

IDEC

B-567(6)

INSTRUCTION SHEET (ORIGINAL)

HE2B Double 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

3-position switch	HE2B-M200P*	Rubber boot	blank : Without rubber boot
2: 2 contacts		Y: Silicon rubber/ Yellow	
Release monitor switch		B: Silicon rubber/ Black	
0: blank		N1: NBR/PVC Polyblend/ Gray	
1: 1 contact		Rubber boot	blank : Without rubber boot
2: 2 contacts		P : With a rubber boot attached	
Push monitor switch			
0: blank			
1: 1 contact			
2: 2 contacts			

2 Specifications and Ratings

Applicable Standards	IEC 60947-5-1, EN 60947-5-1, JIS C8201-5-1 IEC 60947-5-8, EN 60947-5-8 UL508, CSA C22.2 No.14, GB/T14048.5					
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 B1.19, ISO 13849-1 / EN ISO 13849-1					
Applicable Directives	Low Voltage Directive, Machinery Directive, RoHS Directive					
Operating Condition	Operating Temperature	-25 to +60°C (no freezing) (rubber boot material: without rubber boot/ silicon rubber)				
	Operating Humidity	-10 to +60°C (no freezing) (rubber boot material: NBR/PVC polyblend)				
	Storage Temperature	45 to 85%RH (no condensation) -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)	2.5kV					
Rated Insulation Voltage	250V					
Thermal Current <Ith>	3A					
Contact Ratings (Reference Values) <Ue, 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	-
	Release/Push Monitor Switch	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
Inductive load(DC-13)	2.3A	0.55A	0.27A			
Operation Frequency	1200 operations/hour					
B10d	100,000 (EN ISO 13849-1 Annex C Table C.1)					
Mechanical Durability	Position 1→2⇒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)					

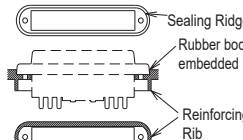
Shock Resistance	Operating Extremes: 150m/s ² Damage Limits: 500m/s ²
Vibration Resistance	Operating Extremes: 5 to 55 Hz, half amplitude 0.5 mm Damage Limits: 16.7 Hz, half amplitude 1.5 mm
Degree of Protection	IP40 HE2B-M2□□□ IP65 HE2B-M2□□P*
Direct Opening Force	60N minimum (Release/Push monitor switch)
Direct Opening Travel	Release monitor switch: 1.7 N minimum Push monitor switch: 4.7 N minimum
Conditional short-circuit Current	50A (250V)
Short-Circuit Protective Device	250V AC, 10A Fuse (IEC 60127-1)
Actuator Strength	500 N minimum (when pressing the entire surface of the button)
Weight	Approx. 26g (without rubber boot) Approx. 30g (with a rubber boot)

Ratings approved by safety agencies

(1) TUV rating	3-position switch	AC-12 125V / 0.5A DC-13 30V / 1A DC-13 30V / 0.7A
	Monitor switch	AC-15 250V / 0.75A AC-15 250V / 0.5A DC-13 125V / 0.22A DC-13 30V / 2.3A
(2) UL, c-UL rating	3-position switch	AC 250V / 0.5A Resistive AC 250V / 1A Resistive DC 30V / 0.7A Pilot Duty AC 250V / 0.75A Pilot Duty AC 250V / 0.5A Pilot Duty DC 125V / 0.22A Pilot Duty
	Monitor switch	AC-12 125V / 0.5A DC-13 30V / 1A DC-13 30V / 0.7A AC-15 250V / 0.75A DC-13 125V / 0.22A DC-13 30V / 2.3A
(3) CCC rating	3-position switch	AC-12 125V / 0.5A DC-13 30V / 1A DC-13 30V / 0.7A
	Monitor switch	AC-15 250V / 0.75A DC-13 125V / 0.22A DC-13 30V / 2.3A

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. (EN ISO 13849-1)
- 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. In this case, it is recommended to use a control that does not detect an error only due to a time gap between the two contact operations.
- In the unlikely event that an error is detected due to a time gap between two contact operations, it is recommended that the error be reset by once releasing the switch button (both contacts OFF).
- 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.
- The ridge on the bottom of rubber boot serves as a seal, and waterproof characteristics are attained when the ridge is tightly pressed to the mounting panel. If the mounting panel is deformed, the normal waterproof characteristic is not assured. Keep a sufficient strength of the mounting panel. When the mounting panel is bent and the ridge cannot be pressed to the panel, add a reinforcing rib to secure the boot to the mounting panel.
- The edge of rubber boot may stick out if excessive force is applied on the rubber boot. When such event is anticipated, it is recommended to embed the rubber boot in the mounting panel as shown on the right.
- When using the HE2B 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-D2Y	Silicon rubber	Yellow
HE9Z-D2B	Silicon rubber	Black
HE9Z-D2N1	NBR/PVC polyblend	Gray

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

Installing the Rubber Boot

- Put M3 nuts into the hexagonal holes.
 - Wrap the rubber boot around 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.
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CAUTION

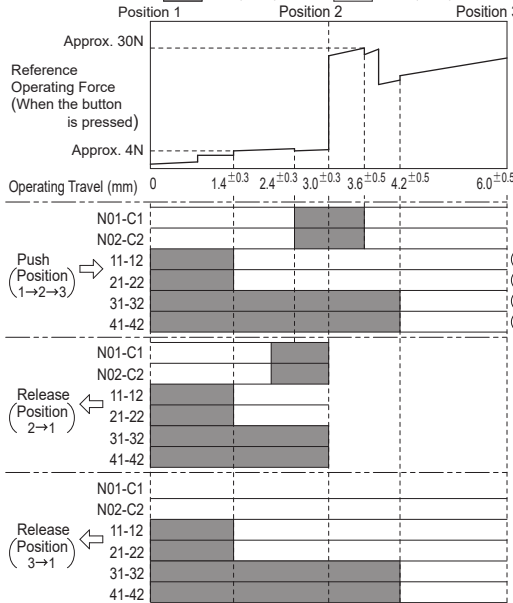
- This product has been designed for industrial purposes. Use of this product for residential, commercial, or lighting purposes may cause unwanted electromagnetic disturbances in which case you may be required to take adequate mitigation measures. (clause 5.3 of IEC 60947-1)
- Use wires of proper size 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.
- If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstance.
- The entire concept of the control system, in which the safety component is integrated, must be validated to EN ISO 13849-2.

WARNING

- Turn off the power to the enabling switch before starting installation, removal, wiring, maintenance, and inspection on the enabling switch. Failure to turn power off may cause electrical shocks or fire hazard.
- Do not disassemble or modify the switch. Also do not attempt to disable the enabling switch function, otherwise a breakdown or an accident will result.
- When using the HE2B 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 HE2B, 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

- Operating Characteristics (Pressing the center of the button without boot: reference value)



Note: The operating force of the enabling switch with rubber boot depends on the ambient temperature.

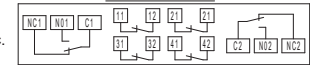
- Configuration of Contacts and Number of Poles
- 3-position Switch: 2 poles

- Terminal No.: between NO1 and C1 between NO2 and C2
- Release monitor Switch: 0 to 2 poles
- Terminal No.: between 11 and 12 between 21 and 22
- Push monitor Switch: 0 to 2 poles
- Terminal No.: between 31 and 32 between 41 and 42

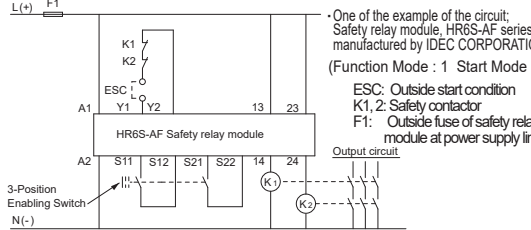
Note: Use the NO and C terminals(OFF →ON →OFF) (Do not use the NC terminals.)

- Terminal Configuration (BOTTOM VIEW) IDEC mark side

- Applicable Wire Size
- 0.5 mm² (maximum) x 1 pc.
- Terminal Soldering
- Solder the terminal at a temperature of 310 to 350°C within 3 seconds using a soldering iron. Do not use flow or dip soldering. 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.



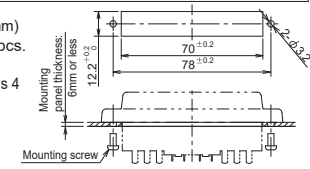
- Example of wiring Diagram resizing Safety Category4



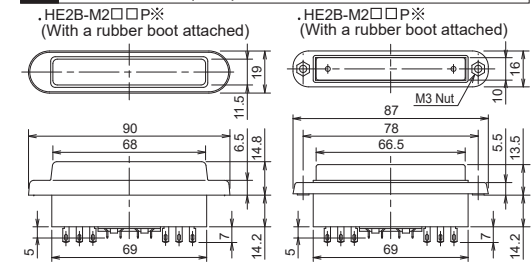
Note: The insulation of the cable has to withstand environmental influences.

5 Mounting

- Mounting Hole Layout (mm)
- Mounting Screws: M3 x 2 pcs.
- Mounting Screw Length: Mounting panel thickness plus 4 to 5 mm
- Recommended Screw Tightening Torque: 0.5 to 0.8 N·m



6 Dimensions (mm)



7 Precaution for Disposal

Dispose of HE2B Enabling Switch as an industrial waste.

IDEC CORPORATION <http://www.idec.com>

DECLARATION OF CONFORMITY
We, IDEC CORPORATION declare under our sole responsibility that the product:

Description: Three-Position Enabling Switch
Model No: HE2B

Applied Union harmonized legislation and references to the relevant harmonization standards used or references the other technical specifications in relation to which conformity is declared.

Manufacturer: IDEC CORP.
2-8-64 Nishimiyaohara Yodogawa-ku, Osaka 532-0004, Japan
EU Authorized Representative: APEM SAS
55, Avenue Edouard Herriot BP1, 82303 Caussade Cedex, France
Applicable EU Directive : Low Voltage Directive (2014/35/EU),
RoHS Directive (2011/65/EU)

Applicable Standard(s) : EN 60947-5-8, EN IEC 63000
UK Authorized Representative: APEM COMPONENTS LIMITED
Drakes Drive, Long Crendon, Buckinghamshire, HP18 9BA, UK
Applicable UK Legislation : Electrical Equipment (Safety) Regulations 2016,
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
Applicable Standard(s) : EN 60947-5-8, EN IEC 63000