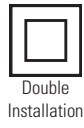


## HE1G Series Grip Style Enabling Switch

**HE5B Key features include:**

- 3 position functionality (Off – On – Off) as required for manual robotic control
- Ideally suited for use as an enabling (aka “deadman”) switch for robotic cells
- 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
- Contacts will not re-close when released from Off → On (3 → 1) (per IEC60204-1; 9.2.5.8)
- Optional E-Stop switch built in
- Connection for conduit and cable strain relief built in
- IP66 waterproof sealing
- Meets ANSI RIA 15.06 robotics standards
- Optional momentary pushbutton or E-Stop built in


**Specifications**

<b>Conforming to Standards</b>	IEC60947-5-1, EN60947-5-1, JIS C8201-5-1, UL508, CSA C22.2 No 14	
<b>Applicable 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 maximum (no condensation)	
<b>Storage Temperature</b>	-40 to +80°C (no freezing)	
<b>Pollution Degree</b>	3	
<b>Contact Resistance</b>	100mΩ maximum	
<b>Insulation Resistance</b>	Between live & dead metal parts: 100MΩ maximum Between positive & 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: 1,000,000 operations minimum Position 1 → 2 → 3 → 1: 100,000 operations minimum	
<b>Electrical Life</b>	100,000 minimum at 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>Recommend Wire Size</b>	0.14 to 1.5mm <sup>2</sup> (24AWG - 16AWG)	
<b>Recommend Cable Size</b>	ø7 to 13mm	
<b>Conduit Size</b>	M20	
<b>Terminal Pulling Strength</b>	20N minimum	
<b>Terminal Screw Torque</b>	0.5 to 0.6Nm	
<b>Degree of Protection</b>	HE1G-21SM: IP66, HE1G-20MB: IP65 HE1G-20ME: IP65, HE1G-21SMB: IP65	
<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. 250g (HE1G-20ME) Approx. 210g (HE1G-21SM)	

Part Numbers

Part Numbers	3 Position Switch	Monitor Switch	Emergency Stop Pushbutton	Momentary Pushbutton
HE1G-21SM	2 Contacts	Yes (1NC)	No	No
HE1G-20ME	2 Contacts	No	Yes (2NC)	No
HE1G-21SMB	2 Contacts	Yes (1NC)	No	Yes (1NO)
HE1G-20MB	2 Contacts	No	No	Yes (2NO)

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 (Terminal No.1-2, 3-4)</b>	<b>AC</b>	<b>Resistive Load (AC-12)</b>	–	3A	0.5A
			<b>Inductive Load (AC-15)</b>	–	1.5A	0.5A
		<b>DC</b>	<b>Resistive Load (DC-12)</b>	2A	0.4A	–
			<b>Inductive Load (DC-13)</b>	1A	0.22A	–
	<b>Monitor Switch (Terminal No. 5-6 of HE1G-21SM)</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>Emergency Stop Pushbutton (Terminal No. 5-6, 7-8 of HE1G-20ME)</b>	<b>AC</b>	<b>Resistive Load (AC-12)</b>	–	–	–
			<b>Inductive Load (AC-15)</b>	–	–	0.5A
		<b>DC</b>	<b>Resistive Load (DC-12)</b>	–	–	–
			<b>Inductive Load (DC-13)</b>	–	–	0.1A
<b>Contact Structure</b>	3 Position Switch		2 Contacts			
	Monitor Switch		0 or 1 Contact			
	Emergency Stop Pushbutton		0 or 2 Contacts			
	Momentary Pushbutton		0 to 2 contacts			

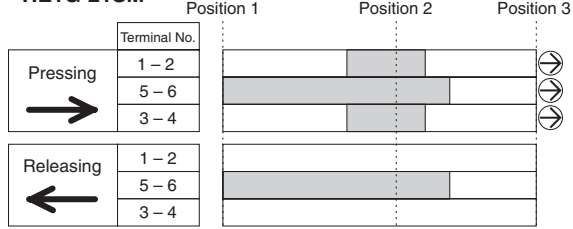


The minimum load (reference) = AC/DC3V • 5mA (for reference only).

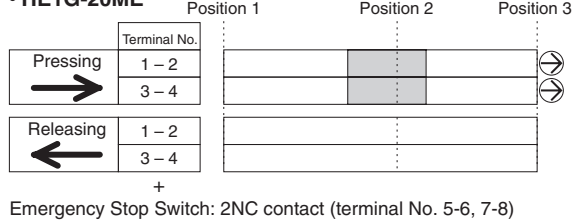
Operation Characteristics

Contact Movement

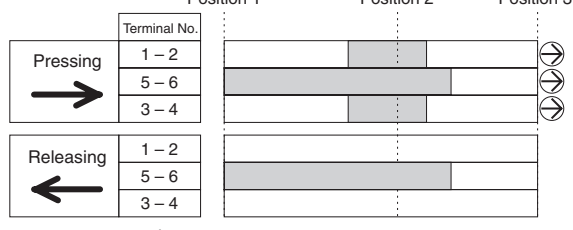
• HE1G-21SM



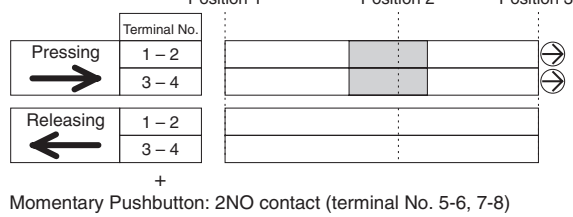
• HE1G-20ME



• HE1G-21SMB



• HE1G-20MB

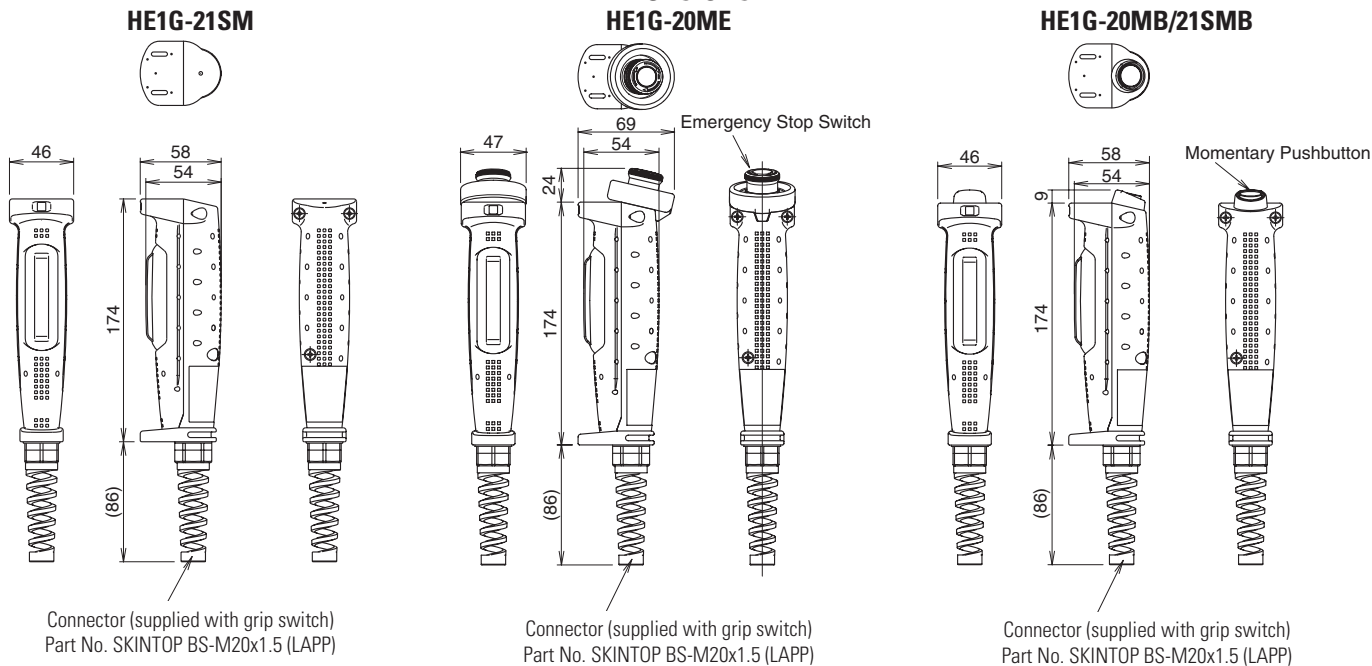


Momentary Pushbutton: 1NO contact (terminal No. 7-8)

■ : contact ON (closed) □ : contact OFF (open)

- 1. Terminals No. 1-2, 3-4, 5-6 will become positive action when moving from position 2 to 3.
- 2. Use terminal contacts 1-2 and 3-4 for safest circuit.
- 3. When the center of the button is pressed, the above operation characteristics occur.

Dimensions



Connector (supplied with grip switch)  
Part No. SKINTOP BS-M20x1.5 (LAPP)

Connector (supplied with grip switch)  
Part No. SKINTOP BS-M20x1.5 (LAPP)

Connector (supplied with grip switch)  
Part No. SKINTOP BS-M20x1.5 (LAPP)

Replacement Rubber Cover

Appearance	Part Number	Material	Color
	HE9Z-GBK1	Silicon Rubber	Yellow

Accessories

Mounting Plate (secures grip switch)

Appearance	Part Number	Material
	HE9Z-GH1	Metal

Material: SUS304  
Thickness: 3.0 mm

Overview

X Series E-Stops

Door Interlock Switches

Enabling Switches

Barriers

AS-Interface Safety at Work

## General Information

### Safety Precautions

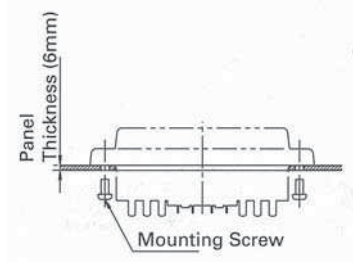
- In order to avoid electric shock or fire, turn power off before installation, removal, wire connection, maintenance or inspection of switch.
- Follow specification when installing. Improper electrical load may damage switch, cause electric shock, or fire.

- 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.



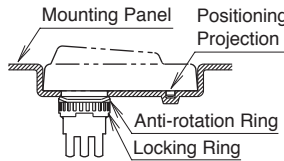
#### HE2B/HE3B

- 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.

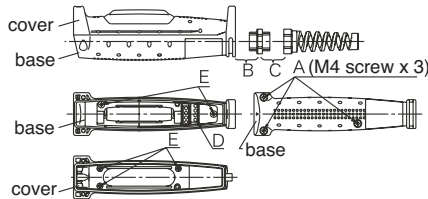


### Wiring Precautions

#### 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.

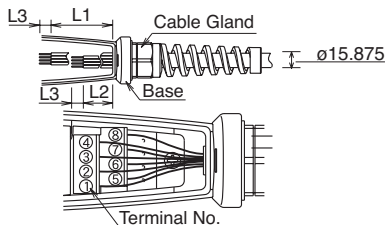
- Recommended Torque



#### 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)

### 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.