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Enabling Switches



www.IDEC.com/safety



Enabling "Dead Man" Switches

What is an enabling switch?

An enabling switch is a 3-position (OFF-ON-OFF) switch to allow a machine operation only when the switch is lightly pressed and held in the middle position (position 2). Because it disables machine operation when released (position 1) or further depressed (position 3) by a panicked operator, the safety of operators is ensured.

IDEC was a pioneer in developing these type of switches and championed the additional IEC60947-5-8 requirements for enabling switches to be used in automated manufacturing cells.



IEC symbol designating a 3-position enabling switch as specified in IEC60947-5-8

Because operators use pendants in dangerous environments performing teaching, system changeover, and maintenance of robots, they must have protection against unpredictable motion of robots, and therefore teach pendants are equipped with 3-position enabling switches.



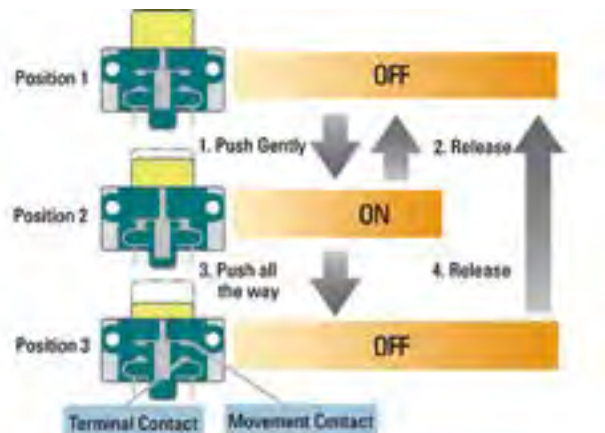
HE1B Enabling Switch Movement

3 Position Enabling Switch

Position 1 - Normal position - Contact Open

Position 2 - Push half way - Contact Closed






Position 3 - Push all the way - Contact Open







When releasing switch from position 3 back to position 1, the switch will not enter the ON state.

Selection Guide

Enabling Switches

Series	HE1B	HE2B	HE3B	HE5B	HE6B
Appearance					
Page	392	394	397	400	403
Description	Basic Switch	Full Size Contacts	16mm Panel Mount	16mm Panel Mount	Compact Size
Main Contacts	1NO	DPDT/DPDT, 2NC/DPDT, 4NC	DPDT	DPDT	DPDT
Monitor Contacts	–	2NC, 4NC	–	–	2NC

Grip Switches

Series	HE1G	HE1G-L	HE2G	HE5B Housing
Appearance				
Page	406	410	413	417
Description	Grip Switch	Light Force Grip Switch	Compact, Ergonomic Grip Switch	Grip switch housing for HE5B
Maximum Contacts	DPDT, 1NC/DPDT, 2NC	DPDT, 1NC/DPDT, 2NC	DPDT	DPDT
Options	E Stop or Push Button	E Stop or Push Button	E Stop, Push Button, Key Switch, Pilot Light	–

Application Example



HE1B Basic Enabling Switch

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Key features:

- 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
- Positive action contacts “On” (pos. 2) to “Off” (pos. 3) ensure no contact welding (per EN60947-5-1 / IEC60947-5-1)
- Contacts will not close when released from “Off” (pos. 3) to “Off” (pos. 1) (per IEC60204-1; 9.2.5.8)
- Small and lightweight



Part Numbers

Item	Installation	Part Number
	Side	HE1B-M1
	Front	HE1B-M1N



Specifications

Conforming to Standards		UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized), IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Operating Temperature		–25 to +60°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Storage Temperature		–40 to +80°C (no freezing)
Pollution Degree		2
Initial Contact Resistance		50mΩ maximum
Insulation Resistance		100MΩ minimum
Impulse Withstand Voltage		2.5kV
Operating Frequency		1200 operations/hour
Mechanical Life		Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life		100,000 operations minimum at rated load
Shock Resistance	Operating Extremes	150m/s ² (15G)
	Damage Limits	1000m/s ² (100G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Terminal		Solder Terminal
Recommended Wire Size		0.5mm ² maximum / 1 line (20AWG)
Solder Heat Resistance		260°C / 3 seconds maximum
Terminal Pulling Strength		20N minimum
Recommended Screw Torque		HE1B-M1: M3 screw / 0.5 to 0.8Nm
Degree of Protection		IP40 (IEC 60529) excluding terminal part
Conditional Short-Circuit Current		50A (250V)
Recommended Short Circuit Protection		250V, 10A fast blow fuse (IEC 60127-1)
Circuit Opening Force		30N minimum (position 2→3)
Control Resistance (Operating)		250N minimum
Weight		Approx. 6g

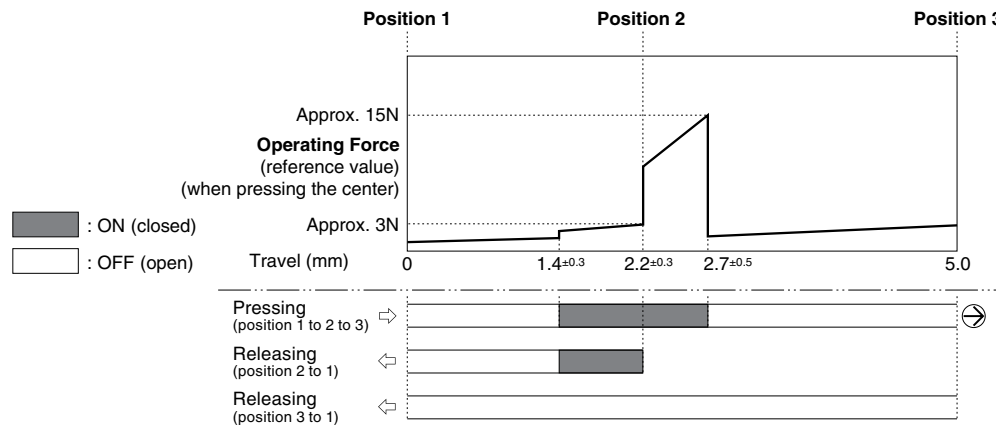
Current Ratings

Rated Insulation Voltage (Ui)			AC / DC250V		
Thermal Current (Ith)			5A		
Rated Operating Voltage (Ue)			30V	125V	250V
Rated Operating Current (Ie)	AC 50/60Hz	Resistive Load (AC-12)	—	3A	1.5A
		Inductive Load (AC-15)	—	1.5A	0.75A
	DC	Resistive Load (DC-12)	2A	0.4A	0.2A
		Inductive Load (DC-13)	1A	0.22A	0.1A
Contact Configuration			SPST-NO three position (OFF-ON-OFF)		



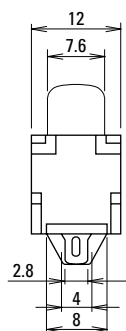
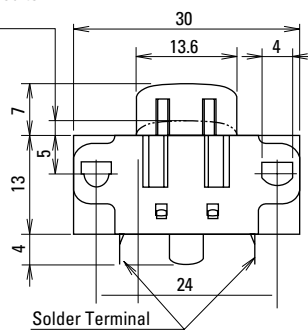
Minimum applicable load: AC/DC3V • 5mA (For reference only).

Operating Characteristics



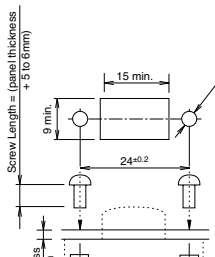
Dimensions (mm)

When pressed to position 3: 2



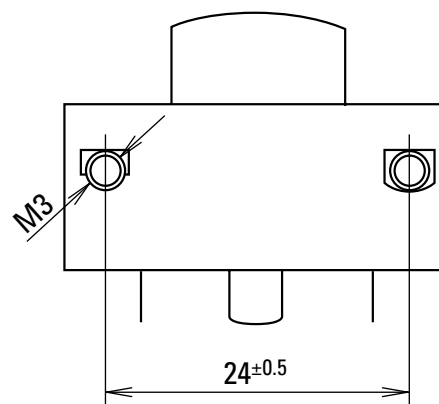
HE1B-M1 (Side Mounting)

1. M3 Screw (not provided)
2. Thread built in



HE1B-M1N (Front Mounting)

1. M3 Screw (not provided)
2. Locking nut (2 pcs) included

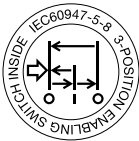


When using a panel thicker than 2mm, the button will be lower than the surface of the panel

HE2B Redundant (Double) Basic Enabling Switch

Key features:

- 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)



Part Numbers

Style		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
	Yellow	2	0	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
	Gray	2	0	0	HE2B-M200PN1
		2	1	1	HE2B-M211PN1
		2	2	2	HE2B-M222PN1

Accessories
Replacement Rubber Cover

Apperance	Color	Part Number	Material
	Yellow	HE9Z-D2Y	Silicon Rubber
	Black	HE9Z-D2B	
	Gray	HE9Z-D2N1	NBR/PVC Polyblend

Specifications

Conforming to Standards		UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized), IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Application Standards		ISO 12100-1, -2, EN 12100-1, 2 / EN 292, IEC 60204-1 / EN 60204-1 ISO11161 / prEN 11161, ISO10218 / EN 775, ANSI / RIA R15.06, ANSI B11.19
Operating Temperature		-25 to +60°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Storage Temperature		-40 to +80°C (no freezing)
Pollution Degree		2 (inside of panel/contact side) 3 (outside of panel/operating side)
Contact Resistance		50mΩ maximum
Insulation Resistance		Between live and dead metal parts: 100MΩ maximum Between positive and negative live parts: 100MΩ minimum
Impulse Withstand Voltage		2.5kV
Operating Frequency		1200 operations/hour
Mechanical Life		Position 1→2: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life		100,000 (at full rated load)
Shock Resistance	Operating Extremes	150m/s ² (15 G)
	Damage Limits	1000m/s ² (100 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Terminal		0.110" quick connect / solder terminal
Recommended Wire Size		0.5mm ² maximum / 1 line (20AWG)
Solder Heat Resistance		310 ~ 350°C / 3 seconds maximum
Terminal Pulling Strength		20N minimum
Recommended Screw Torque		0.5 to 0.8Nm
Degree of Protection		with rubber cover: IP65, without rubber cover: IP40 (IEC 60529),
Conditional Short-Circuit Current		50A (250V)
Recommended Short Circuit Protection		250V/10A fast blow fuse (IEC 60127-1)
Circuit Opening Force		60N minimum (button return monitor & button push monitor)
Actuating Force (Operating)		500N minimum
Weight		Approx. 26g (without cover), 30g (with cover)

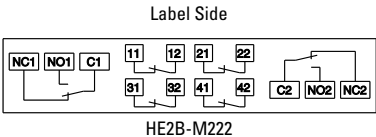
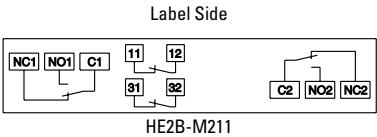
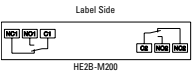
Contact Ratings

Rated Insulation Voltage (Ui)				250V		
Thermal Current (Ith)				3A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current (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	—
			Inductive Load (DC-13)	0.7A	0.1A	—
	Push/return Monitor Switch (NC Contacts)	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 (DPDT)		
		Return Monitor Switch		0 ~ 2 contacts (NC)		
		Push Monitor Switch		0 ~ 2 contacts (NC)		

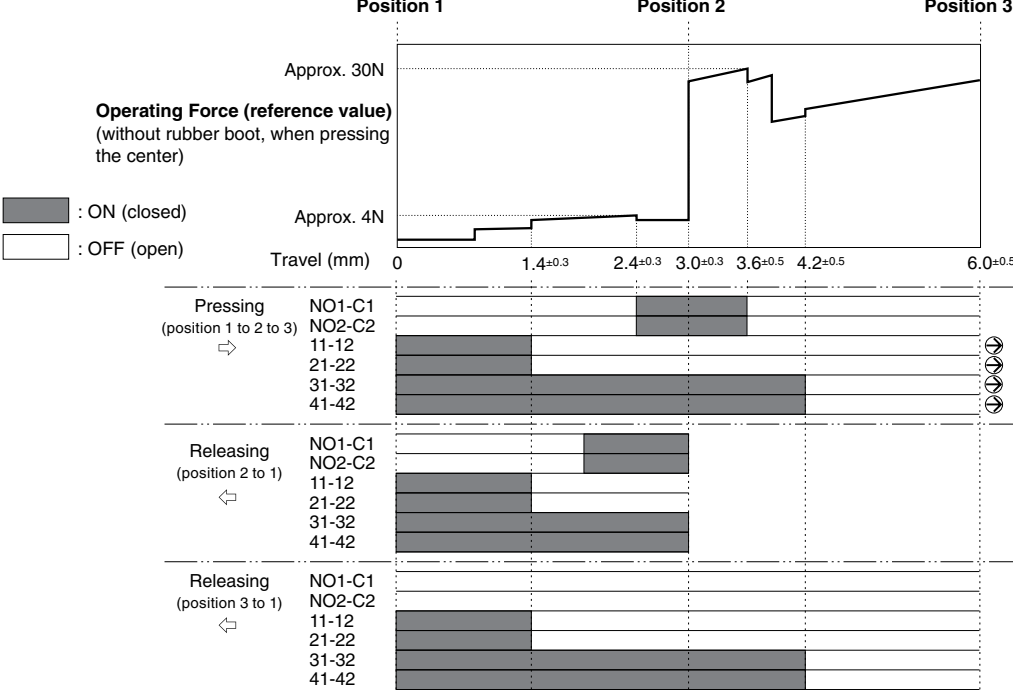


Minimum applicable load (reference) = AC/DC3V • 5mA (for reference only)

Circuit Diagrams
Terminal Circuit Diagrams (bottom view)

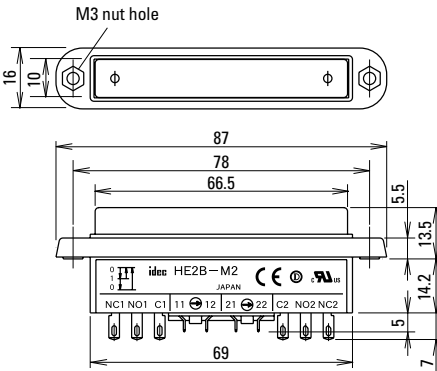


Operating Characteristics
Operating Characteristics (without rubber cover/center of button being pushed)

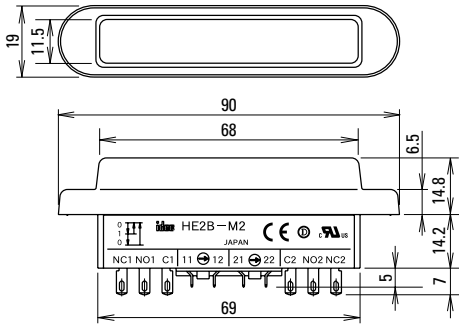


Using rubber boot will change the operating force depending on the operating temperature.

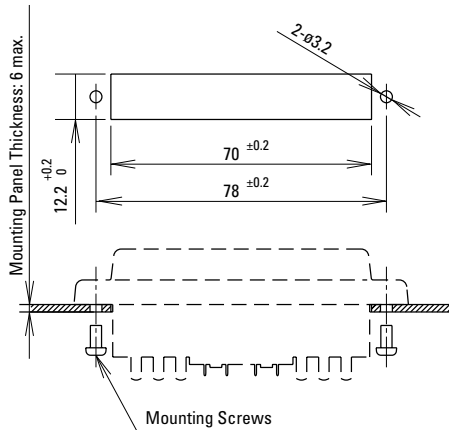
Dimensions (mm)
Without Rubber Cover



With Rubber Cover



Mounting Hole Layout



HE3B ø16mm Redundant Contact Switch

Key features:

- 3-position functionality (OFF – ON – OFF) as required for manual robotic control
- 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)
- Multiple contacts for enhanced reliability
- Snap acting contacts from position 1 to 2
- Available with or without rubber cover



Part Numbers


Style	Part Numbers	
	Without Rubber Cover	HE3B-M2
	Yellow	HE3B-M2PY
	Black	HE3B-M2PB
	Gray	HE3B-M2PN1

Accessories

Replacement Rubber Cover

Appearance	Color	Part Number	Material
	Yellow	HE9Z-D3Y	Silicon Rubber
	Black	HE9Z-D3B	
	Gray	HE9Z-D3N1	NBR/PVC polyblend

Lock Nut Tool

Appearance	Part Number	Material
	MT-001	Metal

Specifications

Conforming to Standards	UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized) IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Application Standards	ISO 12100-1, -2, EN 12100-1, 2, IEC 60204-1 / EN 60204-1 ISO 11161 / prEN 11161, ISO 10218 / EN 775 ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	–25 to +60°C (no freezing)
Operating Humidity	45 to 85% RH maximum (no condensation)
Storage Temperature	–40 to +80°C (no freezing)
Pollution Degree	2 (inside panel, terminal side) 3 (outside panel, operator side)
Contact Resistance	50mΩ maximum
Insulation Resistance	Between live & dead metal parts: 100MΩ maximum
	Between positive & negative live parts: 100MΩ minimum
Impulse Withstand Voltage	1.5kV
Operating Frequency	1200 operations/hour
Mechanical Life	Position 1→2→1: 1,000,000 operations minimum
	Position 1→2→3→1: 100,000 operations minimum

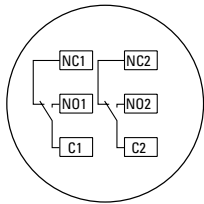
Specifications con't

Electrical Life		100,000 operations minimum at rated load
Shock Resistance	Operating Extremes	150m/s² (15 G)
	Damage Limits	500m/s² (50 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, applitude 0.5mm minimum
	Damage Limits	16.7Hz, applitude 1.5mm minimum
Terminal		0.110" quick connect / solder terminal
Recommended Wire Size		0.5mm² maximum / 1 line (20AWG)
Solder Heat Resistance		310 ~ 350°C / 3 seconds maximum
Terminal Pulling Strength		20N minimum
Recommended Screw Torque		0.68 to 0.88Nm
Degree of Protection		with rubber cover: IP65, without rubber cover: IP40 (IEC 60529)
Conditional Short-Circuit Current		50A (125V)
Recommended Short Circuit Protection		125V/10A fast blow fuse (IEC 60127-1)
Circuit Opening Force		500N minimum
Weight		without rubber cover - Approx. 14g with rubber cover - Approx. 18g

Contact Ratings

Rated Insulation Voltage (Ui)			125V	
Thermal Current (Ith)			3A	
Rated Operating Voltage (Ue)			30V	125V
Rated Operating Current (Ie)	AC	Resistive Load (AC-12)	—	1A
		Inductive Load (AC-15)	—	0.7A
	DC	Resistive Load (DC-12)	1A	0.2A
		Inductive Load (DC-13)	0.7A	0.1A
Contact Configuration			2 contacts (DPDT)	
Minimum Applicable Load			AC/DC5V 1mA reference	

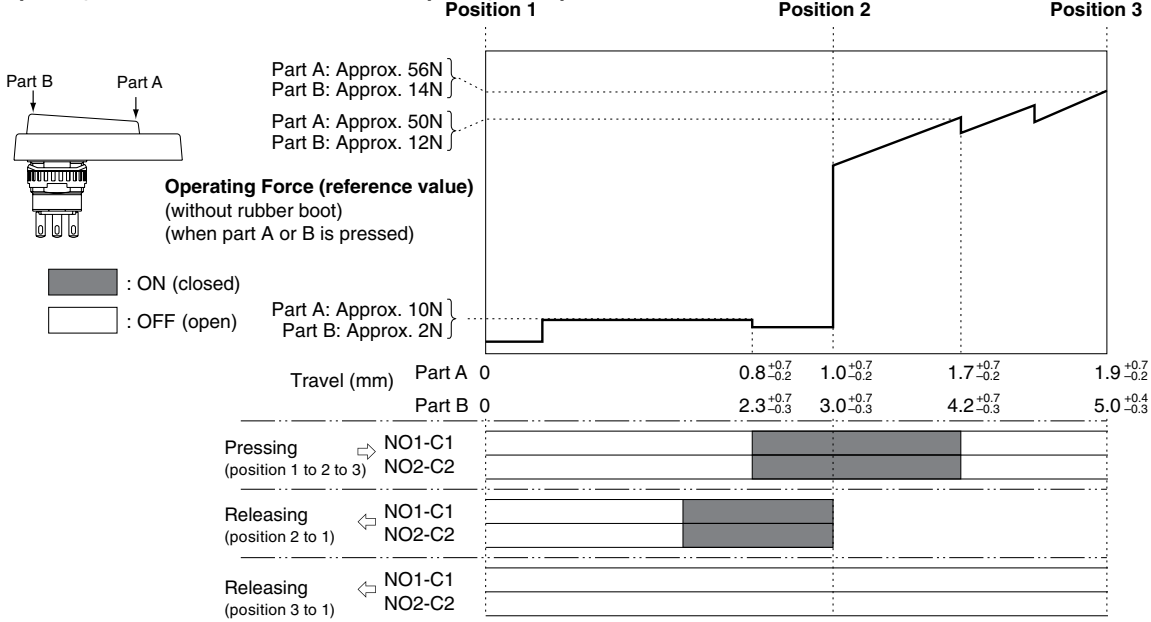
Circuit Diagrams
Terminal Circuit Diagrams (bottom view)



1. 3 position switch: 2 contacts, terminal no. = between NO1-C1, between NO2-C2
2. Use between NO-C for OFF→On→ OFF 3 position switch (NC is not used).

Operating Characteristics

Operating Characteristics (without rubber cover/pushing button part A and B)

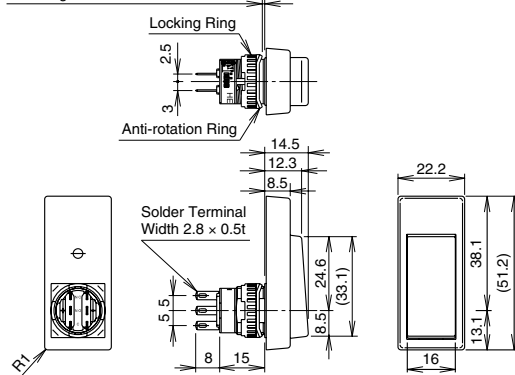


Using rubber boot will change the operating force depending on the operating temperature.

Dimensions (mm)

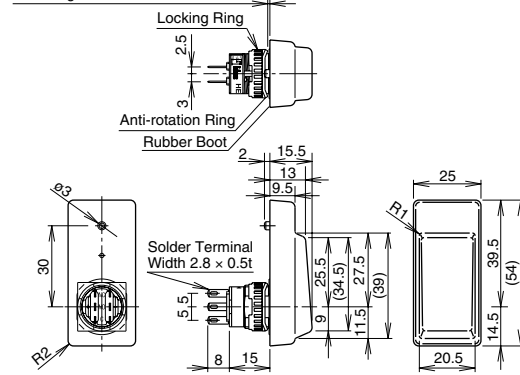
Without Rubber Cover

Mounting Panel Thickness: 0.5 to 4



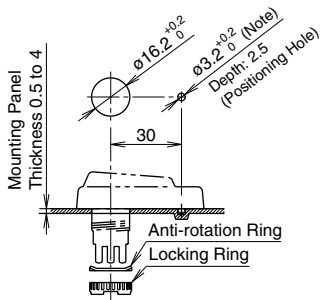
With Rubber Cover

Mounting Panel Thickness: 0.5 to 4



All dimensions in mm.

Mounting Hole Layout



1. Recommended Lock Nut Torque: 0.68 to 0.88Nm.
2. Use a lock nut tool to screw on the lock nut (see page 397).
3. To retain the switches waterproof performance, do not penetrate the rubber cover.
4. Remove the rubber cover projection if you do not want a positioning hole. (Do not penetrate the rubber cover).

HE5B ø16mm Redundant Contact Pushbutton Enabling Switch


Key features:

- Ergonomically-designed OFF-ON-OFF 3-position operation
- Easy recognition of position 1 → 2 transition, made possible by snap action switch
- Sufficient load difference is provided for shifting from position 2 → 3
- Light force needed to maintain position 2, so that operators can easily use the enabling switch
- The switch does not turn ON when being released from position 3 (OFF when pressed) to position 1 (OFF when released) (IEC60204-1, 9.2.5.8)
- Two contacts are provided for safety
- IP65 (using the waterproof rubber cover)
- Mounts in a 16mm (5/8") round hole




Part Numbers


Style	Color	Part Number
	Yellow	HE5B-M2PY
	Black	HE5B-M2PB
	Gray	HE5B-M2PN1

 NBR/PVC cover comes in gray only.

Accessories
Replacement Rubber Cover

Appearance	Part Number	Material
	Silicon Rubber	Yellow HE9Z-D5Y
		Black HE9Z-D5B
	NBR/PVC Polyblend	Gray HE9Z-D5N1

Lock Nut Tool

Appearance	Part Number	Material
	MT-001	Metal

Grip Housing

Appearance	Part Number
	HE9Z-GSH51

See page 417 for more information.

Specifications

Conforming to Standards	UL508 (UL recognized), CSA C22.2, No. 14 (c-UL recognized) IEC/EN 60947-5-1, IEC/EN 60947-5-8 (TÜV approval)
Application Standards	ISO 12100-1, -2, EN 12100-1, 2 / EN292, IEC 60204-1 / EN 60204-1, ISO 11161 / prEN 11161, ISO 10218 / EN 775, ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	Silicon rubber boot: -25 to 60°C (no freezing) NBR/PVC Polyblend rubber boot: -10 to 60°C (no freezing)
Relative Humidity	45 to 85% RH (no condensation)
Storage Temperature	-40 to +80°C (no freezing)
Operating Environment	Degree of pollution: 2 (panel inside/terminal side) Degree of pollution: 3 (panel outside/operator side)
Contact Resistance	50 mΩ maximum (initial value)
Insulation Resistance (DC megger)	Between live and dead metal parts: 100 MΩ minimum Between terminals of different pole: 100 MΩ minimum
Impulse Withstand Voltage	1.5 kV

Specifications con't

Operating Frequency	1200 operations per hour
Mechanical Life	Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
Electrical Life	100,000 operations minimum
Shock Resistance	Operating extremes: 150 m/s ² (15 G) Damage limits: 500 m/s ² (50 G)
Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5 mm minimum Damage limits: 5 to 55 Hz, amplitude 0.5 mm minimum
Terminal Style	Solder Terminal
Recommended Wire Size	0.5 mm ² maximum per line (20AWG)
Solder Heat Resistance	310 ~ 350°C, 3 seconds maximum
Terminal Pulling Strength	20 N minimum
Recommended Tightening Torque of Locking Ring	0.29 to 0.49 N·m
Degree of Protection	IP65
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast acting type fuse for short circuit protection.)
Operator Strength	250N minimum (when pressing the entire surface of the operator)
Weight (approx.)	9 g

Current Ratings

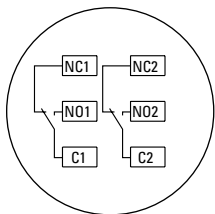
Rated Insulation Voltage (Ui)			125V	
Thermal Current (Ith)			3A	
Rated Operating Voltage (Ue)			30V	125V
Rated Operating Current (Ie)	AC	Resistive Load (AC-12)	—	0.5A
		Inductive Load (AC-15)	—	0.3A
	DC	Resistive Load (DC-12)	1A	—
		Inductive Load (DC-13)	0.7A	—
Contact Configuration			2 contacts (DPDT)	



Minimum applicable load (reference): 5V AC/DC, 5mA.

Circuit Diagrams

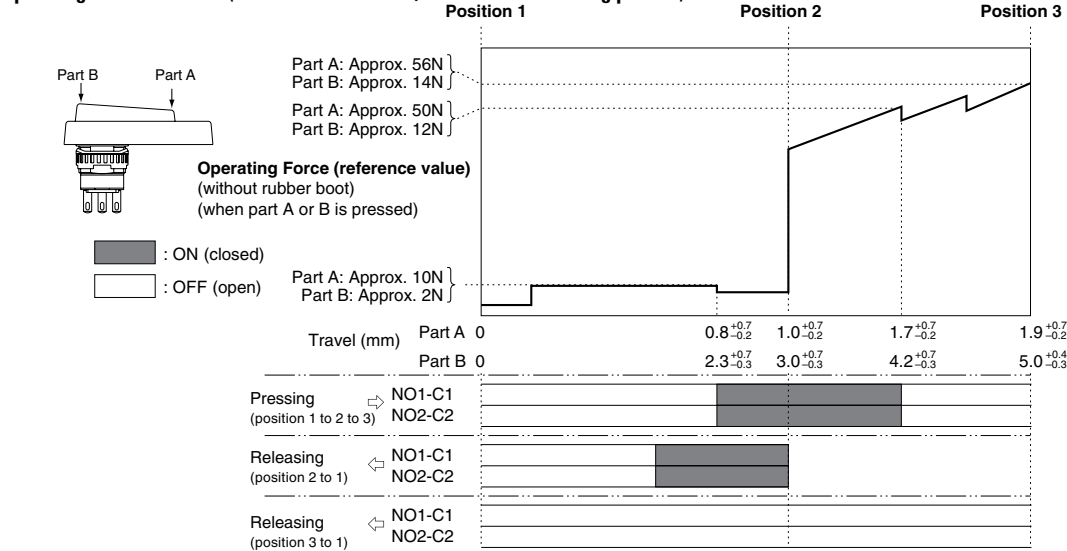
Terminal Arrangement (Bottom View)



1. 3 position switch: 2 contacts, terminal no. = between NO1-C1, between NO2-C2
2. Use between NO-C for OFF→On→OFF 3 position switch (NC is not used).

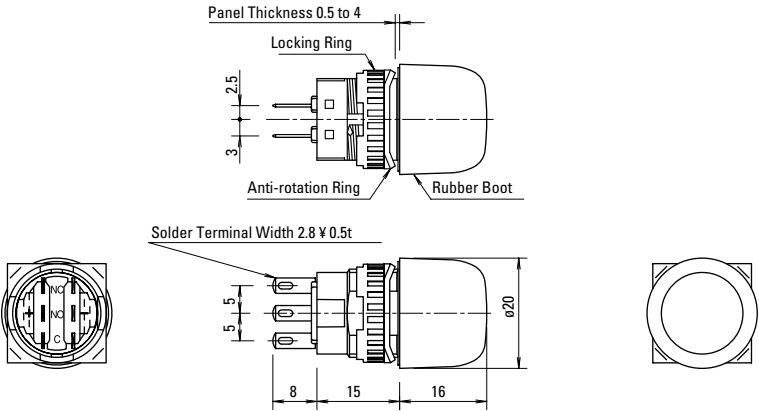
Operating Characteristics

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

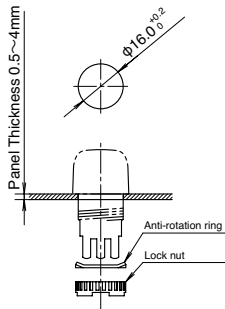


Operating load depends on ambient temperature.

Dimensions (mm)
With Rubber Cover



Mounting Hole Layout



1. Recommended tightening torque for Locking Ring: 0.29 to 0.49 N·mm.
2. Use a lock nut tool to screw on the lock nut (see page 400).

HE6B Enabling Switch

Key features:

- Ergonomically-designed OFF-ON-OFF operation.
- The switch does not turn ON while returning from position 3 (OFF) to position 1 (OFF)
- IEC 60204-1 (2005), 10.9
- IEC 60947-5-8 (2006), 7.1.9*
- Some teach pendants are equipped with two 3-position enabling switches, and when one switch is pressed to position 3 (OFF), the other switch must not enable machine operation even when pressed to position 2. Machine operation can resume after both switches are released. The monitoring switches monitor the OFF status of the 3-position enabling switch, whether the button is returned to position 1 or the button is pressed to position 3 (monitor switches have direct opening action mechanism.)
- Two contacts are provided in a 3-position enabling switch so that even if one contact fails, the other contact will still disable machine operation.
- The waterproof rubber boot provides IP65 protection.



* IEC 60947-5-8 Control circuit devices and switching elements – Three-position enabling switches



Part Numbers

Model	Contact Configuration/No. of Contacts			Color	Part Number
	3-position Switch	Button Return Monitor Switch	Button Depress Monitor Switch		
	2	0	0	Yellow	HE6B-M200Y
				Black	HE6B-M200B
	2	1	1	Yellow	HE6B-M211Y
				Black	HE6B-M211B

Accessories

Replacement Rubber Cover

Appearance	Color	Part Number	Material
	Yellow	HE9Z-D6Y	Silicon Rubber
	Black	HE9Z-D6B	

Specifications

Overview	Conforming to Standards	IEC 60947-5-1/EN60947-5-1 IEC 60947-5-8/EN60947-5-8 (TÜV approved) GS-ET-22 (TÜV approved) UL508 (UL recognized) CSA C22.2 No.14 (c-UL recognized)
	Application 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 B 11.19 ISO 13849-1/EN ISO 13849-1
XW Series E-Stops	Operating Temperature	–25 to +60°C (no freezing)
	Relative Humidity	45 to 85% RH (no condensation)
	Storage Temperature	–40 to +80°C (no freezing)
Interlock Switches	Pollution Degree	2 (inside panel, terminal side) 3 (outside panel, operator side)
	Contact Resistance	50mΩ maximum (initial value)
	Insulation Resistance	Between live and dead metal parts: 100MΩ minimum (500V DC megger) Between terminals of different poles: 10 MΩ minimum (500V DC megger)
	Impulse Withstand Voltage	1.5kV (3 position switch) 2.5kV (monitor switch)
	Operating Frequency	1200 operations per hour
Enabling Switches	Mechanical Life	Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum
	Electrical Life	100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA)
	Shock Resistance	Operating extremes: 150m/s ² (15G) Damage limits: 500m/s ² (50G)
	Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5mm Damage limits: 16.7Hz, amplitude 1.5mm
	Terminal Style	Solder terminal
Safety Control Relays	Applicable Wire Size	1 cable, 0.5mm ² maximum (20AWG wire)
	Solder Terminal Heat Resistance	310 to 350°C, 3 seconds maximum
	Terminal Tensile Strength	20N minimum
	Locking Ring Recommended Tightening Torque	0.5 to 0.8N-m
	Degree of Protection	IP65 (IEC 60529)
Light Curtains	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 (button release monitor and button depress monitor switches)
	Direct Opening Stroke (when pressing the entire button surface)	0.9mm minimum (button return monitor switch) 4.0mm minimum (button depress monitor switch)
	Operator Strength	250N minimum (when pressing the entire button surface)
	Weight (approx.)	17g

Current 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	—	—
	Button return monitor switch Button 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		
		Button return monitor switch		0 or 1 contact		
		Button depress monitor switch		0 or 1 contact		

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

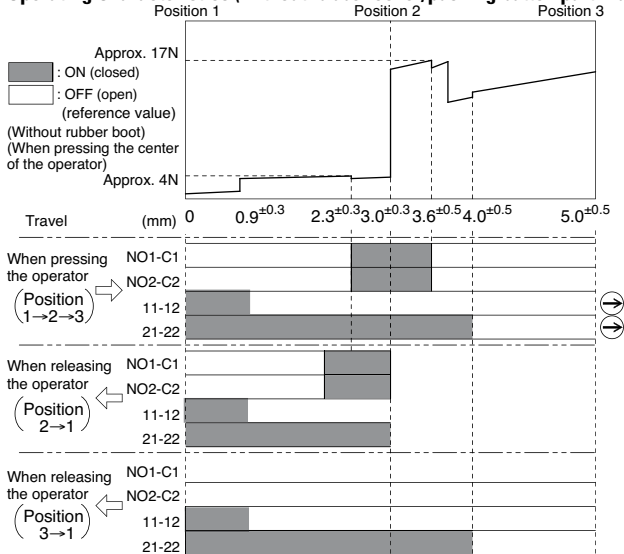
UL ratings:
3-position switch:
125V AC/0.5A (Resistive)
30V DC/1A (Resistive)
Monitor switch:
250V AC/0.5A (General use)
30V DC/1A (General use)



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

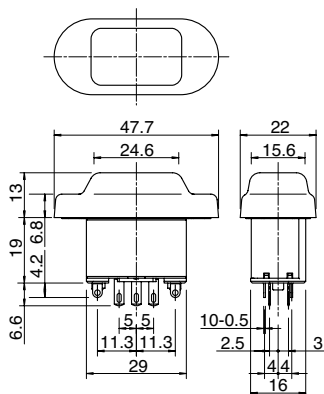
Operating Characteristics

Operating Characteristics (without rubber cover/pushing button part A and B)

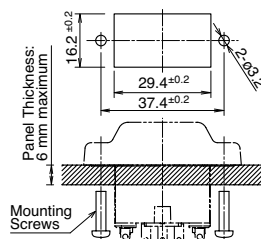


Notes: When a rubber boot is used, the operating force depends on the operating temperature.

Dimensions (mm)

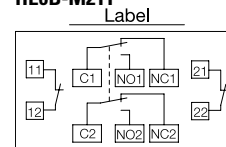


Mounting Hole Layout



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

Terminal Arrangement (bottom view) HE6B-M211



3-position switch 2 contacts¹
Button return monitor switch: 1 contact, terminals 11-12
Button depress monitor switch: 1 contact, terminals 21-22
There are no terminals 11-22 and 21-22 for HE6B-M200 type.
¹Use NO and C terminals for OFF → ON → OFF 3-position switch
(NC terminal is not used.)

HE1G Basic Grip Enabling Switch

Key features:

- 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



Part Numbers

Contact Configuration			Rubber Boot	Part No.
3-position Switch	Monitor Switch	Pushbutton		
2 contacts	With (1NC)	—	Silicon Rubber / yellow	HE1G-21SM
		—	NBR/PVC Polyblend / gray	HE1G-21SM-1N
	Without	Momentary Pushbutton (1NO) (1NO: AB6M-M1PB)	Silicon Rubber / yellow	HE1G-21SMB
		—	NBR/PVC Polyblend / gray	HE1G-21SMB-1N
		Emergency Stop Switch (2NC) (2NC: HA1E-V2S2R)	Silicon Rubber / yellow	HE1G-20ME
		—	NBR/PVC Polyblend / gray	HE1G-20ME-1N
		Momentary Pushbutton (2NO) (2NO: AB6M-M2PB)	Silicon Rubber / yellow	HE1G-20MB
		—	NBR/PVC Polyblend / gray	HE1G-20MB-1N

Accessories

Replacement Rubber Cover

Appearance	Part Number	Material	Color
	HE9Z-GBK1	Silicon Rubber	Yellow
	HE9Z-GBK1-1N	NBR/PVC	Gray

Mounting Plate (secures grip switch)

Appearance	Part Number	Material
	HE9Z-GH1	Metal

Specifications

Conforming to Standards	UL508 (UL listed), CSA C22.2, No. 14 (c-UL listed), IEC/EN 60947-5-1 (TÜV/BG approval), GS-ET-22 (TÜV/BG approval)
Applicable Standards	ISO 12100-1, -2, EN12100-1, -2, IEC 60204-1 / EN 60204-1, ISO11161 / prEN11161, ISO 10218 / EN 775, ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	–25 to +60°C (no freezing)
Operating Humidity	45 to 85% RH maximum (no condensation)
Storage Temperature	–40 to +80°C (no freezing)
Pollution Degree	3
Contact Resistance	100mΩ maximum
Insulation Resistance	Between live & dead metal parts: 100MΩ maximum Between positive & negative live parts: 100MΩ minimum

Specifications con't

Impulse Withstand Voltage		2.5kV
Operating Frequency		1200 operations/hour
Mechanical Life		Position 1→2→1: 1,000,000 operations minimum
		Position 1→2→3→1: 100,000 operations minimum
Electrical Life		100,000 minimum at rated load
Shock Resistance	Operating Extremes	150m/s ² (15 G)
	Damage Limits	1000m/s ² (100 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Recommend Wire Size		0.14 to 1.5mm ² (24AWG - 16AWG)
Recommend Cable Size		ø7 to 13mm
Conduit Size		M20
Terminal Pulling Strength		20N minimum
Terminal Screw Torque		0.5 to 0.6Nm
Degree of Protection		HE1G-21SM: IP66, HE1G-20MB: IP65
		HE1G-20ME: IP65, HE1G-21SMB: IP65
Conditional Short Circuit Current		50A (250V)
Recommended Short Circuit Protection		250V/10A fast blow fuse (IEC 60127-1)
Weight (approx.)		HE1G-21SM: 210g
		HE1G-20ME: 250g
		HE1G-20MB/HE1G-21SMB: 220g

Contact Ratings

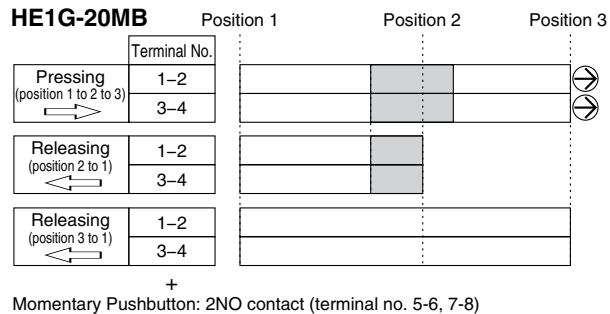
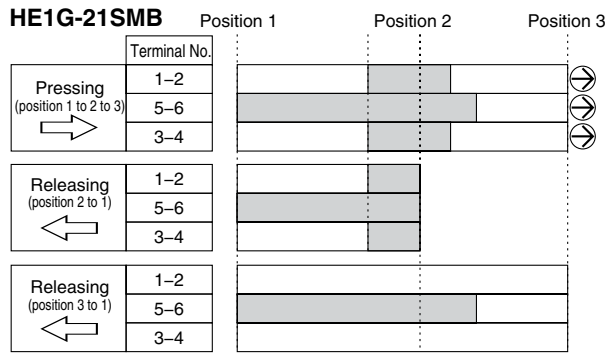
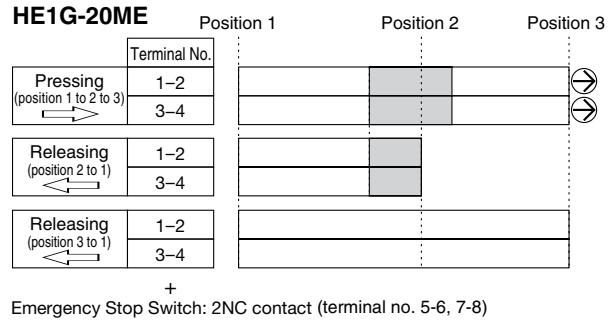
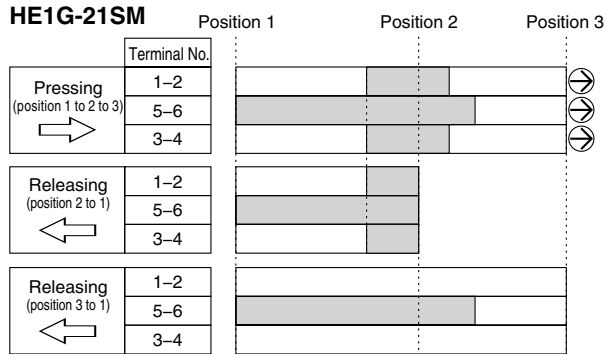
Rated Insulation Voltage (Ui)				250V		
Thermal Current (Ith)				3A		
Rated Operating Voltage (Ue)				30V	125V	250V
Rated Operating Current (Ie)	3 Position Switch (Terminal No.1-2, 3-4)	AC	Resistive Load (AC-12)	—	3A	1.5A
			Inductive Load (AC-15)	—	1.5A	0.75A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Monitor Switch (Terminal No. 5-6 of HE1G-21SM)	AC	Resistive Load (AC-12)	—	2A	1A
			Inductive Load (AC-15)	—	1A	0.5A
		DC	Resistive Load (DC-12)	2A	0.4A	0.2A
			Inductive Load (DC-13)	1A	0.22A	0.1A
	Emergency Stop Pushbutton (Terminal No. 5-6, 7-8 of HE1G-20ME)	AC	Resistive Load (AC-12)	—	—	—
			Inductive Load (AC-15)	—	—	0.5A
		DC	Resistive Load (DC-12)	—	—	—
			Inductive Load (DC-13)	—	—	0.1A
Contact Configuration		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).

Operating Characteristics

Contact Movement



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

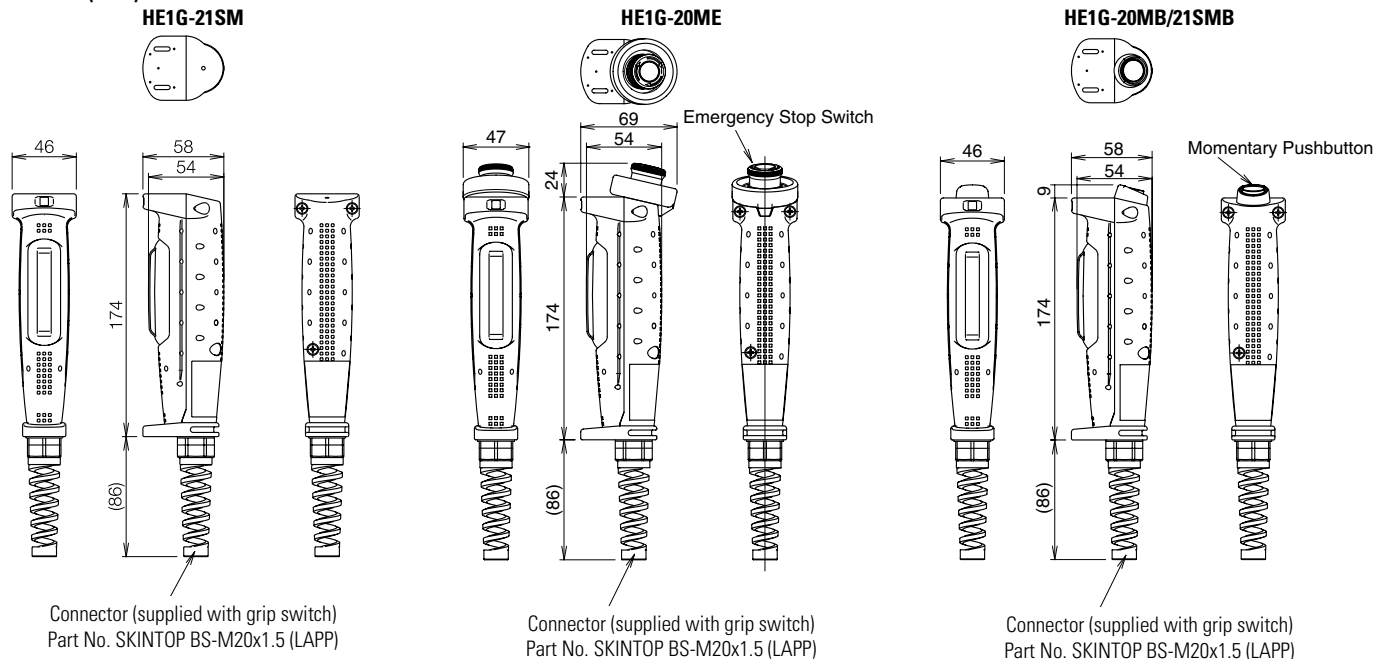
■ : contact ON (closed) □ : contact OFF (open)



Notes:

1. 3-position switches operate with direct opening action ⤴ when shifting from position 2 to position 3.
2. For the output of the enabling device, use terminals 1-2 and 3-4.
3. The above operation characteristics show when the center of the button is pressed. Pressing the edge of a button turns on one contact earlier than the other contact, causing a delay in operation.

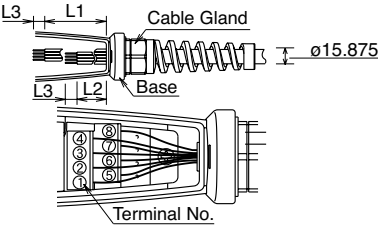
Dimensions (mm)



Wiring Precautions
HE1G

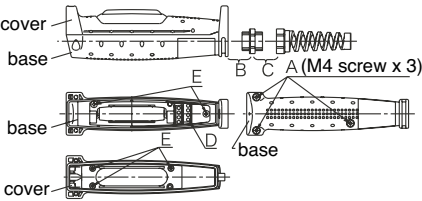
- Wire Stripping Information

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 1.5mm² (24 - 16AWG, one wire per terminal)

- Recommended Torque



	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	

HE1G-L Light Force Grip Enabling Switch

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

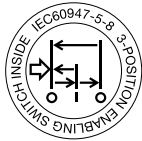
Safety Control Relays

Light Curtains

AS-Interface Safety at Work

Key features:

- 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
- Distinctive tactile feedback when shifting to position 2 (enabling position)
- Lighter operating force to on position





Variation

In addition to a monitoring switch, the HE1G grip switch is also available with an emergency stop switch or a momentary pushbutton. Screw terminal and wire-saving internal connector models can be selected.

Part Numbers

Contact Configuration			Rubber Boot	Part Numbers	
3-position Switch	Monitor Switch	Additional Pushbutton Switch		Screw Terminals	Internal Connector
2 contacts	With (1NC)	Without	Yellow ¹	HE1G-L21SM	HE1G-L21SMC
			Gray ²	HE1G-L21SM-1N	HE1G-L21SMC-1N
		Momentary Pushbutton Switch (1NO: AB6M-M1PB)	Yellow ¹	HE1G-L21SMB	HE1G-L21SMCB
			Gray ²	HE1G-L21SMB-1N	HE1G-L21SMCB-1N
	Without	Emergency Stop Switch (2NC: HA1E-V2S2R)	Yellow ¹	HE1G-L20ME	HE1G-L20MCE
			Gray ²	HE1G-L20ME-1N	HE1G-L20MCE-1N
		Momentary Pushbutton Switch (2NO: AB6M-M2PB)	Yellow ¹	HE1G-L20MB	HE1G-L20MCB
			Gray ²	HE1G-L20MB-1N	HE1G-L20MCB-1N

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

Specifications

Applicable Standards	UL508 (UL listed, screw terminal only) CSA C22.2, No. 14 (c-UL listed, screw terminal only) IEC/EN 60947-5-1 (TÜV/BG approval) GS-ET-22 (TÜV/BG approval)
Applicable Standards for Use	ISO 12100-1, -2, IEC 60204-1/EN 60204-1, ISO11161 / prEN11161, ISO 10218 / EN 775, ANSI/RIA R15.06, ANSI B11.19
Operating Temperature	Silicon rubber boot: -25 to 60°C (no freezing) NBR/PVC Polyblend rubber boot: -10 to 60°C (no freezing)
Relative Humidity	45 to 85% (no condensation)
Storage Temperature	-40 to +80°C (no freezing)
Pollution Degree	3
Contact Resistance	100 mΩ maximum (initial value)
Insulation Resistance	Between live and dead metal parts: 100 MΩ minimum (500V DC megger) Between terminals of different pole: 100 MΩ minimum (500V DC megger)
Impulse Withstand Voltage	Screw terminal: 2.5 kV (momentary pushbuttons: 1.5 kV) Internal connector: 1.5 kV
Electric Shock Protection Class	Class II (IEC 61140)
Operating Frequency	1,200 operations per hour
Mechanical Life	Position 1 → 2 → 1: 1,000,000 operations minimum Position 1 → 2 → 3 → 1: 100,000 operations minimum
Electrical Life	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: 1,000 m/s ²
Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5 mm minimum Damage limits: 16.7 Hz, amplitude 1.5 mm minimum
Applicable Wire Size	Screw terminal: 0.14 to 1.5 mm ² (AWG16 to 24) Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30)
Applicable Cable	Outside diameter ø7 to 13 mm
Conduit Port Size	M20 (cable gland is supplied with the grip style enabling switch)
Terminal Tensile Strength	20N minimum
Terminal Screw Tightening Torque	0.5 to 0.6 N·m
Degree of Protection	HE1G-L21SM: IP66 (IEC 60529) HE1G-L20ME: IP65 (IEC 60529) HE1G-L20MB: IP65 (IEC 60529) HE1G-L21SMB: IP65 (IEC 60529)
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast-blow fuse for short circuit protection.)
Direct Opening Force	70N minimum (monitor switch)
Operator Strength	500N minimum (when pressing the entire button surface)
Weight (approx.)	HE1G-L21SMC: 190g HE1G-L21SM/L21SMCB/L20MCB: 200g HE1G-L21SMB/L20MB: 210g HE1G-L20MCE: 230g HE1G-L20ME: 240g



See grip switch catalog for complete list of specifications.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches


Safety Control Relays

Light Curtains

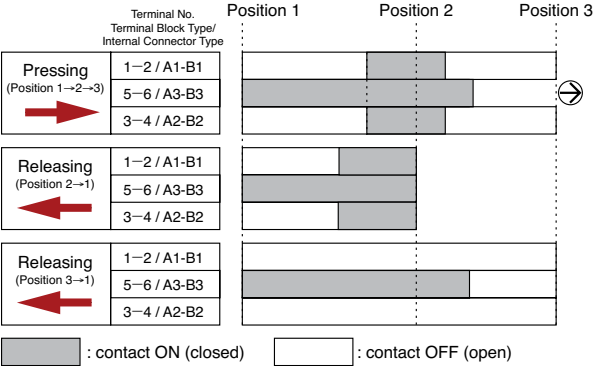
AS-Interface Safety at Work

Contact Ratings

Rated Insulation Voltage (Ui)					250V (momentary pushbutton: 125V)		
Rated Thermal Current (Ith)					2.5A (Note)		
Rated Voltage (Ue)					30V	125V	250V
Rated Current (Ie)	Grip Style Enabling Switch	3-position Switch (Terminal No.1-2/A1-B1,3-4/A2-B2)	AC	Resistive Load (AC-12)	—	1A	0.5A
				Inductive Load (AC-15)	—	0.7A	0.5A
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—
		Monitor Switch (HE1G-L21SM/ HE1G-L21SMB, Terminal No.5-6/A3-B3)	AC	Resistive Load (AC-12)	—	2A	1A
				Inductive Load (AC-15)	—	1A	0.5A
			DC	Resistive Load (DC-12)	2.5A	1.1A	0.55A
				Inductive Load (DC-13)	2.3A	0.55A	0.27A
	Pushbutton	Emergency Stop Switch (HE1G-L20M, Terminal No. 5-6/A3-B3, 7-8/A4-B4)	AC	Resistive Load (AC-12)	—	—	—
				Inductive Load (AC-15)	—	—	0.5A
			DC	Resistive Load (DC-12)	—	—	—
				Inductive Load (DC-13)	—	—	0.1A
		Momentary Pushbutton (HE1G-L20M, Terminal No.5-6/A3-B3,7-8/A4-B4) (HE1G-L21SM, Terminal No.7-8/A4-B4)	AC	Resistive Load (AC-12)	—	0.5A	—
				Inductive Load (AC-15)	—	0.3A	—
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—

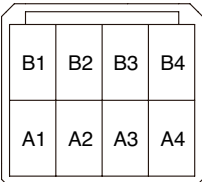
 Minimum applicable load (reference value): 3V AC/DC, 5 mA (Applicable range is subject to the operating conditions and load.)
Note: Operating temp. 40 to up to +50°C (not included): 2A (4 circuits) 50 to +60°C: 1.5A (3 or 4 circuits)

Operating Characteristics
HE1G-L21SM, HE1G-L21SMC,
HE1G-L21SM-1N, HE1G-L21SMC-1N



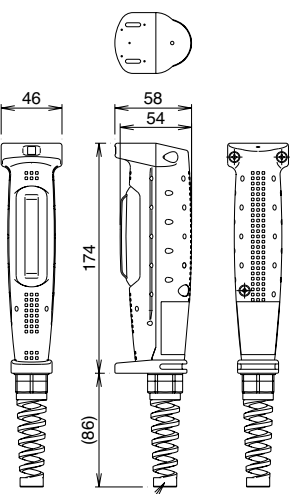
Terminals 1-2/A1-B1 and 3-4/A2-B2 are outputs of the 3-position enabling switch.
Terminals 5-6/A3-B3 are outputs of the monitor switch.
The above operation characteristics show when the center of the grip switch button is pressed. Because two contacts are designed to operate independently, pressing the edge of the 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.

Internal Connector Terminal No.



Connector
Tyco Electronics D-1200D series
Receptacle housing: 1-1827864-4
Receptacle contact
1827586-2: AWG28 to 30
(Hand tool: 1762952-1)
1827587-2: AWG22 to 28
(Hand tool: 1762846-1)
1827588-2: AWG22 to 28
(Hand tool: 1762950-1)
1827589-2: AWG18 to 22
(Hand tool: 1762625-1)

Dimensions (mm)
HE1G-L21SM, HE1G-L21SMC,
HE1G-L21SM-1N, HE1G-L21SMC-1N

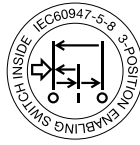


Cable Gland (supplied with grip switch)
Type No.: SKINTOP BS-M20 × 1.5 (LAPP)

HE2G Compact Grip Enabling Switch

Key features:

- New compact, light-weight grip switch provides a comfortable hold
- Compact design fits comfortably in the hand
- Light operating force ensures worry-free operation
- 3-position switch with distinctive tactile feedback
- Dual enabling contacts ensure a high level of safety



Part Numbers

Additional Control Units		Rubber Boot Color	Solder Terminal	Internal Connector
None		Yellow	HE2G-21SH	HE2G-21SC
		Gray	HE2G-21SH-1N	HE2G-21SC-1N
Estop		Yellow	HE2G-21SHE	—
Estop and Green Pilot Light			HE2G-21SHE-P-0	
Two Momentary Pushbuttons			HE2G-21SH-L-L	
E-Stop and Two Momentary Pushbuttons			HE2G-21SHE-L-L	HE2G-21SCE-L-L
E-Stop, Momentary Pushbutton and Key Switch			HE2G-21SHE-L-K	HE2G-21SCE-L-K



1. Additional control units installed on the HE2G are as follows:
 Emergency Stop Switch: XA1E-BV3U02R
 Momentary Pushbutton: AB6M-M2PLW
 Key Selector Switch: AS6M-2KT2PA Pilot Light: UP9P-2498G

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

Specifications

Overview	Applicable Standards	UL508 (UL recognition) CSA C22.2, No. 14 (c-UL recognition) IEC/EN 60947-5-1 (TÜV) GS-ET-22 (TÜV approval)
	Applicable Standards for Use	ISO 12100-1, -2 IEC 60204-1/EN 60204-1 ISO11161 / prEN11161 ISO 10218 / EN 775 ANSI/RIA R15.06 ANSI B11.19
XW Series E-Stops	Operating Temperature	Silicon rubber boot: -25 to 60°C (no freezing) NBR/PVC Polyblend rubber boot: -10 to 60°C (no freezing)
	Relative Humidity	45 to 85% (no condensation)
	Storage Temperature	-40 to +80°C (no freezing)
	Pollution Degree	3
Interlock Switches	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 pole: 100 MΩ minimum (500V DC megger)
	Impulse Withstand Voltage	(Solder terminal) Grip style enabling switch/emergency stop switch: 2.5 kV Momentary pushbutton/key selector switch: 1.5 kV Pilot light: 500V AC, 1 minute (between live and dead parts) (Internal connector) Grip style enabling switch/emergency stop switch/momentary pushbutton/key selector switch: 1.5 kV
	Electric Shock Protection Class	Class II (IEC 61140) (With pilot light: class III)
Enabling Switches	Operating Frequency	1,200 operations per hour
	Mechanical Life	Position 1 → 2 → 1: 1,000,000 operations minimum Position 1 → 2 → 3 → 1: 100,000 operations minimum
	Electrical Life	100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA)
	Shock Resistance	Operating extremes: 150 m/s ² (15G) Damage limits: 1,000 m/s ² (100G)
Safety Control Relays	Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5 mm minimum Damage limits: 16.7 Hz, amplitude 1.5 mm minimum
	Applicable Wire	Solder terminal: 0.5 mm ² maximum (20 AWG) Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30)
	Applicable Wire Size	Solder terminal: 0.5 mm ² (20 AWG) Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30) (AWG22 between switch and connector)
	Applicable Cable	Outside diameter: ø4.5 to 10 mm
Light Curtains	Conduit Port Size	M16 (cable gland is supplied)
	Terminal Tensile Strength	20N minimum
	Degree of Protection	With control unit: IP67/IP66 (IEC 60529) Without control unit: IP65 (IEC 60529)
	Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast-blow fuse for short circuit protection.)
AS-Interface Safety at Work	Direct Opening Force	60N minimum (monitor switch)
	Operator Strength	500N minimum (when pressing the entire button surface)
AS-Interface Safety at Work	Weight (approx.)	HE2G-21SH: 140g HE2G-21SH-P-0/-21SC: 145g HE2G-21SHE/-21SC-P-0: 150g HE2G-21SH-L-L/-21SHE-P-0/-21SCE: 155g HE2G-21SH-L-K/-21SCE-P-0: 160g HE2G-21SHE-L-L/-21SC-L-L: 165g HE2G-21SHE-L-K/-21SC-L-K: 170g HE2G-21SCE-L-L: 175g HE2G-21SCE-L-K: 180g

Contact Ratings

Rated Insulation Voltage (Ui)					250V (momentary pushbutton and key selector: 125V) / 30V (with pilot light)		
Rated Thermal Current (Ith)					3A (emergency stop switch: 5A)		
Rated Voltage (Ue)					30V	125V	250V
Rated Current	Grip Style Enabling Switch	3-position switch (Terminal No. N01-C1/A1-B1, N02-C2/A3-B3)	AC	Resistive Load (AC-12)	—	1A	0.5A
				Inductive Load (AC-15)	—	0.7A	0.5A
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—
		Monitor Switch (NC contact) (Terminal No. 31-32/A2-B2)	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
	Control Unit	Emergency Stop Switch XA1E-BV3U02R (Terminal No.1-2/A1-B1, 1-2/A2-B2)	AC	Resistive Load (AC-12)	—	5A	3A
				Inductive Load (AC-15)	—	3A	1.5A
			DC	Resistive Load (DC-12)	2A	0.4A	0.2A
				Inductive Load (DC-13)	1A	0.22A	0.1A
		Momentary Pushbutton Key Selector Switch AB6M-M2PLW, AS6M-2KT2PA (Terminal No.C1/B1, N01/B2, NC1/B3, C2/A1, N02/A2, NC2/A3)	AC	Resistive Load (AC-12)	—	0.5A	—
				Inductive Load (AC-15)	—	0.3A	—
			DC	Resistive Load (DC-12)	1A	0.2A	—
				Inductive Load (DC-13)	0.7A	0.1A	—
		UP9 Pilot Light UP9P-2498G (Terminal No. +, -)					Rated operating voltage: 24V DC ±10% Rated current: 15mA

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

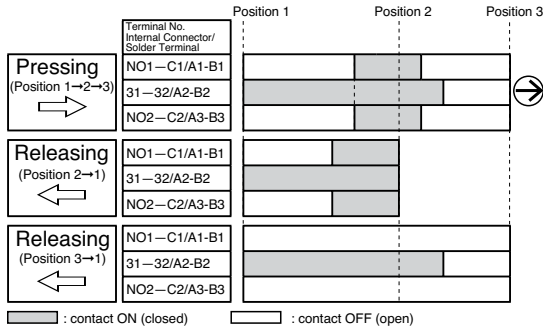


Note: Minimum applicable load (reference value): 3V AC/DC, 5 mA
(Applicable range is subject to the operating conditions and load.)

*Operating temperature for internal connectors:

-25°C min., 40°C max. 2.5A (12 to 19 poles), 2A (20 to 22 poles)
40°C min., 50°C max. 2.5A (8 to 12 poles), 2A (13 to 22 poles)
50°C min., 60°C max. 2.5A (6, 7 poles), 2A (8 to 13 poles), 1.5A (14 to 22 poles)

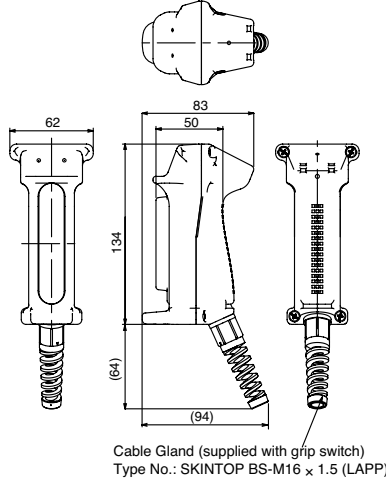
Operation Characteristics



Terminals NO1-C1/A1-B1, NO2-C2/A3-B3 are outputs of the 3-position enabling switch.

The above operation characteristics show when the center of the grip switch button is pressed. Because two contacts are designed to operate independently, pressing the edge of the 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.

Dimensions (mm) HE2G-21SH/HE2G-21SC



All dimensions in mm.

Internal Connector

Cable side connector:

Tyco Electronics D-1200D Series

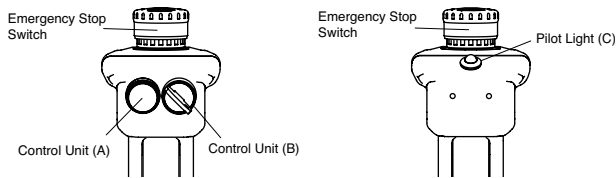
- Receptacle: 1-1827864-□
- Receptacle contact
1827586-2: AWG28 to 30
(Hand tool: 1762952-1)
1827587-2: AWG22 to 28
(Hand tool: 1762846-1)
1827588-2: AWG22 to 28
(Hand tool: 1762950-1)
1827589-2: AWG18 to 22
(Hand tool: 1762625-1)

Specify 2 or 3 in place of □.

- 2: 4-pin connector
3: 6-pin connector

The customer needs to purchase the connector separately.

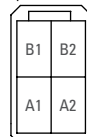
Additional Control Unit Layout



Contact Arrangement (Internal Connector)

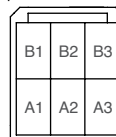
Internal Connector Pin No.

4-pin



Emergency stop switch

6-pin



3-position switch
Momentary pushbutton
Key selector switch

3-position switch /control unit side connector:

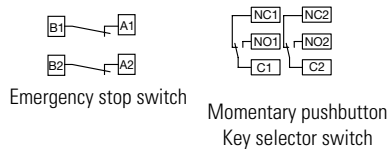
Tyco Electronics D-1200D Series

Tab housing: 1-1903130-2 (4-pin connector)

1-1903130-3 (6-pin connector)

Tab contact: 19303116-2

Terminal Arrangement (TOP VIEW) 6-Pin Connector Allotment Table



Internal Connector Pin No.	Momentary pushbutton Key selector switch
A1	C2
A2	NO2
A3	NC2
B1	C1
B2	NO1
B3	NC1

Grip Switch Housing for HE5B Enabling Switch

Grip Style Enabling Switch Housing

- HE5B enabling switches can be installed in the HE9Z-GSH51 grip style enabling switch housing to be used as 3-position grip style enabling switches.



Shown with HE5B switch.

Part Numbers

Part Number	Description
HE9Z-GSH51	Grip Switch Housing for HE5B Enabling Switch

Specifications

Applicable Standards	IEC/EN 60529, UL50
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	3
Shock Resistance	Damage limits: 500 m/s ² (50G)
Vibration Resistance	Damage limits: 5 to 55 Hz, amplitude 0.5 mm
Electric Shock Protection Class	Class II (when using HE5B-M2P*)
Applicable Cable	Outside diameter ø4.5 to 10 mm
Conduit Port Size	M16 (cable gland is supplied with the grip style enabling switch housing)
Degree of Protection	IP65 (with HE5B-M2P*) Type 4X (with HE5B-M2P*)
Weight (approx.)	65g (grip style enabling switch housing only)



The specifications are for the grip style enabling switch housing only. For enabling switch, see the HE5B specifications on page 400.

The following switches can be installed on the grip style enabling switch housing to be used as hand-held switches.

AB6M pushbuttons (IP65, except for AB6M-V)

AS6M selector switches (IP65)

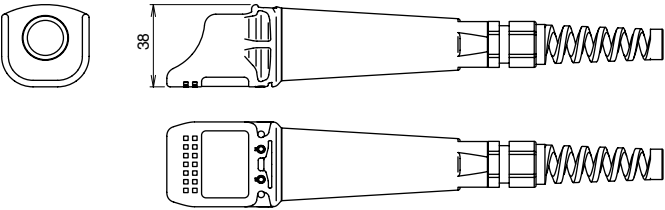
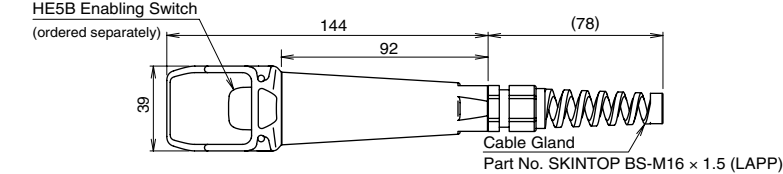
AS6M key selector switches (IP65)

Notes:

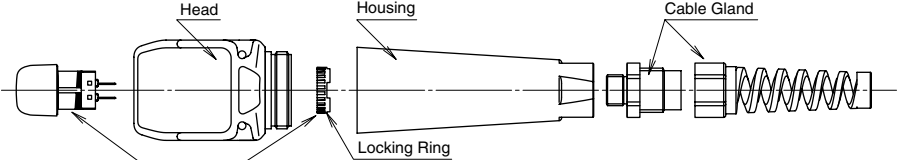
The HE9Z-GSH51 grip style enabling switch housing does not include the HE5B enabling switch. The enabling switch must be ordered separately.

The HE5B enabling switch must be installed and wired to the HE9Z-GSH51 grip style enabling switch housing by the user. For information on wiring, see the instruction sheet supplied with the HE9Z-GSH51.

Dimensions (mm)



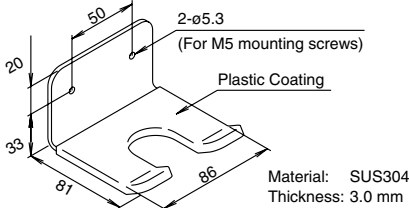
HE9Z-GSH51 + HE5B Construction



HE5B Enabling Switch (not supplied with the grip style enabling switch housing)

Anti-rotation ring is not required when installing the HE5B enabling switch on the HE9Z-GSH51 grip style enabling switch housing. Use the locking ring only.

Mounting Bracket
Part No. HE9Z-GH1



All dimensions in mm.