HE6B Rectangular Three-position Enabling Switches

3-position enabling switch with monitoring contacts—Smallest in its class.

(Monitor Switch)

• See website for details on approvals and standards.

HE6B

	Style		Contact Configuration/No. of Contacts: 3-position Switch	Return Monitor Switch	Depress Monitor Switch	Part No.	Ordering No.	Package Quantity
	With Rubber Boot	Rubber Boot Material: Silicon Rubber Color: Y: yellow B: black	2	0	0	HE6B-M200∗	HE6B-M200∗	1
							HE6B-M200∗PN10	10
			2	1	1	HE6B-M211∗	HE6B-M211∗	1
							HE6B-M211∗PN10	10

• Specify rubber boot color code in place of ∗ in the Part No.

Part No. Development

HE6B - M 2 0 0 ∗

3-position Switch
2: 2 contacts

Monitor Switch
00: No switch
11: 1 contact of return monitor switch
1 contact of depress monitor switch
20: 2 contacts of return monitor switch
02: 2 contacts of depress monitor switch
(20 and 02 are not standard. Contact IDEC for details.)

Rubber Boot Material, Color
Blank: No rubber boot
Y: Silicon rubber, yellow (Note 1)
B: Silicon rubber, black (Note 1)
[N1]: NBR/PVC polyblend, gray (Not standard. Contact IDEC) (Note 2)

Note 1: Silicon rubber: Can be used in general factories. Remaining flexible in cold temperatures. Suitable for applications in a wide operating temperature range.
Note 2: NBR/PVC polyblend: Oil-proof. Suitable for environments subjected to machine oil and for painting robots where silicon rubber cannot be used.

Specifications

Applicable Standards	IEC/EN60947-5-1 IEC/EN60947-5-8 (TÜV approval) GS-ET-22 (TÜV approval) UL508 (UL recgonized) CSA C22.2 No.14 (c-UL recognized) GB/T14048.5 (CCC approval)
Applicable Standards for Use	ISO12100/EN ISO12100 IEC60204-1/EN60204-1 ISO11161/EN ISO11161 ISO10218-1/EN ISO10218-1 ANSI/RIA/ISO10218-1 ANSI/RIA/R15.06, ANSI B 11.19 ISO13849-1/EN ISO13849-1
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	50 mΩ maximum (initial value)
Insulation Resistance	Between live and dead metal parts: 100 MΩ minimum (500V DC megger) Between terminals of different poles: 100 MΩ minimum (500V DC megger)
Impulse Withstand Voltage	1.5 kV (3 position switch) 2.5 kV (monitor switch)
Operating Frequency	1200 operations per hour
Mechanical Durability	Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Durability	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: 500 m/s^2
Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5 mm Damage limits: 16.7 Hz, amplitude 1.5 mm
Terminal Style	Solder terminal
Applicable Wire	1 cable, 0.5 mm^2 maximum
Solder Terminal Heat Resistance	310 to 350°C, 3 seconds maximum
Terminal Tensile Strength	20N minimum
Locking Ring Recommended Tightening Torque	0.5 to 0.8 N·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 (monitor switch)
Direct Opening Stroke (when pressing the entire button surface)	0.9 mm minimum (return monitor switch) 4.0 mm minimum (depress monitor switch)
Operator Strength	250N minimum (when pressing the entire button surface)
Weight (approx.)	14g (without rubber boot), 17g (with rubber boot)

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	—	—
	Return monitor switch 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		
		Return monitor switch		0 to 1 contact		
		Depress monitor switch		0 to 1 contact		

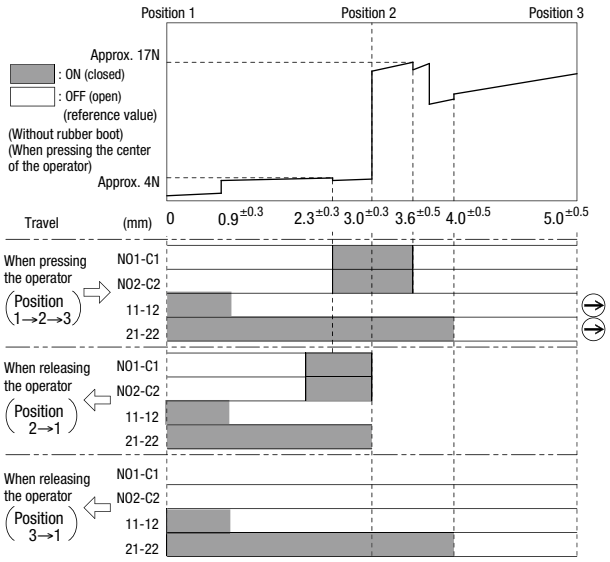
- Minimum applicable load (reference value): 3V AC/DC, 5 mA
  (Applicable operation area depends on the operating conditions and load.)

TÜV ratings:
3 position switch:
AC-12 125V/0.5A
DC-12 30V/1A
DC-13 30V/0.7A
Monitor Switch:
AC-15 250V/0.75A
DC-13 125V/0.22A
DC-13 30V/2.3A

UL ratings:
3-position switch:
125V AC/0.5A (Resistive)
30V DC/1A (Resistive)
30V DC/0.7A (Pilot Duty)
Monitor switch:
250V AC/0.5A (General use)
30V DC/1A (General use)
250V AC/0.75A (Pilot Duty)
30V DC/2.3A (Pilot Duty)

Operating Characteristics

HE6B-M211

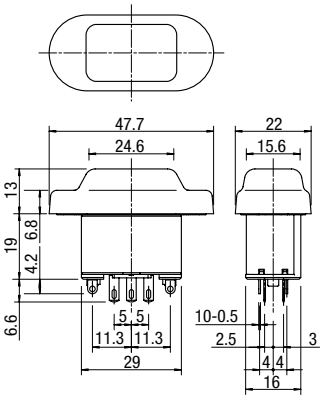


Notes:
- When a rubber boot is used, the operating force depends on the operating temperature.
- The operating force to move the button from position 2 to position 3 can be changed. For details, contact IDEC.

HE6B Rectangular Three-position Enabling Switches

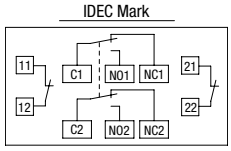
Dimensions

All dimensions in mm.



Terminal Arrangement (bottom view)

HE6B-M211

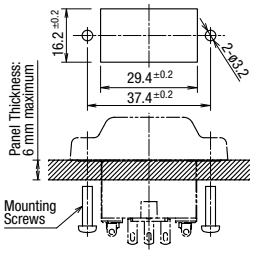


- 3-position switch (Note): 2 contacts
- Return monitor switch: 1 contact, terminal nos. 11-12
- Depress monitor switch: 1 contact, terminal nos. 21-22
- There are no terminal nos. 11-22 and 21-22 for HE6B-M200.

Note: Use NO and C terminals for OFF→ON→OFF 3-position switch (NC terminal is not used.)

Mounting Hole Layout

All dimensions in mm.



- Mounting screws: M3 screw × 2 (not attached and must be supplied by the user)
- Mounting screw length: 5 to 6 mm (panel thickness + gasket)

Accessories

Replacement Rubber Boot

Material, Color	Part No.	Ordering No.	Package Quantity
Silicon Rubber Y: yellow B: black	HE9Z-D6∗	HE9Z-D6∗PN10	10

- Specify rubber boot color code in place of ∗ in the Ordering No.

IDEC

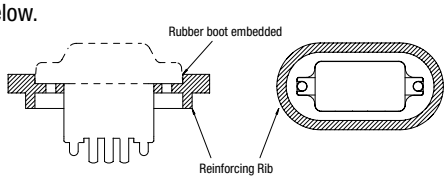
⚠ Safety Precautions

- The enabling switches have been designed for industrial purposes. Use for residential, commercial, or lighting purposes may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures. (IEC60947-1, Clause 5.3)
- Do not assemble or modify the enabling switches and do not disable the enabling function. Otherwise, failure of accidents may occur.
- When using the enabling switch in a safety related part of a control system, use the enabling switch properly in accordance with the safety standards and regulations of the actual machine, system, and application, of the country or region where the enabling switch is used. Also, perform a risk assessment before using the enabling switch.
- Do not disable the safety function of the enabling switch by using tape, elastic band, or by disfiguring the rubber boot, otherwise the loss of enabling switch function may cause serious accidents.
- Perform a risk assessment in actual applications as strong force may be applied to the switch when depressed to position 3.
- Perform a risk assessment for the shape and structure of the part where the enabling switch is installed, to prevent unintended operation of the enabling switch. For example, an enabling switch protruding from the teach pendant may result in an unintended operation of the enabling switch.
- Strong force may be applied to a 3-position enabling switch when pressed to position 3. Provide sufficient strength to the part where 3-position enabling switches will be installed.
- Use wires of the proper size to meet voltage and current requirements, and solder the wires correctly according to the wiring instruction described below. If soldering is incomplete, the wire may heat during operation, causing a fire hazard.
- Do not apply excessive force to the enabling switch.
- Follow the wiring instructions mentioned in the instruction manual.
- 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.

Instructions

Operating Instructions

- 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 travel.
- To achieve a high level of safety, connect the two contacts of the 3-position switch to a disparity detection circuit (e.g., safety relay module) (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. To avoid this, always press the center of the button.
- When an enabling switch with rubber boot is mounted in a hermetically-sealed control box, a large change in internal air pressure may cause the rubber boot to inflate and deflate, affecting the performance of the enabling switch. Check periodically to make sure that the enabling switch operates correctly.
- If the mounting panel is deformed, waterproof characteristics of the enabling switch with rubber boot cannot be achieved. Keep sufficient strength on the mounting panel.
- 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. 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 in the figure below.



- Using enabling switches without rubber boots in an environment where foreign particles or dust exist may lead to malfunction. Order an optional rubber boot or add extra protection.

Installation Instructions

- If the mounting panel is deformed, waterproof characteristics of the enabling switch cannot be achieved. Keep sufficient strength on the mounting panel.

Wiring Instructions

- Applicable wire size: 0.5 mm^2 maximum × 1 pc.
- 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. Do not use flow or dip soldering.
- 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.