

Selection Guide..... 365

Panel Mount Enabling Switches..... 366

    HE1B Series..... 366

    HE2B Series..... 368

    HE3B Series..... 371

    HE5B Series..... 374

    HE6B Series..... 377

Grip Enabling Switches..... 380

    HE1G Series ..... 380

    HE1G-L Series..... 384

    HE2G Series ..... 387

    HE5B Housing..... 391

# Enabling Switches



[www.IDEC.com/safety](http://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.

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.

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.

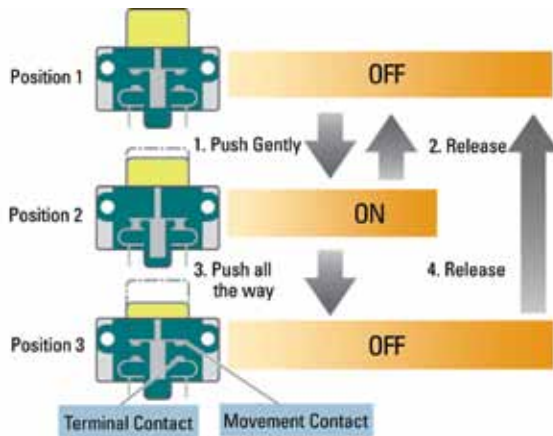


IEC symbol designating a 3-position enabling switch as specified in IEC60947-5-8



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.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches






Safety Control Relays

Light Curtains


AS-Interface Safety at Work

Selection Guide

Enabling Switches

Series	HE1B	HE2B	HE3B	HE5B	HE6B
Appearance					
Page	366	368	371	374	377
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	380	384	387	391
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



Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work


## HE1B 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
- 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 (TUV 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 <sup>2</sup> (15G)
	Damage Limits	1000m/s <sup>2</sup> (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 <sup>2</sup> 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	

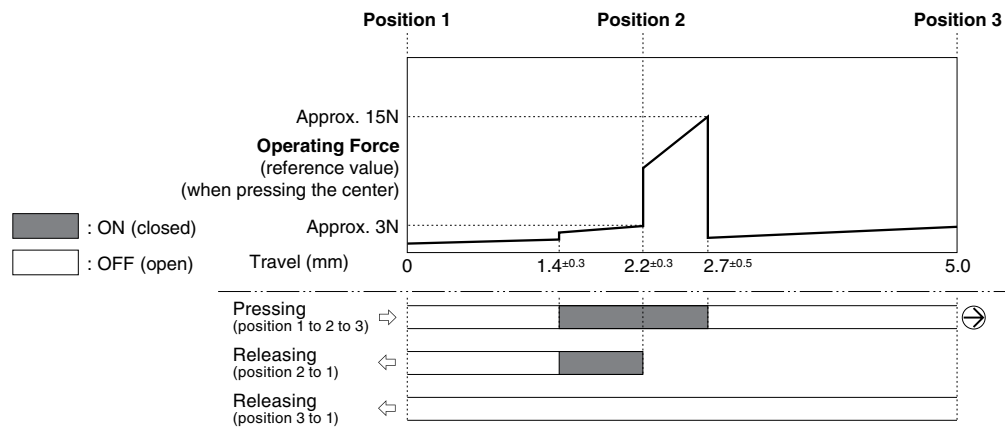
## Current Ratings

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)			



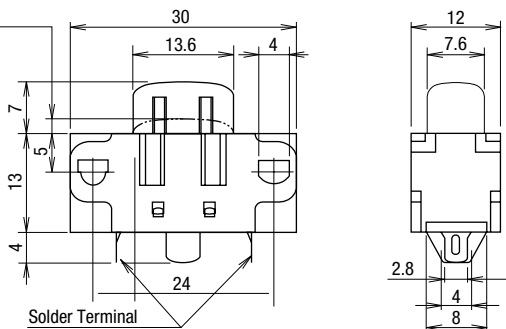
Minimum applicable load: AC/DC3V • 5mA (For reference only).

## Operating Characteristics



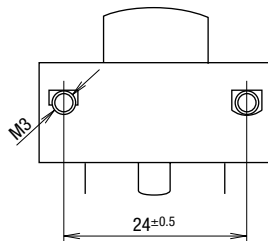
## Dimensions (mm)

When pressed to position 3: 2



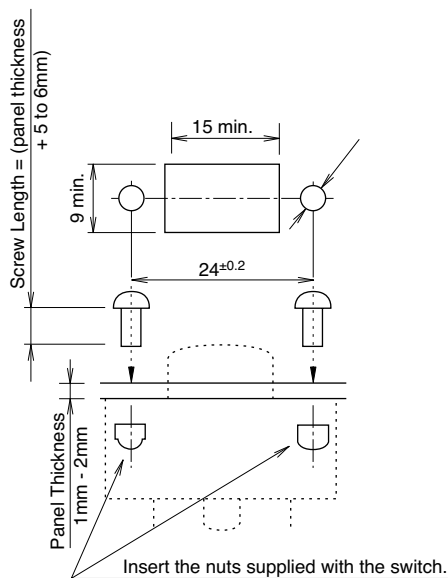
### HE1B-M1 (Side Mounting)

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



### HE1B-M1N (Front Mounting)

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

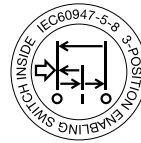


When using a panel thicker than 2mm, the button will be lower than the surface of the panel

## 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
With Rubber Cover	Yellow	2	0	HE2B-M200PY
		2	1	HE2B-M211PY
		2	2	HE2B-M222PY
	Black	2	0	HE2B-M200PB
		2	1	HE2B-M211PB
		2	2	HE2B-M222PB
Gray	2	0	HE2B-M200PN1	
	2	1	HE2B-M211PN1	
	2	2	HE2B-M222PN1	

### Accessories

#### Replacement Rubber Cover

Appearance	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 <sup>2</sup> (15 G)
	Damage Limits	1000m/s <sup>2</sup> (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 <sup>2</sup> 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

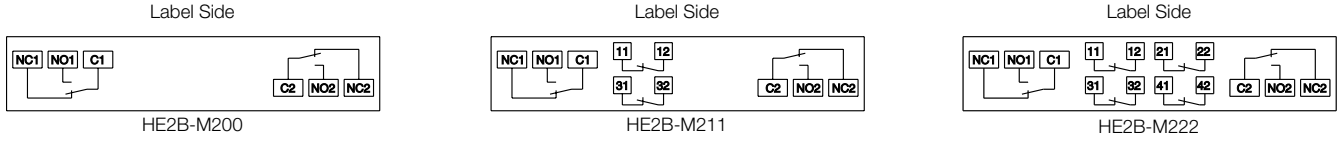
Rated Insulation Voltage (Ui)		250V				
Thermal Current (Ith)		3A				
Rated Operating Voltage (Ue)		30V	125V	250V		
Rated Operating Current (Ie)	3 Position Switch	AC	Resistive Load (AC-12)	–	1A	0.5A
			Inductive Load (AC-15)	–	0.7A	0.5A
		DC	Resistive Load (DC-12)	1A	0.2A	–
			Inductive Load (DC-13)	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)

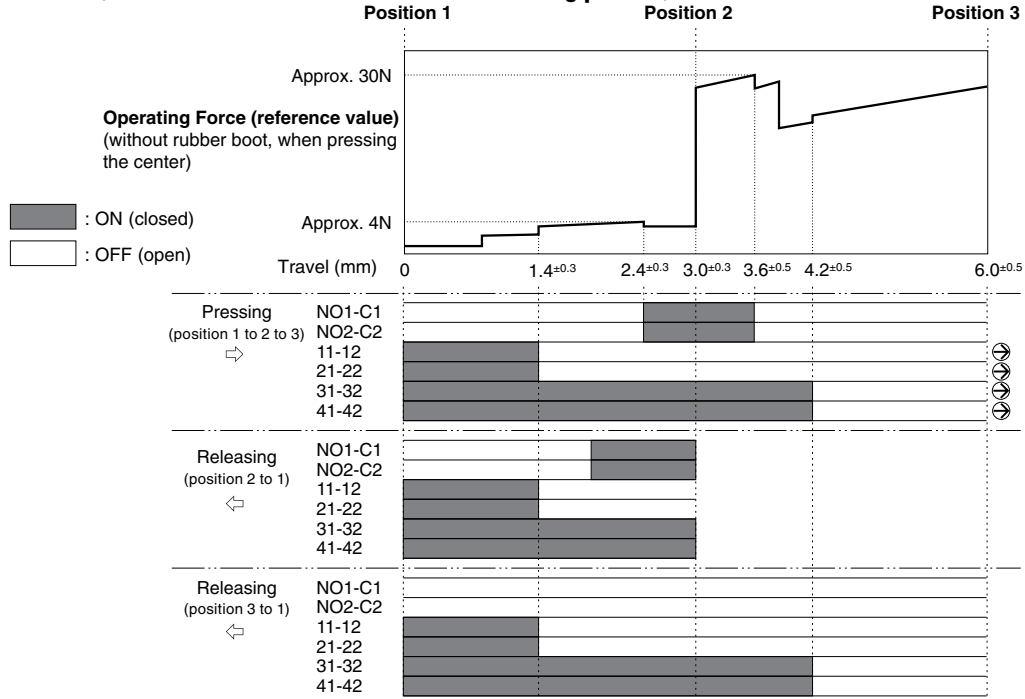
Circuit Diagrams

Terminal Circuit Diagrams (bottom view)



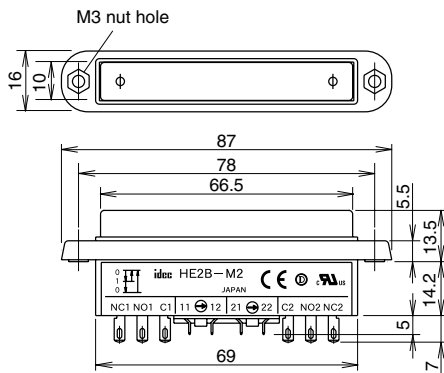
Operating Characteristics

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

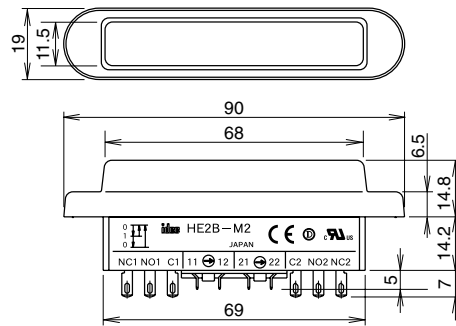


Using rubber boot will change the operating force depending on the operating temperature.

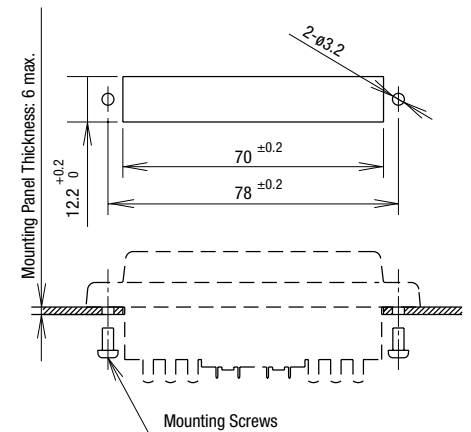
Dimensions (mm)  
Without Rubber Cover



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
 With Rubber Cover	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

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

## Specifications con't

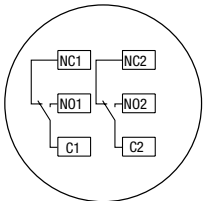
Electrical Life		100,000 operations minimum at rated load
Shock Resistance	Operating Extremes	150m/s <sup>2</sup> (15 G)
	Damage Limits	500m/s <sup>2</sup> (50 G)
Vibration Resistance	Operating Extremes	5 to 55Hz, amplitude 0.5mm minimum
	Damage Limits	16.7Hz, amplitude 1.5mm minimum
Terminal		0.110" quick connect / solder terminal
Recommended Wire Size		0.5mm <sup>2</sup> 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)	0.2A
		Inductive Load (DC-13)	0.1A
Contact Configuration		2 contacts (DPDT)	
Minimum Applicable Load		AC/DC5V 1mA reference	

## Circuit Diagrams

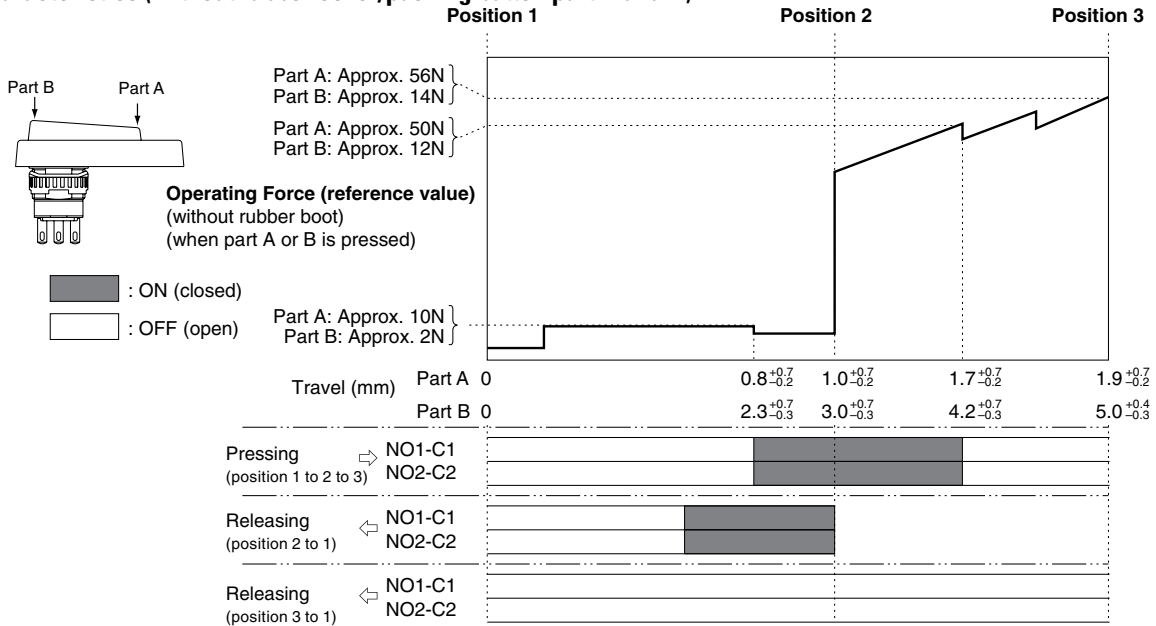
## Terminal Circuit Diagrams (bottom view)



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

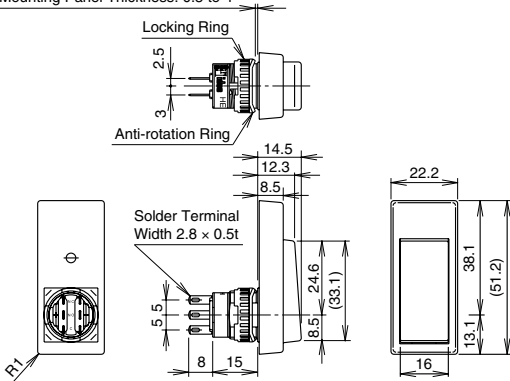
### Operating Characteristics (without rubber cover/pushing button part A and B)



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

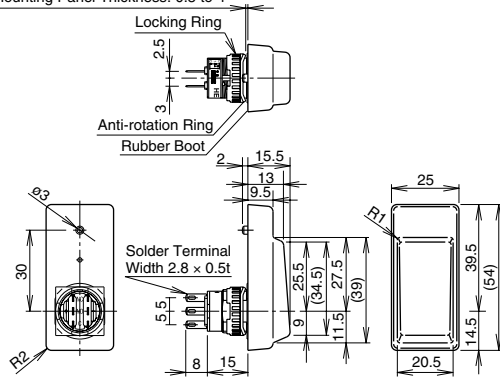
### Dimensions (mm) Without Rubber Cover

Mounting Panel Thickness: 0.5 to 4



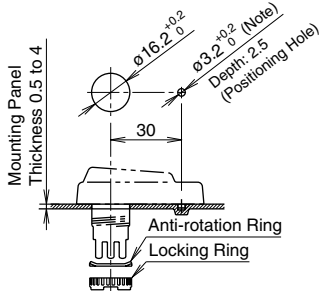
### With Rubber Cover

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 371).
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 391 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 <sup>2</sup> (15 G) Damage limits: 500 m/s <sup>2</sup> (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 <sup>2</sup> 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

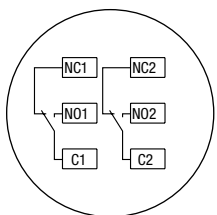
## Current Ratings


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

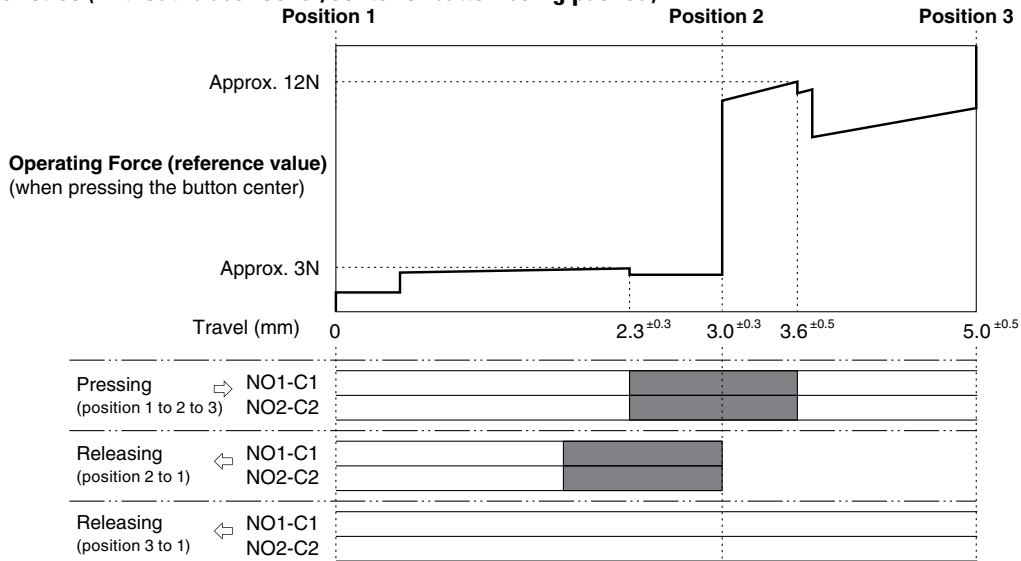
### Terminal Arrangement (Bottom View)



-  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).

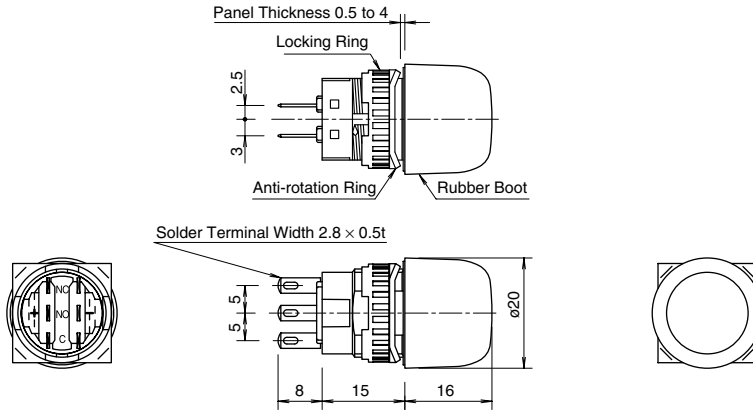
Operating Characteristics

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

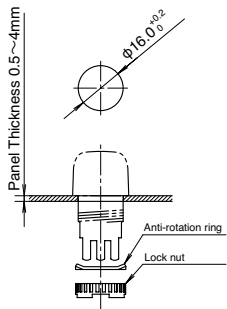


Operating load depends on ambient temperature.

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 374).



### 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	

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

## 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)
XW Series E-Stops	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
	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)
Interlock Switches	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 <sup>2</sup> (15G) Damage limits: 500m/s <sup>2</sup> (50G)
	Vibration Resistance	Operating extremes: 5 to 55 Hz, amplitude 0.5mm Damage limits: 16.7Hz, amplitude 1.5mm
Safety Control Relays	Terminal Style	Solder terminal
	Applicable Wire Size	1 cable, 0.5mm <sup>2</sup> 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)
AS-Interface Safety at Work	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	-
			DC	Resistive Load (DC-12)	1A	-
		AC		Resistive Load (AC-12)	-	2.5A
			DC	Resistive Load (DC-12)	2.5A	1.1A
	Button return monitor switch	AC		Resistive Load (AC-12)	-	0.5A
			DC	Resistive Load (DC-12)	2.5A	1.1A
Button depress monitor switch (NC)	AC	Resistive Load (AC-12)		-	0.5A	-
		DC	Resistive Load (DC-12)	2.5A	1.1A	0.55A
Contact Configuration			3-position switch	2 contacts		
		Button return monitor switch	0 or 1 contact			
		Button depress monitor switch	0 or 1 contact			

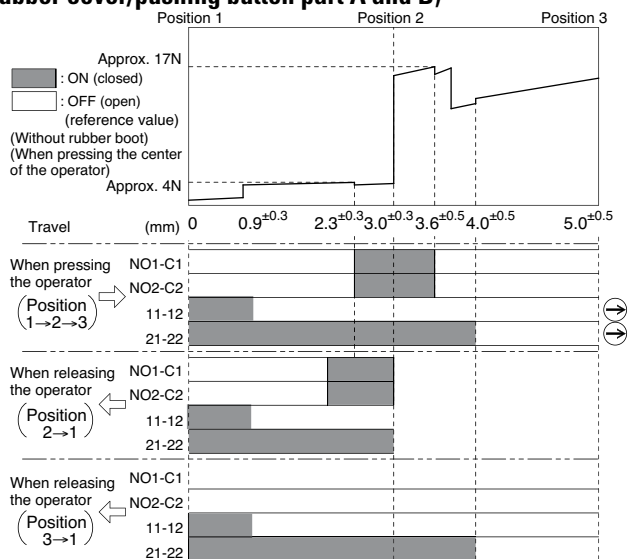
TÜV ratings:  
 3 position switch:  
 AC-12 125V/0.5A  
 DC-12 30V/1A  
 DC-13 30V/0.7A  
 Monitor Switch:  
 AC-15 250V/0.5A  
 DC-13 125V/0.22A  
 DC-13 30V/1A

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.)

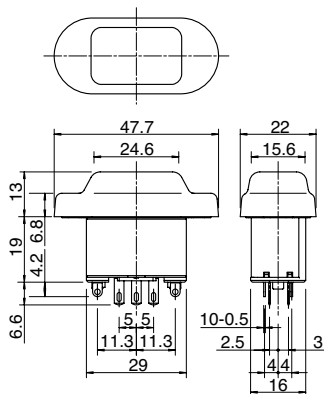
## Operating Characteristics

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

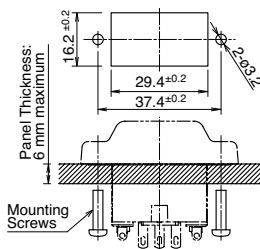


Notes: When a rubber boot is used, the operating force depends on the operating temperature.

## Dimensions (mm)

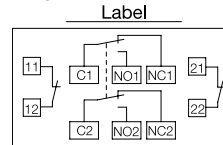


## Mounting Hole Layout



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 contacts<sup>1</sup>  
 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.  
<sup>1</sup>Use 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**

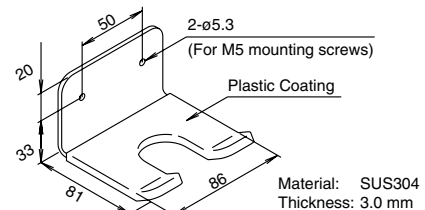
Contact Configuration		Rubber Boot	Part No.	
3-position Switch	Monitor Switch			
2 contacts	With (1NC)	–	HE1G-21SM	
		–	HE1G-21SM-1N	
	Without	Momentary Pushbutton (1NO) (1NO: AB6M-M1PB)	Silicon Rubber / yellow	HE1G-21SMB
		Momentary Pushbutton (1NO) (1NO: AB6M-M1PB)	NBR/PVC Polyblend / gray	HE1G-21SMB-1N
		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

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work

## 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 <sup>2</sup> (15 G)
	Damage Limits	1000m/s <sup>2</sup> (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 <sup>2</sup> (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

Overview

XW Series E-Stops

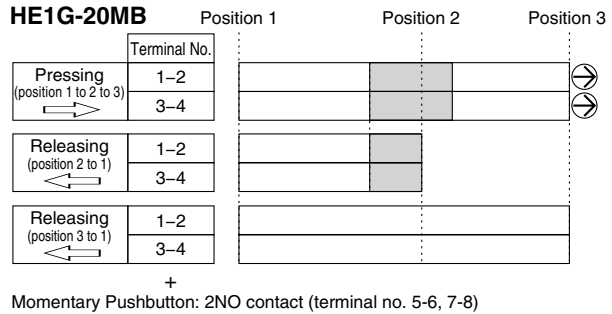
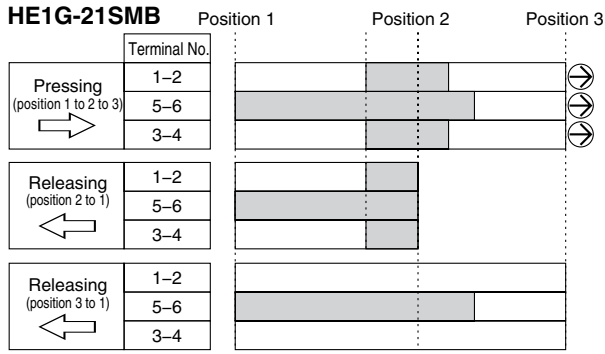
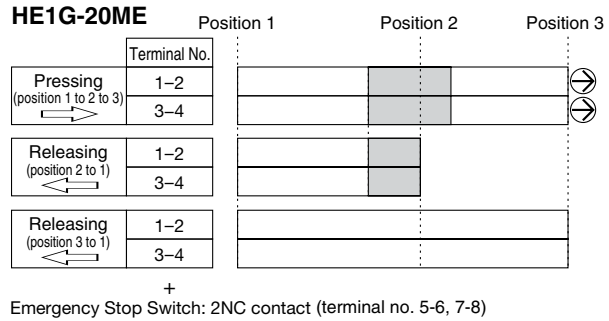
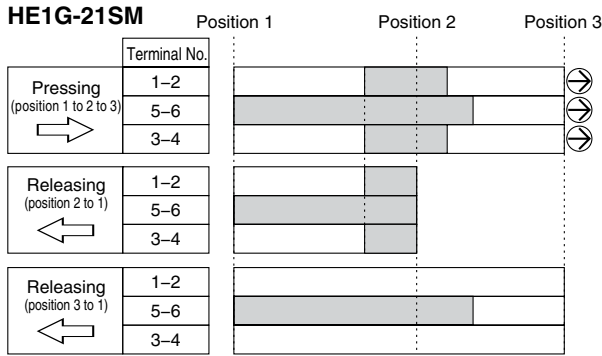
Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work



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

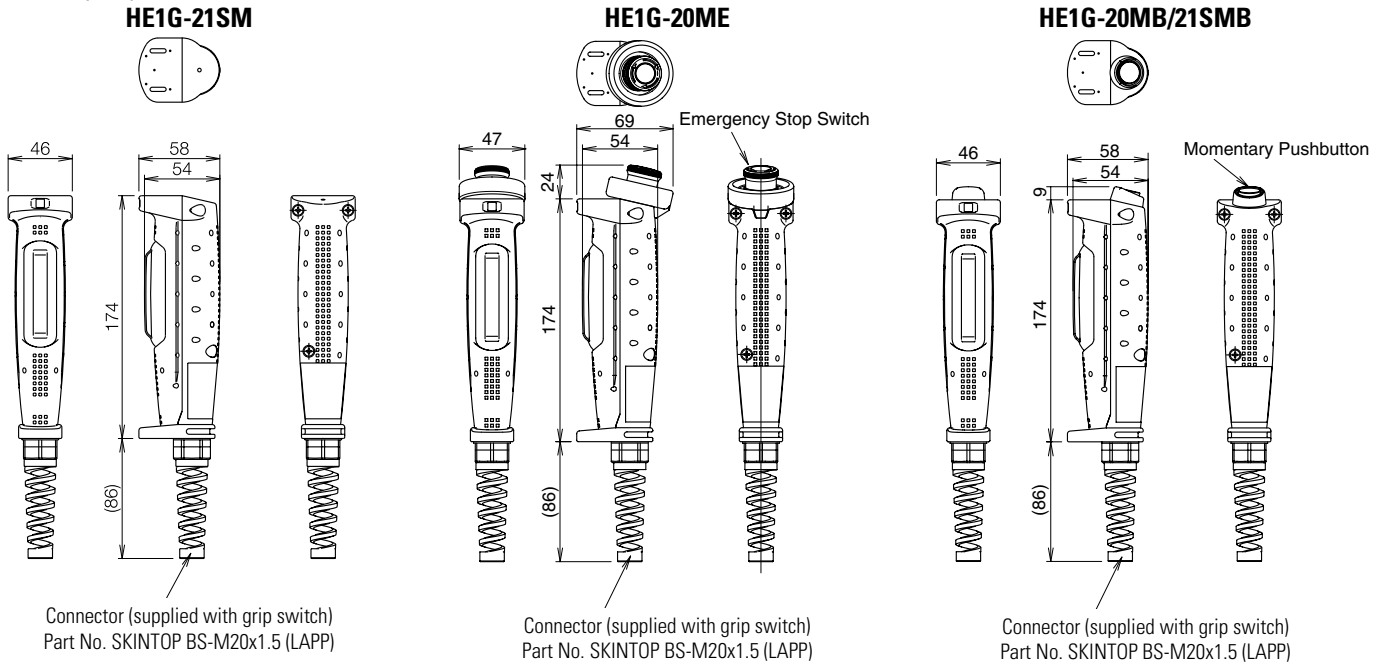
■ : contact ON (closed) □ : contact OFF (open)



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)



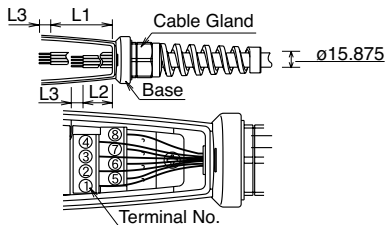


**Wiring Precautions**

**HE1G**

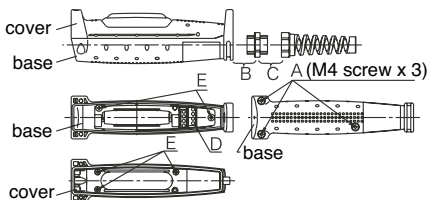
- Wire Stripping Information

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

- Recommended Torque

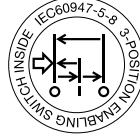


	See Drawing Above	Recommended Torque
Rubber Boot & Base	A	1.2±0.1Nm
Connector & Grip Switch	B	4.0±0.3Nm
Connector	C	4.0±0.3Nm
Terminal Screw	D	0.5±0.6Nm
Do Not Remove	E	

## HE1G-L Light Force Grip Enabling Switch

### 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	Without		Yellow <sup>1</sup>	HE1G-L21SM	HE1G-L21SMC	
			Gray <sup>2</sup>	HE1G-L21SM-1N	HE1G-L21SMC-1N	
	With (1NC)	Momentary Pushbutton Switch (1NO: AB6M-M1PB)		Yellow <sup>1</sup>	HE1G-L21SMB	HE1G-L21SMCB
				Gray <sup>2</sup>	HE1G-L21SMB-1N	HE1G-L21SMCB-1N
	Without	Emergency Stop Switch (2NC: HA1E-V2S2R)		Yellow <sup>1</sup>	HE1G-L20ME	HE1G-L20MCE
				Gray <sup>2</sup>	HE1G-L20ME-1N	HE1G-L20MCE-1N
Without	Momentary Pushbutton Switch (2NO: AB6M-M2PB)		Yellow <sup>1</sup>	HE1G-L20MB	HE1G-L20MCB	
			Gray <sup>2</sup>	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.

Overview  
XW Series E-Stops  
Interlock Switches  
Enabling Switches  
Safety Control Relays  
Light Curtains  
AS-Interface Safety at Work

## 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 <sup>2</sup> Damage limits: 1,000 m/s <sup>2</sup>
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 <sup>2</sup> (AWG16 to 24) Internal connector: 0.05 to 0.86 mm <sup>2</sup> (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



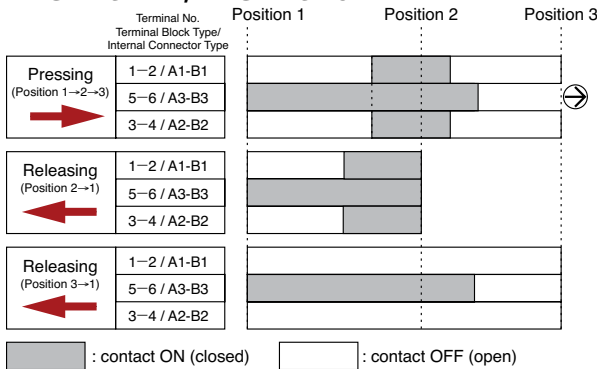
See grip switch catalog for complete list of specifications.

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	—
		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	—			

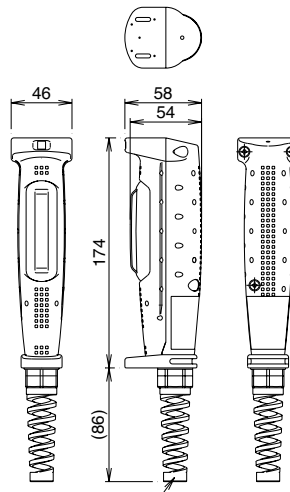
 Minimum applicable load (reference value): 3V AC/DC, 5 mA (Applicable range is subject to the operating conditions and load.)  
 Note: Operating temp. 40 to up to +50°C (not included): 2A (4 circuits) 50 to +60°C: 1.5A (3 or 4 circuits)

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



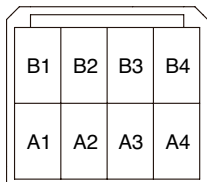
Terminals 1-2/A1-B1 and 3-4/A2-B2 are outputs of the 3-position enabling switch.  
 Terminals 5-6/A3-B3 are outputs of the monitor switch.  
 The above operation characteristics show when the center of the grip switch button is pressed. Because two contacts are designed to operate independently, pressing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

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



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

Internal Connector Terminal No.



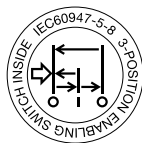
Connector  
 Tyco Electronics D-1200D series  
 Receptacle housing: 1-1827864-4  
 Receptacle contact  
 1827586-2: AWG28 to 30  
 (Hand tool: 1762952-1)  
 1827587-2: AWG22 to 28  
 (Hand tool: 1762846-1)  
 1827588-2: AWG22 to 28  
 (Hand tool: 1762950-1)  
 1827589-2: AWG18 to 22  
 (Hand tool: 1762625-1)

Overview | XW Series E-Stops | Interlock Switches | Enabling Switches | Safety Control Relays | Light Curtains | AS-Interface Safety at Work

### 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.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work


## 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)	
Interlock Switches	Pollution Degree	3	
	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	
Enabling Switches	Electric Shock Protection Class	Class II (IEC 61140) (With pilot light: class III)	
	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 <sup>2</sup> (15G) Damage limits: 1,000 m/s <sup>2</sup> (100G)	
	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 <sup>2</sup> maximum (20 AWG) Internal connector: 0.05 to 0.86 mm <sup>2</sup> (AWG18 to 30)	
Safety Control Relays	Applicable Wire Size	Solder terminal: 0.5 mm <sup>2</sup> (20 AWG) Internal connector: 0.05 to 0.86 mm <sup>2</sup> (AWG18 to 30) (AWG22 between switch and connector)	
	Applicable Cable	Outside diameter: ø4.5 to 10 mm	
	Conduit Port Size	M16 (cable gland is supplied)	
	Terminal Tensile Strength	20N minimum	
Light Curtains	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.)	
	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

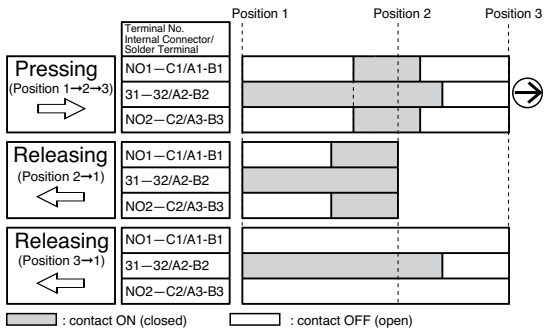


## Contact Ratings

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. NO1-C1/A1-B1, NO2-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, NO1/B2, NC1/B3, C2/A1, NO2/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			

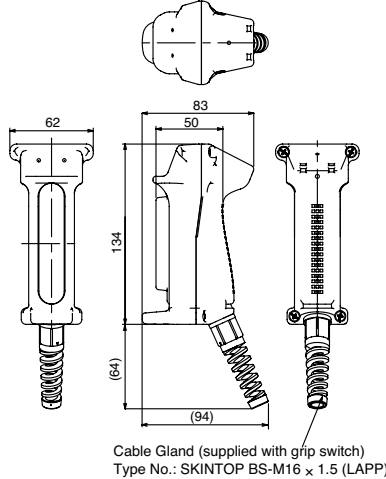
 Note: Minimum applicable load (reference value): 3V AC/DC, 5 mA  
(Applicable range is subject to the operating conditions and load.)  
\*Operating temperature for internal connectors:  
-25°C min., 40°C max. 2.5A (12 to 19 poles), 2A (20 to 22 poles)  
40°C min., 50°C max. 2.5A (8 to 12 poles), 2A (13 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)

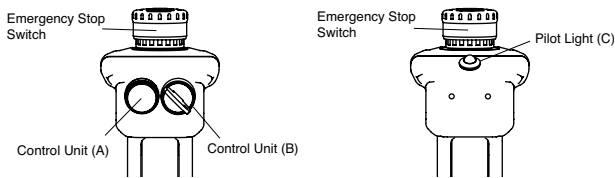
Specify 2 or 3 in place of □.

2: 4-pin connector

3: 6-pin connector

The customer needs to purchase the connector separately.

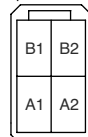
Additional Control Unit Layout



Contact Arrangement (Internal Connector)

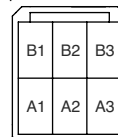
Internal Connector Pin No.

4-pin



Emergency stop switch

6-pin



3-position switch  
Momentary pushbutton  
Key selector switch

3-position switch /control unit side connector:

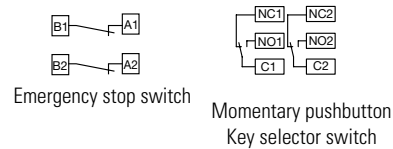
Tyco Electronics D-1200D Series

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 <sup>2</sup> (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 $\varnothing$ 4.5 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 374.

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:

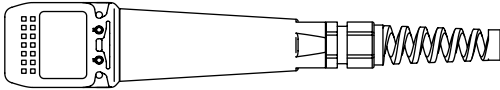
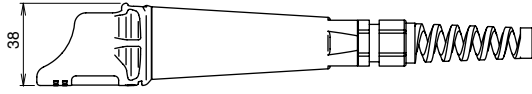
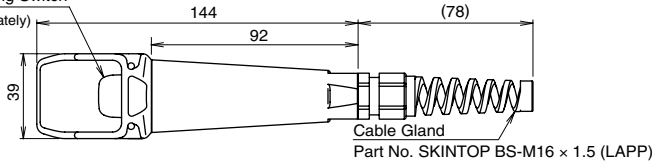
The HE9Z-GSH51 grip style enabling switch housing does not include the HE5B enabling switch. The enabling switch must be ordered separately.

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.

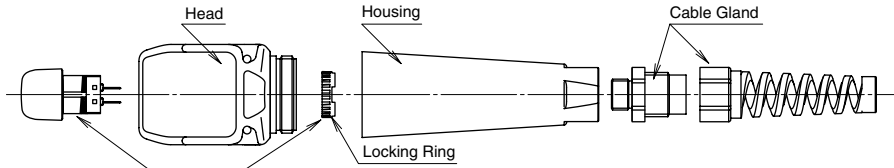
**Dimensions (mm)**

**HE9Z-GSH51**

HE5B Enabling Switch  
(ordered separately)



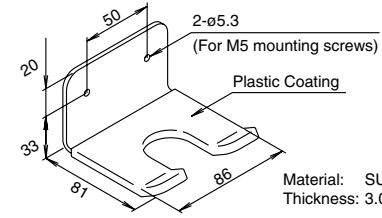
**HE9Z-GSH51 + HE5B Construction**



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**



Material: SUS304  
Thickness: 3.0 mm

All dimensions in mm.

Overview

XW Series E-Stops

Interlock Switches

Enabling Switches

Safety Control Relays

Light Curtains

AS-Interface Safety at Work