

## HE2B Series Redundant (Double) Basic Enabling Switch

### HE2B Key features include:

- 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)



### Specifications

<b>Conforming to Standards</b>	IEC60947-5-1, EN60947-5-1, JIS C8201-5-1, UL508, CSA C22.2 No 14	
<b>Application Standards</b>	ISO12100/EN292, IEC60204-1/EN60204-1, ISO11161/prEN11161, ISO10218/EN775, ANSI/RIA R15.06	
<b>Operating Temperature</b>	-25 to +60°C (no freezing)	
<b>Operating Humidity</b>	45 to 85% RH (no condensation)	
<b>Storage Temperature</b>	-40 to +80°C (no freezing)	
<b>Pollution Degree</b>	2 (inside of panel/contact side) 3 (outside of panel/operating side)	
<b>Contact Resistance</b>	50mΩ maximum	
<b>Insulation Resistance</b>	Between live and dead metal parts: 100MΩ maximum Between positive and negative live parts: 100MΩ minimum	
<b>Impulse Withstand Voltage</b>	2.5kV	
<b>Operating Frequency</b>	1200 operations/hour	
<b>Mechanical Life</b>	Position 1→2: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum	
<b>Electrical Life</b>	100,000 (at full rated load)	
<b>Shock Resistance</b>	<b>Operating Extremes</b>	100m/s <sup>2</sup> (10 G)
	<b>Damage Limits</b>	1000m/s <sup>2</sup> (100 G)
<b>Vibration Resistance</b>	<b>Operating Extremes</b>	5 to 55Hz, amplitude 0.5mm minimum
	<b>Damage Limits</b>	16.7Hz, amplitude 1.5mm minimum
<b>Terminal</b>	0.110" quick connect / solder terminal	
<b>Recommend Wire Size</b>	0.5mm <sup>2</sup> maximum / 1 line (20AWG)	
<b>Solder Heat Resistance</b>	260°C / 3 seconds maximum	
<b>Terminal Pulling Strength</b>	20N minimum	
<b>Recommended Screw Torque</b>	0.5 to 0.8Nm	
<b>Degree of Protection</b>	with rubber cover: IP65, without rubber cover: IP40 (IEC 60529),	
<b>Conditional Short-Circuit Current</b>	50A (250V)	
<b>Recommended Short Circuit Protection</b>	250V/10A fast blow fuse (IEC 60127-1)	
<b>Weight</b>	Approx. 26g (without cover), 30g (with cover)	
<b>Circuit Opening Force</b>	60N minimum (button return monitor & button push monitor)	
<b>Actuating Force (Operating)</b>	500N minimum	

### Ordering Information

**HE2B - M 2 0 0 P Y**

**3 Position Switch**  
2: 2 contacts (DPDT)



**Rubber Cover Color**  
None: without cover  
Y: Yellow  
B: Black

**Rubber Cover**  
None: without cover  
P: with cover

**Return Monitor Switch**  
0: None  
1: 1 contact  
2: 2 contacts


**Push Monitor Switch**  
0: None  
1: 1 contact  
2: 2 contacts

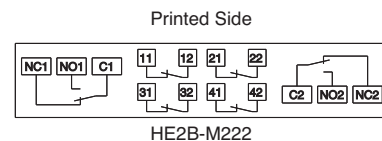
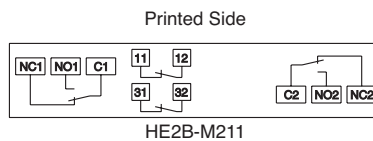
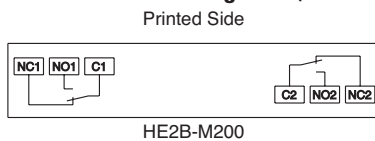
**Part Numbers**

Model	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	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

**Ratings**
**Contact Ratings**

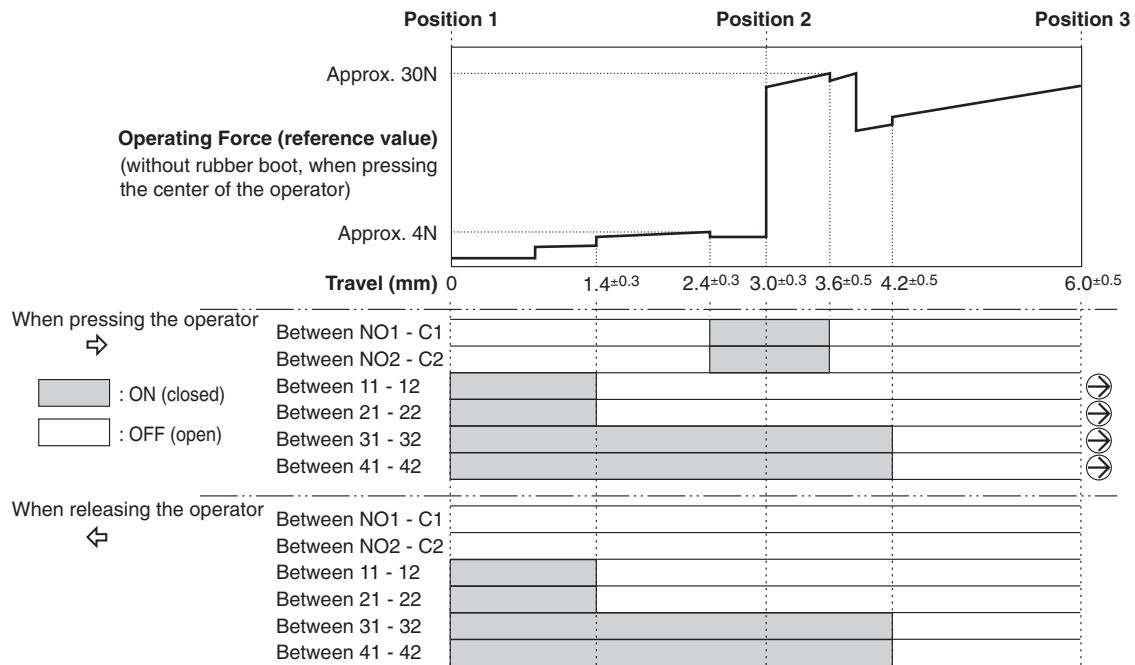
<b>Rated Insulation Voltage (Ui)</b>		250V				
<b>Thermal Current (Ith)</b>		3A				
<b>Rated Operating Voltage (Ue)</b>		30V	125V	250V		
<b>Rated Operating Current (Ie)</b>	<b>3 Position Switch</b>	<b>AC</b>	<b>Resistive Load (AC-12)</b>	–	1A	0.5A
			<b>Inductive Load (AC-15)</b>	–	0.7A	0.5A
		<b>DC</b>	<b>Resistive Load (DC-12)</b>	1A	0.2A	–
			<b>Inductive Load (DC-13)</b>	0.7A	0.1A	–
	<b>Push/return Monitor Switch (NC Contacts)</b>	<b>AC</b>	<b>Resistive Load (AC-12)</b>	–	2A	1A
			<b>Inductive Load (AC-15)</b>	–	1A	0.5A
		<b>DC</b>	<b>Resistive Load (DC-12)</b>	2A	0.4A	0.2A
			<b>Inductive Load (DC-13)</b>	1A	0.22A	0.1A
<b>Contact Structure</b>	3 Position Switch		2 contacts (DPDT)			
	Button Return Monitor Switch		0 to 2 contacts			
	Button Push Monitor Switch		0 to 2 contacts			

 Minimum applicable load (reference) = AC/DC3V • 5mA (for reference only)

**Circuit Diagrams**
**Terminal Circuit Diagrams (bottom view)**


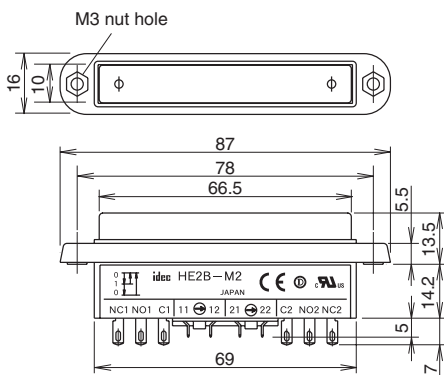
### Operating Characteristics

#### Operating Characteristics (without rubber cover/center of button being pushed)

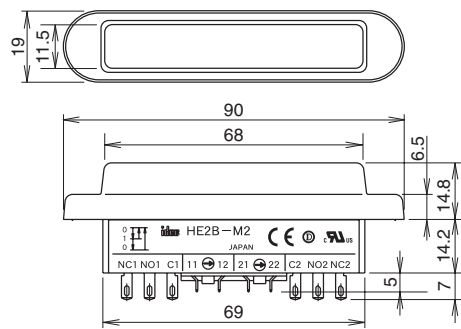


Using rubber cover will change the operating load because the operating temperature would increase

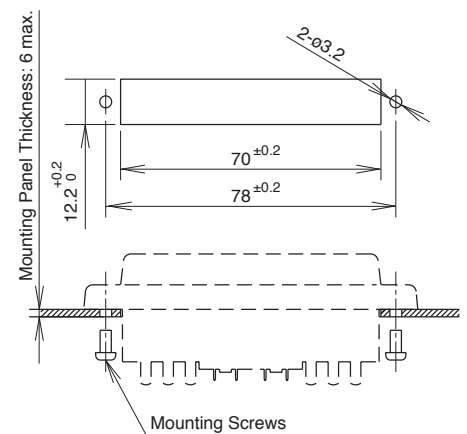
#### Dimensions (mm) Without Rubber Cover



#### With Rubber Cover



#### Mounting Hole Layout



#### Accessories

##### Replacement Rubber Cover

Appearance	Color	Part Number	Material
	Yellow	HE9Z-D2Y	Silicon Rubber
	Black	HE9Z-D2B	

## General Information

### Safety Precautions

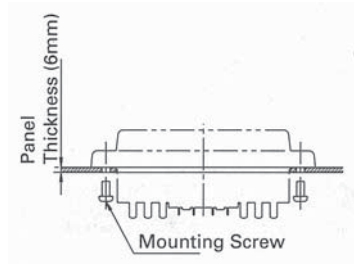
- In order to avoid electric shock or fire, turn power off before installation, removal, wire connection, maintenance or inspection of switch.
- Follow specification when installing. Improper electrical load may damage switch, cause electric shock, or fire.

- Use proper wire diameter to meet voltage and current requirements. Using improper wires or incomplete soldering may cause fire due to abnormal heat generation.

### Installation Precautions

#### HE2B

- M3 nut is inside the rubber cover.



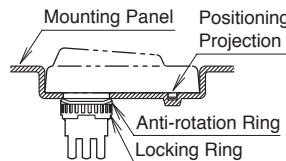
#### HE2B/HE3B

- A change in internal air pressure may cause the rubber boot to expand and shrink on an enabling switch that has the rubber boot sealed. This may affect the performance of the switch. Periodically check to ensure that the enabling switch is operating correctly.

- If the panel is not level when mounting an enabling switch, the waterproof feature cannot be guaranteed.

#### HE3B

- The rubber boot has a tab to be used for orientation. When making a positioning hole in a panel, do not make a hole in the rubber boot, or the waterproof feature cannot be guaranteed. When the positioning hole is not on the panel, remove the tab, but do not make a hole in the rubber boot.
- When tightening the locking ring, secure the flange to prevent the enabling switch from rotating. In applications where the enabling switch is to be rotated, mount the switch in a recess on the panel as shown.

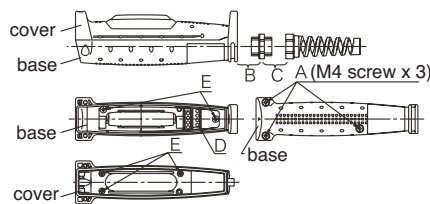


### Wiring Precautions

#### HE1B/HE2B/HE3B

- Applicable wire size is 0.5mm<sup>2</sup> (20AWG) (maximum) / 1 line.
- When soldering the terminal, solder at a temperature of 260°C within 3 seconds. Use non-corrosive liquid rosin as soldering flux.

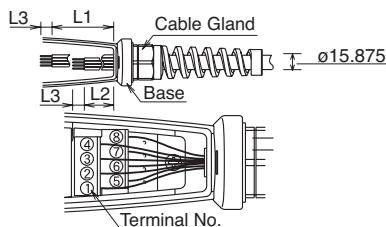
- Recommended Torque



#### 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 1.5mm<sup>2</sup> (24 - 16AWG, one wire per terminal)

	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	

### Use Precautions

#### HE2B/HE3B/HE1G

- To ensure the highest level of reliability connect both contacts to a monitoring device such as a safety relay.

#### HE1B/HE2B/HE3B

- When installing the enabling switch ensure that it cannot be accidentally activated. For example, a protrusion from a teaching pendant could cause the enabling switch to be activated by the weight of the teaching pendant.