

### Three-Position Enabling Switches

Confirm that the delivered product is what you have ordered. Read this instruction sheet to make sure of correct operation. Make sure that the instruction sheet is kept by the end user.

#### SAFETY NOTE

In this operation instruction sheet, 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.

**CAUTION**  
Caution notices are used where inattention might cause personal injury or damage to equipment.

#### 1 Type

HE3B-M2P*	
<b>Contact Configuration</b>	<b>Rubber boot material/ Color</b>
3-position Switch : 2 poles	Y : Silicon rubber/ Yellow B : Silicon rubber/ Black N1 : NBR/PVC Polyblend/ Gray
<b>Rubber boot</b>	
blank : Without rubber boot	
P : With a rubber boot attached	

#### 2 Specifications and Ratings

Applicable Standards	IEC60947-5-1, EN60947-5-1, JIS C8201-5-1 IEC60947-5-8, EN60947-5-8 UL508, CSA C22 2 No.14, GB14048.5			
Standards for Use	ISO12100-1, -2/EN12100-1, -2 IEC60204-1/EN60204-1 ISO11161/prEN11161, ISO10218/EN775 ANSI/RIA R15.06, ANSI B11.19 ISO13849-1/EN ISO13849-1			
Applicable Directives	Low Voltage Directive (2006/95/EC) Machinery Directive (2006/42/EC)			
Operating Condition	Operating Temperature	-25 to +60°C (no freezing) (rubber boot material: without rubber boot/ silicon rubber) -10 to +60°C (no freezing) (rubber boot material: NBR/PVC polyblend)		
	Operating Humidity	45 to 85%RH (no condensation) (IEC60068-2-30)		
	Storage Temperature	-40 to +80°C (no freezing)		
	Pollution Degree	2 (inside the panel/ terminal side) 3 (outside the panel/ operator side)		
Altitude	2000m maximum			
Impulse Withstand Voltage (Uimp)	1.5kV			
Rated Insulation Voltage	125V			
Thermal Current <th>	3A			
Contact Ratings (Reference Values) <Ue, Ie>	AC	Resistive load(AC-12)	30V	125V
		Inductive load(AC-15)	-	1A
		DC	1A	0.2A
DC	Resistive load(DC-12)	1A	0.2A	
	Inductive load(DC-13)	0.7A	0.1A	
	Operation Frequency	1200 operations/hour		
B103	2,000,000 (EN ISO 13849-1 Annex C Table C.1)			
Mechanical Durability	Position 1→2→3	1:1,000,000 operations min		
	Position 1→2→3→1	100,000 operations min		
Electrical Durability	100,000 operations min. (Rated operating load)	1,000,000 operations min. (AC/DC 24V 100mA)		
	Operating Extremes : 150ms <sup>2</sup>	Damage Limits : 500m/s <sup>2</sup>		
Shock Resistance	Operating Extremes : 5 to 55 Hz, half amplitude 0.5 mm	Damage Limits : 16.7 Hz, half amplitude 1.5 mm		
	Degree of Protection	IP40	HE3B-M2	
Conditional short-circuit Current	IP65	HE3B-M2P*		
	Short-Circuit Protective Device	50A(125V) 125V AC, 10A Fuse (IEC60127-1)		
Actuator Strength	500 N minimum (when pressing the entire surface of the button)			
Weight	Approx. 14g (without rubber boot)			
	Approx. 18g (with a rubber boot)			

(1) TUV rating	AC-12 125V / 1A
	DC-12 125V / 0.2A
	DC-12 30V / 1A
(2) UL, c-UL rating	AC 125V / 1A Resistive
	DC 30V / 1A Resistive
	AC-12 125V / 1A
(3) CCC rating	AC-12 125V / 0.2A
	DC-12 30V / 1A
	DC-13 30V / 0.7A

#### 3 Notes for Operation

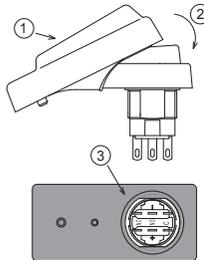
- The enabling switch permits machine operation only while the enabling switch is manually operated for robot teaching or other purposes in hazardous areas. Make sure that the control system is designed to activate the machine only when the enabling switch is at position 2 (3mm operating stroke).
- In order to ensure safety of the control system, connect each pair of the contacts of the 3-position switch to a discrepancy detection circuit such as a safety relay module. (ISO13849-1/EN954-1)
- Because two contacts are designed to operate independently, pressing the edge of a button turns on one contact earlier than the other contact, causing a delay in operation.
- With an enabling switch with rubber boot mounted on a hermetically sealed control box, a large change in internal air pressure may cause the rubber boot to expand and shrink, affecting the performance of the enabling switch. Check periodically to make sure that the enabling switch operates correctly.
- If the mounting panel is deformed when mounting an enabling switch with rubber boot, the normal waterproof characteristic is not assured. Keep a sufficient strength of the mounting panel.
- When using the HE3B with rubber boot, do not press the rubber boot with excessive pressure to an inappropriate direction, otherwise the waterproof function is impaired.
- When using the HE3B without rubber boot, provision for protection is required to prevent button malfunction.
- The rubber boot may deteriorate depending on the operating environment and conditions. Immediately replace the deformed or cracked rubber boot with new ones.

Replacement rubber boot(separate order)

Type	Rubber boot Material	Rubber boot Color
HE9Z-D3Y	Silicon rubber	Yellow
HE9Z-D3B	Silicon rubber	Black
HE9Z-D3N1	NBR/PVC polyblend	Gray

Note: Installing the rubber boot as shown below.  
Do not break the rubber boot during installation.

- Put the long flange side into the rubber boot.  
(Keep foreign objects from entering the rubber boot to prevent malfunction.)  
Wrap the rubber boot around without rubber boot/ silicon rubber)
- the flange. (Keep foreign objects from entering the rubber boot to prevent malfunction.)  
Viewing from the terminal side, check that the rubber boot is installed correctly on the area.



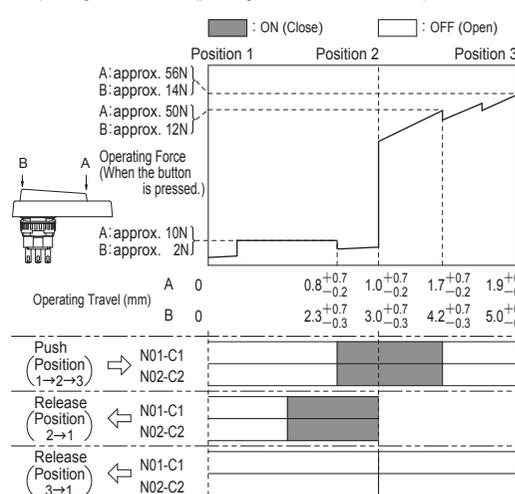
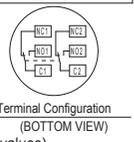
- WARNING**
- This product has been designed for environment A. Use of this product in B environment may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures. (clause 5, 3 of IEC60947-1)
  - Turn off the power to the safety switch before starting installation, removal, wiring, maintenance, and inspection on the safety switch. Failure to turn power off may cause electrical shocks or fire hazard.
  - Use wires of proper size to meet voltage and current requirements. Using improper wires may cause fire hazard due to abnormal heat generation.
  - Do not apply an excessive shock to the switch.
  - Wire the switch correctly after reading a catalog or this instruction sheet.

#### CAUTION

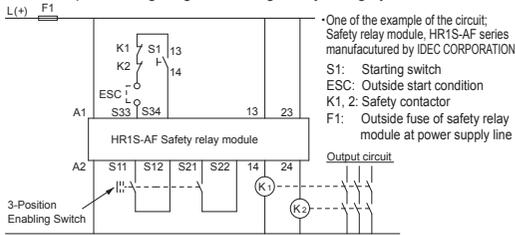
- When using the HE3B for safety-related equipment in a control system, refer to the safety standards and regulations in each country and region depending on the application purpose of the actual machines and installations to make sure of correct operation. Also, perform risk assessment to make sure of safety before starting operation.
- Do not tie the enabling switch around the button with a tape or string, or distort the rubber boot to keep the switch in position 2. Otherwise the original function of the enabling switch is lost, posing a great risk of danger.
- Perform a sufficient risk assessment against the high operating force at transition to the OFF position when the button is pressed to the bottom.
- Perform a sufficient risk assessment against the shape and structure where the enabling switch is mounted, in order to prevent unintended actuation. For example, protrusion from a teaching pendant may cause the enabling switch to be actuated by the weight of the teaching pendant.
- When mounting the HE3B, make sure of sufficient strength of the mounting panel against the anticipated operating physical force. (High operating physical force is expected especially at transition to the OFF position when the button is pressed to the bottom.)

#### 4 Wiring

- Configuration of Contacts and Number of Poles
  - 3-position Switch: 2 poles
  - Terminal No.: between NO1 and C1 between NO2 and C2
- Note: Use the NO and C terminals (OFF→ON→OFF) (Do not use the NC terminals.)
- Operating Characteristics (pressing A and B: reference values)



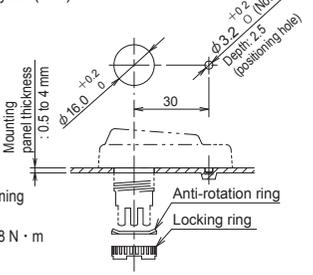
- Note: The operating force of the enabling switch with rubber boot depends on the ambient temperature.
- Applicable Wire Size
    - 0.5 mm<sup>2</sup> (maximum) x 1 pc.
  - Terminal Soldering
    - Solder the terminal at a temperature of 310 to 350°C within 3 seconds using a soldering iron. Sn-Ag-Cu type is recommended when using lead-free solder.
    - When soldering, take care not to touch the enabling switch with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal.
    - Use non-corrosive liquid rosin as soldering flux.
  - Example of wiring Diagram realizing Safety Category 4



- Note: Use the monitoring device (Safety relay module) provided the capability to detect a cross short circuit.  
The insulation of the cable has to withstand environmental influences. If a control device other than the one shown in the draft is used, the used control device has to be equipped with a cross short circuit monitor.

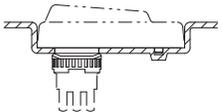
#### 5 Mounting

- Mounting Hole Layout (mm)
- Recommended tightening torque of locking ring : 0.68 to 0.88 N · m

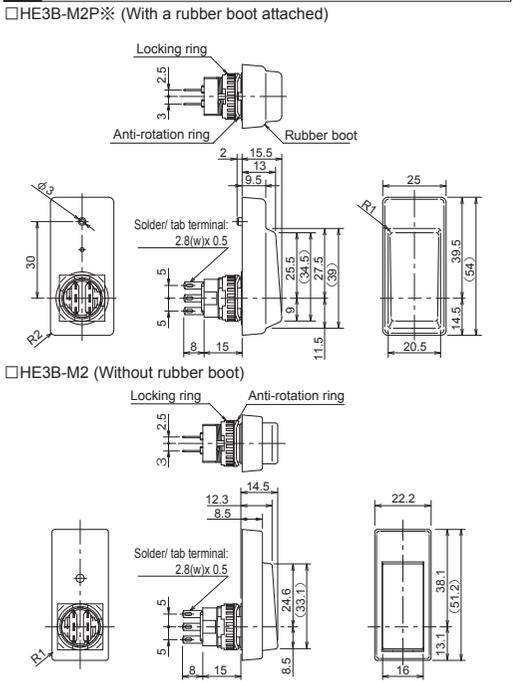


Note: The rubber boot has a protrusion for orientation. When making a positioning hole on a panel, do not make a through hole; otherwise the waterproof characteristic will be impaired.  
When a positioning hole is not made on the panel, cut off the protrusion from the rubber boot, but do not make a perforation in the rubber boot.

Note: Tighten the locking ring using the ring wrench (Type: MT-001).  
When tightening the locking ring, secure the flange part to prevent the enabling switch from rotating.  
When tightening the locking ring, secure the flange part to prevent the enabling switch from rotating.  
In applications where the enabling switch may be rotated, mount the enabling switch in a recess on the panel as shown.



#### 6 Dimensions



#### 7 Precaution for Disposal

Dispose of HE3B Enabling Switch as an industrial waste.  
DECLARATION OF CONFORMITY  
W. IDEC CORPORATION, 6-64, Nishimiyahara 2-chome Yodogawa-ku, Osaka 532-0004, Japan declare under our sole responsibility that the product: Description: Three-Position Enabling Switch Model No: HE3B to which this declaration relates is in conformity with the EC Directive on the following standard(s) or other normative document(s). In case of alteration of the product, not agreed upon by us, this declaration will lose its validity.  
Applicable EC Directive: LOW Voltage Directive (2006/95/EC) Machinery Directive (2006/42/EC)

Applicable Standard(s): EN60947-5-8

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