating Characteristics			Power Consumption (W)
				Pickup Voltage (at 23°C)	Dropout Voltage (at 23°C)	Maximum Allowable Voltage (at 23°C)	
DC	6V	35	-	90% max	7% min	110%	0.21
	9V	18.6	-				0.2
	12V	14.6	-				0.2
	18V	11.6	-				0.2
	24V	10.6	-				0.25
AC/ DC	12V	15.5	755	90% max	7% min	110%	0.2
	18V	13.3	1365				0.25
	24V	13.7	1730				0.33
	48V	4	11880				0.2
	60V	3.4	17600				0.2
	110V - 125V	3.4 - 3.9	31790 - 31890				0.5
	220V - 240V	3.3 - 3.6	65670 - 66070				0.85

Note 1 ±10% for 6V, 9V and 12V

6mm Electromechanical Contact Ratings

Allowable Contact Power	Resistive Load	1500VA, 180W DC
Rated Load	Resistive Load	250V AC 6A, 30V DC 6A
Allowable Switching Current		6A
Allowable Switching Voltage		400V AC, 125V DC
Allowable Switching Power		1500VA, 180W DC
Minimum Applicable Load		6V DC/10mA

6mm Solid State Input Ratings

Type	Control Voltage Range	Output / Input Voltage	Pickup Voltage	Dropout Voltage	Input Current	Maximum Operation Time	Maximum Release Time
	4.5-12V DC	24V DC / 6V DC	4.5V DC	1.5V DC	10mA±10%(±6VDC)	120μs	200μs
	19.6-30V DC	24V DC / 24V DC	19.6V DC	5V DC	9mA±10%(±24VDC)	350μs	200μs
	96-132V AC	24V DC / 120V AC	96V AC	12V AC	10mA±10%(±120VAC)	11ms	14ms
	192-264V AC	24V DC / 240V AC	192V AC	24V AC	10mA±10%(±240VAC)	11ms	14ms
	4.5-12V DC	48V DC / 6V DC	4.5V DC	1.5V DC	6mA±10%(±6VDC)	40μs	300μs
	19.6-30V DC	48V DC / 24V DC	19.6V DC	5V DC	7mA±10%(±24VDC)	40μs	300μs
	96-132V AC	48V DC / 120V AC	96V AC	12V AC	10mA±10%(±120VAC)	8ms	14ms
	192-264V AC	48V DC / 240V AC	192V AC	24V AC	10mA±10%(±240VAC)	8ms	14ms
Zero Crossing	4.5-12V DC	240V AC / 6V DC	4.5V DC	2V DC	15mA±10%(±6VDC)	10ms	10ms
	19.6-30V DC	240V AC / 24V DC	19.6V DC	5V DC	7mA±10%(±24VDC)	10ms	10ms
	96-132V AC	240V AC / 120V AC	96V AC	12V AC	10mA±10%(±120VAC)	16ms	20ms
	192-264V AC	240V AC / 240V AC	192V AC	24V AC	10mA±10%(±240VAC)	16ms	20ms
Random Crossing	4.5-12V DC	240V AC / 6V DC	4.5V DC	2V DC	15mA±10%(±6VDC)	300μs	10ms
	19.6-30V DC	240V AC / 24V DC	19.6V DC	5V DC	7mA±10%(±24VDC)	300μs	10ms
	96-132V AC	240V AC / 120V AC	96V AC	12V AC	10mA±10%(±120VAC)	8ms	20ms
	192-264V AC	240V AC / 240V AC	192V AC	24V AC	10mA±10%(±240VAC)	8ms	20ms

6mm Solid State Output Ratings

Typical Input Voltage	24V DC	48V DC	240V AC
Output Device	MOSFET	Photo-transistor	Triac
Operating Voltage Range	0-24V DC	0-48V DC	24-280V AC (47-63Hz)
Maximum Load Current	3.5A	100mA	2A
Minimum Load Current	1mA	1mA	70mA
Maximum Blocking Voltage	30V DC	60V DC	600V AC
Maximum Surge Current	9A (10ms)	300mA (10ms)	120A pk (16.6ms)
Maximum I ² t for Fusing	—	—	60A ² sec
Typical On-State Leakage Current	0.4V	1V	1.1V (peak)
Maximum Off-State Leakage Current	0.001mA	0.001mA	4mA
Switching Configuration	Normally Open	Normally Open	Normally Open

14mm Electromechanical Coil Ratings

Rated Voltage	Rated Current ±15% (mA) ¹ (at 23°C)			Circuit AC Resistance ±15% (Ω) ¹ (at 23°C)			Operating Characteristics (Against Rated Voltage)				Operation and release time	Power Consumption (W)		
	DC	AC 50Hz	AC 60Hz	DC	AC 50Hz	AC 60Hz	Pickup Voltage (at 23°C)	Dropout Voltage (at 23°C)	Maximum Allowable Voltage (at 23°C)	Maximum Allowable Voltage ²		DC	AC (50Hz)	AC (60Hz)
DC	6V	75.0			80							0.45	-	-
	9V	44.0			205							0.40	-	-
	12V	32.0			375					120%		0.38	-	-
	18V	24.0			750							0.43	-	-
	24V	20.0			1200							0.48	-	-
AC/DC	12V	32.0	29.0	29.0	375	414	80% max	7% min				0.38	0.35	0.35
	18V	24.0	24.0	24.0	750	750						0.43	0.43	0.43
	24V	20.0	21.0	21.0	1200	1143						0.48	0.50	0.50
	48V	7.6	9.0	9.0	6316	5333						0.36	0.43	0.43
	60V	7.6	9.0	9.0	7895	6667				110%		0.46	0.54	0.54
	110V - 125V	4.4-5.1	5.3-5.8	5.3-5.8	24510	21552						0.64	0.73	0.73
	220V - 240V	4-4.6	4.5-5.2	4.8-5.5	52174	46154						1.10	1.25	1.32

Note 1: Input voltages lower than 24V: ±10%

Note 2: At rated operating temperature

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

14mm Contact Ratings

		Screw Terminal	Spring Clamp Terminal
Allowable contact power	Resistive load	1 Pole 4,000VA	1 Pole 3,000VA
		2 Pole 2,000VA	2 Pole 1,500VA
	Inductive load	B300 (pilot duty)	B300 (pilot duty)
Rated Load	Resitive load	1 Pole 250V AC, 16A (8A per terminal) at 55°C, 12A (6A per terminal) at 70°C	1 Pole 250V AC, 12A (6A per terminal) at 70°C
		2 Pole 250V AC, 8A at 55°C, 6A at 70°C	2 Pole 250V AC, 6A at 70°C
	Inductive load	B300 (pilot duty)	B300 (pilot duty)
Allowable Switching Current		1 Pole 16A (8A per terminal) at 55°C, 12A (6A per terminal) at 70°C	1 Pole 12A (6A per terminal) at 70°C
		2 Pole 8A at 55°C, 6A at 70°C	2 Pole 6A at 70°C
Allowable Switching Power		1 Pole 4,000VA	1 Pole 3,000VA
		2 Pole 2,000VA	2 Pole 1,500VA
Minimum Applicable Load (reference value)		1 Pole 6VDC 100mA	1 Pole 6VDC 100mA
		2 Pole 5VDC 10mA	2 Pole 5VDC 10mA

Accessories

Jumper, Spacer, and Screwdriver

6mm	Color	Part Number
Jumper for 6mm Relay (20 combs) ^{1, 2, 6} 	Black	SV9Z-J20B
	Gray	SV9Z-J20W
	Blue	SV9Z-J20S
14mm		
Jumper for 14mm Relay (32 combs, with 2 combs per relay, or 16 discrete relays.) ^{3, 4, 6} 	Black	SV9Z-J232B
	Gray	SV9Z-J232W
	Blue	SV9Z-J232S

Spacer (circuit separator)^{5, 6}



SV9Z-SA2W

Screwdriver



BC1S-SD0

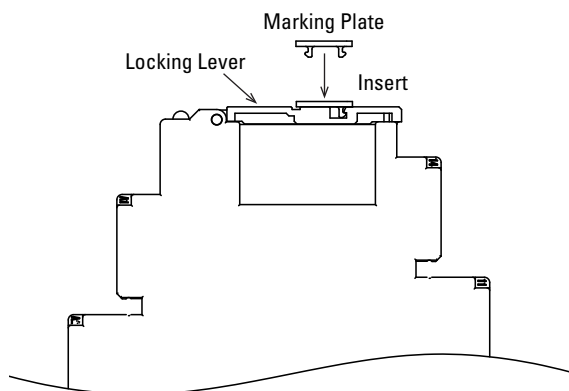
1. Jumper combs come with 20 points for 6mm relays. If shorter lengths are needed, simply cut off the excess points.
2. Ensure that the total current to the jumper does not exceed the overall rated current (Rated current: 6A).
3. Jumper combs come with 16 pairs of combs for 14mm relays. If shorter lengths are needed, simply cut off the excess points.
4. Ensure that the total current to the jumper does not exceed the overall rated current (Rated current: 6A for spring-clamp terminals and 8A for screw type terminations).
5. Width of spacer: 2mm
6. When using a cut jumper, please use a spacer on the cut side. For additional information see instruction sheet.

Marking Plate Part Numbers

	6mm	14mm	Part Number	Engraving
Horizontal Orientation			SV9Z-PW10	blank
			SV9Z-PW10-①1-10	1-10
			SV9Z-PW10-①11-20	11-20
			SV9Z-PW10-①21-30	21-30
			SV9Z-PW10-①31-40	31-40
			SV9Z-PW10-①41-50	41-50
			SV9Z-PW10-①51-60	51-60
			SV9Z-PW10-①61-70	61-70
			SV9Z-PW10-①71-80	71-80
			SV9Z-PW10-①81-90	81-90
Vertical Orientation			SV9Z-PW10-①91-100	91-100
			SV9Z-PW10-①A-J	A-J
			SV9Z-PW10-①K-T	K-T
			SV9Z-PW10-①U-Z	U-Z
			SV9Z-PW10-①GROUND	⏏
			SV9Z-PW10-①AC	⚡

1. In place of ① insert orientation code: V=Vertical, H=Horizontal
2. Each unit has 10 pieces (marking plates).

Marking Plate Placement



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

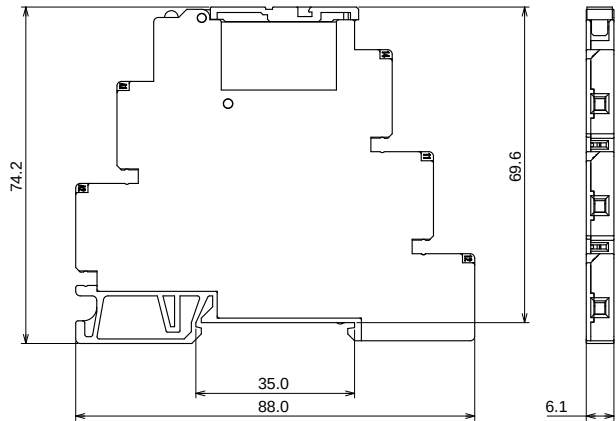
Terminal Blocks

Circuit Breakers

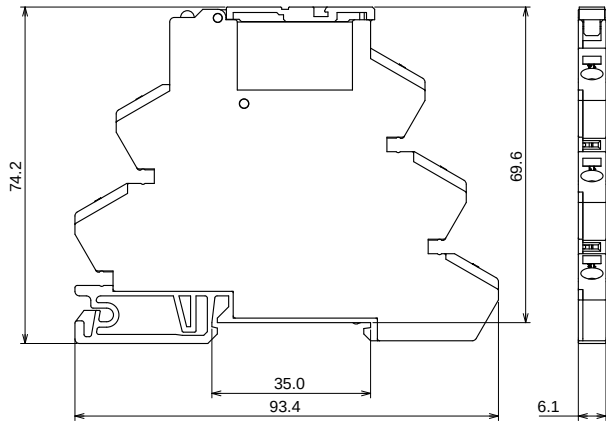
Dimensions (mm)

6mm Electromechanical and Solid State Relay

6mm Screw Terminal

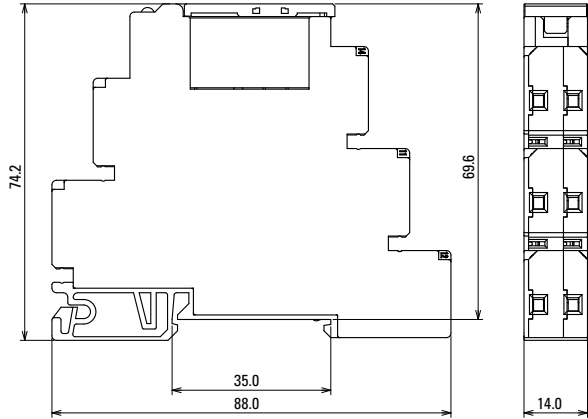


6mm Spring Clamp Terminal

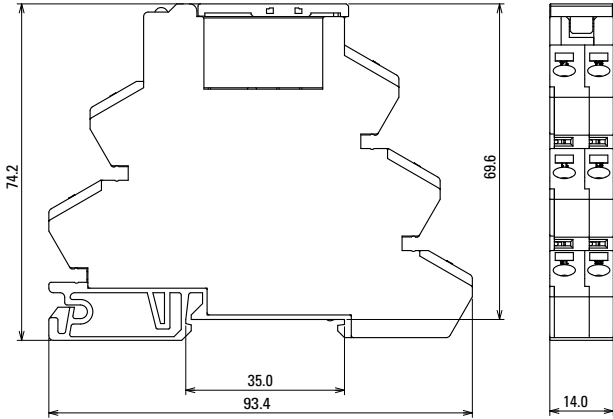


14mm Electromechanical Relay

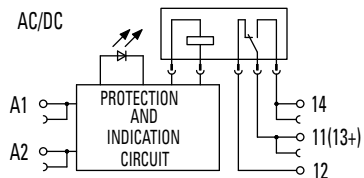
14mm Screw Terminal



14mm Spring Clamp Terminal

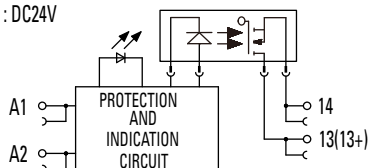


6mm Electromechanical Relay

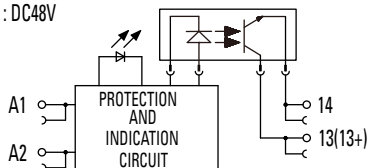


6mm Solid State Relay

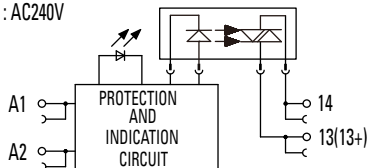
INPUT : AC120V,AC240V
OUTPUT : DC24V



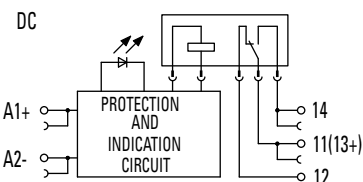
INPUT : AC120V,AC240V
OUTPUT : DC48V



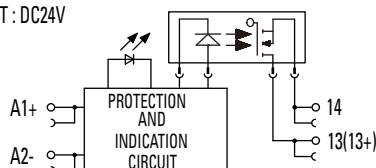
INPUT : AC120V,AC240V
OUTPUT : AC240V



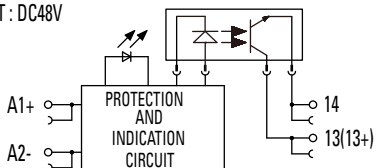
Internal Connections



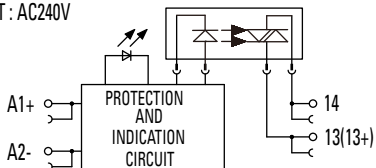
INPUT : DC6V,DC24V
OUTPUT : DC24V



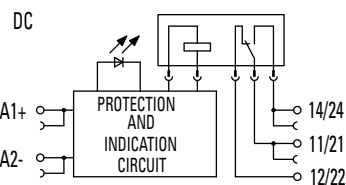
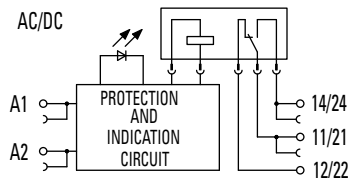
INPUT : DC6V,DC24V
OUTPUT : DC48V



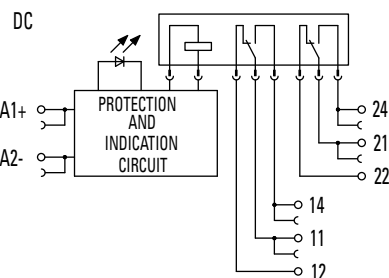
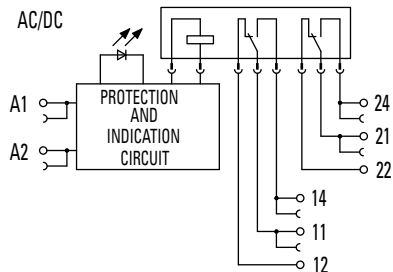
INPUT : DC6V,DC24V
OUTPUT : AC240V



14mm Electromechanical Relay 1 Pole



14mm Electromechanical Relay 2 Pole



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

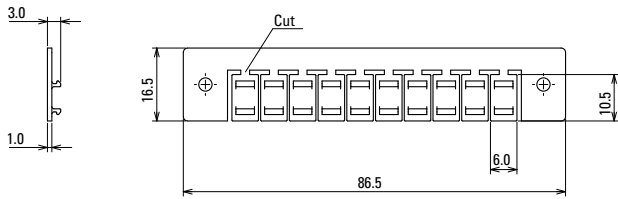
Contactors

Terminal Blocks

Circuit Breakers

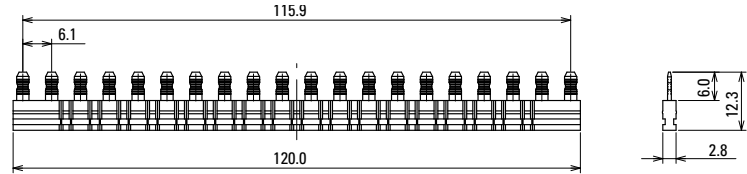
Accessories Dimensions

SV9Z-PW10* Marking Plate



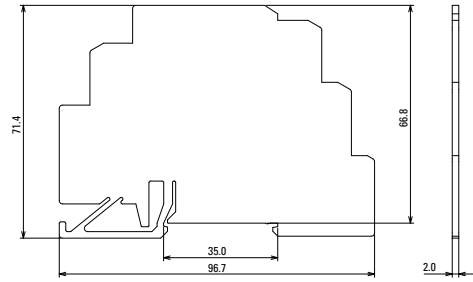
*Available blank or pre-marked.

SV9Z-J20* Jumper for 6mm Relay

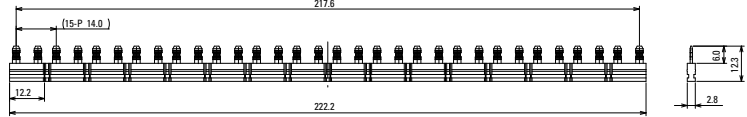


*Available in Black, Gray and Blue

SV9Z-SA2W Spacer for 6 and 14mm Relay



SV9Z-J232* Jumper for 14mm Relay

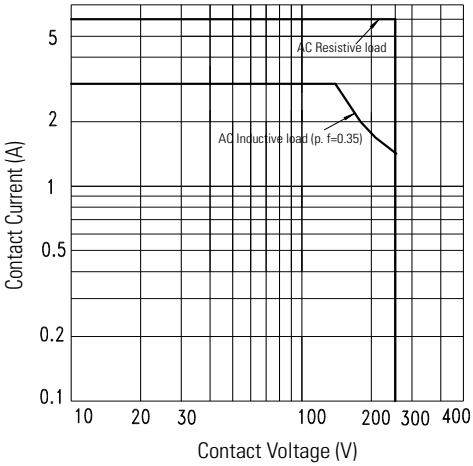


* Available in black, gray and blue.

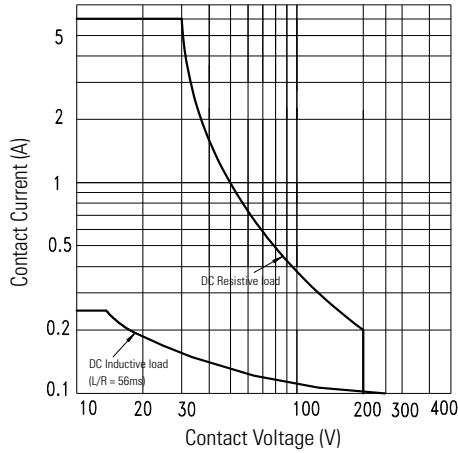
Characteristics

6mm Electromechanical Relay

Maximum Switching Power AC

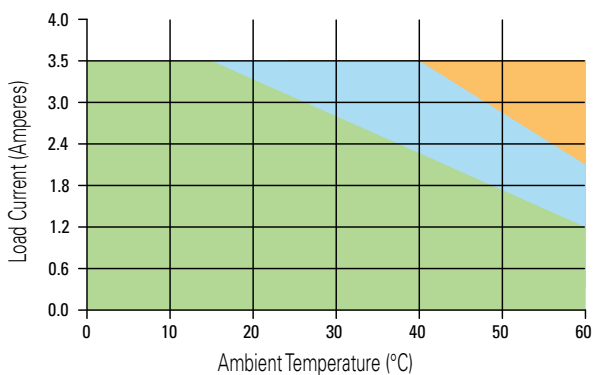


Maximum Switching Power DC

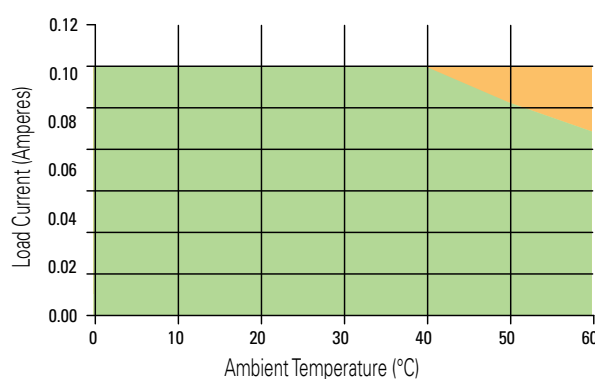


6mm Solid State Continuous Load Current vs. Ambient Temperature Curves

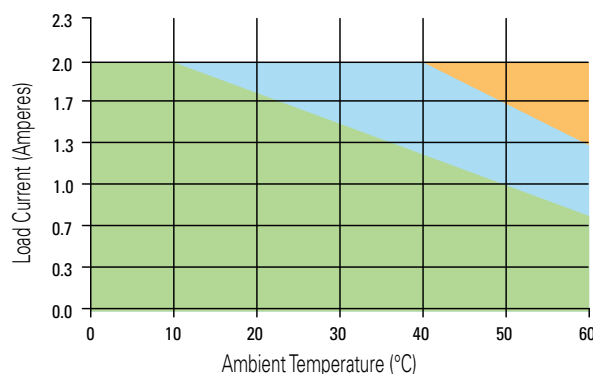
24V DC



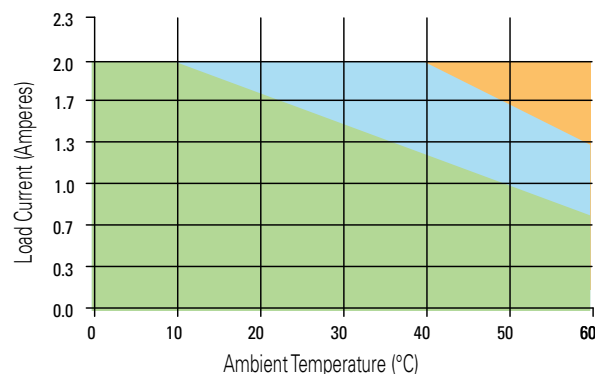
48V DC



240V AC Zero Cross



240V AC Random Cross

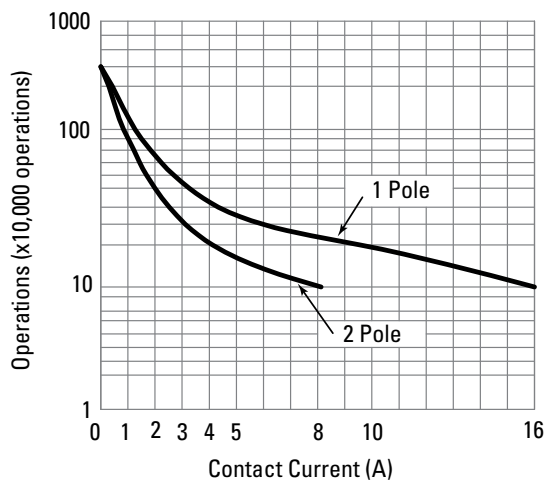


Legend

- No spacing required between units.
- Spacing of 6.2mm minimum required between units
- Not Recommended

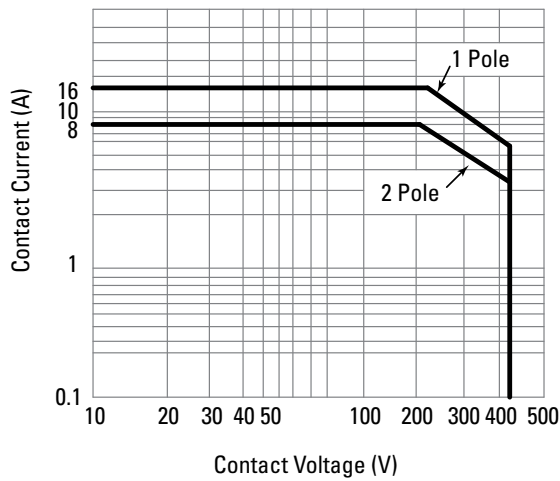
14mm Electromechanical Relays

14 mm Electrical Life Curve AC Load

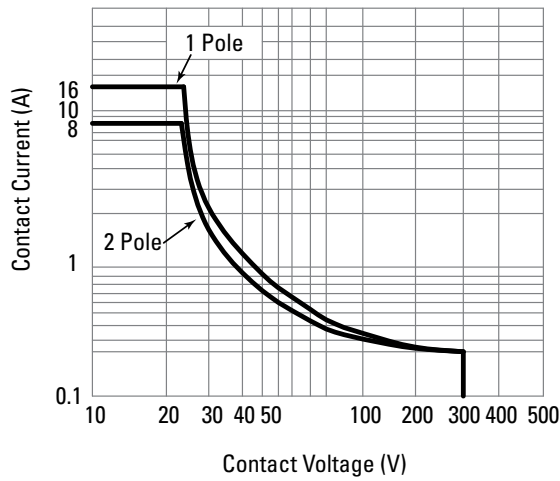


14mm Contact Ratings

AC



DC



RJ Series Slim Power Relays

Key features:

- Compact and rugged power relays. Large switching capacity
- Compact housing only 12.7-mm wide.
Large contact rating
RJ1 (1-pole): 16A (UL general use rating @250V AC)
RJ2 (2-pole): 8A
- Non-polarized LED indicator available on blade type. IDEC's unique light guide structure enables high visibility of coil status from any direction.
- The smallest width for 2-pole/bifurcated contact relay
- Excellent electrical and mechanical life.
Electrical life: 200,000 operations (AC load)
Mechanical life: 30 million operations (AC coil)
- RoHS directive compliant (EU directive 2002/95/EC). Contains no lead, cadmium, mercury, hexavalent chromium, PBB or PBDE.
- Diode model:
Diode reverse withstand voltage: 1000V
- UL recognized, CSA certified, EN compliant.



UL508
UL File No. E55996



CSA C22.2 No. 14
1608322
CSA File No. LR35144



EN61810-1
VDE (REG.-Nr B312)



EN61810-1
EC Low Voltage Directive

Part Number Selection

Style	Terminal	Contact	Model	Part Number	Coil Voltage Code (Standard Stock in bold)
	Blade	SPDT	Standard	RJ1S-C-□	A24 , A110, A120 , A220, A240 , D12, D24 , D48, D100
			with LED	RJ1S-CL-□	
			with Surge Suppresion Diode	RJ1S-CD-□	D12, D24 , D48, D100
			with LED & Surge Suppresion Diode	RJ1S-CLD-□	
		DPDT	Standard	RJ2S-C-□	A24 , A110, A120 , A220, A240 , D12, D24 , D48, D100
			with LED	RJ2S-CL-□	
			with Surge Suppresion Diode	RJ2S-CD-□	D12, D24 , D48, D100
			with LED & Surge Suppresion Diode	RJ2S-CLD-□	
			Standard Bifurcated contacts (without LED indicator)	RJ22S-C-□	A12, A24 , A120 , A240 , D5, D12, D24 , D100
			Bifurated contacts (with LED indicator)	RJ22S-CL-□	
			Bifurcated contacts diode (without LED indicator)	RJ22S-CD-□	D5, D12, D24 , D48, D100
			Bifurcated contacts diode (with LED indicator)	RJ22S-CLD-□	
	PCB	SPDT	Standard	RJ1V-C-□	
			High Capacity	RJ1V-CH-□	
		SPST-NO	Standard	RJ1V-A-□	A24 , A110, A120 , A220, A240 , D5, D6, D12, D24 , D48, D100
			High Capacity	RJ1V-AH-□	
		DPDT	Standard	RJ2V-C-□	
			Standard	RJ2V-A-□	
		DPST-NO	Bifurcated contacts	RJ22V-C-□	A12, A24 , A120 , A240 , D5, D12, D24 , D48, D100
			Bifurcated contacts	RJ22V-A-□	

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RJ1S-C-** **A120**
Part No. Coil Voltage Code

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Coil Voltage Table

Coil Voltage Code	A12	A24	A110	A120	A220	A240	D5	D6	D12	D24	D48	D100
Coil Rating	12V AC	24V AC	110V AC	120V AC	220V AC	240V AC	5V DC	6V DC	12V DC	24V DC	48V DC	100-110V DC

Sockets

Relays		Standard DIN Rail Mount	Finger-safe DIN Rail Mount	PCB Mount
Blade Models	RJ1S (Std)	SJ1S-05BW	SJ1S-07LW	SJ1S-61
	RJ2S (Std)/RJ22S	SJ2S-05BW	SJ2S-07LW	SJ2S-61
PCB Models	RJ1V (Std)	—	SQ1V-07B*	SQ1V-63*
	RJ1V (HC) RJ2V/RJ22V	—	SQ2V-07B*	SQ2V-63*
				
		Shown with optional marking plate.		



*Hold-down clip or spring must be removed to use with RJ PCB relays.

Replacement Hold Down Springs

Part Number	Used With Socket
SJ9Z-CM	SJ1S-05BW, SJ1S-07LW, SJ2S-05BW, SJ2S-07LW
SQ9Z-C	SQ1V-07B, SQ2V-07B
SQ9Z-C63	SQ1V-63, SQ2V-63

Jumpers for SJ Sockets

Poles	Part Number	Quantity
2	SJ9Z-JF2	Must purchase in quantities of 10.
5	SJ9Z-JF5	
8	SJ9Z-JF8	
10	SJ9Z-JF10	

Accessories

Item	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.
Marking Plate		Finger safe sockets (ONLY)	SJ9Z-PWPN10	10 pieces per pack

Specifications

Model		RJ1	RJ2	RJ22S	RJ22V
Number of Poles		1-pole	2-pole		
Contact Configuration		SPDT	DPDT	DPDT bifurcated contacts	DPDT (bifurcated), DPST-NO (bifurcated)
Contact Material		Silver-nickel alloy		AgNi (gold clad)	
Degree of Protection		IP40			Flux-tight structure
Contact Resistance (initial value) ¹		50 mΩ maximum			
Operating Time ²		15ms maximum (with diode: 20 ms maximum)			
Release Time ²		10 ms maximum (with diode: 20 ms maximum)			
Dielectric Strength	Between contact and coil	5000V AC, 1 minute			
	Between contacts of the same pole	1000V AC, 1 minute			
	Between contacts of different poles	—	3000V AC, 1 minute		
Vibration Resistance	Operating extremes	10 to 55 Hz, amplitude 0.75 mm			
	Damage limits	10 to 55 Hz, amplitude 0.75 mm			
Shock Resistance	Operating extremes	NO contact: 200 m/s ² , NC contact: 100 m/s ²			
	Damage limits	1000 m/s ²			
Electrical Life (rated load)		AC load: 200,000 operations minimum (operation frequency 1800 operations per hour) DC load: 100,000 operations minimum (operation frequency 1800 operations per hour)		AC load: 100,000 operations minimum (operation frequency 1,800 per hour) DC load: 200,000 operations minimum (operation frequency 1,800 per hour)	
Mechanical Life (no load)		AC coil: 30,000,000 operations minimum (operation frequency 18,000 operations per hour) DC coil: 50,000,000 operations minimum (operation frequency 18,000 operations per hour)		AC load: 10 million operations minimum (operating frequency 18,000 operations per hour) DC load: 20 million operations minimum (operating frequency 18,000 operations per hour)	
Operating Temperature ³		−40 to +70°C (no freezing)			
Operating Humidity		5 to 85% RH (no condensation)			
Weight (approx.)		19g (blade type), 17g (PCB form C type), 16g (PCB form A type)		19g	DPDT: 17g, DPST-NO: 16g



Note: Above values are initial values.

1. Measured using 5V DC, 1A voltage drop method.

2. Measured at the rated voltage (at 20°C), excluding contact bounce time.

3. 100% rated voltage.

Coil Ratings

Rated Voltage			Coil Voltage Code	Rated Current (mA) ±15% (at 20°C)				Coil Resistance (ohms)±10% (at 20°C)	Operating Characteristics²			Power Consumption	
				Without LED¹		With LED¹			Pickup Voltage	Dropout Voltage	Maximum Allowable Voltage³		
				50Hz	60Hz	50Hz	60Hz						
AC	Blade & PCB Models	24V	A24	43.9	37.5	47.5	41.1	243	80% max	30% min	140%	0.9VA (60Hz)	
		120V	A120	8.8	7.5	8.7	7.4	6,400					
		240V	A240	4.3	3.7	4.3	3.7	25,570					
	Bifurcated Models	12V	A12	87.3	75.0	91.1	78.8	62.5				Approx. 1.1VA (50Hz) 0.9 to 1.2VA (60Hz)	
		24V	A24	43.9	37.5	47.5	41.1	243					
		120V	A120	8.8	7.5	8.7	7.4	6,400					
		240V	A240	4.3	3.7	4.3	3.7	25,570					
Rated Voltage			Coil Voltage Code	Rated Current (mA) ±15% (at 20°C)				Coil Resistance (ohms)±10% (at 20°C)	Operating Characteristics²			Power Consumption	
				Without LED¹		With LED¹			Pickup Voltage	Dropout Voltage	Maximum Allowable Voltage³		
DC	Blade Models	12V	D12	44.2		48.0		271				70% max	10% min
		24V	D24	22.1		25.7		1,080	160%				
		48V	D48	11.0		10.7		4,340					
		100-110V	D100	5.3 - 5.8		5.2 - 5.7		18,870					
	PCB Models	5V	D5	106		—		47.2	70% max	10% min	170%	0.53-0.64W	
		6V	D6	88.3		—		67.9					
		12V	D12	44.2		—		271					
		24V	D24	22.1		—		1,080					
		48V	D48	11.0		—		4,340			160%		
	100-110V	D100	5.3 - 5.8		—		18,870						
	Bifurcated Models	5V	D5	106		110		47.2	70% max	10% min	170%	Approx. 0.53 to 0.64W	
		12V	D12	44.2		48.0		271					
		24V	D24	22.1		25.7		1,080					
		48V	D48	11		10.7		4,340					
		100-110V	D100	5.3-5.8		5.2-5.7		18,870			160%		



1. LED Indicator is only available on Blade or Bifurcated relays.
2. Operating characteristics are at 20°C.
3. The maximum allowable voltage is the maximum value which can be applied to the relay coils.

Contact Ratings

Model		Contact	Allowable Contact Power		Rated Load			Allowable Switching Current	Allowable Switching Voltage	Minimum Applicable Load
			Resistive Load	Inductive Load	Voltage	Resistive Load	Inductive Load $\cos\phi=0.3$ L/R=7ms			
Blade Models	1 pole	NO	3000VA	1875VA	250V AC	12A	7.5A	16A	AC250V	DC5V
		NC	3000VA	1875VA	250V AC	12A	7.5A	6A	DC30V	100mA
	2 poles	NO	2000VA	1000VA	250V AC	8A	4A	4A	AC250V	DC5V
		NC	2000VA	1000VA	250V AC	8A	4A	4A	DC30V	10mA
	2 poles (bifurcated contacts)	NO	250VA AC	100VA AC	250V AC	1A	0.4A	1A	250V AC	1V DC
		NC	30W DC	15W DC	30V DC	1A	0.5A		125V DC	100μA
PCB Models	1 pole	Standard Type	3000VA	1875VA	250V AC	12A	7.5A	12A	AC250V	DC5V 100mA
			360W	180W	30V DC	12A	6A			
			3000VA	1875VA	250V AC	12A	7.5A			
		High Capacity Type	180W	90W	30V DC	6A	3A	16A	AC250V	DC5V 100mA
			4000VA	2000VA	250V AC	16A	8A			
			480W	240W	30V DC	16A	8A			
	2 poles	NC	4000VA	2000VA	250V AC	16A	8A	8A	AC250V	DC125V
			240W	120W	30V DC	8A	4A			
			2000VA	1000VA	250V AC	8A	4A			
		NO	2000VA	1000VA	250V AC	8A	4A	8A	AC250V	DC5V 10mA
			240W	120W	30V DC	8A	4A			
			2000VA	1000VA	250V AC	8A	4A			
	2 poles (bifurcated contacts)	NO	250VA AC	100VA AC	250V AC	1A	0.4A	1A	250V AC	1V DC
			30W DC	15W DC	30V DC	1A	0.5A			
		NC	250VA AC	100VA AC	250V AC	1A	0.4A	1A	250V AC	1V DC
			30W DC	15W DC	30V DC	1A	0.5A			

Agency Ratings

Voltage	UL							
	General Use						Resistive	
	RJ1		RJ2		RJ22		RJ22	
	NO	NC	NO	NC	NO	NC	NO	NC
250V AC	16A	6A	8A	4A	1A	1A	—	—
30V DC	12A	6A	8A	4A	—	—	1A	1A

Voltage	CSA													
	General Use		Resistive						Inductive					
	RJ22		RJ1		RJ2		RJ22		RJ1		RJ2		RJ22	
	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	NC
250V AC	1A	1A	12A	12A	8A	8A	—	—	7.5A	7.5A	4A	4A	—	—
30V DC	—	—	12A	6A	8A	4A	1A	1A	6A	3A	4A	2A	1A	1A

Voltage	VDE					
	Resistive				AC-15, DC-13*	
	RJ1	RJ2	RJ22		RJ1	RJ2
	NO	NO	NO	NC	NO	NO
250V AC	12A	8A	1A	1A	6A	3A
30V DC	12A	8A	1A	1A	2.5A	2A



*According to the utilization categories of IEC60947-5-1

Socket Specifications

	Socket	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail/ Panel Mount	SJ1S-05BW	M3 screw with captive wire clamp	250V, 12A	Maximum up to 2 - #14 AWG	0.6 - 1.0N•m (Maximum 1.2N•m)
	SJ2S-05BW	M3 screw with captive wire clamp	250V, 8A	Maximum up to 2 - #14 AWG	0.6 - 1.0N•m (Maximum 1.2N•m)
Finger-safe DIN Rail/Panel Mount	SJ1S-07LW	M3 screw with captive wire clamp, fingersafe	250V, 12A	Maximum up to 2 - #14 AWG	0.6 - 1.0N•m (Maximum 1.2N•m)
	SJ2S-07LW	M3 screw with captive wire clamp, fingersafe	250V, 8A	Maximum up to 2 - #14 AWG	0.6 - 1.0N•m (Maximum 1.2N•m)
	SQ1V-07B	M3 screw with box clamp, fingersafe	300V, 12A	Maximum up to 2 - #14 AWG	1.0N•m Maximum
	SQ2V-07B	M3 screw with box clamp, fingersafe	300V, 10A	Maximum up to 2 - #14 AWG	1.0N•m Maximum
PCB Mount	SJ1S-61	PCB mount	250V, 12A	—	—
	SJ2S-61	PCB mount	250V, 8A	—	—
	SQ1V-63	PCB mount	300V, 12A	—	—
	SQ2V-63	PCB mount	300V, 12A	—	—

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

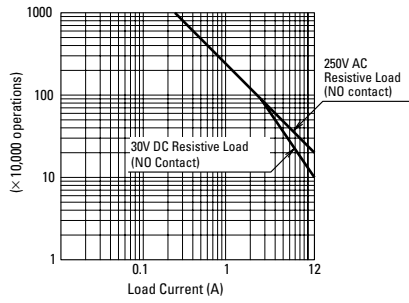
Contactors

Terminal Blocks

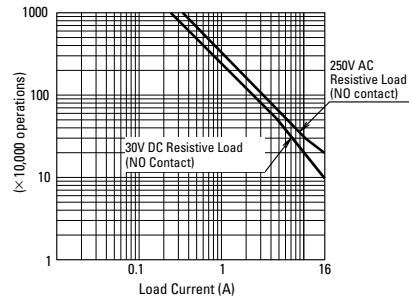
Circuit Breakers

Electrical Life Curve (Resistive Load)

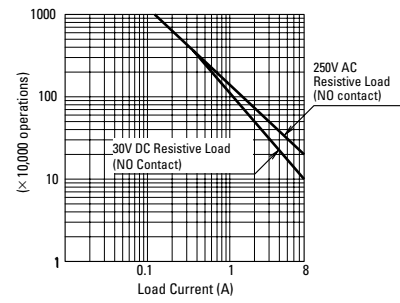
RJ1



RJ1 High Capacity

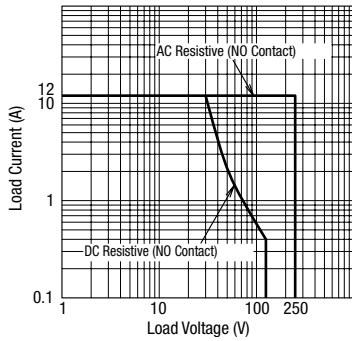


RJ2

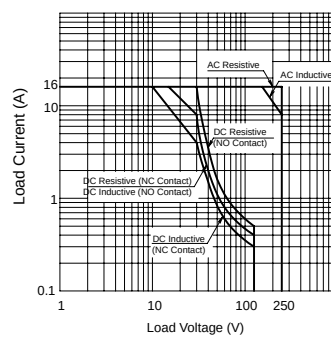


Maximum Switching Capacity (Resistive Load)

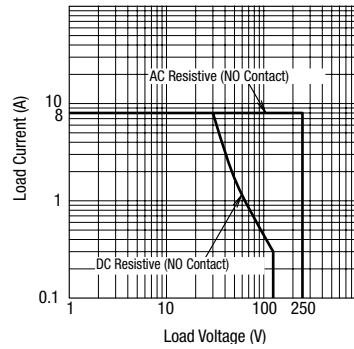
RJ1



RJ1 High Capacity

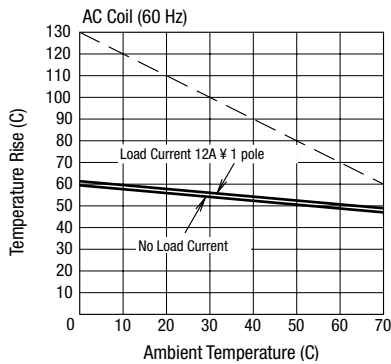


RJ2

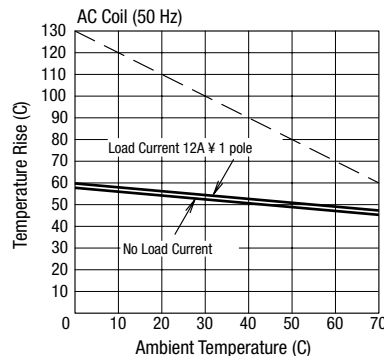


Operating Temperature and Coil Temperature Rise

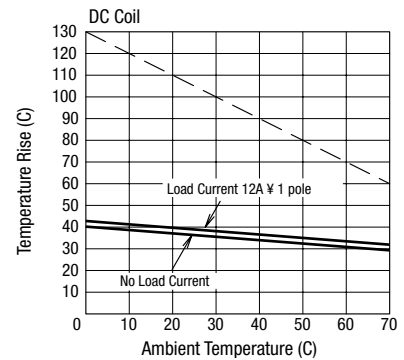
RJ1 (AC Coil, 60 Hz)



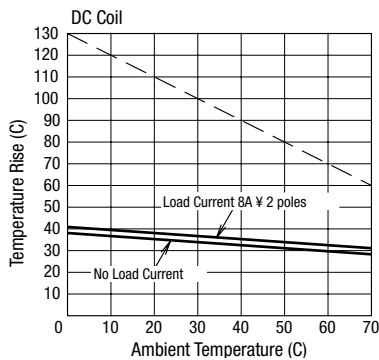
RJ1 (AC Coil, 50 Hz)



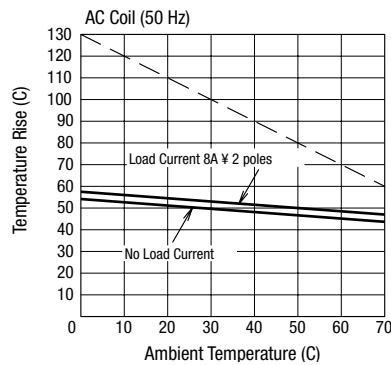
RJ1 (DC Coil)



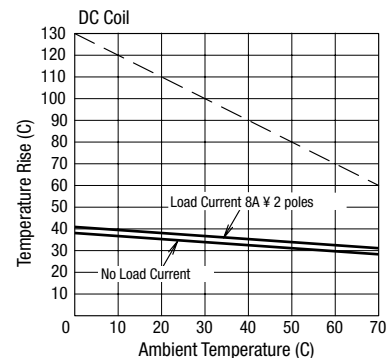
RJ2 (AC Coil, 60 Hz)



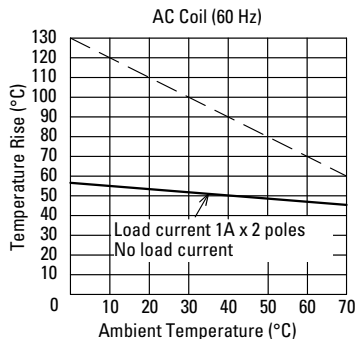
RJ2 (AC Coil, 50 Hz)



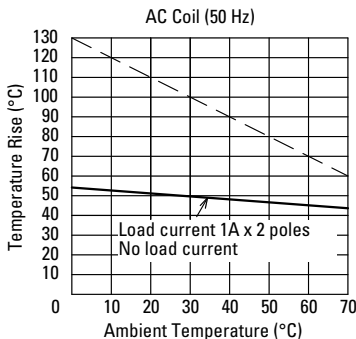
RJ2 (DC Coil)



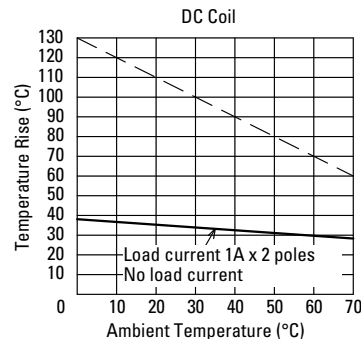
RJ22 (AC Coil, 60 Hz)



RJ22 (AC Coil, 50 Hz)



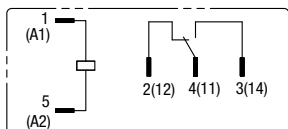
RJ22 (DC Coil)



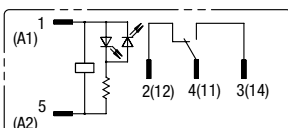
The above temperature rise curves show characteristics when 100% the rated coil voltage is applied.
The slanted dashed line indicates allowable temperature rise for the coil at different ambient temperatures.

Internal Connection (View from Bottom)

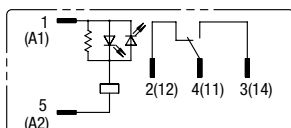
RJ1-C-* Standard



RJ1-CL-* With LED Indicator

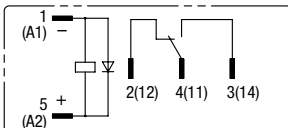


Coil voltage 24V AC/DC and below

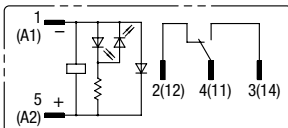


Coil voltage greater than 24V AC/DC

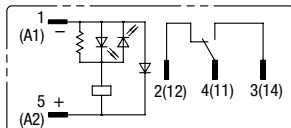
RJ1-CD-* With Diode



RJ1-CLD-* With LED Indicator and Diode

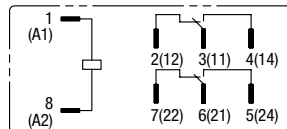


Coil voltage 24V DC and below

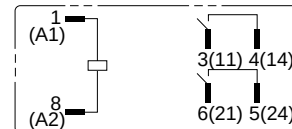


Coil voltage greater than 24V DC

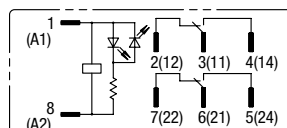
RJ2-C/RJ22-C-* Standard



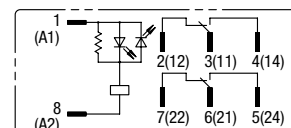
RJ22V-A-*



RJ2-CL/RJ22-CL-* With LED Indicator

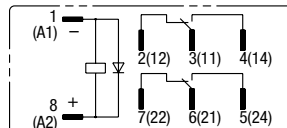


Coil voltage 24V AC/DC and below

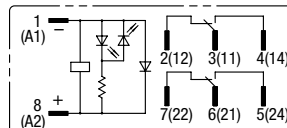


Coil voltage greater than 24V AC/DC

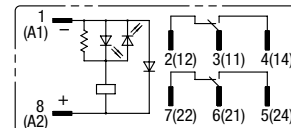
RJ2-CD-/RJ22-CD-* With Diode



RJ2-CLD-/RJ22-CLD-* With LED Indicator and Diode



Coil voltage 24V DC and below

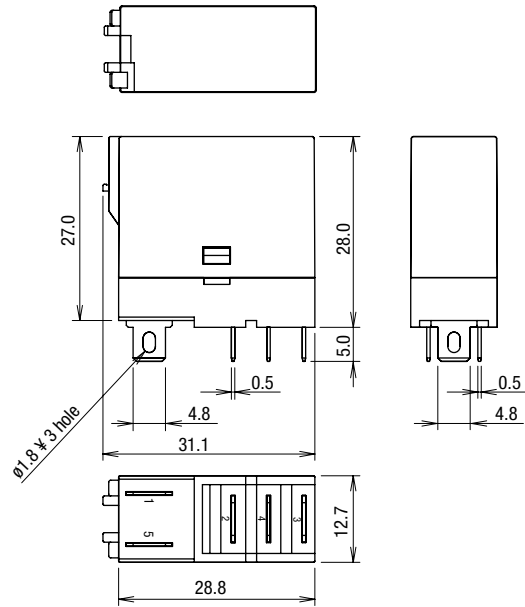


Coil voltage greater than 24V DC

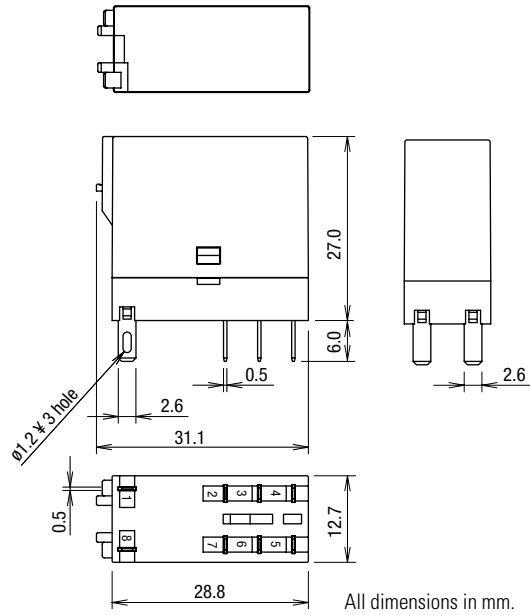
Dimensions (mm)

Blade Relay (mm)

RJ1S



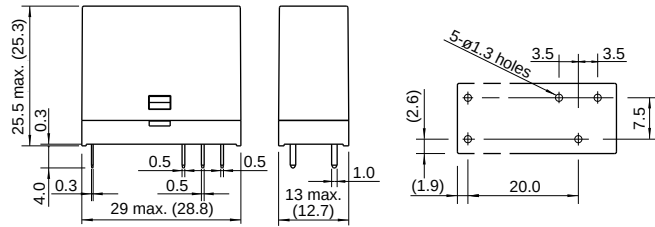
RJ2S/RJ22S



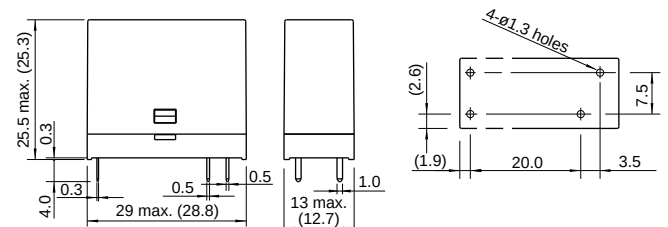
All dimensions in mm.

PCB Relay (mm)

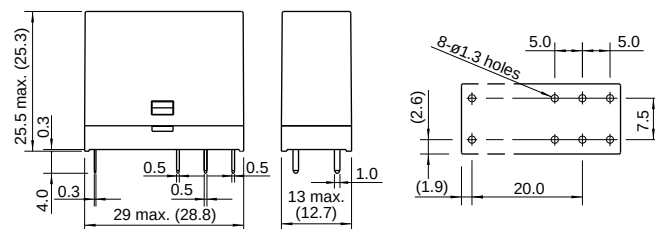
RJ1V-C-*



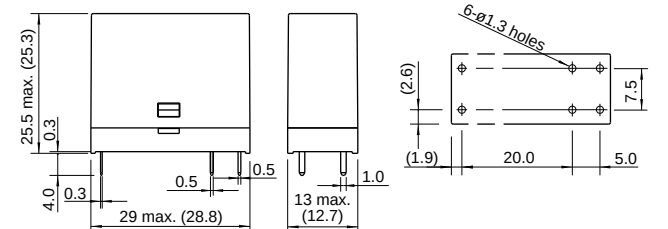
RJ1V-A-*



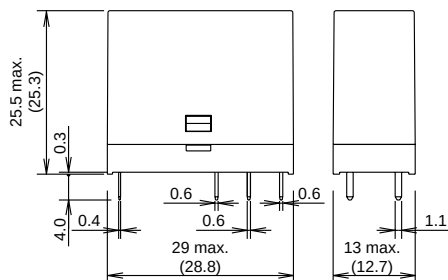
RJ1V-CH-*/RJ2V-C-*



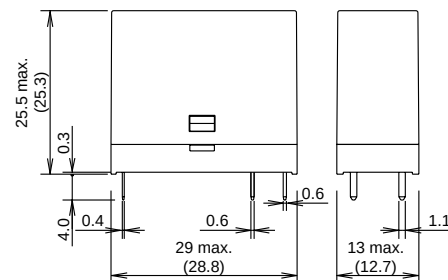
RJ1V-AH-*/RJ2V-A-*



RJ22V-C-*



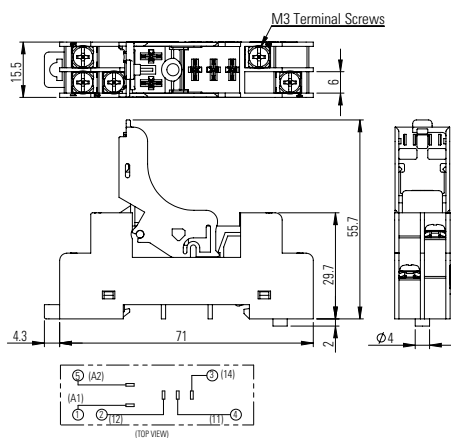
RJ22V-A-*



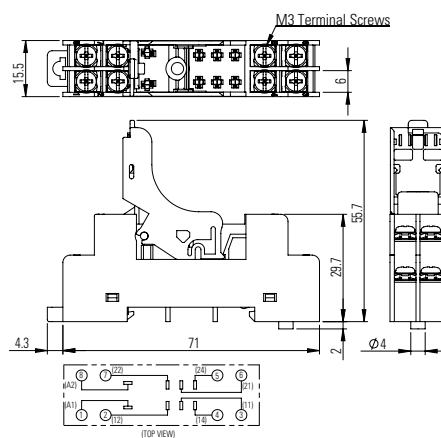
Dimensions con't (mm)

Standard DIN Rail Mount Sockets

SJ1S-05BW

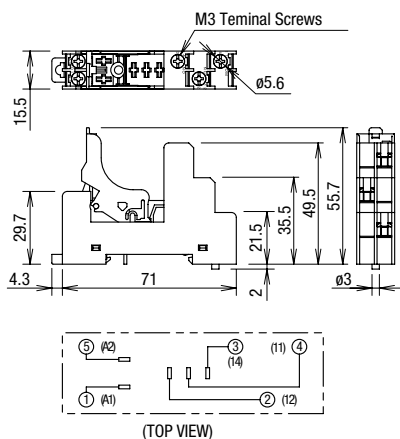


SJ2S-05BW

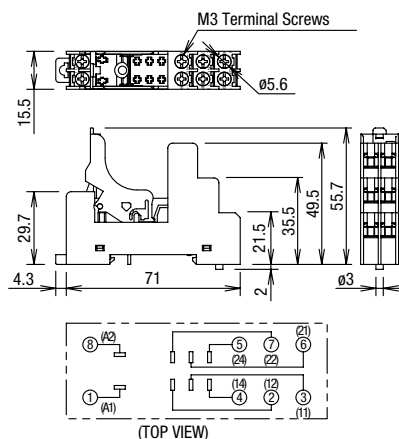


Finger-safe DIN Rail Mount Sockets

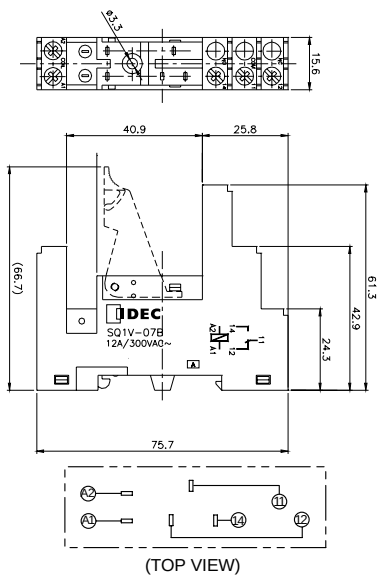
SJ1S-07LW



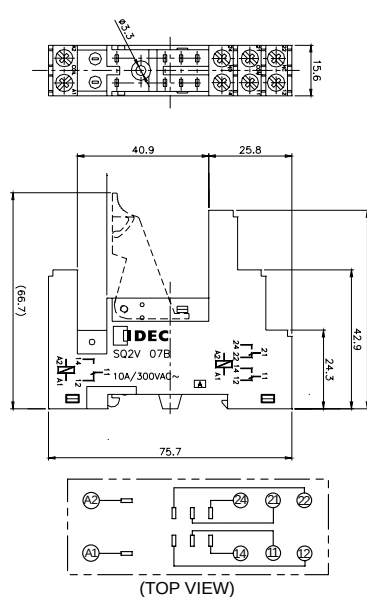
SJ2S-07LW



SQ1V-07B



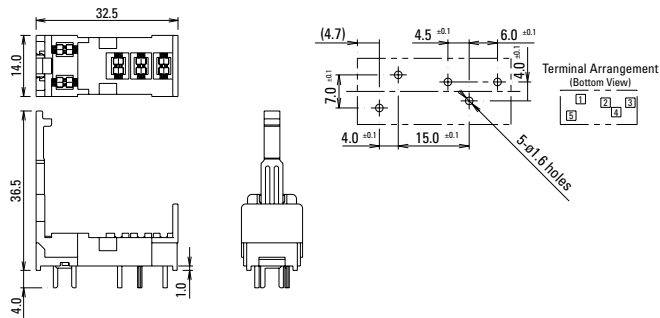
SQ2V-07B



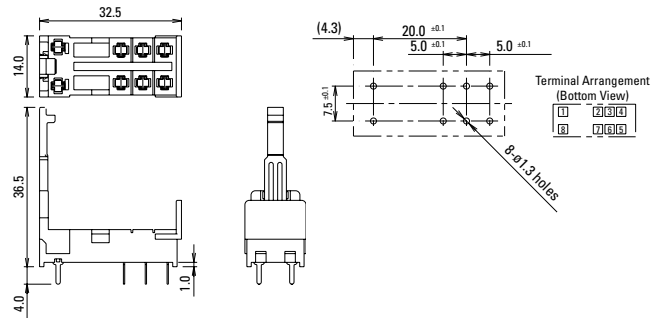
Dimensions con't (mm)

PC Mount Sockets

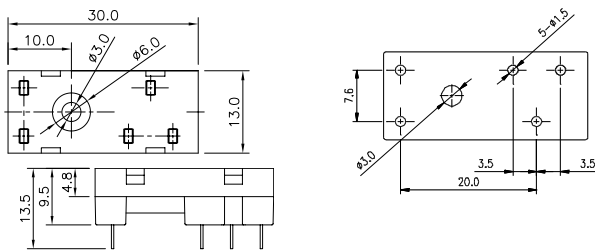
SJ1S-61



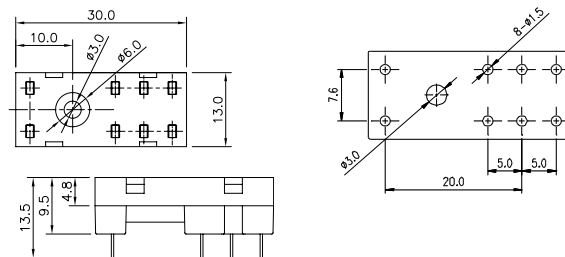
SJ2S-61



SQ1V-63



SQ2V-63



RL Series Power Relays

Quick Connect
Flange MountScrew Terminal
DIN Rail Mount

Specifications

		RL1	RL2
Number of poles		1 pole	2 poles
Contact Configuration		1X (SPST, double make)	2X (DPST, double make)
Contact material		Ag Alloy	Ag Alloy
Operating Time and Release Time		30ms max	30ms max
Degree of Protection		IP40	IP40
Dielectric strength	Between contact and coil	4,000V AC for 1 minute	4,000V AC for 1 minute
	Between pole	2,000V AC for 1 minute	2,000V AC for 1 minute
	Between contact sets	-	2,000V AC for 1 minute
Vibration Resistance	Operating extremes	Frequency 10 to 55 Hz, Amplitude 0.75mm	Frequency 10 to 55 Hz, Amplitude 0.75mm
	Damage limits	Frequency 10 to 55 Hz, Amplitude 0.75mm	Frequency 10 to 55 Hz, Amplitude 0.75mm
Shock Resistance	Operating extremes	100 m/s ² (10G)	100 m/s ² (10G)
	Damage limits	1,000 m/s ² (100G)	1,000 m/s ² (100G)
Electrical Life (rated load). Operation frequency (1800 operations per hour)	AC resistive load	200,000 operations min	200,000 operations min
	Inductive load	100,000 operations min	100,000 operations min
Mechanical Life (without load)		1,000,000 operations min	1,000,000 operations min
Operating Temperature		-25 to +55°C	-25 to +55°C
Operating Humidity		5 to 85% (without condensation)	5 to 85% (without condensation)
Weight		Between 90 and 135 grams, depending on model	Between 90 and 135 grams, depending on model

Standards Compliance

Agency ratings	RL1	RL2
Standard current ratings	30 A, 277 Vac, General Use, 100,000 Cycles	25 A, 277 Vac, General Use, 100,000 cycles
HP ratings	1.5 HP, 120 Vac, 10,000 Cycles	1.5 HP, 120 Vac, 10,000 Cycles
	3 HP, 277 Vac, 30,000 Cycles	3 HP, 277 Vac, 30,000 Cycles
FLA and LRA ratings	20 FLA, 120 LRA, 120 Vac, 50/60 Hz, 30,000 Cycles	20 FLA, 120 LRA, 120 Vac, 50/60 Hz, 30,000 Cycles
	17 FLA, 102 LRA, 277 Vac, 50/60 Hz, 30,000 Cycles	17 FLA, 102 LRA, 277 Vac, 50/60 Hz, 30,000 Cycles

Designed with a 1- and 2-pole 3HP/277V AC rating in an economical and compact package, 30A RL power relays are the superior choice for HVAC panels, energy management and applications requiring higher voltage loads and inductive kick-back. Choose from panel or DIN rail mounting.

Unlike the competition, when DIN rail mounted, RL relays don't require a socket or adaptor. Quick Connect terminals allow faster installation on commercial applications, while screw terminations are ideal for industrial applications.

Key Features

- 3HP at 277VAC, 1.5HP at 120VAC
- Single pole rated at 30A, double pole at 25A
- Double Make contacts
- Flange mount or DIN-rail mount with panel mount tabs
- #250 quick-connect or screw terminations
- AC or DC Coil Inputs
- Designed for Motor, Lighting, and Heater Loads
- Up to 7500 VA maximum switching power
- RoHS compliant



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Coil Ratings

Rated Voltage		Coil Voltage Code	Rated Current (mA) ±10%		Coil Resistance (Ω)	Operating Characteristics at 20°C			Power Consumption
						Pickup Voltage	Dropout Voltage	Maximum Allowable Voltage	
DC	12V	D12	160		75	80% max	15% min	110%	1.9W
	24V	D24	79.0		303				1.9W
Rated Voltage		Coil Voltage Code	Rated Current (mA) +15% -25%		Coil Resistance (Ω)	Operating Characteristics at 20°C			Power Consumption
			50Hz	60Hz		Pickup Voltage	Dropout Voltage	Maximum Allowable Voltage	
AC (50-60Hz)	24V	A24	71.0	69.5	-	80% max	10% min	110%	1.7-2.5VA
	100V - 120V	A100	17.0	16.6	-				1.7-2.5VA
	200V - 240V	A200	8.5	8.1	-				1.7-2.5VA

Contact Ratings

		RL1	RL2
Allowable Contact Power	Resistive load	7500VA	6250VA
Rated Load	Resitive load	250VAC 30A, 30VDC 30A	250VAC 25A, 30VDC 25A
Allowable Switching Current		30A	25A
Allowable Switching Voltage		277VAC	

Part Numbers

Flange Mount

Coil voltage		Screw Terminal 1 Pole Flange Mount	Screw Terminal 2 Pole Flange Mount	Quick Connect Terminal 1 Pole Flange Mount	Quick Connect Terminal 2 Pole Flange Mount
DC	12V	RL1N-T-D12	RL2N-T-D12	RL1B-T-D12	RL2B-T-D12
	24V	RL1N-T-D24	RL2N-T-D24	RL1B-T-D24	RL2B-T-D24
AC	24V	RL1N-T-A24	RL2N-T-A24	RL1B-T-A24	RL2B-T-A24
	100V - 120V	RL1N-T-A100	RL2N-T-A100	RL1B-T-A100	RL2B-T-A100
	200V - 240V	RL1N-T-A200	RL2N-T-A200	RL1B-T-A200	RL2B-T-A200

DIN Rail Mount with Panel Mount Tabs

Coil voltage		Screw Terminal 1 Pole DIN Rail	Screw Terminal 2 Pole DIN Rail	Quick Connect Terminal 1 pole DIN Rail	Quick Connect Terminal 2 Pole DIN Rail
DC	12V	RL1N-D-D12	RL2N-D-D12	RL1B-D-D12	RL2B-D-D12
	24V	RL1N-D-D24	RL2N-D-D24	RL1B-D-D24	RL2B-D-D24
AC	24V	RL1N-D-A24	RL2N-D-A24	RL1B-D-A24	RL2B-D-A24
	100V - 120V	RL1N-D-A100	RL2N-D-A100	RL1B-D-A100	RL2B-D-A100
	200V - 240V	RL1N-D-A200	RL2N-D-A200	RL1B-D-A200	RL2B-D-A200

Part Number Structure

RL 1 B - T-A 100

Series Name

Contact Arrangement

1 : 1 Form X
2 : 2 Form X

Terminal Construction

B : Quick Connect Terminal
N : Screw Terminal

Input Voltage

12 : 12V
24 : 24V
100 : 100-120V
200 : 200-240V

Voltage

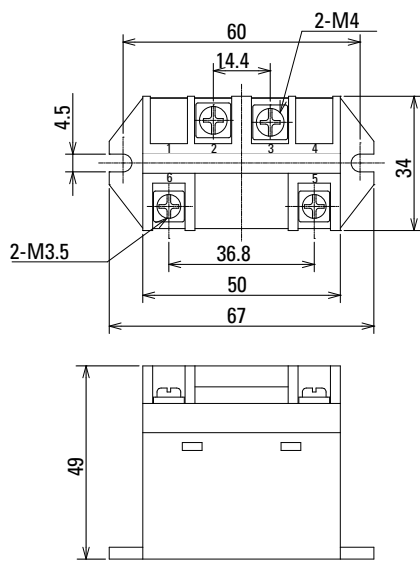
D : DC (Voltage: 12, 24V)
A : AC 50/60Hz (Voltage: 24, 100-120, 200-240V)

Mounting

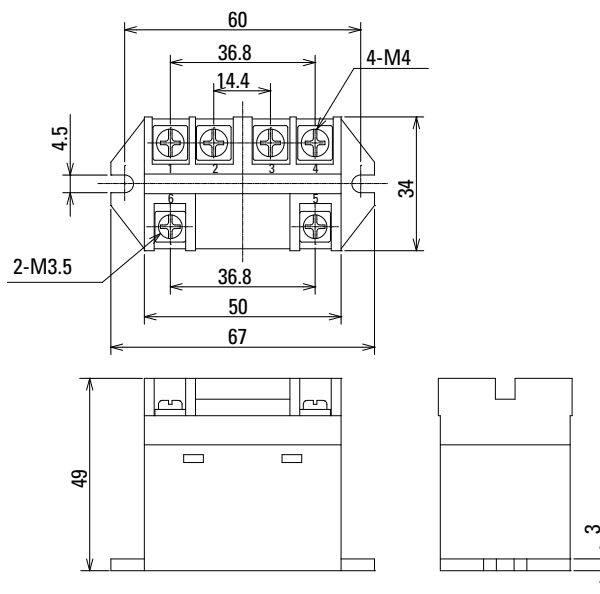
T : Flange Mount
D : DIN Rail Mount with panel mount tabs

Dimensions

RL1N-T Screw Terminal 1 Pole Flange Mount

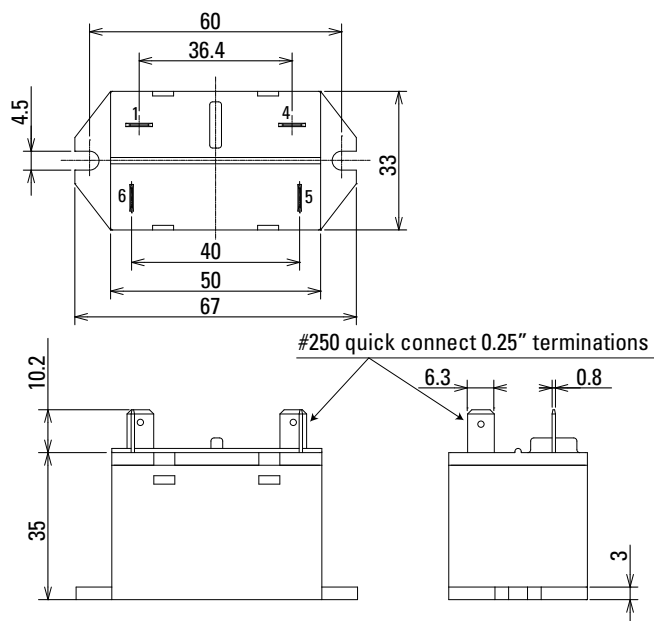


RL2N-T Screw Terminal 2 Pole Flange Mount

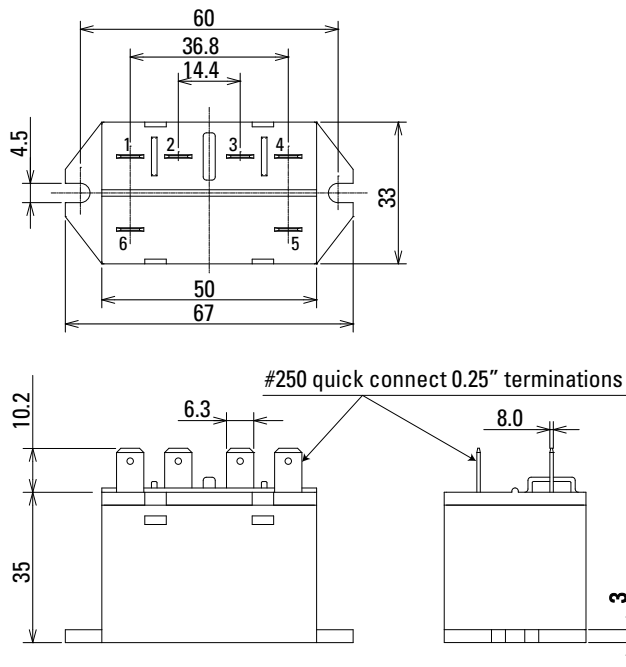


Recommended tightening torque: Coil terminals (M3.5): 0.7 - 0.9 N·m, Contact terminals (M4): 1.0 - 1.4 N·m

RL1B-T Quick Connect Terminal 1 Pole Flange Mount



RL2B-T Quick Connect Terminal 2 Pole Flange Mount



(All dimensions in mm, except where noted.)

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

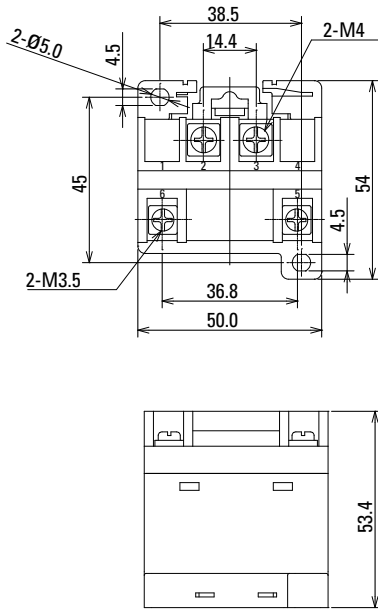
Timers

Contactors

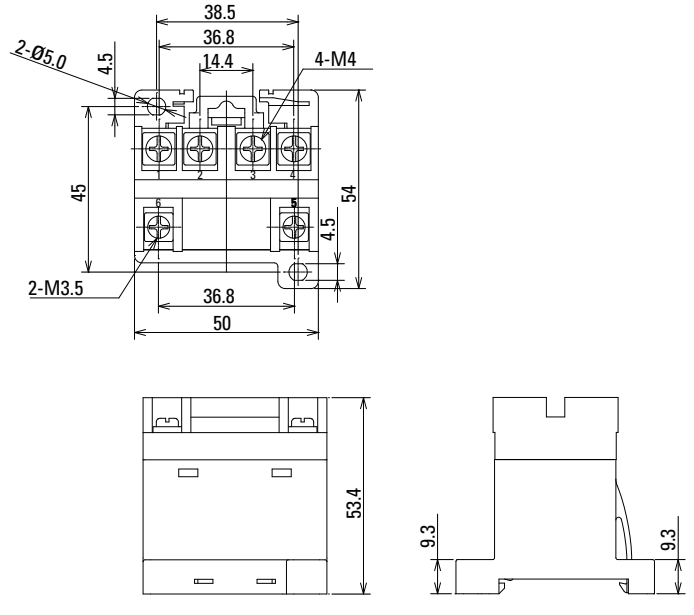
Terminal Blocks

Circuit Breakers

RL1N-D Screw Terminal 1 Pole DIN Rail Mount

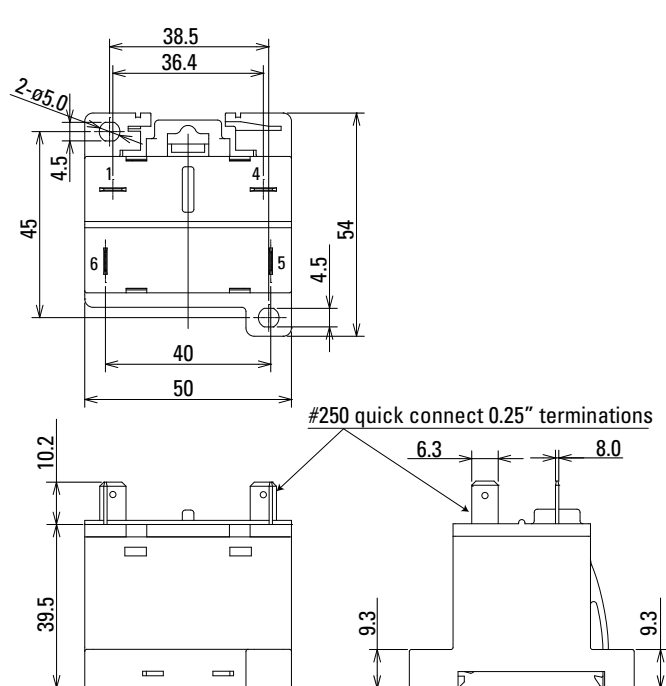


RL2N-D Screw Terminal 2 Pole DIN Rail Mount

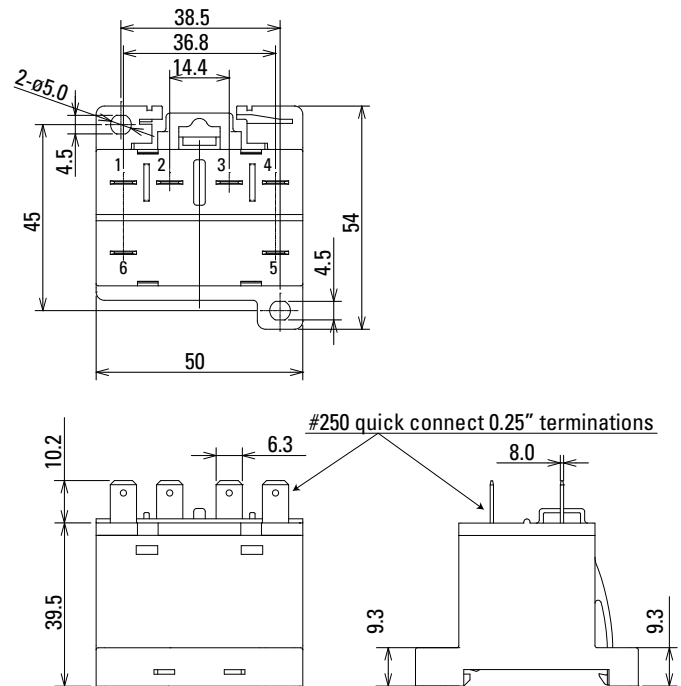


Recommended tightening torque: Coil terminals (M3.5): 0.7 - 0.9 N·m, Contact terminals (M4): 1.0 - 1.4 N·m

RL1B-D Quick Connect Terminal 1 Pole DIN Rail Mount



RL2B-D Quick Connect Terminal 2 Pole DIN Rail Mount



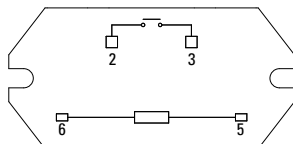
Accessories

Description	Color	Part Number
Finger-safe terminal cover	Clear	RL9Z-C

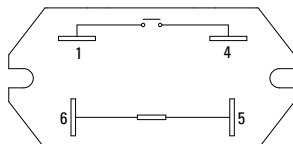
Applicable for screw terminal models only

Terminal Arrangements (Top View)

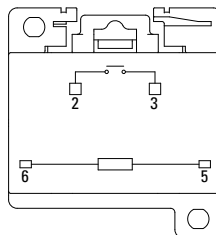
**Screw Terminal
1 Pole Flange Mount**



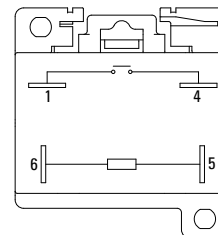
**Quick Connect Terminal
1 Pole Flange Mount**



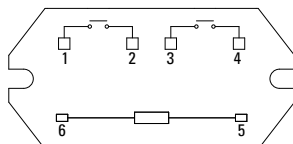
**Screw Terminal
1 Pole DIN Rail Mount**



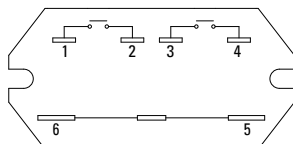
**Quick Connect Terminal
1 Pole DIN Rail Mount**



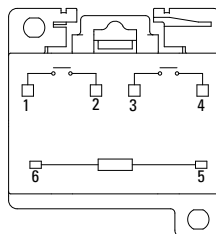
**Screw Terminal
2 Pole Flange Mount**



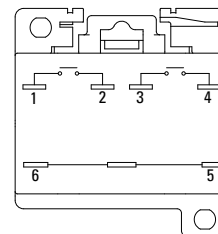
**Quick Connect Terminal
2 Pole Flange Mount**



**Screw Terminal
2 Pole DIN Rail Mount**

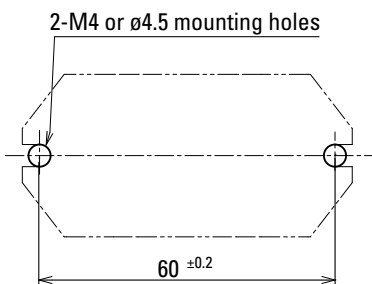


**Quick Connect Terminal
2 Pole DIN Rail Mount**

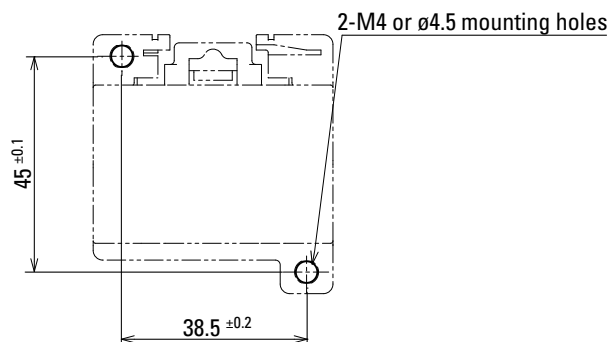


Mounting Hole Dimensions

Flange Mount



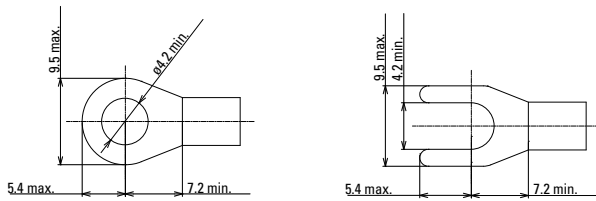
DIN Rail Mount with Panel Mount Tabs



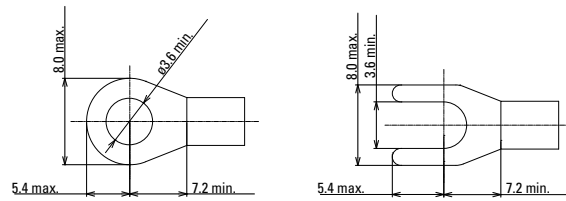
Recommended tightening torque: 0.6 - 0.9 N·m

Recommended ring or fork terminations for screw terminals.

Contact Terminals



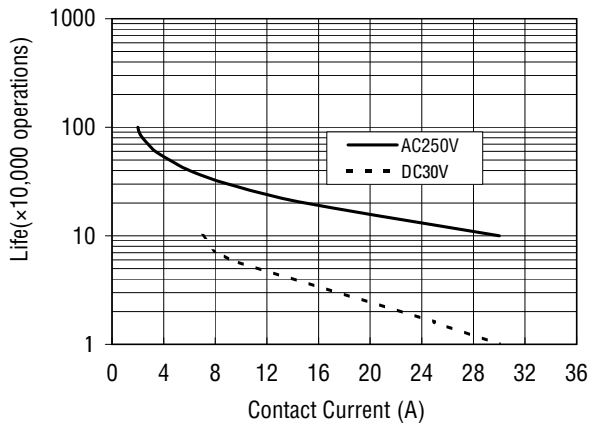
Coil Terminals



Electrical Life Curves

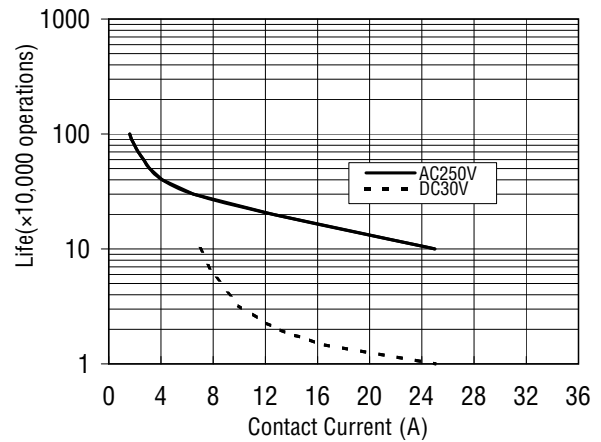
RL1

1 pole



RL2

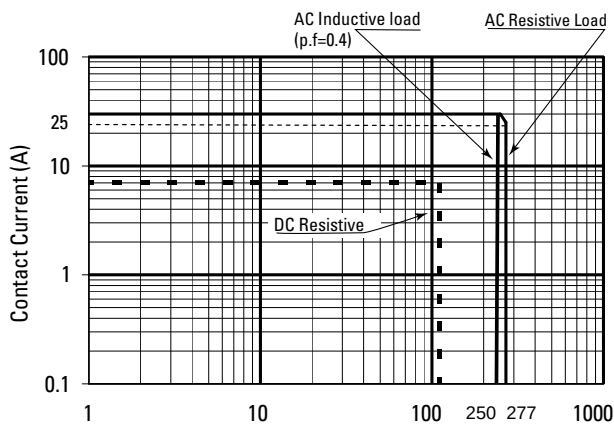
2 poles



Maximum Switching Capacity

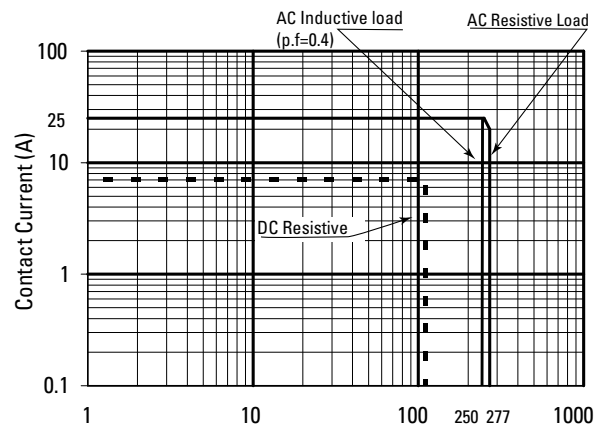
RL1

1 pole



RL2

2 poles



RQ Series PCB Relays

IDEC RQ relays are low-profile, PCB relays in a compact package. Size equals value. RQ relays are small, yet maintain high contact ratings and long operational life. For larger power needs, a 16A model is also available.

Key features:

- Low profile:
29 x 12.7 x 15 mm
- Contact rating:
8A (DPDT) and 12A (SPDT)
- High capacity model with 16A (SPDT) contact rating
- Operational life:
100K cycles at full resistive load
10 million cycles, no load
- LED/Diode Plug-in modules available with DIN rail socket



UL Recognized
File No. E59804



Part Number Selection

Contact	Model	Part Number	
		Pin Terminal	Coil Voltage Code
SPDT 12A 	Basic	RQ1V-CM-□	A24, A115, A230, D12, D24
SPDT 16A 	High Capacity (HC)	RQ1V-CH-□	A24, A115, A230, D12, D24, D110
DPDT 8A 	Basic	RQ2V-CN-□	A24, A115, A230, D12, D24, D110

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RQ1V-CM** **A115**
 Part No. Coil Voltage Code

Coil Voltage Table

Coil Voltage Code	A24	A115	A230	D12	D24	D110
Coil Rating	24V AC	110-120V AC	220-240V AC	12V DC	24V DC	110V DC

Sockets

Relays	Finger-safe DIN Rail Mount	PCB Mount
RQ1	SQ1V-07B [†]	SQ1V-63 [*]
RQ2 RQ1 HC	SQ2V-07B [†]	SQ2V-63 [*]
		

Replacement Parts & Accessories

Part Number	Description	Part Number	Description
SQ9Z-C	Replacement retaining clip	SQ9Z-LD	Diode plug in modules for DIN socket
SQ9Z-C63	Replacement hold-down spring for SQ PCB sockets	SQ9Z-LR	RC plug-in module (110-230V AC) for DIN socket
SQ9Z-J8	8 pt jumper for DIN socket	SQ9Z-P	Replacement marking plate

- 
1. ^{*}Comes with hold down spring

2. [†] Comes with retaining clip and marking plate.

Accessories

Item	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	IDEC offers a low-profile DIN rail (BNDN1000). The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.

Specifications

Model (Contact)		RQ1	RQ1 HC	RQ2
No. of poles		1	1	2
Contact Configuration		SPDT	SPDT	DPDT
Contact Rating		12A	16A	8A
Contact Material		Silver-Nickel alloy		
Contact Resistance		100mΩ max		
Operating Time		12 ms		
Release Time		8 ms		
Dielectric Strength	Between contact & coil Between contacts	5,000VAC, 1 minute 1,000VAC, 1 minute		
Vibration Resistance	Damage limits Operating extremes	10-55 Hz, amplitude 1.5mm 10-55 Hz, amplitude 1.5mm		
Shock Resistance	Damage limits Operating extremes	100m/s ² min (10G) 1,000m/s ² min (100G)		
Mechanical Life		10,000,000 operations		
Electrical Life @ Full Rated Load		100,000 operations		
Operating Temperature		-40 to 85° C		
Operating Humidity		45 to 85% RH		
Dimensions (H x W x D mm)		29 x 12.7 x 15		
Weight (Approx.)		15g		

Coil Ratings

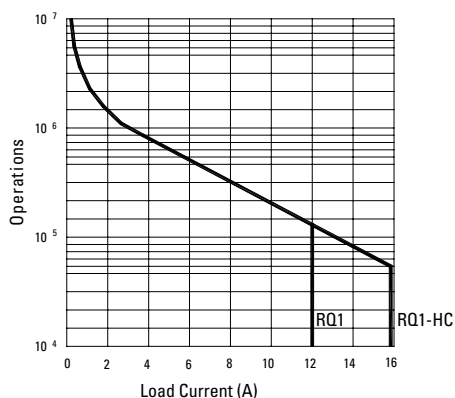
Rated Voltage	Nominal Current		Coil Resistance	Power Consumption		Pickup Voltage	Dropout Voltage	Max Allowable Voltage
	50HZ	60HZ		50HZ	60HZ			
DC	12V	33.3mA	360Ω	0.40W		80% Max	5% Min	130%
	24V	16.7mA	1,440Ω					
	110V	4.1mA	26,530Ω					
AC	24V	29.75mA	25.35mA	350Ω	0.71W	80% Max	30% Min	130%
	115V	7.65mA	6.3mA	8,100Ω	0.88W			
	230V	3.42mA	2.72mA	32,500Ω	0.79W			

Socket Specifications

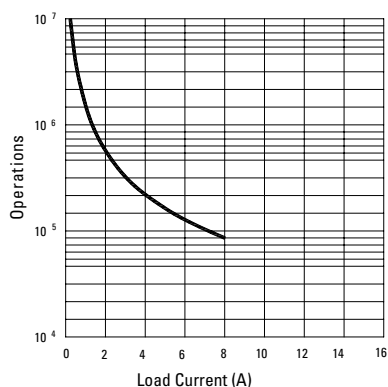
	Relays	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail Sockets	SQ1V-07B	M3 screw with box clamp	300V, 12A	Maximum up to 2 - #14 AWG	1.0N•m Maximum
	SQ2V-07B	M3 screw with box clamp	300V, 8A	Maximum up to 2 - #14 AWG	1.0N•m Maximum
PCB Mount Socket	SQ1V-63	PCB mount	300V, 12A	—	—
	SQ2V-63	PCB mount	300V, 12A	—	—

Electrical Life Curves

RQ1 & RQ1 High Capacity

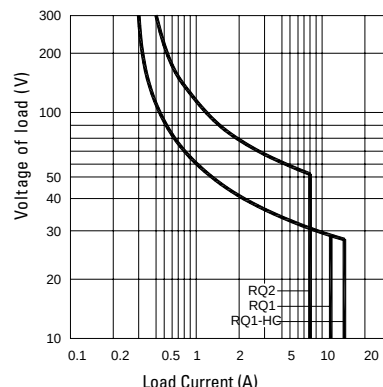


RQ2



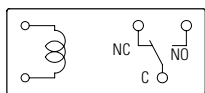
Maximum Switching Capacity

RQ1, RQ1 High Capacity & RQ2

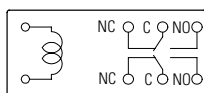


Internal Connection (View from Bottom)

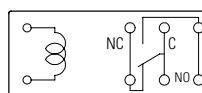
RQ1



RQ2

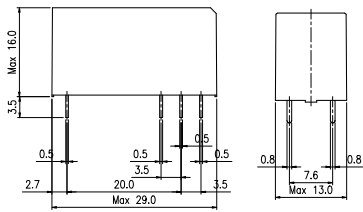


RQ1 HC

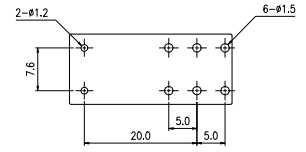
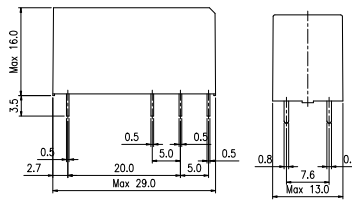


Dimensions (mm)

RQ1

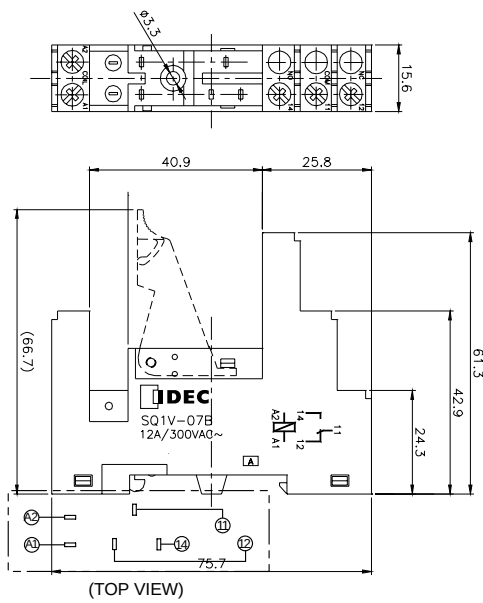


RQ2/RQ1 HC

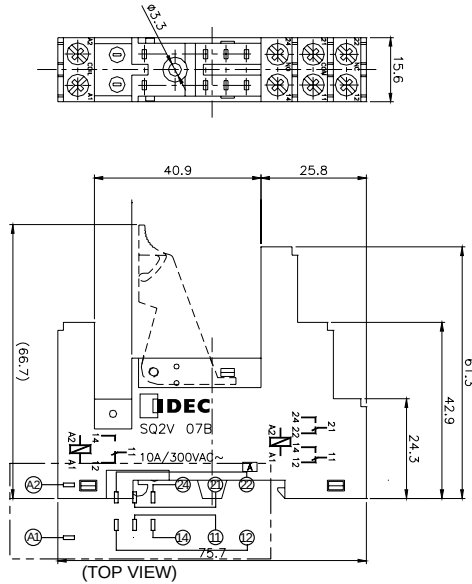


SQ Socket Dimensions

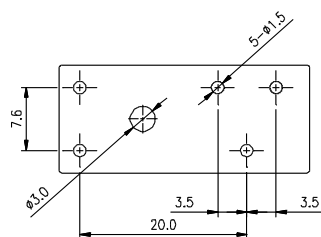
SQ1V-07B



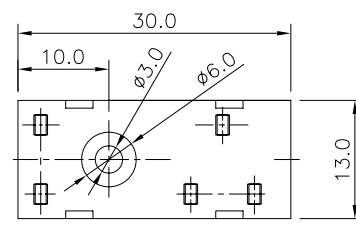
SQ2V-07B



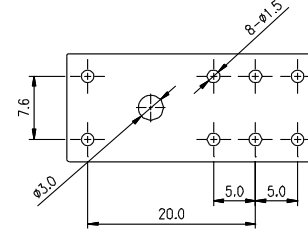
SQ1V-63 PCB Pin Layout



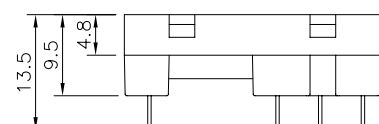
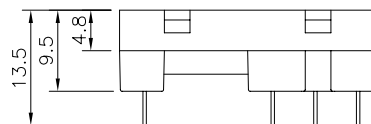
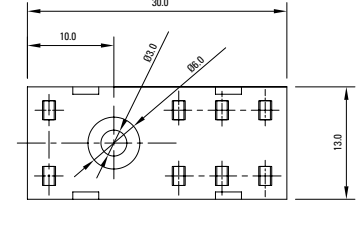
SQ1V-63



SQ2V-63 PCB Pin Layout



SQ2V-63



RH Series Compact Power Relays

Key features

- SPDT through 4PDT, 10A contacts
- Compact power type relays
- Miniature power relays with a large capacity
- 10A contact capacity
- Compact size saves space



Part Number Selection

Contact	Model	Part Number		Coil Voltage Code (Standard Stock in bold)
		Blade Terminal	PCB Terminal	
SPDT 	Standard	RH1B-U □	RH1V2-U □	AC6V, AC12V, AC24V , AC110V, AC120V , AC220V, AC240V DC6V, DC12V , DC24V , DC48V, DC110V, DC125V
	With Indicator	RH1B-UL □	—	
	With Check Button	RH1B-UC □	—	
	With Indicator and Check Button	RH1B-ULC □	—	
	Top Bracket Mounting	RH1B-UT □	—	DC6V, DC12V , DC24V , DC48V, DC110V, DC125V
	With Diode (DC coil only)	RH1B-UD □	RH1V2-UD □	
	With Indicator and Diode (DC coil only)	RH1B-ULD □	—	
DPDT 	Standard	RH2B-U □	RH2V2-U □	AC6V, AC12V, AC24V , AC110-120V , AC220-240V DC6V, DC12V , DC24V , DC48V, DC100-110V, DC125V
	With Indicator	RH2B-UL □	RH2V2-UL □	
	With Check Button	RH2B-UC □	—	
	With Indicator and Check Button	RH2B-ULC □	—	
	Top Bracket Mounting	RH2B-UT □	—	DC6V, DC12V , DC24V , DC48V, DC100-110V, DC125V
	With Diode (DC coil only)	RH2B-UD □	RH2V2-UD □	
	With Indicator and Diode (DC coil only)	RH2B-ULD □	RH2V2-ULD □	
3PDT 	Standard	RH3B-U □	RH3V2-U □	AC6V, AC12V, AC24V , AC110V, AC120V , AC220V, AC240V DC6V, DC12V , DC24V , DC48V, DC110V, DC125V
	With Indicator	RH3B-UL □	RH3V2-UL □	
	With Check Button	RH3B-UC □	—	
	With Indicator and Check Button	RH3B-ULC □	—	
	Top Bracket Mounting	RH3B-UT □	—	DC6V, DC12V, DC24V, DC48V, DC110V, DC125V
	With Diode (DC coil only)	RH3B-UD □	—	
	With Indicator and Diode (DC coil only)	RH3B-ULD □	—	
4PDT 	Standard	RH4B-U □	RH4V2-U □	AC6V, AC12V, AC24V , AC110V, AC120V , AC220V, AC240V DC6V, DC12V , DC24V , DC48V, DC110V, DC125V
	With Indicator	RH4B-UL □	RH4V2-UL □	
	With Check Button	RH4B-UC □	—	
	With Indicator and Check Button	RH4B-ULC □	—	
	Top Bracket Mounting	RH4B-UT □	—	DC6V, DC12V, DC24V, DC48V, DC110V, DC125V
	With Diode (DC coil only)	RH4B-UD □	RH4V2-UD □	
	With Indicator and Diode (DC coil only)	RH4B-ULD □	—	



PCB terminal relays are designed to mount directly to a circuit board without any socket.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RH3B-U** **AC120V**
Part No. Coil Voltage Code

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Sockets (for Blade Terminal Models)

Relays	Standard DIN Rail Mount ¹	Finger-safe DIN Rail Mount ¹	Through Panel Mount	PCB Mount
RH1B	SH1B-05	SH1B-05C	SH1B-51	SH1B-62
RH2B	SH2B-05	SH2B-05C	SH2B-51	SH2B-62
RH3B	SH3B-05	SH3B-05C	SH3B-51	SH3B-62
RH4B	SH4B-05	SH4B-05C	SH4B-51	SH4B-62
				
				



1. DIN Rail mount socket comes with two horseshoe clips. Do not use unless you plan to insert pullover wire spring. Replacement horseshoe clip part number is Y778-011.

Hold Down Springs & Clips

Appearance	Item	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket
	Pullover Wire Spring	RH1B	SY2S-02F1 ²	SY4S-51F1
		RH2B	SY4S-02F1 ²	
		RH3B	SH3B-05F1 ²	
		RH4B	SH4B-02F1 ²	
	Leaf Spring (side latch)	RH1B, RH2B, RH3B, RH4B	SFA-202 ³	SFA-302 ³
	Leaf Spring (top latch)	RH1B, RH2B, RH3B, RH4B	SFA-101 ³	SFA-301 ³



2. Must use horseshoe clip when mounting in DIN mount socket. Replacement horseshoe clip part number is Y778-011.
3. Two required per relay.

AC Coil Ratings

Voltage (V)	Rated Current (mA) ±15% at 20°C								Coil Resistance (Ω) ±10% at 20°C				Operation Characteristics (against rated values at 20°C)		
	AC 50Hz				AC 60Hz				SPDT	DPDT	3PDT	4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT							
6	170	240	330	387	150	200	280	330	18.8	9.4	6.4	5.4	110%	80% maximum	30% minimum
12	86	121	165	196	75	100	140	165	76.8	39.3	25.3	21.2			
24	42	60.5	81	98	37	50	70	83	300	153	103	84.5			
110	9.6	—	18.1	21.6	8.4	—	15.5	18.2	6,950	—	2,200	1,800			
110-120	—	9.4-10.8	—	—	—	8.0-9.2	—	—	—	—	—	—			
120	8.6	—	16.4	19.5	7.5	—	14.2	16.5	8,100	—	10,800	7,360			
220	4.7	—	8.8	10.7	4.1	—	7.7	9.1	25,892	—	10,800	7,360			
220-240	—	4.7-5.4	—	—	—	4.0-4.6	—	—	—	18,820	—	—			
240	4.9	—	8.2	9.8	4.3	—	7.1	8.3	26,710	—	12,100	9,120			

DC Coil Ratings

Voltage (V)	Rated Current (mA) ±15% at 20°C				Coil Resistance (Ω) ±10% at 20°C				Operation Characteristics (against rated values at 20°C)		
	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
6	128	150	240	250	47	40	25	24	110%	80% maximum	10% minimum
12	64	75	120	125	188	160	100	96			
24	32	36.9	60	62	750	650	400	388			
48	18	18.5	30	31	2,660	2,600	1,600	1,550			
100-110	—	8.2-9.0	—	—	—	12,250	—	—			
110	8	—	12.8	15	13,800	—	8,600	7,340			



Standard coil voltages are in **BOLD**.

Contact Ratings

Model	Continuous Current	Maximum Contact Capacity				
		Allowable Contact Power		Rated Load		
		Resistive Load	Inductive Load	Voltage (V)	Res. Load	Ind. Load
SPDT	10A	1540VA 300W	990VA 210W	110 AC	10A	7A
				220 AC	7A	4.5A
				30 DC	10A	7A
DPDT 3PDT 4PDT	10A	1650VA 300W	1100VA 225W	110 AC	10A	7.5A
				220 AC	7.5A	5A
				30 DC	10A	7.5A



Note: Inductive load for the rated load — $\cos \phi = 0.3$, $L/R = 7$ ms

TÜV Ratings

Voltage	RH1	RH2	RH3	RH4
240V AC	10A	10A	7.5A	7.5A
30V DC	10A	10A	10A	10A



AC: $\cos \phi = 1.0$, DC: $L/R = 0$ ms

UL Ratings

Voltage	Resistive			General Use			Horsepower Rating		
	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4
240V AC	10A	7.5A	7.5A	7A	6.5A	5A	1/3 HP	1/3 HP	—
120V AC	—	10A	10A	—	7.5A	7.5A	1/6 HP	1/6 HP	—
30V DC	10A	10A	—	7A	—	—	—	—	—
28V DC	—	—	10A	—	—	—	—	—	—

CSA Ratings

Voltage	Resistive				General Use				Horsepower Rating
	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	RH1, 2, 3
240V AC	10A	10A	—	7.5A	7A	7A	7A	5A	1/3 HP
120V AC	10A	10A	10A	10A	7.5A	7.5A	—	7.5A	1/6 HP
30V DC	10A	10A	10A	10A	7A	7.5A	—	—	—

Socket Specifications

	Sockets	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail Mount Sockets	SH1B-05	(Coil) M3 screws (contact) M3.5 screws with captive wire clamp	250V, 10A	Maximum up to 2-#12AWG	5.5 - 9 in•lbs 9 - 11.5 in•lbs
	SH2B-05 SH3B-05 SH4B-05	M3.5 screws with captive wire clamp	300V, 10A	Maximum up to 2-#12AWG	9 - 11.5 in•lbs
	SH1B-05C	(coil) M3 screws (contact) M3.5 screws with captive wire clamp, fingersafe	250V, 10A	Maximum up to 2-#12AWG	5.5 - 9 in•lbs 9 - 11.5 in•lbs
	SH2B-05C SH3B-05C SH4B-05C	M3.5 screws with captive wire clamp, fingersafe	300V, 10A	Maximum up to 2-#12AWG	9 - 11.5 in•lbs
Through Panel Mount Socket	SH1B-51 SH2B-51 SH3B-51 SH4B-51	Solder	300V, 10A	—	—
PCB Mount Socket	SH1B-62	PCB mount	250V, 10A	—	—
	SH2B-62 SH3B-62 SH4B-62	PCB mount	300V, 10A	—	—

Accessories

Item	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.
Replacement Hold-Down Spring Anchor		DIN mount sockets and hold down springs.	Y778-011	For use on DIN rail mount socket when using pullover wire hold down spring. 2 pieces included with each socket.

Specifications

Contact Material		Silver cadmium oxide	
Contact Resistance ¹		50mΩ maximum	
Minimum Applicable Load		24V DC, 30 mA; 5V DC, 100 mA (reference value)	
Operating Time ²	SPDT DPDT	20ms maximum	
	3PDT 4PDT	25ms maximum	
Release Time ²	SPDT DPDT	20ms maximum	
	3PDT 4PDT	25ms maximum	
Power Consumption (approx.)	SPDT	AC: 1.1VA (50Hz), 1VA (60Hz)	DC: 0.8W
	DPDT	AC: 1.4VA (50Hz), 1.2VA (60Hz)	DC: 0.9W
	3PDT	AC: 2VA (50Hz), 1.7VA (60Hz)	DC: 1.5W
	4PDT	AC: 2.5VA (50Hz), 2VA (60Hz)	DC: 1.5W
Insulation Resistance		100MΩ minimum (500V DC megger)	
Dielectric Strength ³	SPDT	Between live and dead parts: 2,000V AC, 1 minute Between contact and coil: 2,000V AC, 1 minute Between contacts of the same pole: 1,000V AC, 1 minute	
	DPDT 3PDT 4PDT	Between live and dead parts: 2,000V AC, 1 minute Between contact and coil: 2,000V AC, 1 minute Between contacts of different poles: 2,000V AC, 1 minute Between contacts of the same pole: 1,000V AC, 1 minute	
Operating Frequency		Electrical: 1,800 operations/hour maximum Mechanical: 18,000 operations/hour maximum	
Vibration Resistance		Damage limits: 10 to 55Hz, amplitude 0.5 mm Operating extremes: 10 to 55Hz, amplitude 0.5 mm	
Shock Resistance		Damage limits: 1,000m/s ² (100G) Operating extremes: 200m/s ² (20G - SPDT, DPDT) 100m/s ² (10G - 3PDT, 4PDT)	
Mechanical Life		50,000,000 operations minimum	
Electrical Life	DPDT	500,000 operations minimum (120V AC, 10A)	
	SPDT 3PDT 4PDT	200,000 operations minimum (120V AC, 10A)	
Operating Temperature ⁴	SPDT DPDT	-25 to +70°C (no freezing)	
	3PDT 4PDT		
Operating Humidity		45 to 85% RH (no condensation)	
Weight (approx.)		SPDT: 24g, DPDT: 37g, 3PDT: 50g, 4PDT: 74g	



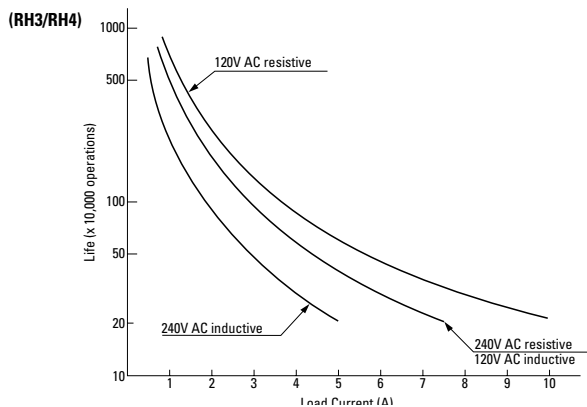
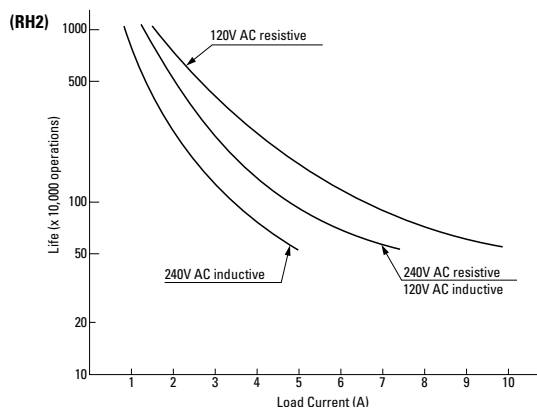
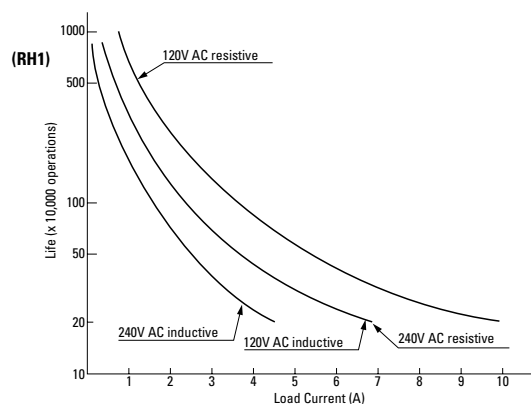
Note: Above values are initial values.

1. Measured using 5V DC, 1A voltage drop method
2. Measured at the rated voltage (at 20°C), excluding contact bouncing
Release time of relays with diode: 40 ms maximum
3. Relays with indicator or diode: 1000V AC, 1 minute
4. For use under different temperature conditions, refer to Continuous Load Current vs. Operating Temperature Curve. The operating temperature range of relays with indicator or diode is -25 to +40°C.

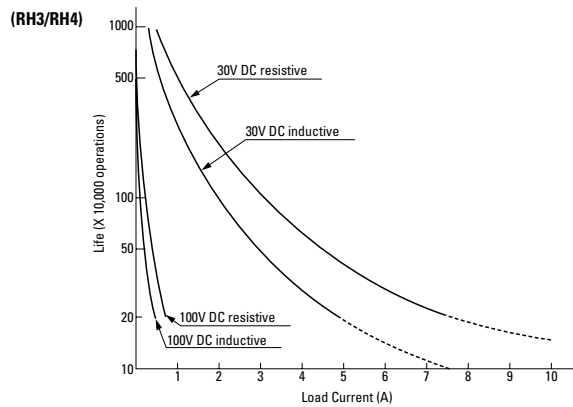
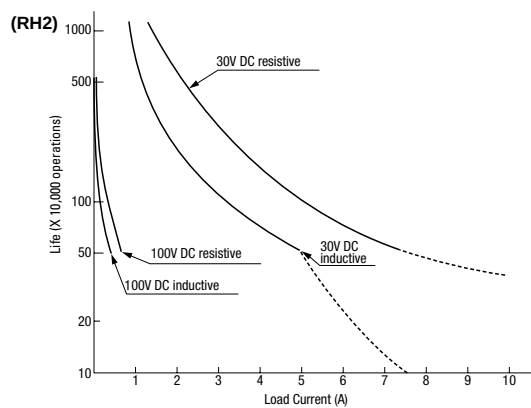
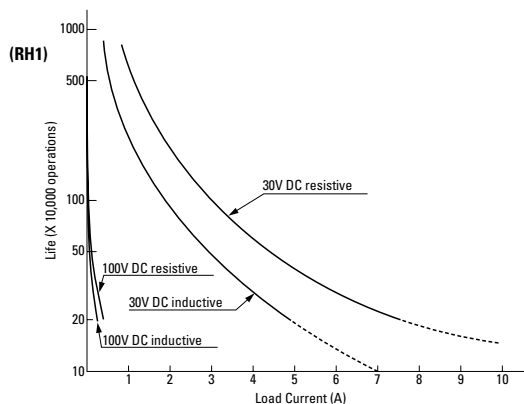
Characteristics (Reference Data)

Electrical Life Curves

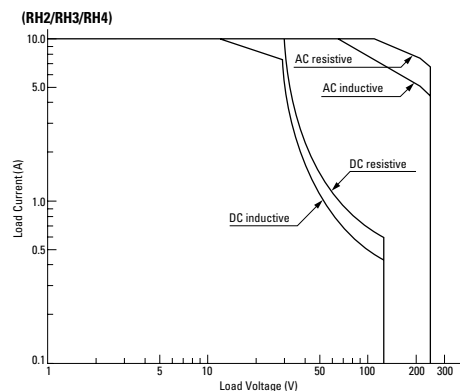
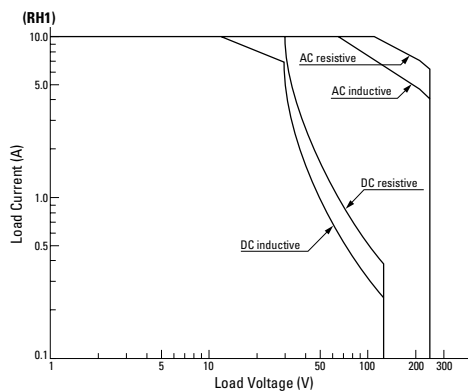
AC Load



DC Load



Maximum Switching Capacity



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

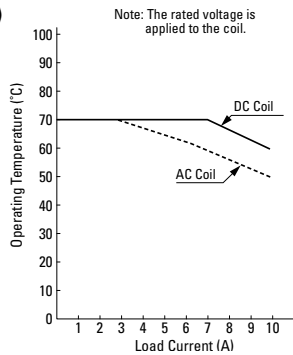
Contactors

Terminal Blocks

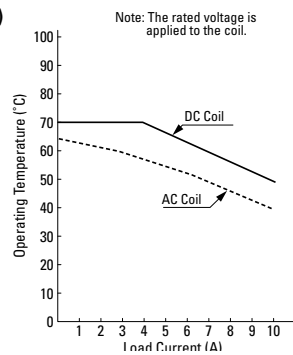
Circuit Breakers

Continuous Load Current vs. Operating Temperature Curve (Basic Type, With Check Button, and Top Bracket Mounting Type)

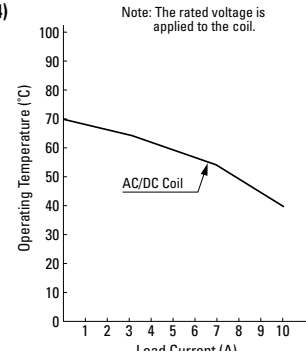
(RH1)



(RH2)



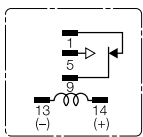
(RH3/RH4)



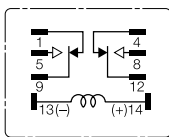
Internal Connection (View from Bottom)

Basic Type

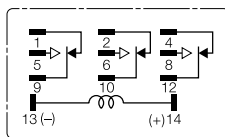
SPDT



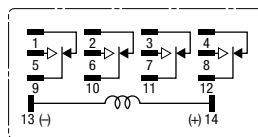
DPDT



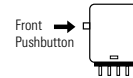
3PDT



4PDT



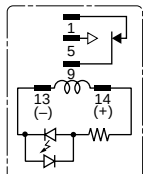
With Check Button



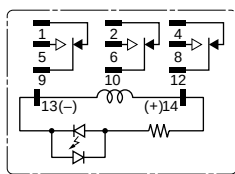
Contacts can be operated by pressing the check button.

With Indicator (-L type)

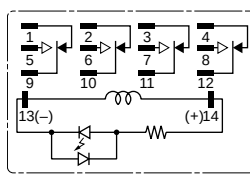
SPDT



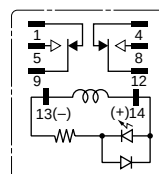
3PDT



4PDT



DPDT

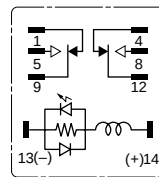
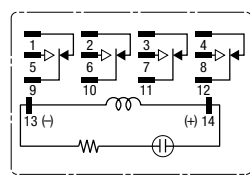
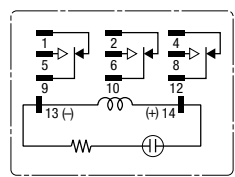
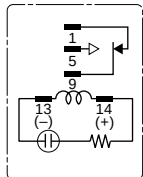


Below
24V AC/
DC

When the relay is energized, the indicator goes on.

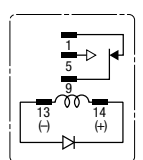
- Relay coils less than 100V DC do not contain a protection diode (except DPDT).
- Relay coils below 100V use LED indicator, coils above 100V use neon lamp indicator.
- LED color of DPDT model is green

24V AC/
DC and
over

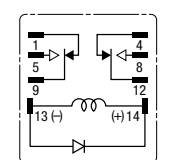


With Diode (-D type)

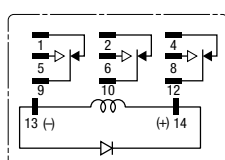
SPDT



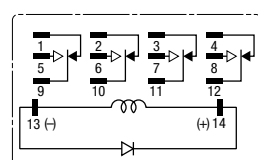
DPDT



3PDT



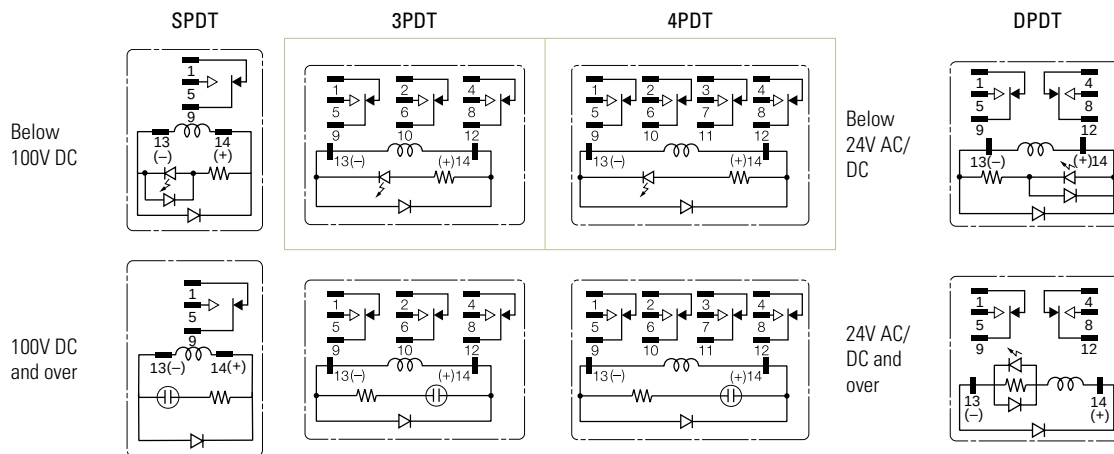
4PDT



Contains a diode to absorb the back emf generated when the coil is de-energized. The release time is slightly longer. Available for DC coil only.

- Diode Characteristics
Reverse withstand voltage: 1,000V
Forward current: 1A

With Indicator LED & Diode (-LD type)

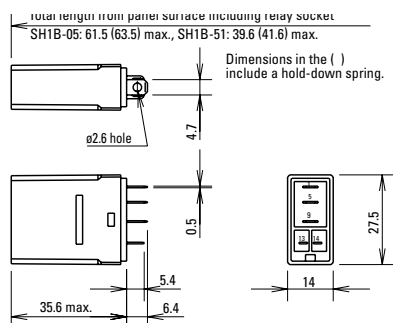


Contains an LED indicator and a surge absorber, and has the same height as the basic type.

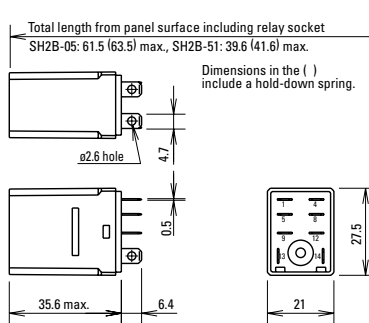
LED color of DPDT model is green.

Dimensions (mm)

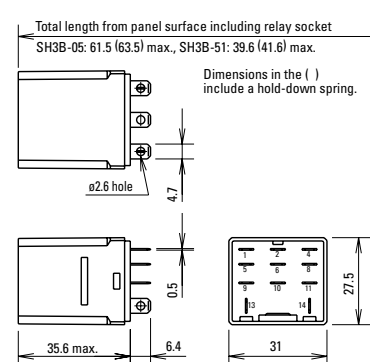
RH1B-U/RH1B-UL/RH1B-UD/RH1B-ULD



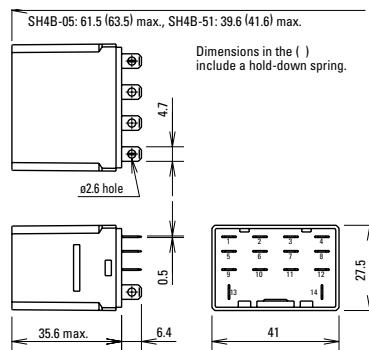
RH2B-U/RH2B-UL/RH2B-UD/RH2B-ULD



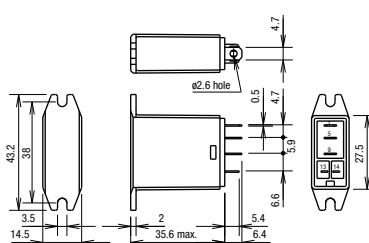
RH3B-U/RH3B-UL/RH3B-UD/RH3B-ULD



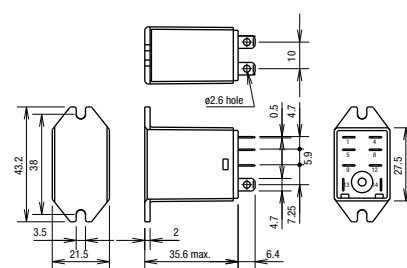
RH4B-U/RH4B-UL/RH4B-UD/RH4B-ULD



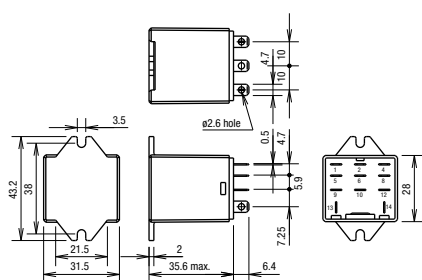
RH1B-UT



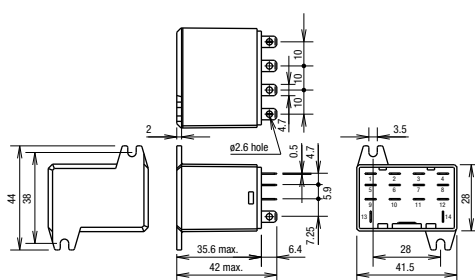
RH2B-UT



RH3B-UT

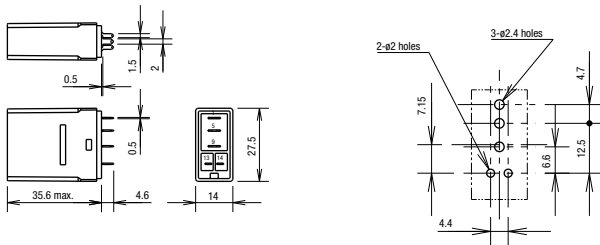


RH4B-UT

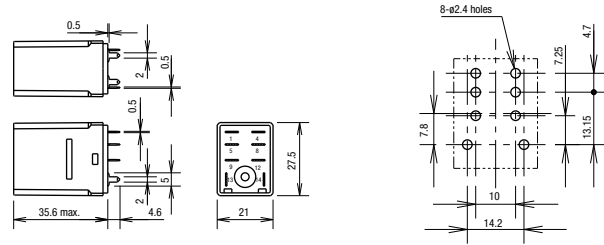


Dimensions con't (mm)

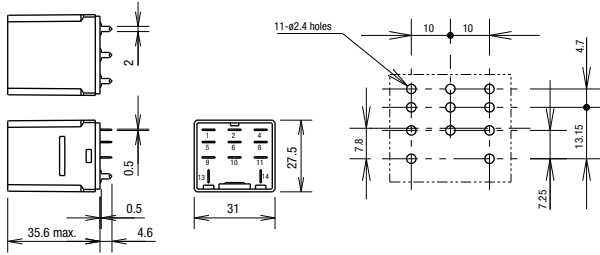
RH1V2-U/RH1V2-UD



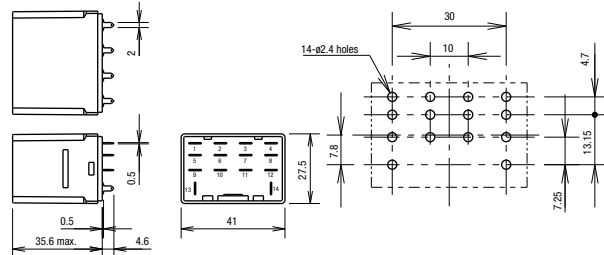
RH2V2-U/RH2V2-UL/RH2V2-UD



RH3V2-U/RH3V2-UL/RH3V2-D

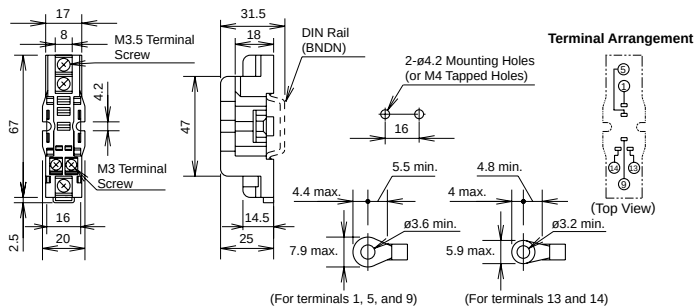


RH4V2-U/RH4V2-UL/RH4V2-UD

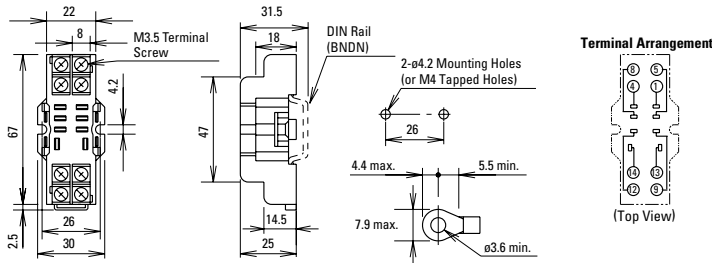


Standard DIN Rail Mount Sockets

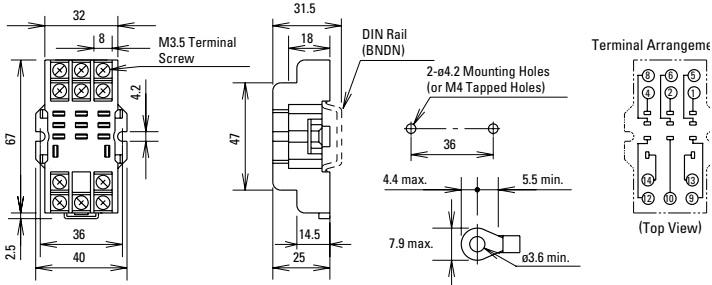
SH1B-05



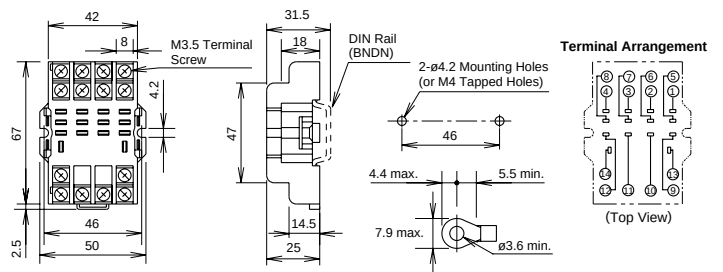
SH2B-05



SH3B-05



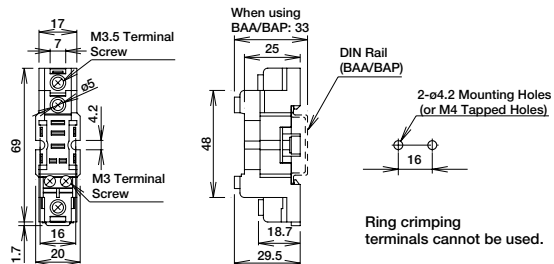
SH4B-05



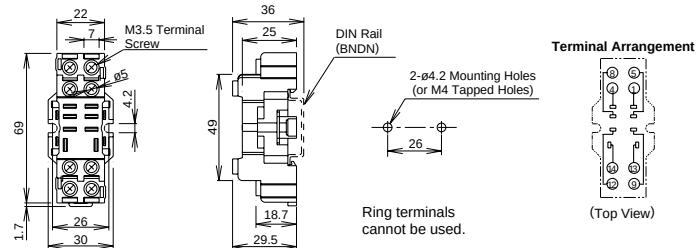
Dimensions con't (mm)

Finger-safe DIN Rail Mount Sockets

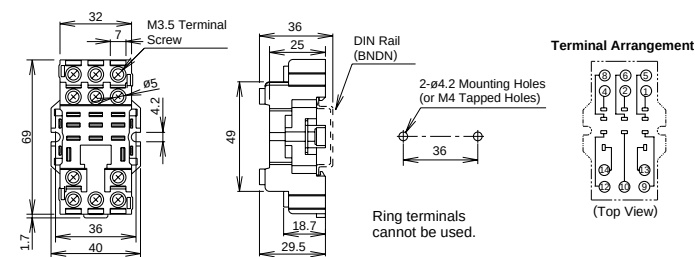
SH1B-05C



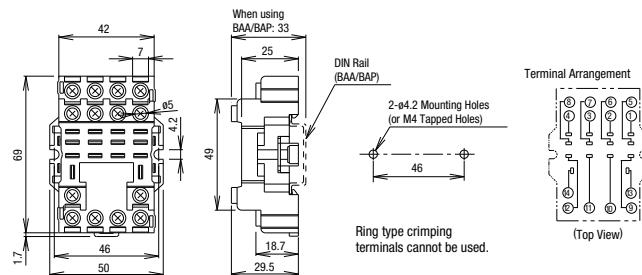
SH2B-05C



SH3B-05C

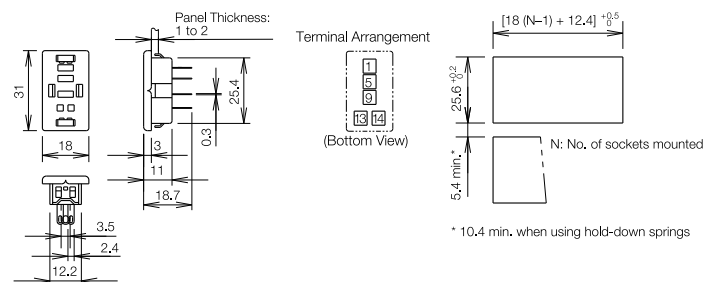


SH4B-05C

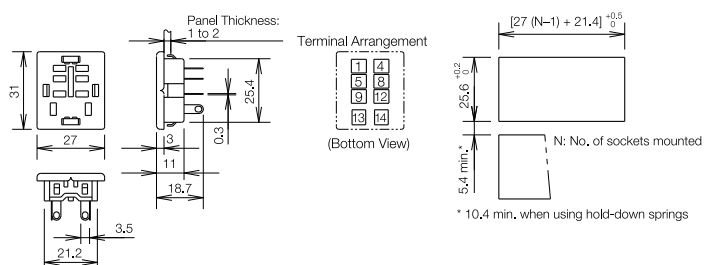


Through Panel Mount Socket

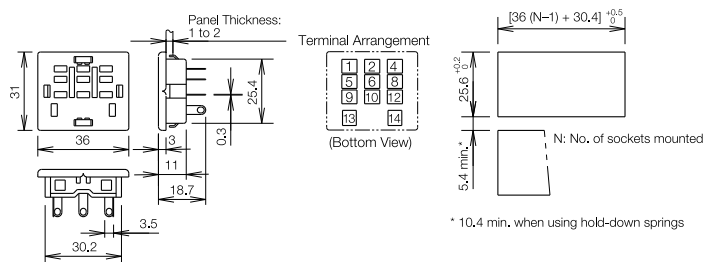
SH1B-51



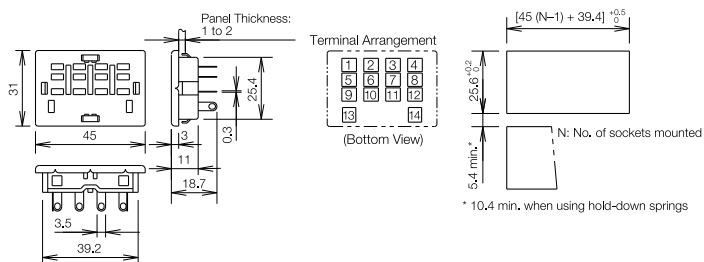
SH2B-51



SH3B-51



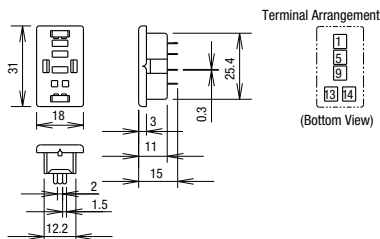
SH4B-51



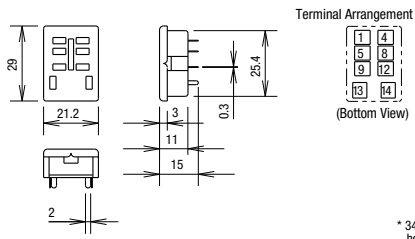
Dimensions con't (mm)

PCB Mount Sockets

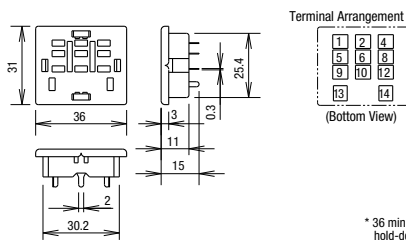
SH1B-62



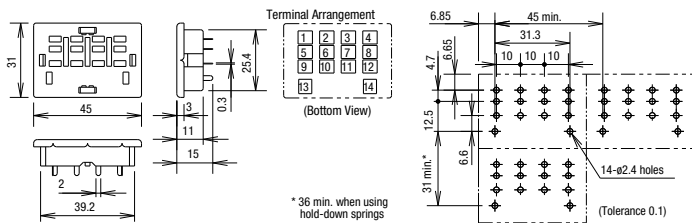
SH2B-62



SH3B-62



SH4B-62



RR Series Power Relays

Key features:

- SPDT through 3PDT, 10A contacts
- Midget power type relays
- Available in pin and blade terminal styles.
- Options include an indicator, check button for test operations and side flange.
- DIN rail, surface and panel mount sockets are available for a wide a variety of mounting applications.



Part Number Selection

Contact	Model	Part Number		Coil Voltage Code (Standard Stock Items in Bold)
		Pin Terminal	Blade Terminal*	
	Standard	—	RR1BA-U □	AC6V, AC12V, AC24V, AC110V, AC120V , AC240V, DC6V, DC12V, DC24V , DC48V, DC110V
	With Indicator		RR1BA-UL □	
	With Check Button		RR1BA-UC □	
	With Indicator and Check Button		RR1BA-ULC □	
	Side Flange Model		RR1BA-US □	
	Standard	RR2P-U □	RR2BA-U □	
	With Indicator	RR2P-UL □	RR2BA-UL □	
	With Check Button	RR2P-UC □	RR2BA-UC □	
	With Indicator and Check Button	RR2P-ULC □	RR2BA-ULC □	
	Side Flange Model	—	RR2BA-US □	
	Standard	RR3PA-U □	RR3B-U □	
	With Indicator	RR3PA-UL □	RR3B-UL □	
	With Check Button	RR3PA-UC □	RR3B-UC □	
	With Indicator and Check Button	RR3PA-ULC □	RR3B-ULC □	
	Side Flange Model	—	RR3B-US □	



*Blade type not TUV tested or CE marked.
Side flange model mounts directly to panel with no socket required.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RR3B-U** **AC120V**
Part No. Coil Voltage Code

Sockets

Relays	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	Through Panel Mount
RR2P	SR2P-05 SR2P-06	SR2P-05C	SR2P-51
RR3PA	SR3P-05 SR3P-06	SR3P-05C	SR3P-51
RR1BA RR2BA RR3B	SR3B-05	—	SR3B-51



All DIN rail mount sockets shown here can be mounted using DIN rail BNDN1000.

Hold Down Springs & Clips

Appearance	Description	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket
	Pullover Wire Spring	RR2P	SR2B-02F1	SR3P-01F1
		RR3PA	SR3B-02F1	
		RR1BA, RR2BA, RR3B	SR3B-02F1	SR3B-02F1
	Leaf Spring (side latch)	RR2P, RR3PA	SFA-203	—

Accessories

Item	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.
Replacement Hold-Down Spring Anchor		Horseshoe clip for sockets SR3B-05, SR2P-06, SR3P-06	Y778-011	For use on DIN rail mount socket when using pullover wire hold down spring. 2 pieces included with each socket.
		Chair clip for sockets SR2P-05(C), SR3P-05(C)	Y703-102	

Specifications

Contact Material		Silver	
Contact Resistance ¹		30 mΩ maximum	
Minimum Applicable Load		1V DC, 10 mA	
Operating Time	²	25 ms maximum	
Release Time	²	25 ms maximum	
Power Consumption (approx.)		AC: 3 VA (50 Hz), 2.5 VA (60 Hz) DC: 1.5W	
Insulation Resistance		100 MΩ minimum (500V DC megger)	
Dielectric Strength	Pin Terminal	Between live and dead parts:	1500V AC, 1 minute
		Between contact and coil:	1500V AC, 1 minute
		Between contacts of different poles:	1500V AC, 1 minute
		Between contacts of the same pole:	1000V AC, 1 minute
	Blade Terminal	Between live and dead parts:	2000V AC, 1 minute
		Between contact and coil:	2000V AC, 1 minute
		Between contacts of different poles:	2000V AC, 1 minute
		Between contacts of the same pole:	1000V AC, 1 minute
Operating Frequency		Electrical:	1800 operations/h maximum
		Mechanical:	18,000 operations/h maximum
Vibration Resistance		Damage limits:	10 to 55 Hz, amplitude 0.5 mm
		Operating extremes:	10 to 55 Hz, amplitude 0.5 mm
Shock Resistance		Damage limits:	1000 m/s ² (100g)
		Operating extremes:	100 m/s ² (10G)
Mechanical Life		10,000,000 operations	
Electrical Life		200,000 operations (220V AC, 5A)	
Operating Temperature ³		−25 to +40°C (no freezing)	
Operating Humidity		5 to 85% RH (no condensation)	
Weight (approx.) (Standard type)		RR2P: 90g, RR3PA: 96g, RR1BA/RR2BA/RR3B: 82g	



1. Measured using 5V DC, 1A voltage drop method
2. Measured at the rated voltage (at 20°C), excluding contact bouncing
3. For use under different temperature conditions, refer to Continuous Load Current vs. Operating Temperature Curve.

Coil Ratings

Rated Voltage (V)		Rated Current (mA) ±15% (at 20°C)		Coil Resistance (Ω) ±10% (at 20°C)	Operating Characteristics (values at 20°C)		
		50 Hz	60 Hz		Maximum Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
AC (50/60 Hz)	6	490	420	4.9	110%	80% maximum	30% minimum
	12	245	210	18			
	24	121	105	79			
	110	27	23	1,680			
	120	24	20.5	2,100			
	240	12.1	10.5	8,330			
DC	6	240		25	110%	80% maximum	10% minimum
	12	120		100			
	24	60		400			
	48	30		1,600			
	110	13		8,460			

Contact Ratings

Maximum Contact Capacity					
Continuous Current	Allowable Contact Power		Rated Load		
	Resistive Load	Inductive Load	Voltage (V)	Res. Load	Ind. Load
10A	1650VA AC 300W DC	1100VA AC 150W DC	110 AC	10A	7.5A
			220 AC	7.5A	5A
			30 DC	10A	5A



Note: Inductive load for the rated load — $\cos \phi = 0.3$, $L/R = 7$ ms

TÜV Ratings

Voltage	
240V AC	10A
30V DC	10A



AC: $\cos \phi = 1.0$, DC: $L/R = 0$ ms

UL Ratings

Voltage	Resistive	General use	Horse Power Rating
240V AC	10A	7A	1/3 HP
120V AC	10A	7.5A	1/4 HP
30V DC	10A	7A	—

CSA Ratings

Voltage	Resistive	General use
240V AC	10A	7A
120V AC	10A	7.5A
100V DC	—	0.5A
30V DC	10A	7.5A

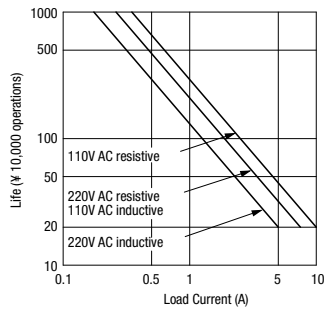
Socket Specifications

	Relays	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail Sockets	SR2P-05	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR2P-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR2P-06	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3P-05	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3P-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3P-06	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3B-05	M3 screw with captive wire clamp	300V, 15A (10A)* (*CSA rating)	Maximum 2 - #12 AWG	9 - 11.5in•lbs
Through Panel Mount Sockets	SR2P-51	Solder	300V, 10A	—	—
	SR3P-51	Solder	300V, 10A	—	—
	SR3B-51	Solder	300V, 10A	—	—

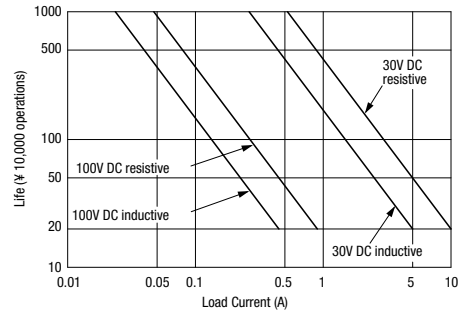
Characteristics (Reference Data)

Electrical Life Curves

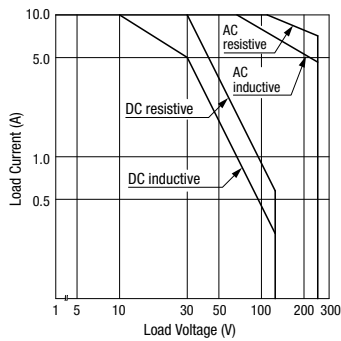
AC Load



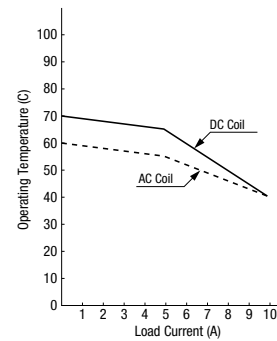
DC Load



Maximum Switching Capacity

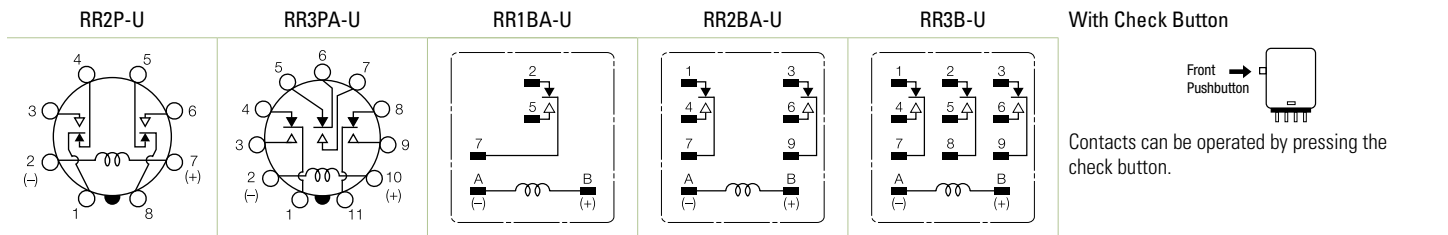


Continuous Load Current vs. Operating Temperature Curve (Standard Type, With Check Button, and Side Flange Type)

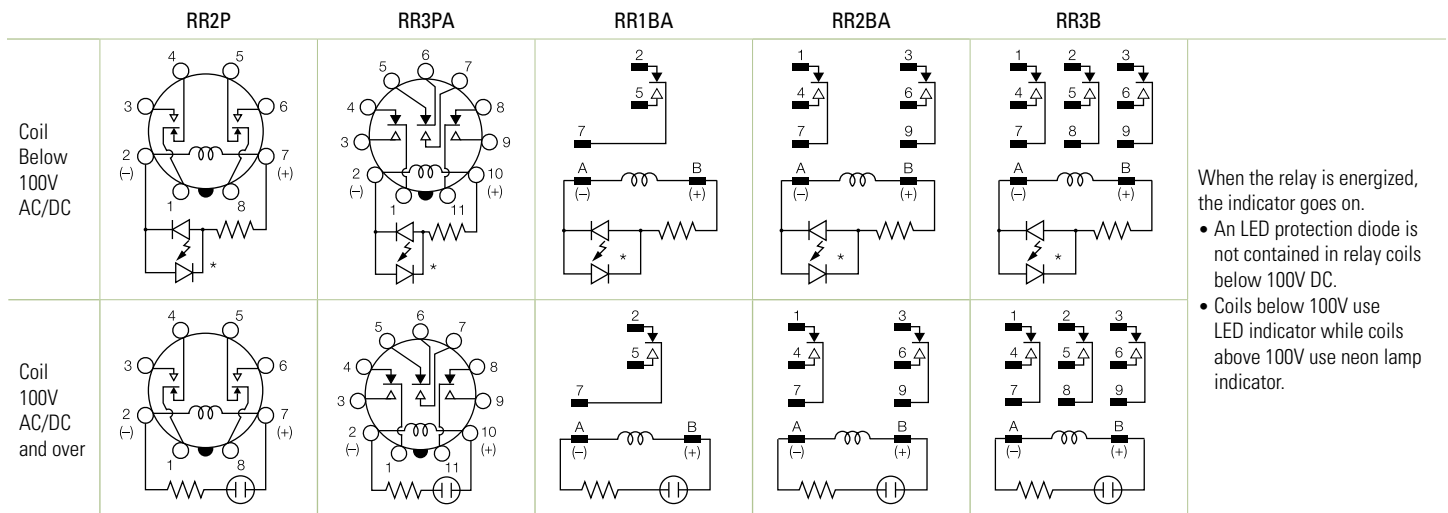


Internal Connection (View from Bottom)

Standard Type

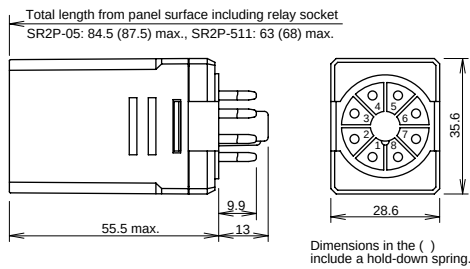


With Indicator (-UL type)

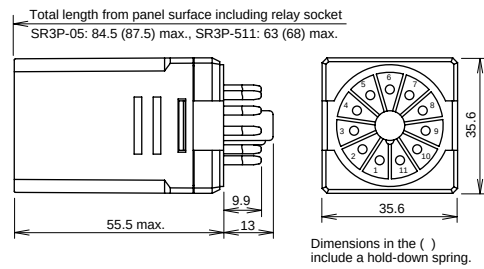
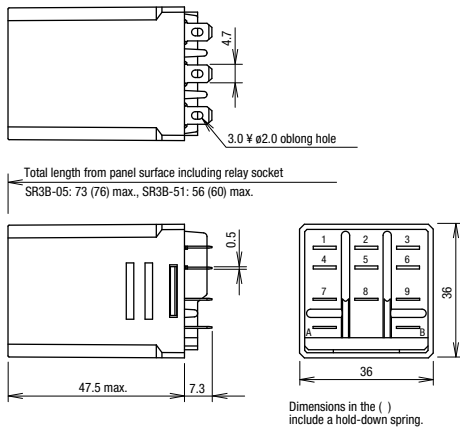


Dimensions (mm)

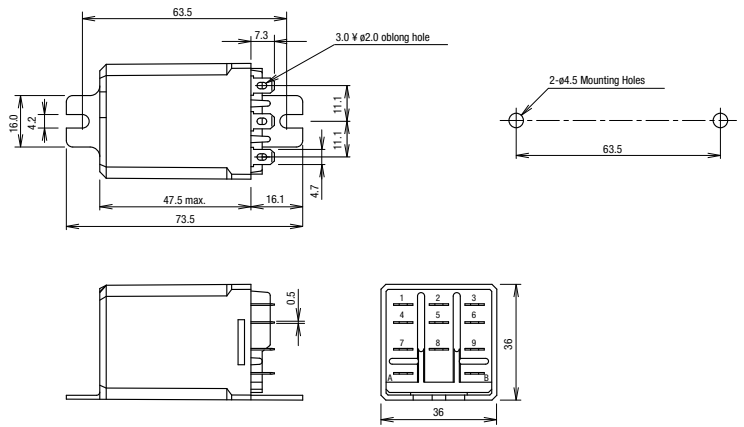
RR2P-U/RR2P-UL



RR3PA-U/RR3PA-UL

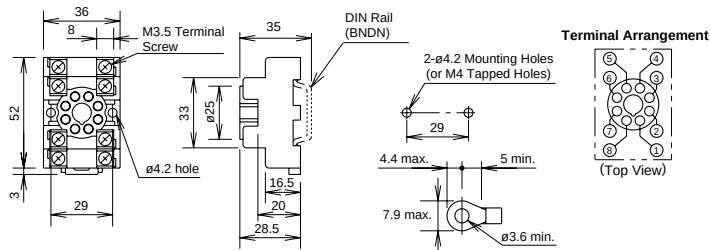
RR1BA-U/RR2BA-UL/RR2BA-U
RR2BA-UL/RR3B-U/RR3B-UL

RR1BA-US/RR2BA-US/RR3B-US

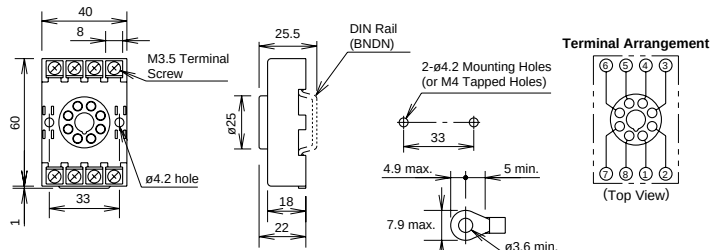


Standard DIN Rail Mount Sockets

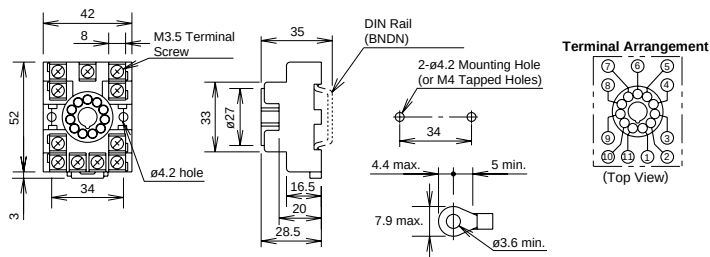
SR2P-05



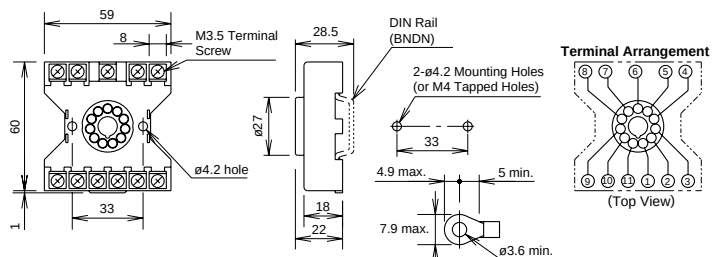
SR2P-06



SR3P-05

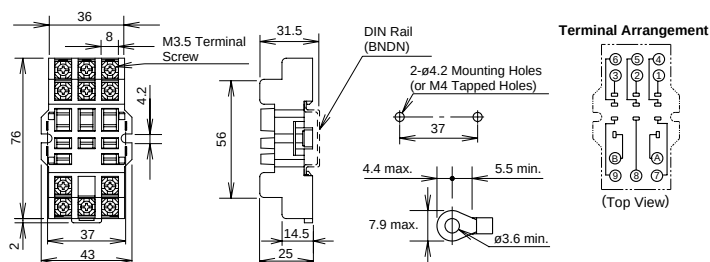


SR3P-06



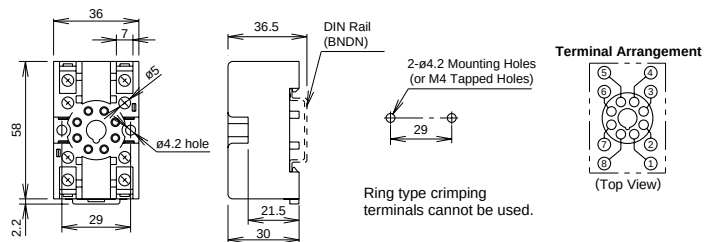
Standard DIN Rail Mount Sockets

SR3B-05

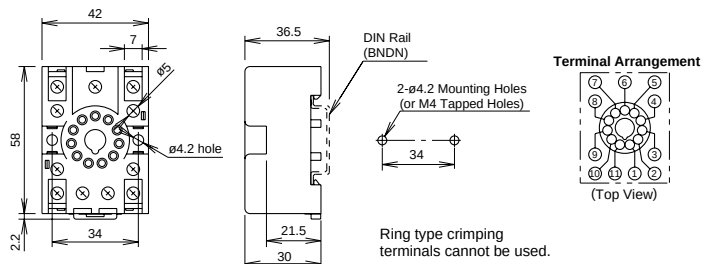


Finger-safe DIN Rail Mount Sockets

SR2P-05C

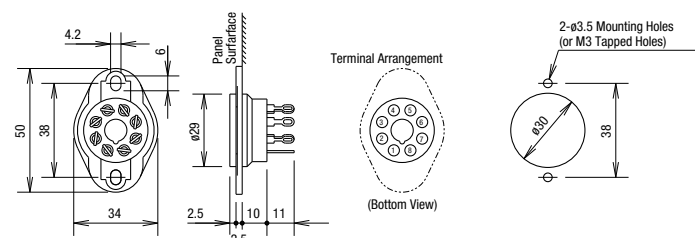


SR3P-05C

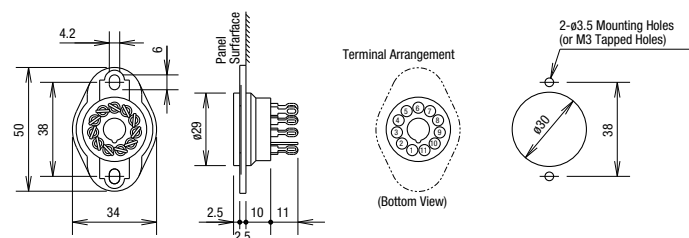


Through Panel Mount Socket

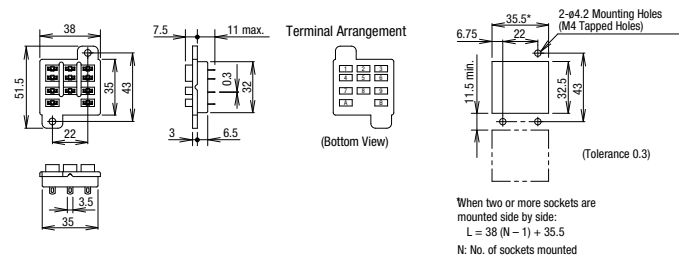
SR2P-51



SR3P-51



SR3B-51



RU Series Universal Relays

Key features:

- Full featured universal miniature relays
- Designed with environment taken into consideration
- Two terminal styles: plug-in and PCB mount
- Non-polarized LED indicator
- No internal wires, lead-free construction
- Cadmium-free contacts
- Mechanical flag indicator
- Manual latching lever with color coding for AC or DC coil
- Snap-on yellow marking plate; optional marking plates are available in four other colors
- Maximum contact ratings: 10A (RU2), 6A (RU4), 3A (RU42)
- UL Recognized, CSA Certified, EN Compliant



With Latching or Momentary Lever

Mechanical Indicator*

The contact position can be confirmed through the five small windows.

Marking Plate

Standard yellow marking plate is easily replaced with optional marking plates in four colors for easy identification of relays.

LED Indicator*

Non-polarized green LED indicator is standard provision for plug-in terminal, latching lever types



Latching and Momentary Lever

Using the lever, operation can be checked without energizing the coil. The lever is color coded for AC and DC coils.

	Latching	Momentary
AC coil:	Orange	Red
DC coil:	Green	Blue

In Normal Operation



Note: Turn off the power to the relay coil when using the latching lever. After checking the operation, return the latching lever in the normal position.

Standard (without lever)

AC/DC Color Marking

For identification of AC or DC coils.

AC coil: Yellow

DC coil: Blue

Mechanical Indicator*

Marking Plate

LED Indicator*

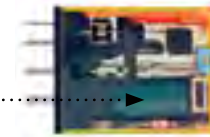
Non-polarized green LED indicator is standard provision for plug-in terminal types.



AC Coil



DC Coil



Coil Voltage	Tape Color
24V AC	White
100 to 110V AC	Clear
110 to 120V AC	Blue
200 to 220V AC	Black
220 to 240V AC	Red
24V DC	Green
6V DC	Voltage marking on yellow tape
12V DC	
48V DC	
110V DC	



*Not available on PCB type.

Part Number Selection

Contact	Model	Part Number			Coil Voltage Code (Standard Stock in bold)
		Standard	With Latching Lever	With Momentary Lever	
DPDT (10A) 	Standard	RU2S-C-□	RU2S-□	RU2S-M-□	A24, A110 , A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU2S-CR-□	RU2S-R-□	RU2S-MR-□	A110, A220
	With diode (DC coil only)	RU2S-CD-□	RU2S-D-□	RU2S-MD-□	D6, D12, D24 , D48, D110
	PCB	RU2V-NF-□	—	—	A24, A110, A220 D6, D12, D24 , D48, D110
4PDT (6A) 	Standard	RU4S-C-□	RU4S-□	RU4S-M-□	A24, A110 , A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU4S-CR-□	RU4S-R-□	RU4S-MR-□	A110, A220
	With diode (DC coil only)	RU4S-CD-□	RU4S-D-□	RU4S-MD-□	D6, D12, D24, D48, D110
	PCB	RU4V-NF-□	—	—	A24, A110 , A220 D6, D12, D24 , D48, D110
4PDT Bifurcated (3A) 	Standard	RU42S-C-□	RU42S-□	RU42S-M-□	A24, A110, A220 D6, D12, D24 , D48, D110
	With RC (AC coil only)	RU42S-CR-□	RU42S-R-□	RU42S-MR-□	A110, A220
	With diode (DC coil only)	RU42S-CD-□	RU42S-D-□	RU42S-MD-□	D6, D12, D24, D48, D110
	PCB	RU42V-NF-□	—	—	A24, A110, A220 D6, D12, D24 , D48, D110



1. Plug-in terminal models have an LED indicator and a mechanical indicator as standard.
2. PCB models do not have an LED indicator or a mechanical indicator.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RU2S-C** **A110**
 Part No. Coil Voltage Code

Coil Voltage Table

Coil Voltage Code	A24	A110	A220	D6	D12	D24	D48	D110
Coil Rating	24V AC	110-120V AC	220-240V AC	6V DC	12V DC	24V DC	48V DC	110V DC

Sockets

Relays	Spring Clamp DIN Rail Mount	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	Panel Mount	PCB Mount
RU2S (DPDT)	SU2S-11L	SM2S-05	SM2S-05C	SY4S-51	SM2S-61 SM2S-62
RU4S (4PDT) RU42S (4PDT)	SU4S-11L	SY4S-05	SY4S-05C		SY4S-61 SY4S-62
					

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Hold Down Springs & Clips

Appearance	Item	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket
	Pullover Wire Spring	RU2S/RU4S/ RU42S	SY4S-02F1	SY4S-51F1
	Leaf Spring (side latch)	RU2S/RU4S/ RU42S	SFA-202*	SFA-302*
	Leaf Spring (top latch)	RU2S/RU4S/ RU42S	SFA-101*	SFA-301*



Note: Order 2 pieces for each relay

Accessories

Name	Part Number	Color Code *
Marking Plate	RU9Z-P*	A (orange), G (green), S (blue), W (white), Y (yellow)



Specify a color code when ordering. The marking plate can be removed from the relay by inserting a flat screwdriver under the marking plate.

Specifications

Model (Contact)	RU2 (DPDT)	RU4 (4PDT)	RU42 (4PDT-bifurcated)
Contact Material	Silver alloy	Silver (gold clad)	Silver-nickel (gold clad)
Contact Resistance ¹	50 mΩ maximum		
Minimum Applicable Load ²	24V DC, 5 mA (reference value)	1V DC, 1 mA	1V DC, 0.1 mA
Operating Time ³	20 ms maximum		
Release Time ³	20 ms maximum		
Power Consumption	AC: 1.1 to 1.4VA (50 Hz), 0.9 to 1.2VA (60 Hz) DC: 0.9 to 1.0W		
Insulation Resistance	100MΩ minimum (500V DC megger)		
Dielectric Strength	Between contact and coil: 2500V AC, 1 minute		
	Between contacts of different poles:		
	2500V AC, 1 minute	2000V AC, 1 minute	
	Between contacts of the same pole: 1000V AC, 1 minute		
Operating Frequency	Electrical: 1800 operations/h maximum Mechanical: 18,000 operations/h maximum		
Vibration Resistance	Damage limits: 10 to 55 Hz, amplitude 0.5 mm Operating extremes: 10 to 55 Hz, amplitude 0.5 mm		
Shock Resistance	Damage limits: 1000 m/s ² (100G) Operating extremes: 150 m/s ² (15G)		
Mechanical Life	AC: 50,000,000 operations DC: 100,000,000 operations		50,000,000 operations
Electrical Life ⁴	See table on page 952		
Operating Temperature ⁵	PCB model: -55 to +70°C (no freezing) Blade model: -55 to +60°C (no freezing)		
Operating Humidity	5 to 85% RH (no condensation)		
Weight	Approx. 35g		



1. Measured using 5V DC, 1A voltage drop method

2. Measured at operating frequency of 120 operations/min (failure rate level P, reference value)

3. Measured at the rated voltage (at 20°C), excluding contact bouncing;

Release time of AC relays with RC: 25 ms maximum

Release time of DC relays with diode: 40 ms maximum

4. Contact Load and Electrical Life (at ambient temperature 20°C)

5. Measured at the rated voltage.

Accessories

Item	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.
Replacement Hold-Down Spring Anchor		Horseshoe clip for DIN rail sockets	Y778-011	For use on DIN rail mount socket when using pullover wire hold down spring. 2 pieces included with each socket.

Coil Ratings

Rated Voltage (V)		Coil Voltage Code	Rated Current (mA) ±15% (at 20°C)		Coil Resistance (Ω) ±10% (at 20°C)	Operating Characteristics (values at 20°C)		
			50 Hz	60 Hz		Maximum Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
AC (50/60 Hz)	24	A24	49.3	42.5	164	110%	80% maximum	30% minimum
	110-120	A110	8.4-10.0	7.1-8.2	4,550			
	220-240	A220	4.2-5.0	3.6-4.2	18,230			
DC	6	D6	155		40	110%	80% maximum	10% minimum
	12	D12	80		160			
	24	D24	44.7		605			
	48	D48	18		2,560			
	110	D110	8.9		12,100			



1. The rated current includes the current of the LED indicator.

Surge Suppressor Ratings

Model		Ratings
AC Coil	With RC	RC series circuit R: 20 kΩ, C: 0.033 μF
DC Coil	With Diode	Diode reverse voltage: 1000V Diode forward current: 1A

UL and c-UL Ratings

Voltage	Resistive			General Use			Horse Power Rating		
	RU2	RU4	RU42	RU2	RU4	RU42	RU2	RU4	RU42
250V AC	10A	—	3A	—	6A	—	—	1/10HP	—
30V DC	10A	6A	3A	—	—	—	—	—	—

Contact Ratings

Maximum Contact Capacity						
Contact	Continuous Current	Allowable Contact Power		Voltage (V)	Rated Load	
		Resistive Load	Inductive Load		Res. Load	Ind. Load
DPDT	10A	2500VA AC	1250VA AC	250 AC	10A	5A
		300W DC	150W DC	30 DC	10A	5A
4PDT	6A	1500VA AC	600VA AC	250 AC	6A	0.8A
		180W DC	90W DC	30 DC	6A	1.5A
4PDT bifurcated	3A	750VA AC	200VA AC	250 AC	3A	0.8A
		90W DC	45W DC	30 DC	3A	1.5A

CSA Ratings

Voltage	Resistive
	RU42
250V AC	3A
30V DC	3A

TÜV Ratings

Voltage	Resistive			Inductive		
	RU2	RU4	RU42	RU2	RU4	RU42
250V AC	10A	6A	3A	5A	0.8A	0.8A
30V DC	10A	6A	3A	5A	1.5A	1.5A



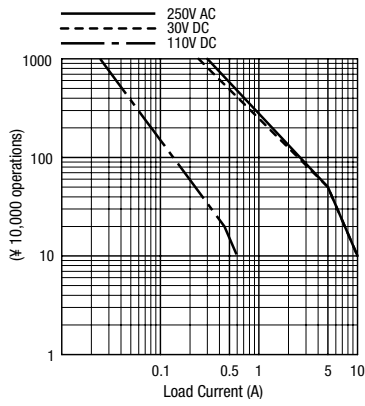
- On 4PDT relays, the maximum allowable total current of neighboring two poles is 6A. At the rated load, make sure that the total current of neighboring two poles does not exceed 6A (3A + 3A = 6A).
- Inductive load for the rated load — $\cos \theta = 0.3$, $L/R = 7$ ms

Socket Specifications

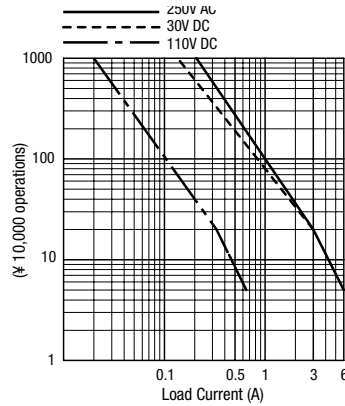
	Sockets	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail Mount Sockets	SU2S-11L	Spring clamp terminals	250V/10A	24-16 AWG	—
	SU4S-11L	Spring clamp terminals	250V/6A (using RU4), 10A (using RU2)	24-16 AWG	—
	SM2S-05	M3 screw with captive wire clamp	300V, 10A	Maximum up to 2-#14AWG	5.5 - 9in•lbs
	SM2S-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum up to 2-#14AWG	5.5 - 9in•lbs
	SY4S-05	M3 screw with captive wire clamp	300V, 7A (using RU4), 10A (using RU2)	Maximum up to 2-#14AWG	5.5 - 9in•lbs
	SY4S-05C	M3 screw with captive wire clamp, fingersafe	300V, 7A (using RU4), 10A (using RU2)	Maximum up to 2-#14AWG	5.5 - 9in•lbs
Through Panel Mount Socket	SY4S-51	Solder	300V, 7A	—	—
PCB Mount Socket	SY4S-61	PCB mount	300V, 7A	—	—
	SY4S-62	PCB mount	250V, 7A	—	—

Electrical Life Curves

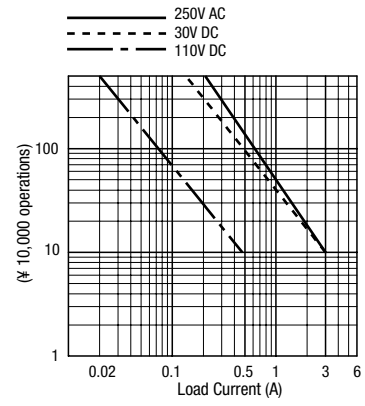
RU2 (Resistive Load)



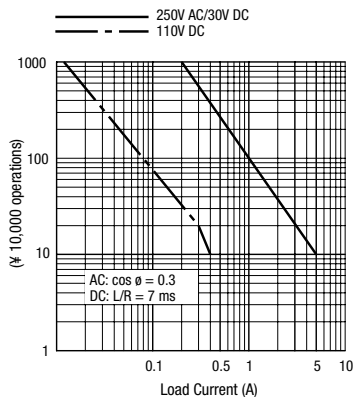
RU4 (Resistive Load)



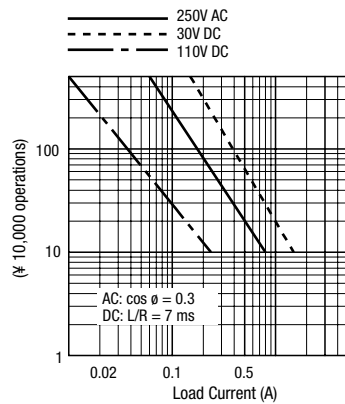
RU42 (Resistive Load)



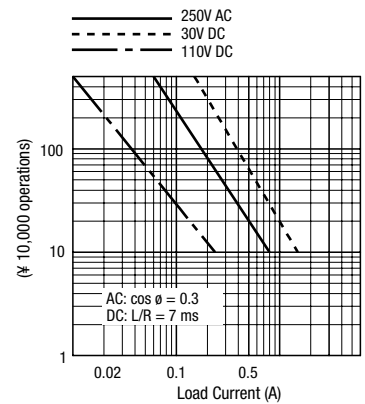
RU2 (Inductive Load)



RU4 (Inductive Load)

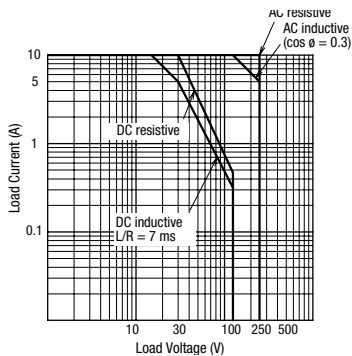


RU42 (Inductive Load)

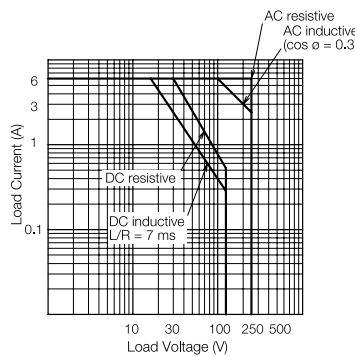


Maximum Switching Current

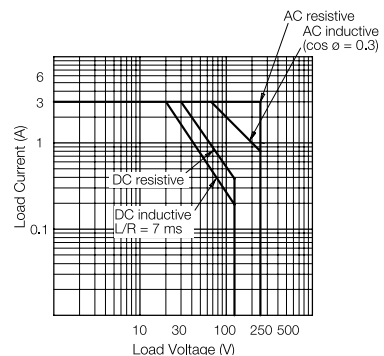
RU2



RU4

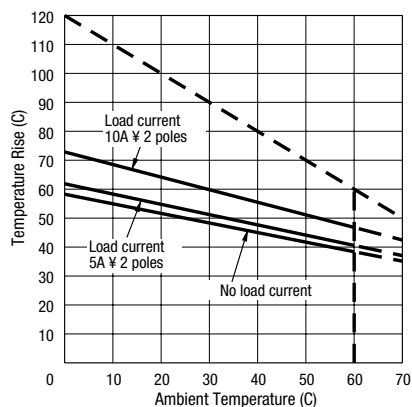


RU42 (Bifurcated)

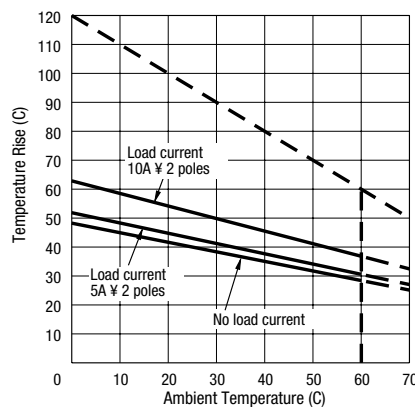


Ambient Temperature vs. Temperature Rise Curves

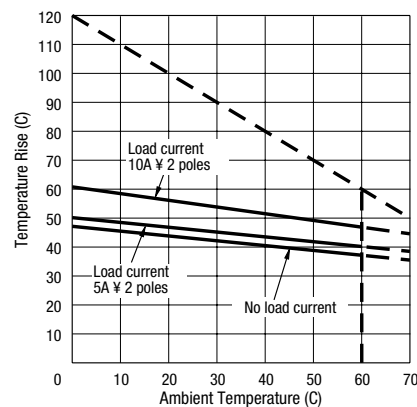
RU2 (AC Coil, 50 Hz)



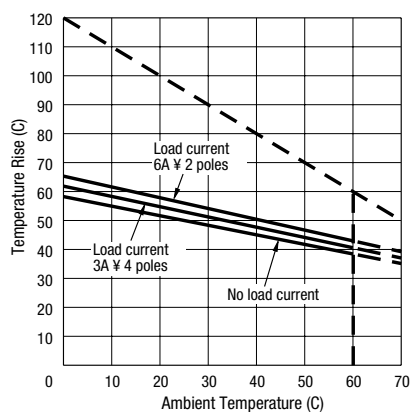
RU2 (AC Coil, 60 Hz)



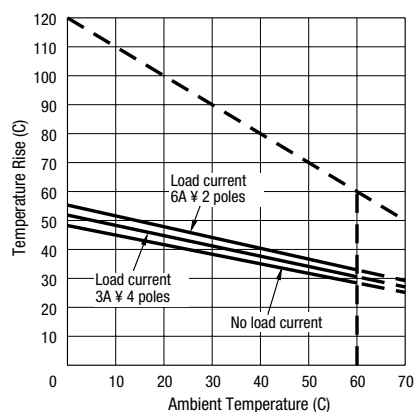
RU2 (DC Coil)



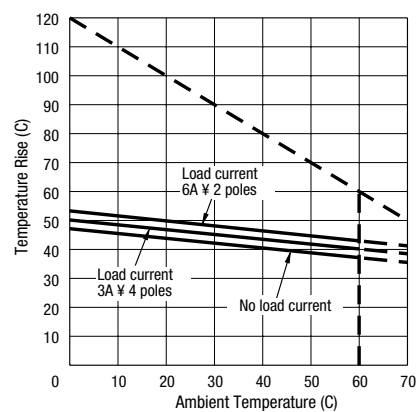
RU4/RU42 (AC Coil, 50 Hz)



RU4/RU42 (AC Coil, 60 Hz)



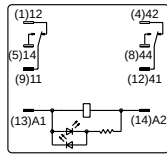
RU4/RU42 (DC Coil)



The above temperature rise curves show the characteristics when 100% the rated coil voltage is applied.
The heat resistance of the coil is 120°C. The slant dashed line indicates the allowable temperature rise for the coil at different ambient temperatures.
Load current 6A x 2 poles is for the RU4 models only.

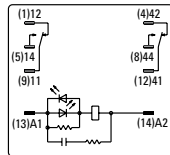
Internal Connection (View from Bottom)

RU2S-* Standard

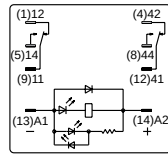


24V AC/DC coil or less

RU2S-*R with RC

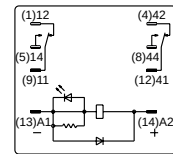
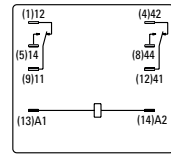


RU2S-*D With Diode

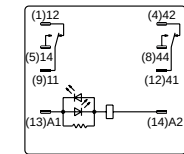


24V DC coil or less

RU2V-NF-*

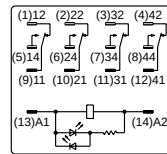


Over 24V DC coil



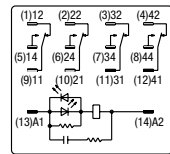
Over 24V AC/DC coil

RU4S-*/RU42S-* Standard

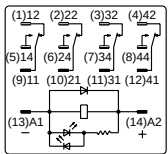


24V AC/DC coil or less

RU4S-*R/RU42S-*R With RC

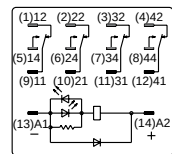
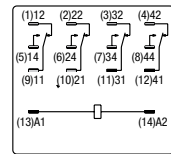


RU4S-*D/RU42S-*D With Diode

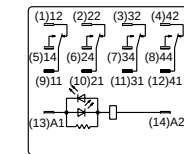


24V DC coil or less

RU4V-NF-*/RU42V-NF-*



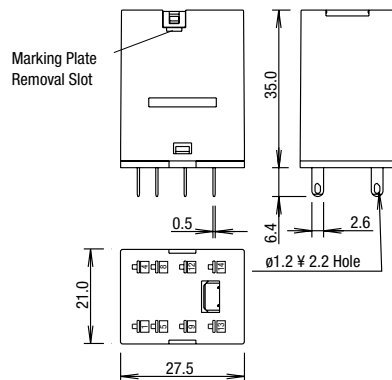
Over 24V DC coil



Over 24V AC/DC coil

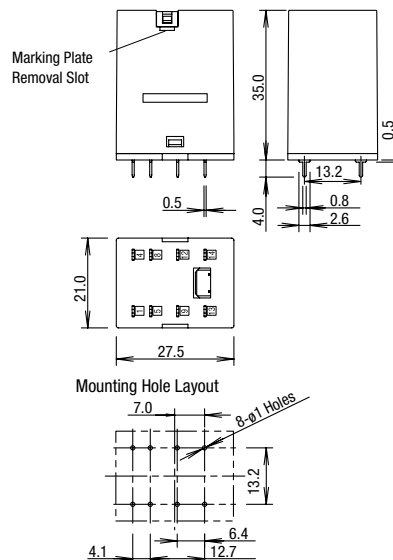
Dimensions (mm)

RU2S



Marking plate removal slot is provided only on one side.
Insert a flat screwdriver into the slot to remove the marking plate.

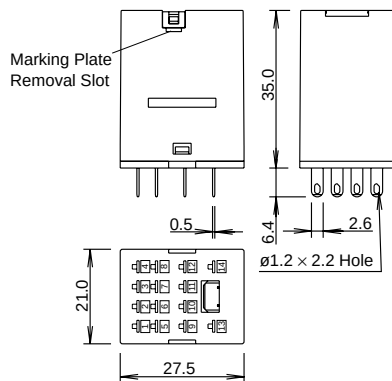
RU2V



All dimensions in mm.

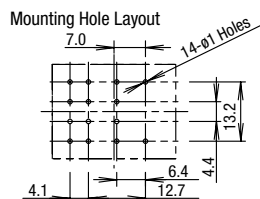
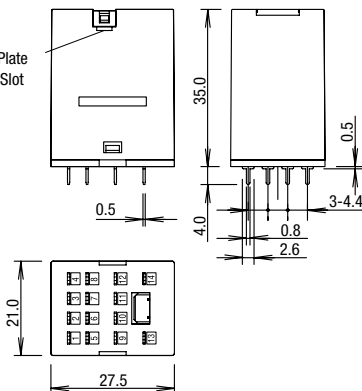
Dimensions con't (mm)

RU4S/RU42S



Marking plate removal slot is provided only on one side.
Insert a flat screwdriver into the slot to remove the marking plate.

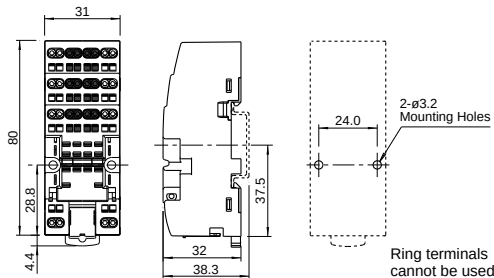
RU4V/RU42V



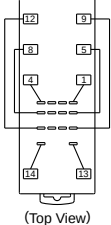
All dimensions in mm.

Spring Clamp DIN Rail Mount Sockets

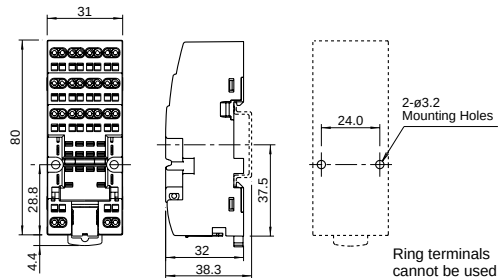
SU2S-11L



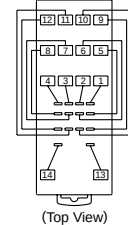
Terminal Arrangement



SU4S-11L

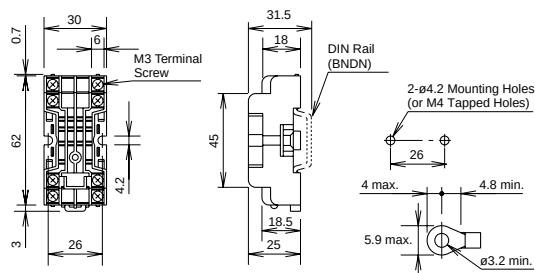


Terminal Arrangement



Standard DIN Rail Mount Sockets

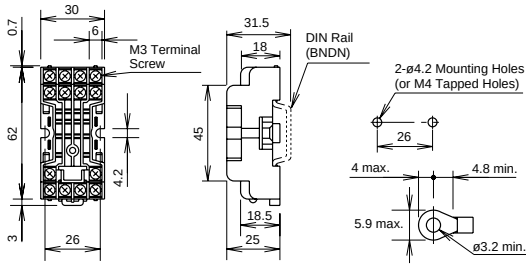
SM2S-05



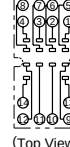
Terminal Arrangement



SY4S-05



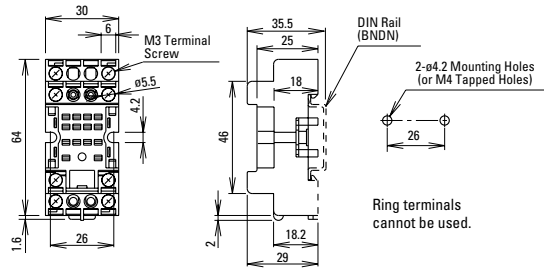
Terminal Arrangement



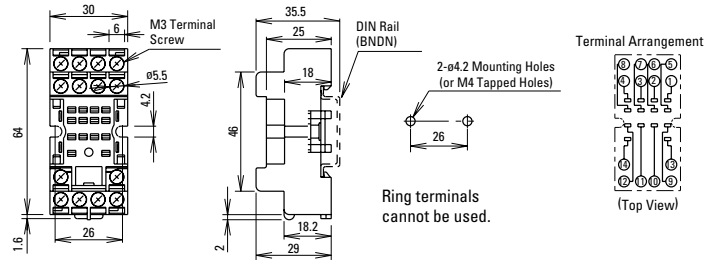
Dimensions con't (mm)

Finger-safe DIN Rail Mount Sockets

SM2S-05C

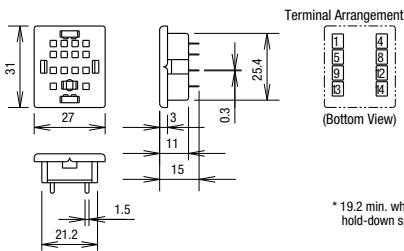


SY4S-05C

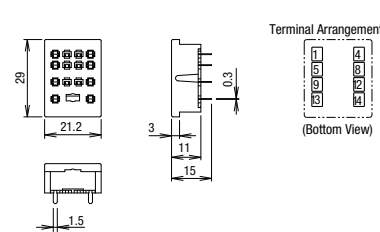


PCB Mount Sockets

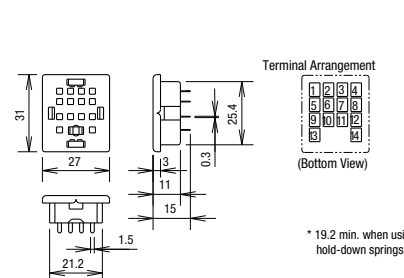
SM2S-61



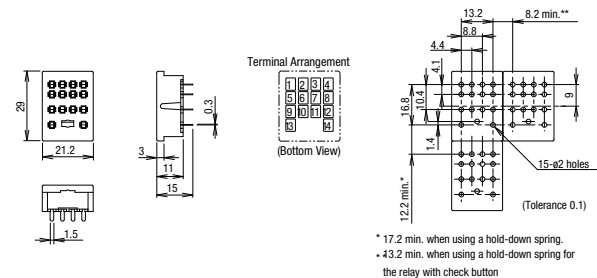
SM2S-62



SY4S-61

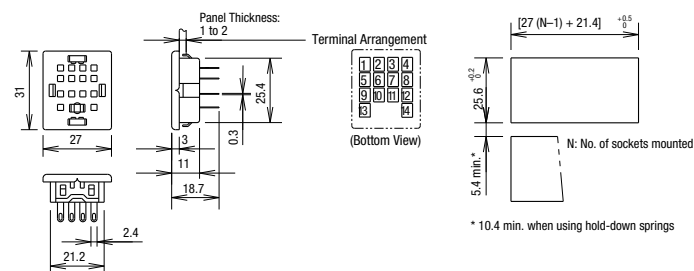


SY4S-62



Through Panel Mount Socket

SY4S-51



RY/RM Series Miniature Relays

Key features:

- RY2 (3A), RY4 (5A), RM2 (5A)
- General purpose miniature relays
- 3A or 5A contact capacity
- Wide variety of terminal styles and coil voltages meet a wide range of applications
- All 4PDT types have arc barriers.



Part Number Selection

		Part Number		
Contact	Model	Plug-in Terminal	PC Board Terminal	Coil Voltage Code
 DPDT (Slim) 3A	Standard	RY2S-U □	RY2V-U □	AC6V, AC12V, AC24V, AC110V, AC120V, AC220V, AC240V DC6V, DC12V, DC24V, DC48V, DC110V
	With Indicator	RY2S-UL □	RY2V-UL □	
	With Check Button	RY2S-UC □	—	
	With Indicator and Check Button	RY2S-ULC □		
	Top Bracket Mounting	RY2S-UT □		
	With Diode (DC coil only)	RY2S-UD □	RY2V-UD □	DC6V, DC12V, DC24V, DC48V, DC110V
 DPDT (Wide) 5A	Standard	RM2S-U □	RM2V-U □	RYAC6V, AC12V, AC24V, AC110-120V, AC220-240V DC6V, DC12V, DC24V, DC48V, DC100-110V
	With Indicator	RM2S-UL □	RM2V-UL □	
	With Check Button	RM2S-UC □	—	
	With Indicator and Check Button	RM2S-ULC □		
	Top Bracket Mounting	RM2S-UT □		
	With Diode (DC coil only)	RM2S-UD □		DC6V, DC12V, DC24V, DC48V, DC100-110V
	With Indicator and Diode (DC coil only)	RM2S-ULD □		
 4PDT 5A	Standard	RY4S-U □	RY4V-U □	AC6V, AC12V, AC24V, AC110-120V, AC220-240V DC6V, DC12V, DC24V, DC48V, DC100-110V
	With Indicator	RY4S-UL □	RY4V-UL □	
	With Check Button	RY4S-UC □	—	
	With Indicator and Check Button	RY4S-ULC □		
	Top Bracket Mounting	RY4S-UT □		
	With Diode (DC coil only)	RY4S-UD □		DC6V, DC12V, DC24V, DC48V, DC100-110V
	With Indicator and Diode (DC coil only)	RY4S-ULD □		



Top mount models are designed to mount directly to a panel and do not require a socket.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RY4S-U** **AC110-120V**
 Part No. Coil Voltage Code

Sockets

Relays	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	Through Panel Mount	PCB Mount
RY2S	SY2S-05	SY2S-05C	SY2S-51	SY2S-61
RM2	SM2S-05	SM2S-05C	SM2S-51	SY4S-61 SY4S-62
RY4S	SY4S-05	SY4S-05C	SY4S-51	
				

Hold Down Springs & Clips

Appearance	Item	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket
	Pullover Wire Spring	RY2S	SY2S-02F1	SY4S-51F1
		RM2	SY4S-51F1	SY4S-51F1
		RY4S		
	Leaf Spring ¹ (side latch)	RY2S	SFA-202 ²	SFA-302
		RM2, RY4S		
	Leaf Spring ¹ (top latch)	RY2S	SFA-101 ²	SFA-301
		RM2		
		RY4S		

 1. Not available for PCB mount socket SY4S-62.
2. Order 2 pieces per relay.

Accessories

Item	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop		DIN rail	BNL5	9.1 mm wide.
Replacement Hold-Down Spring Anchor		Horseshoe clip for all DIN rail sockets	Y778-011	For use on DIN rail mount socket when using pullover wire hold down spring. 2 pieces included with each socket.

Specifications

Contact Model	Standard Contact		
	RY2 - DPDT Slim	RM2 - DPDT Wide	RY4 - 4PDT
Contact Material	Gold-plated silver	Silver	Gold-plated silver
Contact Resistance ¹	50 mΩ maximum	30 mΩ maximum	50 mΩ maximum
Minimum Applicable Load	24V DC, 5 mA; 5V DC, 10 mA (reference value)	24V DC, 10 mA; 5V DC, 20 mA (reference value)	24V DC, 5 mA; 5V DC, 10 mA (reference value)
Operating Time ²	20 ms maximum		
Release Time ²	20 ms maximum		
Power Consumption (approx.)	AC: 1.1 VA (50 Hz), 1 VA (60 Hz) DC: 0.8W	AC: 1.4 VA (50 Hz), 1.2 VA (60 Hz) DC: 0.9W	AC: 1.4 VA (50 Hz), 1.2 VA (60 Hz) DC: 0.9W
Insulation Resistance	100 MΩ minimum (500V DC megger)		
Dielectric Strength	Between live and dead parts:		
	1500V AC, 1 minute	2000V AC, 1 minute	2000V AC, 1 minute
	Between contact and coil:		
	1500V AC, 1 minute	2000V AC, 1 minute	2000V AC, 1 minute
	Between contacts of different poles:		
	1500V AC, 1 minute	2000V AC, 1 minute	2000V AC, 1 minute
	Between contacts of the same pole:		
	1000V AC, 1 minute	1000V AC, 1 minute	1000V AC, 1 minute
Operating Frequency	Electrical: 1800 operations/h maximum Mechanical: 18,000 operations/h maximum		
Vibration Resistance	Damage limits: 10 to 55 Hz, amplitude 0.5 mm Operating extremes: 10 to 55 Hz, amplitude 0.5 mm		
Shock Resistance	Damage limits: 1000 m/s ² Operating extremes: 100 m/s ² (DPDT Slim), 200 m/s ² (4PDT, DPDT Wide)		
Mechanical Life	50,000,000 operations		
Electrical Life	200,000 operations (220V AC, 3A)	500,000 operations (220V AC, 5A)	100,000 operations (220V AC, 5A) 200,000 operations (220V AC, 3A)
Operating Temperature ³	−25 to +55°C (no freezing)	−25 to +45°C (no freezing)	−25 to +55°C (no freezing) ⁴
Operating Humidity	45 to 85% RH (no condensation)		
Weight (approx.)	23g	35g	34g



Note: Above values are initial values.

1. Measured using 5V DC, 1A voltage drop method
2. Measured at the rated voltage (at 20°C), excluding contact bouncing
Release time of relays with diode: 40 ms maximum

3. For use under different temperature conditions, refer to Continuous Load Current vs. Operating Temperature Curve. The operating temperature range of relays with indicator or diode is −25 to +40°C.
4. When the total current of 4 contacts is less than 15A, the operating temperature range is −25 to +70°C.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

AC Coil Ratings

Voltage (V)	Rated Current (mA) ±15% at 20°C				Coil Resistance (Ω) ±10% at 20°C		Operation Characteristics (against rated values at 20°C)		
	AC 50Hz		AC 60Hz						
	DPDT Slim	DPDT Wide & 4PDT	DPDT Slim	DPDT Wide & 4PDT	DPDT Slim	DPDT Wide & 4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
6	170	240	150	200	18.8	9.4	110%	80% maximum	30% minimum
12	86	121	75	100	76.8	39.3			
24	42	60.5	37	50	300	153			
110	9.6	—	8.4	—	6,950	—			
110-120	—	9.4-10.8	—	8.0-9.2	—	4,290			
120	8.6	—	7.5	—	8,100	—			
220	4.7	—	4.1	—	25,892	—			
220-240	—	4.7-5.4	—	4.0-4.6	—	18,820			
240	4.9	—	4.3	—	26,710	—			

DC Coil Ratings

Voltage (V)	Rated Current (mA) ±15% at 20°C		Coil Resistance (Ω) ±10% at 20°C		Operation Characteristics (against rated values at 20°C)		
	DPDT Slim	DPDT Wide & 4PDT	DPDT Slim	DPDT Wide & 4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
6	128	150	47	40	110%	80% maximum	10% minimum
12	64	75	188	160			
24	32	36.9	750	650			
48	18	18.5	2,660	2,600			
100-110	—	8.2-9.0	—	12,250			
110	8	—	13,800	—			

Contact Ratings

Maximum Contact Capacity						
Contact	Continuous Current	Allowable Contact Power		Rated Load		
		Resistive Load	Inductive Load	Voltage (V)	Res. Load	Ind. Load
DPDT Slim (RY2)	3A	660 VA AC 90W DC	176 VA AC 45W DC	110V AC	3A	1.5A
				220V AC	3A	0.8A
				30V DC	3A	1.5A
DPDT Wide (RM2)	5A	1100VA AC 150W DC	440VA AC 75W DC	110V AC	5A	2.5A
				220V AC	5A	2A
				30V DC	5A	2.5A
4PDT (RY4)	5A	1200 VA AC 150W DC	288 VA AC 60W DC	240V AC	5A	1.2A
				30V DC	5A	2A

 Note: Inductive load for the rated load — cos ϕ = 0.3, L/R = 7 ms

TÜV Ratings

Voltage	DPDT Slim	DPDT Wide	4PDT
240V AC	3A	5A	5A
30V DC	3A	5A	5A

 AC: cos ϕ = 1.0, DC: L/R = 0 ms

UL Ratings

Voltage	Resistive			General use		
	DPDT Slim	DPDT Wide	4PDT	DPDT Slim	DPDT Wide	4PDT
240V AC	3A	5A	5A	0.8A	2A	5A
120V AC	—	—	—	1.5A	2.5A	—
100V DC	0.2A	0.4A	0.2A	0.2A	—	0.2A
30V DC	3A	5A	5A	3A	—	5A

CSA Ratings

Voltage	Resistive			General use		
	DPDT Slim	DPDT Wide	4PDT	DPDT Slim	DPDT Wide	4PDT
240V AC	3A	5A	5A	0.8A	2A	5A
120V AC	3A	5A	—	1.5A	2.5A	—
100V DC	—	—	—	0.2A	0.4A	0.2A
30V DC	3A	5A	5A	1.5A	2.5A	1.5A

Socket Specifications

	Sockets	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail Mount Sockets	SY2S-05	M3 screws with captive wire clamp	300V, 7A	Maximum up to 2-#14AWG	5.5 - 9 in•lbs
	SM2S-05	M3 screw with captive wire clamp	300V, 10A	Maximum up to 2-#14AWG	5.5 - 9 in•lbs
	SY4S-05	M3 screw with captive wire clamp	300V, 7A*	Maximum up to 2-#14AWG	5.5 - 9 in•lbs
Finger-safe DIN Rail Mount	SY2S-05C	M3 screws with captive wire clamp, fingersafe	300V, 7A	Maximum up to 2-#14AWG	5.5 - 9 in•lbs
	SM2S-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum up to 2-#14AWG	5.5 - 9 in•lbs
	SY4S-05C	M3 screw with captive wire clamp, fingersafe	300V, 7A*	Maximum up to 2-#14AWG	5.5 - 9 in•lbs
Through Panel Mount Socket	SY2S-51	Solder	250V, 7A	—	—
	SM2S-51	Solder	250V, 10A	—	—
	SY4S-51	Solder	250V, 7A*	—	—
PCB Mount Socket	SY2S-61	PCB Mount	300V, 7A	—	—
	SY4S-61	PCB Mount	300V, 7A	—	—
	SY4S-62	PCB Mount	250V, 7A	—	—



* When using only 2 poles of the 4-poles, the UL recognized current is 10A.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

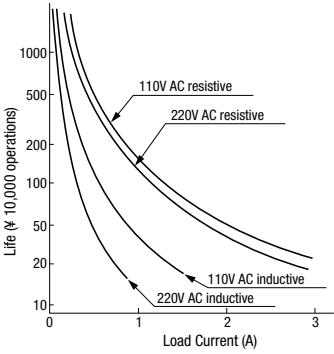
Terminal Blocks

Circuit Breakers

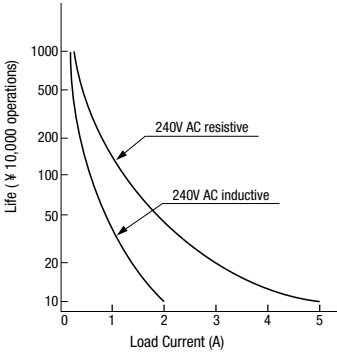
Characteristics (Reference Data)

Electrical Life Curves

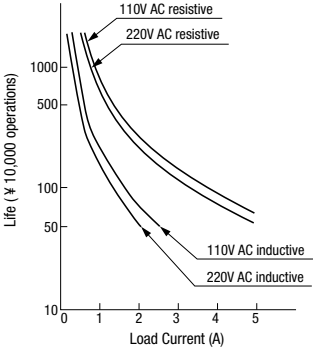
AC Load
(RY2)



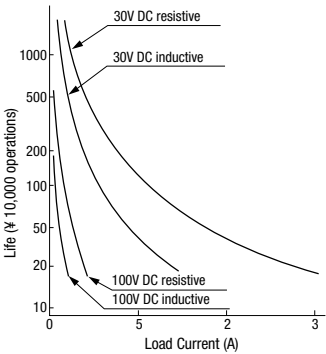
(RY4)



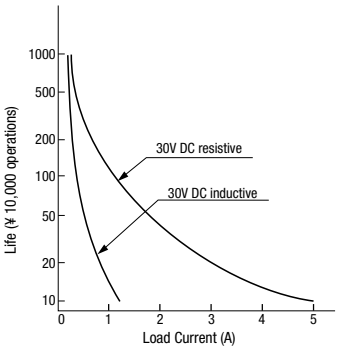
(RM2)



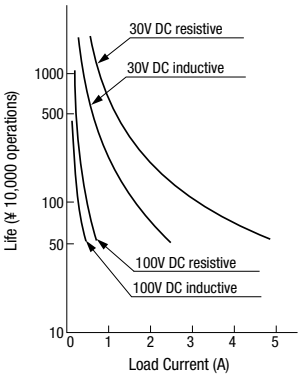
DC Load
(RY2)



(RY4)

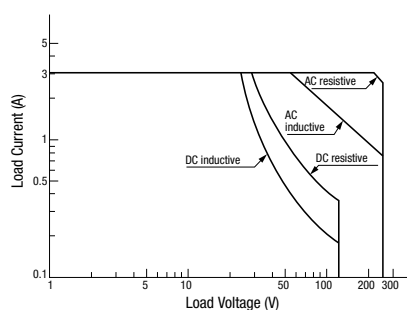


(RM2)

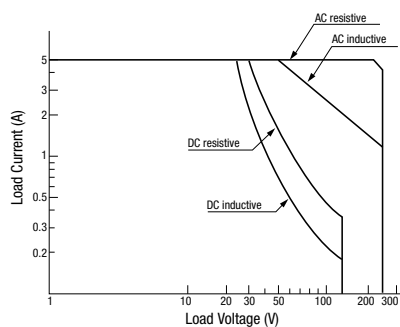


Maximum Switching Capacity

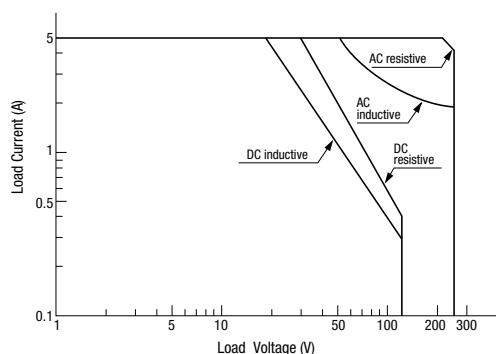
(RY2)



(RY4)

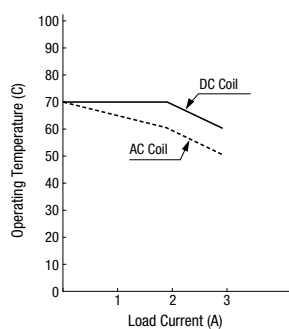


(RM2)

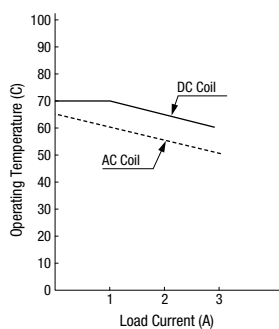


Continuous Load Current vs. Operating Temperature Curve (Standard Type, With Check Button, and Top Bracket Mounting Type)

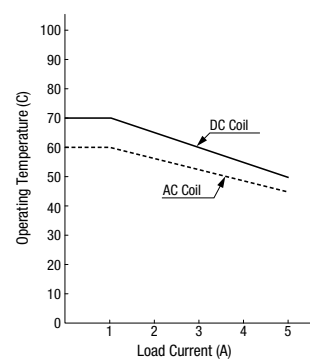
(RY2)



(RY4)

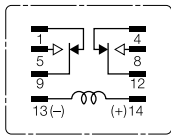


(RM2)

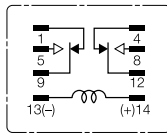


Internal Connection (View from Bottom) Standard Type

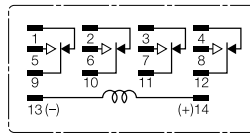
DPDT Slim (RY2)



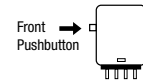
DPDT Wide (RM2)



4PDT (RY4)



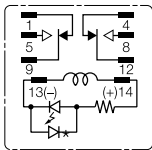
With Check Button



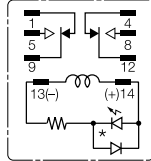
Contacts can be operated by pressing the check button.

With Indicator (-L type)

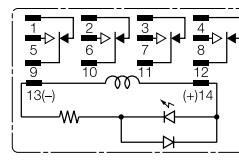
DPDT Slim (RY2)



DPDT Wide (RM2)



4PDT (RY4)



Coil
Below
100V
AC/DC

Coil
Below
24V AC/
DC

When the relay is energized,
the indicator goes on.

- An LED protection diode is not contained in DPDT relays for coils below 100V DC.

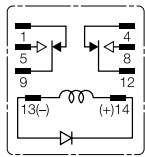
Coil
100V
AC/DC
and over

Coil 24V
AC/DC
and over

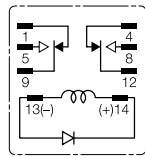
- If coil polarity is reversed LED will not light.

With Diode (-D type)

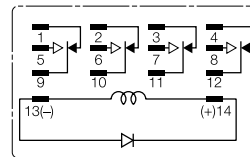
DPDT Slim (RY2)



DPDT Wide (RM2)



4PDT (RY4)

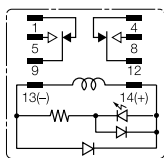


Contains a diode to absorb the back emf
generated when the coil is de-energized. The
release time is slightly longer.

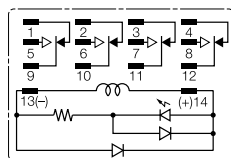
- Diode Characteristics
Reverse withstand voltage: 1,000V
Forward current: 1A

With Indicator and Diode (-LD type)

DPDT Wide (RM2)

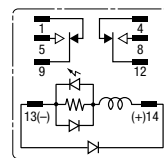


4PDT (RY4)

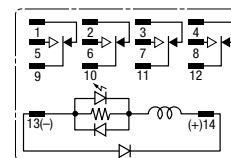


Coil 24V
DC and
over

DPDT Wide (RM2)



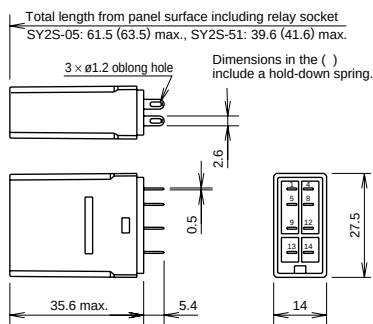
4PDT (RY4)



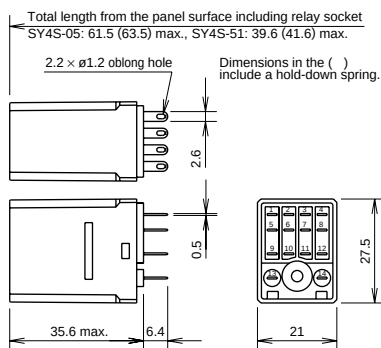
Contains an LED
indicator and a surge
absorber.

Dimensions (mm)

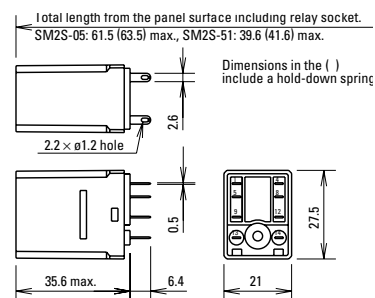
RY2S



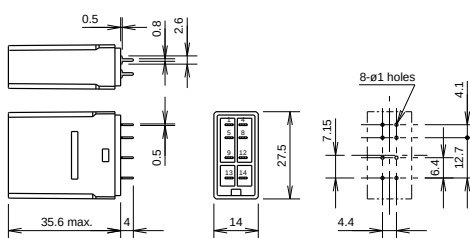
RY4S



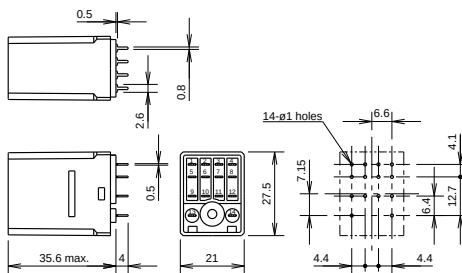
RM2S



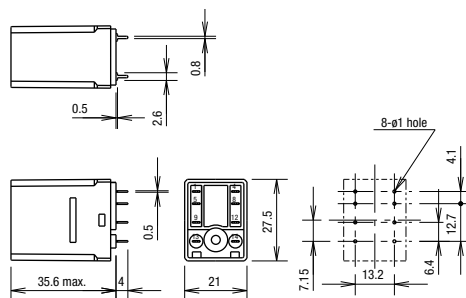
RY2V



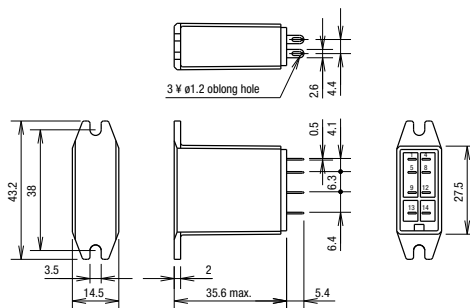
RY4V



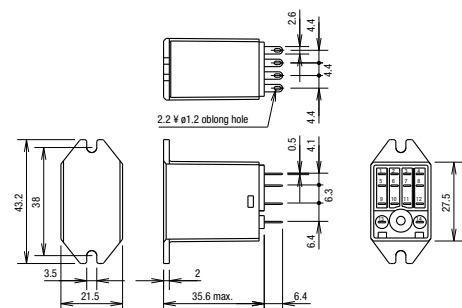
RM2V



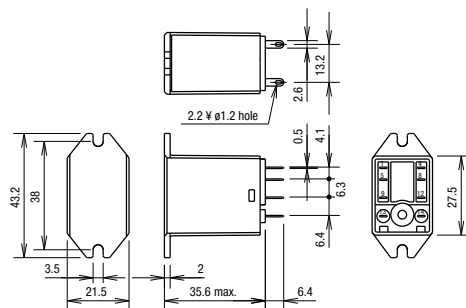
RY2S-UT



RY4S-UT



RM2S-UT



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

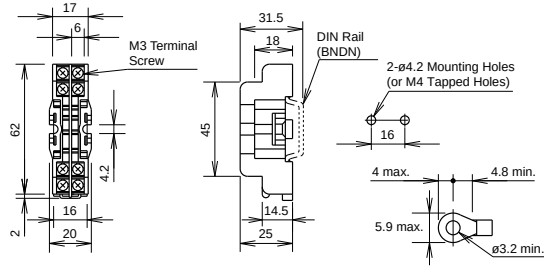
Terminal Blocks

Circuit Breakers

Dimensions

Standard DIN Rail Mount Sockets

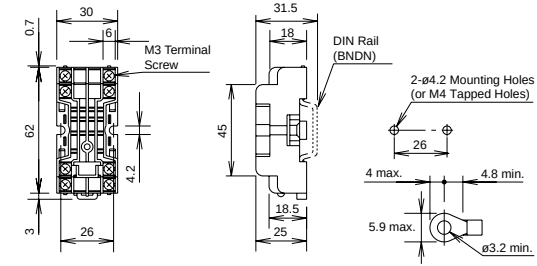
SY2S-05



Terminal Arrangement

(Top View)

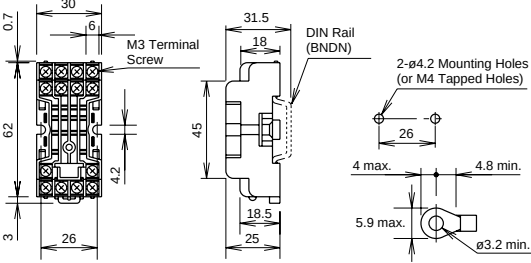
SM2S-05



Terminal Arrangement

(Top View)

SY4S-05

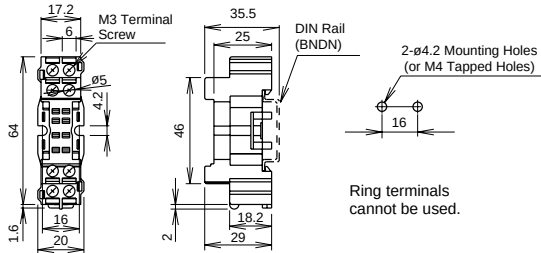


Terminal Arrangement

(Top View)

Finger-safe DIN Rail Mount Sockets

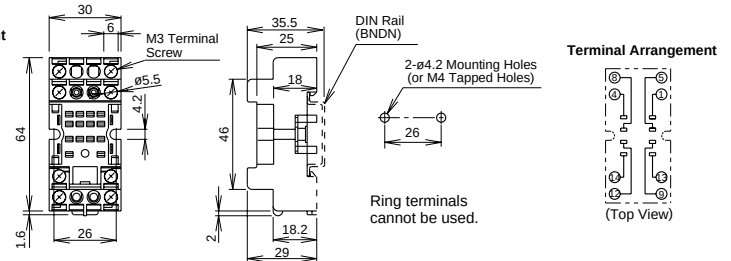
SY2S-05C



Terminal Arrangement

(Top View)

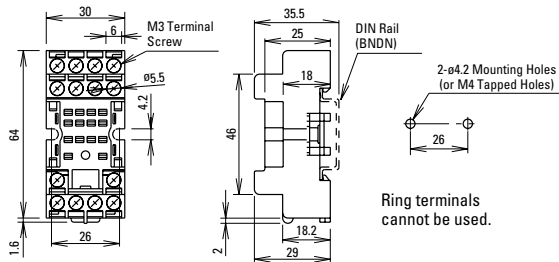
SM2S-05C



Terminal Arrangement

(Top View)

SY4S-05C

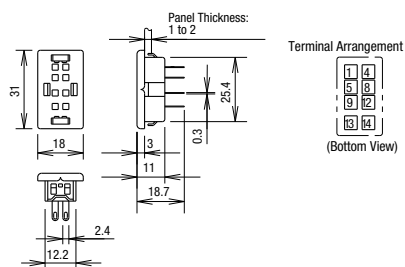


Terminal Arrangement

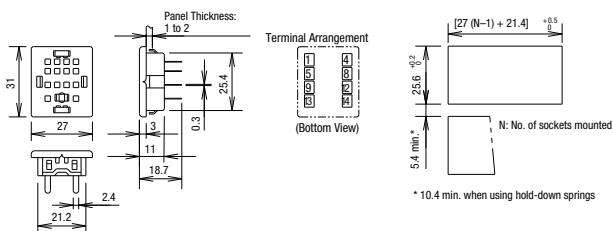
(Top View)

Through Panel Mount Socket

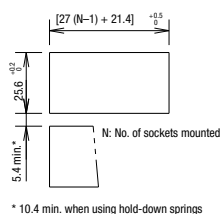
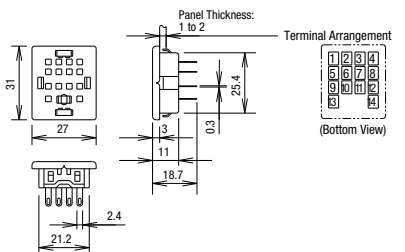
SY2S-51



SM2S-51

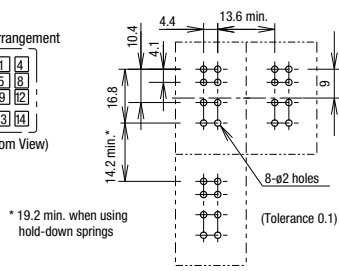
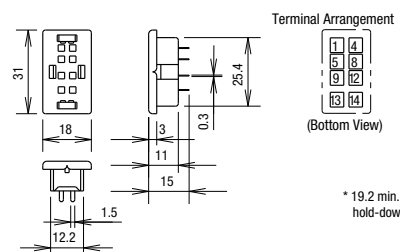


SY4S-51

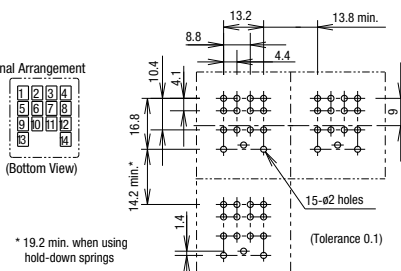
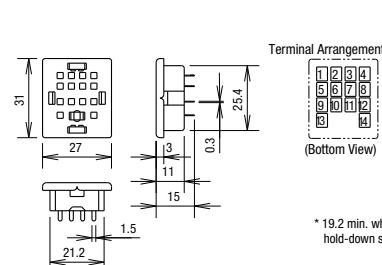


PCB Mount Sockets

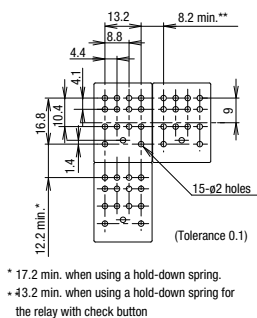
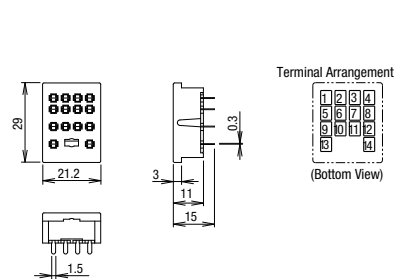
SY2S-61



SY4S-61



SY4S-62



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

RF1V Force Guided Relays/SF1V Relay Sockets

Key features:

- Compact and EN compliant RF1V force guided relays
- Force guided contact mechanism (EN50205 Type A TÜV approved)
- Contact configuration
4-pole (2NO-2NC, 3NO-1NC)
6-pole (4NO-2NC, 5NO-1NC, 3NO-3NC)
- Built-in LED indicator model and Counter Electromotive force diode models
- Fast response time (8 ms maximum).
- High shock resistance (200 m/s² minimum)
- Finger-safe DIN rail mount socket and PC board mount soc



Applicable Standard	Marking	Certification Organization/ File Number
UL508		UL recognized File No. E55996
CSA C22.2 No.14		CSA File No. 253350
EN50205 EN61810-1		TÜV SÜD

Part Number Selection

		Part Number			
Contact	Rated Coil Voltage	Without LED Indicator	With LED Indicator	Counter-Electromotive Force	
4-pole	2NO-2NC	12V DC	RF1V-2A2B-D12	RF1V-2A2BL-D12	RF1V-2A2BLD1-D12
		24V DC	RF1V-2A2B-D24	RF1V-2A2BL-D24	RF1V-2A2BLD1-D24
		48V DC	RF1V-2A2B-D48	RF1V-2A2BL-D48	RF1V-2A2BLD1-D48
	3NO-1NC	12V DC	RF1V-3A1B-D12	RF1V-3A1BL-D12	RF1V-3A1BLD1-D12
		24V DC	RF1V-3A1B-D24	RF1V-3A1BL-D24	RF1V-3A1BLD1-D24
		48V DC	RF1V-3A1B-D48	RF1V-3A1BL-D48	RF1V-3A1BLD1-D48
6-pole	4NO-2NC	12V DC	RF1V-4A2B-D12	RF1V-4A2BL-D12	RF1V-4A2BLD1-D12
		24V DC	RF1V-4A2B-D24	RF1V-4A2BL-D24	RF1V-4A2BLD1-D24
		48V DC	RF1V-4A2B-D48	RF1V-4A2BL-D48	RF1V-4A2BLD1-D48
	5NO-1NC	12V DC	RF1V-5A1B-D12	RF1V-5A1BL-D12	RF1V-5A1BLD1-D12
		24V DC	RF1V-5A1B-D24	RF1V-5A1BL-D24	RF1V-5A1BLD1-D24
		48V DC	RF1V-5A1B-D48	RF1V-5A1BL-D48	RF1V-5A1BLD1-D48
	3NO-3NC	12V DC	RF1V-3A3B-D12	RF1V-3A3BL-D12	RF1V-3A3BLD1-D12
		24V DC	RF1V-3A3B-D24	RF1V-3A3BL-D24	RF1V-3A3BLD1-D24
		48V DC	RF1V-3A3B-D48	RF1V-3A3BL-D48	RF1V-3A3BLD1-D48

Sockets

Style	No. of Poles	Ordering Type No.
	4	SF1V-4-07L
	6	SF1V-6-07L
	4	SF1V-4-61
	6	SF1V-6-61

Certification for Sockets

Applicable Standard	Marking	Certification Organization/ File Number
UL508		UL recognized File No. E62437
CSA C22.2 No.14		CSA File No. 253350
EN147000 EN147100		TÜV SÜD
		EC Low Voltage Directive (DIN rail mount sockets only)

Coil Ratings

Contact		Rated Coil Voltage (V)	Rated Current (mA) $\pm 10\%$ (at 20°C) ¹	Coil Resistance (Ω) $\pm 10\%$ (at 20°C)	Operating Characteristics (at 20°C)			Power Consumption
					Pickup Voltage	Dropout Voltage	Maximum Continuous Applied Voltage ²	
4-pole	2NO-2NC	12V DC	30	400	75% maximum	10% minimum	110%	Approx. 0.36W
		24V DC	15	1600				
		48V DC	7.5	6400				
	3NO-1NC	12V DC	30	400				
		24V DC	15	1600				
		48V DC	7.5	6400				
6-pole	4NO-2NC	12V DC	41.7	288				Approx. 0.5W
		24V DC	20.8	1152				
		48V DC	10.4	4608				
	5NO-1NC	12V DC	41.7	288				
		24V DC	20.8	1152				
		48V DC	10.4	4608				
	3NO-3NC	12V DC	41.7	288				
		24V DC	20.8	1152				
		48V DC	10.4	4608				
		48V DC	10.4	4608				



1. For relays with LED indicator, the rated current increases by approx. 2 mA.
2. Maximum continuous applied voltage is the maximum voltage that can be applied to relay coils.

Accessories

Item	Appearance	Specifications	Type No.	Remarks
DIN Rail		Aluminum Weight: Approx. 250g	BNDN1000	Length: 1m Width: 35 mm
End Clip		Metal (zinc plated steel) Weight: Approx. 15g	BNL5	—
			BNL6	

Specifications

Number of Poles		4-pole		6-pole	
Contact Configuration		2NO-2NC	3NO-1NC	4NO-2NC	5NO-1NC 3NO-3NC
Contact Resistance (initial value) ¹		100 mΩ maximum			
Contact Material		AgSnO ₂ (Au flashed)			
Rated Load (resistive load)		6A 250V AC, 6A 30V DC			
Allowable Switching Power (resistive load)		1500 VA, 180W			
Allowable Switching Voltage		250V AC, 30V DC			
Allowable Switching Current		6A			
Minimum Applicable Load ²		5V DC, 1 mA (reference value)			
Power Consumption (approx.)		0.36W		0.5W	
Insulation Resistance		1000 MΩ minimum (500V DC megger, same measurement positions as the dielectric strength)			
Dielectric Strength	Between contact and coil	4000V AC, 1 minute			
	Between contacts of different poles	2500V AC, 1 minute Between contacts 7-8 and 9-10	2500V AC, 1 minute Between contacts 7-8 and 11-12 Between contacts 9-10 and 13-14 Between contacts 11-12 and 13-14		
		4000V AC, 1 min. Between contacts 3-4 and 5-6 Between contacts 3-4 and 7-8 Between contacts 5-6 and 9-10	4000V AC, 1 min. Between contacts 3-4 and 5-6 Between contacts 3-4 and 7-8 Between contacts 5-6 and 9-10 Between contacts 7-8 and 9-10		
	Between contacts of the same pole	1500V AC, 1 minute			
Operating Time (at 20°C)		20 ms maximum (at the rated coil voltage, excluding contact bounce time)			
Response Time (at 20°C) ³		8 ms maximum (at the rated coil voltage, excluding contact bounce time)			
Release Time (at 20°C)		20 ms maximum (at the rated coil voltage, excluding contact bounce time)			
Vibration Resistance	Operating Extremes	10 to 55 Hz, amplitude 0.75 mm			
	Damage Limits	10 to 55 Hz, amplitude 0.75 mm			
Shock Resistance	Operating Extremes (half sine-wave pulse: 11 ms)	200 m/s ² , when mounted on DIN rail mount socket: 150 m/s ²			
	Damage Limits (half sine-wave pulse: 6 ms)	1000 m/s ²			
Electrical Life		250V AC 6A resistive load: 100,000 operations minimum (operating frequency 1200 per hour) 30V DC 6A resistive load: 100,000 operations minimum (operating frequency 1200 per hour) 250V AC 1A resistive load: 500,000 operations minimum (operating frequency 1800 per hour) 30V DC 1A resistive load: 500,000 operations minimum (operating frequency 1800 per hour) [AC 15] 240V AC 2A inductive load: 100,000 operations minimum (operating frequency 1200 per hour, cos ø = 0.3) [DC 13] 24V DC 1A inductive load: 100,000 operations minimum (operating frequency 1200 per hour, L/R = 48 ms)			
Mechanical Life		10 million operations minimum (operating frequency 10,800 operations per hour)			
Operating Temperature ⁴		−40 to +85°C (no freezing)			
Operating Humidity		5 to 85%RH (no condensation)			
Storage Temperature		−40 to +85°C			
Operating Frequency (rated load)		1200 operations per hour			
Weight (approx.)		20g		23g	



1. Measured using 6V DC, 1A voltage drop method.
2. Failure rate level P (reference value)

3. Response time is the time until NO contact opens, after the coil voltage is turned off.
4. When using at 70 to 85°C, reduce the switching current by 0.1A/°C.

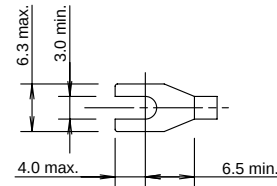
Socket Specifications

Part Number	SF1V-4-07L	SF1V-6-07L	SF1V-4-61	SF1V-6-61
Rated Current	6A			
Rated Voltage	250V AC/DC			
Insulation Resistance	1000 MΩ minimum (500V DC megger, between terminals)			
Dielectric Strength	2500V AC, 1 minute (between terminals)			
Screw Terminal Style	M3 slotted Phillips screw		—	
Applicable Wire	0.7 to 1.65 mm² (18 AWG to 14 AWG)		—	
Recommended Screw Tightening Torque	0.5 to 0.8 N·m		—	
Terminal Strength	Wire tensile strength: 50N min.		—	
Vibration Resistance	Damage limits: 10 to 55 Hz, amplitude 0.75 mm Resonance: 10 to 55 Hz, amplitude 0.75 mm			
Shock Resistance	1000 m/s²			
Operating Temperature ¹	−40 to +85°C (no freezing)			
Operating Humidity	5 to 85% RH (no condensation)			
Degree of Protection	IP20 (finger-safe screw terminals)		—	
Weight (approx.)	40g	55g	9g	10g



1. When using at 70 to 85°C, reduce the switching current by 0.1A/°C.

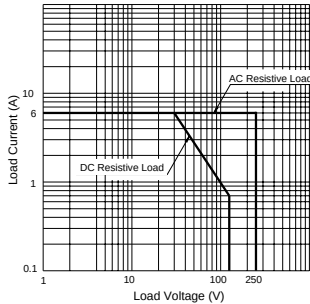
Applicable Crimping Terminals Specifications



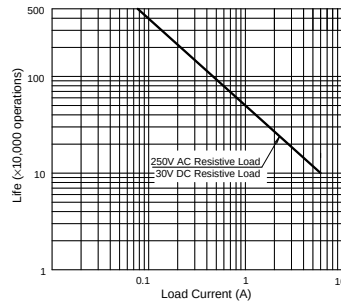
Note: Ring tongue terminals cannot be used.

Characteristics

Maximum Switching Capacity

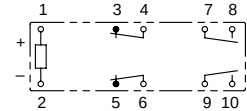


Electrical Life Curve



Notes on Contact Gaps except Welded Contacts

Example: RF1V-2A2B-D24



- If the NO contact (7-8 or 9-10) welds, the NC contact (3-4 or 5-6) remains open even when the relay coil is de-energized, maintaining a gap of 0.5 mm. The remaining unwelded NO contact (9-10 or 7-8) is either open or closed.
- If the NC contact (3-4 or 5-6) welds, the NO contact (7-8 or 9-10) remains open even when the relay coil is energized, maintaining a gap of 0.5 mm. The remaining unwelded NC contact (5-6 or 3-4) is either open or closed.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

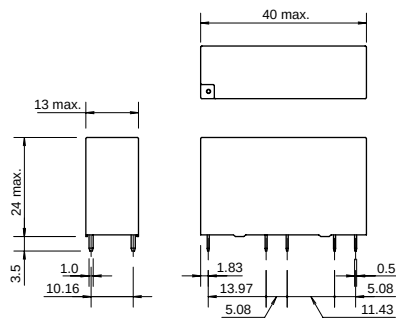
Contactors

Terminal Blocks

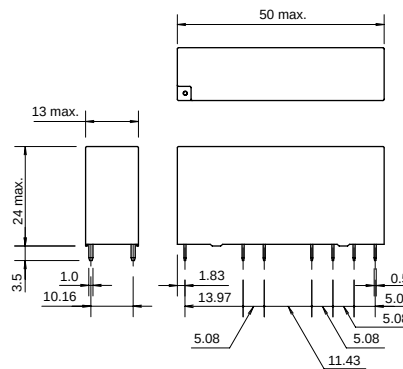
Circuit Breakers

RF1V Dimensions (mm)

RF1V (4-pole)

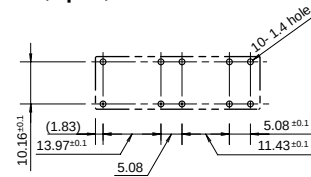


RF1V (6-pole)

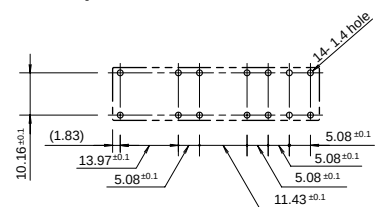


PC Board Terminal type Mounting Hole Layout (Bottom View)

RF1V (4-pole)

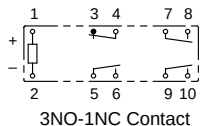
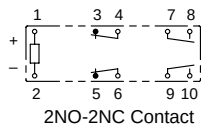


RF1V (6-pole)

Internal Connection (View from Bottom)
With Indicator and Diode (-LD type)

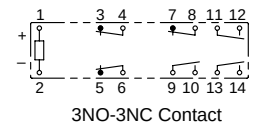
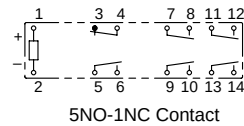
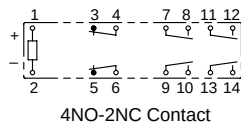
RF1V (4-pole)

Without LED Indicator

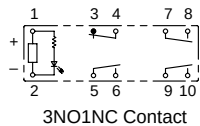
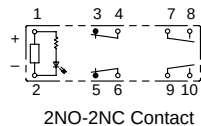


RF1V (6-pole)

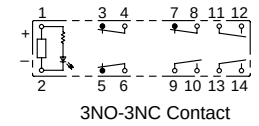
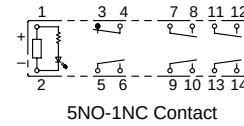
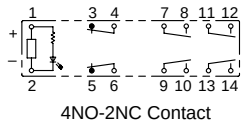
Without LED Indicator



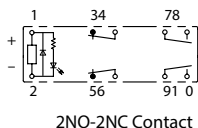
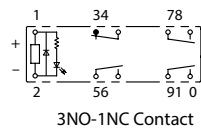
With LED Indicator



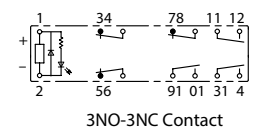
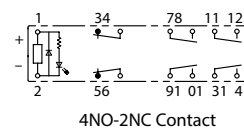
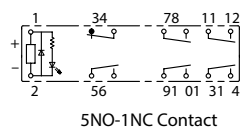
With LED Indicator



With Counter-electromotive Force Diode



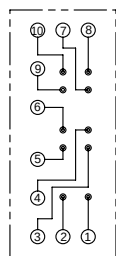
With Counter-electromotive Force Diode



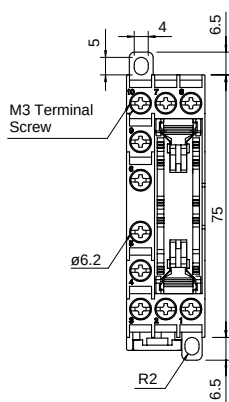
SF1V DIN Rail Mount Socket Dimensions (mm)

SF1V-4-07L (4-pole)

(Internal Connection)

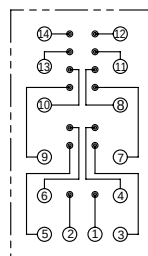


(Top View)

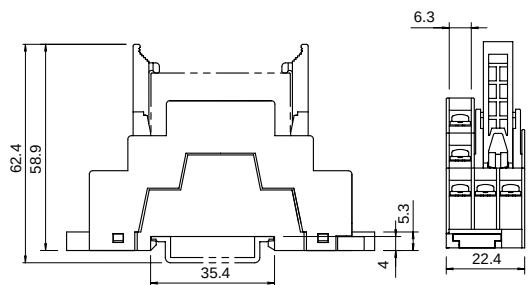
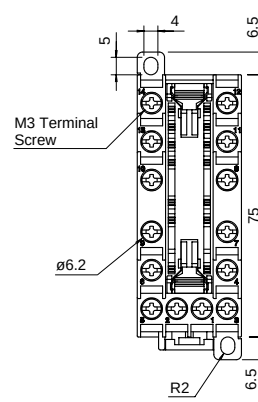


SF1V-6-07L (6-pole)

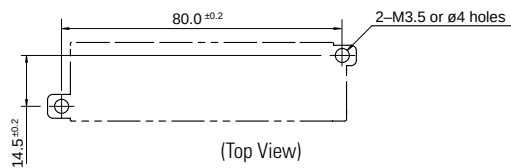
(Internal Connection)



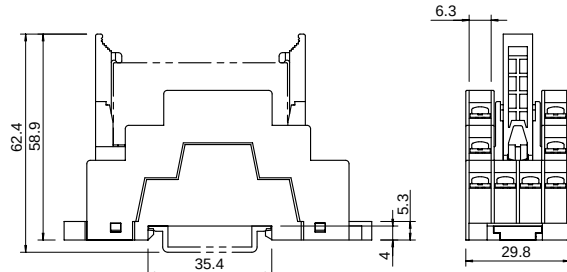
(Top View)



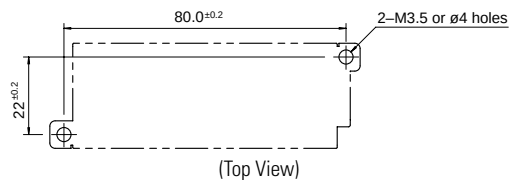
(Panel Mounting Hole Layout)



(Top View)



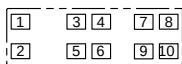
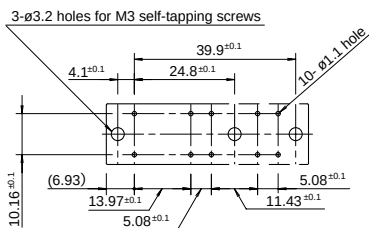
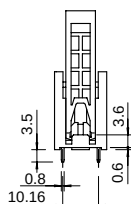
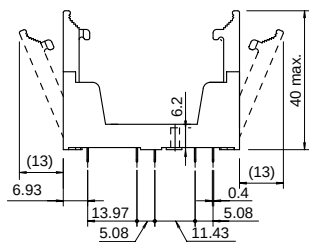
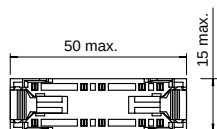
(Panel Mounting Hole Layout)



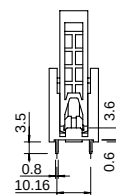
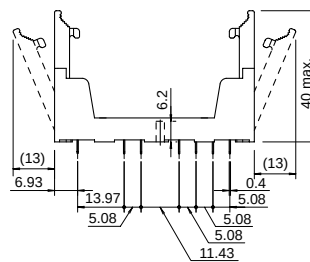
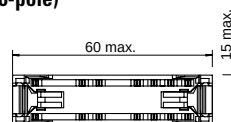
(Top View)

SF1V PC Board Mount Sockets

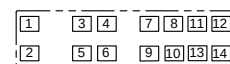
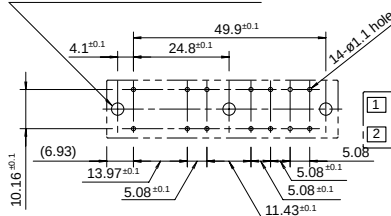
SF1V-4-07L (4-pole)



SF1V-6-07L (6-pole)



3-ø3.2 holes for M3 self-tapping screws



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

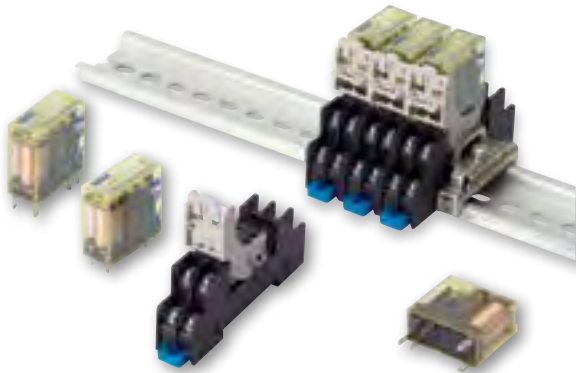
Terminal Blocks

Circuit Breakers

RF2V 2-Pole Force Guided Relays/SJ Series Relay Sockets

Key features:

- 2-pole force guided relay to reduce cost and installation space.
- Force guided contact mechanism (EN50205 Type A TÜV approved).
- Reinforced insulation between coil and contact and contacts of different poles.
- Mechanical indicator shows contact status.
- Two terminal styles - socket mounting and PC board mounting.
- RTIII degree of protection, LED, diode models available.
- Can be used with SJ series relay socket.
- Applicable Standards Mark Certification

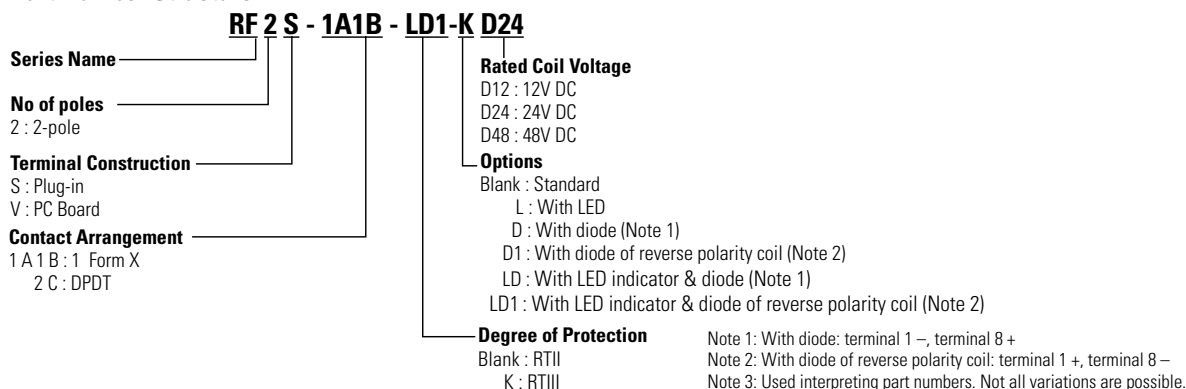


Applicable Standard	Marking	Certification Organization/ File Number
UL60947-4-1a		UL/Recognition File No. E55996
CSA C22.2 No.14		CSA File No. LR35144
EN50205 EN61810-1		TÜV SÜD
		EU Low Voltage Directive

Part Numbers

Contact Configuration	Terminal Style	LED Indicator	w/Diode	Degree of Protection (Note)		Rated Coil Voltage	Part No.
				Flux-tight (RTII)	Sealed (RTIII)		
2-pole	SPST-NO + SPST-NC	Plug-in	With	√	√	12V DC	RF2S-1A1BLD1-D12
			Without	—	√	24V DC	RF2S-1A1B-D24
			With	√	√		RF2S-1A1BD1-D24
				√	√		RF2S-1A1BLD1-D24
			Without	—	√		RF2S-1A1BLD1K-D24
				√	√	48V DC	RF2S-1A1B-D48
			With	√	√		RF2S-1A1BLD1-D48
				√	√		RF2S-1A1BLD1K-D48
		PC Board	Without	—	√	12V DC	RF2V-1A1B-D12
				—	√	24V DC	RF2V-1A1B-D24
				—	√		RF2V-1A1BK-D24
				√	√		RF2V-1A1BD1-D24
			With	√	√		RF2V-1A1BD1K-D24
				√	√		RF2V-1A1BLD1K-D24
			Without	—	√	48V DC	RF2V-1A1B-D48
				—	√	24V DC	RF2V-2C-D24
	DPDT		Without	—	√		

Part Number Structure



Coil Ratings

Rated Voltage (V)	Rated Current (mA) ±15% (at 20°C)		Coil Resistance ±10% (at 20°C)		Operating Characteristics (against rated values at 20°C)			Power Consumption
	Without LED	With LED	Without LED	With LED	Minimum Pickup Voltage	Dropout Voltage	Maximum Continuous Applied Voltage	
12V DC	58	63	205	205	75% maximum	10% minimum	110%	Approx. 0.7W
24V DC	29	33	820	820				
48V DC	14.6	18	3300	3300				



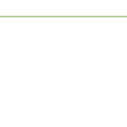
Note: Maximum continuous applied voltage is the maximum voltage that can be applied to relay coils.

Standards Ratings

Voltage	UL Rating Resistive		CSA Rating Resistive	
	NO	NC	NO	NC
277V AC	6A	3A	6A	3A
30V DC	6A	3A	6A	3A

Voltage	TÜV Rating Resistive	
	NO	NC
240VAC	6A	3A
24V DC	6A	3A

Sockets

Style	No. of Poles	Part Number
 Standard Screw Terminal	2	SJ2S-05BW
 Fingersafe Screw Terminal	2	SJ2S-07LW
 PC Board Mount Sockets	2	SJ2S-61

Certification for Sockets

Applicable Standard	Marking	Certification Organization/ File Number
UL508		UL Recognition File No. E62437
CSA C22.2 No.14		CSA File No. LR84913
EN60999-1 (Note 4) EN60664-1 (Note 5)		EC Low Voltage Directive

Note 4: Finger-safe screw terminal only.
Note 5: PC board terminal only.

Specifications

Model		RF2S (Plug-in Terminal) 2-pole	RF2V (PC board terminal) 2-pole
Contact Configuration		SPST-NO + SPST-NC, DPDT	
Contact Resistance (initial value) ¹		100 mΩ maximum	
Contact Material		AgNi+Au-Clad	
Rated Load (resistive load)		NO contact: 240V AC, 6A/24V DC, 6A NC contact: 240V AC, 3A/24V DC, 3A	
Allowable Switching Power (resistive load)		NO contact: 1440VA/144W, NC contact: 720VA/72W	
Allowable Switching Voltage		250V AC, 125V DC	
Allowable Switching Current		6A	
Minimum Applicable Load ²		1V DC, 1mA	
Power Consumption (approx.)		Approx. 0.7W	
Insulation Resistance		1000 MΩ minimum (500V DC megger, same measurement positions as the dielectric strength)	
Dielectric Strength	Between contact and coil	5000V AC, 1 minute	
	Between contacts of the same pole	4000V AC, 1 minute	
	Between contacts of different poles	1500V AC, 1 minute	
Operating Time (at 20°C)		15 ms maximum (at the rated coil voltage, excluding contact bounce time)	
Response Time (at 20°C) ³		5ms max. (at the rated coil voltage, without diode)	
		20ms max. (at the rated coil voltage, with diode)	
Release Time (at 20°C)		10ms max. (at the rated coil voltage, excluding contact bounce time, without diode)	
		25ms max. (at the rated coil voltage, excluding contact bounce time, with diode)	
Vibration Resistance	Operating Extremes	NO contact: 10 to 55Hz, amplitude 0.75mm NC contact: 10 to 55Hz, amplitude 0.2mm	
	Damage Limits	10 to 55Hz, amplitude 0.75mm	
Shock Resistance	Operating Extremes	No Contact 100 m/s ² , NC contact: 50 m/s ²	
	Damage Limits	1000 m/s ²	
Electrical Life		NO contact:	
		100,000 operations minimum (operating frequency 1,800 per hour) at 240V 6A resistive load or 2A inductive load (power factor 0.4)	
		100,000 operations minimum (operating frequency 1,800 per hour) at 24V 6A resistive load or 1A inductive load (time constant 48ms)	
		NC contact:	
		100,000 operations minimum (operating frequency 1,800 per hour) at 240V AC, 3A resistive load or 2A inductive load (power factor 0.4)	
Mechanical Life		100,000 operations minimum (operating frequency 1,800 per hour) at 24V DC, 3A resistive load or 1A inductive load (time constant 48ms)	
		10 million operations minimum (operating frequency 10,800 operations per hour)	
Operating Temperature		Single mounting: -40 to +70°C (no freezing)	
		Collective mounting: -40 to +55°C (no freezing)	
Operating Humidity		-40 to +70°C (no freezing)	
Storage Temperature		5 to 85%RH (no condensation)	
Operating Frequency (rated load)		-40 to +85°C (no freezing)	
Weight (approx.)		1200 operations per hour	
		18g (without LED/diode), 20g (with LED/with diode/with LED & diode)	



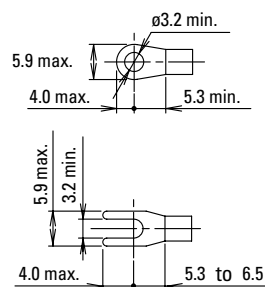
1. Measured using 5V DC, 1A voltage drop method.
2. Failure rate level P (reference value)

3. Response time is the time until NO contact opens, after the coil voltage is turned off.

Socket Specifications

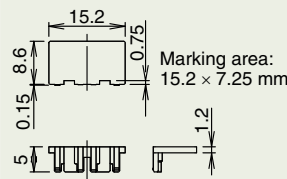
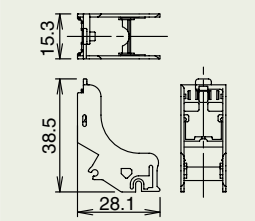
Part Number		SJ2S-05B/-07L	SJ2S-61
Mounting		DIN Rail	PC Board
Rated Current		8A	
Rated Insulation Voltage		250V AC/DC	
Dielectric Strength	Between contact and coil	4000V AC, 1 minute	5000V AC, 1 minute
	Between contacts of the same pole	1000V AC, 1 minute	
	Between contacts of the different pole	3000V AC, 1 minute	
Screw Terminal Style		M3 slotted Phillips screw	-
Applicable Wire		2mm ²	-
Recommended Screw Tightening Torque		0.6 to 1.0 N·m	-
Terminal Strength		Wire tensile strength: 50N min.	-
Vibration Resistance		Damage limits: 90 m/s ² Resonance: 10 to 55 Hz, amplitude 0.75 mm	
Shock Resistance		1000 m/s ²	
Operating Temperature ¹		-40 to +70°C (no freezing)	
Operating Humidity		5 to 85% RH (no condensation)	
Storage Temperature		-55 to +85°C (no freezing)	
Storage Humidity		5 to 85% RH (no condensation)	
Degree of Protection (Screw Terminal)		SJ2S-07L: IP20 (IEC 60529)	-
Weight (approx.)		4034g	4.5g

Applicable Crimping Terminals Specifications



 Note: Ring tongue terminals cannot be used on SJ2S-0L.

 1. When using at 70 to 85°C, reduce the switching current by 0.1A/°C.

Description/Shape		Material	Part No.	Ordering No.	Package Quantity	Remarks
Removable Marking Plate		Plastic (white)	SJ9Z-PW	SJ9Z-PWPN10	10	
Jumper	For 2 sockets					Terminal centers: 15.5mm Rated current: 12A Ensure that the total current to the jumper does not exceed the maximum current.
	For 5 sockets	Nickel-coated brass with polypropylene coating	SJ9Z-JF5	SJ9Z-JF5PN10		
	For 8 sockets		SJ9Z-JF8	SJ9Z-JF8PN10		
	For 10 sockets		SJ9Z-JF10	SJ9Z-JF10PN10		
Replacement Release Lever (with integrated marking plate)		Plastic (gray)	SJ9Z-CM	SJ9Z-CMPN05	5	

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

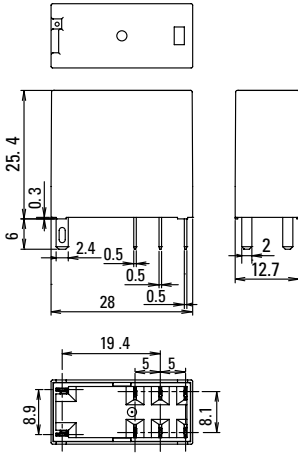
Timers

Contactors

Terminal Blocks

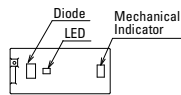
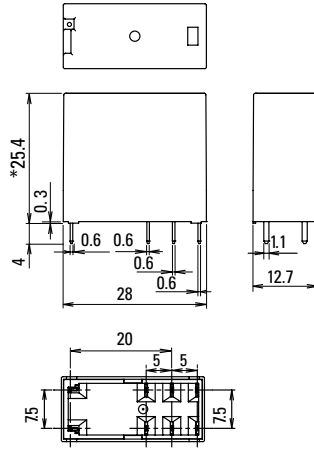
Circuit Breakers

RF2V Dimensions (mm)

RF2S (plug-in terminal)
Standard (without LED/diode)

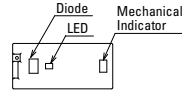
With LED/diode: 28.4

With LED/diode

RF2V (PC board terminal)
Standard (without LED/diode)

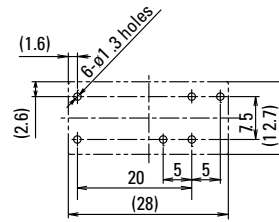
With LED/diode: 28.4

With LED/diode

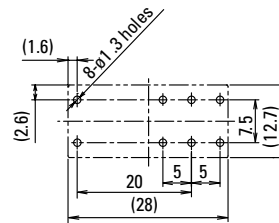


PC Board Terminal type Mounting Hole Layout (Bottom View)

RF2V (SPST-NO + SPST-NC)

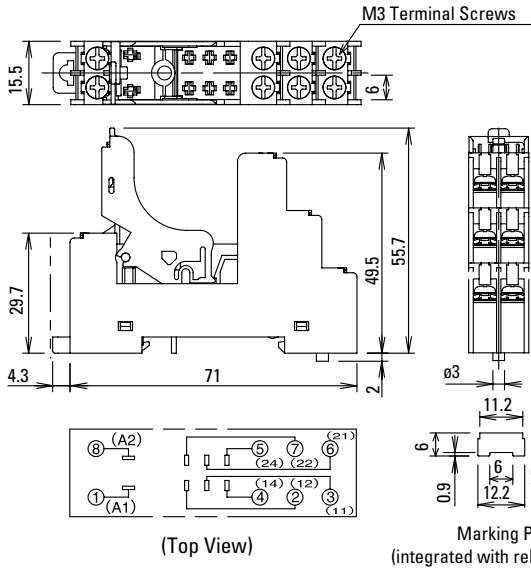


RF2V (DPDT)

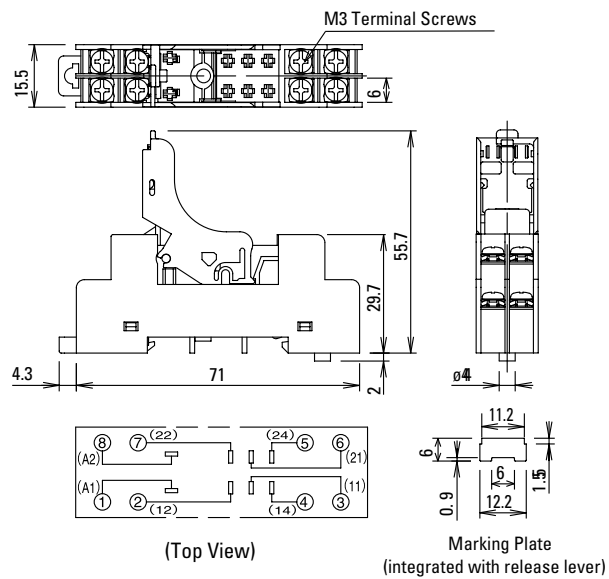


Socket Dimensions

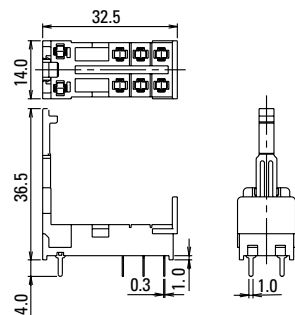
SJ2S-07L



SJ2S-05B



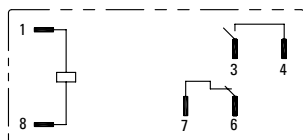
SJ2S-61



Internal Connection (View from Bottom)

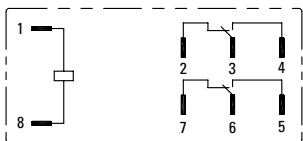
RF2 -1A1B-□

Standard



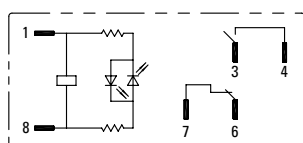
RF2 *-2C-□

Standard



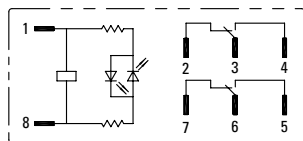
RF2* -1A1BL-□

With LED indicator



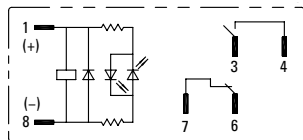
RF2* -2CL-□

With LED indicator



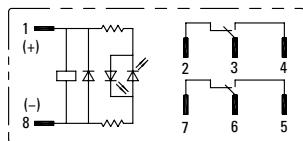
RF2* -1A1BD1-□

With LED indicator + diode of reverse polarity coil



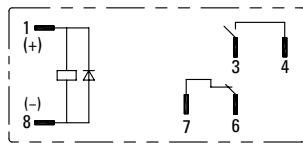
RF2 -2CLD1-□

With LED indicator + diode of reverse polarity coil



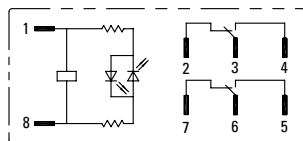
RF2* -1A1BD1-□

With diode of reverse polarity coil



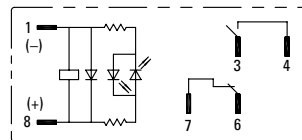
RF2* -2CD1-□

With diode of reverse polarity coil



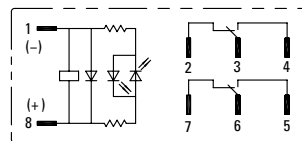
RF2 -1A1BD-□

With LED indicator + diode



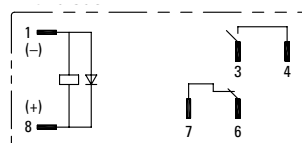
RF2* -2CLD-□

With LED indicator + diode



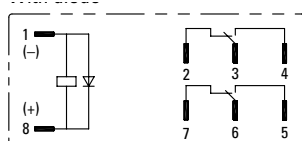
RF2* -1A1BD-□

With diode



RF2* -2CD-□

With diode

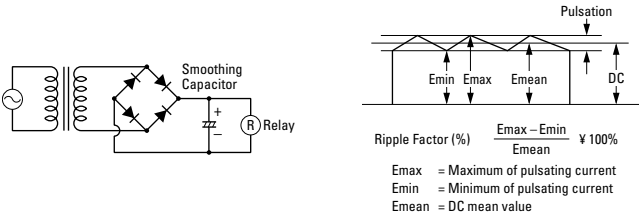


Relays with diode have polarity. Take polarity into consideration when wiring.
When using DPDT model as a force guided relay, use in SPST-NO + SPST-NC wiring (EN50205).

Operating Instructions

Driving Circuit for Relays

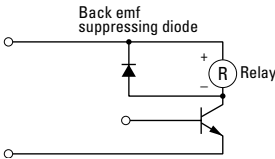
1. To ensure correct relay operation, apply rated voltage to the relay coil.
2. Input voltage for the DC coil:
A complete DC voltage is best for the coil power to make sure of stable relay operation. When using a power supply containing a ripple voltage, suppress the ripple factor within 5%. When power is supplied through a rectification circuit, the relay operating characteristics, such as pickup voltage and dropout voltage, depend on the ripple factor. Connect a smoothing capacitor for better operating characteristics as shown below.



3. Leakage current while relay is off:
When driving an element at the same time as the relay operation, special consideration is needed for the circuit design. As shown in the incorrect circuit below, leakage current (I_0) flows through the relay coil while the relay is off. Leakage current causes coil release failure or adversely affects the vibration resistance and shock resistance. Design a circuit as shown in the correct example.



4. Surge suppression for transistor driving circuits:
When the relay coil is turned off, a high-voltage pulse is generated, causing a transistor to deteriorate and sometimes to break. Be sure to connect a diode to suppress the back electromotive force. Then, the coil release time becomes slightly longer. To shorten the coil release time, connect a Zener diode between the collector and emitter of the transistor. Select a Zener diode with a Zener voltage slightly higher than the power voltage.



Protection for Relay Contacts

1. The contact ratings show maximum values. Make sure that these values are not exceeded. When an inrush current flows through the load, the contact may become welded. If this is the case, connect a contact protection circuit, such as a current limiting resistor.
2. Contact protection circuit:
When switching an inductive load, arcing causes carbides to form on the contacts, resulting in increased contact resistance. In consideration of contact reliability, contact life, and noise suppression, use of a surge absorbing circuit is recommended. Note that the release time of the load becomes slightly longer. Check the operation using the actual load. Incorrect use of a contact protection circuit will adversely affect switching characteristics. Four typical examples of contact protection circuits are shown in the following table:

RC		This protection circuit can be used when the load impedance is smaller than the RC impedance in an AC load power circuit. • R: Resistor of approximately the same resistance value as the load • C: 0.1 to 1 μF
		This protection circuit can be used for both AC and DC load power circuits. R: Resistor of approximately the same resistance value as the load C: 0.1 to 1 μF
Diode		This protection circuit can be used for DC load power circuits. Use a diode with the following ratings. Reverse withstand voltage: Power voltage of the load circuit x 10 Forward current: More than the load current
Varistor		This protection circuit can be used for both AC and DC load power circuits. For a best result, when using a power voltage of 24 to 48V AC/DC, connect a varistor across the load. When using a power voltage of 100 to 240V AC/DC, connect a varistor across the contacts.

3. Do not use a contact protection circuit as shown below:

	This protection circuit is very effective in arc suppression when opening the contacts. But, the capacitor is charged while the contacts are opened. When the contacts are closed, the capacitor is discharged through the contacts, increasing the possibility of contact welding.
	This protection circuit is very effective in arc suppression when opening the contacts. But, when the contacts are closed, a current flows to charge the capacitor, causing contact welding.

Generally, switching a DC inductive load is more difficult than switching a DC resistive load. Using an appropriate arc suppressor, however, will improve the switching characteristics of a DC inductive load.

Soldering

1. When soldering the relay terminals, use a soldering iron of 30 to 60W, and quickly complete soldering (within approximately 3 seconds).
2. Use a non-corrosive rosin flux.

Operating Instructions con't

Other Precautions

1. General notice:
To maintain the initial characteristics, do not drop or shock the relay.
The relay cover cannot be removed from the base during normal operation. To maintain the initial characteristics, do not remove the relay cover.
Use the relay in environments free from condensation, dust, sulfur dioxide (SO₂), and hydrogen sulfide (H₂S).
Make sure that the coil voltage does not exceed applicable coil voltage range.
2. UL and CSA ratings may differ from product rated values determined by IDEC.
3. Do not use relays in the vicinity of strong magnetic field, as this may affect relay operation.

Safety Precautions

- Turn off the power to the relay before starting installation, removal, wiring, maintenance, and inspection of the relays. Failure to turn power off may cause electrical shock or fire hazard.
- Observe specifications and rated values, otherwise electrical shock or fire hazard may be caused.
- Use wires of the proper size to meet voltage and current requirements. Tighten the terminal screws on the relay socket to the proper tightening torque.
- Surge absorbing elements on AC relays with RC or DC relays with diode are provided to absorb the back electromotive force generated by the coil. When the relay is subject to an excessive external surge voltage, the surge absorbing element may be damaged. Add another surge absorbing provision to the relay to prevent damage.

Precautions for the RU Relays

- Before operating the latching lever of the RU relay, turn off the power to the RU relay. After checking the circuit, return the latching lever to the original position.
- Do not use the latching lever as a switch. The durability of the latching lever is a minimum of 100 operations.
- When using DC loads on 4PDT relays, apply a positive voltage to terminals of neighboring poles and a negative voltage to the other terminals of neighboring poles to prevent the possibility of short circuits.
- DC relays with a diode have a polarity in the coil terminals. Apply the DC voltage to the correct terminals.

RSC Series Solid State Relays

Key features:

- Slim design allows for DIN rail or panel mounting
- Built-in heat sink maximizes current output capability
- Epoxy-free design
- Choice of 20A, 30A and 45A models
- LED indicator
- Finger-safe terminals
- Zero voltage switching
- Back-to-back SCR output
- Direct Bond Copper (DBC) substrate construction
- Built-in transient protection (TVS)
- 100k-cycle UL508 endurance rating
- UL Recognized, TUV Approved, CE Marked
- Lead free and RoHS compliant
- EMC (Level 3) & IEC 62314 compliant



Part Number Selection

Input Control Voltage	Output Current Rating	Part Number
4-32V DC	20A	RSCDN-20A
	30A	RSCDN-30A
	45A	RSCDN-45A
90-140V AC	20A	RSCA1N-20A
	30A	RSCA1N-30A
	45A	RSCA1N-45A
180-280V AC	20A	RSCA2N-20A
	30A	RSCA2N-30A
	45A	RSCA2N-45A*



*Input control voltage is 180-260V AC.

Specifications

Model		20A	30A	45A
General Characteristics	Operating temperature (°C)	-20 to +80 -20 to +60 (90-140 V AC input models)		
	Storage temperature (°C)	-40 to +100		
	Input-to-Output isolation voltage (Vrms)	4200		
	Input/Output to ground isolation voltage (Vrms)	4000		
	Operating frequency (Hz)	47 to 63		
	Housing material	UL94-V0 Self-extinguishing polycarbonate		
	Heat sink material	Anodized aluminum black		
	Protection (IEC 60529) - Casing	IP20		
	Input terminal wire size (stranded and solid)	16 AWG to 24 AWG		
	Input terminal tightening torque (Nm)	0.5		
	Output terminal wire size (stranded)	8 AWG to 16 AWG		
	Output terminal wire size (solid)	10 AWG to 16 AWG		
	Output terminal tightening torque (Nm)	1.3		
	Weight (g)	225		400

Specifications con't

	Model	20A	30A	45A
Safety Standards	Conformity to standards	IEC 62314 IEC 60947-4-2 (AC 53a) TUV certified per EN 60950 UL recognized per UL 508		
	Vibrations according to IEC/ EN60068-2-6	35 mm / 10-55 Hz		
	Shock test IEC 60068-2-27	15 G / 11 ms		
	Immunity to electrostatic discharges IEC/EN 61000-4-2	Level 3		
	Immunity to electrostatic fields ENV 50140/204 (IEC 1000-4-3)	Level 3		
	Immunity to rapid transient bursts to IEC 1000-4-4	Level 3		
	Immunity to shock waves according to IEC/EN 61000-4-5	Level 3		
	Immunity to radio frequency in common mode acc. to ENV (CEI 1000-4-6)	Level 3		
	Conducted and radiated noise for industrial environments per CISPR 11	Class A		
	Pollution	Degree 2		
	Overvoltage	Category III		

	Model	20A, 30A, 45A		
Input Specifications	Input voltage (V)	4-32V DC	90-140V AC	180-280V AC*
	Turn-off voltage (V)	1	10	10
	Max. controlled current (mA)	20	6	8
	Min. input current (mA)	16	5	6
	Turn-on time (ms)	8.33 (60Hz) / 10 (50Hz)	30	30
	Max. turn-off time (ms)	8.33 (60Hz) / 10 (50Hz)	30	30



1. LED is not an absolute indicator of power being present.
2. *45A model is 180-260V AC

	Model	20A	30A	45A
Output Specifications	Voltage range (Vrms max)	48-600	48-600	48-600
	Non-rep. peak voltage (Vpeak)	1100	1100	1100
	Maximum off-state leakage at Vmax and T = 25 °C (μA)	120	120	120
	Current max @ 40°C (A)	20	30	45
	Minimum current (mA)	100	100	100
	On-state voltage drop at I max (Vpeak)	1.2	1.2	1.35
	I ² t (t = 10 ms) (A ² s) (50/60 Hz)	1225/1020	2850/2350	3200/2600
	Static (off-state) dv/dt (V/μs)	500	500	500
	HP ratings at 120V	1/2	3/4	1.5
	HP ratings at 240V	1	2	3
	HP ratings at 480V	—	—	5
	Utilization category AC-51 (A)	20	30	45
	Utilization Category AC-53 (A)	6	9	10
	Max. non-rep. 1 s surge (T=25°C) (A)	100	150	160
	Max. non-rep. 1-cycle surge (T=25°C) (A)	495	750	800

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

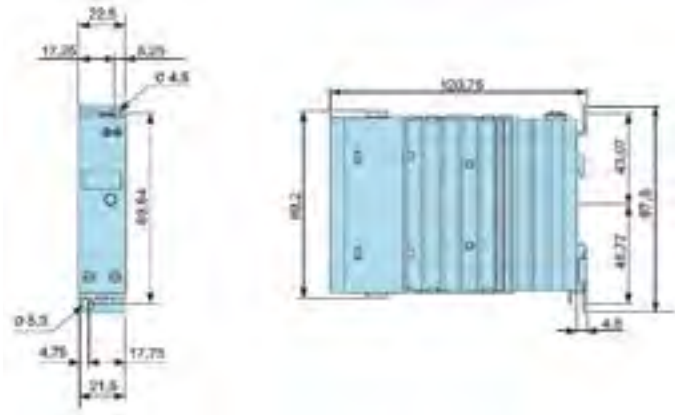
Contactors

Terminal Blocks

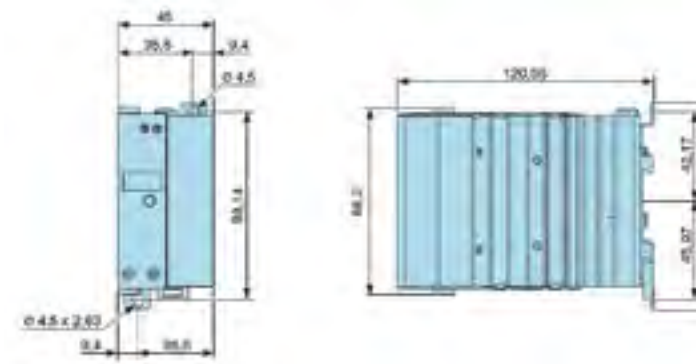
Circuit Breakers

Dimensions (mm)

20A/30A Models



45A Model



RSS Series Panel Mount Solid State Relays

Key features:

- Input status LED Indicator
- Dual SCR output with epoxy free design
- Direct bond copper substrate with direct output lead frame termination
- Internal transient protection – built-in snubber
- EMC compliant (level 3)
- 1200 Volt blocking voltage
- 4000 Volt optical isolation
- Zero crossing voltage turn-on
- High surge capability
- Optional fingersafe cover (RSS-CVR)



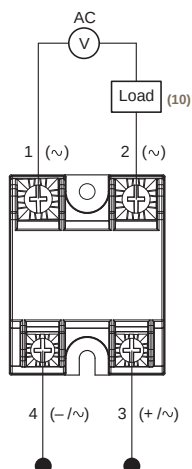
UL Recognized
File No. E194577



Part Number Selection

Input	Continuous Output Current	Part Number
AC Input 90-280V AC	10A	RSSAN-10A
	25A	RSSAN-25A
	50A	RSSAN-50A
	75A	RSSAN-75A
	90A	RSSAN-90A
DC Input 3-32V DC	10A	RSSDN-10A
	25A	RSSDN-25A
	50A	RSSDN-50A
	75A	RSSDN-75A
	90A	RSSDN-90A

Wiring Diagram



Specifications

	Series	RSSDN			RSSAN		
Input Specifications	Voltage Range	3 to 32V DC			90 to 280V AC		
	Input Current	current regulated (10mA)					
	Pick Up Voltage	3V DC			90V AC		
	Drop Out Voltage	1V DC			10V AC		
	Dielectric Strength (Input-Output-Base)	4000 RMS (min)			4000 RMS (min)		
	Capacitance (Input to Output)	8pF			8pF		
	Rev. Voltage Protection	Yes (–32V DC)			N/A		
Output Specifications	Current (continuous)	10A	25A	50A	75A	90A	
	1-Cycle Surge Current	150A	300A	750A	1000A	1200A	
	1-Second Surge Current at 25°C	50A	85A	150A	225A	300A	
	Minimum Holding Current	50mA	50mA	100mA	100mA	100mA	
	Voltage Drop at Rated Current	1.35V (maximum)					
	Voltage Range	48 - 660V AC					
	Output	Dual SCR (N.O.)					
	Over Voltage Rating	1200 PIV					
	Frequency Range	47 to 440Hz					
	Off-State Leakage at Rated Voltage	25mA (maximum)					
	Turn-On Time	1/2 cycle @ 60Hz for zero-cross versions, 20ms for other versions					
	Turn-Off Time	1/2 cycle @ 60Hz for zero-cross versions, 30ms for other versions					
	Zero Voltage Switching	Yes					
	Static DV/DT	200V/μsec					
	Commutating DV/DT	Snubbed for 0.5 power factor at rated load					
	Ambient operating temperature range	-20 to 80°C					
	Weight	82g					

Recommended Loads

Transformer Loads

Transformer loads sometimes result in severe inrush current when the transformer saturates during the first cycle. Use a relay rated for this surge, which has a 1/2 cycle surge current greater than the maximum applied line voltage; the transformer's primary resistance (approximately 10x rated current).

Recommended Loads

SSR Rating	at 120V AC	at 240V AC
10A	500VA	1KVA
25A	1KVA	2KVA
50A	2KVA	4KVA

Heater Loads

When using solid state relays for driving heaters where the load is switched on and off rapidly and continuously, severe thermal stress will result. In such cases, use an SSR relay at no more than 75% of the rating.

Recommended Loads

SSR Rating	at 120V AC	at 240V AC
10A	1KW	2KW
25A	2KW	4KW
50A	3KW	6KW

Solenoid Valves and Contactors

RSS relays use high-noise immunity circuitry with a built-in snubber to handle the electrical noise generated by inductive loads.

Recommended Loads

SSR Rating	at 120V AC	at 240V AC
10A	900W	1,800W
25A	2,100W	4,200W
50A	3,800W	7,500W

RSS series relays provide a highly reliable means of switching AC loads when applied properly. Read the technical notes on the following page prior to installing solid state relays.

UL Motor Load Ratings (HP Ratings)

Part Number	120V	240V	480V
10A	1/2	3/4	3/4
25A	1/2	3/4	3/4
50A	3/4	1 1/2	1 1/2
75A	3/4	5	5
90A	3/4	5	5

Lamp Loads

Zero voltage switching is ideal for driving incandescent lamps, since the cold filament will not be subjected to a large inrush current. Using a zero-switched SSR will reduce inrush current and prolong lamp life.

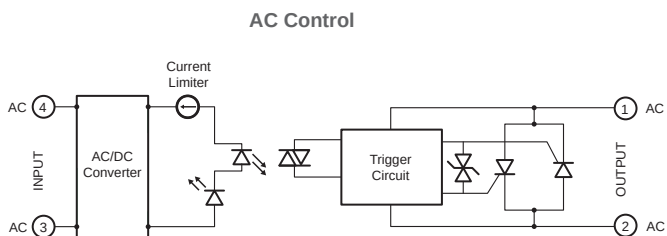
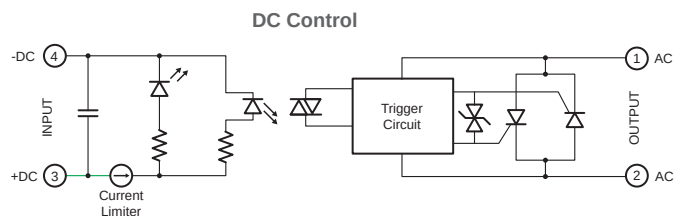
Recommended Loads

SSR Rating	at 120V AC	at 240V AC
10A	1KW	2KW
25A	2KW	4KW
50A	3KW	6KW

Recommended Wire Sizes

Terminals	Wire Size (Solid/ Stranded)	Wire Pull-Out Strength (lbs) (N)
Input	24 AWG (0.2 mm ²) / 0.2 (min)	10 (44.5)
	2 x 12 AWG (3.3 mm ²) / 3.3 (max)	90 (400)
Output	20 AWG (0.5 mm ²) / 0.518 (min)	3 (133)
	2 x 10 AWG (5.4 mm ²) / 5.4	110 (490)
	2 x 8 AWG (8.4 mm ²) / 8.4 (max)	90 (400)

Internal Circuit Block Diagram



Technical Notes

Environment

Do not install SSRs near sources of excessive heat. Make sure applications are dry and well ventilated.

If SSRs must be installed in an environment subject to high temperatures or poor ventilation, or if SSRs are mounted collectively, reduce the load current so that it does **not** approach the ambient temperature-load current recommendation. (See the Temperature Derating Curves on the following page.)

When SSRs are used with inductive loads, suppress the inrush current to half of the peak surge current.

Heat Sinks

Heat sinks are recommended for all solid state relays depending on ambient temperature and mounting position. The recommended heat sink dimensions and material are shown in the table:

Output Rating	Dimensions	Material
10A	12" x 12" x 1/8"	Aluminum (black anodized)
25A	12" x 12" x 1/8" (DC/AC)	Aluminum (black anodized)
25A	15" x 15" x 1/8" (AC/AC)	Aluminum (black anodized)
50A	15" x 15" x 1/8"	Aluminum (black anodized)
75A	17" x 17" x 1/8"	Aluminum (black anodized)
90A	17" x 17" x 1/8"	Aluminum (black anodized)

Using a thermal compound between the base of the SSR and the heat sink for heat dissipation is recommended.

Wiring

Locate SSRs as far from motor leads as possible to prevent malfunction from induced current.

Use shielded wires for input leads when they are exposed to a source of induced current.

Mounting

Provide sufficient ventilation.

Use #6 – 32 screws, flat washers, and lock washers to secure mounting on heat sinks.

Vertical mounting is recommended to allow air to flow unimpeded. Horizontal or inverted mounting is possible, but the SSR must be derated according to the derating curves on the following page.

Additional Information

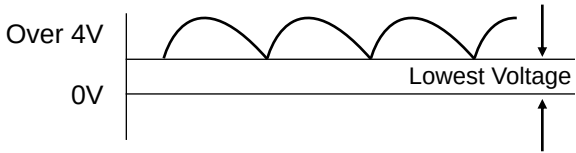
Do not exceed the load voltage and current specifications.

A small-capacity load may not turn off due to the leakage current present after the SSR has turned off. If this is the case, use a resistor in parallel with the load to shunt the leakage current.

Observe the polarity of input terminals. Failure to do so may cause damage to the SSR.

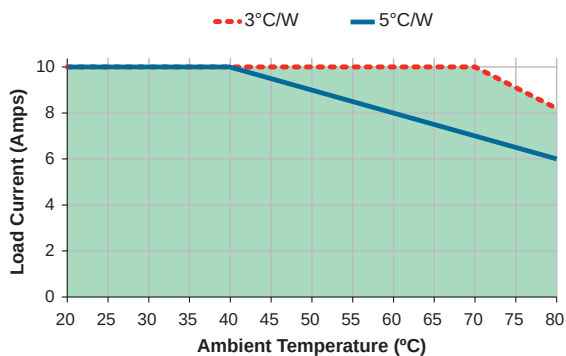
When the SSR output is subjected to a higher than rated voltage, a varistor or other element should be connected to the output terminals to absorb the over-voltage.

When the input signal contains a ripple voltage, the lowest ripple amplitude should exceed the minimum pick-up voltage of 4V.

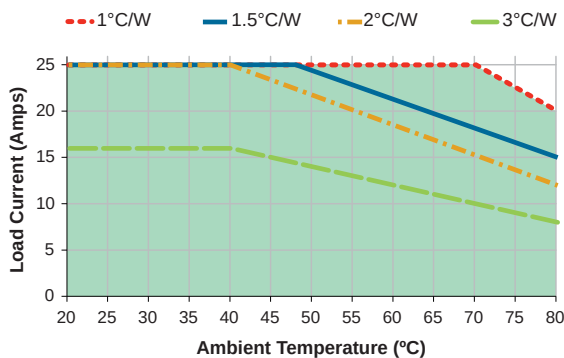


Temperature Derating Curves: RSS Series - Dependent upon heat-sink heat dissipation

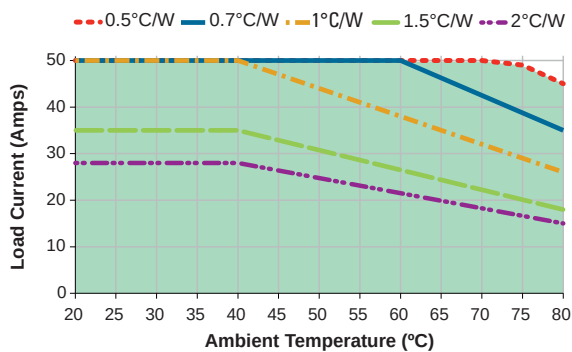
10 AMP SCR OUTPUT



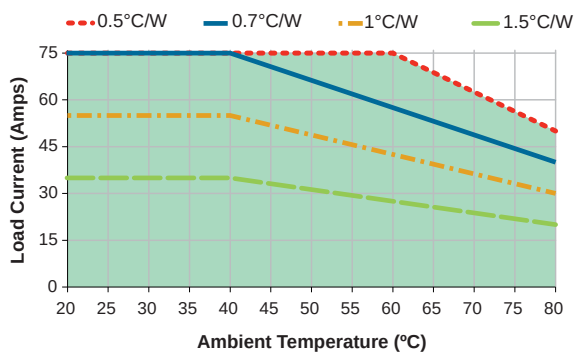
25 AMP SCR OUTPUT



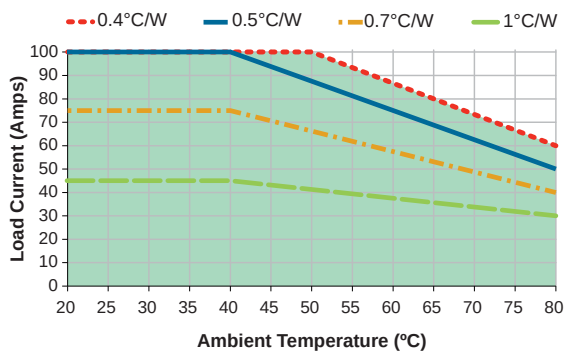
50 AMP SCR OUTPUT



75 AMP SCR OUTPUT



90 AMP SCR OUTPUT



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

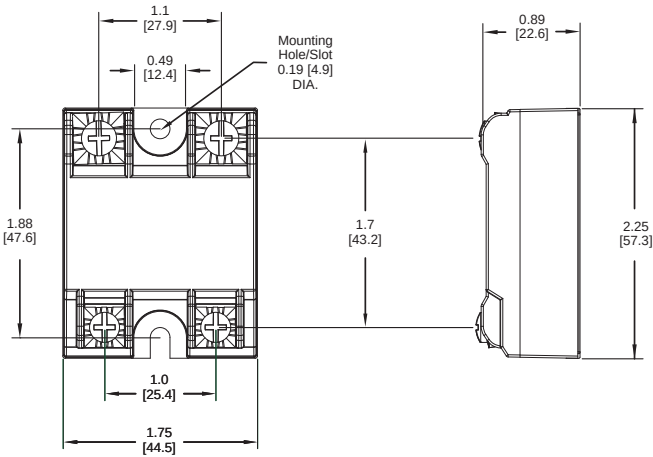
Contactors

Terminal Blocks

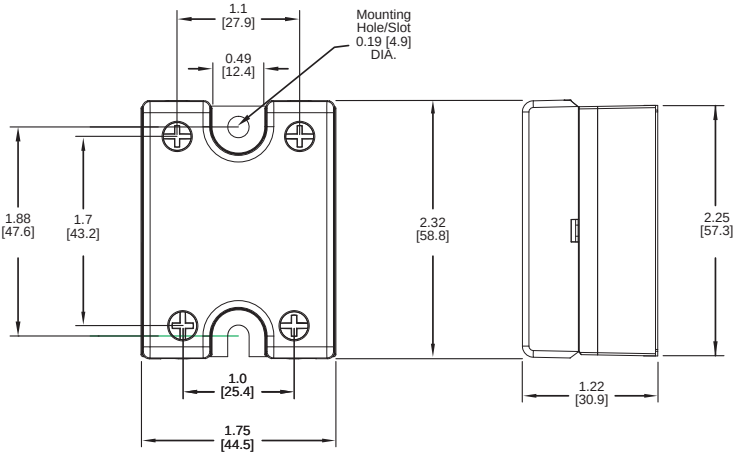
Circuit Breakers

Dimensions (mm)

Relay Dimensions



Finger-safe Cover Dimensions



Tolerances: ±0.02 in / 0.5 mm
All dimensions are in: inches [millimeters]

Selection Guide.....	992
RTE Series - Analog Timers	998
Accessories	1003
Dimensions	1004
GT3A Series - Analog Timers.....	1005
GT3F Series - True Power OFF Delay Timers.....	1013
GT3W Series - Dual Time Range Timers	1017
GT3 Series.....	1021
Accessories	1021
Dimensions	1025
GE1A Series - ON Delay Timers.....	1027
Accessories	1029
Dimensions	1030
GT5P Series - ON Delay Timers	1031
Accessories	1034
Dimensions	1035
GT5Y Series - ON Delay Timers	1036
Accessories	1039
Dimensions	1040
General Instructions for All Timer Series	1040

Timers



www.IDEC.com/timers



Selection Guide

Series	RTE	GT3A	GT3F
Page	998	1005	1013
Appearance			
Modes of Operation	ON-delay Interval OFF-delay One-shot Cycle (ON first) Cycle (OFF first) Signal OFF delay Signal ON/OFF delay	ON-delay Interval OFF-delay One-shot Cycle (off first) Cycle (on first) Signal OFF delay Signal ON/OFF delay	True Power OFF-delay
Time Range	0.1 second to 600 hrs	0.1 second to 180 hrs	0.1 to 600 seconds
Contact Configuration	DPDT	SPDT, DPDT	SPDT, DPDT
Repeat Accuracy	±0.25% maximum	±0.2% maximum	±0.4% maximum
Contact Load Rating (resistive)	10A, 240V AC	SPDT: 3A, 250V AC DPDT: 5A, 240V AC	5A, 250V AC
Available Operating Voltage	100-240V AC 12V DC 24V AC/DC	100 to 240V AC 12V DC 24V AC/DC	100 to 240V AC 24V AC/DC
Approvals	UL Listed c-uL Listed TUV CE	UL Listed c-uL Listed CE	UL Listed c-uL Listed CE

 1. For Timing Diagrams Overview, see page 994.
2. For all series specific instructions, accessories, and dimensions, see the individual series section.

Selection Guide

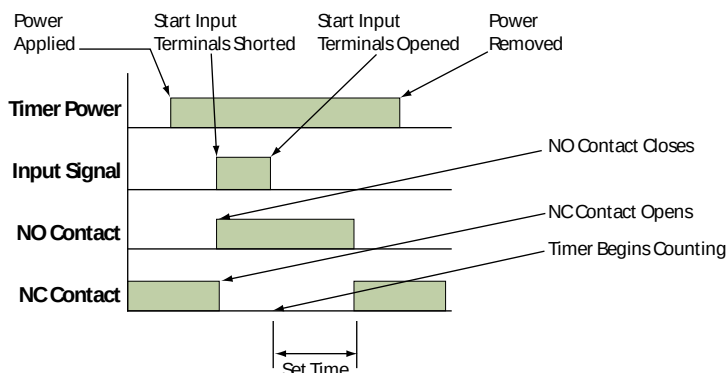
Series	GT3W	GE1A	GT5P	GT5Y
Page	1017	1027	1031	1036
Appearance				
Modes of Operation	Sequential start ON-delay Recycler and instantaneous Recycler OFF start Recycler ON start Interval Interval ON delay Sequential interval	ON-delay	ON-delay	ON-delay
Time Range	0.1s to 300 hrs	0.1s to 10 hrs	0.1s to 10 minutes	0.1s to 1 hour
Contact Configuration	DPDT	SPDT, DPDT	SPDT	DPDT, 4PDT
Repeat Accuracy	±0.2% maximum	±0.2% maximum	±0.2% maximum	±0.2% maximum
Contact Load Rating (resistive)	3A, 250V AC 5A, 120V AC/30V DC	5A, 240V AC	5A, 250V AC	5A, DPDT: 250V AC 3A, 4PDT: 250V AC
Available Operating Voltage	100 to 240V AC 12V DC 24V AC/DC	24V AC/DC 110 to 120V AC 220 to 240V AC	100 to 120V AC 200 to 240V AC 12V DC 24V DC	100 to 120V AC 200 to 240V AC 12V DC 24V DC 24V AC
Approvals	UL Listed c-uL Listed CE	UL Listed c-uL Listed TUV CE	UL recognized TUV CSA CE	UL Listed c-uL Listed CE



1. For Timing Diagrams Overview, see page 994.
2. For all series specific instructions, accessories, and dimensions, see the individual series section.

Timing Diagrams Overview

Guide to Reading Timing Function Diagrams

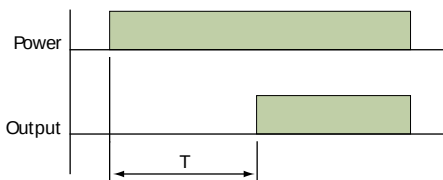


1. If power is disconnected during actual timing, most electronic timers reset to the preset time, ready for the re-application of supply voltage (except for GT3F "true power OFF Delay").
2. NO = Normally open.
3. NC = Normally closed.

Timing Function Diagrams Overview

ON-Delay 1 (power start)

When voltage is applied to the coil, the relay contacts remain in the **off state** and the set time begins. When the set time has elapsed, the relay contacts transfer to the **on state**. The contacts remain in the on state until the timer is reset. The timer is reset by removing the coil voltage. Applicable models: RTE-P(B)1, GT3A-1, -2, -3, GE1A, GT5Y and GT5P.

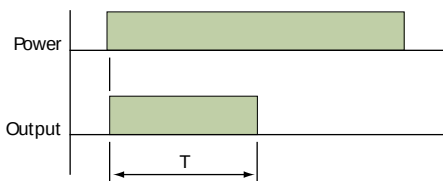


Type No.	GT3A-1, -2, -3	RTE-*1
Mode	A	A
See Page	1005	998

Type No.	GE1A	GT5Y/GT5P
See Page	1027	1036/1031

Interval 1 (power start)

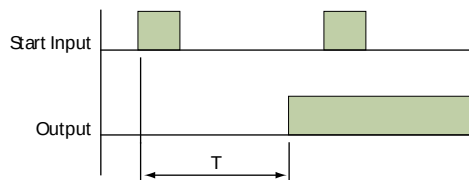
When voltage is applied to the coil, the relay contacts transfer immediately to the **on state** and the set time begins. When the set time has elapsed, the relay contacts transfer to the **off state**. The contacts remain in the **off state** until the timer is reset. The timer is reset by removing the coil voltage. Applicable models: RTE-P(B)1, GT3A-1, -2, -3.



Type No.	GT3A-1, -2, -3	RTE-*1
Mode	B	B
See Page	1005	998

ON-Delay 2 (signal start)

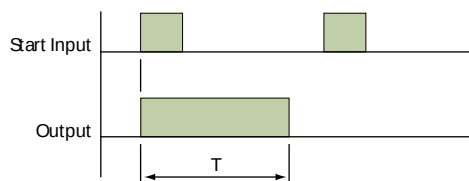
Voltage is applied to the coil at all times. When a start input is supplied, the relay contacts remain in the **off state** and the set time begins. When the set time has elapsed, the relay contacts transfer to the **on state**. The contacts remain in the **on state** until the timer is reset. The timer is reset by applying a reset input or by removing the coil voltage. Applicable models: GT3A-4 and RTE-P(B) 2.



Type No.	GT3A-4	RTE-*2
Mode	A	A
See Page	1005	998

Interval 2 (signal start)

Voltage is applied to the coil at all times. When a start signal is supplied, the relay contacts transfer immediately to the **on state** and the set time begins. When the set time has elapsed, the relay contacts transfer to the **off state**. The contacts remain in the **off state** until the timer is reset. The timer is reset by applying a reset input or by removing the coil voltage. Applicable model: GT3A-5.



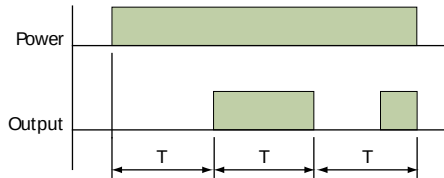
Type No.	GT3A-5
Mode	A
See Page	1005



1. T = set time, T' = shorter than set time, Ts = one shot output time
2. For more detailed timing diagrams, see specifications for individual timer models.

Cycle 1 (power start, OFF first)

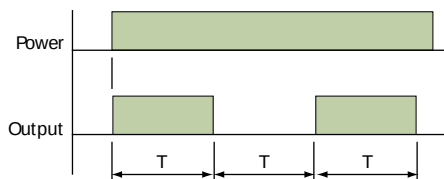
When voltage is applied to the coil, the contacts remain in the **off state** and the set time begins. At the end of the set time, the contacts transfer to the **on state** and remain in the **on state** until the set time elapses. The timer cycles between the two states until power is removed from the coil. Removing the coil voltage resets the timer. The set time for both the **on state** and the **off state** is the same. Applicable models: GT3A-1, -2, -3 and RTE-P(B)1.



Type No.	GT3A-1, -2, -3	RTE-*1
Mode	C	C
See Page	1005	998

Cycle 3 (power start, ON first)

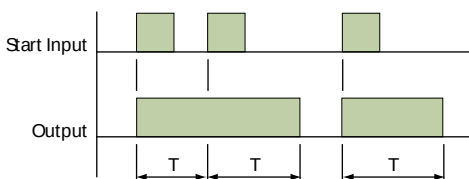
When voltage is applied to the coil, the contacts immediately transfer to the **on state** and the set time begins. At the end of the set time, the contacts transfer to the **off state** and remain in the **off state** until the set time elapses. The timer cycles between the two states until power is removed from the coil. Removing the coil voltage resets the timer. The set time for both the **off state** and the **on state** is the same. Applicable models: GT3A-1, -2, -3 and RTE-P(B)1.



Type No.	GT3A-1, -2, -3	RTE-*1
Mode	D	D
See Page	1005	998

One Shot 1 (signal start, retriggerable)

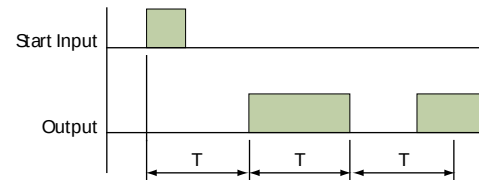
Voltage is applied to the coil at all times. When a start signal is supplied, the contacts immediately transfer to the **on state** and the set time begins. If another start signal is supplied (**before set time has elapsed**) the set time restarts, as the contacts remain in the **on state**. Successive pulses at a frequency greater than the set time will cause the contacts to remain in the "On state" indefinitely. When the set time has elapsed the contacts transfer back to the **off state**. The contacts remain in the **off state** until the next start signal is supplied (no reset is necessary). The timer can be reset by application of a reset input or by removing coil voltage. Applicable model: GT3A-6.



Type No.	GT3A-6
Mode	A
See Page	1005

Cycle 2 (signal start, OFF first)

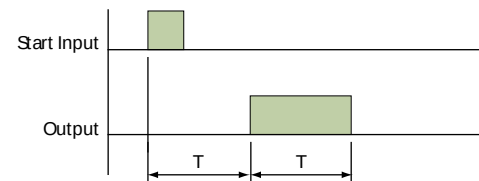
Voltage is applied to the coil at all times. When a start signal is supplied, the relay contacts remain in the **off state** and the set time begins. At the end of the set time, the contacts transfer to the **on state** and remain in the **on state** until the set time elapses. The timer cycles between the two states until the timer is reset. The set time for both the **on state** and the **off state** are the same. The timer is reset by application of a reset input or by removing coil voltage. Applicable models: GT3A-4 and RTE-P(B) 2.



Type No.	GT3A-4	RTE-*2
Mode	B	B
See Page	1005	998

One Shot Cycle (signal start)

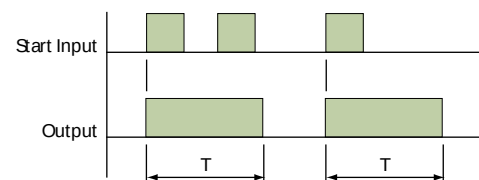
Voltage is applied to the coil at all times. When a start signal is supplied, the contacts remain in the **off state** and the set time begins. At the end of the set time, the contacts transfer to the **on state** and remain in the **on state** for the set time. After the set time has elapsed, the contacts return to the **off state**. The contacts remain in the **off state** until the timer is reset. The timer is reset by application of a reset input or by removing coil voltage. Applicable model: GT3A-5.



Type No.	GT3A-5
Mode	B
See Page	1005

One Shot 2 (signal start)

Voltage is applied to the coil at all times. When a start signal is supplied, the contacts immediately transfer to the **on state** and the set time begins. If another start signal is supplied (**before set time has elapsed**), the set time will not be affected. When the set time has elapsed, the contacts transfer back to the **off state**. The contacts remain in the **off state** until the next start signal is supplied (no reset is necessary). The timer can be reset by application of a reset input or by removing coil voltage. Applicable models: GT3A-6 and RTE-P(B)2.



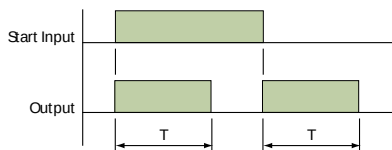
Type No.	GT3A-6	RTE-*2
Mode	C	F
See Page	1005	998



1. T = set time, T' = shorter than set time, Ts = one shot output time
2. For more detailed timing diagrams, see specifications for individual timer models.

Signal ON/OFF-Delay 1

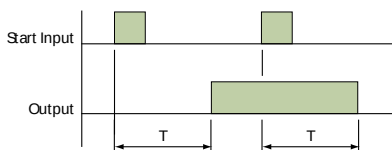
Voltage is supplied to the coil at all times. When a maintained start signal is supplied, the contacts immediately transfer to the **on state** and the set time begins. When the set time has elapsed, the contacts transfer to the **off state**. The contacts remain in the **off state** until the start signal is removed. The contacts transfer back to the **on state** and remain in the **on state** for the set time. When the set time has elapsed, the contacts transfer to the **off state** and remain in the **off state** until the start signal is supplied again (no reset is necessary). The timer is reset by application of a reset input or by removing coil voltage. Applicable models: GT3A-4 and RTE-R(B)2.



Type No.	GT3A-4	RTE-*2
Mode	C	D
See Page	1005	998

Signal ON/OFF-Delay 2

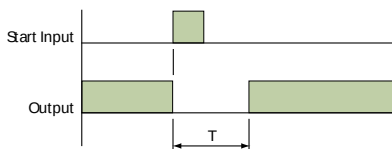
Voltage is supplied to the coil at all times. When a momentary start signal is supplied, the contacts remain in the **off state** and the set time begins. When the set time has elapsed, the contacts transfer to the **on state**. The contacts remain in the **on state** until another momentary input is supplied. The contacts then remain in the **on state** for the set time. When the set time has elapsed, the contacts transfer to the **off state** and remain in the **off state** until the start signal is supplied again (no reset is necessary). The timer is reset by application of a reset input or by removing coil voltage. Applicable model: GT3A-6.



Type No.	GT3A-6
Mode	D
See Page	1005

One Shot ON-Delay (signal start)

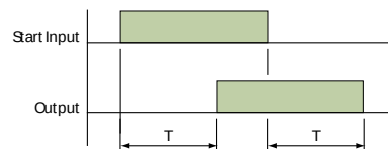
When voltage is applied to the coil, the preset time is initiated and the contacts remain in the **off state** for the preset time. Following the preset time, the contacts transfer to the **on state**, and remain in the **on state** until the start input is supplied. Following the start input, the contacts transfer to the **off state** for the preset time. After the preset time has elapsed, the contacts transfer back to the **on state** and remain there until either the next start input is supplied or the timer is reset. The timer can be reset by either a reset input or removal of the coil voltage. Applicable model: GT3A-6.



Type No.	GT3A-6
Mode	B
See Page	1005

Signal ON/OFF-Delay 2

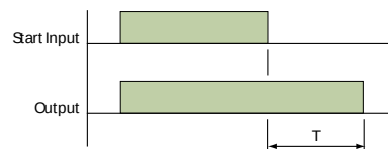
Voltage is supplied to the coil at all times. When a maintained start signal is supplied, the contacts remain in the **off state** and the set time begins. When the set time has elapsed, the contacts transfer to the **on state**. The contacts remain in the **on state** until the start signal is removed. Once the start signal is removed, the contacts remain in the **on state** and the set time begins again. Once the set time has elapsed, the contacts transfer back to the **off state**. The timer is ready for the next start signal. The timer is reset by the application of a reset signal or removal of power. Applicable model: GT3A-5.



Type No.	GT3A-5
Mode	C
See Page	1005

Signal OFF-Delay 1

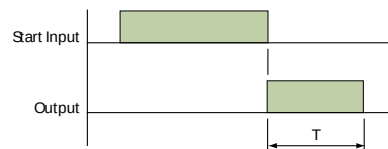
Voltage is applied to the coil at all times. When a start signal is supplied, the contacts immediately transfer to the **on state**. The set time begins **when the start signal is removed**. When the set time has elapsed, the contacts transfer to the **off state**. The contacts remain in the **off state** until the next start signal is supplied (no reset is necessary). The timer can be reset by application of a reset input or by removing coil voltage. Applicable models: RTE-P(B)2 and GT3A-4.



Type No.	GT3A-4	RTE-*2
Mode	D	E
See Page	1005	998

Signal OFF-Delay 2

Voltage is applied to the coil at all times. When a maintained start signal is supplied, the contacts remain in the **off state**. When the "start signal is removed", the contacts transfer to the **"On state"** and the set time begins. When the set time has elapsed, the contacts transfer back to the **off state**. They remain in the **off state** until the next start signal is supplied (no reset is necessary). The timer can be reset by application of a reset input or by removing coil voltage. Applicable model: GT3A-5.



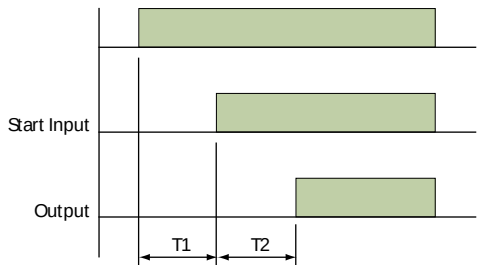
Type No.	GT3A-5
Mode	D
See Page	1005



1. T = set time, T' = shorter than set time, Ts = one shot output time
2. For more detailed timing diagrams, see specifications for individual timer models.

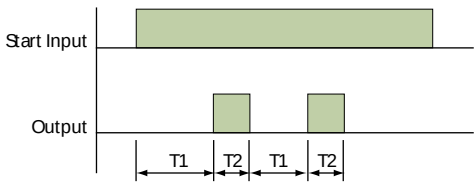
Sequential Start (power start)

When voltage is applied to the coil, both contacts remain in the OFF state and the set time, T1, begins. When T1 has elapsed, output 1 comes on and T2 begins. When T2 has elapsed, output 2 comes on. Both outputs remain on until power is removed from the coil. Applicable model: GT3W-A.



Type No.	GT3W-A
Mode	A
See Page	1017

When voltage is applied to the coil, both contacts remain in the off state and time T1 begins. When T1 has elapsed, both contacts transfer to the ON state and T2 begins. When T2 has elapsed, both contacts transfer back to the OFF state and T1 begins again. The cycle continues until power is removed, at which time both contacts transfer back to the OFF state. Applicable model: GT3W-A.



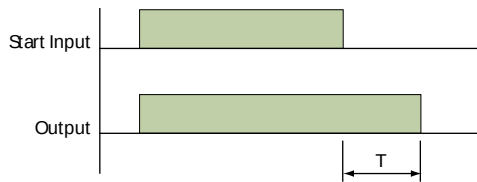
Type No.	GT3W-A
Mode	D
See Page	1017



- 1. T = set time, T' = shorter than set time, Ts = one shot output time
- 2. For more detailed timing diagrams, see specifications for individual timer models.

True Power-OFF Delay

When voltage is applied, output comes on immediately; when voltage is removed from the coil, the timer begins timing (internal capacitors power the timing circuit). When time has expired, contacts transfer back to the OFF state. If power is reapplied before the elapsed time has expired, the timing function will reset back to the starting point. Applicable models: GT3F-1, 2.



Type No.	GT3F-1, 2
Mode	Power OFF-Delay
See Page	1013

Recycler Outputs (power start)

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

RTE Series — Analog Timers

Key features:

- 20 time ranges and 10 timing functions
- Time delays up to 600 hours
- Space-saving package
- High repeat accuracy of $\pm 0.2\%$
- ON and timing OUT LED indicators
- Standard 8- or 11-pin and 11-blade termination
- 2 form C delayed output contacts
- 10A Contact Rating



Cert. No. E9950913332316 (EMC, RTE)
Cert. No. BL960813332355 (LVD, RTE)



UL Listed
File No. E66043



General Specifications

Operation System		Solid state CMOS Circuit	
Operation Type		Multi-Mode	
Time Range		0.1sec to 600 hours	
Pollution Degree		2 (IE60664-1)	
Over voltage category		III (IE60664-1)	
Rated Operational Voltage	AF20	100-240V AC(50/60Hz)	
	AD24	24V AC(50/60Hz)/24V DC	
	D12	12V DC	
Voltage Tolerance	AF20	85-264V AC(50/60Hz)	
	AD24	20.4-26.4V AC(50/60Hz)/21.6-26.4V DC	
	D12	10.8-13.2V DC	
Input off Voltage		Rated Voltage x10% minimum	
Ambient Operating Temperature		-20 to +65°C (without freezing)	
Ambient Storage and Transport Temperature		-30 to +75°C (without freezing)	
Relative Humidity		35 to 85%RH (without condensation)	
Atmospheric Pressure		80kPa to 110kPa (Operating), 70kPa to 110kPa (Transport)	
Reset Time		100msec maximum	
Repeat Error		$\pm 0.2\%$, $\pm 20\text{msec}^*$	
Voltage Error		$\pm 0.2\%$, $\pm 20\text{msec}^*$	
Temperature Error		$\pm 0.5\%$, $\pm 20\text{msec}^*$	
Setting Error		$\pm 10\%$ maximum	
Insulation Resistance		100M Ω minimum (500V DC)	
Dielectric Strength		Between power and output terminals: 2000V AC, 1 minute	
		Between contacts of different poles: 2000V AC, 1 minute	
		Between contacts of the same pole: 1000V AC, 1 minute	
Vibration Resistance		10 to 55Hz amplitude 0.5mm ² hours in each of 3 axes	
Shock Resistance		Operating extremes: 98m/sec ² (10G)	
		Damage limits: 490m/sec ² (50G)	
		3 times in each of 3 axes	
Degree of Protection		IP40 (enclosure) (IEC60529)	
Power Consumption (Approx.)	TYPE	RTE-P1, -B1	RTE-P2, -B2
	AF20	120V AC/60Hz	6.5VA
		240V AC/60Hz	6.6VA
	24V AC 60Hz/DC		11.6VA
	D12		3.4VA/1.7W
Mounting Position		Free	
Dimensions	RTE-P1, P2	40Hx 36W x 77.9D mm	
	RTE-B1, B2	40Hx 36W x 74.9D mm	
Weight (Approx.)	RTE-P1	RTE-P2	RTE-B1, -B2
	87g	89g	85g

Contact Ratings

Contact Configuration		2 Form C, DPDT (Delay output)
Allowable Voltage / Allowable Current		240V AC, 30V DC / 10A
Maximum Permissible Operating Frequency		1800 cycles per hour
Rated Load	Resistive	10A 240V AC, 30V DC
	Inductive	7A 240V AC, 30V DC
	Horse Power Rating	1/6 HP 120V AC, 1/3 HP 240V AC
Life	Electrical	500,000 op. minimum (Resistive)
	Mechanical	50,000,000 op. minimum

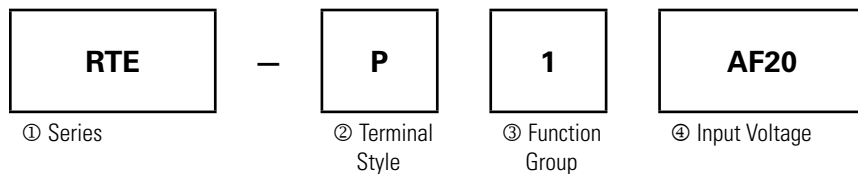


*For the value of the error against a preset time, whichever the largest, applies.

Part Numbering Guide

RTE series part numbers are composed of 4 part number codes. When ordering a RTE series part, select one code from each category.

Example: **RTE-P1AF20**



Part Numbers: RTE Series

	Description	Part Number Code	Remarks
① Series	RTE series	RTE	For internal circuits, see next page.
② Terminal Style	Pin	P	Select one only.
	Blade	B	
③ Function Group	ON-delay, interval, cycle OFF, cycle ON	1	Each function group has different timing functions.
	ON-delay, cycle OFF, cycle ON, signal ON/OFF delay, OFF-delay, one-shot	2	See page 994.
④ Input Voltage	100 to 240V AC(50/60Hz)	AF20	
	24V AC(50/60Hz)/24V DC	AD24	
	12V DC	D12	

Part Numbers

Voltage	Power Triggered		Start Input Triggered	
	8-Pin	Blade	11-Pin	Blade
12V DC	RTE-P1D12	RTE-B1D12	RTE-P2D12	RTE-B2D12
24V AC/DC	RTE-P1AD24	RTE-B1AD24	RTE-P2AD24	RTE-B2AD24
100-240V AC	RTE-P1AF20	RTE-B1AF20	RTE-P2AF20	RTE-B2AF20

Time Range Determined by Time Range Selector and Dial Selector

	Dial	0 - 1	0 - 3	0 - 10	0 - 30	0 - 60
Range	Second	0.1 sec - 1 sec	0.1 sec - 3 sec	0.2 sec - 10 sec	0.6 sec - 30 sec	1.2 sec - 60 sec
	Minute	1.2 sec - 1 min	3.6 sec - 3 min	12 sec - 10 min	36 sec - 30 min	1.2 min - 60 min
	Hour	1.2 min - 1 hr	3.6 min - 3 hr	12 min - 10 hr	36 min - 30 hr	1.2 hr - 60 hr
	10 Hours	12 min - 10 hr	36 min - 30 hr	2 hr - 100 hr	6 hr - 300 hr	12 hr - 600 hr

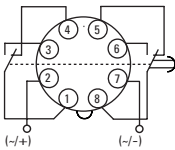
Timing Diagrams

RTE-P1, -B1

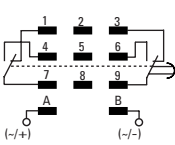


- 1. RTE-B1: Do not apply voltage to terminals #2, #5 & #8.
- 2. IDEC sockets are as follows: RTE-P1: SR2P-06* pin type socket, RTE-B1: SR3B-05* blade type socket, (*-may be followed by suffix letter A,B,C or U).

RTE-P1

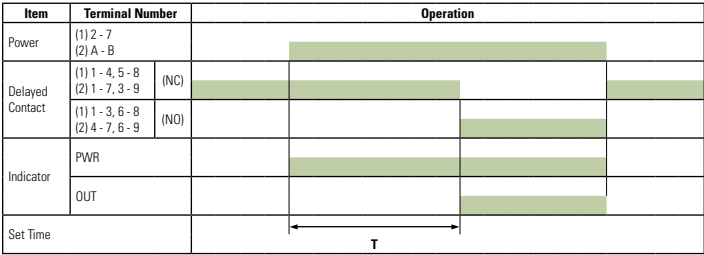


RTE-B1



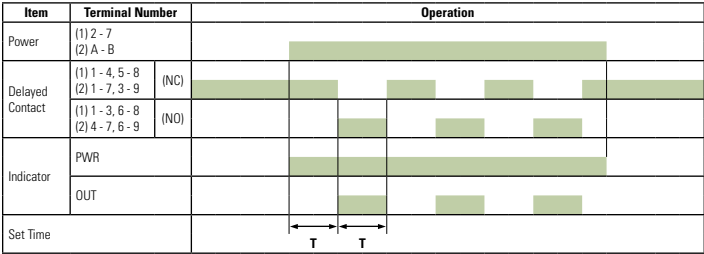
A: ON-Delay 1 (power start)

Set timer for desired delay, apply power to coil. Contacts transfer after preset time has elapsed, and remain in transferred position until timer is reset. Reset occurs with removal of power.



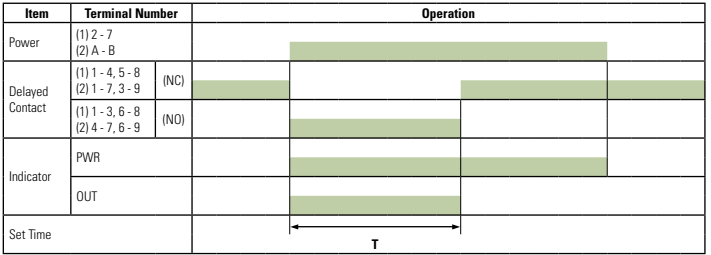
C: Cycle 1 (power start, OFF first)

Set timer for desired delay, apply power to coil. First transfer of contacts occurs after preset delay has elapsed, after the next elapse of preset delay contacts return to original position. The timer now cycles between on and off as long as power is applied (duty ratio 1:1).



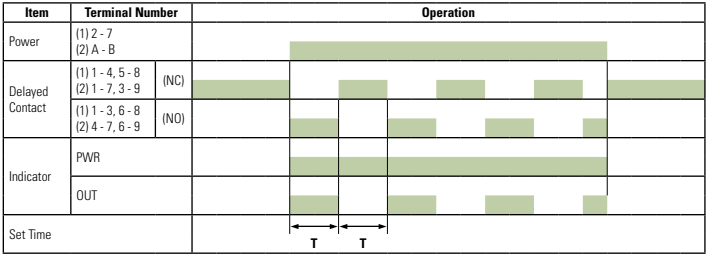
B: Interval (power start)

Set timer for desired delay, apply power to coil. Contacts transfer immediately, and return to original position after preset time has elapsed. Reset occurs with removal of power.



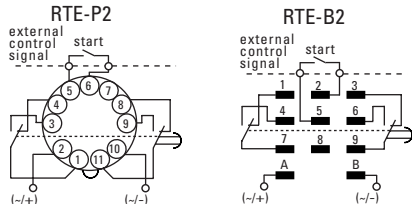
D: Cycle 3 (power start, ON first)

Functions in same manner as Mode C, with the exception that first transfer of contacts occurs as soon as power is applies. The ratio is 1:1. Time On = Time Off



Timing Diagrams con't

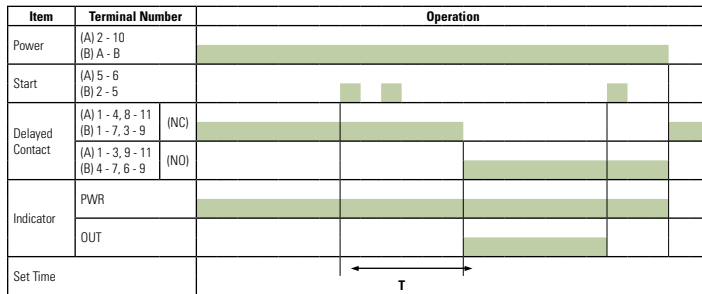
RTE-P2, -B2



1. RTE-P2: Do not apply voltage to terminals #5, #6 & #7.
2. RTE-B2: Do not apply voltage to terminals #2, #5 & #8.
3. IDEC sockets are as follows: RTE-P2: SR3P-05* pin type socket, RTE-B2: SR3B-05* blade type socket, (*-may be followed by suffix letter A,B,C or U).

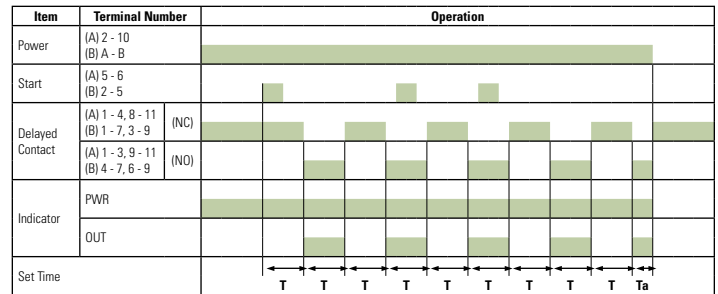
A: ON-Delay 2 (signal start)

When a preset time has elapsed after the start input turned on while power is on, the NO output contact goes on.



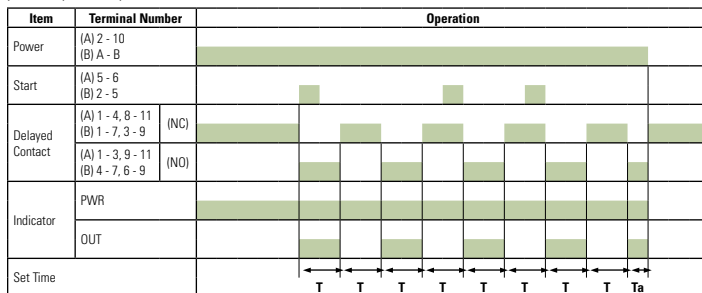
B: Cycle 2 (signal start, OFF first)

When the start input turns on while power is on, the output oscillates at a preset cycle (duty ratio 1:1), starting while the NO contact off.



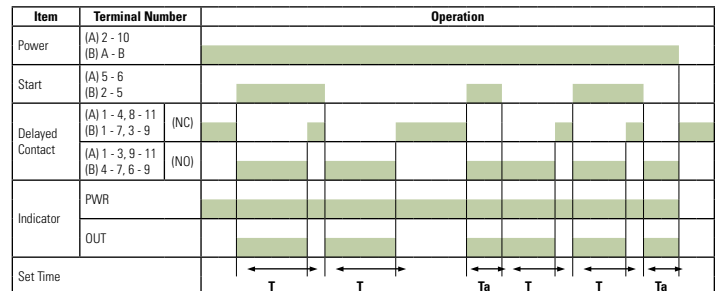
C: Cycle 4 (signal start, ON first)

When the start input turns on while power is on, the NO contact goes on. The output oscillates at a preset cycle (duty ratio 1:1).



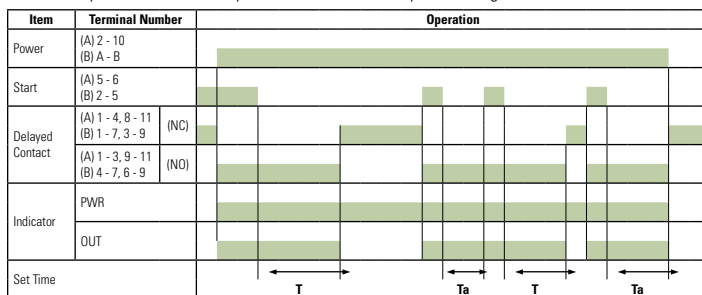
D: Signal ON/OFF-Delay

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed while the start input remains on, the output contact goes off. When the start input turns off, the NO contact goes on again. When a preset time has elapsed after the start input turned off, the NO contact goes off.



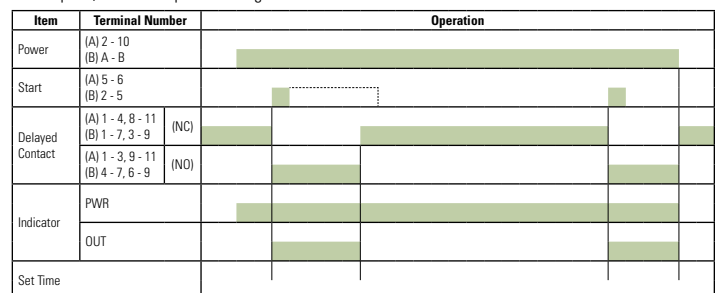
E: Signal OFF-Delay

When power is turned on while the start input is on, the NO output contact goes on. When a preset time has elapsed after the start input turned off, the NO output contact goes off.

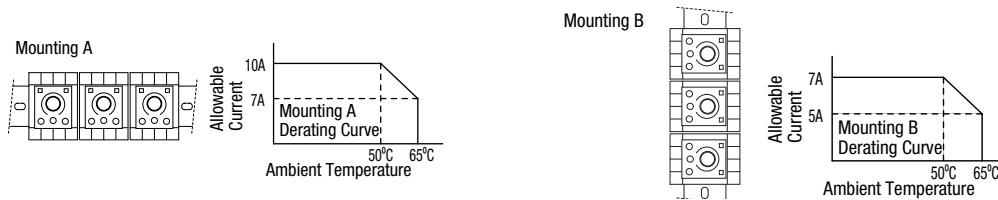


F: One-Shot (signal start)

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed, the NO output contact goes off.

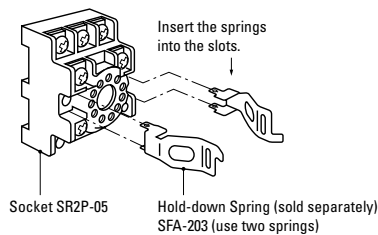
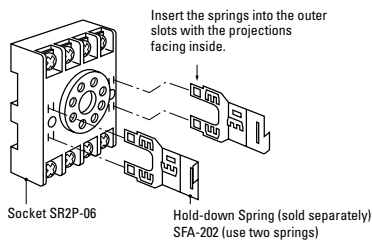


Temperature Derating Curves



Instructions

Installation of Hold-Down Springs DIN Rail Mount Socket



Switch Settings



1. Turn the selectors securely using a flat screwdriver 4mm wide (maximum). Note that incorrect setting may cause malfunction. Do not turn the selectors beyond their limits.
2. Since changing the setting during timer operation may cause malfunction, turn power off before changing.

Safety Precautions

Special expertise is required to use Electronic Timers.

- All Electronic Timers are manufactured under IDEC's rigorous quality control system, but users must add a backup or fail safe provision to the control system when using the Electronic Timer in applications where heavy damage or personal injury may occur should the Electronic Timer fail.
- Install the Electronic Timer according to instructions described in this catalog.
- Make sure that the operating conditions are as described in the specifications. If you are uncertain about the specifications, contact IDEC in advance.
- In these directions, safety precautions are categorized in order of importance under Warning and Caution.

Warnings

Warning notices are used to emphasize that improper operation may cause severe personal injury or death.

- Turn power off to the Electronic timer before starting installation, removal, wiring, maintenance, and inspection on the Electronic Timer.
- Failure to turn power off may cause electrical shocks or fire hazard.

- Do not use the Electronic Timer for an **emergency stop circuit** or **interlocking circuit**. If the Electronic Timer should fail, a machine malfunction, breakdown, or accident may occur.

Caution

Caution notices are used where inattention might cause personal injury or damage to equipment.

- The Electronic Timer is designed for installation in equipment. Do not install the Electronic Timer outside equipment.
- Install the Electronic Timer in environments described in the specifications. If the Electronic Timer is used in places where it will be subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, or excessive shocks, then electrical shocks, fire hazard, or malfunction could result.
- Use an IEC60127-approved fuse and circuit breaker on the power and output line outside the Electronic Timer.
- Do not disassemble, repair, or modify the Electronic Timer.
- When disposing of the Electronic Timer, do so as industrial waste.

Accessories

DIN Rail Mounting Accessories

DIN Rail/Surface Mount Sockets and Hold-Down Springs

DIN Rail Mount Socket				Applicable Hold-Down Springs	
Style	Appearance	Use with Timers	Part Number	Appearance	Part Number
11-Pin Screw Terminal (dual tier)		RTE-P2	SR3P-05		SFA-203
11-Pin FingerSafe Socket			SR3P-05C		
8-Pin Screw Terminal		RTE-P1	SR2P-06		SFA-202
8-Pin Fingersafe Socket			SR2P-05C		
11-Blade Screw Terminal		RTE-B1 RTE-B2	SR3B-05		
DIN Mounting Rail Length 1000mm		—	BNDN1000		

Panel Mounting Accessories

Flush Panel Mount Adapter and Sockets that use an Adapter

Accessory	Description	Appearance	Use with	Part No.
Panel Mount Adapter	Adaptor for flush panel mounting RTE timers		All RTE timers	RTB-G01
Sockets for use with Panel Mount Adapter	8-pin screw terminal	 (Shown: SR6P-M08G Wiring Socket Adapter)	RTE-P1	SR6P-M08G
	11-pin screw terminal		RTE-P2	SR6P-M11G
	8-pin solder terminal		RTE-P1	SR6P-S08
	11-pin solder terminal		RTE-P2	SR6P-S11

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

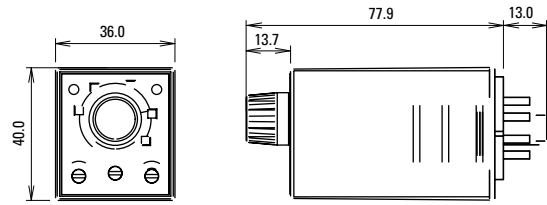
Timers

Contactors

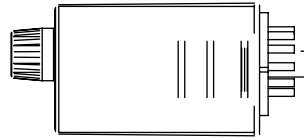
Terminal Blocks

Circuit Breakers

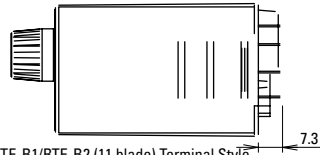
Dimensions



RTE-P1 (8 pin) Terminal Style



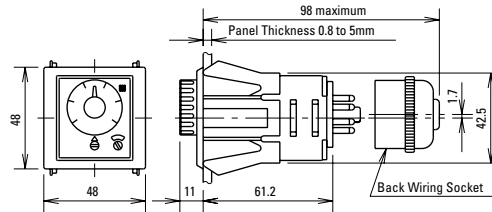
RTE-P2 (11 pin) Terminal Style



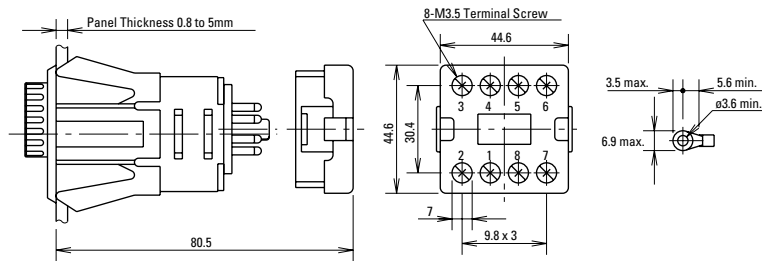
RTE-B1/RTE-B2 (11 blade) Terminal Style

Panel Mount Adapter

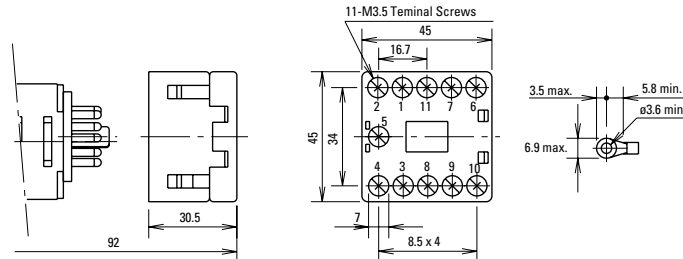
RTE Timer, 8-Pin and 11-Pin with SR6P-S08 or SR6P-S11



RTE Timer, 8-Pin with SR6P-M08G



RTE Timer, 11-Pin with SR6P-M11G



GT3A Series — Analog Timers

Key features:

- 4 selectable operation modes on each model
- External start, reset, and gate inputs
- Panel mount or socket mount
- Large variety of timing functions
- Power and output status indicating LEDs



UL, c-UL Listed
File No. E55996



Specifications

	GT3A-1	GT3A-2	GT3A-3	GT3A-4,-5,-6
Operation	Multi-mode			Multi-mode with inputs (11 pins)
Time Range	0.1s to 180 hours			
Rated Voltage	100 to 240V AC, 50/60Hz 12V DC 24V AC, 50/60Hz / 24V DC			
Contact Ratings	125V AC/250V AC, 3A; 30V DC, 1A (resistive load)		125V AC/250V AC, 5A; 30V DC, 5A (resistive load)	
Minimum Applicable Load	5V, 10mA (reference value)			
Voltage Tolerance	AF20 (100V AC): 85 to 264V AC AD24: 20.4 to 26.4V AC/21.6 to 26.4V DC D12: 10.8 to 13.2V DC			
Error	±0.2%, ±10 msec (repeat, voltage, temperature)			
Setting Error	±10% maximum			
Reset Time	60msec maximum			
Insulation Resistance	100MW minimum			
Dielectric Strength	Between power and output terminals: 2,000V AC, 1 minute Between contacts of different poles: 2,000V AC, 1 minute Between contacts of the same pole: 750V AC, 1 minute			
Power Consumption (approximate)	Delayed SPDT	Delayed SPDT + instantaneous SPDT	Delayed DPDT	Delayed DPDT
	10.8VA (200V AC, 60Hz)	13.5VA (200V AC, 60Hz)	14.4VA (200V AC, 60Hz)	4.7VA (100V AC, 60Hz), 14.4VA (200V AC, 60Hz)
	—	12VDC/1W 24VDC/0.7W 24VAC/1.2VA	12VDC/1.1W 24VDC/0.6W 24VAC/1.3VA	12VDC/0.8W 24VDC/0.6W 24VAC/1.3VA
Mechanical Life	10,000,000 operations minimum		5,000,000 operations minimum	
Electrical Life	50,000 operations minimum (rated load)		100,000 operations minimum (rated load)	
Weight (approximate)	63g	73g	79g	80g
Vibration Resistance	100m/sec ² (approximate 10G)			
Shock Resistance	Operating extremes: 100m/sec ² (approximate 10G) Damage limits: 500m/sec ² (approximate 50G)			
Operating Temperature	−10 to +50°C			
Operating Humidity	45 to 85% RH			
Storage Temperature	−30 to +80°C			
Housing Color	Gray			

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Part Numbers

GT3A-1, -2, -3

Mode Of Operation	Rated Voltage Code	Time Range	Output	Contact	Complete Part No.	
					8-Pin	11-Pin
A: ON-delay 1 B: Interval 1 C: Cycle 1 D: Cycle 3	AF20: 100 to 240V AC (50/60Hz)	0.1 seconds to 180 hours	250V AC, 3A, 30V DC, 1A (resistive load)	Delayed SPDT	GT3A-1AF20	GT3A-1EAF20
	AF20: 100 to 240V AC (50/60Hz) D12: 12V DC AD24: 24V AC (50/60Hz)/24V DC			Delayed SPDT + Instantaneous SPDT	GT3A-2AF20	GT3A-2EAF20
					GT3A-2D12	GT3A-2ED12
			240V AC, 5A, 24V DC, 5A (resistive load)	Delayed DPDT	GT3A-2AD24	GT3A-2EAD24
					GT3A-3AF20	GT3A-3EAF20
	GT3A-3D12				GT3A-3ED12	
						GT3A-3AD24

- 
1. For wiring schematics and timing diagrams for GT3A-1, -2, -3, see pages page 994 and page 995 respectively.

2. For more details about time ranges, see instructions on page page 994.

3. For socket and accessory part numbers, see page 1012.

GT3A-4, -5, -6

Mode of Operation	Rated Voltage Code	Time Range	Output	Contact	Input	Complete Part No.	
						A (11-pin)	B (11-pin)
A: ON-Delay 2 B: Cycle 2 C: Signal ON/OFF-Delay 1 D: Signal OFF-Delay 1	AF20: 100 to 240V AC (50/60Hz) D12: 12V DC AD24: 24V AC (50/60Hz)/24V DC	0.1 seconds to 180 hours	250V AC, 5A, 24V DC, 5A (resistive load)	Delayed DPDT	Start Reset Gate	GT3A-4AF20	GT3A-4EAF20
						GT3A-4D12	GT3A-4ED12
						GT3A-4AD24	GT3A-4EAD24
A: Interval 2 B: One-Shot Cycle C: Signal ON/OFF-Delay 2 D: Signal OFF-Delay 2	AF20: 100 to 240V AC (50/60Hz) AD24: 24V AC (50/60Hz)/24V DC					GT3A-5AF20	GT3A-5EAF20
						GT3A-5AD24	GT3A-5EAD24
A: One-Shot B: One-Shot ON-Delay C: One-Shot 2 D: Signal ON/OFF-Delay 3						GT3A-6AF20	GT3A-6EAF20
						GT3A-6AD24	GT3A-6EAD24

- 
4. For wiring schematics and timing diagrams GT3A-4,-5,-6, see pages 994, 995, and 995 respectively.

5. For more details about time ranges, see instructions on page 994.

6. A (11-pin) and B (11-pin) differ in the way inputs are wired.

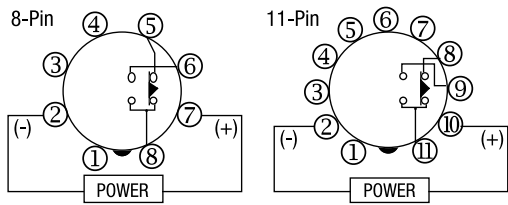
7. For socket and accessory part numbers, see page 1012.

8. For the timing diagrams overview, see page 994.

Timing Diagrams/Schematics

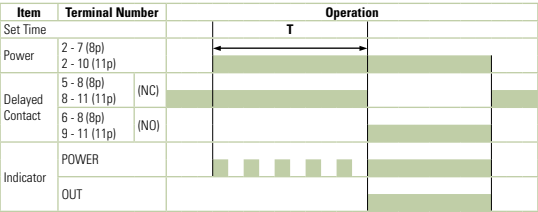
GT3A-1 Timing Diagrams
Delayed SPDT

Operation
Mode
Selection



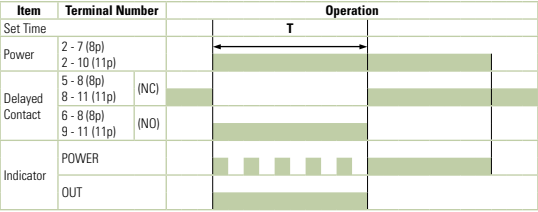
ON-Delay 1

MODE



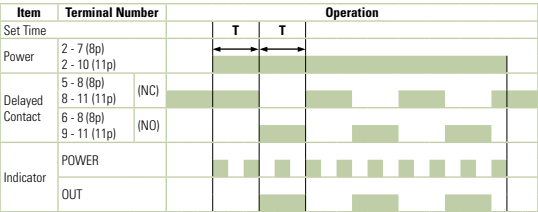
Interval 1

MODE



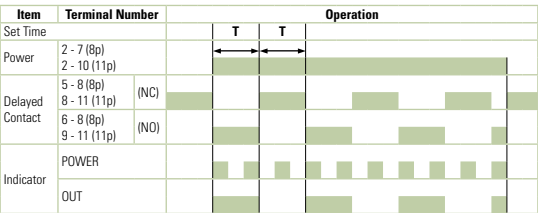
Cycle 1
(OFF first)

MODE



Cycle 3
(ON first)

MODE



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

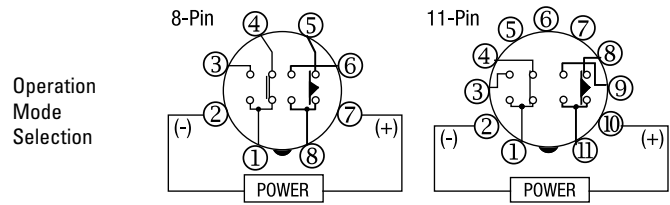
Timers

Contactors

Terminal Blocks

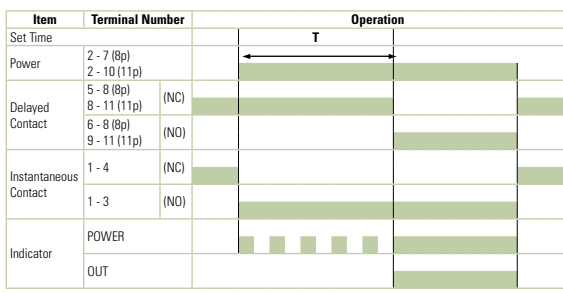
Circuit Breakers

GT3A-2 Timing Diagrams
Delayed SPDT + Instantaneous SPDT



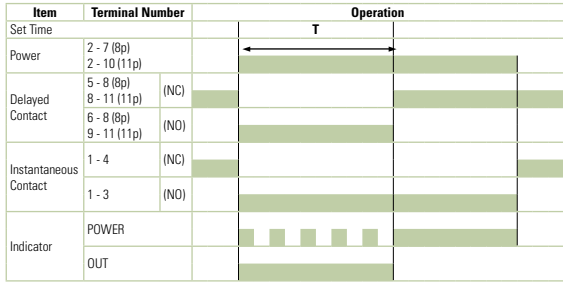
ON-Delay 1

MODE



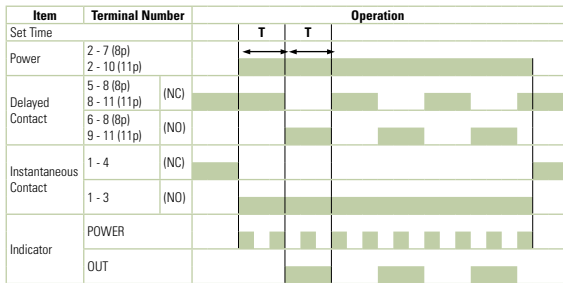
Interval 1

MODE



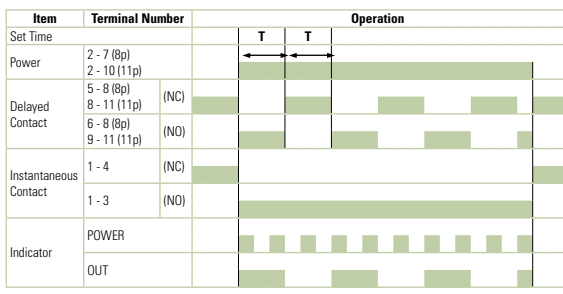
Cycle 1 (OFF first)

MODE

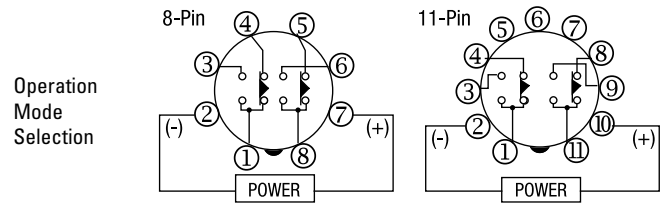


Cycle 3 (ON first)

MODE

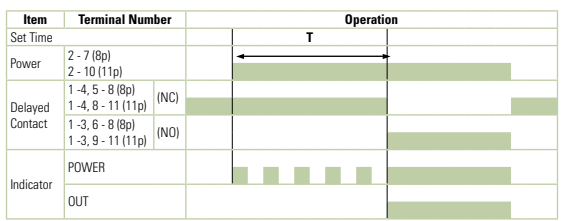


GT3A-3 Timing Diagrams
Delayed DPDT



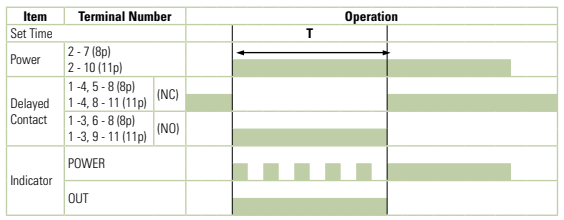
ON-Delay 1

MODE



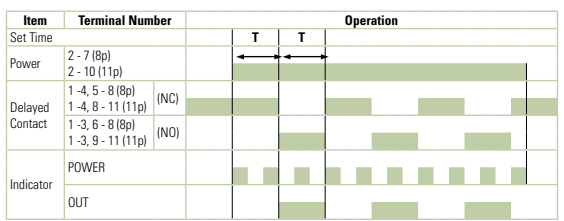
Interval 1

MODE



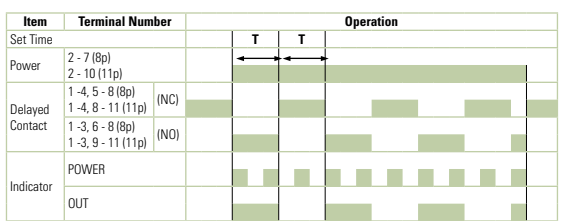
Cycle 1 (OFF first)

MODE



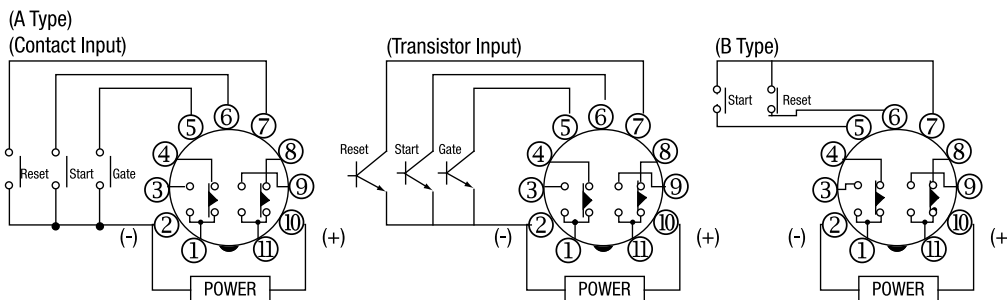
Cycle 3 (ON first)

MODE



Note: Pins 1, 3, and 4 are the instantaneous contacts.

Operation Mode Selection



MODE



Item	Terminal Number		Operation			
Power	2 - 10 POWER					
Input	Start	2 - 6 (A) 5 - 7 (B)	ON or L			
	Reset	2 - 7 (A) 6 - 7 (B)	ON or L			
	Gate	2 - 5 (A)	ON or L			
Delayed Contact	1 - 4 8 - 11	(NC)				
	1 - 3 9 - 11	(NO)				
Indicator	POWER					
	OUT					
Set Time			T	T_a	T'	T''

MODE



Item	Terminal Number			Operation											
Power	2 - 10 POWER														
Input	Start	2 - 6 (A) 5 - 7 (B)	ON or L												
	Reset	2 - 7 (A) 6 - 7 (B)	ON or L												
	Gate	2 - 5 (A)	ON or L												
Delayed Contact	1 - 4 8 - 11	(NC)													
	1 - 3 9 - 11	(NO)													
Indicator	POWER														
	OUT														
Set Time															

MODE



Item	Terminal Number			Operation											
Power	2 - 10 POWER														
Input	Start	2 - 6 (A) 5 - 7 (B)	ON or L												
	Reset	2 - 7 (A) 6 - 7 (B)	ON or L												
	Gate	2 - 5 (A)	ON or L												
Delayed Contact	1 - 4 8 - 11	(NC)													
	1 - 3 9 - 11	(NO)													
Indicator	POWER														
	OUT														
Set Time															

MODE

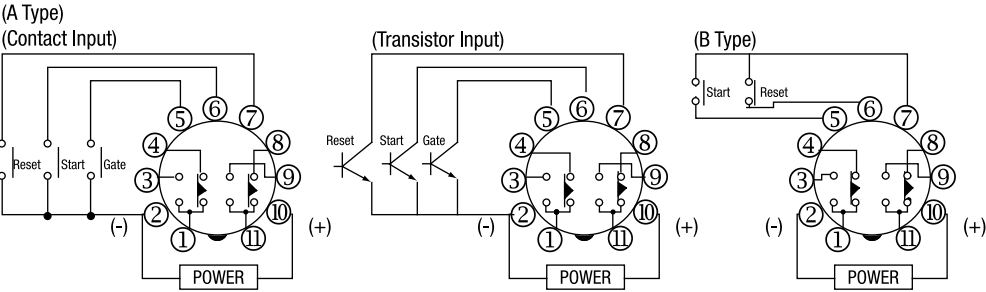


Item	Terminal Number			Operation									
Power	2 - 10 POWER												
Input	Start	2 - 6 (A) 5 - 7 (B)	ON or L										
	Reset	2 - 7 (A) 6 - 7 (B)	ON or L										
	Gate	2 - 5 (A)	ON or L										
Delayed Contact	1 - 4 8 - 11	(NC)											
	1 - 3 9 - 11	(NO)											
Indicator	POWER												
	OUT												
Set Time				 T T_a T_a T T T									

 T = Set time T_a = Shorter than set time
 $T = T' + T''$

GT3A-5 Timing Diagrams
Delayed DPDT

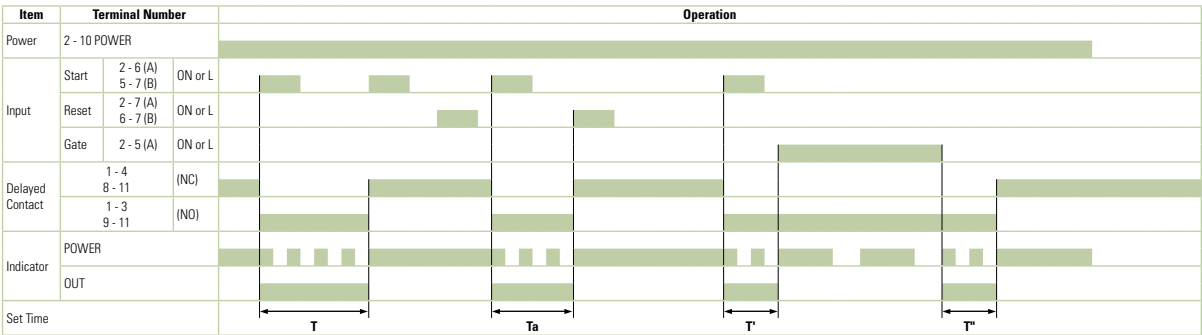
Operation
Mode Selection



Interval 2

MODE

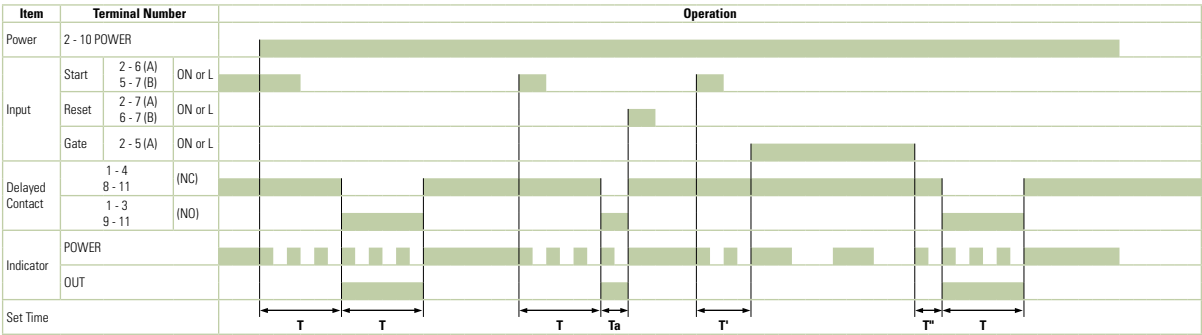
A



One-Shot Cycle

MODE

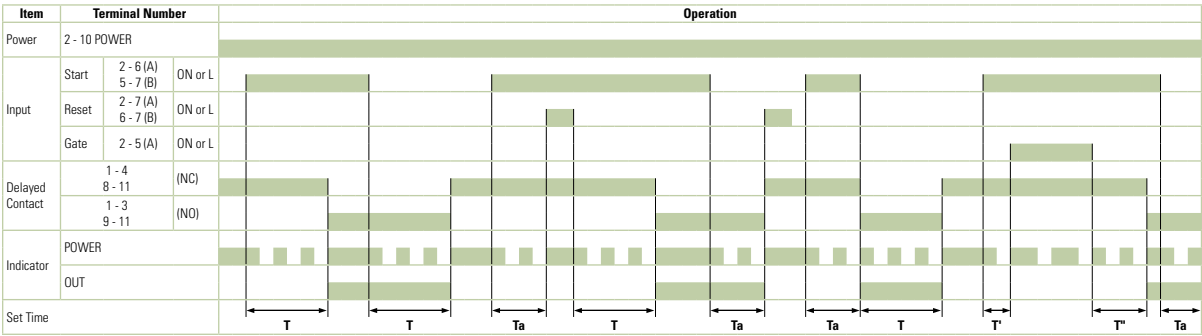
B



Signal ON/OFF-Delay 2

MODE

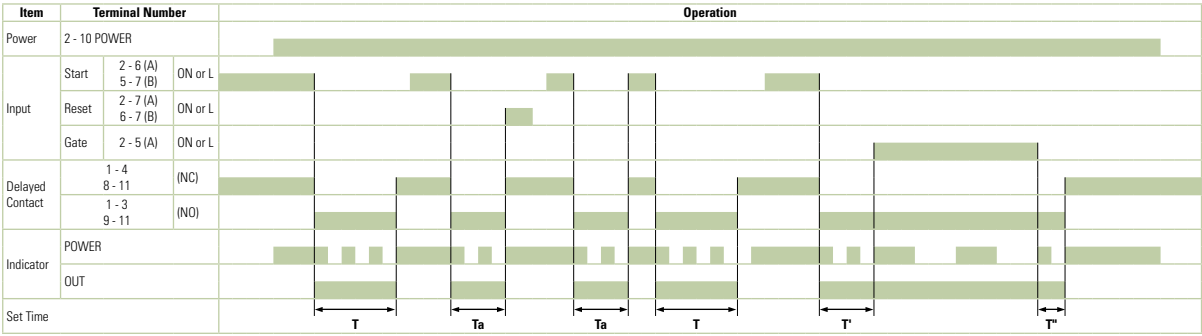
C



Signal OFF-Delay 2

MODE

D

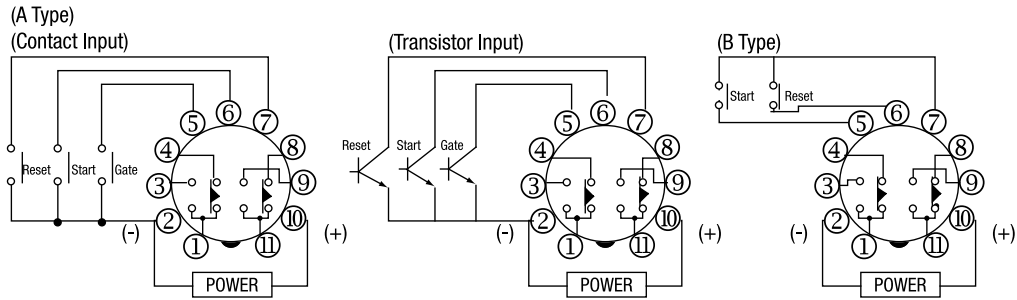


T = Set time Ta = Shorter than set time
T = T' + T''



GT3A-6 Timing Diagrams
Delayed DPDT

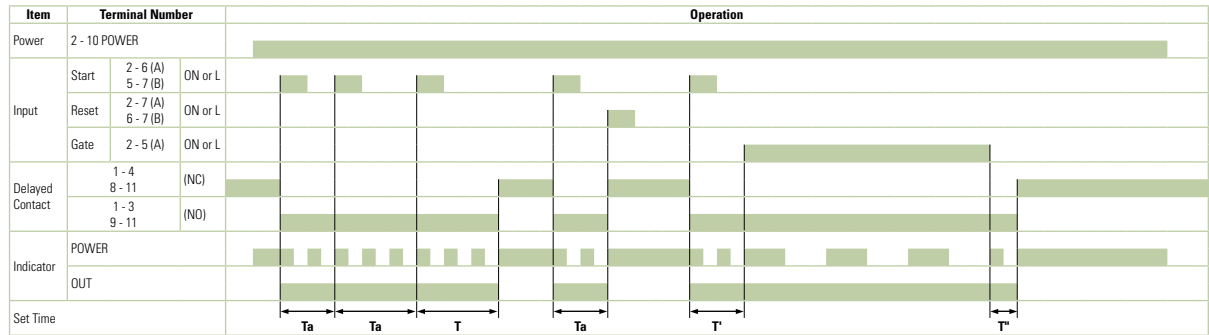
Operation
Mode Selection



One-Shot 1

MODE

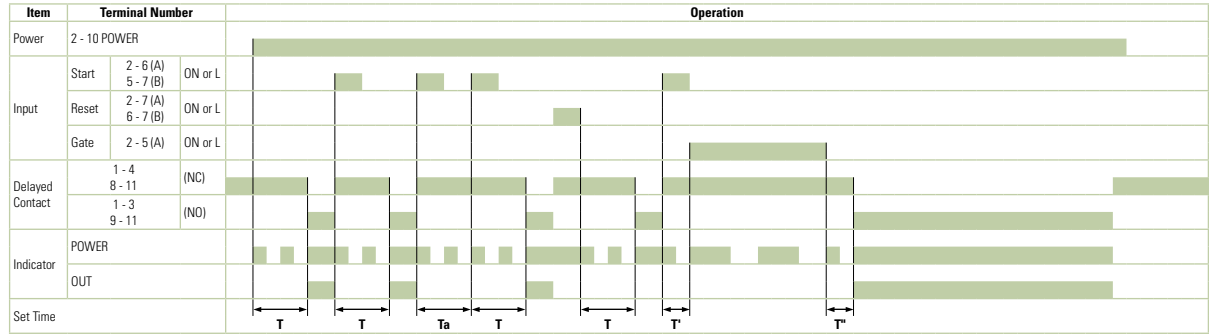
A



One-Shot ON-Delay

MODE

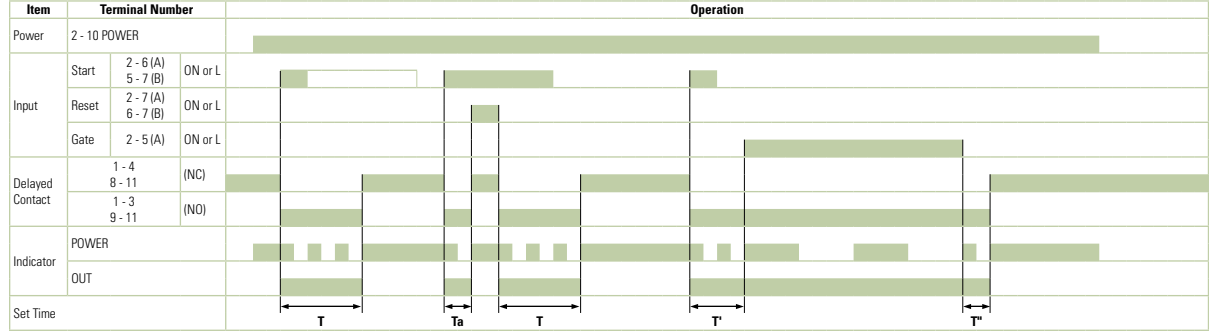
B



One-Shot 2

MODE

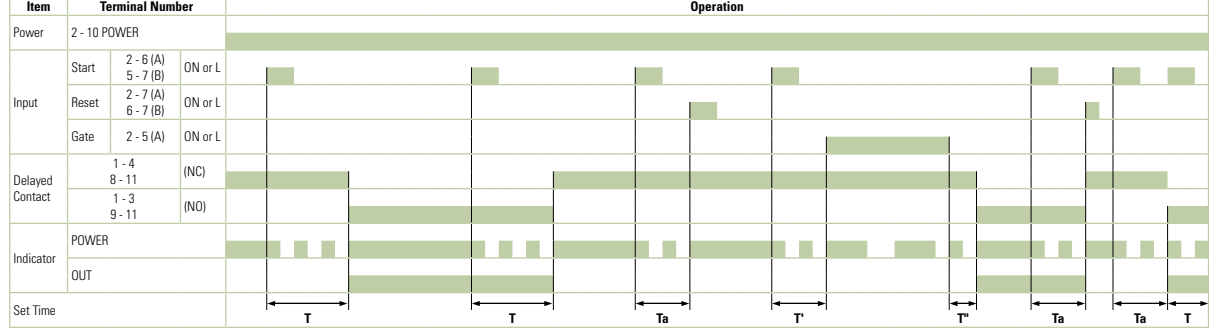
C



Signal ON/OFF-Delay 3

MODE

D



T = Set time Ta = Shorter than set time
T = T' + T''

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

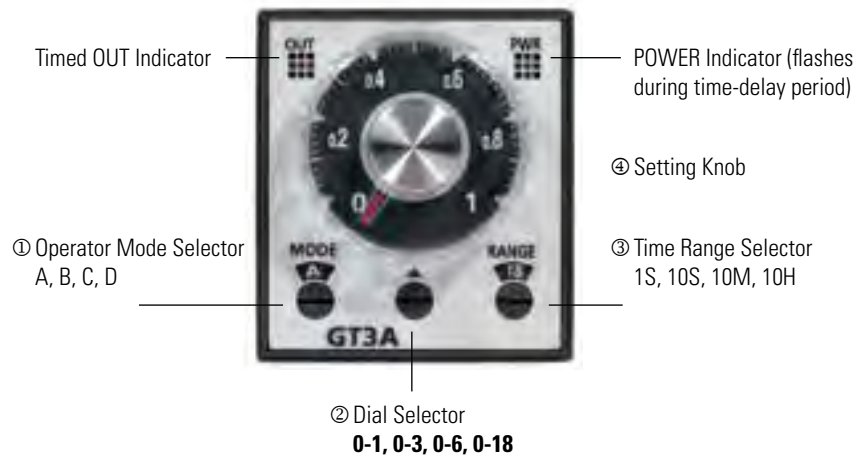
Timers

Contactors

Terminal Blocks

Circuit Breakers

Instructions: Setting GT3A Series Timers



Step 1.	Desired Mode of Operation		Selection		Remarks
Select the desired mode of operation.	For Timers	Mode of Operation	① Operation Mode Selector		The desired operation mode can be selected from the A, B, C, and D modes using the Operation Mode Selector. Change the operation mode from A to B, C, and D in turn by turning the operation mode selector clockwise using a flat screwdriver which is a maximum of 0.156" (4mm) wide. The selected mode is displayed in the window.
	GT3A-1 GT3A-2 GT3A-3	ON-delay 1	A		
		Interval 1	B		
		Cycle 1	C		
		Cycle 3	D		
	GT3A-4	ON-delay 2	A		
		Cycle 2	B		
		Signal ON/OFF-delay 1	C		
		Signal OFF-delay 1	D		
	GT3A-5	Interval 2	A		
		One-shot cycle	B		
		Signal ON/OFF-delay 2	C		
		Signal OFF-delay 2	D		
	GT3A-6	One-shot 1	A		
		One-shot ON-delay	B		
One-shot 2		C			
Signal ON/OFF-delay 3		D			
Step 2.	Desired Time Range		Selection		Remarks
Select the time range that contains the desired time period.	Time Ranges		② Dial Selector	③ Time Range Selector	The desired time range is selected by setting both ② Dial Selector and ③ Time Range Selector.
	0.1 seconds to 1 second		0-1	1S	
	0.1 seconds to 3 seconds		0-3		
	0.1 seconds to 6 seconds		0-6		
	0.15 seconds to 18 seconds		0-18		
	0.1 seconds to 10 seconds		0-1	10S	
	0.3 seconds to 30 seconds		0-3		
	0.6 seconds to 60 seconds		0-6		
	1.8 seconds to 180 seconds		0-18		
	6 seconds to 10 minutes		0-1	10M	
	18 seconds to 30 minutes		0-3		
	36 seconds to 60 minutes		0-6		
	108 seconds to 180 minutes		0-18		
	6 minutes to 10 hours		0-1	10H	
	18 minutes to 30 hours		0-3		
	36 minutes to 60 hours		0-6		
	108 minutes to 180 hours		0-18		
Step 3.	Selection				
Set the precise period of time desired by using the ④ Setting Knob.					

GT3F Series — True Power OFF Delay Timers

Key features:

- “True” power OFF-delay up to 10 minutes
- No external control switch necessary
- Available with reset inputs
- Mountable in sockets or flush panel



Specifications

	GT3F-1	GT3F-2
Operation	True power OFF-delay	
Time Range	0.1 seconds to 600 seconds	
Rated Voltage	100 to 240V AC, 50/60Hz 24V AC/DC	
Contact Rating	250V AC/24V DC, 5A (resistive load)	250V AC/24V DC, 3A (resistive load)
Contact Form	SPDT	DPDT
Minimum Power Application Time	1 second	
Voltage Tolerance	AF20: 100 to 240V AC AD24: 21.6 to 26.4VDC, 20.4 to 26.4VAC	
Repeat Error	±0.2%, ±10 msec	
Voltage Error	±0.2%, ±10 msec	
Temperature Error	±0.2%, ±10 msec	
Setting Error	±10% maximum	
Insulation Resistance	100MW minimum	
Dielectric Strength	Between power and output terminals: 2,000V AC, 1 minute (SPDT) 1,500V AC, 1 minute (DPDT) Between contacts on different poles: 1,000V AC, 1 minute (DPDT) Between contacts of the same pole: 750V AC, 1 minute	
Power Consumption	AF20: 3.7VA (200V AC, 60Hz) AD24: 0.8W (DC), 1.2VA (AC)	
Mechanical Life	3,000,000 operations minimum	
Electrical Life	100,000 operations minimum	
Vibration Resistance	100m/sec ² (approximate 10G)	
Shock Resistance	Operating extremes: 100 m/sec ² (approximate 10G) Damage limits: 500 m/sec ² (approximate 50G)	
Operating Temperature	-10 to +50°C	
Storage Temperature	-30 to +80°C	
Operating Humidity	45 to 85% RH	
Weight (approximate)	77g	79g



1. An inrush current flows during the minimum power application time. AF20: approximate 0.4A, AD24: approximate 1.2A
2. GT3F does not read the preset time range shown on the knob after power is turned off. Note that minimizing the preset time, by turning the knob to zero, does not shorten the delay time after power is removed.

Part Numbering List

GT3F

Mode of Operation	Rated Voltage Code	Time Range	Output	Contact	Optional Input	Complete Part Number		
						8-Pin	11-Pin	
True-Power Off-delay	AF20: 100 to 240VAC (50/60Hz)	0.1 seconds to 600 seconds	250V AC, 5A,	Delayed SPDT	Reset	GT3F-1AF20	GT3F-1EAF20	
			30V DC, 5A (resistive load)			GT3F-1AD24	GT3F-1EAD24	
	AD24: 24V AC/DC		250V AC, 3A,	Delayed DPDT	None (8p) Reset (11p)	GT3F-2AF20	GT3F-2EAF20	
			30V DC, 3A (resistive load)			GT3F-2AD24	GT3F-2EAD24	

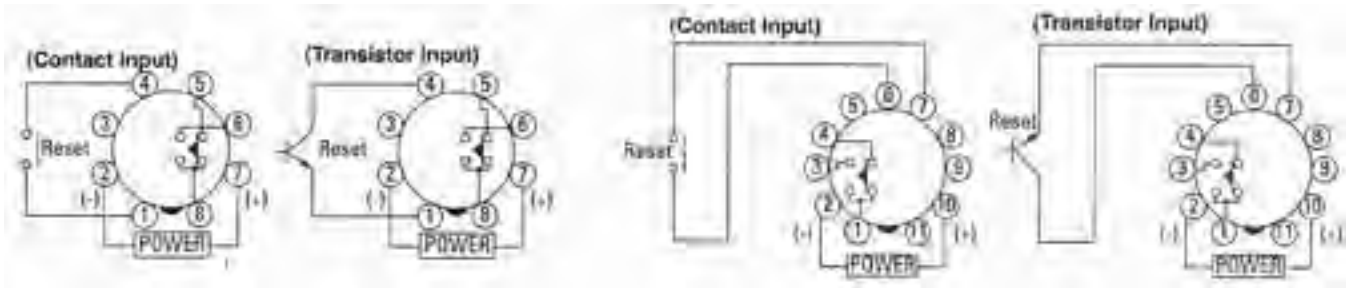


Optional reset input resets the contact to the OFF state before time out.

Timing Diagrams/Schematics

GT3F-1 Timing Diagrams

GT3F-1 (8-pin)	GT3F-1E (11-pin)
Delayed SPDT Output, with Reset Input	



Item	Terminal Number	Operation
Power	2 - 7 (8p) 2 - 10 (11p)	
Reset Input	1 - 4 (8p) 6 - 7 (11p)	ON or L
Delayed Contact	5 - 8 (8p) 1 - 4 (11p)	(NC)
	6 - 8 (8p) 1 - 3 (11p)	(NO)
Indicator	POWER	
Set Time		Tr T Ta Ts T



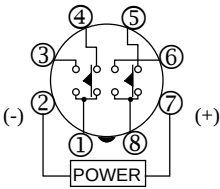
- T = Set time
Ta = Shorter than set time
Ts = 1 Second
Tr = Minimum Power Application Time
GT3F-1: 1 Second
1. For time ranges, see page page 995.
 2. For sockets and accessory part numbers, see page page 1021.
 3. When power is applied, the NO output contact closes. When power is removed, the timing period begins. When time has elapsed, the NO contact opens.
 4. For the timing diagram overview, see page page 994.

GT3F-2 Timing Diagrams

GT3F-2 (8-pin)

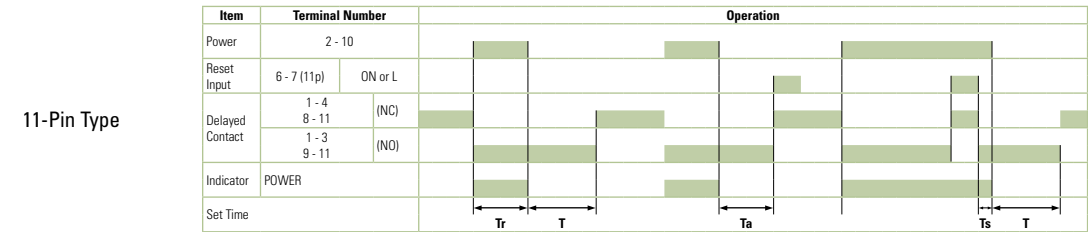
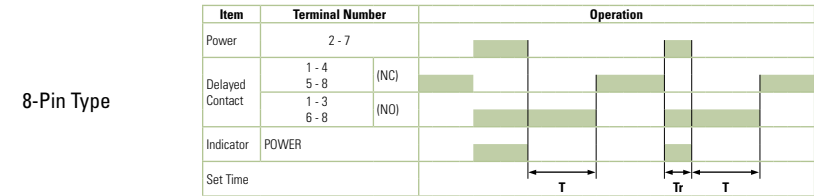
GT3F-2E (11-pin)

Delayed DPDT Output



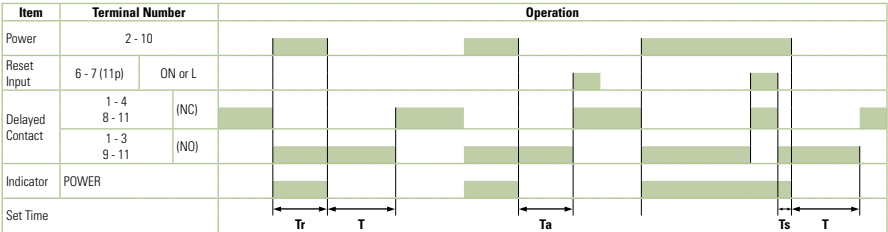
(Contact Input)

(Transistor Input)



When power is applied, the NO contact closes. When power is removed, the timing period begins. When time has elapsed, the NO contact opens. Optional reset input will return contacts to original state before time elapses.

-
- T = Set time
 - Ta = Shorter than set time
 - Ts = 1 Second
 - Tr = Minimum Power Application Time
 - GT3F-1: 1 Second



Instructions: Setting GT3F Series Timers

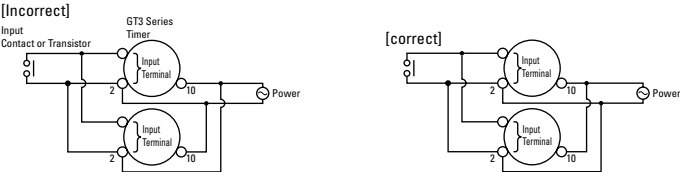


Step 1	Desired Operation	Selection		Remarks
Select a time range that contains the desired period of time.	Base Time Ranges	① Dial Selector	② Time Range Selector	Time range can be selected from 1S and 10S using a flat screwdriver and five different dials of 0 to 1, 0 to 3, 0 to 6, 0 to 18, and 0 to 60 are displayed in the six windows by turning the Dial Selector, allowing for selecting the best suited scale. Note that the switch does not turn infinitely.
	0.1s to 1s	0 to 1	1s	
	0.1s to 3s	0 to 3		
	0.1s to 6s	0 to 6		
	0.1s to 10s	0 to 1		
	0.3s to 30	0 to 3		
	0.6s to 60	0 to 6		
	1.8s to 180s	0 to 18		
6s to 600s	0 to 60			
Step 2				Remarks
The set time is selected by turning the ③ Setting Knob.				Setting Examples: 1. When the Setting Knob ③ is set at 2.5, with Dial Selector ① 0 to 3 and Time Range Selector ② 1S selected, then the set time is 2.5 seconds. 2. When the Setting Knob ③ is set at 5.0, with Dial Selector ① 0 to 60 and Time Range Selector ② 10S selected, then the set time is 500 seconds.

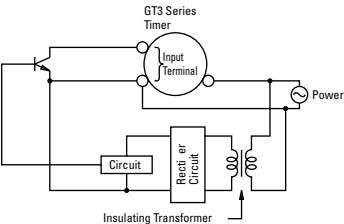
Instructions: Wiring Inputs

Inputs of GT3F

To avoid electric shock, do not touch the input signal terminal during power voltage application. Never apply the input signals to two or more GT3F timers using the same contact or transistor.



In a transistor circuit for controlling input signals, with its primary and secondary power circuits isolated, do not ground the secondary circuit.



On the GT3F timers, connect the input signals to terminal No.1 and 4 only on the 8-pin type; connect the input signals to terminal No. 6 and 7 only on the 11-pin type. Never apply voltage to other terminals; otherwise, the internal circuit may be damaged. Input signal lines must be made as short as possible and installed away from power cables and power lines. Use shielded wires or a separate conduit for input wiring. The GT3F, consisting of a high-impedance circuit, may not be reset due to the influence of an inductive voltage or residual voltage caused by a leakage current. If not reset, connect an RC filter or bleeder resistor between power terminals so that the voltage between power terminals can be reduced to less than 15% of the rated voltage.

GT3W Series — Dual Time Range Timers

Key features:

- Sequential start, sequential interval, on-delay, recycler, and interval ON timing functions
- 2 time settings in one timer
- 8 selectable operation modes on each model
- Mountable in sockets or flush panel
- Power and output status indicating LEDs
- Time ranges up to 300 hours



General Specifications

Operation System			Solid state CMOS Circuit
Operation Type			Multi-Mode
Time Range			1: 0.1sec to 6 hours, 3: 0.1sec to 300 hours
Pollution Degree			2 (IE60664-1)
Over Voltage Category			III (IE60664-1)
Rated Operational Voltage	AF20	100-240V AC(50/60Hz)	
	AD24	24V AC(50/60Hz)/24V DC	
	D12	12V DC	
Voltage Tolerance	AF20	85-264V AC(50/60Hz)	
	AD24	20.4-26.4V AC(50/60Hz)/21.6-26.4V DC	
	D12	10.8-13.2V DC	
Disengaging Value of Input Voltage			Rated Voltage x10% minimum
Range of Ambient Operating Temperature			-10 to +50°C (without freezing)
Range of Ambient Storage and Transport Temperature			-30 to +75°C (without freezing)
Range of Relative Humidity			35 to 85%RH (without condensation)
Atmospheric Pressure			80kPa to 110kPa (Operating), 70kPa to 110kPa (Transport)
Reset Time			60msec maximum
Repeat Error			±0.2%, ±10msec*
Voltage Error			±0.2%, ±10msec*
Temperature Error			±0.6%, ±10msec*
Setting Error			±10% maximum
Insulation Resistance			100MΩ minimum (500V DC)
Dielectric Strength			Between power and output terminals: 2000V AC, 1 minute Between contacts of different poles: 2000V AC, 1 minute Between contacts of the same pole: 750V AC, 1 minute
Vibration Resistance			10 to 55Hz amplitude 0.75mm ² hours in each of 3 axes
Shock Resistance			Operating extremes: 98m/sec ² (approx. 10G) Damage limits: 490m/sec ² (approx. 50G) 3 times in each of 3 axes
Degree of Protection			IP40 (enclosure), IP20 (socket) (IEC60529)
Power Consumption (Approx.)	AF20	100V AC/60Hz	2.3VA
		200V AC/60Hz	4.6VA
	AD24 (AC/DC)		1.8VA/0.9W
Mounting Position			Free
Dimensions			40Hx 36W x 70 mm
Weight (Approx.)			72g



* For the value of the error against a preset time, whichever the largest applies.

Contact Ratings

Allowable Contact Power		960VA/120W
Allowable Voltage		250V AC/150V DC
Allowable Current		5A
Maximum permissible operating frequency		1800 cycles per hour
Rated Load	1/8HP, 240V AC	
	3A, 240V AC (Resistive)	
	5A, 120V AC/30V DC (Resistive)	
Conditional Short Circuit		Fuse 5A, 250V
Life	Electrical	100,000 op. minimum (Resistive)
	Mechanical	20,000,000 op. minimum

Part Number List

Part Numbers

Mode of Operation	Output	Contact	Time Range*	Rated Voltage	Pin Configuration	New Part Numbers
A: Sequential Start B: On-delay with course and fine C: Recycler and instantaneous D: Recycler outputs (OFF Start) E: Recycler outputs (ON Start) F: Interval ON G: Interval ON Delay H: Sequential Interval	3A, 240V AC 5A, 120V AC/30V DC (Resistive Load)	Delayed SPDT + Delayed SPDT	1: 0.1sec - 6 hours *(See Time Range Settings for details.)	100 to 240V AC (50/60Hz)	8 pin	GT3W-A11AF20N
					11 pin	GT3W-A11EAF20N
				24V AC/DC	8 pin	GT3W-A11AD24N
					11 pin	GT3W-A11EAD24N
				12V DC	8 pin	GT3W-A11D12N
					11 pin	GT3W-A11ED12N
			3: 0.1sec - 300 hours	100 to 240V AC (50/60Hz)	8 pin	GT3W-A33AF20N
				24V AC/DC		GT3W-A33AD24N

- 
1. For timing diagrams and schematics, see page 994.

2. For socket and accessory part number information, see page 1013.

3. 8- and 11-pin models differ only in the number of pins (extra pins are not used).

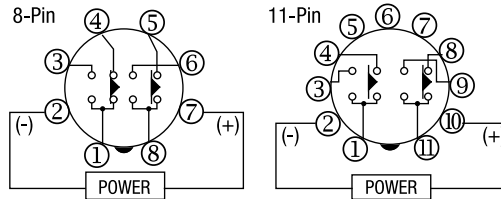
4. For the timing diagram overview, see page 994.

5. *For details on setting time ranges, see the instructions on page 995.

Time Range Table

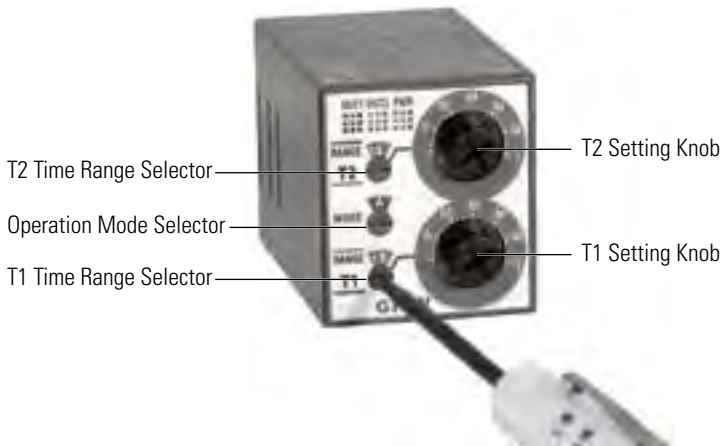
Time Range Code: 1			Time Range Code: 3		
Time Range Selector	Scale	Time Range	Time Range Selector	Scale	Time Range
1S	0-1	0.1 sec - 1 sec	1S	0 - 3	0.1 sec - 3 sec
10S		0.3 sec - 10 sec	1M		3 sec - 3 min
10M		15 sec - 10 min	1H		3 min - 3 hours
1S	0 - 6	0.1 sec - 6 sec	1S	0 - 30	0.6 sec - 30 sec
10S		1 sec - 60 sec	1M		36 sec - 30 min
1M		6 sec - 6 min	1H		36min - 30 hours
10M		1 min - 60 min	10H		6 hours - 300 hours
1H		6 min - 6 hours			

Timing Diagrams/Schematics



Mode	Operation Chart				Mode	Operation Chart			
A: Sequential Start	Item	Terminal No.	Operation	Description	E: Recycler outputs (ON Start)	Item	Terminal No.	Operation	Description
	Power	2-7				Power	2-7		
	Delayed Contact Ry1	1-4 (NC) 1-3 (NO)		ON after T1		Delayed Contact Ry1	1-4 (NC) 1-3 (NO)		ON during T1 OFF during T2
	Delayed Contact Ry2	5-8 (NC) 6-8 (NO)		ON after T1 + T2		Delayed Contact Ry2	5-8 (NC) 6-8 (NO)		ON during T1 OFF during T2
B: On-delay with course and fine	Indicator	OUT1 OUT2			F: Interval ON	Indicator	OUT1 OUT2		
	Set Time					Set Time			
	Item	Terminal No.	Operation	Description		Item	Terminal No.	Operation	Description
	Power	2-7				Power	2-7		
C: Recycler and instantaneous	Delayed Contact Ry1	1-4 (NC) 1-3 (NO)		ON after T1 + T2	G: Interval ON Delay	Delayed Contact Ry1	1-4 (NC) 1-3 (NO)		ON during T1
	Delayed Contact Ry2	5-8 (NC) 6-8 (NO)		ON after T1 + T2		Delayed Contact Ry2	5-8 (NC) 6-8 (NO)		ON after T1 + T2
	Indicator	OUT1 OUT2				Indicator	OUT1 OUT2		
	Set Time					Set Time			
D: Recycler outputs (OFF Start)	Item	Terminal No.	Operation	Description	H: Sequential Interval	Item	Terminal No.	Operation	Description
	Power	2-7				Power	2-7		
	Delayed Contact Ry1	1-4 (NC) 1-3 (NO)		OFF during T1 ON during T2		Delayed Contact Ry1	1-4 (NC) 1-3 (NO)		ON during T1 + T2
	Delayed Contact Ry2	5-8 (NC) 6-8 (NO)		OFF during T1 ON during T2		Delayed Contact Ry2	5-8 (NC) 6-8 (NO)		ON after T1, during T2
	Indicator	OUT1 OUT2				Indicator	OUT1 OUT2		
	Set Time					Set Time			
	Item	Terminal No.	Operation	Description		Item	Terminal No.	Operation	Description
	Power	2-7				Power	2-7		

Instructions: Setting GT3W Timer



1. The switches should be securely turned using a flat screwdriver 4mm wide (maximum). Note that incorrect setting may cause malfunction. The switches, which do not turn infinitely, should not be turned beyond their limits.
2. Since changing the setting during timer operation may cause malfunction, turn power off before changing.

Safety Precautions

Special expertise is required to use Electronic Timers.

- All Electronic Timer modules are manufactured under IDEC's rigorous quality control system, but users must add a backup or fail safe provision to the control system when using the Electronic Timer in applications where heavy damage or personal injury may occur should the Electronic Timer fail.
- Install the Electronic Timer according to instructions described in this catalog.
- Make sure that the operating conditions are as described in the specifications. If you are uncertain about the specifications, contact IDEC in advance.
- In these directions, safety precautions are categorized in order of importance to Warning and Caution.

Warning

Warning notices are used to emphasize that improper operation may cause severe personal injury or death.

- Turn power off to the Electronic timer before starting installation, removal, Wiring, maintenance, and inspection on the Electronic Timer.
- Failure to turn power off may cause electrical shocks or fire hazard.
- Emergency stop and interlocking circuits must be configured outside the Electronic timer. If such a circuit is configured inside the Electronic Timer, failure of the Electronic timer may cause malfunction of the control system, or an accident.

Caution

Caution notices are used where inattention might cause personal injury or damage to equipment.

- The Electronic Timer is designed for installation in equipment. Do not install the Electronic Timer outside equipment.
- Install the Electronic Timer in environments described in the specifications. If the Electronic Timer is used in places where it will be subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, or excessive shocks, then electrical shocks, fire hazard, or malfunction could result.
- Use an IEC60127-approved fuse and circuit breaker on the power and output line outside the Electronic Timer.
- Do not disassemble, repair, or modify the Electronic Timer.
- When disposing of the Electronic Timer, do so as industrial waste.

GT3 Series Accessories

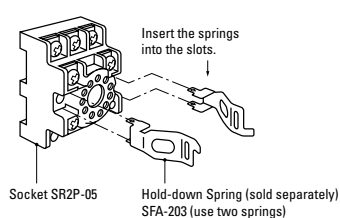
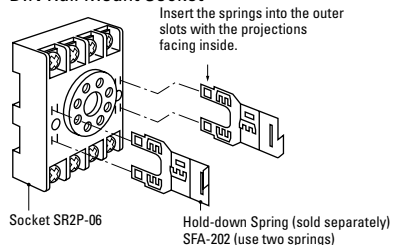
DIN Rail Mounting Accessories

DIN Rail/Surface Mount Sockets and Hold-Down Springs

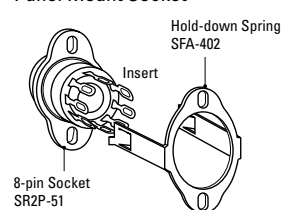
DIN Rail Mount Socket				Applicable Hold-Down Springs	
Style	Appearance	Use with Timers	Part No.	Appearance	Part No.
8-Pin Screw Terminal (dual tier)		GT3A-1, 2, 3 (8-pin) GT3F-1, 2 (8-pin) GT3W (8-pin)	SR2P-05		SFA-203
11-Pin Screw Terminal (dual tier)		GT3A-1, 2, 3 (11-pin) GT3A-4, 5, 6 GT3F-1, 2 (11-pin) GT3W (11-pin)	SR3P-05		
8-Pin Fingersafe Socket		GT3A-1, 2, 3 (8-pin) GT3F-1, 2 (8-pin) GT3W (8-pin)	SR2P-05C		
11-Pin Fingersafe Socket		GT3A-1, 2, 3 (11-pin) GT3A-4, 5, 6 GT3F-1, 2 (11-pin) GT3W (11-pin)	SR3P-05C		
8-Pin Screw Terminal		GT3A-1, 2, 3 (8-pin) GT3F-1, 2 (8-pin) GT3W (8-pin)	SR2P-06		SFA-202
11-Pin Screw Terminal		GT3A-1, 2, 3 (11-pin) GT3A-4, 5, 6 GT3F-1, 2 (11-pin) GT3W (11-pin)	SR3P-06		
DIN Mounting Rail Length 1000mm		—	BNDN1000		

Installation of Hold-Down Springs

DIN Rail Mount Socket



Panel Mount Socket



Panel Mounting Accessories

Panel Mount Sockets and Hold-Down Springs

Panel Mount Socket				Applicable HD Springs	
Style	Appearance	Use with Timers	Part No.	Appearance	Part No.
8-Pin Solder Terminal		GT3A- (8-pin) GT3W- (8-pin) GT3F- (8-pin)	SR2P-51		SFA-402
11-Pin Solder Terminal		GT3A- (11-pin) GT3W- (11-pin) GT3F- (11-pin)	SR3P-51		

 For information on installing the hold-down springs, see page 1021.

Flush Panel Mount Adapter and Sockets that use an Adapter

Accessory	Description	Appearance	Use with Timers	Part No.
Panel Mount Adapter	Adaptor for flush panel mounting GT3 timers		All GT3 timers	RTB-G01
Sockets for use with Panel Mount Adapter	8-pin screw terminal		All 8-pin timers	SR6P-M08G
	11-pin screw terminal		All 11-pin timers	SR6P-M11G
	8-pin solder terminal		All 8-pin timers	SR6P-S08
	11-pin solder terminal		All 11-pin timers	SR6P-S11

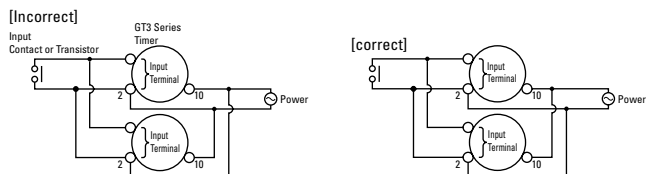
 No hold down springs are available for flush panel mounting.

Instructions: Wiring Inputs for GT3 Series

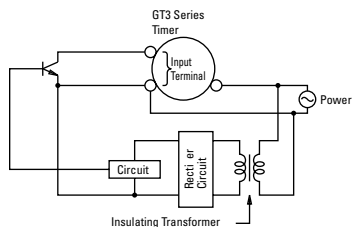
Inputs

To avoid electric shock, do not touch the input signal terminal during power voltage application.

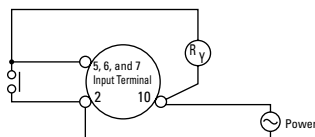
When connecting the input signal terminals of two or more GT3A timers to the same contact or transistor, the input terminals of the same number should be connected. (Connect Terminals No.2 in common.)



In a transistor circuit for controlling input signals, with its primary and secondary power circuits isolated, do not ground the secondary circuit.



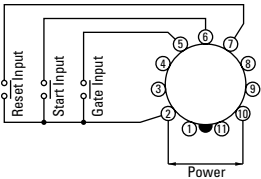
Connect the input signal terminals of the GT3A timers to Terminal No.2 only. Never apply voltage to other terminals; otherwise, the internal circuit may be damaged.



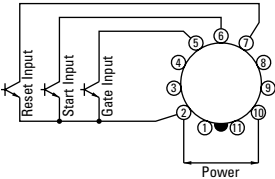
Input signal lines must be made as short as possible and installed away from power cables and power lines. Use shielded wires or a separate conduit for input wiring.

Inputs Instructions, continued

For contact input, use gold-plated contacts to make sure that the residual voltage is less than 1V when the contacts are closed.

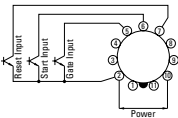


For transistor input, use transistors with the following specifications; VCE = 40V, VCES = 1V or less, IC = 50 mA or more, and ICBO = 50μA or less. The resistance should be less than 1kΩ when the transistor is on. When the output transistor switches on, a signal is input to the timer.



Inputs: GT3A-1, -2, -3

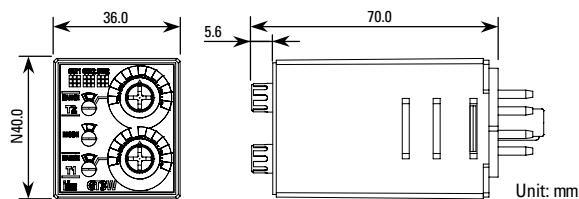
Transistor output equipment such as proximity switches and photoelectric switches can input signals if they are voltage/current output type, with power voltage ranges from 18 to 30V and have 1V. When the signal voltage switches from H to L, a signal is input to the timer



Inputs: GT3A-4, -5, -6

Start Input	The start input initiates a time-delay operation and controls output status.	No-voltage contact inputs and NPN open collector transistor inputs are applicable.
Reset Input	When the reset input is activated, the time is reset, and contacts return to original state.	24V DC, 1mA maximum
Gate Input	The time-delay operation is suspended while the gate input is on (pause).	Input response time: 50msec maximum

Dimensions

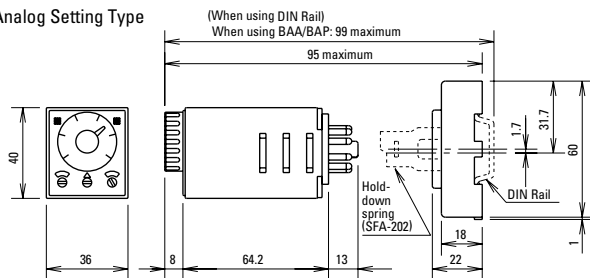


NOTE: GT3W series are UL Listed when used in combination with following IDEC's sockets:
 GT3W-A11, A33: SR2P-06* pin type socket.
 GT3W-A11E: SR3P-05* pin type socket.
 (*-May be followed by A,B,C or U)

The socket to be used with these timers are rated:
 -Conductor Temperature Rating 60°C min.
 -Use 14AWG max.(2mm²max.) Copper conductors only
 -Terminal Torque 1.0 to 1.3 N-m

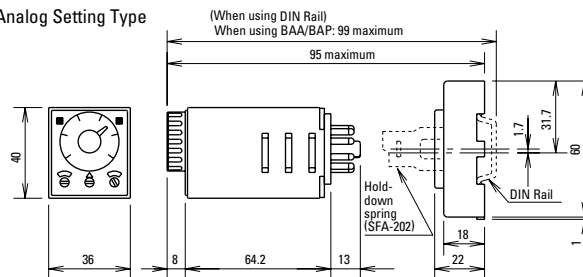
Analog GT3 Timer, 8-Pin with SR2P-06

Analog Setting Type



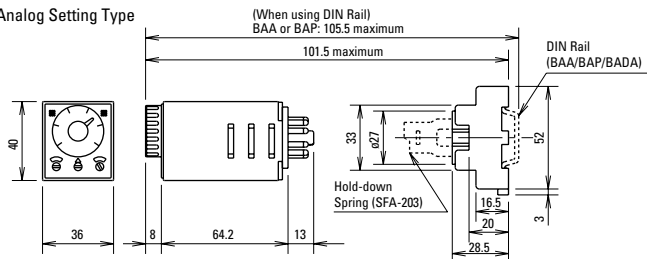
Analog GT3 Timer, 11-Pin with SR3P-06

Analog Setting Type



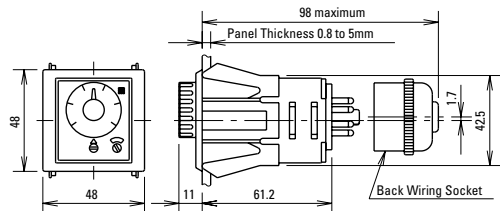
Analog GT3 Timer, 11-Pin with SR3P-05

Analog Setting Type



Panel Mount Adapter

Analog GT3 Timer, 8-Pin and 11-Pin with SR6P-S08 or SR6P-S11



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

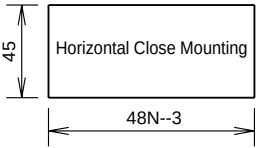
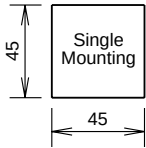
Timers

Contactors

Terminal Blocks

Circuit Breakers

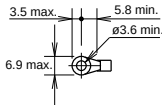
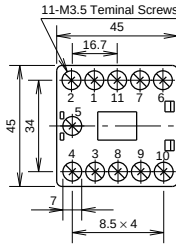
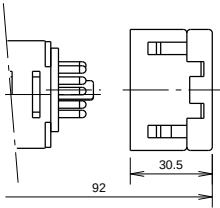
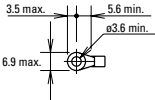
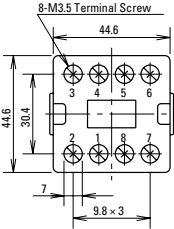
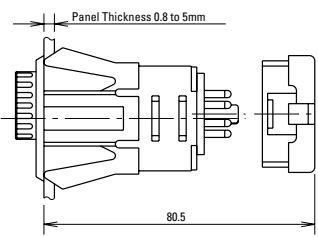
Mounting Hole Layout



Tolerance: +0.5 to 0
N: No. of timers mounted

GT3 Timer, 8-Pin with SR6P-M08G

GT3 Timer, 11-Pin with SR6P-M11G



GE1A Series — ON Delay Timers

Single Function

Key features:

- DPDT or SPDT + instantaneous SPDT
- 8-pin, octal base
- Repeat error $\pm 0.2\%$ maximum
- Large, clear knob for easy setting
- Instant monitoring of operational status by LED indicators



UL, c-UL Listed
File No. E55996



Specifications

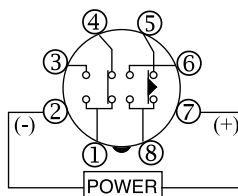
Rated Operating Voltage	24V AC/DC 110 to 120V AC 220 to 240V AC	
Voltage Tolerance	AC: 85 to 110% DC: 90 to 110%	
Contact Rating	240V AC/5A 24V DC/5A	
Contact Form	DPDT or SPDT+ instantaneous SPDT	
Repeat Error	±0.2% ±10msec maximum	
Voltage Error	±0.5% ±10msec maximum	
Temperature Error	±3% maximum	
Setting Error	±10% maximum	
Reset Time	0.1 sec maximum	
Insulation Resistance	100MΩ minimum (500V DC megger)	
Dielectric Strength	Between power and output terminals: 2,000V AC, 1 minute Between contact circuits: 750V AC, 1 minute	
Vibration Resistance	Damage limits: Amplitude 0.75mm, 10 to 55 Hz Operating extremes: Amplitude 0.5mm, 10 to 55 Hz	
Shock Resistance	Damage limits: 500m/s ² (Approx. 50G)	
Power Consumption	GE1A-B	24V AC type: 1.6 VA
		24V DC type: 1.0W
		110V AC type: 3.8 VA
		220V AC type: 7.7 VA
	GE1A-C	24V AC type: 2.0 VA
		24V DC type: 0.8W
		110V AC type: 3.5 VA
		220V AC type: 8.0 VA
Electrical Life	100,000 operations minimum (at full rated load)	
Mechanical Life	B type: 10,000,000 operations minimum, C type: 5,000,000 operations minimum	
Operating Temperature	−10 to +55°C (without freezing)	
Operating Humidity	35 to 85% RH (without freezing)	

Switches & Pilot Lights

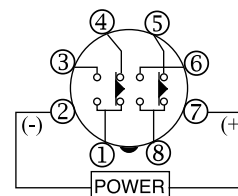
Signaling Lights

Relays & Sockets

Operation Mode Selection



ON-Delay 1



Item	Terminal Number	Operation			
Set Time					
Power	2 - 7 (8p)				
Delayed Contact	5 - 8 (8p)	(NC)			
	6 - 8 (8p)	(NO)			
Instantaneous Contact	1 - 4	(NC)			
	1 - 3	(NO)			
Indicator	POWER				
	OUT				

Item	Terminal Number	Operation	
Set Time			
Power	2 - 7 (8p)		
Delayed Contact	5 - 8 (8p) (NC)		
	6 - 8 (8p) (NO)		
Indicator	POWER		
	OUT		



Note: Terminals 1, 3, and 4 are for the instantaneous contact

Accessories

Mounting Accessories & Sockets

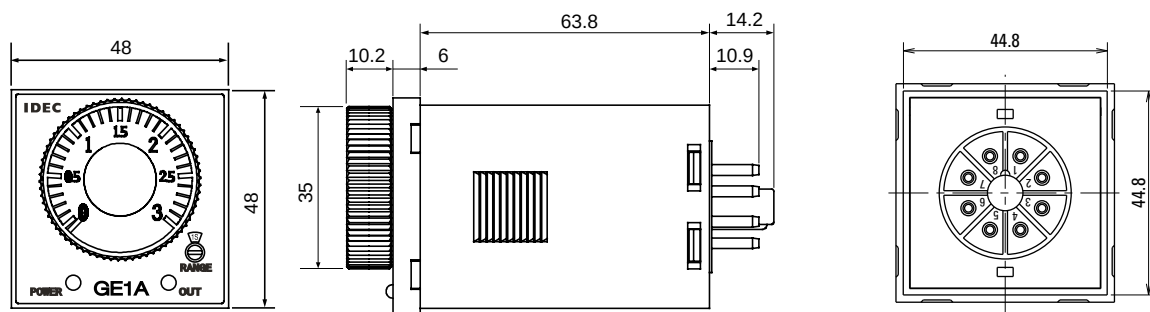
Item	Appearance	Part No.
DIN Rail/Surface Mounting Accessories	8-Pin Screw Terminal (dual tier)	SR2P-05
	8-Pin Fingersafe Socket	SR2P-05C
	8-Pin Screw Terminal	SR2P-06
	DIN Mounting Rail Length 1000mm	BNDN1000
Panel Mounting Accessories	8-Pin Solder Terminal	SR2P-51
	Screw Terminal Socket	SR6P-M08G
	Panel Mount Adapter	GE9Z-AD

Other Accessories

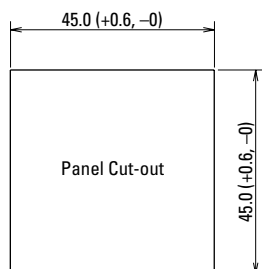
Item	Appearance	Part No.
Dust Cover		GE9Z-C48

Dimensions

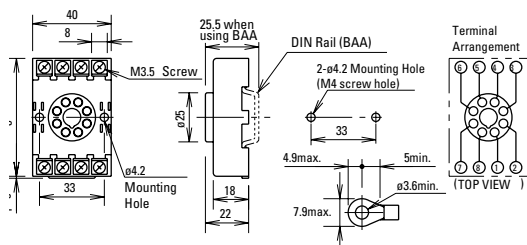
GE1A Timer



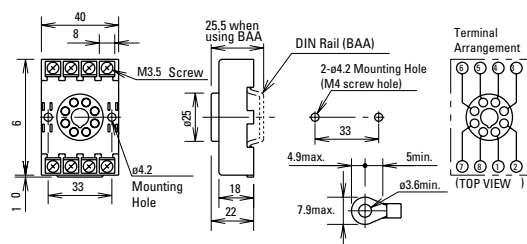
GE1A Timer Panel Cutout



8-Pin SR2P-05



8-Pin SR2P-06



GT5P Series — ON Delay Timers

Key features:

- SPDT, 5A contacts
- 8-pin, octal base
- 9 time ranges
- Repeat error $\pm 0.2\%$ maximum
- Control settings by hand or screwdriver
- Power ON and timing out LED indicators
- Uses the same sockets and hold down clips as IDEC's RR2P 8-pin relays



UL Recognized
File No. E55996



CSA Certified
File No. LR66809



Specifications

Rated Operating Voltage		100 to 120V AC (50/60Hz) 200 to 240V AC (50/60Hz) 24V AC/DC 12V DC
Voltage Tolerance		AC type: $\pm 15\%$ DC type: $\pm 10\%$ (ripple 10% maximum)
Contact Rating	Resistive load	120V AC/24V DC, 5A 240V AC, 3A
	Inductive load	240V AC, 0.8A 120V AC, 1.4A 24V DC, 1.7A
Allowable Contact Power (resistive load)		960VA AC 120W DC
Contact Form		SPDT
Voltage		250V AC, 150V DC
Repeat Error		$\pm 0.2\%$ $\pm 10\text{msec}$
Voltage Error		$\pm 0.5\%$ $\pm 10\text{msec}$
Temperature Error		$\pm 3\%$ maximum (over -10 to 50°C , reference temperature 20°C)
Setting Error		$\pm 10\%$ maximum
Reset Time		When turning power off after time up: 0.1 sec maximum When turning power off before time up: 1 sec maximum
Insulation Resistance		100M Ω minimum
Dielectric Strength		2000V AC, 1 minute (except between contacts of the same pole)
Vibration Resistance		Damage limits: 10 to 55 Hz, amplitude 0.75mm, 2 hours in 3 directions. Operating Extremes: 10 to 55 HZ, amplitude 0.5 mm, 10 minutes in 3 directions.
Shock Resistance		Operating extremes: 100N (approximate 10G) Damage limits: 500N (approximate 50G)
Power Consumption		100V AC type: 2.9VA (at 50Hz) 200V AC type: 5.0VA (at 50Hz) 24V DC type: 1.4VA/0.5W
Electrical Life		100,000 operations minimum (at rated load)
Mechanical Life		20,000,000 operations minimum
Operating Temperature		-10 to $+50^\circ\text{C}$
Operating Humidity		45 to 85% RH



1. Inductive load (reference), $\cos \phi = 0.3$ to 0.4 or $L/R = 15\text{msec}$.
2. Minimum applicable load: 5VDC/10mA (reference).

Part Numbering List

Mode of Operation	Contact	Output	Rated Voltage	Time Range	Complete Part No.
ON-Delay	SPDT	24V DC/120V AC, 5A 240V AC, 3A	100 to 120V AC	1S	—
				3S	GT5P-N3SA100
				6S	—
				10S	GT5P-N10SA100
				30S	GT5P-N30SA100
				60S	GT5P-N60SA100
				3M	GT5P-N3MA100
				6M	GT5P-N6MA100
				10M	GT5P-N10MA100
			200 to 240V AC	1S	GT5P-N1SA200
				3S	—
				6S	GT5P-N6SA200
				10S	GT5P-N10SA200
				30S	GT5P-N30SA200
				60S	GT5P-N60SA200
				3M	GT5P-N3MA200
				6M	GT5P-N6MA200
				10M	GT5P-N10MA200
			24V AC/DC	1S	GT5P-N1SAD24
				3S	—
				6S	GT5P-N6SAD24
				10S	GT5P-N10SAD24
				30S	—
				60S	GT5P-N60SAD24
				3M	—
				6M	GT5P-N6MAD24
				10M	GT5P-N10MAD24
			12V DC	1S	—
				3S	—
				6S	—
				10S	GT5P-N10SD12
				30S	GT5P-N30SD12
				60S	GT5P-N60SD12
				3M	—
				6M	—
				10M	GT5P-N10MD12

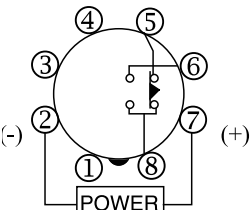


For sockets and accessories, see page 995.

Timing Diagram/Schematic/Electrical Life Curves

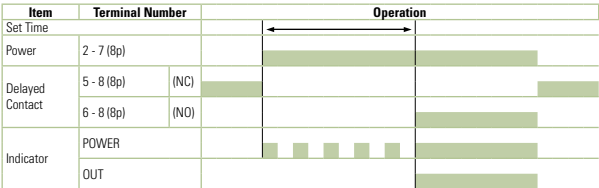
SPDT

Operation Mode

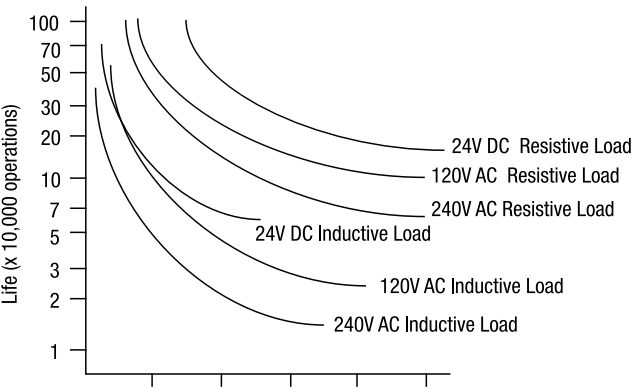


Do not apply voltage to terminals 1, 3, and 4.

ON-Delay



Electrical Life Curves



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

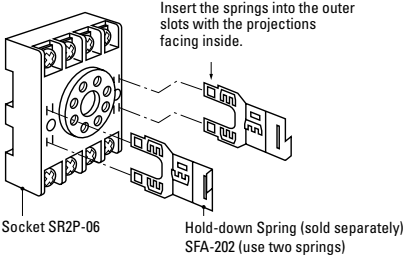
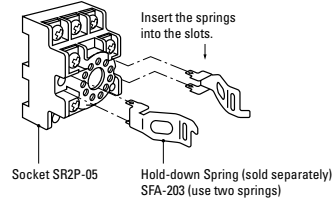
Terminal Blocks

Circuit Breakers

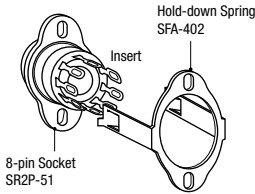
Accessories
Mounting

Mounting Accessories and Sockets					Applicable Hold-Down Springs	
	Style	Appearance	Use with Timers	Part No.	Appearance	Part No.
DIN Rail/ Surface Mounting Accessories	8-Pin Screw Terminal (dual tier)		GT5P	SR2P-05		SFA-203
	8-Pin Fingersafe Socket		GT5P	SR2P-05C		
	8-Pin Screw Terminal		GT5P	SR2P-06		SFA-202
	DIN Mounting Rail Length 1000mm		—	BNDN1000		
Part Numbers: Mounting Accessories and Sockets					Applicable Hold-Down Springs	
Mounting Accessories	8-Pin Solder Terminal			SR2P-51		SFA-402

Installation of Hold-Down Springs
DIN Rail Mount Socket



Panel Mount Socket



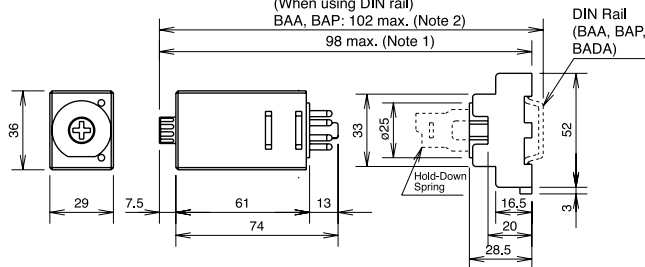
Dimensions

GT5P Timer, 8-Pin with SR2P-05

(When using DIN rail)

BAA, BAP: 102 max. (Note 2)

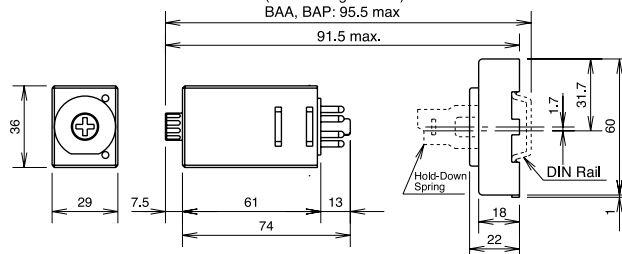
98 max. (Note 1)

**GT5P Timer, 8-Pin with SR2P-06**

(When using DIN rail)

BAA, BAP: 95.5 max

91.5 max.



GT5Y Series — ON Delay Timers

Key features:

- 4PDT, 3A or DPDT, 5A contacts
- 4 time ranges
- Repeat error ±0.2% maximum
- Control settings by hand or screwdriver
- Power ON and timing out LED indicators
- Uses the same sockets and hold-down clips as IDEC’s RY4S and RU series relays



UL, c-UL Listed
File No. E55996



Specifications

		GT5Y-2	GT5Y-4
Rated Operating Voltage		100 to 120V AC (50/60Hz) 200 to 240V AC (50/60Hz) 24V DC 24V AC 12V DC	
Contact Form		DPDT	4PDT
Rated Load	Resistive Load	220V AC, 5A 30V DC, 5A	220V AC, 3A 30V DC, 3A
	Inductive Load	220V AC, 2A 30V DC, 2.5A	220V AC, 0.8A 30V DC, 1.5A
Allowable Contact Power	Resistive Load	1100VA AC 150W DC	660VA AC 90W DC
	Inductive Load Cos ϕ = 0.3 L/R = 7msec	440VA AC 75W DC	176VA AC 45W DC
Allowable Voltage		250V AC, 125V DC	
Allowable Current		5A	3A
Temperature Error		±3% maximum (over -10 to 50°C, reference temperature 20°C)	
Setting Error		±10% maximum	
Reset Time		When turning power off after time up: 0.1 second maximum When turning power off before time up: 1 second maximum	
Insulation Resistance		100M Ω minimum	
Dielectric Strength		2,000V AC, 1 minute (except between contacts of the same pole)	
Vibration Resistance		100N (approximate 10G)	
Shock Resistance		Operating extremes: 100N (approximate 10G) Damage limits: 500N (approximate 50G)	
Power Consumption		100V AC type: 1.5VA (at 50Hz) 200V AC type: 1.6VA (at 50Hz) 24V DC type: 0.9W	
Electrical Life		500,000 operations minimum (220V AC, 5A)	200,000 operations minimum (110V AC, 3A)
Mechanical Life		50,000,000 operations minimum	
Operating Temperature		-10 to +50°C	
Operating Humidity		45 to 85% RH	

1. Minimum applicable load: GT5Y-2: 5V DC, 20mA (reference value); GT5Y-4: 5V DC, 10mA (reference value).
2. Inductive load: cos ϕ = 0.3, L/R = 7msec.

Part Numbering List

Mode of Operation	Contact	Output	Rated Voltage	Time Range	Complete Part No.
ON-Delay	DPDT	220V AC/ 30V DC, 5A	100 to 120V AC	1S/10S/1M/10M	GT5Y-2SN1A100
				3S/30S/3M/30M	GT5Y-2SN3A100
				6S/60S/6M/60M	GT5Y-2SN6A100
			200 to 240V AC	1S/10S/1M/10M	GT5Y-2SN1A200
				3S/30S/3M/30M	GT5Y-2SN3A200
				6S/60S/6M/60M	GT5Y-2SN6A200
			12V DC	1S/10S/1M/10M	GT5Y-2SN1D12
				3S/30S/3M/30M	GT5Y-2SN3D12
				6S/60S/6M/60M	GT5Y-2SN6D12
			24V DC	1S/10S/1M/10M	GT5Y-2SN1D24
				3S/30S/3M/30M	GT5Y-2SN3D24
				6S/60S/6M/60M	GT5Y-2SN6D24
			24V AC	1S/10S/1M/10M	GT5Y-2SN1A24
				3S/30S/3M/30M	GT5Y-2SN3A24
				6S/60S/6M/60M	GT5Y-2SN6A24
	4PDT	220V AC/30V DC, 3A	100 to 120V AC	1S/10S/1M/10M	GT5Y-4SN1A100
				3S/30S/3M/30M	GT5Y-4SN3A100
				6S/60S/6M/60M	GT5Y-4SN6A100
			200 to 240V AC	1S/10S/1M/10M	GT5Y-4SN1A200
				3S/30S/3M/30M	GT5Y-4SN3A200
				6S/60S/6M/60M	GT5Y-4SN6A200
			12V DC	1S/10S/1M/10M	—
				3S/30S/3M/30M	GT5Y-4SN3D12
				6S/60S/6M/60M	—
			24V DC	1S/10S/1M/10M	GT5Y-4SN1D24
				3S/30S/3M/30M	GT5Y-4SN3D24
				6S/60S/6M/60M	GT5Y-4SN6D24
			24V AC	1S/10S/1M/10M	GT5Y-4SN1A24
				3S/30S/3M/30M	GT5Y-4SN3A24
				6S/60S/6M/60M	GT5Y-4SN6A24



For sockets and accessories, see page 995.

Timing Ranges

Code	Scale	Time Range Indication		Time Range
1S	0 to 10	x 0.1	S	0.1 second to 1 second
10S		x 1	S	0.2 second to 10 seconds
1M		x 0.1	M	1.2 seconds to 1 minute
10M		x 1	M	12 seconds to 10 minutes
3S	0 to 3	x 1	S	0.1 second to 3 seconds
30S		x 10	S	0.5 second to 30 seconds
3M		x 1	M	3 seconds to 3 minutes
30M		x 10	M	30 seconds to 30 minutes
6S	0 to 6	x 1	S	0.1 second to 6 seconds
60S		x 10	S	1 second to 60 seconds
6M		x 1	M	6 seconds to 6 minutes
60M		x 10	M	1 minute to 60 minutes

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

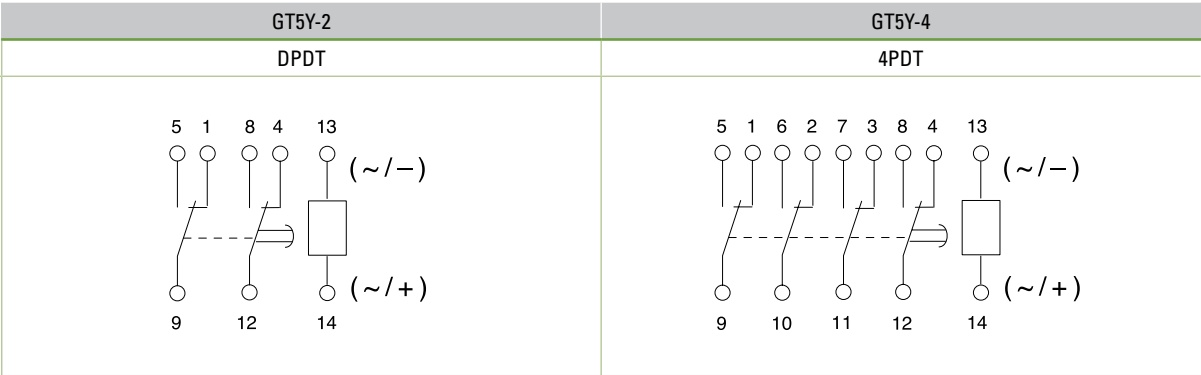
Timers

Contactors

Terminal Blocks

Circuit Breakers

Timing Diagram/Schematics/Electrical Life Curves

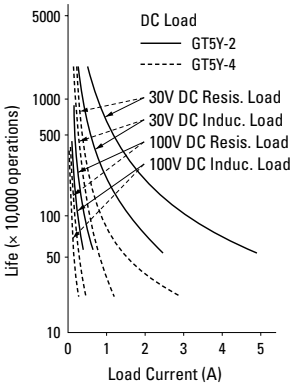
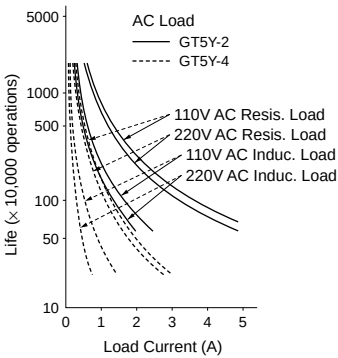


Operation Mode:
ON-Delay

Item	Terminal Number	Operation
Set Time		
Power	13 - 14	
Delayed Contact	1 - 9, 2 - 10	
	3 - 11, 4 - 12 (NC)	
	5 - 9, 6 - 10	
Indicator	7 - 11, 8 - 12 (NO)	
	POWER	
OUT		

For an explanation of timing modes, see page page 994.

Electrical Life Curves



Accessories2

DIN Rail Mounting Accessories

DIN Rail/Surface Mount Sockets and Hold-Down Springs

DIN Rail Mount Socket			Applicable Hold-Down Springs	
Style	Appearance	Part No.	Appearance	Part No.
14-Blade Screw Terminal		SY4S-05		SFA-202
14-Blade Screw Terminal (fingersafe)		SY4S-05C		
DIN Mounting Rail Length 1000mm		BNDN1000		

Panel Mounting Accessories

Part Numbers: Panel Mount Socket and Hold-Down Springs

Panel Mount Socket			Applicable Hold-Down Springs	
Style	Appearance	Part No.	Appearance	Part No.
14-Blade Solder Terminal		SY4S-51		SFA-302

PCB Mounting Accessories

Part Numbers: PCB Mount Sockets with Applicable Hold-Down Springs

PCB Mount Socket			Applicable Hold-Down Springs	
Style	Appearance	Part No.	Appearance	Part No.
14 Blade, PCB Terminal		SY4S-61		SFA-302
14 Blade, PCB Terminal		SY4S-62		SY4S-02F1

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

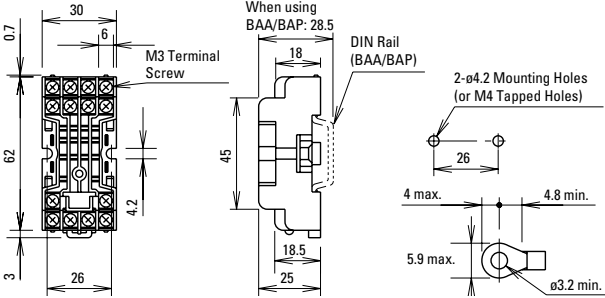
Contactors

Terminal Blocks

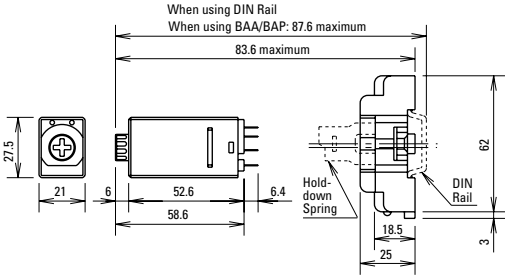
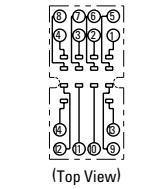
Circuit Breakers

Dimensions

GT5Y Timer, Blade with SY4S-05



Terminal Arrangement



General Instructions for All Timer Series

Load Current

With inductive, capacitive, and incandescent lamp loads, inrush current more than 10 times the rated current may cause welded contacts and other undesired effects. The inrush current and steady-state current must be taken into consideration when specifying a timer.

Contact Protection

Switching an inductive load generates a counter-electromotive force (back EMF) in the coil. The back EMF will cause arcing, which may shorten the contact life and cause imperfect contact. Application of a protection circuit is recommended to safeguard the contacts.

Temperature and Humidity

Use the timer within the operating temperature and operating humidity ranges and prevent freezing or condensation. After the timer has been stored below its operating temperature, leave the timer at room temperature for a sufficient period of time to allow it to return to operating temperatures before use.

Environment

Avoid contact between the timer and sulfurous or ammonia gases, organic solvents (alcohol, benzene, thinner, etc.), strong alkaline substances, or strong acids. Do not use the timer in an environment where such substances are prevalent. Do not allow water to run or splash on the timer.

Vibration and Shock

Excessive vibration or shocks can cause the output contacts to bounce, the timer should be used only within the operating extremes for vibration and shock resistance. In applications with significant vibration or shock, use of hold down springs or clips is recommended to secure a timer to its socket.

Time Setting

The time range is calibrated at its maximum time scale; so it is desirable to use the timer at a setting as close to its maximum time scale as possible. For a more accurate time delay, adjust the control knob by measuring the operating time with a watch before application.

Input Contacts

Use mechanical contact switch or relay to supply power to the timer. When driving the timer with a solid-state output device (such as a two-wire proximity switch, photoelectric switch, or solid-state relay), malfunction may be caused by leakage current from the solid-state device. Since AC types comprise a capacitive load, the SSR dielectric strength should be two or more times the power voltage when switching the timer power using an SSR.

Generally, it is desirable to use mechanical contacts whenever possible to apply power to a timer or its signal inputs. When using solid state devices, be cautious of inrushes and back-EMF that may exceed the ratings on such devices. Some timers are specially designed so that signal inputs switch at a lower voltage than is used to power the timer (models designated as "B" type).

Timing Accuracy Formulas

Timing accuracies are calculated from the following formulas:

Repeat Error = $\pm \frac{1 \times \text{Maximum Measured Value} - \text{Minimum Measured Value}}{2 \text{ Maximum Scale Value}} \times 100\%$

Voltage Error = $\pm \frac{T_v - T_r}{T_r} \times 100\%$

Tv: Average of measured values at voltage V
Tr: Average of measured values at the rated voltage

Temperature Error = $\pm \frac{T_t - T_{20}}{T_{20}} \times 100\%$

Tt: Average of measured values at °C
T20: Average of measured values at 20°C

Setting Error = $\pm \frac{\text{Average of Measured Values} - \text{Set Value}}{\text{Maximum Scale Value}} \times 100\%$

Selection Guide.....	1042
YC1N K Mini Contactors.....	1043
Part Numbers.....	1043
Accessories.....	1045
Specifications.....	1045
Dimensions.....	1046
Electrical Diagrams.....	1046
YC1U Series Contactor AC Coil.....	1047
Part Numbers.....	1047
Accessories.....	1049
Specifications.....	1050
Dimensions.....	1051
Electrical Diagrams.....	1053
YC1N Series Contactors AC Coil.....	1054
Part Numbers.....	1054
Accessories.....	1055
Specifications.....	1056
Dimensions.....	1057
Electrical Diagrams.....	1058

Contactors



www.IDEC.com/contactor



Selection Guide

Selection by Horsepower Rating (AC Coil)

Series	YC1N(K) Mini series	YC1U AC Series	YC1N AC Series
			
Coil Voltage	AC or DC	AC	AC
Amp Range (AC3)	9A & below	9A - 80A	80A - 300A
RoHS Compliance	Yes	Yes	Yes
Page	1043	1047	1054
Approvals			

Bi-Metallic Thermal Overloads

Series	YC9Z	YC9Z	YC9Z
			
Amp Range	0.1 - 12.5 Amps	0.1 - 90 Amps	65 - 185 Amps
Phase Failure	Yes	Yes	Yes
Reset Mode	Manual and Automatic	Manual and Automatic	Manual and Automatic
RoHS Compliant	Yes	Yes	Yes
Page	1045	1049	1049
Approvals			

YC1N(K) Mini Contactors



Key Features:

- Phase with built in NO or NC Auxiliary contact
- Top mount snap-on Auxiliary contact blocks
- 4 Amp & 5.5 Amp AC-3 Ratings
- Comply with IEC 60945, UL508, CSA C22.2 standards



Part Number Key

YC1
N
–
5
B
A120

Coil Voltage Code

N: AC Coil
K: DC Coil

Contactor Size*

(5, 6)

*See selection table for details.

Coil Voltage

A24: 24V AC, 50/60Hz
A120: 120V AC, 50/6-Hz
A240: 240V AC, 50/60Hz
A480: 480V AC, 50/60Hz
D24: 24V DC
D110: 110V DC

Auxiliary Contact Arrangement

Blank: 1NO
B: 1NC

Part Numbers

Selection by Horsepower Rating (AC Coil)

	Rated Power (Hp) per AC3 IEC 60947-4-1							Rated Power (Hp) per UL508 CSA C22.2						Auxiliary Contact	Part Numbers	Coil Voltage
	1-Phase		3-Phase					1-Phase		3-Phase						
	110V	220V	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V			
	0.5	1	2	4	4	4	4	—	—	2	2	3	3	1NO	YC1N-5	+ A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
														1NC	YC1N-5B	
	0.75	1.5	3	5.5	5.5	5.5	5.5	—	—	3	3	5	5	1NO	YC1N-6	
														1NC	YC1N-6B	

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Selection by Horsepower Rating (DC Coil)

	Rated Power (Hp) per AC3 IEC 60947-4-1							Rated Power (Hp) per UL508 CSA C22.2						Auxiliary Contact	Part Numbers	Coil Voltage
	1-Phase		3-Phase					1-Phase		3-Phase						
	110V	220V	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V			
	0.5	1	2	4	4	4	4	—	—	2	2	3	3	1NO	YC1K-5	+ D24: 24V DC D110: 110V DC
														1NC	YC1K-5B	
	0.75	1.5	3	5.5	5.5	5.5	5.5	—	—	3	3	5	5	1NO	YC1K-6	
														1NC	YC1K-6B	

Selection by Amp Rating (AC Coil)

Rated Power (A) per AC3 IEC 60947-4-1							Rated Power (A) per UL508 CSA C22.2						Auxiliary Contact	Part Numbers	Coil Voltage
1-Phase		3-Phase					1-Phase		3-Phase						
110V	220V	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V			
8	7	7.5	7	6.5/6	5	4	—	—	7.5	6.8	4.8	3.9	1NO	YC1N-5	+ A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
													1NC	YC1N-5B	
10.5	10	10.1	9	8.5/8	6.5	5	—	—	11	9.6	7.6	6.1	1NO	YC1N-6	
													1NC	YC1N-6B	

Selection by Amp Rating (DC Coil)

Rated Power (A) per AC3 IEC 60947-4-1							Rated Power (A) per UL508 CSA C22.2							Auxiliary Contact	Part Numbers	Coil Voltage
1-Phase		3-Phase					1-Phase		3-Phase							
110V	220V	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V				
8	7	7.5	7	6.5/6	5	4	—	—	7.5	6.8	4.8	3.9	1NO	YC1K-5	+ D24: 24V DC D110: 110V DC	
													1NC	YC1K-5B		
10.5	10	10.1	9	8.5/8	6.5	5	—	—	11	9.6	7.6	6.1	1NO	YC1K-6		
													1NC	YC1K-6B		

Selection by Kilowatt Rating (AC Coil)

Rated Power (kW) per AC3 IEC 60947-4-1							Auxiliary Contact	Part Numbers	Coil Voltage
1-Phase		3-Phase							
110V	220V	220/240V	380/400V	415/440V	500V	660/690V			
0.37	0.75	1.5	3	3	3	3	1NO	YC1N-5	+ A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
							1NC	YC1N-5B	
0.55	1.1	2.2	4	4	4	4	1NO	YC1N-6	
							1NC	YC1N-6B	

Selection by Kilowatt Rating (DC Coil)

Rated Power (kW) per AC3 IEC 60947-4-1							Auxiliary Contact	Part Numbers	Coil Voltage
1-Phase		3-Phase							
110V	220V	220/240V	380/400V	415/440V	500V	660/690V			
0.37	0.75	1.5	3	3	3	3	1NO	YC1K-5	+ D24: 24V DC D110: 110V DC
							1NC	YC1K-5B	
0.55	1.1	2.2	4	4	4	4	1NO	YC1K-6	
							1NC	YC1K-6B	

Accessories

Description	Current Range	Part Number
	0.1-0.16A	YC9Z-RHU5AP16
	0.16-0.25A	YC9Z-RHU5AP25
	0.25-0.4A	YC9Z-RHU5AP4
	0.35-0.5A	YC9Z-RHU5AP5
	0.45-0.63A	YC9Z-RHU5AP63
	0.55-0.8A	YC9Z-RHU5AP8
	0.75-1A	YC9Z-RHU5A1P0
	0.9-1.3A	YC9Z-RHU5A1P3
	1.1-1.6A	YC9Z-RHU5A1P6
	1.4-2A	YC9Z-RHU5A2P0
	1.8-2.5A	YC9Z-RHU5A2P5
	2.3-3.2A	YC9Z-RHU5A3P2
	2.9-4A	YC9Z-RHU5A4P0
	3.5-4.8A	YC9Z-RHU5A4P8
	4.5-6.3A	YC9Z-RHU5A6P3
	5.5-7.5A	YC9Z-RHU5A7P5
	7.2-10A	YC9Z-RHU5A10P
	9-12.5A	YC9Z-RHU5A12P

Description	Form A (NO)	Form B (NC)	Part Number
Top Mount Auxiliary Contact 	—	2 NC	YC9Z-CNA202M
	—	4 NC	YC9Z-CNA404M
	1 NO	1 NC	YC9Z-CNA211M
	1 NO	3 NC	YC9Z-CNA413M
	2 NO	—	YC9Z-CNA220M
	2 NO	2 NC	YC9Z-CNA422M
	3 NO	1 NC	YC9Z-CNA431M
	4 NO	—	YC9Z-CNA440M
Mechanical Interlock - for Reversing Contactors			YC9Z-CI6
			
Surge Suppressor Unit	120V AC	RC	YC9Z-SS1ES
		VARISTOR	YC9Z-SS2ES
	240V AC	RC	YC9Z-SS1HS
		VARISTOR	YC9Z-SS2HS

Specifications

General Specifications

	YC1N-5/6	YC1K-5/6
Contact Configuration	3A1a or 3A1b	
Making Capacity (A)	10xIe	
Breaking Capacity (A)	8xIe	
Switching Frequency (Operations/Hr)	1,200	
Electrical Life (Operations)	1,000,000	
Mechanical Life (Operations)	5,000,000	
Operating Temperature	-20°C ~ 55°C	
Storage Temperature	-40°C ~ 70°C	
Weight (Kg)	0.18	0.23

Note: Ie = rated operational current

Main Pole Contact Specifications

	YC1N-5/6	YC1K-5/6
Insulation Voltage, Ui (V)	IEC: 690	UL: 600
Operational Voltage, Ue (V)	IEC: 690	UL: 600
Thermal Current, I _{th} (A)	IEC /UL: 20	
Short Circuit Current Rating (KA)	5	
NEMA Size Equivalent (approx.)	00+	

Auxiliary Contacts Specifications

			YC1N-5/6	YC1K-5/6
Insulation Voltage, Ui (V)			IEC /UL: 600/600	
Operational Voltage, Ue (V)			IEC /UL: 600/600	
Thermal Current, I _{th} (A)			AC: 10	DC: 2.5
Operational Current (A) IEC 60947-5-1 UL 508	AC-15 A600	120V	6	
		240V	3	
		380V	1.9	
		480V	1.5	
		500V	1.4	
		600V	1.2	
	DC-13 Q300	125V	0.55	
		250V	0.27	

Coil Specifications

		YC1N-5/6	YC1K-5/6
Pick-up Voltage	50/60Hz	75%	75%
Power Consumption, max. (VA)	Inrush	27	—
	Sealed	5	3
Power Dissipation max. (W)		2	3

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

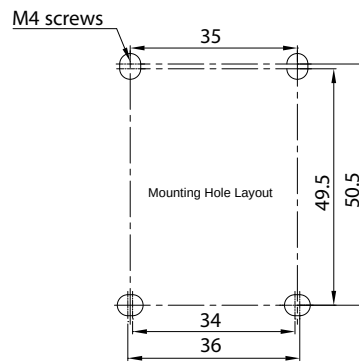
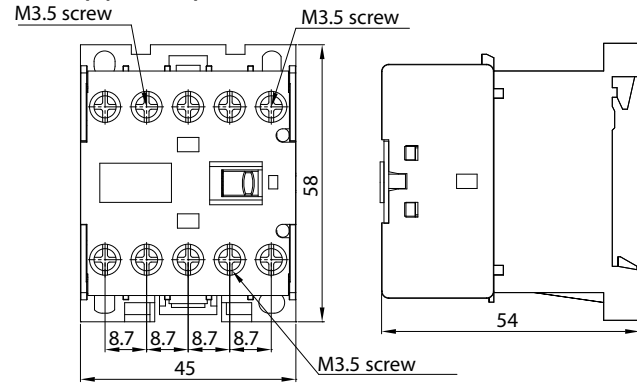
Terminal Blocks

Circuit Breakers

Dimensions (mm)

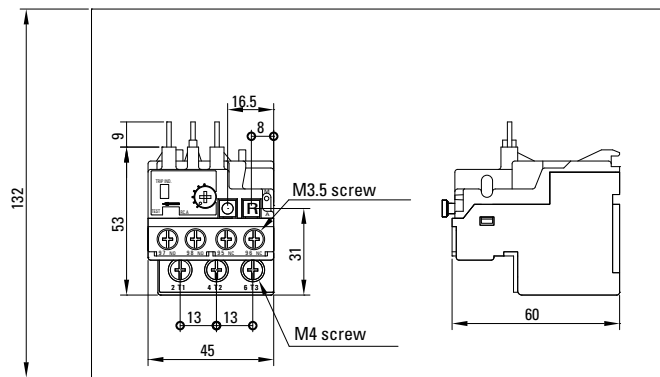
Contactor

YC1N-5/6, YC1K-5/6

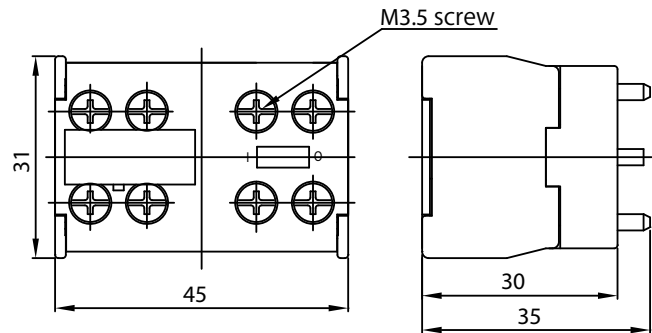


Accessories

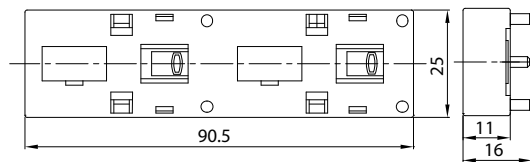
Overload Relay YC9Z-RHU5



Top Mounting Auxiliary Contact YC9Z-CNA

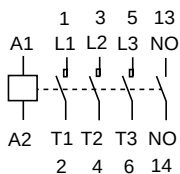


Mechanical Interlock YC9Z-CI6

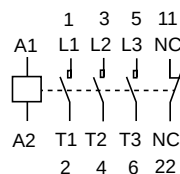


Electrical Diagrams

YC1N-5/6, YC1K-5/6 (1NO Aux.)



YC1N-5/6, YC1K-5/6 (1NC Aux.)



YC1U Series Contactor (AC Coil)



Key Features:

- 3-Phase with built in NO or NC Auxiliary contact
- Side Mount & Top mount snap-on Auxiliary contact blocks
- Comply with IEC 60945, UL508, CSA C22.2 standards



Part Number Key

YC1U - **9** **B** **A120**

Contactor Size*

9, 11, 16, 18, 27, 32, 38, 50, 65, 80

*see selection table for details

Coil Voltage

A24: 24V AC, 50/60Hz
A120: 120V AC, 50/60Hz
A240: 240V AC, 50/60Hz
A480: 480V AC, 50/60Hz

Auxiliary Contact Arrangement

Blank: 1NO (size 9 - 16)
1NO-1NC (size 18 - 38)
2NO-2NC (size 50 - 80)
B: 1NC (size 9 - 16 only)

Part Numbers

Selection by Horsepower Rating

	Rated Power (Hp) per AC3 IEC 60947-4-1							Rated Power (Hp) per UL508 CSA C22.2						Auxiliary Contact	Part Numbers	Coil Voltage
	1-Phase		3-Phase					1-Phase		3-Phase						
	110V	220V	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V			
	0.75	1.5	3.5	5.5	5.5	5.5	5.5	0.75	2	3	3	5	7.5	1NO	YC1U-9	+ A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
														1NC	YC1U-9B	
	0.75	1.5	4	7.5	7.5	7.5	7.5	1	2	5	5	7.5	10	1NO	YC1U-11	
														1NC	YC1U-11B	
	1	2	5.5	10	10	10	10	1.5	3	5	5	10	10	1NO	YC1U-16	
													1NC	YC1U-16B		
	1.5	3	7.5	15	15	15	15	2	3	7.5	7.5	15	15	1NO-1NC	YC1U-18	
	2	4	10	20	20	20	20	2	5	7.5	10	20	20	1NO-1NC	YC1U-27	
	2	5	12	20	20	25	25	3	5	10	15	25	30	1NO-1NC	YC1U-32	
	3	7	15	25	30	30	30	3	7.5	10	15	30	30	1NO-1NC	YC1U-38	
	4	8	20	35	35/40	40	40	5	10	15	20	40	50	2NO-2NC	YC1U-50	
	4	8	25	40	45/50	50	50	5	15	20	25	50	60	2NO-2NC	YC1U-65	
	5.5	10	30	50	54	60	60	7.5	15	25	30	60	60	2NO-2NC	YC1U-80	

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Selection by Amp Rating

Rated Power (A) per AC3 IEC 60947-4-1							Rated Power (A) per UL508 CSA C22.2							Auxiliary Contact	Part Numbers
1-Phase		3-Phase					1-Phase		3-Phase						
110V	220V	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V			
10.5	10.5	11.5	11	10/9	8	6	13.8	12	12	9.6	7.6	9	1NO	YC1U-9	
													1NC	YC1U-9B	
10.5	10.5	12	12	11	9	7	16	12	18	15.2	11	11	1NO	YC1U-11	
													1NC	YC1U-11B	
13.5	14	16	16	15	13	10	20	17	18	15.2	14	11	1NO	YC1U-16	
													1NC	YC1U-16B	
19.5	20.5	23	22	21	19	14	24	17	26	22	21	17	1NO-1NC	YC1U-18	
30	30	30	30	28/27	26	21/20	24	28	25.3	28	27	22	1NO-1NC	YC1U-27	
35	35	35	32	32	30	23/22	34	28	32.2	42	34	32	1NO-1NC	YC1U-32	
39	39	39	38	38	33	25.2/24.2	34	40	32.2	42	40	32	1NO-1NC	YC1U-38	
48	48	55	55	52	45	35	56	50	49	54	52	52	2NO-2NC	YC1U-50	
50	50	65	64	64	55	45	56	68	63	68	65	62	2NO-2NC	YC1U-65	
60	60	75	72	72/70	65	60	80	68	79	80	77	62	2NO-2NC	YC1U-80	

+

Coil Voltage

A24: 24V AC
A120: 120V AC
A240: 240V AC
A480: 480V AC

Selection by Kilowatt Rating

Rated Power (kW) per AC3 IEC 60947-4-1							Auxiliary Contact	Part Numbers
1-Phase		3-Phase						
110V	220V	220/240V	380/400V	415/440V	500V	660/690V		
0.55	1.1	2.5	4	4	4	4	1NO	YC1U-9
							1NC	YC1U-9B
0.55	1.1	3	5.5	5.5	5.5	5.5	1NO	YC1U-11
							1NC	YC1U-11B
0.75	1.5	4	7.5	7.5	7.5	7.5	1NO	YC1U-16
							1NC	YC1U-16B
1.1	2.2	5.5	11	11	11	11	1NO-1NC	YC1U-18
1.5	3	7.5	15	15	15	15	1NO-1NC	YC1U-27
1.5	3.7	9	15	15	18.5	18.5	1NO-1NC	YC1U-32
2.2	5	11	18.5	22	22	22	1NO-1NC	YC1U-38
3	6	15	25	25/30	30	30	2NO-2NC	YC1U-50
3	6	18.5	30	33/37	37	37	2NO-2NC	YC1U-65
4	7.5	22	37	40	45	45	2NO-2NC	YC1U-80

+

Coil Voltage

A24: 24V AC
A120: 120V AC
A240: 240V AC
A480: 480V AC

Accessories

Item	Contactor Size	Current Range	Part Number
	9-27	0.1-0.16	YC9Z-RHU10AP16
		0.16-0.25	YC9Z-RHU10AP25
		0.25-0.4A	YC9Z-RHU10AP40
		0.35-0.5A	YC9Z-RHU10AP5
		0.45-0.63A	YC9Z-RHU10AP63
		0.55-0.8A	YC9Z-RHU10AP8
		0.75-1A	YC9Z-RHU10A1P0
		0.9-1.3A	YC9Z-RHU10A1P3
		1.1-1.6A	YC9Z-RHU10A1P6
		1.4-2A	YC9Z-RHU10A2P0
		1.8-2.5A	YC9Z-RHU10A2P5
		2.3-3.2A	YC9Z-RHU10A3P2
		2.9-4A	YC9Z-RHU10A4P0
		3.5-4.8A	YC9Z-RHU10A4P8
		4.5-6.3A	YC9Z-RHU10A6P3
		5.5-7.5A	YC9Z-RHU10A7P5
		7.2-10A	YC9Z-RHU10A10P
		9-12.5A	YC9Z-RHU10A12P
		11.3-16A	YC9Z-RHU10A16P
		15-20A	YC9Z-RHU10A20P
	27-38	21-25A	YC9Z-RHU10A25P
		24.5-30A	YC9Z-RHU10A30P
		15-20A	YC9Z-RHU10A220
		17.5-21.5A	YC9Z-RHU10A21P
		21-25A	YC9Z-RHU10A225
		24.5-30A	YC9Z-RHU10A230
		29-36A	YC9Z-RHU10A36P
		24.5-36A	YC9Z-RHU80A436
		35-47A	YC9Z-RHU80A447
		17-25A	YC9Z-RHU80A325
	50-80	24.5-36A	YC9Z-RHU80A336
		35-47A	YC9Z-RHU80A347
		45-60A	YC9Z-RHU80A360
		58-75A	YC9Z-RHU80A75P
		72-90A	YC9Z-RHU80A90P

Item	Part Number
	for YC1U-9,11, 16, 18, 27, 32, 38
	YC9Z-CI18
	for YC1U-50, 65, 80
	YC9Z-CI35

Item			Part Number
Side Mount Auxiliary Contact 	for YC1U-9 thru 38 1NO-1NC (1a1b)		YC9Z-CNA111SR
Surge Suppressor Unit	120V AC	RC	YC9Z-SS1E
		VARISTOR	YC9Z-SS2E
	240V AC	RC	YC9Z-SS1H
		VARISTOR	YC9Z-SS2H

Item	Form A (NO)	Form B (NC)	Part Number
Top Mount Auxiliary Contact 	—	2NC	YC9Z-CUA202
	1NO	1NC	YC9Z-CUA211
	2NO	—	YC9Z-CUA220
	2NO	2NC	YC9Z-CUA422
	3NO	1NC	YC9Z-CUA431
	4NO	—	YC9Z-CUA440

Item	Size	Coil Voltage	Part Number
Replacement Coils	9-27	24V AC	YC9Z-LCU22A24*
		110V AC	YC9Z-LCU22A110
		120V AC	YC9Z-LCU22A120*
		208V AC	YC9Z-LCU22A208
		220V AC	YC9Z-LCU22A220
		240V AC	YC9Z-LCU22A240*
		480V AC	YC9Z-LCU22A480*
	27-38	24V AC	YC9Z-LCU38A24*
		110V AC	YC9Z-LCU38A110
		120V AC	YC9Z-LCU38A120*
		208V AC	YC9Z-LCU38A208
		220V AC	YC9Z-LCU38A220
		240V AC	YC9Z-LCU38A240*
		480V AC	YC9Z-LCU38A480*
	50-80	24V AC	YC9Z-LCU80A24*
		110V AC	YC9Z-LCU80A110
		120V AC	YC9Z-LCU80A120*
		208V AC	YC9Z-LCU80A208
		220V AC	YC9Z-LCU80A220
		240V AC	YC9Z-LCU80A240*
		480V AC	YC9Z-LCU80A480*

* Standard stock coil voltages.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Specifications

General Specifications

	YC1U-9	YC1U-11	YC1U-16	YC1U-18	YC1U-27	YC1U-32	YC1U-38	YC1U-50	YC1U-65	YC1U-80
Contact Configuration	3A1a , 3A1b			3A1a1b	3A1a1b			3A2a2b		
Making Capacity (A)	10xIe			10xIe	10xIe			10xIe		
Breaking Capacity (A)	8xIe			8xIe	8xIe			8xIe		
Switching Frequency (Operations/ Hr)	1200			1200	1200			1200		
Electrical Life (Operations)	1,000,000			1,000,000	1,000,000			500,000	1,000,000	1,000,000
Mechanical Life (Operations)	5,000,000			5,000,000	5,000,000			5,000,000		
Operating Temperature	-20°C ~ 55°C									
Storage Temperature	-40°C ~ 70°C									
Weight (Kg)	0.3			0.4	0.7			1.3		

Note: Ie = rated operational current

Main Pole Contact Specifications

	YC1U-9	YC1U-11	YC1U-16	YC1U-18	YC1U-27	YC1U-32	YC1U-38	YC1U-50	YC1U-65	YC1U-80
Insulation Voltage, Ui (V)	IEC: 660 UL: 600			IEC: 660 UL: 600	IEC: 1000 UL: 600			IEC: 660 UL: 600		
Operational Voltage, Ue (V)	IEC: 660 UL: 600			IEC: 660 UL: 600	IEC: 690 UL: 600			IEC: 660 UL: 600		
Thermal Current, I _{th} (A)	IEC: 25 UL: 24			IEC: 32 UL: 35	IEC: 50 UL: 45	IEC: 60 UL: 50	IEC: 60 UL: 55	IEC: 70 UL: 72	IEC: 80/100 UL: 85	IEC: 100 UL: 104
Short Circuit Current Rating (KA)	5			5	5			10		
NEMA Size Equivalent (approx.)	0	0+	0+	1+	1	2	2	2+	2+	3+

Auxiliary Contacts Specifications

			YC1U-9	YC1U-11	YC1U-16	YC1U-18	YC1U-27	YC1U-32	YC1U-38	YC1U-50	YC1U-65	YC1U-80
Contact Configuration			1a or 1b			1a1b	1a1b			1a1b		
Insulation Voltage, Ui (V)			IEC: 600 UL: 600			IEC: 660 UL: 600	IEC: 690 UL: 600			IEC: 660 UL: 600		
Operational Voltage, Ue (V)			IEC: 600 UL: 600			IEC: 600 UL: 600	IEC: 690 UL: 600			IEC: 660 UL: 600		
Thermal Current, I _m (A)			AC: 10 DC: 2.5									
Contact Rating Code Designator UL			A600 Q300									
Operational Current (A) IEC 60947-5-1 UL 508	AC-15 A600	120V	6									
		240V	3									
		380V	1.9									
		480V	1.5									
		500V	1.4									
		600V	1.2									
	DC-13 Q300	125V	0.55									
		250V	0.27									

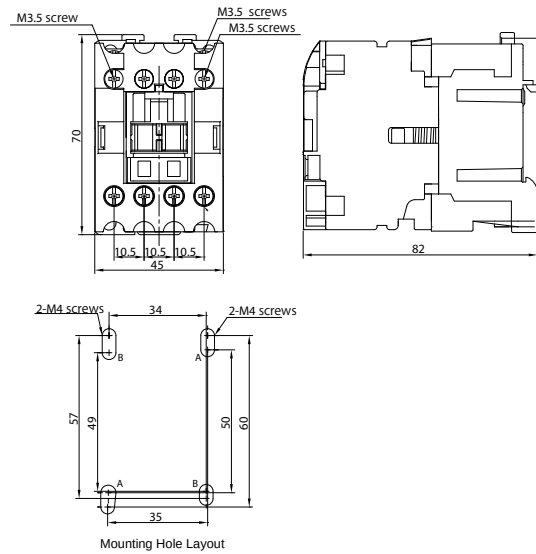
Coil Specifications

	YC1U-9	YC1U-11	YC1U-16	YC1U-18	YC1U-27	YC1U-32	YC1U-38	YC1U-50	YC1U-65	YC1U-80
Pick-up Voltage	50-60Hz	70%			75%	75%			75%	
Power Consumption, max. (VA)	Inrush	70			70	150 (cos ϕ = 0.7)			280	
	Sealed	12			12	15 (cos ϕ = 0.3)			32	
Power Dissipation max. (W)		2-4			2-4	5			6-7.5	

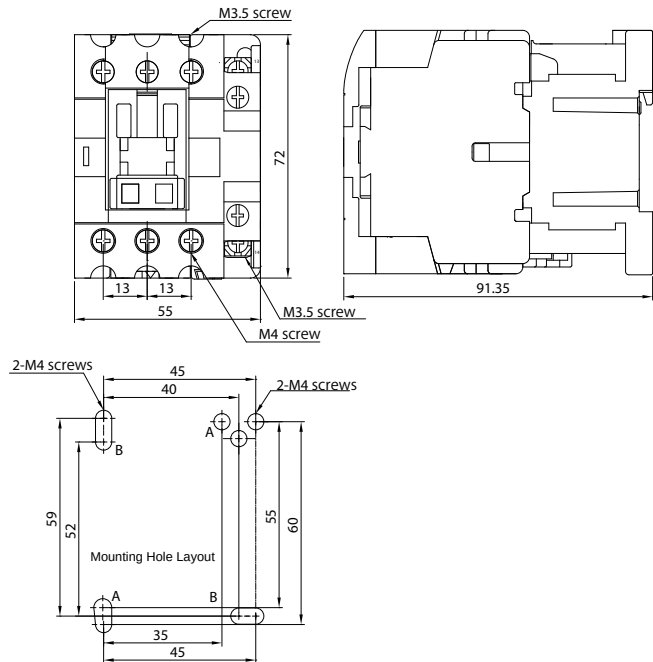
Dimensions (mm)

Contactors

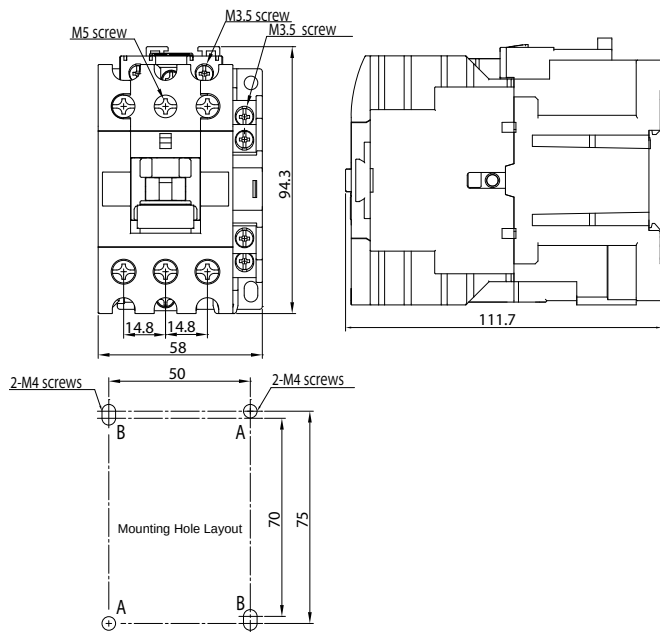
YC1U-9, YC1U-11, YC1U-16



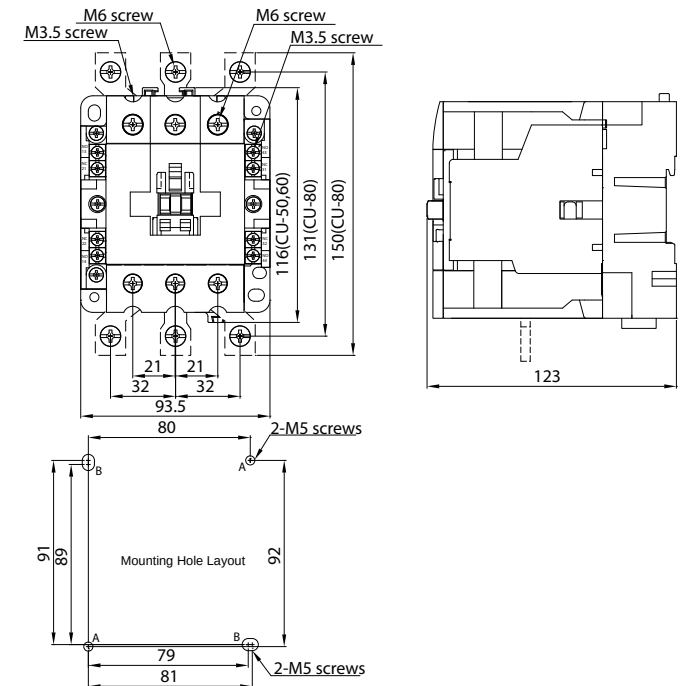
YC1U-18



YC1U-27, YC1U-32, YC1U-38



YC1U-50, YC1U-65, YC1U-80



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

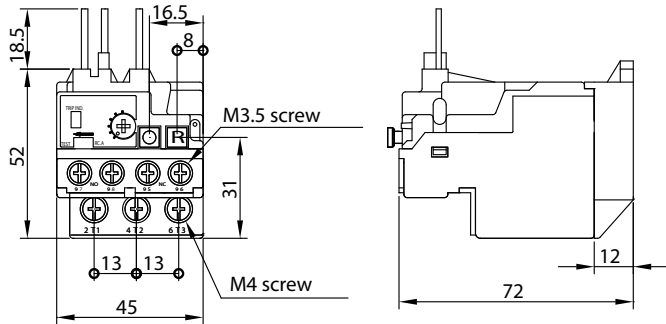
Terminal Blocks

Circuit Breakers

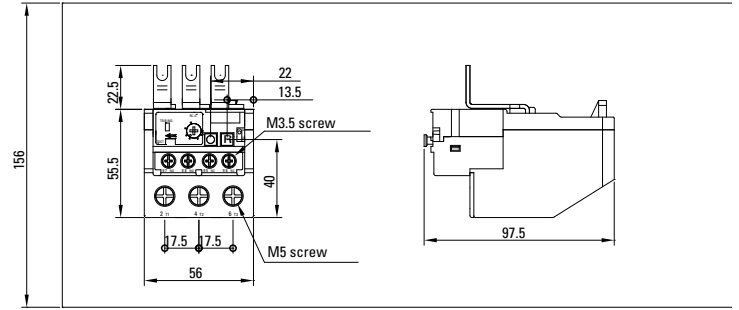
Dimensions (mm)

Overload Relays

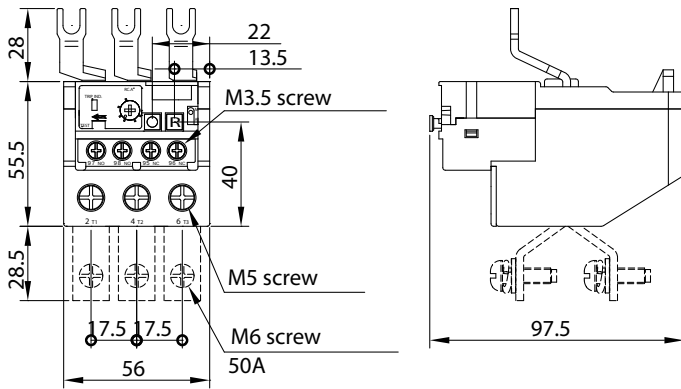
YC9Z-RHU10 (for YC1U-9, 11, 16, 18)



YC9Z-RHU10 (for YC1U-27, 32, 38, 40)

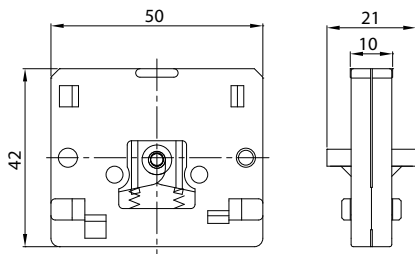


YC9Z-RHU80 (for YC1U-50, 65, 80)

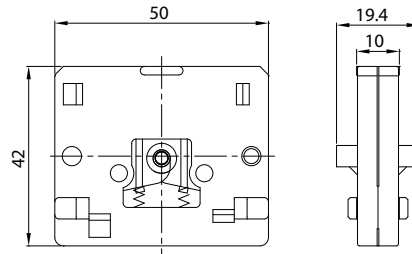


Mechanical Interlocks

YC9Z-CI18 (for YC1U-9, 11, 16, 27, 32, 38)

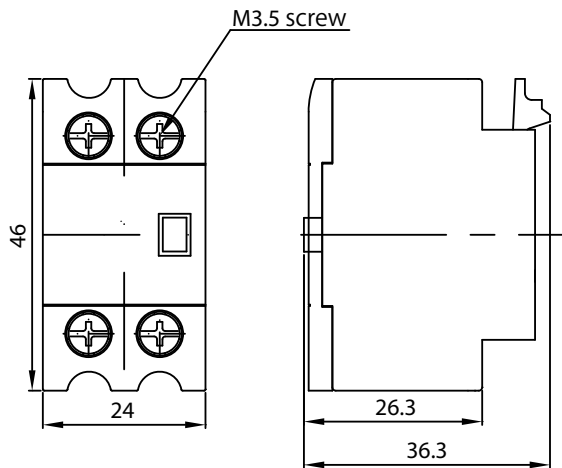


YC9Z-CI135 (for YC1U-50, 65, 80)

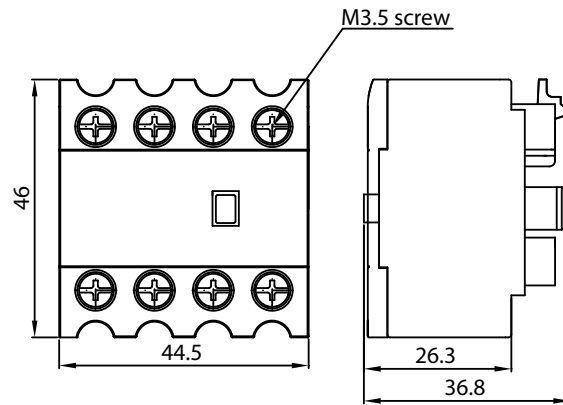


Top Mounting Auxiliary Contacts

YC9Z-CUA2

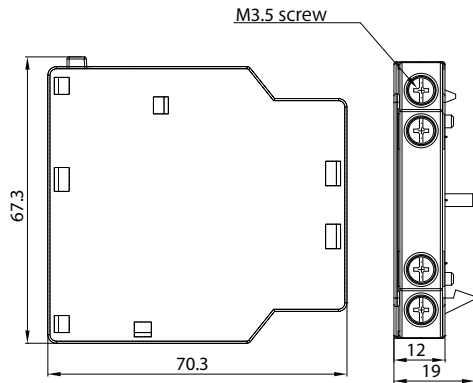


YC9Z-CUA4



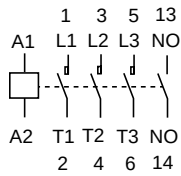
Side Mounting Auxiliary Contact

YC9Z-CNA111SR (1a1b for YC1U-9 to YC1U-38)

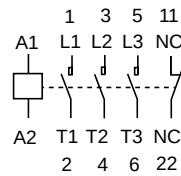


Electrical Diagrams

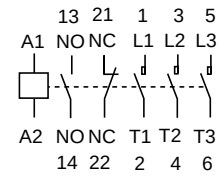
YC1U-9/11/16 (1NO Aux.)



YC1U-9/11/16 (1NC Aux.)



YC1U-18 to YC1U-38 (1NO-1NC Aux.)



YC1N Series Contactors (AC Coil)



Key Features:

- 3-Phase Contactor with 2NO & 2NC Auxillary Contacts
- Side Mount Auxiliary contact blocks
- Comply with IEC 60945, UL508, CSA C22.2 standards



Part Number Key

YC1N – 125 A120

Contactor Size*

100, 125, 150, 180, 220, 300

Coil Voltage

A24: 24V AC, 50/60Hz
A120: 120V AC, 50/6-Hz
A240: 240V AC, 50/60Hz
A480: 480V AC, 50/60Hz

*see selection table for details

Part Numbers

Selection by Horsepower Rating

	Rated Power (Hp) per AC3 IEC 60947-4-1					Rated Power (Hp) per UL508 CSA C22.2						Auxiliary Contact	Part Numbers	Coil Voltage
	3-Phase					1-Phase		3-Phase						
	220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V			
	40	80	80	85	85	10	15	30	40	75	100	2NO-2NC	YC1N-100	+ A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
	54	100	100	100	100	—	—	40	50	100	100		YC1N-125	
	60	110	110	125	136	—	—	50	75	125	125		YC1N-150	
	75	125	136	150	150	—	—	60	75	150	150		YC1N-180	
	85	160	170	180	180	—	—	75	100	200	200		YC1N-220	
	120	220	220	220	270	—	—	100	125	250	250		YC1N-300	

Selection by Amp Rating

Rated Power (A) per AC3 IEC 60947-4-1					Rated Power (A) per UL508 CSA C22.2						Auxiliary Contact	Part Numbers	Coil Voltage	
3-Phase					1-Phase		3-Phase							
220/240V	380/400V	415/440V	500V	660/690V	110/120V	220/240V	200/208V	230/240V	440/480V	575V				
115	115	105	93	75	100	68	92	104	96	99	2NO-2NC	YC1N-100	+	A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
138	138	138	105	85	—	—	120	130	124	99		YC1N-125		
150	147	138	129	107	—	—	150	154	156	125		YC1N-150		
182	179	182	156	118	—	—	177	192	180	144		YC1N-180		
225	225	220	190	140	—	—	221	248	240	192		YC1N-220		
300	300	300	250	220	—	—	285	312	302	242		YC1N-300		

Selection by Kilowatt Rating

Rated Power (kW) per AC3 IEC 60947-4-1					Auxiliary Contact	Part Numbers	Coil Voltage
3-Phase							
220/240V	380/400V	415/440V	500V	660/690V			
30	60	60	65	65	2NO-2NC	YC1N-100	+ A24: 24V AC A120: 120V AC A240: 240V AC A480: 480V AC
40	75	75	75	75		YC1N-125	
45	80	80	90	100		YC1N-150	
55	95	100	110	110		YC1N-180	
65	120	132	132	132		YC1N-220	
90	160	160	160	220		YC1N-300	

Accessories

Item	Size	Current Range	Part Number
Overload Relay	100, 125	65~95A	YC9Z-RHN100A95P
		85~125A	YC9Z-RHN100A125
		110~160A	YC9Z-RHN100A160
	150	65~95A	YC9Z-RHN150A95P
		85~125A	YC9Z-RHN150A125
		110~160A	YC9Z-RHN150A160
	180	110~160A	YC9Z-RHN180A160
		125~185A	YC9Z-RHN180A185
	220, 300	110~160A	YC9Z-RHN220A160
		125~185A	YC9Z-RHN220A185

Item	Part Number		
Mechanical Interlock	YC9Z-CI100		
Side Mount Auxiliary Contact	YC9Z-CNA111BC		
Surge Suppressor Unit	120V AC	RC	YC9Z-SS1E
		VARISTOR	YC9Z-SS2E
	240V AC	RC	YC9Z-SS2H
		VARISTOR	YC9Z-SS1H

Item	Contactor Size	Coil Voltage	Part Number
Replacement Coils	100, 125	24VAC	YC9Z-LCN125A24*
		110VAC	YC9Z-LCN125A110
		120VAC	YC9Z-LCN125A120*
		208VAC	YC9Z-LCN125A208
		220VAC	YC9Z-LCN125A220
		240VAC	YC9Z-LCN125A240*
		480VAC	YC9Z-LCN125A480*
	150, 180	24VAC	YC9Z-LCN180A24*
		110VAC	YC9Z-LCN180A110
		120VAC	YC9Z-LCN180A120*
		208VAC	YC9Z-LCN180A208
		220VAC	YC9Z-LCN180A220
		240VAC	YC9Z-LCN180A240*
		480VAC	YC9Z-LCN180A480*
	220, 300	24VAC	YC9Z-LCN300A24*
		110VAC	YC9Z-LCN300A110
		120VAC	YC9Z-LCN300A120*
		208VAC	YC9Z-LCN300A208
		220VAC	YC9Z-LCN300A220
		240VAC	YC9Z-LCN300A240*
		480VAC	YC9Z-LCN300A480*

* Standard stock coil voltages.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Specifications

General Specifications

	YC1N-100	YC1N-125	YC1N-150	YC1N-180	YC1N-220	YC1N-300
Contact Configuration	3A2a2b					
Making Capacity (A)	10xIe					
Breaking Capacity (A)	8xIe					
Switching Frequency (Operations/ Hr)	1,200					
Electrical Life (Operations)	1,000,000					
Mechanical Life (Operations)	5,000,000					
Operating Temperature	-20°C ~ 55°C					
Storage Temperature	-40°C ~ 70°C					
Weight (Kg)	2.2		4.1		6.7	

Note: Ie = rated operational current

Main Pole Contact Specifications

	YC1N-100	YC1N-125	YC1N-150	YC1N-180	YC1N-220	YC1N-300
Insulation Voltage, Ui (V)	IEC: 1000 UL: 600		IEC: 1000 UL:600		IEC: 1000 UL:600	
Operational Voltage, Ue (V)	IEC: 690 UL:600		IEC: 690 UL:600		IEC: 690 UL:600	
Thermal Current, I _{th} (A)	IEC: 135 UL: 130	IEC/UL: 150	IEC/UL: 200	IEC/UL: 240	IEC/UL: 260	IEC/UL: 350
Short Circuit Current Rating (KA)	10		10		18	
NEMA Size Equivalent (approx.)	3	4	4	4	4	5

Auxiliary Contacts Specifications

	YC1N-100	YC1N-125	YC1N-150	YC1N-180	YC1N-220	YC1N-300
Insulation Voltage, Ui (V)	IEC: 690 UL:600					
Operational Voltage, Ue (V)	IEC: 690 UL: 600					
Thermal Current, I _{th} (A)	AC: 10 DC: 2.5					
Contact Rating Code Designation UL	A600 Q300					
Operational Current (A) IEC 60947-5-1 UL 508	AC-15 A600	120V	6			
		240V	3			
		380V	1.9			
		480V	1.5			
		500V	1.4			
		600V	1.2			
	DC-13 Q300	125V	0.55			
		250V	0.27			

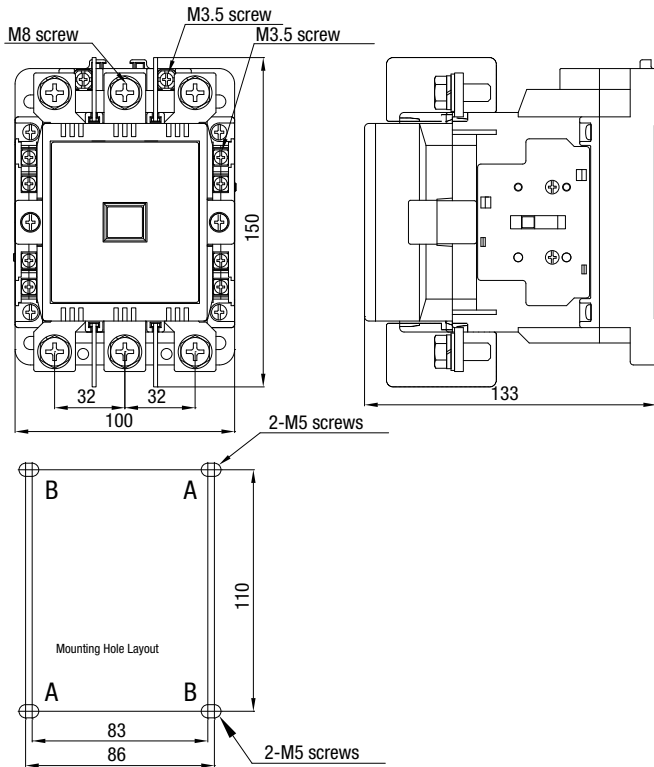
Coil Specifications

		YC1N-100/YC1N-125	YC1N-150/YC1N-180	YC1N-220/YC1N-300
Pick-up Voltage	50/60Hz	75%	75%	75%
Drop-out Voltage		60%	45%	45%
Power Consumption, max. (VA)	Inrush	560	700	300
	Sealed	63	88	63
Power Dissipation max. (W)		6-11.6	25-35	9-15

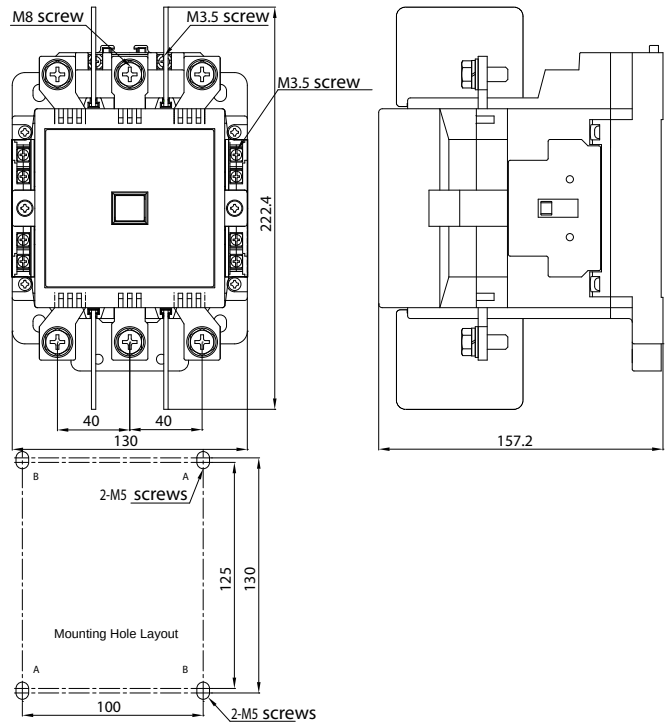
Dimensions (mm)

Contactors

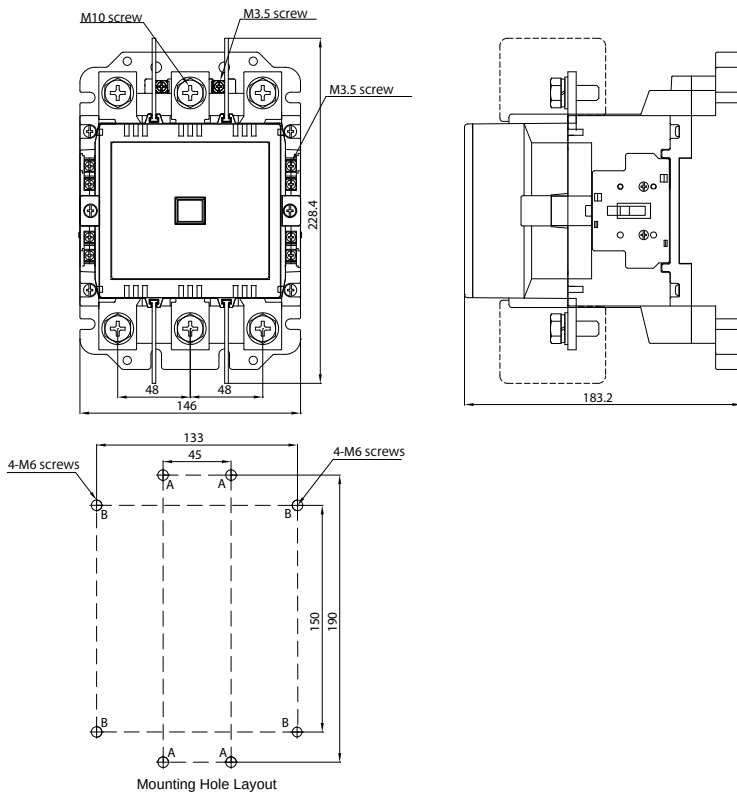
YC1N-100, YC1N-125



YC1N-150, YC1N-180



YC1N-220, YC1N-300



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

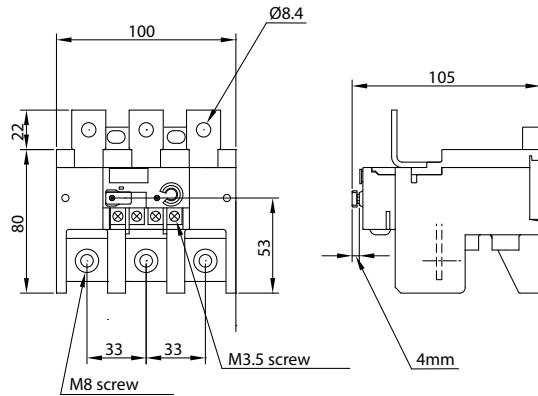
Terminal Blocks

Circuit Breakers

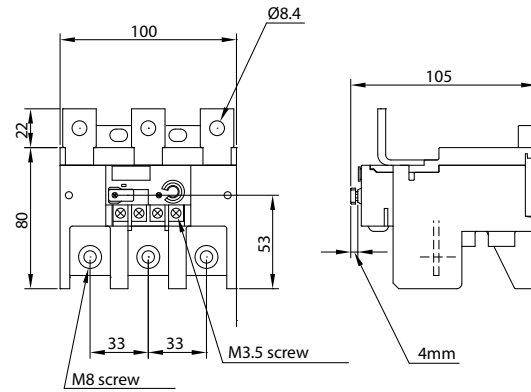
Dimensions (mm)

Overload Relay

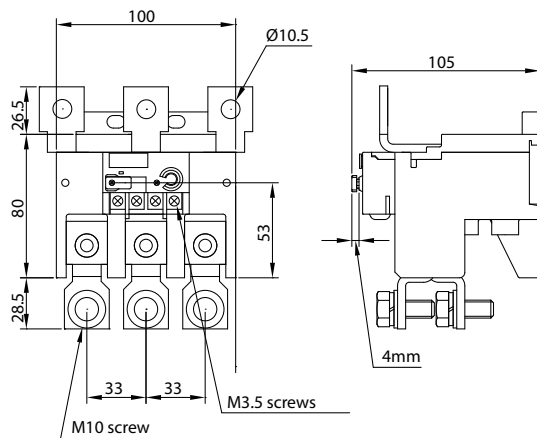
YC9Z-RHN100



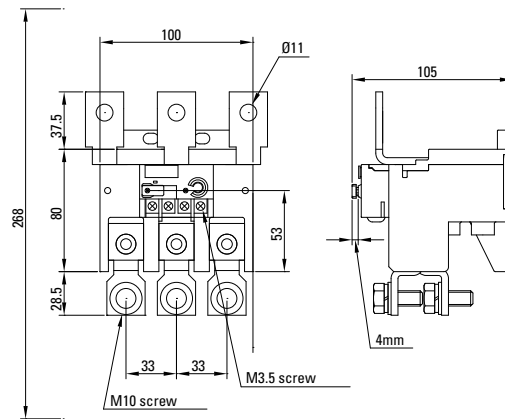
YC9Z-RHN150



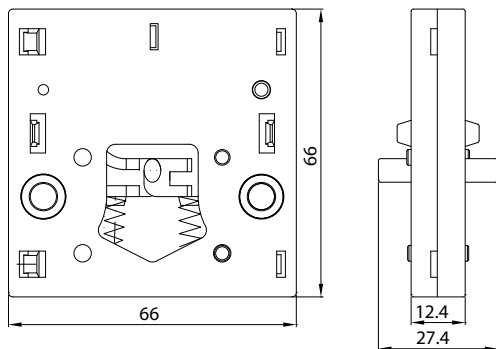
YC9Z-RHN180



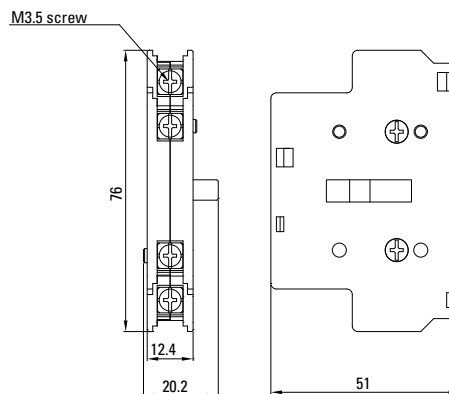
YC9Z-RHN220



Mechanical Interlock YC9Z-CI100



Side Mounting Auxiliary Contact YC9Z-CNA111BC (1a1b)



Electrical Diagram

YC1N-100 to YC1N-300



Selection Guides	1060
General Purpose Terminal Blocks	1061
BN/BNH Modular Terminal & Fuse Blocks	1061
BN High Current Power Blocks	1065
BA One Piece Terminal/Fuse Blocks & Small Current Power Blocks	1067
BX Break-Out Modules.....	1077

Terminal Blocks



www.IDEC.com/terminalblocks



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Selection Guide

Description	Appearance	Page	Current
Modular DIN Rail Terminal Blocks		1061	10A to 150A
Modular DIN Rail Fuse Holders		1063	10A maximum
One-Piece Power Blocks (DIN rail and surface mount)		1065	200A to 350A
One-Piece DIN Rail Terminal Blocks		1067	15A to 40A
One-Piece DIN Rail Fuse Holders		1068	10A maximum
DIN Rail Break-Out Modules		1077	1A maximum

Terminal Blocks

- Key features of IDEC terminal blocks include:**
- Molded from UL94-V0 material with excellent flame- and shock-resistance
 - Mounts on a standard 35mm DIN rail
 - Marking strips and dust covers are available
 - Control circuit, power circuits, and fuse blocks, are available
 - Sectional or one-piece construction

Circuit Breakers

Specifications	Insulation Voltage	600V
	Dielectric Strength	2,500V AC, 1 minute
	Insulation Resistance	100MΩ minimum
	Operating Temperature	−25 to +55°C
	Operating Humidity	45 to 85% RH

BNH/BN Series



Key features:

- Touch-down terminals with spring-loaded captive screws
- Jumpers available up to 50A model
- Fuse block with or without blown-fuse indicator in neon or LED
- Mounts on 35mm standard DIN rail



UL Recognized
File No. E78117



CSA Certified
File No. LR64803



File No. R9551701
J9551516 (power blocks)
R9650688 (dual-deck blocks)



Specifications

Model		BNH10W	BNH15MW	BNH15LW	BNH30W
Appearance					
Width		0.275" (7mm)	0.315" (8mm)	0.413" (10.5mm)	0.472" (12mm)
Approvals		UL, CSA, TUV	UL, CSA, TUV	UL, CSA, TUV	UL, CSA, TUV
No. of Poles		1	1	1	1
Wire Sizes		22 to 16 AWG	22 to 14 AWG	22 to 14 AWG	18 to 10 AWG
Voltage/Current		600V / 10A	600V / 10A	600V / 15A	600V / 30A
Terminals	Size	M3	M3	M3.5	M4
	Type	Touch-down	Touch-down	Touch-down	Touch-down
Mounting		35mm DIN rail	35mm DIN rail	35mm DIN rail	35mm DIN rail
Terminal Torque	(N-m)	0.6 - 1.0	0.6 - 1.0	1.0 - 1.3	1.4 - 2.0
	(in-lbs.)	5.3 - 8.9	5.3 - 8.9	8.9 - 11.5	12.4 - 17.8
End Plate		BNE15W	BNE15W	BNE15W	BNE30W
DIN Rail Stop		BNL-5	BNL-5	BNL-5	BNL-5
Dust Cover		BNC230	BNC230	BNC230	BNC230
Marking Strip	PVC	BNM7	BNM7	BNM7	BNM7
	Fiberglass	BNM9	BNM9	BNM9	BNM9
	End clip	BNM3	BNM3	BNM3	BNM3
Ring Terminal Jumpers		BNJ16	BNJ26W	BNJ46	BNJ56
Fork Terminal Jumpers		BNJ16F	BNJ26FW	BNJ46F	BNJ56F



1. BNDN1000 aluminum DIN rails are available in 1 meter lengths.
2. Marking strips are sold in 1 meter lengths.
3. Most jumpers are provided with 6 poles (except for BNH50W jumper that is 2-poles only).
4. Remove the "H" in the terminal block part number for standard screw type (ex. BNH10W becomes BN10W).

Specifications, continued

Model		BNH50W	BN75W	BN150W	BNDH15W
Appearance					
Width		0.610" (15.5mm)	0.787" (20mm)	1.024" (26mm)	0.315" (8mm)
Approvals		UL, CSA, TUV	UL, CSA, TUV	UL, CSA, TUV	UL, CSA, TUV
No. of Poles		1	1	1	2
Wire Sizes		16 to 6 AWG	16 to 4 AWG	16 to 0 AWG	22 to 14 AWG
Voltage/Current		600V / 50A	600V / 75A	600V / 150A	600V / 10A
Terminals	Size	M5	M6	M8	M3
	Type	Touch-down	Hex bolt	Hex bolt	Touch-down
Mounting		35mm DIN rail	35mm DIN rail	35mm DIN rail	35mm DIN rail, surface
Terminal Torque	(N-m)	2.6 - 3.7	3.9 - 5.4	10 - 13.5	0.6 - 1.0
	(in-lbs.)	23.1 - 32.8	34.6 - 47.9	88.8 - 119.8	5.3 - 8.9
End Plate		BNE50W	BNE75W	BNE150W	BNDE15W
DIN Rail Stop		BNL-5	BNL-6	BNL-6	BNL-8
Dust Cover		BNC320	BNC420	BNC520	BNC230 (top level) BNC240 (bottom Level)
Marking Strip	PVC	BNM7	BNM7	BNM7	BNM7
	Fiberglass	BNM9	BNM9	BNM9	BNM9
	End clip	BNM3	BNM3	BNM3	BNM3
Connecting Rods		—	—	—	BNR1 10.34" (265mm) BNR2 19.69" (500mm)
Connecting Nuts		—	—	—	BNN1 (2 pieces)
Base Mount Brackets		—	—	—	BNDL2
Ring Terminal Jumpers		BNJ62 (2 pole)	—	—	BNJ26
Fork Terminal Jumpers		—	—	—	BNJ26FW



1. BNDN1000 aluminum DIN rails are available in 1 meter lengths.
2. Marking strips are available in 1 meter lengths.
3. Most jumpers are six poles (except for BNJ62 which is 2 poles only).
4. Remove the "H" in the terminal block part number for standard screw type (ex. BNH50W becomes BN50W).

Specifications, continued

Model		BNF10SW	BNF10NW	BNF10DW
Appearance				
Width		0.591" (15mm)	0.591" (15mm)	0.591" (15mm)
Blown Fuse Indicator		None	Neon (100–300VAC)	LED (24V DC)
Approvals		UL, CSA	UL, CSA	UL, CSA
No. of Poles		1	1	1
Wire Sizes		18 to 10 AWG	18 to 10 AWG	18 to 10 AWG
Voltage/Current		600V/10A maximum	600V/10A maximum	600V/10A maximum
Terminals	Size	M4	M4	M4
	Type	Standard screw	Standard screw	Standard screw
Mounting		35mm DIN rail	35mm DIN rail	35mm DIN rail
Terminal Torque	(N-m)	1.4 - 2.0	1.4 - 2.0	1.4 - 2.0
	(in-lbs.)	12.4 - 17.8	12.4 - 17.8	12.4 - 17.8
End Plate		BNE20	BNE20	BNE20
DIN Rail Stop		BNL-5	BNL-5	BNL-5
Dust Cover		—	—	—
Marking Strip		BNM7	BNM7	BNM7
Applicable Fuse Size		1/4" x 1-1/4" (6.35 x 31.8mm)	1/4" x 1-1/4" (6.35 x 31.8mm)	1/4" x 1-1/4" (6.35 x 31.8mm)



1. BNDN1000 aluminum DIN rails are available in 1 meter lengths.
2. Fuses not included.

Dimensions

BNH Series

Part No.	Diagrams	
BNH10W BNH15MW		
BNH15LW BNH30W		
BNH50W		

BN Series

Part No.	Diagrams	
BN75W BN150W		

Part No.	Diagrams	
BNF10SW BNF10NW BNW10DW		

BN Power Block Series



Key features:

- Up to 350A are available for DIN rail or direct mounting on panel surfaces
- 2, 3, 4 pole models available



UL Recognized
File No. E78117



CSA Certified
File No. LR64803



File No. J9551516

Specifications

Model	BN200NW# (replace # with the number of poles)	BN400NW# (replace # with the number of poles)	BN200NW#K (replace # with the number of poles)	BN400NW#K (replace # with the number of poles)
Appearance				
Width	See dimension table on page 1066	See dimension table on page 1066	See dimension table on page 1066	See dimension table on page 1066
Approvals	UL, CSA, TUV	UL, CSA, TUV	UL, CSA, TUV	UL, CSA, TUV
No. of Poles	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4
Wire Sizes	0000 AWG	400 mcm	0000 AWG	400 mcm
Voltage/Current	600V / 200A	600V / 350A	600V / 200A	600V / 350A
Terminals	Size	M10 stud	M10 stud	M12 stud
	Type	17mm hex	19mm hex	19mm hex
Mounting	35mm DIN rail	35mm DIN rail	Surface	Surface
Terminal Torque	(N-m)	21 - 28	21 - 28	38 - 49
	(in-lbs.)	186 - 249	186 - 249	337 - 435
DIN Rail Stop	BNL-8	BNL-8	—	—
Dust Cover	Included	Included	Included	Included
Marking Strip	Included	Included	Included	Included



1. BNDN1000 aluminum DIN rails are available in 1 meter lengths.

Dimensions

Part No.	Diagram									
BN200NW BN400NW										
Part No.	No. of poles	Dim A	Dim B	Dim C	Dim D	Dim E	Dim F	Dim G	Dim H	Dim I
BN200NW	2-Pole	3.04" (78mm)	1.44" (37mm)	1.29" (33mm)	0.156" (4mm)	Terminal stud M10	1.33" (34mm)	2.59" (66.5mm)	2.56" (65mm)	3.51" (90mm)
	3-Pole	4.49" (115mm)	1.44" (37mm)	1.29" (33mm)	0.156" (4mm)	Terminal stud M10	1.33" (34mm)	2.59" (66.5mm)	2.56" (65mm)	3.51" (90mm)
	4-Pole	5.93" (152mm)	1.44" (37mm)	1.29" (33mm)	0.156" (4mm)	Terminal stud M10	1.33" (34mm)	2.59" (66.5mm)	2.56" (65mm)	3.51" (90mm)
BN400NW	2-Pole	4.41" (113mm)	2.22" (57mm)	2.03" (52mm)	0.195" (5mm)	Terminal stud M12	1.48" (38mm)	3.18" (81.5mm)	3.12" (80mm)	4.68" (120mm)
	3-Pole	6.86" (176mm)	2.22" (57mm)	2.03" (52mm)	0.195" (5mm)	Terminal stud M10	1.48" (38mm)	3.18" (81.5mm)	3.12" (80mm)	4.68" (120mm)
	4-Pole	9.09" (233mm)	2.22" (57mm)	2.03" (52mm)	0.195" (5mm)	Terminal stud M10	1.48" (38mm)	3.18" (81.5mm)	3.12" (80mm)	4.68" (120mm)

Part No.	Diagram									Mounting Hole Dimension			
BN200NW#K BN400NW#K													
Part No.	No. of poles	Dim A	Dim B	Dim C	Dim D	Dim E	Dim F	Dim G	Dim H	Dim I	Dim J	Dim K	Dim L
BN200NW#K	2-Pole	3.04" (78mm)	3.9" (100mm)	4.52" (116mm)	3.9" (100mm)	Terminal stud M10	Ø 0.312" (8mm) 3 holes	1.33" (34mm)	1.44" (37mm)	1.29" (33mm)	0.156" (4mm)	2.59" (66.5mm)	2.54" (65mm)
	3-Pole	4.49" (115mm)	5.34" (137mm)	5.97" (153mm)	5.34" (137mm)								
	4-Pole	5.93" (152mm)	6.79" (174mm)	7.41" (190mm)	6.79" (174mm)								
BN400NW#K	2-Pole	4.41" (113mm)	5.54" (142mm)	6.16" (158mm)	5.54" (142mm)	Terminal stud M10	Ø 0.312" (8mm) 3 holes	1.48" (38mm)	2.22" (57mm)	2.03" (52mm)	0.195" (5mm)	3.21" (81.5mm)	3.12" (80mm)
	3-Pole	6.86" (176mm)	7.76" (199mm)	8.39" (215mm)	7.76" (199mm)								
	4-Pole	9.09" (233mm)	9.98" (256mm)	10.61" (272mm)	9.98" (256mm)								

BA Series



Key features:

- Self-contained: end plates are not required
- Rugged heavy-duty construction
- Current capacities up to 40A
- 3-pole units available as 1 piece (no endplates are needed)
- Fuse blocks with blown fuse indicators



UL Recognized
File No. E78117



CSA Certified
File No. LR64803

Specifications

Power Blocks

Model		BA111T	BA211T	BA311T	BA411S
Appearance					
Width		0.984" (25mm)	1.201" (30.5mm)	1.358" (34.5mm)	0.630" (16mm)
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA
No. of Poles		3	3	3	1
Wire Sizes		22 to 14 AWG	22 to 12 AWG	18 to 10 AWG	16 to 6 AWG
Voltage/ Current	UL/CSA	300V / 15A	300V / 20A	150V / 30A	600V / 40A
	JIS	600V / 16A	600V / 21A	600V / 40A	600V / 70A
Terminals	Size	M3	M3.5	M4	M5
	Type	Standard screw	Standard screw	Standard screw	Standard screw
Mounting		35mm DIN rail	35mm DIN rail	35mm DIN rail	35mm DIN rail
Terminal Torque	(N-m)	0.6 - 1.0	1.0 - 1.3	1.4 - 2.0	2.6 - 3.7
	(in-lbs.)	5.3 - 8.9	8.9 - 11.5	12.4 - 17.8	23.1 - 32.8
DIN Rail Stop		BNL-5	BNL-5	BNL-5	BNL-5
Dust Cover		BNC220	BNC220	BNC230	BNC320
Marking Strip	PVC	BNM7	BNM7	BNM7	BNM7
	Fiberglass	BNM9	BNM9	BNM9	BNM9
	End clip	BNM3	BNM3	BNM3	BNM3



1. BNDN1000 aluminum DIN rails are available in 1 meter lengths.
2. Marking strips are available in 1 meter lengths.

Specifications, continued

Fuse Blocks

Model		BAF111SU	BAF111SNU	BAF111SDU
Appearance				
Width		0.630" (16mm)	0.630" (16mm)	0.630" (16mm)
Blown Fuse Indicator		None	Neon (100 to 300V AC)	LED (24V DC)
Approvals		UL, CSA	UL, CSA	UL, CSA
No. of Poles		1	1	1
Wire Sizes		18 to 10 AWG	18 to 10 AWG	18 to 10 AWG
Current		10A maximum	10A maximum	10A maximum
Terminals	Size	M4	M4	M4
	Type	Standard screw	Standard screw	Standard screw
Mounting		35mm DIN rail	35mm DIN rail	35mm DIN rail
Terminal Torque	(N-m)	1.4 - 2.0	1.4 - 2.0	1.4 - 2.0
	(in-lbs.)	12.4 - 17.8	12.4 - 17.8	12.4 - 17.8
DIN Rail Stop		BNL-5	BNL-5	BNL-5
Dust Cover		—	—	—
Marking Strip		BNM7	BNM7	BNM7
Applicable Fuse Size		1/4" x 1-1/4" (6.35 x 31.8mm)	1/4" x 1-1/4" (6.35 x 31.8mm)	1/4" x 1-1/4" (6.35 x 31.8mm)

Dimensions

Part No.	Diagrams	
BA111T		
BA211T		
BA311T		
BA411S		
Part No.	Diagrams	
BAF111		

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Accessories

Part Numbers: End Plates, DIN Rail Stops, Stand-Offs, DIN Rail and Dust Covers

Item	Appearance	Use with	Part No.	Remarks	
End Plates		BNH10W	BNE15W		
		BNH15MW			
		BNH15LW			
		BNH30W	BNE30W		
		BNF10SW	BNE20		
		BNF10NW			
		BNF10DW			
		BNH50W	BNE50W		
		BN75W	BNE75W		
		BN150W	BNE150W		
		BNDH15W	BNDE15W		
DIN Rail Stops		BNH10W	BNL5 (small)	1. DIN rail stops prevent side-to-side movement. 2. The BNL-5 width is 0.375" (9mm).	
		BNH15MW			
		BNH15LW			
		BNH30W			
		BNH50W			
		BNF10SW			
		BNF10NW			
		BNF10DW			
		BA111T			
		BA211T			
		BA311T			
		BA411S			
		BAF111SU			
	BAF111SDU				
		BN75W BN150W	BNL6 (medium)		1. DIN rail stops prevent side-to-side movement. 2. The BNL-6 width is 0.375" (9mm). 3. To firmly stabilize these higher profile terminal blocks, the BNL-6 has a higher profile than the BNL-5.
			BNDH15W BN200NW# BN400NW#		BNL8 (large)
DIN Rail Stand-Offs			All series	BNS3	1.46" (37mm) height
		BNS4		3.03" (77mm) height	
DIN Rail		All series	BNDN1000 (length 39.37" (1mm))	1. For calculating the rail lengths required, see the instructions on page 876. 2. The DIN rail material is aluminum.	
Surface Mount Bracket		BNDH15W (dual-deck)	BNDL2	Used to surface mount dual-deck terminal blocks. (BNDL2).	

Accessories, continued

Part Numbers: Rods, Nuts, Marking Strips, Dust Covers, and Jumpers

Item	Appearance	Use with	Part No.	Remarks
Dust Covers		BNDH15W	BNC230	The overall length is 39.37" (1,000mm). The material is polycarbonate (UL94-V2).
		BNH10W		
		BNH15MW		
		BNH15LW		
		BNH30W	BNC320	
		BNH50W		
		BN75W	BNC420	
		BN150W	BNC520	
		BN200	BAC820	
		BN400	BNC1000	
Marking Strips		All series	BNM7	Material: polyvinyl chloride (PVC) Strip dimensions are 0.37"x39" (9.5 x 1,000mm).
			BNM9	Material: fiberglass Strip dimensions are 0.37"x39" (9.5 x 1,000mm).
Marking Strip Fastener		All series	BNM3	Used to prevent marking strips from sliding off terminal block.
Ring Terminal Jumpers		BNH10W	BNJ16	Jumpers come standard with 6 points (except BNJ62).
		BNH15MW	BNJ26W	
		BNH15LW	BNJ46	
		BNH30W	BNJ56	
		BNDH15W	BNJ26W	
		BNH50W	BNJ62	
Fork Terminal Jumpers		BNH10W	BNJ16F	Note: insulated jumpers available - add "B" to end of part number. For example, BNJ26WB.
		BNH15MW	BNJ26FW	
		BNH15LW	BNJ46F	
		BNH30W	BNJ56F	
		BNDH15W	BNJ26FW	
M4 Thread Rod		BNDH15W	BNR1 (265mm)	1. Rod and connecting nuts are used to mount dual-decks collectively. 2. Each connecting nut set includes 1 hex connecting nut and 1 round connecting nut. 3. The BNR1 rod dimensions are 0.027 "x 10.43" (0.7 x 265mm). 4. The BNR2 rod dimensions are 0.027" x 19.69" (0.7 x 500mm).
			BNR2 (500mm)	
Connecting Nuts		BNR1 BNR2	BNN1	
Terminal Block Removal Tool			BND2	



For accessory dimensions, see page 1072.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

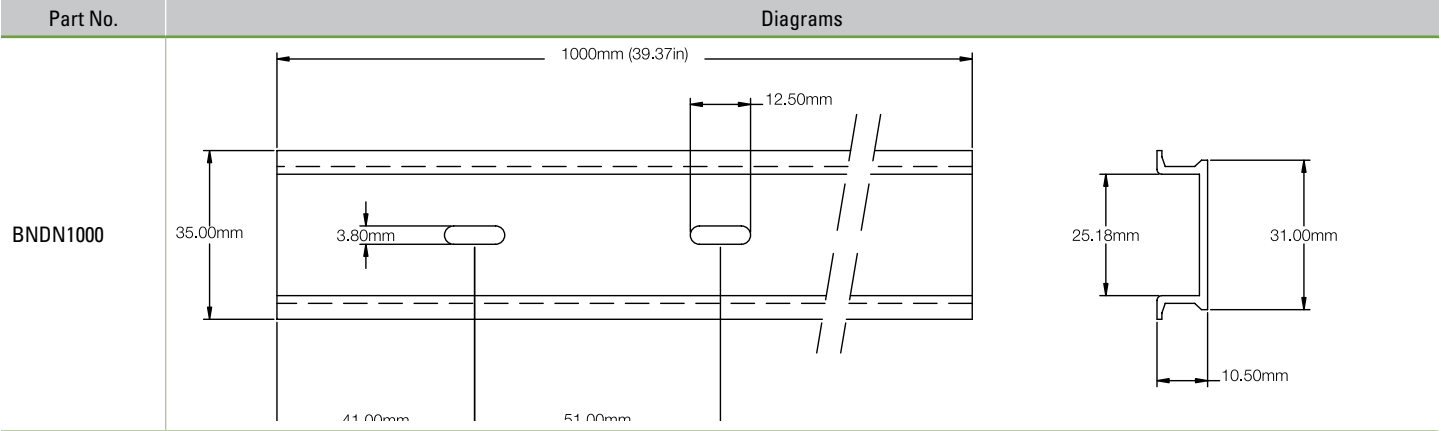
Contactors

Terminal Blocks

Circuit Breakers

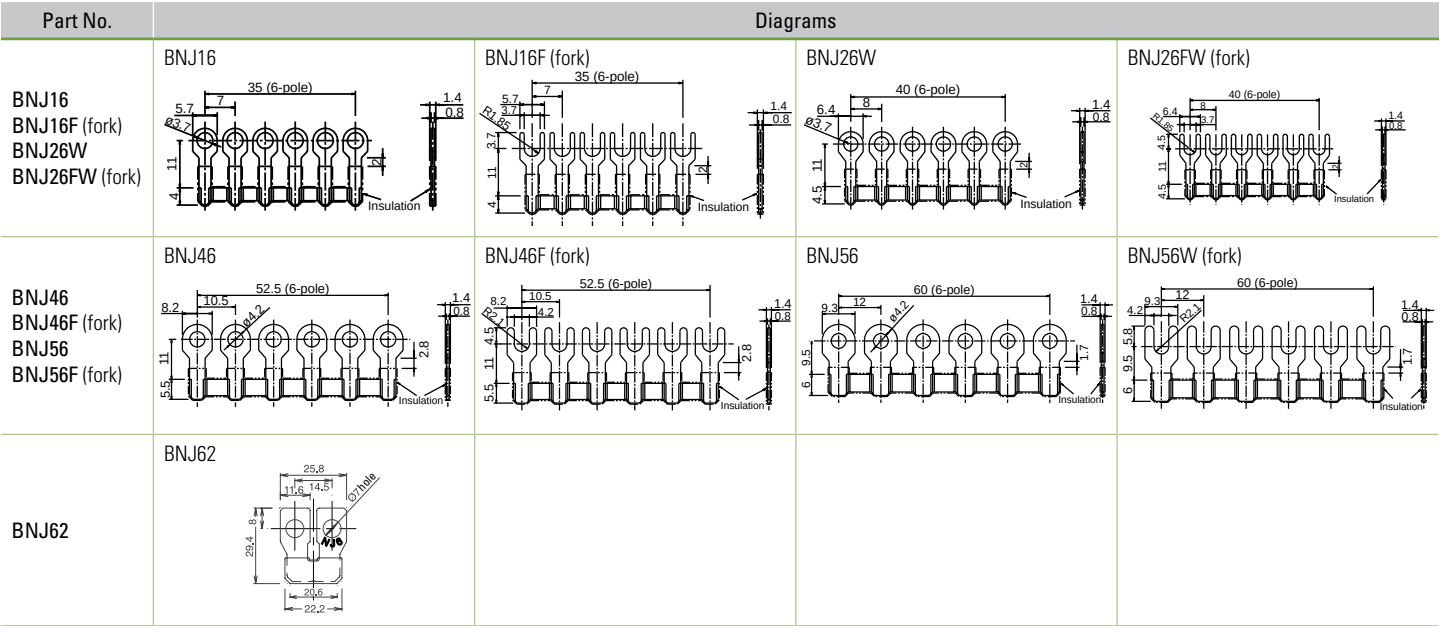
Dimensions

Dimensions: DIN Rail



Dimensions: Jumpers

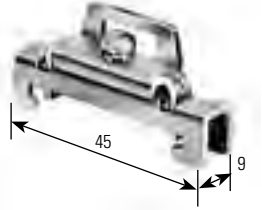
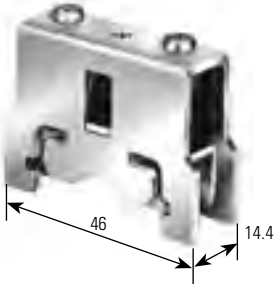
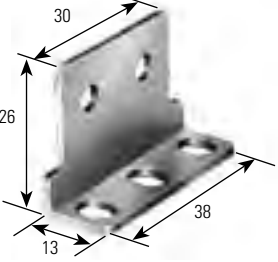
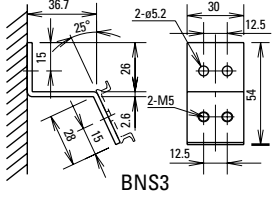
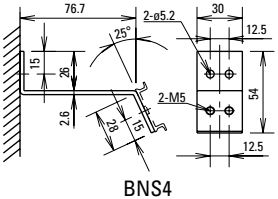
BNH Series



 Thickness + 0.8mm (0.0315")

Dimensions, continued

Dimensions, DIN Rail Stops and Stand-offs

Part No.	Dimensions
BNL-6	 BNL-6 shown, BNL-5 same except without back crossbar
BNL-8	
BNDL2	
BNS3	
BNS4	

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

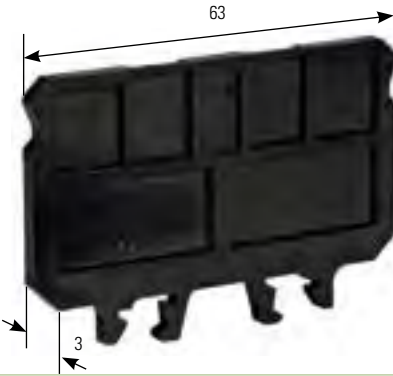
Contactors

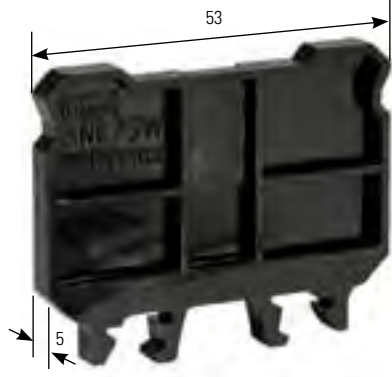
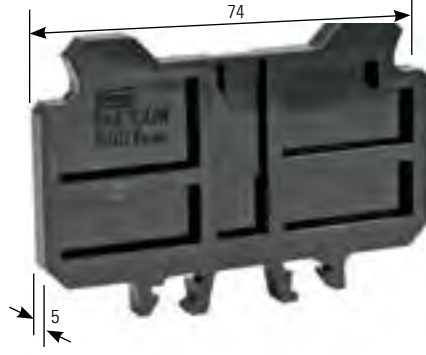
Terminal Blocks

Circuit Breakers

Dimensions, continued

Dimensions: End Plates

Part No.	Dimensions
BNE15W	
BNE20	
BNE30W	
BNE50W	

Part No.	Dimensions
BNE75W	
BNE150W	
BNDE15W	

Instructions

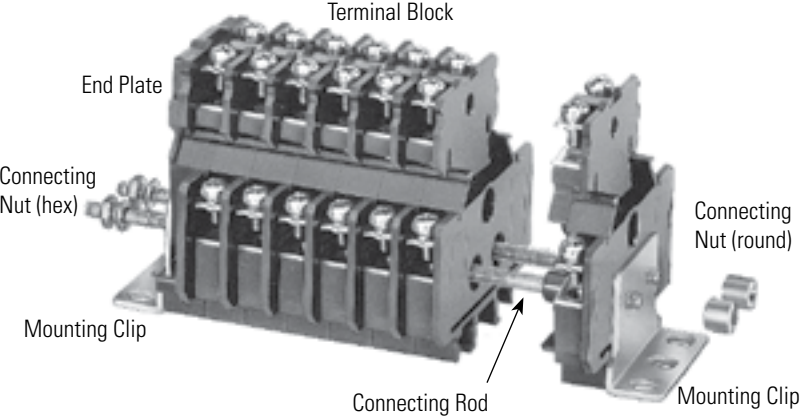
Wiring Touch-Down Terminal Blocks: BNH Series

Instructions	Step 1	Step 2	Step 3	Step 4
Step 1. Insert the wire (or crimping terminal) into the terminal block with the terminal screws in the open position. (Use of crimping terminals is optional.) Step 2. Push the terminal screw down to hold the wire in place. Step 3. Hold the terminal screw down, and tighten with a screwdriver. Step 4. To remove the wire, loosen the terminal screw and pull up until wire is released.				

Installation and Removal of Terminal Blocks

Instructions	Appearance
Step 1. Slide the terminal blocks onto the DIN rail from one end. Step 2. Use BNL5 or BNL6 end clips to secure the terminal block row and to prevent side-to-side movement. BNH10W, BNH15MW, BNH15LW, and BNH30W can be installed from the middle of a DIN rail. Step 3. To install, place the terminal block on top of the DIN rail and push down until both edges of the terminal block snap onto the DIN rail. Step 4. To remove the terminal block, use the BND2 removal tool as shown on the right.	

Mounting Double-Deck Terminal Blocks

Instructions	Appearance
DIN Rail Mount: Step 1. First install the end plate. Then mount the terminal blocks onto the DIN rail. Step 2. To prevent side-to-side movement on the DIN rail, use the BNL-8 mounting clip at both ends of the rail.	
Panel Mount: Step 1. Assemble a row of terminal blocks with end plates on exposed end(s). Step 2. Use BNDL2 mounting clips at both ends of a row. Step 3. With the two holes of the mounting clip aligned with the terminal block holes, insert a connecting rod through each hole. Step 4. Secure the ends of the connecting rods with the connecting nuts, as shown below.	

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Calculating DIN Rail Lengths

Instructions

Step 1. Add widths of all terminal blocks (reference pages 864 through 869).

Step 2. Add the endplate thickness (usually only one).

Step 3. Add the DIN rail stop widths (usually two are used).

Step 4. Round to the nearest 2" (50mm) increment to allow for DIN rail hole spacing.

Step 5. Add 1" (25mm) to ensure 0.5" (12.5mm) of clearance at each end of the DIN rail.

Appearance

DIN Rail Stop Dimensions

Part No.	Width
BNL-5	.374" (9mm)
BNL-6	.374" (9mm)
BNL-8	.571" (14.5mm)

Torque Specifications and Applicable Connector Sizes

Screw Size	M3	M3.5	M4	M5	M6	M8	M10	M12	Diagram
Torque	(N-m)	0.6 to 1.0	1.0 to 1.3	1.4 to 2.0	2.6 to 3.7	3.9 to 5.4	10 to 13.5	21 to 28	38 to 49
	(kgf-cm)	6.1 to 10.2	10.2 to 13.3	14.3 to 20.4	26.5 to 37.7	39.8 to 55.1	102 to 138	214 to 286	388 to 500
Dimension A	0.257" (6.6mm)	0.332" (8.5mm)	0.371" (9.5mm)	0.499" (12.8mm)	0.655" (16.8mm)	0.890" (22.8mm)	1.279" (32.8mm)	1.981" (50.8mm)	
Dimension B	0.129" (3.3mm)	0.156" (4mm)	0.176" (4.5mm)	0.176" (4.5mm)	0.234" (6mm)	0.312" (8mm)	0.429" (11mm)	0.546" (14mm)	
Dimension C	0.195" (5mm)	0.195" (5mm)	0.234" (6mm)	0.254" (6.5mm)	0.332" (8.5mm)	0.429" (11mm)	0.624" (16mm)	1.014" (26mm)	
Dimension D	Ø 0.125" (3.2mm)	Ø 0.140" (3.6mm)	Ø 0.164" (4.2mm)	Ø 0.203" (5.2mm)	Ø 0.242" (6.2mm)	Ø 0.332" (8.5mm)	Ø 0.410" (10.5mm)	Ø 0.488" (12.5mm)	

Rated Current

Applicable Wire	Rated at 60°C	Applicable Wire	Rated at 60°C
22 AWG (0.3mm²)	3A	6 (14mm²)	50A
20 AWG (0.5mm²)	5A	4 (22mm²)	75A
18 AWG (0.75mm²)	7A	0 (38mm²)	100A
16 AWG (1.25mm²)	10A	00 (60mm²)	150A
14 AWG (2mm²)	15A	0000 (100mm²)	200A
12 (3.5mm²)	20A	300mcm (150mm²)	300A
10 (5.5mm²)	30A	400mcm (200mm²)	350A

UL/CSA ratings are specified. The current carrying capacity depends on the rating of the wire used, as shown.

BX Series

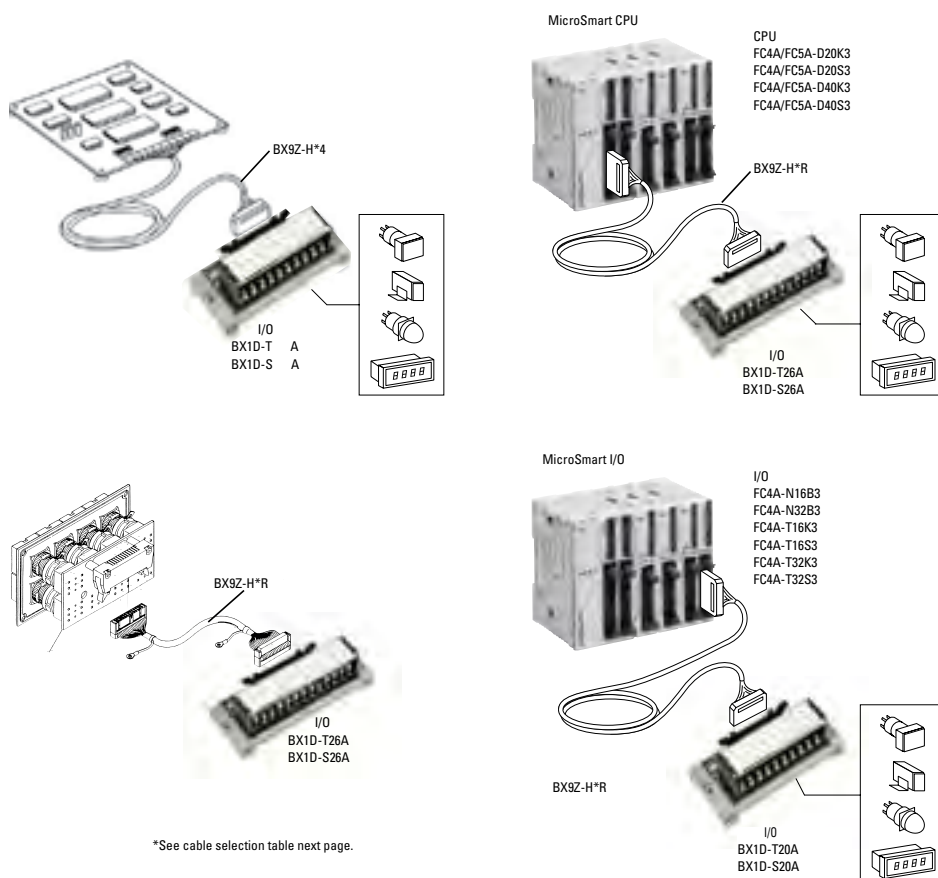
Key features:

- Unique touch-down terminals
- All units are molded from UL94-V0 material with excellent flame- and shock-resistance
- Mount on DIN rail or flat surface
- Current capacity: 1A
- Available with 16, 20, 26, 34, 40, and 50 pins
- UL and CSA
- Hinged covers with built-in marking strips

Specifications

Terminal Width	7.62mm (M3 screw)
Rated Voltage	125V
Rated Current	1A
Rated Wire Size	22-14 AWG (2mm ²)
Insulation Resistance	100MΩ minimum (500V DC)
Dielectric Strength	500V AC, 1 minute
Operating Temperature	-10 to 65°C
Humidity Range	45 to 85% RH
Housing Material	PPE resin (UL94-V0)
Terminals/Connector	PBT resin (UL94-V0)

BX Series Application Examples



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Part Numbers

Part Numbers: Break-Out Modules and Cables

Accessories

	Pins	Terminal Style	Module Part Number	Cable Part Number			Remarks
				MIL to Single Connectors	MIL to MIL Shielded	MIL to MIL Non-shielded	
Standard MIL Connector Modules	16	Touch-down	BX1D-T16A	BX9Z-H#D4	-	-	
		Screw	BX1D-S16A				
	20	Touch-down	BX1D-T20A	BX9Z-H#E4	FC9Z-H#A20	FC9Z-H#B20	FC4A/FC5A 16 & 32 point I/O modules
		Screw	BX1D-S20A				
	26	Touch-down	BX1D-T26A	FC9Z-H100C26A	FC9Z-H#A26	FC9Z-H#B26	FC4A/FC5A 20 & 40 point I/O slim CPUs
		Screw	BX1D-S26A				
	34	Touch-down	BX1D-T34A	BX9Z-H#F4	-	-	
		Screw	BX1D-S34A				
	40	Touch-down	BX1D-T40A	BX9Z-H#G4	-	-	
		Screw	BX1D-S40A				
	50	Touch-down	BX1D-T50A	BX9Z-H#H4	-	-	
		Screw	BX1D-S50A				

- 
1. For BX terminal arrangements, see page 879.

2. # = length codes:

100 = 39.4"

200 = 78.7"

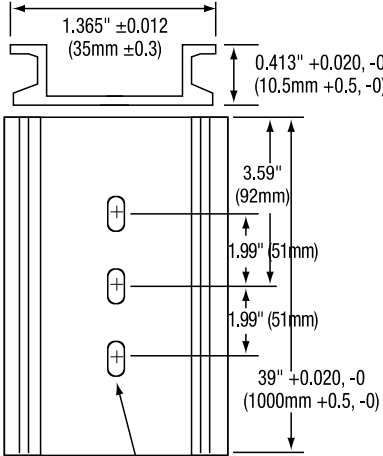
300 = 118.1"

(1 meter)

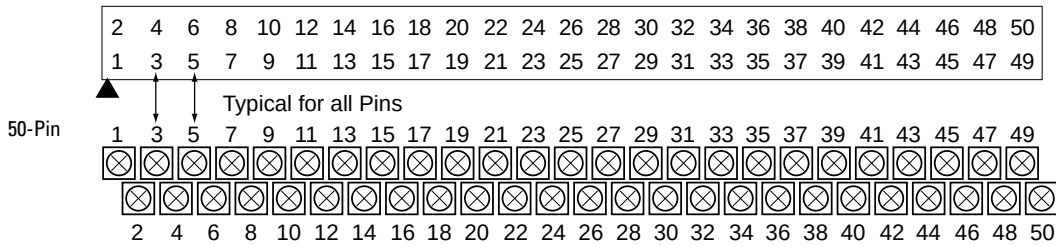
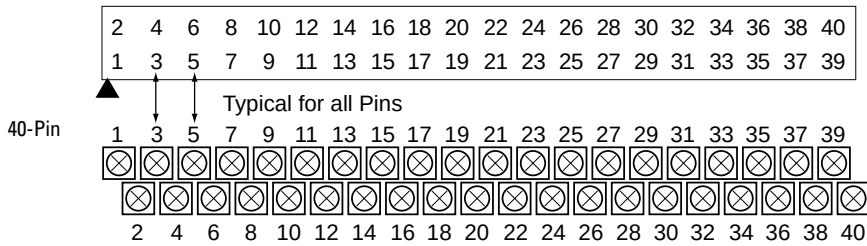
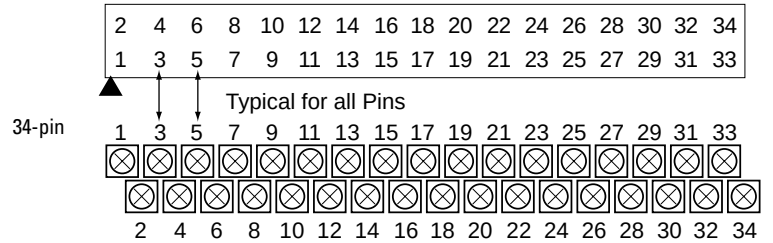
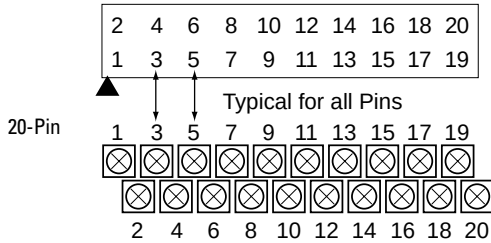
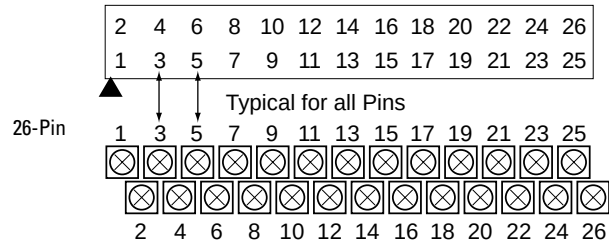
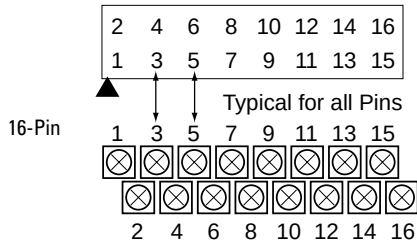
(2 meter)

(3 meter)

Part Numbers: DIN Rail and DIN Rail Stops

Description	Use with	Diagram	Part No.	Remarks
DIN Rail	All BX series		BNDN1000	1. The length is 39.37" (1,000mm). 2. For calculating the rail lengths required, see the instructions on page 876. 3. DIN rail material is aluminum.
DIN Rail Stop	All BX series		BNL6	1. Rail stops prevent side-to-side movement. 2. Use rail stops on BNDN1000 DIN rails.

Terminal Arrangements: BX Series



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Dimensions: BX Series

Dimensions

Part No.	Pins	Dimensions		Diagram
		L	A	
BX1D-T16A	16	3.66"	3.27"	
BX1D-S16A		(94mm)	(84mm)	
BX1D-T20A	20	4.29"	3.89"	
BX1D-S20A		(113mm)	(103mm)	
BS1D-T26A	26	5.20"	4.80"	
BX1D-S26A		(132mm)	(122mm)	
BX1D-T34A	34	6.38"	5.98"	
BX1D-S34A		(162mm)	(152mm)	
BX1D-T40A	40	7.28"	6.89"	
BX1D-S40A		(185mm)	(175mm)	
BX1D-T50A	50	8.78"	8.39"	
BX1D-S50A		(223mm)	(213mm)	

Selection Guide.....	1082
NC1V Series	1083
Dimensions	1089

Circuit Breakers



www.IDEC.com/circuitbreaker



Selection Guide

Series	NC1V	NRA	NRBM
Appearance			
Page	1083	Visit www.IDEC.com/circuitbreaker	
Actuator Style	Lever	Lever and Rocker (non-illuminated and illuminated)	Lever
Number of Poles	1, 2, 3	Lever: 1, 2, 3 Rocker: 1	1, 2, 3
Protection Method	Hydraulic magnetic	Electromagnetic trip	
Internal Circuits	Series current trip Relay voltage trip	Series current trip	
Auxiliary Contact	Optional 125V AC 3A (resistive load), 30V DC 2A (resistive load)	Optional (250V AC, 5A; 50V DC, 1A)	Optional (250V AC, 5A; 50V DC, 1A)
Alarm Contact	Optional 125V AC 3A (resistive load). 30V DC 2A (resistive load)	Optional (250V AC, 5A; 50V DC, 1A)	Optional (250V AC, 5A; 50V DC, 1A)
Inertial Delay	Optional (for resistance to high inrush currents)	Optional (for resistance to high inrush)	Optional (for resistance to high inrush)
Time Delay Curves	3 types (AC or DC)	2 types for DC; 3 types for AC	2 types for DC; 3 types for AC
Rated Voltage	1-pole	250V AC, 50/60Hz, 65V DC	
	2-pole		
	3-pole		
Rated Tripping Currents	0.1A, 0.3A, 0.5A, 1A, 2A, 3A, 5A, 7A, 10A, 15A, 20A, 25A, 30A	0.3A, 0.5A, 0.75A, 1A, 2A, 3A, 5A, 7.5A, 10A, 15A, 20A, 25A, 30A	1A, 2A, 3A, 5A, 7.5A, 10A, 15A, 20A, 25A, 30A, 40A, 50A
Rated Interruption Capacity	2,500A	1,000A, 250V AC (50/60Hz), 65V DC	1,000A, 250V AC (50/60Hz), 65V DC
Approvals	UL, CSA, CE, TUV, CCC	Lever: UL, CSA, VDE Rocker: UL	UL, c-UL, VDE



1. For dimensions, see end of each section.
2. UL recognized, applicable standard: UL1077, "Supplementary Protectors."
3. Not suitable for branch circuit protection.



UL Recognized
File No. E68029



File No. LR83454
NRC Series



File No. B07 09 13332 063

*CE, TUV, and CCC apply to NC1V.

NC1V Circuit Breakers

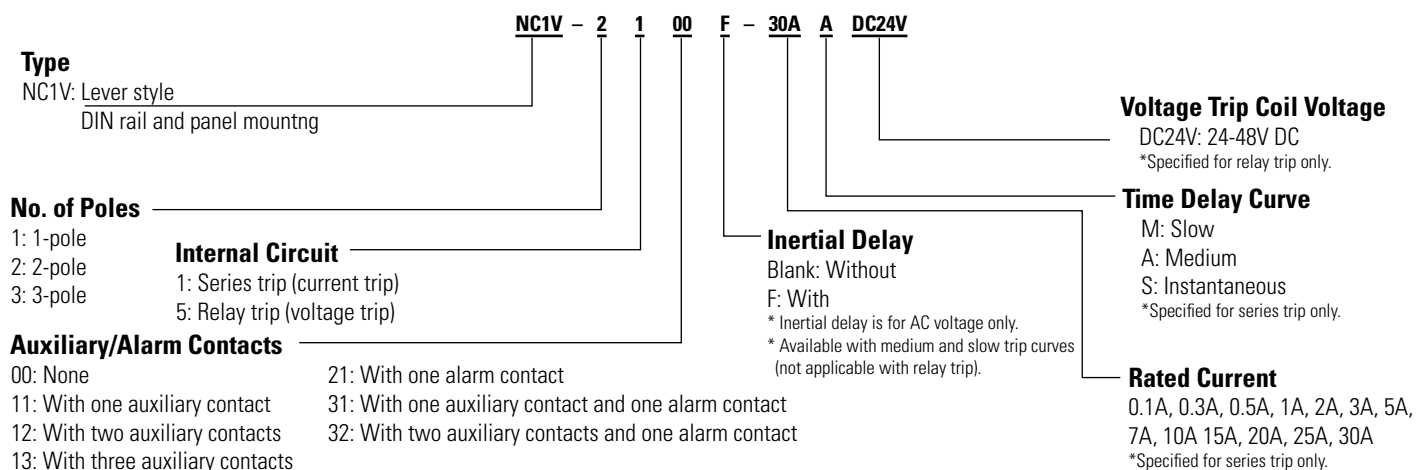
Key features:

- Superior protection for a wide range of devices from sensitive electronic equipment to electrical control circuits. Applications include semiconductor manufacturing equipment, electronic controllers, computers, microprocessors, communications equipment, power supplies, machine tools, motors, and more.
- Excellent tripping time curve performance
- Flat retractable lever for safety operations
- Slim housing design
- Spring-up terminals allow for use of ring terminals
- Fingersafe main circuit terminals
- Color (red/green) contact position indicator
- DIN rail or direct panel mounting (through-panel mounting brackets available)
- Optional built-in auxiliary / alarm contacts



Applicable Standards	Certification Mark	File Number
UL1077		E68029
CSA C22.2 No. 235		LR83454
EN60934		B07 09 13332 063
		European Commission's Low Voltage Directive
GB17701-1999		No. 2008010307265840
Electrical Appliance and Material Safety Law Technical Standard	Series Trip	Jet
	Relay Trip	

Part Number Structure



Specifications

Operator Style		Retractable lever		
Internal Circuit		Series trip (current trip), Relay trip (voltage trip)		
Protection Method		Hydraulic magnetic tripping system, Magnetic tripping system (voltage trip)		
No. of Poles		1-pole	2-pole	3-pole
Rated Voltage (AC/DC) ¹		250V AC 50/60Hz, 65V DC	250V AC 50/60Hz, 125V DC	250V AC, 50/60Hz
Series Trip (Current Trip)	Rated Short-circuit Capacity	250V AC, 2500A 65V DC, 2500A	250V AC, 2500A 125V DC, 2500A	250V AC, 2500A
	Rated Current	0.1A, 0.3A, 0.5A, 1A, 2A, 3A, 5A, 7A, 10A, 15A, 20A, 25A, 30A		
	Operation Characteristics ²	Time delay curve curve M (slow), curve A (medium), S (instantaneous) Only curves M and A are also available with inertial delay option.		
Relay Trip (Voltage Trip) ³	Rated Current	30A		
	Trip Voltage	24 to 48V DC (at 25°C) Voltage application duration 10 sec maximum, tripping time 0.1 sec maximum (at rated voltage)		
Auxiliary Contact/Alarm Contact	Contact Rating	125V AC 3A (resistive load), 30V DC 2A (resistive load)		
	Minimum Applicable Load	24V DC 1mA (resistive load, reference value)		
Insulation Resistance		100MΩ minimum (500V DC megger)		
Dielectric Strength		2,000V AC, 1 minute (between terminals when main contacts are open, between live parts of different poles, between live and dead parts) 600V AC (between terminals when auxiliary circuits are open)		
Vibration Resistance (with rated current applied)		Damage limits: Operating extremes:	147 m/s ² (10 to 55 Hz) (1-pole, 2-pole), 78 m/s ² (3-pole) 98 m/s ² (1-pole, 2-pole), 78 m/s ² (3-pole)	
Shock Resistance (S time delay curve: 80% rated current, A, M time delay curve: 100% rated current)		Damage limits: Operating extremes:	490 m/s ² (1-pole, 2-pole), 297 m/s ² (3-pole) 196 m/s ² (S, A, M curves)	
Electrical Life		10,000 cycles minimum (at rated current), 10 operations per minute		
Reference Temperature		40°C		
Operating Temperature		-10 to +60°C (no freezing) Rated current is based on an ambient temperature of 40°C. When the operating temperature exceeds 40°C, derate the rated current by using the factors shown below.		
Operating Humidity		45 ~ 85% RH (no condensation)		
Terminal Style	Main Circuit Terminal	Spring-up, fingersafe terminal: M4 screw (up to 20A), M5 screw (25A and 30A)		
	Auxiliary/Alarm Contacts, Voltage Coil Terminal	M3.5 screw		
Weight (approx.)		1-pole: 90g, 2-pole: 170g, 3-pole: 260g		



¹3-pole model is for AC voltage only.
²For S (instantaneous) tripping curve, a humming sound may occur when used in an AC sinusoidal-wave current circuit around 80% of the rated current, however, the performance of the circuit breaker will not be affected.
To avoid unnecessary tripping, do not use in circuits where inrush currents may be present.
³Relay trip (voltage trip) type is not equipped with an overcurrent trip function.
Do not use the NC1V circuit breakers in environments where they are exposed to extreme temperature, humidity, dust, corrosive gases, vibration, shock, or in a circuit where inrush current may be present, otherwise unnecessary operation and damage may occur.

Operating Temp.	Derating Factor
50°C	0.9
55°C	0.8
60°C	0.7

Models

Specify rated current, time delay curve, or voltage trip coil voltage in place of [6] [7] [8] when ordering.

Internal Circuit	No. of Poles	Inertial Delay	Auxiliary Contact Alarm Contact	Part No	Code		
					[6] Rated Current	[7] Time Delay Curve	[8] Voltage Trip Coil Voltage
Series Trip (Current Trip)	1-pole	—	—	NC1V-1100-[6] [7]	0.1A 0.3A 0.5A 1A 2A 3A 5A 7A 10A 15A 20A 25A 30A	M (slow) A (medium) S (instantaneous)	—
			One Auxiliary Contact	NC1V-1111-[6] [7]			
			One Alarm Contact	NC1V-1121-[6] [7]			
		With	—	NC1V-1100F-[6] [7]			
			One Auxiliary Contact	NC1V-1111F-[6] [7]			
			One Alarm Contact	NC1V-1121F-[6] [7]			
	2-pole	—	—	NC1V-2100-[6] [7]			
			One Auxiliary Contact	NC1V-2111-[6] [7]			
			Two Auxiliary Contacts	NC1V-2112-[6] [7]			
			One Alarm Contact	NC1V-2121-[6] [7]			
			One Auxiliary Contact and One Alarm Contact	NC1V-2131-[6] [7]			
		With	—	NC1V-2100F-[6] [7]			
			One Auxiliary Contact	NC1V-2111F-[6] [7]			
			Two Auxiliary Contacts	NC1V-2112F-[6] [7]			
			One Alarm Contact	NC1V-2121F-[6] [7]			
			One Auxiliary Contact and One Alarm Contact	NC1V-2131F-[6] [7]			
	3-pole	—	—	NC1V-3100-[6] [7]			
			One Auxiliary Contact	NC1V-3111-[6] [7]			
			Two Auxiliary Contacts	NC1V-3112-[6] [7]			
			Three Auxiliary Contacts	NC1V-3113-[6] [7]			
			One Alarm Contact	NC1V-3121-[6] [7]			
			One Auxiliary Contact and One Alarm Contact	NC1V-3131-[6] [7]			
		With	—	NC1V-3100F-[6] [7]			
			One Auxiliary Contact	NC1V-3111F-[6] [7]			
			Two Auxiliary Contacts	NC1V-3112F-[6] [7]			
			Three Auxiliary Contacts	NC1V-3113F-[6] [7]			
			One Alarm Contact	NC1V-3121F-[6] [7]			
			One Auxiliary Contact and One Alarm Contact	NC1V-3131F-[6] [7]			
Relay Trip (Voltage Trip)	1-pole	—	—	NC1V-1500-[8]	—	—	DC24V
	2-pole			NC1V-2500-[8]			
	3-pole			NC1V-3500-[8]			

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

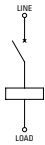
Terminal Blocks

Circuit Breakers

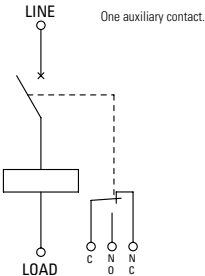
Internal Circuits

1-pole

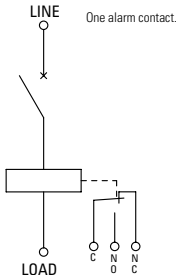
NC1V-1100
(Without auxiliary/alarm contacts)



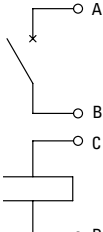
NC1V-1111
(With auxiliary contact)



NC1V-1121
(With alarm contact)

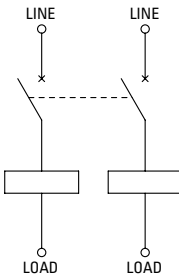


NC1V-1500
(Relay Trip)

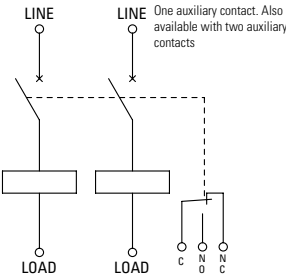


2-pole

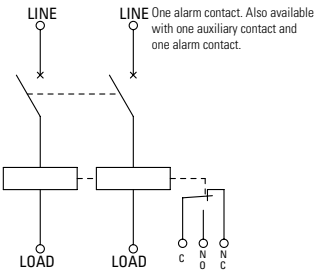
NC1V-2100
(Without auxiliary/alarm contacts)



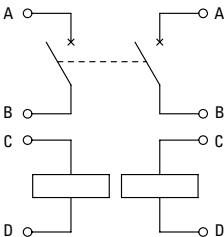
NC1V-2111
(With auxiliary contact)



NC1V-2121
(With alarm contact)

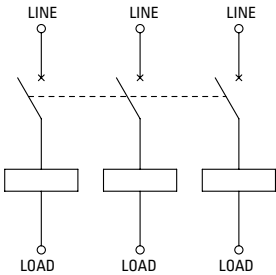


NC1V-2500
(Relay Trip)

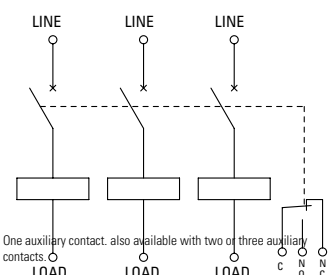


3-pole

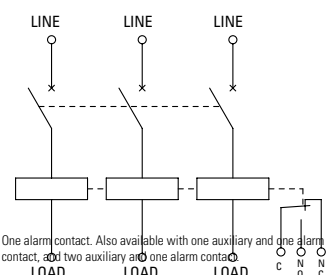
NC1V-3100
(Without auxiliary/alarm contacts)



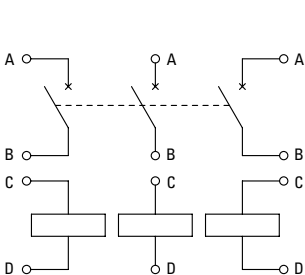
NC1V-3111
(With auxiliary contact)



NC1V-3121
(With alarm contact)



NC1V-3500
(Relay Trip)

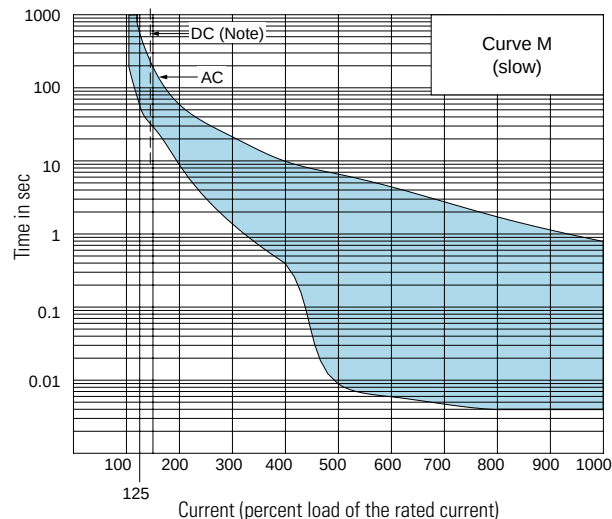
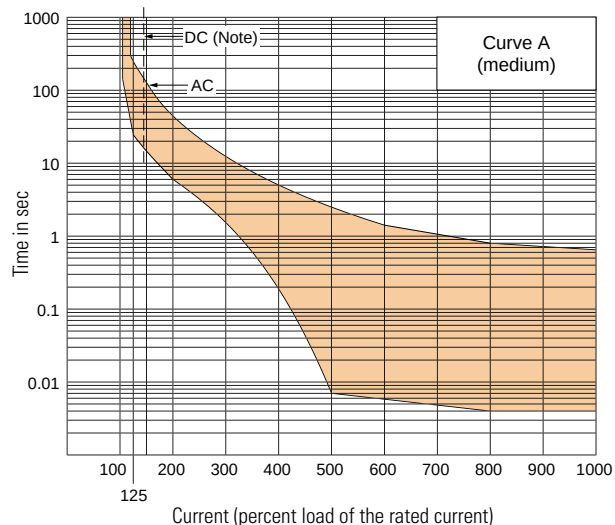


Overcurrent-Time Delay Characteristics (seconds @ 40 deg C) [vertical mounting]

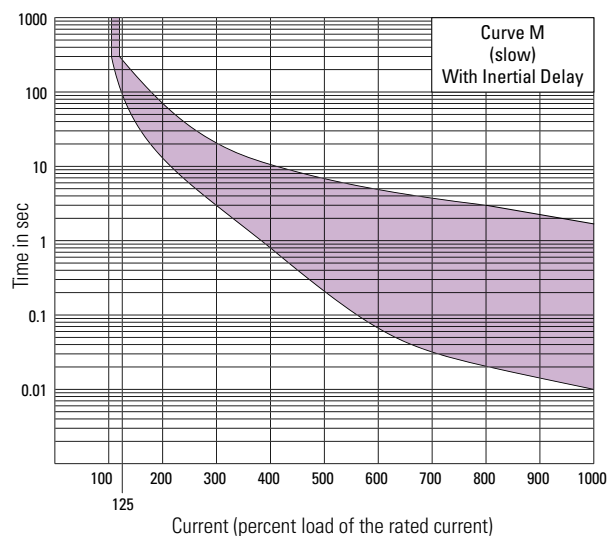
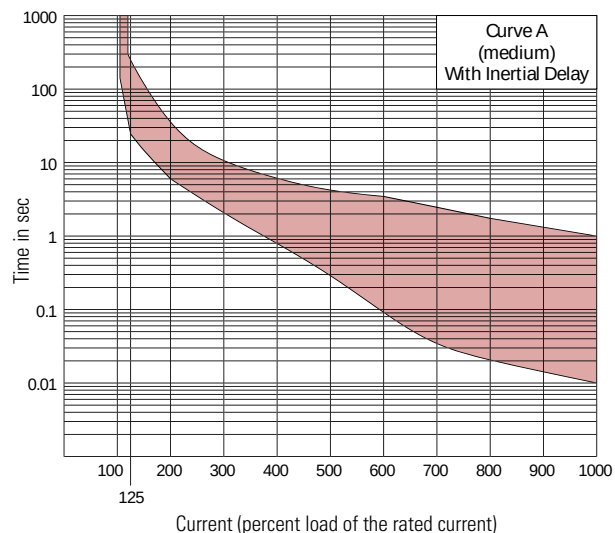
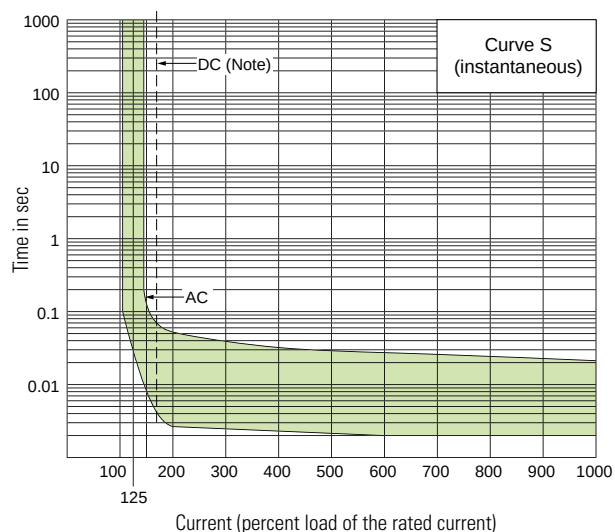
Item	Time Delay Curve	Percent of Rated Current								
		100%	125%	150%	175%	200%	400%	600%	800%	1000%
AC (50/60Hz)/DC	S (instantaneous)	NO TRIP	—	*0.005 to 0.1	0.003 to 0.06	0.0027 to 0.05	0.002 to 0.03	0.002 to 0.028	0.002 to 0.025	0.002 to 0.022
	A (medium)	NO TRIP	*25 to 240	16 to 140	—	6 to 32	0.4 to 4	0.0055 to 1.5	0.004 to 0.8	0.004 to 0.65
	M (slow)	NO TRIP	*60 to 600	30 to 200	—	9 to 60	0.4 to 10	0.006 to 4.5	0.004 to 1.8	0.004 to 0.8
AC (50/60Hz)	With Inertial Delay A (medium)	NO TRIP	25 to 240	—	—	6 to 32	0.8 to 6	0.09 to 3.5	0.02 to 1.8	0.01 to 1.0
	With Inertial Delay M (slow)	NO TRIP	60 to 600	—	—	10 to 60	0.8 to 10	0.06 to 4.5	0.02 to 3	0.01 to 1.75

*: MAY TRIP ON DC

Time Delay Curves at 40°C



Note: The entire shaded area applies to AC. For DC, the shaded area on the right of the dashed line applies.



Note: Inertial Delay option not available with S (instantaneous) curve.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

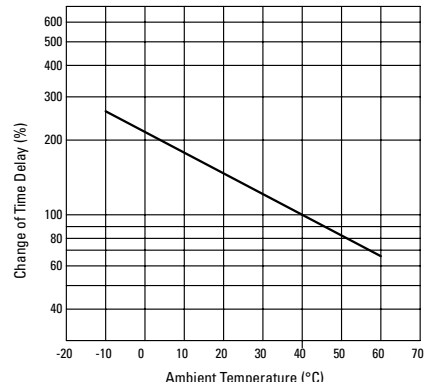
Switches & Pilot Lights
Signaling Lights
Relays & Sockets
Timers
Contactors
Terminal Blocks
Circuit Breakers

Time Delay Curve and Ambient Temperature

NC1V circuit breakers employ a hydraulic magnetic tripping system, where the rated current (trip current) is not affected by ambient temperatures. But the time delay may vary with the oil viscosity in the oil dash pot. Lower oil viscosity at higher temperatures results in a shorter delay, whereas at lower temperatures the delay will be longer.

Temperature Correction Curve

The time delay curves on the preceding page are measured at 40°C. With reference to the following curves, time delays can be corrected according to ambient temperature.



The time delay is based on an ambient temperature of 40°C. Time delays at other temperatures are corrected according to the temperature correction curve. The time delay of the instantaneous time delay curve (S) is not affected by ambient temperature.

When operating temperature exceeds 40°C, derate the rated current by multiplying the derating factor shown on the right.

Operating Temp	Derating Factor
50°C	0.9
55°C	0.8
60°C	0.7

Impedance and Coil Resistance Series Trip (Current Trip) at 25°C

Rated Current	For AC 50/60 Hz Impedance (Ω)		For DC Resistance (Ω)	
	Curve S	Curves A, M	Curve S	Curves A, M
0.1A	66.0	116.0	43.0	106.0
0.3A	6.6	11.0	4.1	10.0
0.5A	1.92	3.65	0.86	3.40
1A	0.50	0.93	0.25	0.90
2A	0.16	0.27	0.11	0.25
3A	0.07	0.12	0.050	0.11
5A	0.025	0.050	0.015	0.045
7A	0.014	0.027	0.011	0.025
10A	0.007	0.021	0.005	0.020
15A	0.006	0.010	0.005	0.009
20A	0.005	0.006	0.004	0.005
25A	0.004	0.005	0.004	0.005
30A	0.003	0.004	0.003	0.004

Tolerance: ±25% (up to 20A), ±50% (25A and 30A)

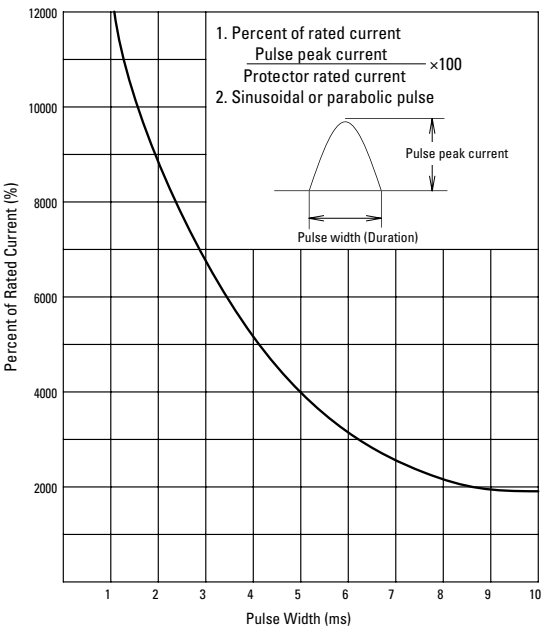
Relay Trip (Voltage Trip) at 25°C

Tripping Voltage	For DC Resistance (Ω)
24-48V	100.0

Tolerance: ±25%

Inertial Delay

Inertial delay is designed not to trip on a non-repeating single pulse of 20 times the rated current (peak value) for a duration of 8ms. In addition, circuit breakers equipped with inertial delay do not respond to high inrush currents caused by transformer or lamp loads, but perform the specified interruption on subsequent overcurrents. Inertial delay is not available with the series trip curve S (instantaneous).

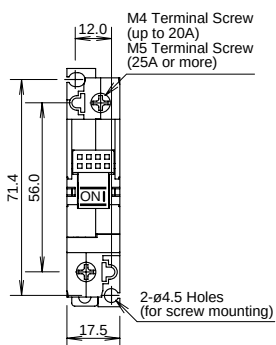


Voltage Drop Due to Coil Resistance or Impedance

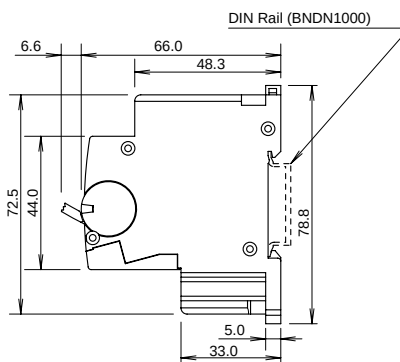
The internal resistance or impedance of a circuit breaker tends to be larger for a smaller rated current. Therefore, when circuit breakers with a small rated current are used, voltage drop should be taken into consideration. Internal resistance also varies with time delay curves, which should also be considered during installation.

1-pole

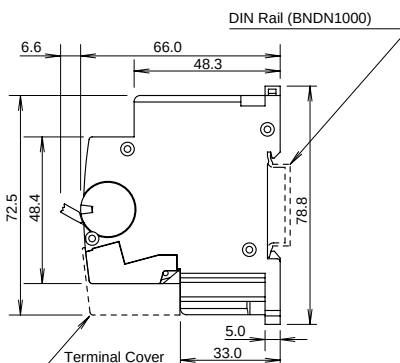
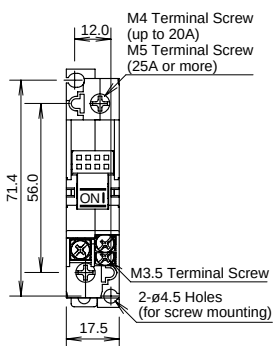
NC1V-1100



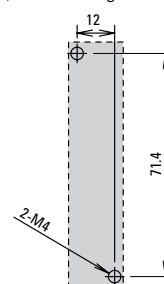
Dimensions (mm)



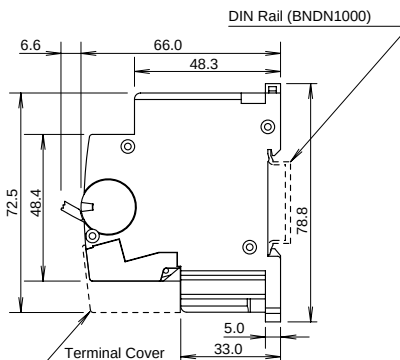
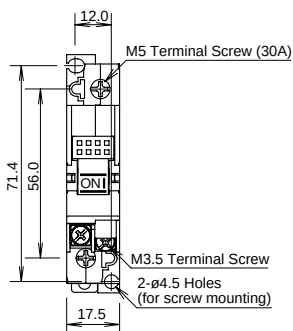
NC1V-1111
(Auxiliary Contact)
NC1V-1121
(Alarm Contact)



Mounting Hole Layout
(M4 Mounting Screws)

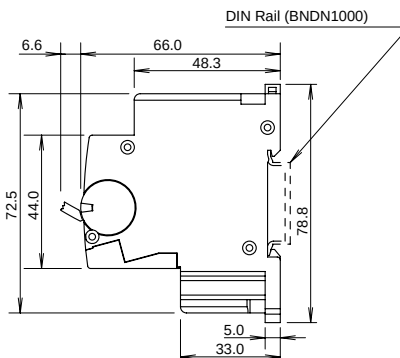
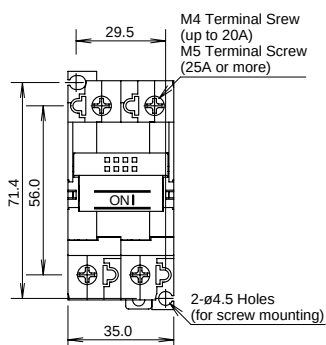


NC1V-1500
(Relay Trip)

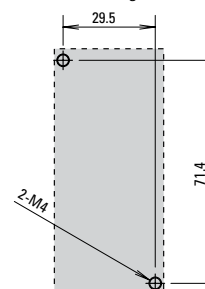


2-pole

NC1V-2100



Mounting Hole Layout
(M4 Mounting Screws)



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

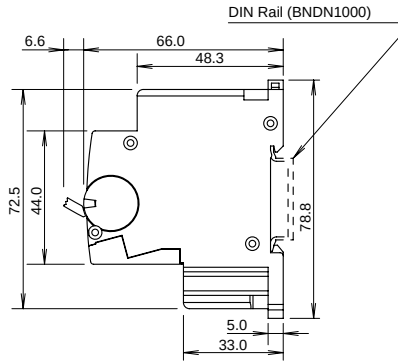
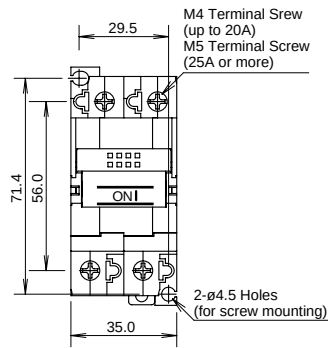
2-pole

NC1V-2111
(one auxiliary contact)

NC1V-2112
(two auxiliary contacts)

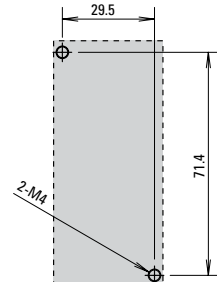
NC1V-2121
(one alarm contact)

NC1V-2131
(one auxiliary contact and
one alarm contact)

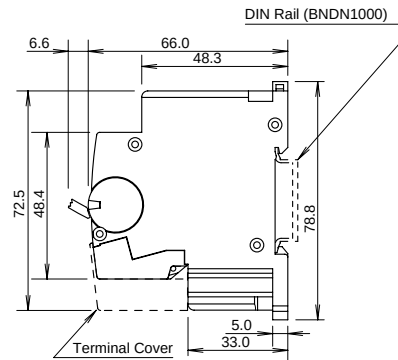
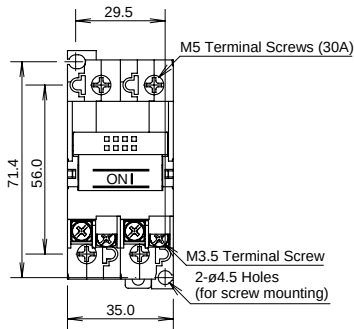


Dimensions shown are for NC1V-2111 and NC1V-2121.

Mounting Hole Layout
(M4 Mounting Screws)

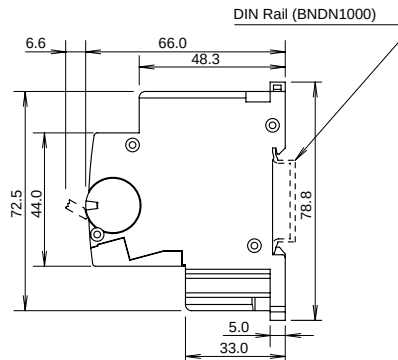
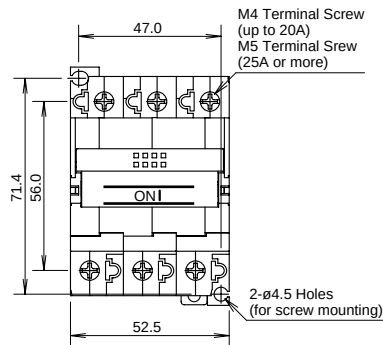


NC1V-2500
(Relay Trip)

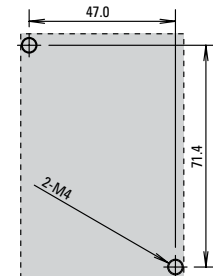


3-pole

NC1V-3100



Mounting Hole Layout
(M4 Mounting Screws)



NC1V-3111
(one auxiliary contact)

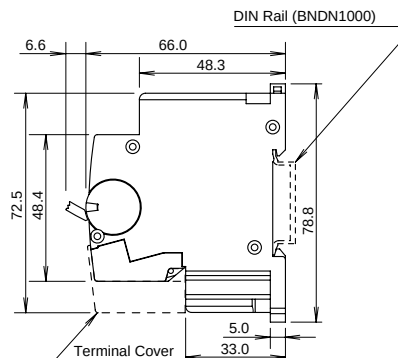
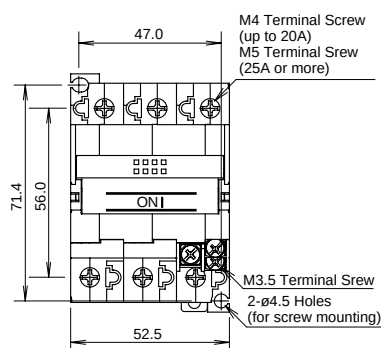
NC1V-3112
(two auxiliary contacts)

NC1V-3113
(three auxiliary contacts)

NC1V-3121
(one alarm Contact)

NC1V-3131
(one auxiliary contact
and one alarm contact)

NC1V-3132
(two auxiliary contacts
and one alarm contact)



Dimensions shown are for NC1V-3111 and NC1V-3121.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

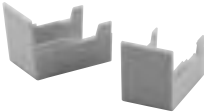
Timers

Contactors

Terminal Blocks

Circuit Breakers

Accessories

Appearance	Part No.	Description	Appearance	Part No.	Description
	NC9Z-MA11	Panel Cut-Out Mounting bracket for 1-pole model		NC9Z-PW1	Marking Plate Holder*
	NC9Z-MA21	Panel Cut-Out Mounting bracket for 2-pole model		NC9Z-LK1	Padlock attachment**
	NC9Z-MA31	Panel Cut-Out Mounting bracket for 3-pole model		NC1V-AUX-CV	Replacement Auxiliary/ Alarm Terminal Cover (Nylon - PA66)
	NC9Z-TA1	Replacement Wiring Clip when using panel mount brackets	*Marking plate not supplied. ** Padlock not supplied.		

Part Number Index

Symbols

4.6" HG1F
 OI Touchscreens 42
 5.7" HG2G
 OI Touchscreens 42
 6mm Interface Relays
 RV8H series 832
 8.4" HG3G
 OI Touchscreens 42
 8-16mm
 AP series 488
 8mm
 A8 series 492
 10.4" HG3G
 OI Touchscreens 42
 12.1" HG4G
 OI Touchscreens 42
 16mm
 A6 series 543
 HA1B/HA1E E-stops 560
 L6 series 557
 LB series 508
 X6 E-Stops 497
 XA E-Stops 460, 497, 501
 22mm
 AP22M series 586
 CW series 589
 FB series enclosures 713
 HW series 611
 TW series 672
 XW E-stops 580
 XW E-Stops 271, 460
 30mm
 ARN series 771
 CS series 764
 TWTD series 721
 XN E-stops 715, 751

A

A2A-L 559
 A6 Series - 16mm 543
 accessories 551
 dimensions 553
 miniature switches & pilot devices
 16mm 543
 part numbers 544
 specifications 543
 switch engraving order form 551
 A8 Series - 8mm 492
 accessories 495
 dimensions 496
 miniature switches & pilot devices
 8mm 492
 part numbers 493
 specifications 492
 AB6E-3 498
 AB6E-4 498
 AB6H-A 544
 AB6H-B 541
 AB6H-M 544
 AB6M-A 544
 AB6M-B 541
 AB6M-M 544
 AB6Q-A 544
 AB6Q-B 541
 AB6Q-M 544
 AB8 493, 495
 ABD 724, 725
 ABD1BN 725
 ABD2BN 725
 ABD3BN 725
 ABD4BN 725
 ABFD 724, 725
 ABFW 676
 ABFW1 675
 ABFW2 675
 ABG 724
 ABGD 725
 ABGW 676
 ABGW4 675
 ABN4F 743
 ABN4G 743
 ABPD 724
 ABQW 676
 ABQW1 675
 ABQW1B 676
 ABQW2 675
 ABQW2B 676
 ABW 676
 ABW1 675
 ABW1B 676
 ABW2 675
 ABW2B 676
 ABW3 675
 ABW3B 676
 ABW4 675
 ABW4B 676
 ACSNK 764
 ACSNO 764
 AKW 676
 AKW2 675
 AKW2B-B 704
 AL6H 541
 AL6H-L 541
 AL6H-M 546
 AL6H-P 549
 AL6H-W 552
 AL6-L 552
 AL6M 541
 AL6M-L 541
 AL6M-M 546, 552
 AL6M-P 549, 552
 AL6M-W 552
 AL6Q 541
 AL6Q-L 541
 AL6Q-M 546
 AL6Q-P 549
 AL6Q-Q 552
 AL6Q-W 552
 AL8 494
 AL-B 490, 552, 573
 AL-B6 537
 AL-B8 490, 495
 AL-BM6 537
 AL-C 552
 AL-C8 495
 AL-C8V 495
 AL-D 552
 ALD 732, 733
 ALFD 732, 733
 ALFW 686
 AL-K 495, 552
 AL-K6SP 537
 AL-KH6SP 537
 ALN3LU 733
 ALN06LU 733
 ALQW 686
 ALQW2 705
 ALQW2B 685
 ALQW2BLU 686
 AL-V6 552
 AL-V8 495
 ALW 686
 ALW2 685, 705
 ALW2BLU 686
 ALW2LU 686
 ALW3 685, 686, 705
 ALW3BLU 686
 ALW3LU 686
 ALW4 685
 ALW4BLU 630, 686
 ALW4LU 686
 Analog Timers
 GT3A Series 931
 RTE Series 924
 AOD 724, 725
 AOF 724
 AOFD 724, 725
 AOFW 676
 AOFW1 675
 AOFW2 675
 AOGD 724, 725
 AOGW 676
 AOGW4 675
 AOLD 732, 733
 AOLFD 732, 733
 AOLFW 686
 AOLQW 686
 AOLQW2B 685
 AOLW 686
 AOLW2 685
 AOLW3 685, 686
 AOLW4 685
 AOPD 724
 AOQW 676
 AOQW1 675
 AOQW2 675
 AOW 676
 AOW1 675
 AOW2 675
 AOW3 675
 AOW4 675
 AP1 489, 490
 AP2 489, 490
 AP2-0 489
 AP6 489, 490
 AP8 489
 AP22M-2Q4 586
 AP22M Series 586
 accessories 586
 dimensions 587
 instructions 588
 part numbers 586
 specifications 587
 APD 733
 APD- 730
 APD1 729
 APD-F 728, 730, 739, 743
 APD-P 744
 APN1 730
 Approvals & Standards 1031
 definitions 1031
 hazardous location definitions 1032
 APQW1 682, 705
 APQW1BLU 683
 AP Series - 8 to 16mm 488
 accessories 490
 dimensions 491

part numbers 489
 specifications 488
 APS-P 705
 APW00L 704
 APW-1 683
 APW1 682
 APW1BLU 683
 APW1LU 683
 APW2 682
 APW2LU 683
 ARN 771
 ARNO- 772
 ARNB-B 772
 ARN-BL 772
 ARNLO- 772
 ARNL-BL 772
 ARNSO-1 772
 ARNSO-2 772
 ARN Series 771
 dimensions 773
 mono-lever switches 771
 replacement parts 772
 part numbering guide 771
 specifications 771
 AS6H-2 550
 AS6M-2 550
 AS6Q-2 550
 AS6-SK 541, 552
 ASD 736
 ASHHL- 736
 ASHHY- 736
 AS-Interface
 safety at work
 accessories 461
 dimensions 463
 E-Stops 460
 operating instructions 464
 part numbers 75, 460
 RV8H 75
 specifications 461
 AS-Interface Overview 218
 ASLD 739
 ASLD2 738
 ASLD3 738
 ASLNHU- 739
 ASLW 694
 ASLW2 693
 ASLW3 693
 ASLWLU- 694
 ASW 691
 ASW2 689
 ASW3 690
 ASW4 690
 ASW5 690
 ASWHHL- 632, 634, 636, 691
 ASWHHY- 691
 Automation Organizer Suite 34, 77, 133
 part number 34, 77
 WindCFG 143
 WindLDR 139
 WindO/I-NV2 134
 WindO/I-NV3 134
 Automation Software
 Automation Organizer Suite 133
 selection guide 132
 WindCFG 143
 WindLDR 139
 WindO/I-NV2 134
 WindO/I-NV3 134
 WindSRV 145
 AVD 727, 728

AVLD 727
 AVL3 728
 AVLN 728
 AVLW3 678, 680
 AVLW3- 679
 AVLW4 678, 680
 AVN 728
 AVW- 679
 AVW3 678
 AVW3B 679
 AVW4 678
 AVW4B 679
 AW-R 704
 AXW- 679
 AXW4 678
 AXW4B 679
 AYD 727, 728
 AYD3BN 728
 AYLD 727, 728
 AYLD2L 728
 AYLD3L 728
 AYLD22TK962 728
 AYLW4 680
 AYLW4- 679
 AYW- 679
 AYW4 678
 AYW4B 679

B

BA 993
 BA211T 993
 BA311T 993
 BA411S 993
 BAF111SDU 994
 BAF111SNU 994
 BAF111SU 994
 Barriers
 discrete input
 EB3C 226
 discrete input with redundant output
 EB3N 233
 discrete output
 EB3L 241, 249
 general information 255
 selection guide
 discrete input 224
 discrete input with redundant output 224
 discrete output 225
 BA Series 993
 dimensions 995
 instructions 1001
 specifications 993
 terminal blocks 993
 BN 988, 997
 BN150W 988
 BN200 991
 BN400 991
 BNC 997
 BND 997
 BNDH 988
 BNDL2 996
 BNDN1000 151, 165, 173, 175, 425, 844, 860, 865, 874, 883, 890, 901, 929, 947, 955, 960, 965, 996, 1004
 BNE 996
 BNF1 989
 BNF10DW 989
 BNF10NW 989
 BNH1 987

BNH5 988
 BNH15LW 987
 BNH15MW 987
 BNH30W 987
 BNH/BN Series 987
 dimensions 990
 instructions 1001
 specifications 987
 terminal blocks 987
 BNJ 997
 BNL5 165, 173, 175, 844, 860, 865, 874, 883, 890, 901, 996
 BNL6 151, 175, 425, 901, 996, 1004
 BNL8 996
 BN Power Block Series 991
 dimensions 992
 instructions 1001
 specifications 991
 terminal blocks 991
 BNR 997
 BNS 996
 BR- 772
 Break-Out Modules
 BX series 1003
 BST-O 725, 728, 733, 736, 739
 BST-D 725, 728, 733, 736, 739
 Buzzers 523
 BX1D- 1004
 BX1D-S 74
 BX1D-T 74
 BX9Z-H 233, 248
 BX Series 1003
 dimensions 1006
 part numbers 1004
 specifications 1003
 terminal arrangements 1005
 terminal blocks 1003

C

Cables
 OI Touchscreens 46
 PLCs 74
 Chemical Plant Lighting 18
 Circuit Breakers
 NC1V Series 1009
 selection guide 1008
 CJ 769
 Commercial Display Case Lighting 13
 Commercial Products Lighting 11
 Communication & Networking 217
 Compact Power Relays
 RH series 863
 Configuration Tool 143
 Contactor Reset Button 656
 Contactors 967
 selection guide 968
 YC1N(K) mini contactors 969
 YC1N series (AC coil) 980
 YC1U series (AC coil) 973
 Control Panel Lighting 11, 13, 16
 CQ 769
 CQM 769
 CQN 769
 CSH- 769
 CS Series 764
 accessories 769
 contact arrangements 766
 contact ratings 764
 dimensions 770
 heavy duty cam switches 764
 nameplates 769
 order form 768

part numbers 764
 terminal arrangements 770
 CW1B 593
 CW1K 602
 CW1L 591, 592
 CW1P 594
 CW1S 598
 CW4B 593
 CW4K 602
 CW4L 591, 592
 CW4P 594
 CW4S 598
 CW9Z-D 603
 CW9Z-L 592, 603, 656
 CW9Z-W 603
 CWAM- 604
 CWAM-OB 603
 CW-CN 592, 593, 594, 602
 CW-DB 594, 603
 CW-E 604
 CW-EAQ 592, 594, 604
 CW Series 589
 accessories 603
 contact ratings 589
 dimensions 605
 illuminated pushbuttons 591
 instructions 609
 key selector switches 599
 LED module 590
 nameplates order form 604
 non-illuminated pushbuttons 593
 operating instructions 609
 pilot lights 594
 replacement parts 603
 selector switches 595
 specifications 589

D

Discrete Input Barriers 226
 EB3C 226
 Discrete Input Barriers with Redundant Output 236
 EB3N 233
 Discrete Output Barriers 241
 EB3L 241, 249
 Door Handle Actuator 362
 HS5B/HS5E Series 362
 Drivers
 OI Touchscreens 35
 Dual Pushbutton Switches 651
 Dual Time Range Timers
 GT3W Series 943

E

EB3C 224
 EB3C Series
 accessories 228
 circuit diagrams 229
 dimensions 230
 features 258
 part numbers 226
 specifications 228
 wiring examples 229
 EB3L 225
 EB3L-S 243
 EB3L Series 241, 249
 accessories 243
 dimensions 244
 features 258
 part numbers 243
 precautions 253
 specifications 242
 wiring examples 245
 EB3N 224, 233
 EB3N Series 236
 dimensions 238
 instructions 239
 specifications 237
 EB3P-LAD 249
 EB3P-LAN 249
 EB3P-LAW 249
 EB3P-LBA 250
 EB3P-LBH 250
 EB3P-LBL 250
 EB3P-LHW 249
 EB3P-LSA 250
 EB3P-LSH 250
 EB3P-LSL 250
 EB3P-LUN 249
 EB3P-LUW 249
 EB3P-ZUN 250
 EB9Z-LDS1 250
 EF1A Series 18
 dimensions 21
 LED optical specifications 20
 specifications 20
 Elevator Ceiling Lightin 22
 Enabling Switches
 basic switch
 HE1B Series 374
 HE6B Series 385
 grip style switch
 HE1G-L Series 392
 HE1G Series 388, 392, 395
 HE2G Series 395
 housing 399
 pushbutton switch
 HE3B Series 379
 HE5B Series 382
 redundant contact pushbutton enabling switch 382
 HR5B Series 382
 redundant contact switch 379
 HE3B Series 379
 redundant (double) basic switch
 HE2B Series 376
 selection guide 373
 Enclosures
 E-Stops 460
 XW, HW & TW 713
 Engraving
 see also Nameplates 820
 Engraving Information
 SLC40 Series 820
 E-Stops
 FB series enclosures 460, 713
 HW series
 pushbuttons 619
 push pull & unibody 621
 nameplates 275, 498, 505, 584, 657, 701, 718, 745
 safe break action design 268
 stations 623
 unibody E-stops 727
 X6 series 497
 XA series 460, 497, 501
 dimensions 463
 part numbers 460, 502
 specifications 461
 XN series 715
 accessories 718
 contact ratings 717
 dimensions 718
 part numbers 716
 specifications 715, 751

terminal arrangements 717
 XW series 267, 460, 580
 accessories 275, 584
 contact ratings 273, 582
 dimensions 274, 463, 583
 part numbers 272, 460, 581
 specifications 271, 461, 580
 terminal arrangements 273, 582
 E-Stop Stations 623

F

FB1W-1 713
 FB1W-H 623
 FB1W-X 460, 581
 FB2W-2 713
 FB2W-3 713
 FB3W-4 713
 FB3W-5 713
 FB9Z-C 461
 FB9Z-P 713
 FB Series Enclosures 460, 713
 accessories 713
 AS-Interface
 safety at work 460
 dimensions 714
 part numbers 713
 specifications 713
 FC2A-K 74
 FC4A-C 63
 FC4A-D 64, 75
 FC4A-ENET 69
 FC4A-H 72, 73
 FC4A-J 69
 FC4A-K 69, 74
 FC4A-M 67
 FC4A-N 65
 FC4A-P 72, 75
 FC4A-R 66
 FC4A-T 66, 67
 FC4A-U 74
 FC5A-C 62
 FC5A-D 62
 FC5A-S 71
 FC5A-SIF2 71
 FC9Y-B 75
 FC9Y-QS100-0 69
 FC9Z-H 74, 233, 248
 FL1E-R 123
 FL9Y-LP1CDW 125
 Flush Mount Switches 508
 Food & Beverage Processing Equipment
 Lighting 4
 Force Guided Relays 900
 RF1V series 900
 FS1A-C 425
 FS1A Series 425
 LEDs 434
 optional parts 425
 part numbers 425
 specifications 428, 432, 437
 FS9Z-CN 425
 FS9Z-MT 425
 FS9Z-SD 425
 FT1A-B 106
 FT1A-H 106
 FT1A SmartAXIS Series
 part numbers 106
 specifications
 display 112
 general 108, 109, 110
 starter kits 107
 FT1A Touch HMI + PLC

Part Numbers 102
 Starter Kits 107
 Full Size Interlock Switches 291, 295
 HS1B series 295
 HS2B Series 291
 Full Size NEMA Pushbuttons 721. *See also* TWTD Series
 Full Size Solenoid Locking Switches 329
 HS1E Series 323

G

GE1A-B 954
 GE1A-C 954
 GE1A Series 953
 accessories 955
 dimensions 956
 instructions 966
 ON delay timers 953
 part numbers 954
 sockets 955
 specifications 953
 timing diagrams 954
 timing diagrams overview 920
 GE9Z-A 955
 GE9Z-C 955
 General Purpose Relays
 RF1V series 900
 RH series 863
 RJ series 843
 RQ series 859
 RR series 873
 RU series 880
 RV8H series 832
 RY/RM series 889
 General Purpose Terminal Blocks
 BA series 993
 BNH/BN series 993
 BN series 991
 General Terms & Conditions 1035
 GT3A-1 932, 938
 GT3A-2 932, 938
 GT3A-3 932, 938
 GT3A-4 932, 938
 GT3A-5 932, 938
 GT3A-6 932, 938
 GT3A Series 931
 analog timers 931
 instructions 938, 966
 part numbers 932
 setting timers 938
 specifications 931
 timing diagrams 933–937
 timing diagrams overview 920
 GT3D Series
 instructions 966
 GT3F-1 940
 GT3F-2 940
 GT3F Series 939
 instructions 942, 966
 part numbers 940
 setting GT3F timers 942
 specifications 939
 timing diagrams 940
 timing diagrams overview 920
 true OFF delay timers 939
 GT3 Series 947
 accessories 947
 DIN rail mounting accessories 947
 panel mounting accessories 948
 dimensions 951
 mounting hole layout 952
 panel mount adapter 951
 instructions 949, 966
 wiring inputs 949
 GT3 Series Timers
 timing diagrams overview 920
 GT3W-A 944
 GT3W Series 943
 contact ratings 943
 dual time range timers 943
 instructions 946, 966
 part numbers 944
 safety precautions 946
 setting GT3W timer 946
 specifications 943
 timing diagrams 945
 timing diagrams overview 920
 GT5P-N 958
 GT5P Series 957
 accessories 960
 instructions 966
 ON delay timers 957
 part numbers 958
 sockets 960
 specifications 957
 timing diagram 959
 timing diagrams overview 920
 GT5Y-2 963
 GT5Y-4 963
 GT5Y Series 962
 accessories 965
 DIN rail mounting accessories 965
 panel mounting accessories 965
 PCB mounting accessories 965
 dimensions 966
 electrical life curves 964
 instructions 966
 ON delay timers 962
 part numbers 963
 sockets 965
 specifications 962
 timing diagram 964
 timing diagrams overview 920
 timing ranges 963

H

H6-PVL 573
 H6-VL2 573
 HA- 559
 HA1A 564
 HA1A-B 559
 HA1A-F 570
 HA1A-L 559
 HA1A-P 562
 HA1B 564
 HA1B-A 558, 559
 HA1B-V 560
 HA1E-V 560
 HA1F 570
 HA1F-2 569
 HA1F-3 569
 HA1K 568
 HA1K-2 567
 HA1K-3 567
 HA1L 564
 HA1L-A 563
 HA1P-0 562
 HA1P-1 561
 HA1R-2 571
 HA1R-3 571
 HA1S 566
 HA1S-2 565
 HA1S-3 565
 HA2A 564
 HA2A-B 559
 HA2A-P 562
 HA2B-A 558, 559
 HA2B-M 558, 559
 HA2L 564
 HA2L-A 563
 HA2L-M 563
 HA2P-0 562
 HA2P-1 561
 HA9Z-AH 562, 564, 570
 HA9Z-H 573
 HA9Z-K 573
 HA9Z-L 552, 573
 HA9Z-LS 559, 562, 564, 566, 568, 570
 HAAV-0 498, 505, 560
 HAAV-0-W 498
 HAAV-0 498, 505
 HAAV-4-0-W 498
 HAAV-27 498, 505
 HA-C 562, 564, 566, 568, 570
 Hazardous Location Definitions 1032
 Hazardous Location Lighting 18
 Hazardous Location Products 1029
 HE1B-M 374
 HE1B Series 374
 basic enabling switch 374
 current ratings 375
 dimensions 375
 part numbers 374
 specifications 374
 HE1G-2 388
 HE1G-L 392
 HE1G-L Series 392
 contact ratings 394
 dimensions 394
 grip style enabling switch 392
 operating characteristics 394
 part numbers 392
 specifications 393
 HE1G Series 388
 accessories 388
 contact ratings 389
 dimensions 390
 grip style enabling switch 388
 operation characteristics 390
 part numbers 388
 specifications 388
 wiring precautions 391
 HE2B-M 376
 HE2B Series 376
 accessories 376
 circuit diagrams 378
 contact ratings 377
 dimensions 378
 operating characteristics 378
 part numbers 376
 redundant (double) basic enabling switch 376
 specifications 376
 HE2G-2 395
 HE2G Series 395
 compact grip enabling switch 395
 contact ratings 397
 dimensions 398
 operation characteristics 398
 part numbers 395
 specifications 396
 HE3B-M 379
 HE3B Series 379
 accessories 379
 circuit diagrams 380
 contact ratings 380
 dimensions 381
 operating characteristics 381

part numbers 379
pushbutton enabling switch 379
specifications 379
HE5B Housing 399
dimensions 400
part numbers 399
specifications 399
HE5B-M 382
HE5B Series 382
accessories 382
circuit diagrams 383
current ratings 383
dimensions 384
operating characteristics 384
part numbers 382, 399
redundant contact pushbutton enabling switch 382
specifications 382, 399
HE6B-M 385
HE6B Series 385
accessories 385
current ratings 387
dimensions 387
operating characteristics 387
part numbers 385
specifications 386
HE9Z-D 376, 379, 382, 385
HE9Z-G 382, 388, 399
Heavy Duty Cam Switches 764. *See also CS Series*
CS series 764
Heavy Duty Photoelectric Sensors 208
SA1U 208
HG1F Series (4.6" Display)
OI Touchscreens 42
HG2G Series (5.7" Display)
OI Touchscreens 42
HG3G Series (8.4" & 10.4" Displays) 42
OI Touchscreens 42
HG4G Series (12.1" Display)
OI Touchscreens 42
HN1E-B 727
HN1E-L 727
HNAV 745
HNAV-0 718
HNAV-27 718
HR1S-AC 403
HR1S-AC Series 403
dimensions 403
part numbers 403
specifications 403
HR1S-AF 350, 406
HR1S-AF Series 406
dimensions 406
part numbers 406
specifications 406
HR1S-ATE 411
HR1S-ATE Series 411
dimensions 411
operation chart 413
part numbers 411
specifications 411
HR1S-D 350
HR1S-DM 409
HR1S-DM Series 409
dimensions 409
operation chart 410
part numbers 409
specifications 409
HR2S-301P/HR2S-301N Series 414
dimensions 415
operation chart 417, 418
part numbers 414
specifications 414

terminal arrangement 415
HR2S-332N 419
HR2S-332N-T075/T15/T30 Series 419
dimensions 421
maintenance parts 424
operation chart 424
part numbers 419
specifications 419
terminal arrangement 421
HR9Z-P 424
HS1B-0 295
HS1B-1 295
HS1B Series 295
accessories 295
actuator keys 295
application examples & circuit diagrams 296
dimensions 297
full size interlock switch 295
part numbers 295
specifications 295
HS1C-R 329
HS1C Series accessories 330, 333
actuator keys 330
contact ratings 331
dimensions 332
full size solenoid locking switches 329
part numbers 329
specifications 330
HS1E-1 323
HS1E-2 323
HS1E-3 323
HS1E-4 323
HS1E Series 323
accessories 323, 327
actuator keys 323
application examples & circuit diagrams 325
contact ratings 324
dimensions 327
full size solenoid locking switches 323
part numbers 323
specifications 324
HS1L-R 334
HS1L Series 334
accessories 335
actuator keys 335
contact ratings 335
dimensions 336
part numbers 334
specifications 335
HS2B-1 291
HS2B Series 291
accessories 291
actuator keys 291
application examples & circuit diagrams 293
dimensions 293
full size interlock switch 291
part numbers 291
specifications 292
HS3A-H 358
HS3A Series 358
accessories 358
dimensions 359
specifications 359
HS5B/HS5E Series 362
dimensions 366
part numbers 362
specifications 363
HS5D-02 284
HS5D-03 284
HS5D-11 284
HS5D-12 284

HS5D Series
actuator keys 284
contact configuration 285
contact ratings 286
dimensions 286
part numbers 284
specifications 285
terminal arrangement 285
HS5E-A 308
HS5E-B 308
HS5E-C 308
HS5E-D 308
HS5E-F 308
HS5E-G 308
HS5E-H 308
HS5E-J 308
HS5E-K 338
HS5E-K Series 337
accessories 338
actuator keys 338
contact ratings 339
dimensions 341
operating instructions 344
specifications 339
HS5E Series 307
accessories 310
actuator keys 310
dimensions 312
miniature solenoid locking switches 307
operating instructions 320
part numbers 308
dual safety circuit type 308
four-circuit independent output type 309
solenoid lock type 310
spring lock type 308
HS6B-0 279
HS6B-1 279
HS6B Series 279
actuator keys 279
contact configuration 279
contact ratings 280
dimensions 281
part numbers 279
specifications 280, 285
wiring designations 281
HS6E-L 298
HS6E-M 298
HS6E-N 298
HS6E-P 298
HS6E Series 298
actuator keys 299
application examples & circuit diagrams 303
contact ratings 300
dimensions 301
operating instructions 305
part numbers 298
specifications 299
subminiature interlock switches with solenoid 298
HS7A-DMC 350
HS7A-DMC Series
accessories 350
dimensions 351
operating instructions 353
part numbers 350
specifications 351
HS7A-DMP 354
HS7A-DMP Series
accessories 354
dimensions 355
operating instructions 357
part numbers 354

specifications 355
HS9Z-A1 291, 295, 323, 330
HS9Z-A1S 335
HS9Z-A2 291, 295, 323, 330
HS9Z-A2S 335
HS9Z-A3 291, 295, 323, 330
HS9Z-A3S 335
HS9Z-A5P 284, 310, 338
HS9Z-A51 284, 310, 338
HS9Z-A51A 284
HS9Z-A52 284, 310, 338
HS9Z-A52A 284
HS9Z-A53 310, 338
HS9Z-A55 284, 310
HS9Z-A61 279, 299
HS9Z-A62 279, 299
HS9Z-A62S 299
HS9Z-A65 279, 299
HS9Z-A66 279, 299
HS9Z-DH 362
HS9Z-FL 362
HS9Z-H3 358, 360
HS9Z-P1 291, 295, 323, 330, 335
HS9Z-PH5 284, 310, 338
HS9Z-SH 310
HS9Z-SH5 284, 338
HS9Z-SP 310, 338
HS9Z-T 310, 338
HS9Z-T1 295, 323, 330, 335
HS9Z-Z 358
HW- 626
HW1A 791
HW1A- 661
HW1A-B 594, 614, 616
HW1A-B1- 650
HW1A-P 624, 626, 795
HW1B 614, 616, 620, 622, 656
HW1B-A 613, 615
HW1B-M 613, 615, 656
HW1B-V 619
HW1B-X 620
HW1B-Y 621
HW1E-B 621
HW1E-L 621
HW1E-T 621
HW1F-2 641, 642
HW1F-3 643, 644
HW1K-2 346, 637, 638
HW1K-3 347, 639, 640
HW1L 628, 630
HW1L-A 627, 629
HW1L-M 627, 629
HW1M 646
HW1M-F 645, 647
HW1M-L 645, 647
HW1P 626
HW1P-1 625
HW1P-2 625
HW1P-5 624, 795
HW1R 650
HW1R-2 649
HW1S-2 631, 632
HW1S-3 633, 634
HW1S-4 635, 636
HW1S-5 635
HW2A 630
HW2A-B 618
HW2B 618
HW2B-M 617
HW2L-A 629
HW2L-M 629

HW2P-1 625
 HW4B 614, 619, 620, 622, 656
 HW4B-A 613, 615
 HW4B-M 613, 615, 656
 HW4B-Y 621
 HW4F-2 641, 642
 HW4F-3 643, 644
 HW4K-2 637, 638
 HW4K-3 639, 640, 755, 757
 HW4L 628, 630
 HW4L-A 627, 629
 HW4L-M 627, 629
 HW4P 626
 HW4P-2 625
 HW4S-2 631, 632
 HW4S-3 633, 634
 HW4S-4 635, 636
 HW4S-5 635
 HW7D 653
 HW7D-B 651
 HW7D-L 652
 HW9Z 650
 HW9Z-A 660
 HW9Z-B 646, 648, 653
 HW9Z-C 646, 648
 HW9Z-D 661
 HW9Z-EMO- 661
 HW9Z-FDY- 642, 644
 HW9Z-K 275, 584, 660, 661, 705
 HW9Z-KG 275
 HW9Z-KL1 349
 HW9Z-L 653, 660
 HW9Z-LS 348, 614, 616, 618, 620, 622, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 653, 660
 HW9Z-P 624, 661, 713, 795
 HW9Z-R 656, 660
 HW9Z-RL 348, 614, 616, 618, 620, 622, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 653, 660
 HW9Z-S 660
 HW9Z-WM 348, 586
 HWAM 349
 HWAM- 657
 HWAQ-O 657
 HWAS- 657
 HWAV-O 275, 584
 HWAV5-O 275, 584, 657
 HWAV5-2 657
 HWAV5-27 275, 584
 HWAV-27 275, 584, 657
 HWAV-O 657
 HW-C 616, 618, 620, 622, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 653, 661, 676, 680, 687, 691, 695
 HW-CB2C 614, 616, 618, 620, 622, 632, 634, 636, 638, 640, 646, 648, 650, 653
 HW-CBL 628, 630, 642, 644, 653
 HW-D 628, 630, 642, 644, 653, 680, 687, 695
 HW-F 614, 616, 618, 620, 622, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 653, 661, 662, 676, 680, 687, 691, 695
 HW-G 348, 614, 616, 618, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 653
 HW-L 628, 630, 642, 644, 653, 695

HW-LH3 680, 686
 HWLV-LENSR 661
 HWM-WASHER 660
 HWNP 604, 657
 HW Series 346, 611
 accessories 348, 660
 dimensions 668
 contact assemblies 661
 contactor reset button 656
 dimensions 347, 662-667
 dual pushbutton selectors 651
 part numbers 651
 E-stop stations 623
 FB series enclosures 713
 general instructions 670
 dual pushbutton instructions 670
 IEC style global pushbuttons 611
 illuminated mushroom & square pushbuttons 629
 replacement parts 630
 illuminated round pushbuttons 627
 replacement parts 628
 illuminated selector switches 2-position 641
 replacement parts 642
 illuminated selector switches 3-position 643
 replacement parts 644
 jumbo dome pilot lights 624
 replacement parts 624
 key switches 2-position 637
 replacement parts 638
 key switches 3-position 639
 replacement parts 640
 mono lever switches 2-position 645
 part numbers 645
 replacement parts 646
 mono lever switches 3- & 4-position 647
 part numbers 648
 replacement parts 648
 nameplates 657
 nameplates order form 658
 non-illuminated E-stop pushbuttons 619
 replacement parts 620
 non-illuminated mushroom head pushbuttons 615
 replacement parts 616
 non-illuminated round pushbuttons 613
 replacement parts 614
 non-illuminated square pushbuttons 613, 617
 replacement parts 614, 618
 operating instructions 349
 operator truth tables 669
 part numbers 613
 pilot lights 625
 replacement parts 626
 pushbutton selectors 649
 push pull & unibody E-stop pushbuttons 621
 replacement parts 622
 replacement parts 348
 safety precautions 670
 selector switches 2-position 631
 replacement parts 632
 selector switches 3-position 633
 replacement parts 634
 selector switches 4- & 5-position 635
 replacement parts 636
 shrouds 661
 specifications 589, 611
 standard legend codes 604, 657
 switch engraving order form 659
 transformer contact assemblies 662
 HW-T 630, 642, 644

HW-V 705, 824
 HW-VG1 661
 HW-VL1 660

IDEC SmartRelay
 function blocks 129
 software
 WindLGC 125
 specifications 126
 starter kits 124
 IEC Style Global Pushbuttons
 HW series 611
 Illuminated Pushbuttons 494, 509, 563, 591, 684, 731
 mushroom & square 629
 round 627
 Illuminated Selector Switches 517, 569, 692, 737, 739
 2-Position 641
 3-Position 643
 Industrial Equipment Lighting 11
 Industrial Machine Lighting 13
 Interface Relays
 6mm RV8H series 832
 Interlock Switches
 full size
 HS1B series 295
 HS2B Series 291
 full size solenoid locking
 HS1C series 329
 HS1E series 323
 miniature solenoid locking
 HS5E Series 307
 selection guide 278
 subminiature
 HS6B series 279
 subminiature with solenoid
 HS6E Series 298
 with solenoid
 HS1L Series 334
 IPL1- 249
 IS- 626, 628, 630, 642, 644, 653, 679, 683, 686, 694, 728, 730, 733, 739, 823

J

Jumbo Dome Pilot Lights 624, 795
 lamp ratings 795
 replacement parts 795

K

K301 769
 Key Locking Safety Interlock Switches 337
 HS5E-K Series 337
 Key Selector Switches 519, 599
 2-Position 637
 3-Position 639
 Key Switch 346
 ø22 HW 346
 Key Switches 567
 KG9Z-SK 573
 KIT-SMART 107
 KIT-TOUCH 107

L

L6 Series
 accessories 573
 dimensions 574

general instructions 579
 illuminated pushbuttons 563
 illuminated selector switches 569
 key switches 567
 miniature switches & pilot devices 557
 non-illuminated pushbuttons 558
 part numbers 558
 pilot lights 561
 pushbutton selectors 571
 selector switches 565
 specifications 557
 switch engraving order form 572

LA1A 518
 LA1A-F 570
 LA1F 570
 LA1F-2 569
 LA1F-3 569
 LA1T-2 571
 LA1T-3 571
 LA2F 570
 LA2F-2 569
 LA2F-3 569
 LA3F 570
 LA3F-2 569
 LA3F-3 569
 LA3Z-1 560
 LA9Z-B 552
 LA9Z-K 537, 553, 574
 LA9Z-S 541, 553, 574
 LA9Z-SK 603
 LAD- 495
 LATD- 547, 549, 552
 LB1A 510, 512, 514
 LB1B 513
 LB1F 517, 518
 LB1K 519, 521
 LB1L 509, 510, 514
 LB1P 511, 512
 LB1S 515, 516
 LB1T 522
 LB2A 510, 512, 514
 LB2B 513
 LB2F 517, 518
 LB2K 519, 521
 LB2L 509, 510, 514
 LB2P 511, 512
 LB2S 515, 516
 LB3A 510, 512, 514
 LB3B 513
 LB3F 517, 518
 LB3K 519, 521
 LB3L 509, 510, 514
 LB3P 511, 512
 LB3S 515, 516
 LB3Z 523
 LB6B 513
 LB6F 517, 518
 LB6GB 513
 LB6GL 509, 510, 514
 LB6K 519, 521
 LB6L 509, 510, 514
 LB6MB 513
 LB6MF 517, 518
 LB6MK 519, 521
 LB6ML 509, 510, 514
 LB6MP 512
 LB6MS 515, 516
 LB6MZ 523
 LB6P 511, 512
 LB6S 515, 516
 LB6T 522
 LB6Z 523

LB7B 513
 LB7F 517
 LB7GB 513
 LB7GL 509, 510, 514
 LB7K 519, 521
 LB7L 509, 510, 514
 LB7MB 513
 LB7MF 517
 LB7MK 519, 521
 LB7ML 509, 510, 514
 LB7MP 511, 512
 LB7MS 515, 516
 LB7P 511, 512
 LB7S 515, 516
 LB8B 513
 LB8F 517
 LB8GB 513
 LB8GL 509, 510, 514
 LB8K 519, 521
 LB8L 510, 514
 LB8MB 513
 LB8MF 517
 LB8MK 519, 521
 LB8ML 510, 514
 LB8MP 511, 512
 LB8MS 515, 516
 LB8MZ 523
 LB8P 511, 512
 LB8S 515, 516
 LB8Z 523
 LB9MP 511
 LB9Z-B 538
 LB9Z-D 537, 538
 LB9Z-L 541
 LB9Z-LED 510, 512, 518, 541
 LB9Z-V 538
 LB78L 509
 LB78ML 509
 LB Series 508
 accessories 537
 dimensions 539
 buzzers 523
 contact ratings 508
 dimensions 526
 illuminated selector switches 517
 illuminated pushbuttons 509
 illuminated selector switches 517
 key selector switches 519
 lever switches 522
 non-illuminated pushbuttons 513
 pilot lights 511
 precautions & instructions 542
 replacement parts 541
 selector switches 515
 specifications 508
 LB-T 510, 512, 514, 516, 518, 521, 522, 523
 LD6A 778, 779
 LD6A Series 778
 base module 779
 dimensions 782
 instructions 784
 LED module 779
 mounting parts 779
 replacement parts 780
 specifications 781
 wiring example 782
 LD9Z 779, 780
 LE 823
 LED Lighting
 Lumifa 1
 LED SignalLight Towers 778
 Lever Switches 522

LF1A Series 16
 dimensions 17
 illuminance chart 17
 part numbers 16
 specifications 17
 LF1B-N Series 13
 brilliance distribution 15
 dimensions 15
 part numbers 13
 specifications 14
 LF1D 4
 long 4
 mini 4
 slim & wide 4
 LF1D-C 4
 LF1D-H 4
 LF1D-J 4
 LF1D & LF2D Series 4
 dimensions 7
 distribution characteristics 7
 illuminance charts 6
 part numbers 4
 specifications 6
 LF1F Series 22
 dimensions 22
 part numbers 22
 specifications 22
 LF2B Series 11
 dimensions 12
 illuminance charts 12
 part numbers 11
 specifications 12
 LF2D 4
 slim & wide 4
 LF9Z 5, 11, 13
 LFTD- 562, 564, 570, 573
 LH- 562, 570, 573
 LH1D 790
 LH9Z 791
 LH Series
 dimensions 793
 instructions 794
 internal circuit 792
 lens colors 792
 part numbers 790
 replacement parts 791
 specifications 791
 Light Curtains 440
 mounting brackets and accessories 454
 SE4D series 441
 selection guide 440
 Type 2 SG2 Series 446
 Type 4 SG4 Series 450
 Lighting
 chemical plants 18
 commercial display cases 13
 commercial product 11
 control panel 11, 13, 16
 elevator 22
 food & beverage processing 4
 hazardous locations 18
 industrial equipment 11
 industrial machines 13
 machine tools 4
 manufacturing equipment 16
 oil & gas 18
 painting booths 18
 vision systems 4
 visual inspection 22
 water treatment 18
 Light Towers
 LT7 Series 787
 LSB-2 624, 795
 LSTD- 626, 628, 630, 642, 644, 653, 679,

683, 686, 694, 728, 733, 739
 LSTD-1 730
 LSTD-2 730
 LSTD-6 730
 LSTDB 624
 LSTDB-2 624, 661, 795
 LSTD-H2 730
 LSTD-M4 730
 LT7A- 787
 LT7A-X 787
 LT7B- 787
 LT7 Series 787
 accessories 788
 dimensions 789
 part numbers 787
 replacement parts 788
 specifications 788
 wiring examples 789
 LT9Z-7 788
 LT9Z-H 788
 LT9Z-M 788
 LT9Z-O 788
 LT9Z-S 788
 Lumifa 1
 selection guide 2
 LW9Z 603
 LW9Z-B 660, 704
 LW9Z-L 660
 LW9Z-SK 348

M

Machine Tool Lighting 4
 Magnetic Safety Switches 354
 HSTA-DMP Series 354
 Manufacturing Equipment Lighting 16
 Mature Product List 1033
 MicroSmart 63
 cables 74
 modules
 analog I/O expansion 68
 communication
 web server module 69
 digital I/O expansion 65
 optional 72
 web server module 69
 part numbers 63
 MicroSmart Pentra 56
 cables 74
 modules
 analog I/O expansion 68
 communication
 web server module 69
 digital I/O expansion 65, 68
 optional 72
 web server module 69
 part numbers 62
 Miniature Interlock Switches
 HS5D 284
 Miniature Interlock Switches with Sole-noid 307
 HS5E Series 307
 Miniature Photoelectric Switches 192
 SA1E 192
 Miniature Pilot Lights
 AP series 488
 Miniature Relays
 RY/RM series 889
 Miniature Switches and Pilot Devices
 A6 series 543
 A8 Series 492
 L6 series 557
 Mini Contactors. *See also* YC1N(K) Series

MMIT-1 461
 MM-SMART 76
 Mono Lever Switches
 2-Position 645
 3- & 4-Position 647
 Mono-Lever Switches 772
 ARN series 771
 MT-001 379, 382, 490, 498, 537, 552, 573
 MT-002 490, 552
 MT-003 490, 552
 MT-004 490, 495
 MT-100 490
 MT-101 495, 537, 552, 573
 Multi-function Safety Relay 425
 FS1A 425
 MW9Z 603
 MW9Z-T 660
 MW9Z-T1 348, 586

N

NAKD 745
 NALD 745
 Nameplates
 CS series 769
 CW series 604
 HW Series 657
 TW series 701
 TWTD series 745
 XN E-Stops 718
 XW E-Stops 275, 584
 Nameplates Order Form
 CW series 604
 HW Series 604, 658
 TW series 702
 TWTD series 746
 NAQD 745
 NC1V-1 1011
 NC1V-2 1011
 NC1V-3 1011
 NC1V-AUX-CV 1018
 NC1V Series
 accessories 1018
 dimensions 1015
 instructions 1017
 models 1011
 specifications 1010
 time delay curves 1013
 NC9Z 1018
 NEMA Style Pushbuttons
 TW series 672
 Non-contact RFID Safety Switches 358
 HS3A Series 358
 Non-Illuminated E-Stop Pushbuttons 619
 Non-Illuminated Pushbuttons 493, 513, 559, 593, 674, 723
 mushroom head 615
 round 613
 square 617
 N-V 744
 NWAL 701
 NWAQL 701
 NWAR 701
 NWA 701

O

OB-11 743
 OB-13 743
 OB-31 660, 704
 OBP-11 743
 OC-11 743

OC-31 660, 704
 OC-32 660, 704
 OC-121 743
 OC-122 743
 OCW-1 704
 OG-81 743
 OG-82 743
 OG-83L 743
 OGL-31 704
 OGL-D 743
 OGP11B 743
 Oil & Gas Lighting 18
 OL-K 743
 OLW-C 704
 ON Delay Timers
 GE1A Series 953
 GT5P Series 957
 GT5Y Series 962
 Operator Interface Touchscreens
 4.6" HG1F 42
 5.7" HG2G 42
 8.4" HG3G 42
 10.4" HG3G 42
 12.1" HG4G 42
 accessories 44
 automation solution packages 43
 Basic Series 33
 Automation Organizer Suite 34
 dimensions & panel cutouts 52
 cables 46
 drivers 35
 expansion modules 45
 High Performance Series 28
 dimensions & panel cutouts 51
 display specifications 47
 general specifications 48
 specifications 47
 part numbers 42
 selection guide 26
 starter kits and solution packages 43
 supported drivers 35
 touchscreen starter kits 43
 Operator Truth Tables
 HW series 669
 TW series 700
 TWTD series 742
 OR-5 704
 OR-44 573
 OR-55 660, 743, 824
 OR-66 495
 OR-77 552

P

Painting Booth Lighting 18
 Panel Mounted Annunciators
 SLC30-IPS Series 804
 SLC30 Series 796
 SLC40 Series 812
 PCB Relays
 RQ series 859
 Piezo Switches 835
 Pilot Devices
 miniature
 A8 series 8mm 492
 Pilot Lights 511
 AP22M series 586
 CW series 594
 HW series 625
 jumbo dome 624
 L6 series 561
 miniature
 A6 series 8mm 488

TW series 681
 TWTD series 729
 PLCs
 cables 74
 communication modules 69
 web server module 69
 MicroSmart 63
 MicroSmart Pentra 56
 modules
 analog I/O expansion 68
 communication
 web server module 69
 digital I/O expansion 65, 68
 optional 72
 web server module 69
 selection guide 54, 132, 133
 software
 WindLGC 125
 specifications 78
 starter kits and solution packages 76
 web server module 69
 Power Relays
 RR Series 873
 Power Supplies
 PS3X series 175
 PS5R slim line 164
 PS5R standard 170
 PS6R series 151
 selection guide 150
 Programmable Logic Controllers
 see also PLCs 53
 PS3X-B 175
 PS3X-C 175
 PS3X-D 175
 PS3X-E 175
 PS3X-Q 175
 PS3X Standard Series
 part numbers 175
 PS5R
 slim line 164
 standard 170
 PS5R-A 170
 PS5R-B 170
 PS5R-C 170
 PS5R-D 170
 PS5R-E 170
 PS5R-F 170
 PS5R-G 170
 PS5R-Q 170
 PS5R-SB 165
 PS5R-SC 165
 PS5R-SD 165
 PS5R-SE 165
 PS5R-SF 165
 PS5R-SG 165
 PS5R Slim Line Series 164
 accessories 165
 dimensions 168
 mounting bracket dimensions 169
 part numbers 165
 specifications 166
 switching power supplies 164
 temperature derating curves 167
 PS5R Standard Series 170
 accessories 173
 dimensions 174
 installation instructions 173
 overcurrent protection characteristics 173
 part numbers 170
 specifications 171, 176
 switching power supplies 170
 temperature derating curves 172
 PS5R-T 170

PS5R-V 157
 PS5R-V Series
 Specifications
 PS5R-V 158
 PS6R-F 151
 PS6R-G 151
 PS6R-J 151
 PS6R Series 151
 accessories 151
 branch terminal module 151
 characteristics 156
 dimensions 154
 instructions 155
 output voltage expansion module 151
 part numbers 151
 specifications
 accessories/modules 153
 PS6R 152
 PS9Z-3 175
 PS9Z-5 165
 PS9Z-6 151
 Pushbutton Selectors 571, 649
 Push Pull & Unibody E-Stop Pushbuttons 621

R

Relays & Sockets
 6mm - RV8H 832
 compact power relays
 RH series 863
 force guide relays 900
 interface 832
 miniature relays
 RY/RM series 889
 PCB relays
 RQ Series 859
 power relays
 RR series 873
 RF1V series 900
 RH series 863
 RJ series 843
 RQ series 859
 RR series 873
 RSC series 908
 RSS series 911
 RU series 880
 RV8H series 832
 RY/RM series 889
 selection guide 830
 solid state relays
 RSC series 908
 RSS series
 DIN panel mount 911
 universal relays
 RU series 880
 RF1V 900
 RF1V Series
 accessories 901
 coil ratings 901
 dimensions
 RF1V 904
 SF1V
 DIN rail mount sockets 905
 PC board mount sockets 905
 operating instructions 906
 part numbers 900
 safety precautions 907
 sockets 900
 socket specifications 903
 specifications 902
 RH1B-U 863
 RH2B-U 863
 RH3B-D 863
 RH3B-U 863
 RH4B-L 863
 RH4B-U 863
 RH Series 863
 accessories 864
 characteristics 867
 coil ratings 865
 compact power relays 863
 contact ratings 865
 dimensions 869-872
 operating instructions 906
 part numbers 863
 safety precautions 907
 sockets 864
 socket specifications 865
 specifications 866
 RJ1S-C 843
 RJ1V-A 843
 RJ1V-C 843
 RJ2S-C 843
 RJ2V-A 843
 RJ2V-C 843
 RJ Series
 accessories 844
 coil ratings 846
 contact ratings 846
 dimensions 850-852
 electrical life curve 848
 operating instructions 906
 part numbers 843
 safety precautions 907
 sockets 844
 socket specifications 847
 specifications 845
 RM2 890
 RM2S-U 889
 RM2V-U 889
 RQ1V-C 859
 RQ Series 859
 accessories 860
 coil ratings 861
 dimensions 862
 electrical life curves 861
 operating instructions 906
 part numbers 859
 PCB relays 859
 safety precautions 907
 sockets 860
 socket specifications 861
 specifications 860
 RR1BA-U 873
 RR2BA-U 873
 RR2P-U 873
 RR3B-U 873
 RR3PA-U 873
 RR Series 873
 accessories 874
 characteristics 877
 coil ratings 875
 contact ratings 876
 dimensions 878
 operating instructions 906
 part numbers 873
 power relays 873
 safety precautions 907
 sockets 873
 socket specifications 876
 specifications 875
 RSCA1N- 908
 RSCA2N- 908
 RSCDN- 908
 RSC Series 908
 dimensions 910
 part numbers 908

solid state relays 908
specifications 908

RSSAN- 911

RSSDN- 911

RSS Series 911
dimensions 916
DIN panel mount solid state relays 911
internal circuit block diagram 913
part numbers 911
recommended loads 912
specifications 911
technical notes 914
temperature derating curves 915

RTB-G01 929, 948

RTE-B 925, 929

RTE-P 925, 929

RTE Series 924
accessories 929
analog timers 924
contact ratings 924
dimensions 930
instructions 966
part numbers 925
sockets 929
specifications 924
temperature derating curves 928
timing diagrams 926
timing diagrams overview 920

RU2S- 881

RU2S-C 881

RU2S-M 881

RU2V-N 881

RU4S- 881

RU4S-C 881

RU4S-M 881

RU4V-N 881

RU9Z-P 882

RU42S- 881

RU42S-D 881

RU42S-M 881

RU42S-R 881

RU42V-N 881

RU Series 880
accessories 882, 883
coil ratings 883
contact ratings 883
dimensions 886-888
electrical life curves 884
operating instructions 906
part numbers 881
safety precautions 907
sockets 881
socket specifications 884
specifications 882
universal relays 880

RV8H Series 75, 832
operating instructions 906
part numbers 75, 832
safety precautions 907

RY2S 890

RY2S-U 889

RY2V-U 889

RY4S 890

RY4S-U 889

RY4V-U 889

RY/RM Series 889
accessories 890
characteristics 894
coil ratings 892
contact ratings 892
dimensions 897-899
miniature relays 889
operating instructions 906
part numbers 889

safety precautions 907
sockets 890
socket specifications 893
specifications 891

S

SGZ-A55 338

SA1E 192
characteristics 200
dimensions 197
instructions 205
Miniature Photoelectric Switches 192
output circuit & wiring diagram 197
part numbers 192
specifications 195

SA1E-B 193

SA1E-D 193

SA1E-G 194

SA1E-L 192

SA1E-N 193

SA1E-P 193

SA1E-T 192

SA1E-X 194

SA1U 208
descriptions 211
dimensions 212
instructions 214
part numbers 208
specifications 209

SA1U-B 208

SA1U-D 208

SA1U-P 208

SA1U-T 208

Safe Break Action Design 268

Safety
components 266
overview 264
selection guide 270

Safety Control 402
Selection Guide 402

Safety Relay 403
FS1A 425
HR1S-AC 403
HR1S-AF 406
HR1S-ATE 411
HR1S-DM 409
HR2S-301P/HR2S-301N 414
HR2S-332N-T075/T15/T30 419

SE4D-H 441

SE4D Series 441
accessories 441
dimensions 445
part numbers 441
specifications
controller 444
general 442
individual 443

Selector Switches 515, 565, 595, 688, 734
2-Position 631
3-Position 633
4- & 5-Position 635

Sensors
heavy duty photoelectric 208
miniature photoelectric switches 192
SA1E series 192
SA1U series 208
selection guide
Datalogic Sensors 184
IDEC Sensors 182

SF1V 900

SFA-101 864, 882, 890

SFA-202 864, 882, 890, 929, 947, 960, 965

SFA-203 874, 929, 947, 960

SFA-301 864, 882, 890

SFA-302 864, 882, 890, 965

SFA-402 948, 960

SG2-30 446

SG2-50 446

SG2-90 446

SG2 Series
light curtains 446. *See also* Type 2 SG2 Series

SG4 Series
light curtains. *See also* Type 4 SG4 Series

SH1B-05 864

SH1B-51 864

SH1B-62 864

SH1B-05C 864

SH2B-05 864

SH2B-05C 864

SH2B-51 864

SH2B-62 864

SH3B-05 864

SH3B-05C 864

SH3B-05F1 864

SH3B-51 864

SH3B-62 864

SH4B-02F1 864

SH4B-05 864

SH4B-05C 864

SH4B-51 864

SH4B-62 864

Shrouds
HW series 661
XA E-Stops 505, 560
XW E-Stops 275, 584

Signaling Lights
jumbo dome pilot lights 795
LD6A Signallight Towers 778
LH Series Surface Mount Indicators 790
LT7 Series Light Towers 787
panel mounted annunciators
SLC30-IPS series 804
SLC30 series 796
SLC40 series 812
selection guide 776
SLC30-IPS series 804
SLC30 series 796
SLC40 series 812

SJ1S-05B 844

SJ1S-07L 844

SJ1S-61 844

SJ2S-05B 844

SJ2S-07L 844

SJ2S-61 844

SJ9Z 844

SJ9Z-C 844

SJ9Z-J 844

SLC 823

SLC-3 822, 823

SLC-4 822, 823

SLC30-IPS Series 804
contact operations 811
dimensions 810
order form 808
instructions 807, 809
panel mounted annunciators 804
part numbers 806
specifications 805

SLC30 Series
dimensions 801-803
order form 799
instructions 800
panel mounted annunciators 796
part numbers 798
specifications 797

window dimensions 801

SLC30-V 824

SLC40N 814

SLC40 Series 812
accessories 822
dimensions 817-819
engraving information 820
installation instructions 825
instructions 819
order form 815
instructions 816
panel mounted annunciators 812
part numbers 814
replacement parts 823
specifications 813
window dimensions 817

SLC40-V 824

SLC-J 824

SLCN 823, 824

SLC Series
installation instructions 825

SLDN 823

Slim Power Relays
RJ series 843

SM2S-05 890

SM2S-05C 890

SM2S-51 890

Sockets
GE1A series timers 955
GT3 series timers 947, 948
GT5P series timers 960
GT5Y series timers 965
RF1V series relays 900
RH series relays 864
RJ series relays 844
RQ series relays 860
RR series relays 873
RTE series timers 929
RU series relays 881
RY/RM series relays 890

Software
Automation Organizer Suite 133
selection guide 132
WindCFG 143
WindLDR 139
WindO/I-NV2 134
WindO/I-NV3 134
WindSRV 145

Solid State Relays
RSC series 908
RSS series
panel mount 911

SQ1V-07B 844, 860

SQ1V-63 844, 860

SQ2V-07B 844, 860

SQ2V-63 844, 860

SQ9Z-C 844, 860

SQ9Z-J 860

SQ9Z-L 860

SQ9Z-P 860

SR2B-02F1 874

SR2P 960

SR2P-05 873, 947, 955

SR2P-05C 873, 929, 947, 955, 960

SR2P-06 873, 929, 947, 955, 960

SR2P-51 873, 948, 955, 960

SR3B-02F1 874

SR3B-05 873, 929

SR3B-51 873

SR3P-01F1 874

SR3P-05 873, 929, 947

SR3P-05C 873, 929, 947

SR3P-06 873, 947

SR3P-51 873, 948
 SR6P-M08G 929, 948, 955
 SR6P-M11G 929, 948
 SR6P-S08 929, 948
 SR6P-S11 929, 948

Starter Kits

FT1A SmartAXIS series 107
 Stop Switches 560, 677, 726
 3 position push-pull 727
 HA1B 560
 HA1E 560
 nameplates 560
 TW series 677
 TWTD series 726

Subminiature Interlock Switch 279
 HS6B series 279

Subminiature Interlock Switches with
 Solenoid 298

HS6E Series 298
 Supported Drivers

Operator Interface 35
 Switch Engraving Order Form
 A6 series 551
 HW series 659
 L6 Series 572
 TW series 703
 TWTD series 747

Switches & Pilot Devices

A6 series 543
 A8 series 492
 AP22M series 586
 AP series 488
 ARN series 771
 CS Series 764
 CW series 589
 E-Stops
 XA series 497, 501
 XN series 715
 XW series 271, 580
 FB series enclosures 713
 full size NEMA pushbuttons
 TWTD series 721
 heavy duty cam switches
 CS series 764
 HW series 589, 611
 IEC style global pushbuttons
 HW series 611

LB Series 508
 miniature pilot lights
 AP series 488

miniature switches & pilot devices
 A6 series 543
 A8 Series 492
 L6 series 557

mono-lever switches
 ARN series 771
 NEMA style pushbuttons
 TW series 672
 selection guide 486
 TW series 672
 TWTD series 721
 XA E-Stops 497, 501
 XN E-Stops 715
 XW E-Stops 271, 580

SX9Z-A 461

SY2S-02F1 864, 890
 SY2S-05 890
 SY2S-05C 890
 SY2S-51 890
 SY2S-61 890
 SY4S-02F1 864, 882, 965
 SY4S-05 890, 965
 SY4S-05C 890, 965
 SY4S-51 890, 965

SY4S-51F1 864, 882, 890
 SY4S-61 890, 965
 SY4S-62 890, 965

T

Terminal Blocks

BA series 993
 BNH/BN series 987
 BN series 991
 BX series 994
 selection guide 986

Terms & Conditions 1035

Timers

analog timers
 GT3A Series 931
 RTE Series 924
 dual time range timers
 GT3W Series 943
 ON delay timers
 GE1A Series 953
 GT5P Series 957
 GT5Y Series 962
 selection guide 918
 timing diagrams overview 920
 True OFF Delay Timers
 GT3F Series 939

True OFF Delay Timers

GT3F Series 939
 TW-D 628, 630, 638, 640, 642, 644,
 648, 650, 653, 676, 680, 687,
 691, 695

TWD-0 728, 730, 733, 739

TW-DB 348, 622

TW-F 628, 630, 642, 644, 653, 680, 683,
 695, 705, 743, 824

TW-FA1 660

TW-H 691

TW-HC1- 632, 634, 636, 736

TW-K 704

TW-KC1 348

TW-L 680, 686, 695

TWN-A 705

TW Series - 22mm 672
 accessories 704
 contact arrangement charts 696
 custom selector switch building guide
 699

dimensions 706
 FB series enclosures 713
 general instructions 710
 nameplates 701
 nameplates order form 702
 NEMA style pushbuttons 672
 operator truth tables 700
 part numbers 675
 specifications 673
 switch engraving order form 703

TW-SK 704, 743

TWST-T1 718

TW-T 628, 630, 642, 644, 680, 683,
 687, 695

TWND Series 721

accessories 743
 contact arrangement charts 740
 contact ratings 722
 dimensions 748
 nameplates 745
 nameplates order form 746
 non-illuminated pushbuttons 723, 725
 operating instructions 750
 operator truth tables 742
 specifications 722

standard legend codes 745
 switch engraving order form 747

Type 2 SG2 Series 446

accessories 447
 dimensions 449
 laser pointer 447
 mounting brackets 447
 specifications 448

Type 4 SG4 Series 450

accessories 451
 dimensions 453
 laser pointer 451
 mounting bracket 454
 mounting brackets 451
 part numbers 450
 specifications 452

U

UCSQM 764

UCSQO 764

Universal Relays

RU series 880

UPQW-1 683

V

Vision System Lighting 4

Visual Inspection Lighting 22

W

W4P-1 625

Water Treatment Lighting 18

Web Server Module 69

W-G 620

WindCFG 143

WindLDR 139

WindLGC 148

software for IDEC SmartRelay 125

WindMSG

software for HG1X character display 134

WindO/I-NV2 134

WindO/I-NV3 134

WindSRV 145

X

X6 E-Stops 497

accessories 498
 contact ratings 497
 dimensions 499
 instructions 500
 part numbers 497
 safety precautions 500
 specifications 497

XA1E-B 460, 502, 503

XA1E-L 502

XA9Z-K 505, 560

XA9Z-KG1 498

XA9Z-L 505

XA9Z-LNPN10 498

XA9Z-V 505

XA E-Stops 460, 497, 501

accessories 505
 AS-Interface
 safety at work 460
 contact ratings 504
 dimensions 463, 505
 nameplates 505
 operating instructions 464, 506
 part numbers 460, 502

shroud 505
 specifications 461, 501

XN1E 716

XN1E-B 716

XN1E-L 716

XN4E 716

XN4E-B 716

XN4E-L 716

XN5E 716

XN5E-B 716

XN5E-L 716

XN9Z-HASP 718

XN9Z-T 718

XN E-Stops 715

accessories 718
 contact ratings 717
 dimensions 718
 nameplates 718
 operating instructions 719
 part numbers 716
 specifications 715, 751
 terminal arrangements 717

XW1E-B 272, 460, 581

XW1E-L 272, 581

XW9Z-C 461

XW9Z-V 275, 584, 718

XW E-Stops 271, 460, 580

accessories 275, 584
 AS-Interface
 safety at work 460
 contact ratings 582
 dimensions 274, 463, 583
 EMO switches 272
 FB enclosures 272
 FB series enclosures 460, 713
 nameplates 275, 584
 operating instructions 275, 464, 584
 part numbers 272, 460, 581
 selection guide 270
 shrouds 275, 584
 specifications 271, 461, 580

Y

Y703-1 874

Y778-0 865, 874, 883, 890

YC1K-5 970

YC1K-5B 970

YC1K-6 970

YC1K-6B 970

YC1N-5 969, 970

YC1N-5B 969, 970

YC1N-6 969, 970

YC1N-6B 969, 970

YC1N-100 980, 981

YC1N-125 980, 981

YC1N-150 980, 981

YC1N-180 980, 981

YC1N-220 980, 981

YC1N-300 980, 981

YC1N(K) Series 969

accessories 971
 dimensions 972
 electrical diagrams 972
 part numbers 969
 by amp rating (AC coil) 970
 by amp rating (DC coil) 970
 by horsepower rating (AC coil) 969
 by horsepower rating (DC coil) 970
 by kilowatt rating (AC coil) 970
 by kilowatt rating (DC coil) 970
 specifications 971

Index

Hazardous Location

Approvals & Standards

Mature Product List

Terms

- YC1N Series 980
 - accessories 981
 - dimensions 983
 - electrical diagram 984
 - part numbers 980
 - by amp rating 981
 - by horsepower rating 980
 - by kilowatt rating 981
 - specifications 982
- YC1U-9 973, 974
- YC1U-9B 973, 974
- YC1U-11 973, 974
- YC1U-11B 973, 974
- YC1U-16 973, 974
- YC1U-16B 973, 974
- YC1U-18 973, 974
- YC1U-27 973, 974
- YC1U-32 973, 974
- YC1U-38 973, 974
- YC1U-50 973, 974
- YC1U-65 973, 974
- YC1U-80 973, 974
- YC1U Series 973
 - accessories 975
 - dimensions 977
 - electrical diagrams 979
 - part numbers 973
 - by amp rating 974
 - by horsepower rating 973
 - by kilowatt rating 974
 - specifications 976
- YC9Z-CI6 971
- YC9Z-CI18 975
- YC9Z-CI35 975
- YC9Z-CI100 981
- YC9Z-CNA 971
- YC9Z-CNA111BC 981
- YC9Z-CNA111SR 975
- YC9Z-CUA 975
- YC9Z-LCN 981
- YC9Z-LCU 975
- YC9Z-RHN 981
- YC9Z-RHU 975
- YC9Z-RHU5 971
- YC9Z-SS 971, 975, 981
- YW9Z- 586
- YW-E 590, 592, 593, 598, 602, 603

IDEC Hazardous Location Products

Family	Series	Hazardous Location Rating	Page
LED Lighting	EF1A	 - UL/c-UL, ATEX, IECEx - Class I, Zone 1 AEx d IIB T4 Gb - IEC60079-0:Ed 6 (2011), IEC60079-1:Ed 6 (2007), IEC60079-31: Ed 1 (2008) - EN60079-0 2012, EN60079-1 2007, EN60079-31 2009 - ANSI/UL 60079-0:Ed. 5 (2009), ANSI/UL 60079-1. Ed.6 (2009) - CSA C22.2 60079-0:2011, CSA C22.2 60079-1:2011	<?>
OI Touchscreens	High Performance Series	 - UL/c-UL - Class I, Division 2 Groups A, B, C, D - ANSI/ISA 12.12.01 - IP66, UL508, ABS, LR, NK, DNV - Type 4X & 13	28
	5.7" HG2G-5TT	 - UL/c-UL - Class I, Division 2 Groups A, B, C, D - ANSI/ISA 12.12.01 - IP66, UL508 - Type 4X & 13	33
	5.7" HG2G-S5TN	- UL/c-UL - Class I, Division 2 Groups A, B, C, D - ANSI/ISA 12.12.01 - IP66, UL508 - Type 13	
	4.6" HG1F	 - UL/c-UL - Class I, Division 2 Groups A, B, C, D - ANSI/ISA 12.12.01 - IP65, UL508 - Type 13	
PLCs	FC5A	 - UL/c-UL - Class I, Division 2 Groups A, B, C, D, - ANSI/ISA 12.12.01-2010	71
	FC4A	 - UL - Class 1 Division 2 Groups A, B, C, D - ANSI/ISA 12.12.01-2010	78
	FT1A	 - UL/c-UL - Class I, Division 2 Groups A, B, C, D - ANSI/ISA 12.12.01-2013	108

Index

Hazardous Location

Approvals & Standards

Mature Product List

Terms

Family	Series	Hazardous Location Rating	Page
PLCs	FL1F	 UL/c-UL Class I, Division 2 Groups A, B, C, D ANSI/ISA 12.12.01-2007 FM Class I, Division 2 Groups A, B, C, D Class I, Zone 2 Ex nC IIC	118
	PS6R	 UL/c-UL Class I and II, Division 2 and Class III, Divisions 1 and 2 ANSI/ISA 12.12.01-2013 ABS and GL Marine certifications (pending)	149
Power Supplies	PS5R-S	 UL/c-UL Class I, Division 2 Groups A, B, C, D ANSI/ISA 12.12.01-2007	155
	EB3C	 UL, FM, CSA, ATEX Class I, II, III, Division 1 Groups A, B, C, D, E, F, G Class I, Zone 0 [AExia] II C UL913, UL60079-0, UL60079-11, UL61010-1	244
Barriers	EB3N	 UL, FM, CSA, ATEX, IECEx Class I, II, III, Division 1 Groups A, B, C, D, E, F, G Class I, Zone 0 [AExia] II C UL913, UL60079-0, UL60079-11, UL61010-1	251
	EB3L	 UL, FM, CSA, ATEX Class I, II, III, Division 1 Groups A, B, C, D, E, F, G Class I, Zone 0 [AExia] II C UL913, UL60079-0, UL60079-11, UL61010-1	259
Relays	RV8H	 UL/c-UL Class I, Division 2 Groups A, B, C, D T4A Class I, Zone 2 AEx nA nC IIC T4 Class I, Zone 2 Ex nA nC IIC T4 X Gc	898
Switches	EU2B	 UL: Class I, Zone 1, AEx de IIC T6 Gb Class I, Div 2, Groups A, B, C and D c-UL: Class I, Zone 1, Ex de IIC T6 Gb Class I, Div 2, Groups A, B, C and D ATEX: II2G Ex de IIC II2D tD A21 IP65	805

Approvals & Standards

Approval	Explanation
	UL Listing Mark This is one of the most common UL marks. If a product carries this mark, it means UL found that samples of this product met UL's safety requirements. These requirements are primarily based on UL's own published Standards for Safety.
	C-UL / US Listing Mark UL introduced this new listing mark in early 1998. It indicates compliance with both Canadian and U.S. requirements.
	Recognized Component Mark for Canada and the United States These are marks consumers rarely see because they are specifically used on component parts that are part of a larger product or system. These components may have restrictions on their performance or may be incomplete in construction. Products that bear this mark comply with the safety standards of Canada and the U.S.

UL Listing vs. UL Recognition What's the difference?

A product is UL Listed if the UL Listing Mark is on the product, accompanied by the manufacturer's name, trade name, trademark or other authorized identification.

A UL Listing Mark on a product is composed of four elements: the "UL in a circle Mark", the word "LISTED" in capital letters, an alpha-numeric control number, and the product name. Sometimes the UL file number is used as company identification. The UL Listing Mark on a product is the manufacturer's representation that samples of that complete product have been tested by UL to nationally recognized Safety Standards; found to be free from reasonably foreseeable risk of fire, electric shock and related hazards; and that the product was manufactured under UL's Follow-Up Services program.

If you do not find a UL Listing Mark on the product, you may find, on closer examination, that some of the individual components have the UL Recognized Component Mark. The UL Recognized Component Mark means that the compo-

nent alone meets the requirements for limited, specified use. UL's Component Recognition Service covers the testing and evaluation of component products that are incomplete or restricted in performance capabilities. These components will later be used in complete end products or systems listed by UL.

UL's Component Recognition Service covers millions of components, such as plastics, wire and printed wiring boards, that may be used in either very specific, or a broad spectrum of end-products, or even components such as motors or power supplies. These components are not intended for separate installation in the field. They are intended for use as components of complete equipment submitted for investigation to UL. Component/end-product compatibility is the critical link between certification of a component and certification of the end product in which the component is used.

Approval	Explanation
	The CSA mark may appear alone or with indicators. If it appears alone, it means that the product is certified for the Canadian market, to the applicable Canadian standards.
	Many products seeking entry into the European Union must comply with the European Directives and bear the CE Marking. The CE Marking is the manufacturers self-declaration, showing compliance with all applicable directives.
	DEMKO's D-Mark represents electrical product safety for a great majority of consumers. The D-Mark is recognized throughout the EU as a reputable European third-party mark of electrical product safety.
	International "emc-Mark" The International "emc-Mark" appears on products meeting the electromagnetic compatibility requirements of Europe, the United States, Japan, Australia, or any combination of the four. In the United States, some types of products can't be sold without proof of compliance to U.S. electromagnetic compatibility requirements.

Approval	Explanation
	C-tick Mark Applying the C-tick mark to a product indicates compliance with Australian EMC regulations.
 	TÜV Product Service The TÜV Product Service mark demonstrates that you meet European Health and Safety Requirements of safety directives. Both the older and newer marks are shown to the left, as IDEC products bear one or the other.
	TÜV Rheinland The TÜV Rheinland mark demonstrates compliance with European safety requirements.
	VDE Mark The VDE Mark indicates conformity with the VDE standards or European or internationally harmonized standards and confirms compliance with protective requirements of the applicable EC Directive(s).
 	The BIA is a test and certification body affiliated with the testing and certification system BG-PRÜFZERT of German institutions for statutory accident insurance and prevention (BG means Berufsgenossenschaft). The BIA has received accreditation from the central office of safety technology of the Länder (ZLS). The BIA acts as a test and certification body for products under the terms of the EC Directive for personal protective equipment.
	The CCC Mark is a labeling requirement for select products entering China. Essentially, the CCC Mark verifies to customs officials that a product complies with safety and quality requirements set by the Chinese government. Compliance is demonstrated by the manufacturer affixing the CCC Mark to their products.
	Factory Mutual is a test and certification body specializing in approvals for Hazardous Locations products.

Hazardous Location Definitions

Class I: An area with flammable gases, vapors or liquids	Division 1: Where ignitable concentrations of flammable gases, vapors, or liquids can exist all of the time under normal operating conditions. Division 2: Where ignitable concentrations of flammable gases, vapors, or liquids are not likely to exist under normal operating conditions.
Class II: An area with combustible dusts	Division 1: Where ignitable concentrations of combustible dusts can exist all of the time or some of the time under normal operating conditions. Division 2: Where ignitable concentrations of combustible dusts are not likely to exist under normal operating conditions.
Class III: An area with ignitable fibers and flyings	Division 1: Where easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used. Division 2: Where easily ignitable fibers are stored or handled.

Mature Product List

Device	Product	Discontinued	Available but not in stock	Replaced by
Pilot Lights	UP		√	None
Switches and Pilot Devices	S Series	√		TWS
	MCM Series	√		MC Series
Relays	RY2L Series	√		None
	RH2L	√		None
	RHN Series	√		RH1B
	RN Series	√		None
	RCN Series	√		None
	LCN Series	√		None
	RG Series	√		None
	RP Series	√		None
	RE Series	√		None
	RW Series	√		None
	RSE Series	√		None
	RA Series	√		None
	RB Series	√		None
	RD Series	√		None
	RV3N	√		None
	RY22	√		RJ22 (different socket needed)
	RY42	√		RU42
Timers	RTB Series	√		GT3A or RTE
	RTA Series	√		GT3A or GT3F
	RTM Series	√		GT3A
	RTP Series	√		GT5P
	RTY Series	√		GT5Y
	GT3P Series	√		GT3W
	GT3D series	√		None
	GT3S series		√	
	GT3W-B	√		GT3W-A (some functions)
	GT3W-C			
	GT3W-D	√		None
	GT3W-E			
	GT3W-F			
	RTE-PN1			
	RTE-PI1			
	RTE-P11	√		RTE-P1
	RTE-PN2			
	RTE-PI2			
	RTE-P12			
	RTE-PF1			
	RTE-PS1			
	RTE-P21	√		RTE-P2
	RTE-PF2			
	RTE-PS2			
	RTE-P22			
	RTE-BN1			
	RTE-BI1			
	RTE-B11	√		RTE-B1
	RTE-BN2			
	RTE-BI2			
	RTE-B12			
	RTE-BF1			
	RTE-BS1			
	RTE-B21	√		RTE-B2
	RTE-BF2			
	RTE-BS2			
	RTE-B22			

Index

Hazardous Location

Approvals & Standards

Mature Product List

Terms

Device	Product	Discontinued	Available but not in stock	Replaced by
Display Lights	SLD Series		√	SLCs
	SA1A, SA1B		√	
	SA1C	√		SA1E
Photoelectric Sensors	ISA	√		SA1E
	ISF	√		SA1U/SA2U
	SA1L	√		None
	SA1K	√		May use SA1J
Full Color Recognition Sensors	SA1K-C2	√		May use SA1J
	SA1K-FA	√		May use SA1J
Laser Sensors	SA1M	√		None
	MX1A/MX1B/MX1C	√		None
Ultrasonic Analog Sensors	SA6A		√	
Intrinsically safe control units	YC contact blocks	√		None
Monolevers	ARW	√		HW1M
Contacts	TW-C**L, TW-C**M TW-C**T	√		New cammed operators in TW and HW series
Thumbwheel switches	DK, DL, DE, DF		√	None
	PSR-S PSR-H	√		PS3L
Power Supplies	PSR-AD	√		PS5R-A
	PS3E	√		PS3X
	PS3L		√	
Incandescent bulb for miniature pushbutton	LAY	√		LATD (LED)
Circuit breakers	NRA*2, NRA*3 NRA*4 NRA*5 NRBM*2 NRBM*3 NRBM*4 NRBM*5	√		None
	NRA/NRB-BD, CD, DD, SD, ED, CA, SA, EA delay curves	√		None
PLCs	FA1	√		
	FA1J	√		
	FC1A (Micro1)	√		
	FC2A (Micro3)	√		
	FC2A (Micro3C)	√		
	FC3A (ONC)		√	
	FA-2J	√		
	FA-3S	√		
LED Lamps	LAPD	√		LATD
	LFPD	√		LFTD
	LSPD	√		LSTD
	LF1E	√		LF2B, LF1B-N
IDEC SmartRelay	FL1A, FL1B, FL1C, FL1D, FL1E	√		FL1F
Operator Interfaces	HG2A, HG2F	√		HG2G
	HG3F, HG4F			HG3G, HG4G
	HG1B, HG1A	√		HG1F
Contactors	YS series			YC series

General Terms & Conditions

1. Responsibility And Title:

All orders are acknowledged, either in writing or by actual shipment, after final acceptance by IDEC. Risk of loss shall pass to Buyer upon delivery to carrier at IDEC's F.O.B. point. The products are security for full payment of the purchase price. If payment is not made on a timely basis, the title to the products shall revert to IDEC.

2. Shipments:

F.O.B. Sunnyvale, California, seller's dock.

3. Delivery Schedule:

IDEC shall not be liable for delays in delivery or failure to perform due to causes beyond reasonable control of IDEC. IDEC reserves the right to bill for merchandise and charges for warehousing, insurance, trucking and other associated expenses, if and when shipment should be held beyond scheduled date at the request of Buyer.

4. Cancellations:

No order accepted by IDEC may be altered or modified by Buyer unless agreed to in writing signed by an authorized official of IDEC, and no such order may be canceled or terminated except upon payment of IDEC's loss, damage and expense arising from such cancellation or termination.

5. Special Handling:

If special transportation, packaging or overseas shipment is requested by Buyer, IDEC reserves the right to assess special handling charges.

6. Terms of Payment:

One percent (1%) discount if paid within ten (10) days from date of invoice, or total amount of invoice within thirty (30) days. Past due accounts are subject to a finance charge of 1.5% per month (annual percentage 18%) or the maximum rate permitted by law, whichever is less.

7. Inspection and Acceptance of Merchandise:

Buyer is responsible for evaluating received merchandise for final acceptance. All claims for shortages must be made within thirty (30) days from receipt of merchandise.

8. Returns:

No merchandise shall be returned unless return authorization has been secured from IDEC. Refer to IDEC's Returned Goods Policy.

9. Warranty:

IDEC warrants its merchandise to be free from defects in material and workmanship under normal and proper use for a period of one (1) year from date of shipment. Buyer's exclusive remedy for a nonconformity in any item shall be repair or replacement at seller's option. This warranty is in lieu of all other warranties whether expressed, implied or statutory, including implied warranties of merchantability and of fitness. IDEC shall not be liable for claims based on breach of warranty or negligence or any other damages including consequential, contingent or incidental damages. Warranty does not apply if the merchandise is altered or modified in any way after delivery by IDEC.

10. Patents:

IDEC shall have no liability of any kind with respect to any actual or alleged infringement of any United States or foreign patent, trade mark or similar rights.

11. Technical Data:

Buyer shall not use, duplicate or disclose any technical data delivered or disclosed by IDEC to Buyer for any purpose other than for use, operation or maintenance of merchandise purchased by Buyer, without IDEC's prior written consent.

12. Taxes:

Unless Buyer provides IDEC with tax exemption certificates acceptable to the taxing authorities, Buyer shall pay any sales, use, excise or similar tax attributable to the sale of merchandise covered hereby.

13. Governing Law:

This agreement and performance by the parties hereunder shall be construed in accordance with the law of the state of California.

14. Specifications, Dimensions & Pricing:

Subject to change without notice.

Section Table of Contents

LED Lighting	Lumifa	1
Automation & Sensing	OI Touchscreens	21
	Programmable Logic Controllers	51
	Automation Software	147
	Power Supplies	165
	Sensors	199
	Communication & Networking	235
	Barriers	241
Safety	Safety Overview	281
	XW Series E-Stops	285
	Interlock Switches	295
	Enabling Switches	389
	Safety Control	419
	Light Curtains	457
	AS-Interface Safety at Work	475
Switching & Controls	Switches & Pilot Devices	483
	Signaling Lights	841
	Relays	895
	Timers	991
	Contactors	1041
	Terminal Blocks	1059
	Circuit Breakers	1081
Index	Index	1093
	Hazardous Location Products	1101
	Approvals & Standards	1103
	Mature Product List	1105
	General Terms & Conditions	1103