AGV AND AUTOMATED WAREHOUSE INDUSTRY

With trends such as the advance of e-commerce continuing to push toward automated warehouses and AGVs, material handling technologies that boost efficiency and automation in the flow of goods must provide the added value of uninterrupted operation and visual control. As seen with the formulation of ISO3691-4 as the new AGV safety standard, balancing safety and peace of mind with productivity could also become an even greater issue in AGVs and automated warehouses. IDEC has a strong history of supplying the industry with safety, HMI, control panel, and automation solutions, as well as a wide range of standard-compliant products. We will continue to use the latest technology to offer solutions that contribute to the advancement of AGV and automated warehouse.
AGV / Automated Warehouse Industry and IDEC

BOOSTING PERFORMANCE

IDEC helps boost the performance of customers’ AGVs and automated warehouses with a vast array of product lines, including switches for triggering the operation of equipment and facilities, operator interfaces for visual control, barcode scanners for product identification, push-in terminal blocks that reduce the installation space and wiring time required for the control devices and safety laser scanners, interlock switches, bumper switches, and enabling switches that ensure operator safety and peace of mind.

PREVENTING DOWNTIME

Preventing downtime in AGVs and automated warehouses hinges on not just reliability but also ease of use. When it comes to quality, IDEC places the utmost priority on both reliability and ease of use and has been constantly making improvements, which is why our products are used by so many customers in so many areas of the AGV and automated warehouse industry. IDEC will continue to develop and supply products with a focus on reliability and ease of use, helping to attain AGVs and automated warehouses with no downtime.

LOOKING AHEAD

As AGVs become increasingly multifunctional and automated warehouses even more efficient, environments where AGV and equipment operation area is physically separated from human work areas will give way to collaborative environments where people work collaboratively with machinery in the same space. The new AGV standard ISO3691-4, formulated in February 2020, will also be revised in the years ahead, making safety standards even clearer. IDEC will pursue product development geared toward peace of mind in addition to safety for the collaborative work environments, while at the same time continuing to provide solutions that facilitate market changes and help realize the bright future of AGVs and automated warehouses.
Safe and efficient solutions for the logistics industry

INDEX
1. New Products ........................................................................................................ 6
2. Safety Laser Scanner ............................................................................................. 8
4. Operator Interface Handheld Model HG1P ............................................................ 10
5. Enabling Switches HE*B .................................................................................... 11
6. LED SignaLight Towers LD6A ............................................................................ 12
7. Circuit Protectors NC1V ...................................................................................... 13
8. Slim Relay / Universal Relays RJ/RU/RV6 ............................................................ 14
11. Flush Silhouette Switches CW Series .................................................................. 16
12. Illuminated Buzzer Pilot Lights HW1Z ................................................................ 18
13. Pilot Lights LH1D/LP22/Q Series ...................................................................... 19
15. Miniature Joysticks TS/NV Series ..................................................................... 21
16. Pendant Controller PC Series ............................................................................ 22
17. Programmable Controller FC6A ........................................................................ 23
18. Operator Interfaces HG Series ........................................................................... 24

Safety products that ensure the safety and security of workers

1. Tablet Mount Safety Device Safety Commander™

2. Emergency Stop Switches XA/X6/XW/XN Series

3. Operator Interface Handheld Model HG1P

4. Enabling Switches HE*B

5. LED SignaLight Towers LD6A
Reduces wiring time and space inside panels

Circuit Protectors NC1V

Slim Relay/Universal Relays RJ/RU/RV8

Products to enhance efficiency in automation

Push-in Switches & Pilot Lights HW Series

Flush Silhouette Switches CW Series

Illuminated Buzzer Pilot Lights HW1Z

Pilot Lights LH1D/AP22/Q Series

Pushbuttons LB/LBW/AV/ES Series

Miniature Joysticks TS/NV Series

Pendant Controller PC Series

Programmable Controller FC6A

Operator Interfaces HG Series

Safety Switches HS5L/HS5E-K

Safety Laser Scanner SE2L
New Products

Safety Commander™
Tablet Mount Safety Device

Safety functions (emergency stop switch / enabling switch) added to commercially available tablets for use as a remote controller or teaching pendants

- The device can hold tablets 8 to 11-inch for flexible mounting.
- Ergonomic grip design ideal for long and fatigue-free operation.
- Pivoting mechanism allows the tablet to be used vertically or horizontally to display a variety of contents including drawings, tables, and graphs.
- Dedicated accessories including wall mount for installation in limited spaces when the device is not in use.

<table>
<thead>
<tr>
<th>Series</th>
<th>Operating Temperature</th>
<th>Operating Humidity</th>
<th>Degree of Protection</th>
<th>Supported Tablet Sizes</th>
<th>Supported Tablet Thickness</th>
<th>Switches</th>
</tr>
</thead>
</table>
| Safety Commander| -20 to +55°C (-20 to +30°C *) | 45 to 85% RH       | IP54                 | 8 to 11 inches         | 9 to 24mm                  | Emergency stop switch: XA1E-LV302Q4R  
Enabling switch: HE5B-M2PY |

*1) USB power supply

Ensuring safety when using a tablet as a remote controller for AGVs / automated warehouse

CONTROL USING A TABLET

Before

Safety issues occur when tablets are used.

After

Easy and safe operation can be achieved
Satisfies ISO369 -4 requirements

Emergency stop switches and enabling switches can be operated while holding the tablet with one hand.
### New Products

#### KW2D  
Smart RFID Reader

RFID to smartly manage access to devices and facilities, such as entering and exiting automated warehouses.

- Ø22 panel cut-out enables standardization with switches of the same cut-out and allows easy installation.
- Device equipped with verification function. Easily tag registration using software.
- Ethernet communication (Modbus TCP, EtherNet/IP) allows easy communication with existing devices such as touch panels and PLCs.

#### HR6S  
Safety Relay Modules

Full range of diagnostic functions reduce downtime at automated warehouses.

- Diagnostic results are coded and output as a pulse signal for easy and detailed monitoring of systems.
- Dial switching allows connection to various input devices and selection of numerous start modes, eliminating the need to use a different module with a different function.
- IDEC safety relay modules, including HR5S category 2 relay modules, cover all safety requirements from categories 1 to 4. Can be used for various safety applications.

#### SE4D-C  
Safety Light Curtains

Compact, lightweight, and high performance. Ideal for detecting access to restricted areas at robot systems.

- Compact size fits on aluminum frame used as safety fences around restricted areas to avoid collision with detected objects.
- Although compact in size, various functions such as a muting function, fixed blanking, and floating blanking, are available for conveyor lines.
- Large operation indicators indicate the presence of the light curtain and prevent downtime due to inadvertent shading in automated warehouses.

* SE4D is shown as image.
Compact safety laser scanner for easy integration in AGVs

- Compact size suitable for integration in devices (85 × 85 × 95mm).
- Safety can be maintained throughout a range of 270 degrees at a distance of 5m with a single unit. Ideal for equipment using robots such as palletizing robots and long conveyor lines.
- A combination of up to 4 master and slave units can be connected. This makes it possible to integrate input and output of multiple units for 360-degree detection of AGVs, as though they are a single unit.
- A maximum of 128 area patterns can be configured/switched according to the mobile application such as AGV, ensuring optimum protection in various applications.
- By sending out distance measurement data through the Ethernet port on an AGV, data of obstacles in surrounding areas can be acquired and used as AGV location information.
- SE9Z-* connection box equipped with a safety relay reduces maintenance time and wiring (*1).

**SE2L Safety Laser Scanner**

### Performance Level: SIL 2

<table>
<thead>
<tr>
<th>Series</th>
<th>Response Speed</th>
<th>Power Supply Voltage</th>
<th>Power Consumption</th>
</tr>
</thead>
</table>
| SE2L  | ON ➞ OFF: 60 to 510ms  
        | OFF ➞ ON: 270 to 510ms  | 24V DC ± 10%: When using converter power supply  
        |                  | 24V DC -30%/+20%: When using battery  | Without Output Load: 6W  
        |                  | Maximum (without output load): 50W  |

**International Standards**

- UL
- CSA
- TÜV
- CE

**Application:** Detection and collision protection of humans entering AGV and AMR routes

**Compact size suitable for limited installation spaces on AGV / AMR**
HS5L/HS5E-K
Interlock Switches

Compact interlock switches suitable for safety doors in automated warehouses

- Compact size mounts comfortably on an aluminum frame without impeding.
- 2-contact models suitable for category 2 are also available
- Locking/unlocking is achieved using a key. By using the same key as HW switches, hostage control is possible
- Head removal detection function prevents accidents that are caused by a door opening unexpectedly when the head is removed
- Complete with 2 types: a spring lock type and a solenoid lock type for applications where locking is not required for safety.
- Rear unlock button models available for unlocking doors in case a person is left behind in a dangerous area.

<table>
<thead>
<tr>
<th>Series</th>
<th>Contact Ratings</th>
<th>Mechanical Durability</th>
<th>Electrical Durability</th>
<th>Solenoid Strength</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rated Insulated Voltage</td>
<td>Rated Current</td>
<td>Rated voltage</td>
<td>Rated current</td>
<td>UL</td>
</tr>
<tr>
<td>HS5L</td>
<td>250V</td>
<td>2.5A</td>
<td>2,000,000 times min. (*4)(*5)</td>
<td>100,000 times min. (Operating Frequency: 900 operations/h)</td>
<td>1400N</td>
</tr>
<tr>
<td>HS5E-K</td>
<td>250V *1)</td>
<td>2.5A max. (1) 1.5A max. (2) 1.0A max. (3)</td>
<td>1,000,000 times min. (*4)(*5)</td>
<td>100,000 times min. (AC-12, 250V, 1A) 1 million operations min. (24V AC/DC, 100 mA) (Operating frequency: 900 operations/h)</td>
<td>–</td>
</tr>
</tbody>
</table>

Application: Interlock for safety fences/dors in automated warehouses

Hostage control can be achieved by reduced installation space and key operation

---

*1) HS5L “2) HS5E-K “3) HS5L spring lock type
HG1P
Operator Interface Hand-Held Model

Lightweight, robust, user-friendly teaching pendant for AGVs and various equipment in automated warehouses

- Lightweight and compact, weighs only 500g, yet robust and drop resistant to a height of 1.5m, to prevent damage if it is dropped.
- Ergonomic design ideal for long, fatigue-free operation. 1.5 second start up reduces wait time.
- High-resolution 4.3-inch TFT color LCD display. Clear and informative display enables intuitive operation.
- Removable cable enables cables to be detached easily when damaged. Saves downtime and cost.
- Easy maintenance with a USB memory card achieve a simple and easy work environment.

HG1P: Lightweight, robust, user-friendly teaching pendant for AGVs and various equipment in automated warehouses

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated Voltage</th>
<th>Power Consumption</th>
<th>Electrostatic Discharge</th>
<th>Display</th>
<th>Color/ Shade</th>
<th>Displaying Resolution</th>
<th>Brightness</th>
<th>View Angle</th>
<th>Backlight Life</th>
<th>User Memory Capacity</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG1P</td>
<td>24V DC</td>
<td>3W max. (2W max. when not using USB interface (USB2))</td>
<td>Air: 8 kV Contact: 4 kV</td>
<td>TFT Color LCD</td>
<td>65,536 colors</td>
<td>480 (W) x 272 (H) pixels</td>
<td>400 cd/m²</td>
<td>Left: right: 80°, top: 67°, bottom: 55°</td>
<td>30,000 hours minimum</td>
<td>12MB</td>
<td>UL</td>
</tr>
</tbody>
</table>

Application: Various teaching and monitoring applications for AGV, AMR, and equipment in automated warehouses

Safe IDEC Products: Easy for anyone to use, and meet the requirements of the new ISO3691-4 AGV standard
HE*B
Enabling Switch

3-position switch suitable for avoiding danger in emergency situations and hold-to-run operation

- Ergonomic 3-position operation OFF→ON→OFF to avoid danger.
- Structure that does not turn ON between pushed-in OFF (position 3) state to released OFF (position 1) state. (IEC60204-1, Section 9.2.5.8; IEC60947-5-8, Section 7.1.9)
- Wide variety of models available, from a single to a maximum of 6 contacts.
- 2 contacts are built in for circuit redundancy, and for compliance with requirement P=C item 24 in table 1 of the new ISO3691-4 AGV standard.
- Compact size with a monitor contact (*1).

*1) HE6B

<table>
<thead>
<tr>
<th>Series</th>
<th>Contact Rating</th>
<th>Rated Insulation Voltage</th>
<th>Rated Current</th>
<th>Mechanical Durability</th>
<th>Electrical Durability</th>
<th>Weight</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100,000 operations min.</td>
<td>26g (without rubber boot), 30g (with rubber boot)</td>
<td>UL CSA TÜV CCC CE</td>
</tr>
<tr>
<td>HE2B</td>
<td>250V</td>
<td>3A</td>
<td></td>
<td>Position 1 → 2 → 1: 1 million operations min.</td>
<td>100,000 operations min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Position 1 → 2 → 3: 100,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE3B</td>
<td>125V</td>
<td>3A</td>
<td></td>
<td>Position 1 → 2 → 1: 1 million operations min.</td>
<td>100,000 operations min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Position 1 → 2 → 3: 100,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE5B</td>
<td>125V</td>
<td>3A</td>
<td></td>
<td>Position 1 → 2 → 1: 1 million operations min.</td>
<td>100,000 operations min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Position 1 → 2 → 3: 100,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE6B</td>
<td>125V</td>
<td>3A</td>
<td></td>
<td>Position 1 → 2 → 1: 1 million operations min. (rated load),</td>
<td>100,000 operations min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Position 1 → 2 → 3: 100,000 operations min. (24V AC/DC 100 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Application: Hold-to-run operation and danger avoidance with teaching pendant and remote control

Compact, lightweight, highly reliable, and suitable for pendants and remote controls
Stylish design fits installation on AGVs and various equipment in automated warehouses

- Universal design with oval shape and striped layout enhances visibility.
- Variety of mounting patterns, easily replaceable LED units, and plug-in terminals. Color combinations can be changed on-site, reducing maintenance time.
- Steady / flashing (flashing cycle compliant with IEC standards / alarm types available).
- Unique, powerful design with 360-degree sound field. Two alarm sound patterns available.

Unique lens offers high visibility

Three different illumination methods and a unique lens shape enable high visibility from all directions.

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated Voltage</th>
<th>Power Consumption (LED)</th>
<th>Power Consumption (Buzzer)</th>
<th>Flashing Cycle</th>
<th>LED Life</th>
<th>Alarm Volume</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD6A</td>
<td>24V AC/DC</td>
<td>LED: 0.6W (R, Y) 0.75W (S, G) 0.5W (W)</td>
<td>110mA max.</td>
<td>Approx. 105 flashes per minute (1.79Hz)</td>
<td>Approx. 30,000 hours</td>
<td>70 to 90dB, at 1m (volume adjustable)</td>
<td>UL</td>
</tr>
</tbody>
</table>

Application: Alarm when abnormality occurs in a device
Panel Solutions

**NC1V**

Circuit Protectors

Circuit protector for usability and safety

- The flat handle fits in the main body to prevent misoperation due to contact.
- Safe trip-free mechanism ensures that the circuit is cut off even if the handle is operated immediately after an accident, in order to avoid a sudden restart.
- Integrated terminal covers achieve IP20 finger protection and prevent electric shock.
- AC / DC common models help reduce stock.

---

**NC1V**

Circuit Protector for usability and safety

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated Voltage (AC, DC) (*1)</th>
<th>Rated Short-circuit Capacity</th>
<th>Series Trip Characteristics</th>
<th>Dimensions (width)</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC1V</td>
<td>1-pole: 250V AC 50/60Hz, 65V DC</td>
<td>2,500A</td>
<td>Curve M (slow) 1-pole: 17.5mm</td>
<td>● ● ● ●</td>
<td>● ● ● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>2-pole: 250V AC 50/60Hz, 125V DC</td>
<td></td>
<td>Curve A (medium) 2-pole: 35.0mm</td>
<td>● ● ● ●</td>
<td>● ● ● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>3-pole: 250V AC, 50/60Hz</td>
<td></td>
<td>Curve S (instantaneous) 3-pole: 52.5mm</td>
<td>● ● ● ●</td>
<td>● ● ● ● ● ●</td>
</tr>
</tbody>
</table>

*1) 3-pole type is for AC voltage only.

---

Application: Protection from damage due to overload and short circuit in devices and circuits inside the equipment

Reduce wiring work and eliminate lost screws achieving cost reduction
RU/RJ/RV8

Slim Relays / Universal Relays

Slim, compact relays save installation space for parts mounting

- **Compact size** with excellent durability and high contact allowable current.
- Circuit can be checked without energizing the coil, enabling check up before applying power to the relay (RU).
- The release lever easily holds and removes the relay and push-in terminals reduce wiring time (RU, RJ).
- Space-saving 6mm ideal for high density mounting (RU, RJ).
- Only 70mm from the DIN rail. Suitable for slim control panels and low-profile AGVs (RV8).

### Time Saving & Efficient

Save up to 55% in wiring time

Wiring time greatly reduced compared with conventional screw terminals.

- Push-in S.J Series
- Conventional screw terminal

### Large Switching Capacity

Highly conductive materials ensure stable electric conduction of current.

- AC: 30,000,000 operations min.
- DC: 50,000,000 operations min.
- Operation frequency 18,000 operations/h

### Reduce maintenance work

Push-in terminals eliminate the need for torque maintenance such as tightening of screws because screws are not used.

### Slim, compact relays save installation space

**RU/RJ/RV8**

**Slim Relays / Universal Relays**

- Compact size with excellent durability and high contact allowable current.
- Circuit can be checked without energizing the coil, enabling check up before applying power to the relay (RU).
- The release lever easily holds and removes the relay and push-in terminals reduce wiring time (RU, RJ).
- Space-saving 6mm ideal for high density mounting (RU, RJ).
- Only 70mm from the DIN rail. Suitable for slim control panels and low-profile AGVs (RV8).

### RU/RJ Series

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated Thermal Current</th>
<th>Contact Material</th>
<th>Electrical Life</th>
<th>Mechanical Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ</td>
<td>1-pole: 10A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-pole: 8A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-pole (bifurcated)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AgNi (*1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AgNi (Au clad)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-pole (RU2):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-pole (RU4):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-pole (RU42) bifurcated contacts:</td>
<td></td>
<td>2-pole (RU2):</td>
<td>100,000 operations min. (250V AC, 10A/resistive load)</td>
</tr>
<tr>
<td></td>
<td>3A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-pole (RU):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ag alloy</td>
<td>100,000 operations min. (250V AC, 10A/resistive load)</td>
<td>2-pole (RU):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(RU4: Ag (Au clad))</td>
<td>500,000 operations min. (250V AC, 5A/resistive load)</td>
<td>4-pole (RU):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(RU42 bifurcated</td>
<td>50,000 operations min. (250V AC, 6A/resistive load)</td>
<td>4-pole (RU42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>contacts):</td>
<td>100,000 operations min. (250V AC, 3A/resistive load)</td>
<td>bifurcated contacts):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RJ</td>
<td>1-pole: 12A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-pole: 8A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AgNi (*1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AgNi (Au clad)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-pole (RU2):</td>
<td>100,000 operations min. (250V AC, 10A/resistive load)</td>
<td>2-pole (RU2):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-pole (RU4):</td>
<td>500,000 operations min. (250V AC, 5A/resistive load)</td>
<td>4-pole (RU4):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pole (RU42) bifurcated contacts:</td>
<td>50,000 operations min. (250V AC, 6A/resistive load)</td>
<td>4-pole (RU42</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100,000 operations min. (250V AC, 3A/resistive load)</td>
<td>bifurcated contacts):</td>
</tr>
</tbody>
</table>

### International Standards

<table>
<thead>
<tr>
<th>UL</th>
<th>CSA</th>
<th>TÜV</th>
<th>CE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(VDE)</td>
</tr>
</tbody>
</table>

**Note:**

- 1-pole: 12A
- 2-pole: 8A
- 2-pole (bifurcated contacts): 3A
- 2-pole (RU2): 10A
- 2-pole (RU4): 6A
- 4-pole (RU42 bifurcated contacts): 3A

**RV8**

- 6A
- AgNi + Au plated
- 30,000 operations min. (NO contact)
- 10,000 operations min. (NC contact)

**RJ1 Competitor products**

- 12A
- 10A

**RJ2 Competitor products**

- 8A
- 5A

**Application: Building control circuit for equipment**

Compact Size with high-capacity contacts reduces installation space.
**XS/X6/XW/XN Series**

Emergency Stop Switches

Ergonomic emergency stop switches for staying one step ahead to ensure safety

- **Safe Break Action**
  - When the contact block is detached from the operator, the NC contact opens (OFF).

- **Reverse Energy Structure**
  - With X series, the potential energy level of the latched status is lower than that of normal status. In the event the switch is damaged due to excessive shocks, the NC contacts will turn off, thus stopping the machine (patented design).

<table>
<thead>
<tr>
<th>Series</th>
<th>Hole Size (mm)</th>
<th>Head Size (mm)</th>
<th>Contact Ratings</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>XA (unibody)</td>
<td>ø16.2</td>
<td>ø29, ø40</td>
<td>Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)</td>
<td>● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>XA (removable contacts)</td>
<td>ø16.2</td>
<td>ø30, ø40</td>
<td>Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)</td>
<td>● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>X6</td>
<td>ø16.2</td>
<td>ø30, ø40</td>
<td>Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)</td>
<td>● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>XW</td>
<td>ø22.3</td>
<td>ø40, ø60</td>
<td>Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)</td>
<td>● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>XW (indicator type)</td>
<td>ø22.3</td>
<td>ø38</td>
<td>Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC) (connector type: 2.5A)</td>
<td>● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>XN</td>
<td>ø30.5</td>
<td>ø40, ø60</td>
<td>Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)</td>
<td>● ● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
</tbody>
</table>

Application: Emergency stop when abnormality occurs in a device

Ensuring safety with high reliability that surpasses the standard requirements
**Push-in** terminals enable easy wiring and little skill is required.

- Approximately 55% less work time and improved efficiency compared to conventional screw terminals. Reduces downtime during manufacturing and maintenance.

- Because screws are not used, re-tightening of screws is not required, eliminating anti-vibration measures for AGVs and automatic warehouses.

- Terminals with finger-safe protection enable safe maintenance and prevents accidents such as electrical shocks.

---

### Time saving & efficient

- Reduce wiring time

**Wiring Procedure**
- Push-in connections are made simple by inserting the wire, reducing wiring time by approximately 55% compared to conventional screw terminals.

---

<table>
<thead>
<tr>
<th>Series</th>
<th>Applicable Wires</th>
<th>Applicable Wire Size</th>
<th>Mechanical Durability</th>
<th>Electrical Durability (*4)</th>
<th>Contact Ratings</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW</td>
<td>UL1007 H05V H07V (JIS 3309W)</td>
<td>0.25 to 1.5mm² (AWG16 to 24)</td>
<td>- Pushbuttons, illuminated pushbuttons: 500,000 operations min.</td>
<td>Silver contacts</td>
<td>*••••••</td>
<td>*****</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Momentary: 5,000,000 operations min.</td>
<td></td>
<td>*4)</td>
<td>UL CSA TÜV CCC CEE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintained: 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Selector switch: 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Key selector switch (disc tumbler): 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Key selector switch (pin tumbler): 100,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pushbuttons: Momentary 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintained: 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Selector switch: 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Key selector switch (disc tumbler): 500,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Key selector switch (pin tumbler): 100,000 operations min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

- **Application:** Operation panel for devices

- ø22 size, reduces wiring time
CW Series
Flush Silhouette Switches

Smart switches with sleek design & Push-in technology

- **Flush design with 2.5mm thick bezel prevents particles and contaminants from accumulating. Also suitable for preventing inadvertent operation.**
- **Push-in terminals and Screw terminal styles available.**
- **Screw terminal models have a short body in depth behind the panel, reducing installation space.**
- **A single LED supports 6 colors. When color changes are required, only the lens needs to be replaced. Eliminates the need to stock replacement LEDs in variety of colors.**
- **Approximately 55% less work time and improved efficiency compared to conventional screw terminals. Reduces downtime during manufacturing and maintenance in AGVs and automated warehouses.**

### Application: Operation panel for devices

Flush silhouette switches enhance usability and push-in terminals increase maintenance efficiency

<table>
<thead>
<tr>
<th>Series</th>
<th>Applicable Wires</th>
<th>Applicable Wire Size</th>
<th>Mechanical Durability</th>
<th>Electrical Durability</th>
<th>Contact Ratings</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW</td>
<td>UL1007 H05V, H07V JIS 3307, JIS 3316 (KV)</td>
<td>0.25 to 1.5mm² (AWG 16 to 24)</td>
<td>Pushbuttons, illuminated pushbuttons Momentary; 2 million operations min. (when single contact block is used) Maintained: 250,000 operations min. (when single contact block is used) Selector switches: 250,000 operations min. (when single contact block is used) Key selector switches: 250,000 operations min. (when single contact block is used)</td>
<td>50,000 operations min. or 100,000 operations min. (*1) (*2)</td>
<td>10A Rated insulated voltage: 300V Rated continuous current: 10A</td>
<td>UL CSA TÜV CCC CE</td>
</tr>
</tbody>
</table>

*1: Depends on rated operating current  
*2: Operating frequency 1800 operations/h momentary, operating frequency 900 operations/h maintained

Six different colors with a single LED

Previously, 5 different color LEDs were required but with the new illuminated unit, only a single LED is needed. Only the lens needs to be replaced to change the illumination color. The new LED reduces maintenance time, makes stock control easier, and is environmentally friendly.
**HW1Z**

Illuminated / Non-illuminated Buzzers

Notifies the approach of AGVs and shuttles by light and sound.
Two functions integrated into one (*1)

*1) Illuminated buzzer only

- **Push-in** terminals and short body with a panel depth of 19.7mm save wiring and space, making the buzzers suitable for installation in tight spaces such as on small and low-profile AGVs.
- Reduced installation space is achieved by integrating the functions of a buzzer and lamp into one unit (illuminated buzzer only).
- Ensures IP65 protection at front of panel. By using a waterproof terminal cover, IP54 protection is achieved without using an enclosure.

<table>
<thead>
<tr>
<th>Series</th>
<th>Rated Voltage Current</th>
<th>Buzzer Sound</th>
<th>IP Rating</th>
<th>Boot Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW1Z</td>
<td>12 to 24V DC</td>
<td>Illuminated type: Steady Non-illuminated: Steady / Intermittent Panel front: IP65 Panel back IP40, IP54 (with terminal rubber boot)</td>
<td>Terminal rubber boot: Nitrile rubber</td>
<td></td>
</tr>
</tbody>
</table>

Application: Indicators and alarms for AGVs, AMRs, and automated warehouses

Reduces installation space with a 2 in 1 short-body
**LH1D/AP22/Q Series Indicators**

Indicator lights suitable as AGV direction indicators, achieving both improved visibility from various angles and space savings.

- Indicator lights can be installed on the surfaces of AGVs, shuttles, palletizing robots (mounts directly on equipment). (LH1D)
- Available in a wide selection of variations, such as flat, dome, ø66 dome, 2-color switching, and 3-color switching. (LH1D)
- Unique optical design ensures high visibility even in bright environments such as in warehouses. (AP22)
- Safety is ensured by preventing electric shock with finger protection on terminals.
- Ultra-bright LED pilot lights achieve excellent visibility under strong daylight. (Q)
- A wide range of sizes available, from ø6mm to ø22mm. (Q)

<table>
<thead>
<tr>
<th>Series</th>
<th>Operating Voltage</th>
<th>Consumption Current</th>
<th>Illumination Color</th>
<th>Life</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cable type: 24V AC / DC</td>
<td>17mA</td>
<td>1-color alternate</td>
<td>Approx. 50,000 hours (When used on complete DC at 25°C, brightness reduces to 50% of the initial intensity.)</td>
<td>UL</td>
</tr>
<tr>
<td>LH1D</td>
<td>M12 connector type: 24V DC</td>
<td>24V DC</td>
<td>2-color alternate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-color alternate (*1)</td>
<td></td>
<td>3-color alternate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP22</td>
<td>24V DC</td>
<td>24mA</td>
<td>2-color alternate</td>
<td>Approx. 30,000 hours (When used on complete DC at 25°C, brightness reduces to 50% of the initial intensity.)</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>24, 28, 220V AC / DC</td>
<td>20mA</td>
<td>3 colors</td>
<td>50,000 hours (25°C)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2V, 12V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1) Dome only

Application: Indicators and alarms in AGVs, AMRs, and automated warehouses

High visibility and various mounting styles achieves flexible mounting
LB/LBW/AV/I/ES Series

Wide variety of switches with stylish design and functions such as flush silhouette

- Stylish design with bezel heights of 2 to 2.2mm. (LB, LBW, (except AV22PNA))
- Removal contacts, single board mounting (LB, LBW)
- Robust and metal switches with stylish design (AV, ES), IP69K (ES) suitable for use in warehouses of food companies, and near conveyors requiring washdowns.

Series | Bezel Size | Mechanical Durability | Electrical Durability | Contact Ratings | International Standards
--- | --- | --- | --- | --- | ---
LB | ø22 / ø22mm | Momentary: 2,000,000 operations min. Maintained: 250,000 operations min. Selector/key selector sw: 250,000 operations min. | 50,000 or 100,000 operations min. (1) (2) | Rated Insulation Voltage: 250V Rated Operating Current: 5A (silver contact) 3A (gold contact) | UL CSA TÜV CCC CE
LBW | ø26 / ø26mm | Momentary: 2,000,000 operations min. Maintained: 250,000 operations min. Selector/key selector sw: 250,000 operations min. | 50,000 or 100,000 operations min. (1) (2) | Rated Insulation Voltage: 250V Rated Operating Voltage: 5A (silver contact) 3A (gold contact) | □□□□□
AV | ø16 / 19 / 22 | 1,000,000 operations min. | Rated Operating Voltage: 24V/30V/48V DC, 250V AC Rated Operating Current: 50mA, 1A, 2A, 3A, 5A | □□□□□
I | ø13.6 | 1,000,000 operations min. | Rated Operating Voltage: 4.5V/12V/24V/48V DC, 250V AC Rated Operating Current: 1.25mA, 50mA, 100mA, 2A, 3A, 4A, 5A | □□□□□
ES | ø22 / 28 | 100,000 operations min. | 600 operations min. | Rated Operating Voltage: DC24V Rated Operating Current: 1A | □□□□□

Application: Operation switches for AGVs and AMRs

Flush design and metal body prevents build up of foreign objects. Achieves high impact resistance
**TS/NV Series**

Miniature Joysticks

Thumb-operated controllers with contactless hall effect technology. Ideal for installation on remote controls to enhance operability.

- By using non-contact hall elements, equipment maintenance work is reduced, achieving longer life and downsizing.
- Ergonomic design and operator-friendly structure suitable for long, repetitive, and fatigue-free operation.
- Protection degree: IP67, 69K
- Supports CAN communication, analog output, and USB output, and can be used with a controller for various IoT purposes.

*Above information applies to TS series

---

**Application:** Indicating direction and adjusting positioning with teaching pendants and remote controllers

**Non-contact thumb controllers for durability and downsizing**

<table>
<thead>
<tr>
<th>Series</th>
<th>Supply Voltage Range</th>
<th>Consumption Current</th>
<th>Operating Force</th>
<th>Durability</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS</td>
<td>5.00V±0.01V DC</td>
<td>11mA max.</td>
<td>3.1N ±0.5N (*)1</td>
<td>1,000,000 times</td>
<td>18.25g±5.0g</td>
</tr>
<tr>
<td>NV</td>
<td>50mA max.</td>
<td>Directions: 4 N ± 1 N Pushbutton: 11 N ± 2 N</td>
<td>1,000,000 times</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Force applied to the top of the castle cap.
Ergonomic game style pendant controller

- USB and analog output options.
- Lightweight, one hand operation.
- Excellent proportional control for smooth vertical movement of lifts.
- Configured to order.
- Readily available in TS series thumbstick and IM series pushbutton configuration.

<table>
<thead>
<tr>
<th>Series</th>
<th>Supply Voltage Range</th>
<th>Consumption Current</th>
<th>Operating Force</th>
<th>Life</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>5.00V±0.250V DC</td>
<td>100mA</td>
<td>3 N ± 0.5 N (TS); 6 N ± 2N (IP)</td>
<td>1 million operations</td>
<td>226.8 g</td>
</tr>
</tbody>
</table>

Application: For remote control of AGVs, Lifts, and AMRs

Durable and compact lightweight pendant controllers
Panel Solutions

**FC6A Programmable Controller**

PLC suitable for the IoT era

- **WEB server function** allows easy construction of a **remote monitoring** system.
- **Data** can be sent by CSV file or screenshot using the email function allowing **tracing** of devices, **factor analysis**, and sending **early alerts** to operators.
- **Remote maintenance** can be performed by using the FTP server and client function to transfer project data and read historical data.
- **Supports standard communication protocols for the industrial industry on CPU modules, communication modules, and communication cartridges. The communication monitoring function reduces debugging time** and allows smooth communication with peripheral devices.

<table>
<thead>
<tr>
<th>Series</th>
<th>Program Size</th>
<th>Max. I/O Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC6A</td>
<td>FC6A All-in-one: 640KB maximum (80,000 steps)</td>
<td>FC6A All-in-one: 520 points maximum</td>
</tr>
<tr>
<td></td>
<td>FC6A Plus: 800KB maximum (100,000 steps)</td>
<td>FC6A Plus: 2060 points maximum (including 511 analog points)</td>
</tr>
</tbody>
</table>

**Application:** Automated warehouse control, remote operation/monitoring

Compact PLC achieves on-site control and remote operation
**HG Series**

Operator Interfaces

Excellent visibility and usability equipped with basic performance required for operators

- With the WEB server function, location of AGVs and status of automated warehouses can be checked, and remote monitoring and operation of device is possible using a PC, tablet, or smartphone.
- Data inside operator interfaces can be sent by CSV file or screenshot using the email function allowing tracing of devices, factor analysis, and sending early alerts to operators.
- Remote maintenance is possible by using the FTP server and client function to transfer project data and read history data.
- Maintenance time can be reduced with a long-life, high-performance LED backlight, reducing operation costs.
- Stress-free 1.5-second startup allows quick access to devices.

<table>
<thead>
<tr>
<th>Series</th>
<th>Display Size</th>
<th>Display</th>
<th>Color/ Shade</th>
<th>Display Resolution</th>
<th>Brightness</th>
<th>Rated Voltage</th>
<th>Power Consumption</th>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG1G</td>
<td>4.3 inch</td>
<td>TFT color LCD</td>
<td>65,536</td>
<td>480 (W) x 272 (H) pixels</td>
<td>800cd/m²</td>
<td>12 / 24V DC</td>
<td>8W max.</td>
<td>UL, CSA, CE</td>
</tr>
<tr>
<td>HG2G-V</td>
<td>5.7 inch</td>
<td>TFT color LCD</td>
<td>65,536</td>
<td>640 (W) x 480 (H) pixels</td>
<td>800cd/m²</td>
<td>12 / 24V DC</td>
<td>18W max. (V) 8W max. (ST)</td>
<td>UL, CSA, CE</td>
</tr>
<tr>
<td>HG2G-5T</td>
<td>5.7 inch</td>
<td>TFT color LCD</td>
<td>65,536</td>
<td>320 (W) x 240 (H) pixels</td>
<td>500cd/m²</td>
<td>12 / 24V DC</td>
<td>8W max.</td>
<td>UL, CSA, CE</td>
</tr>
<tr>
<td>HG3G-VA / V8</td>
<td>10.4 / 8.4 inch</td>
<td>TFT color LCD</td>
<td>65,536</td>
<td>1024 (W) x 768 (H) pixels</td>
<td>700cd/m²</td>
<td>24V DC</td>
<td>25W max. (VA) 22W max. (V8)</td>
<td>UL, CSA, CE</td>
</tr>
<tr>
<td>HG4G-V</td>
<td>12.1 inch</td>
<td>TFT color LCD</td>
<td>65,536</td>
<td>1024 (W) x 768 (H) pixels</td>
<td>600cd/m²</td>
<td>24V DC</td>
<td>25W max.</td>
<td>UL, CSA, CE</td>
</tr>
<tr>
<td>HG5G-V</td>
<td>15 inch</td>
<td>TFT color LCD</td>
<td>65,536</td>
<td>1024 (W) x 768 (H) pixels</td>
<td>650cd/m²</td>
<td>24V DC</td>
<td>27W max.</td>
<td>UL, CSA, CE</td>
</tr>
</tbody>
</table>

**Application:** Operation and monitoring of AGVs, AMRs, and automated warehouses

Fast, visible, and easy with various communication protocols
We make the point of contact, where people interface with machines, easy, safe and secure. We create new possibilities.

One of our corporate principles is to conduct business with consideration for social contribution. Since its founding, IDEC has developed and introduced the world to numerous products and services centered on its control technology. Today, our products are used not only in factories, but in a wide range of settings in people’s everyday lives where customers desire safety, ease of use, reliability and a smaller environmental footprint.