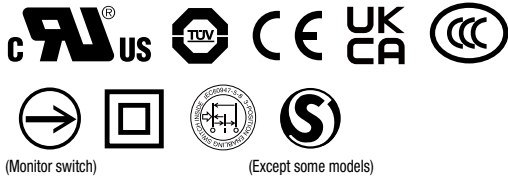


Grip Style Three-position Enabling Switches

HE2G



Compact, light-weight grip switch provides a comfortable hold



• See website for details on approvals and standards.

Select from a wide variety of models

Equipped with different control units for various use.

| | | |
|---|--|---|
| <p>• HE2G-21SHE-L-L Emergency Stop Switch XA1E-BV3U02R</p> <p>A: Momentary Pushbutton (white) AB6M-M2PLW B: Momentary Pushbutton (white) AB6M-M2PLW</p> | <p>• HE2G-21SHE-L-K Emergency Stop Switch XA1E-BV3U02R</p> <p>A: Momentary Pushbutton (white) AB6M-M2PLW B: Key Selector AS6M-2KT2PA</p> | <p>• HE2G-21SHE-P-0 Emergency Stop Switch XA1E-BV3U02R</p> <p>C: Pilot Light (green) UP9P-2498G</p> |
|---|--|---|

Compact design fits comfortably in the hand

The curved grip and small-size makes operation comfortable. The light-weight (approx. 140g, HE2G-21SH) and compact size is suitable for operators with small hands and for use in tight working environments.

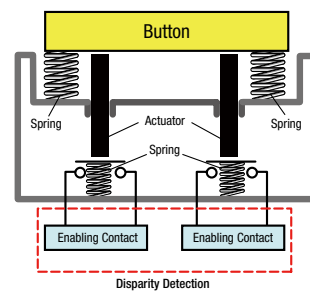


3-position switch with distinctive tactile feedback

Tactile clicking feedback allows easy recognition of switch operation when shifting from position 1 (contact OFF) to position 2 (contact ON).

Dual enabling contacts ensure a high level of safety

Dual enabling contacts with a separate actuator for each contact is IDEC's original design. This ensures a higher safety level. Disparity detection of category 4 (ISO 13849-1) can be achieved by using this switch with a safety relay module or a safety controller.



Actuators with plastic holders, applicable for HS5 series interlock switches, can be used with the HE2G

Example of automatic and manual operation modes when HS5 is used

Automatic mode

Manual mode

Actuator with plastic holder (optional)
HE9Z-GP15

Operation modes can be changed by inserting/removing the actuator with plastic holder installed to the HE2G into the HS5D. When the actuator is inserted, the operation is in automatic mode. When the actuator is removed, the operation is in manual mode.

| | Model | Page |
|--|--------|-------|
| | HE2G | D-084 |
| | HE1G-L | D-089 |

- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
- Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relays & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers
- Operator Interfaces
- Sensors
- AUTO-ID
- HE1B
- HE2B
- HE3B
- HE5B
- HE6B
- HE2G
- HE1G-L
- Actuator w/ Plastic Holder

HE2G Grip Style Three-position Enabling Switches

New compact, light-weight grip style enabling switch provides a comfortable hold



HE2G

| 3-Position Switch | Monitor Switch | Contact Configuration | | | | Rubber Boot Material / Color | Wiring Style | Part No. |
|-------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|--------------------------|------------------------------------|-------------------------------------|--------------------|
| | | Emergency Stop Switch | Switch (A) | Switch (B) | Pilot Switch (green) (C) | | | |
| 2 contacts | With (1NC) | Without | | | | Silicon Rubber / (Yellow) (Note 2) | Solder Terminal | HE2G-21SH |
| | | Without | | | | | NBR/PVC Polyblend / (Gray) (Note 3) | Internal Connector |
| | | With (2NC) | Without | | Without | Silicon Rubber / (Yellow) (Note 2) | | Solder Terminal |
| | | | Without | | | | With | Internal Connector |
| | | With (2NC) | Momentary Pushbutton (DPDT) | Momentary Pushbutton (DPDT) | Without | | Solder Terminal | HE2G-21SHE |
| | | | | | | | Key Selector Switch (DPDT) | Solder Terminal |
| | | With (2NC) | Momentary Pushbutton (DPDT) | Key Selector Switch (DPDT) | Without | | | Solder Terminal |
| | | | | | | | Key Selector Switch (DPDT) | Solder Terminal |
| | | With (2NC) | Momentary Pushbutton (DPDT) | Key Selector Switch (DPDT) | Without | | | Internal Connector |
| | | | | | | | Key Selector Switch (DPDT) | Solder Terminal |
| With (2NC) | Momentary Pushbutton (DPDT) | Key Selector Switch (DPDT) | Without | Internal Connector | HE2G-21SCE-L-K | | | |

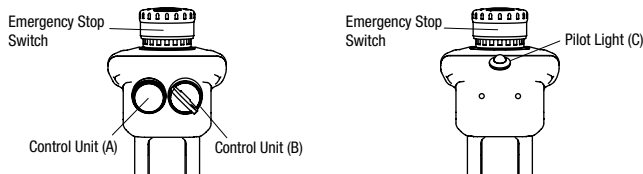
Note 1: Additional switches installed on the HE2G are as follows:

- Emergency Stop Switch: XA1E-BV3U02R
- Momentary Pushbutton: AB6M-M2PLW
- Key Selector Switch: AS6M-2KT2PA Pilot Light: UP9P-2498G

Note 2: Silicon rubber: Can be used in general factories. Remains flexible in cold temperatures. Suitable in applications with a wide operating temperature range.

Note 3: NBR/PVC polyblend: Oil-proof. Suitable for environments subjected to machine oil and painting robots where silicon rubber cannot be used.

Additional Switch Layout



HE2G Grip Style Three-position Enabling Switches

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 | — | | |
| | | | Switch & Pilot Light | 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 | | |
| | Switch & Pilot Light | Emergency Stop Switch XA1E-BV3U02 (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 | | |
| Switch & Pilot Light | | | 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 | | | | |

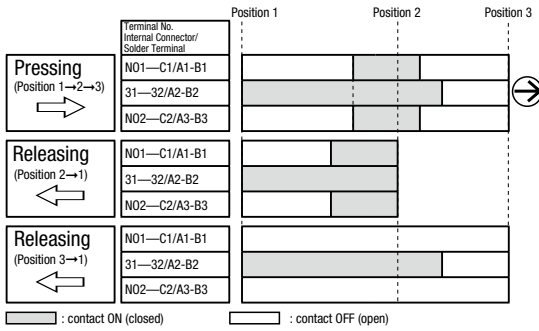
Note: Minimum applicable load (reference value): 3V AC/DC, 5 mA (Applicable range is subject to the operating conditions and load.)

*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)

Specifications

| | |
|-----------------------------------|---|
| Applicable Standards | IEC60947-5-1 EN60947-5-1 (TUV approval) JIS C8201-5-1 IEC60847-5-8, EN60947-5-8(TUV approval) GS-ET-22(TUV approval) UL508 (UL recognized) CSA C22.2 No.14 (c-UL recognized) GB14048.5 (CCC approval) KS C IEC60947-5-1/S1-G-1 (KOSHA approval) |
| Applicable Standards for Use | ISO12100/EN ISO12100 IEC60204-1/EN60204-1 ISO11161/EN ISO11161 ISO10218-1/EN ISO10218-1 ANSI/RIA/ISO10218-1 ANSI/RIA R15.06, ANSI B11.19 ISO13849-1/EN ISO13849-1 |
| 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 | 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) |
| Operating Frequency | 1,200 operations per hour |
| Mechanical Durability | Position 1 → 2 → 1: 1,000,000 operations minimum Position 1 → 2 → 3 → 1: 100,000 operations minimum |
| Electrical Durability | 100,000 operations minimum (rated load) 1,000,000 operations minimum (24V AC/DC, 100 mA) |
| Shock Resistance | Operating extremes: 150 m/s ² Damage limits: 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 | Solder terminal: 0.5 mm ² maximum Internal connector: 0.05 to 0.86 mm ² (AWG18 to 30) |
| Applicable Wire Size | Solder terminal: 0.5 mm ² 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 |
| Conduit Port Size | M16 (cable gland is supplied) |
| Terminal Tensile Strength | 20N minimum |
| Degree of Protection | Without switch/pilot light IP67/66 With switch/pilot light IP65 |
| 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) |
| Free Fall | 1.0m 1 fall (IEC 60068-2-32 compliant) |
| 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 |

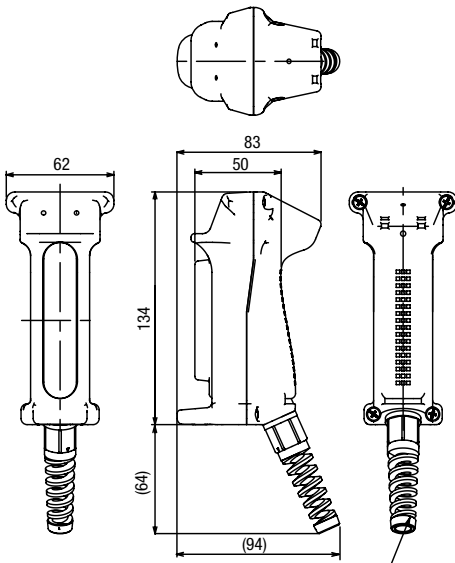
Operation Characteristics



- Terminals N01-C1/A1-B1, N02-C2/A3-B3 are outputs of the 3-position enabling switch.
- The above operation characteristics show when the center of the grip style enabling 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

HE2G-21SH/HE2G-21SC



Cable Gland (supplied with grip style enabling switch)
Part No.: SKINTOP BS-M16 × 1.5 (LAPP)

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)

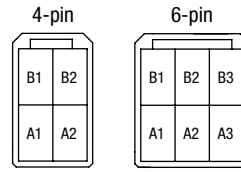
Specify 2 or 3 in place of □.

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

The customer needs to purchase the connector separately.

Contact Arrangement (Internal Connector)

Internal Connector Pin No.

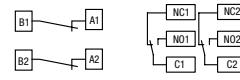


- Emergency stop switch
- 3-position switch
- Momentary pushbutton
- Key selector switch

3-position switch / switch 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)



- Emergency stop switch
- Momentary pushbutton
- Key selector switch

6-Pin Connector Allotment Table

| Internal Connector Pin No. | Momentary pushbutton Key selector switch |
|----------------------------|---|
| A1 | C2 |
| A2 | N02 |
| A3 | NC2 |
| B1 | C1 |
| B2 | N01 |
| B3 | NC1 |

- For signal of the 3-position switch, see "Operation Characteristics".
- For solder terminal type terminal arrangement of each switch/pilot light, see each catalog.

APEM

Switches & Pilot Lights

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

HE1B

HE2B

HE3B

HE5B

HE6B

HE2G

HE1G-L

Actuator w/ Plastic Holder

HE2G Grip Style Three-position Enabling Switches



Safety Precautions

- The enabling switches have been designed for industrial purposes. Use for residential, commercial, or lighting purposes may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures. (IEC60947-1, Clause 5.3)
- Do not assemble or modify the enabling switches and do not disable the enabling function. Otherwise, failure of accidents may occur.
- When using the enabling switch in a safety related part of a control system, use the enabling switch properly in accordance with the safety standards and regulations of the actual machine, system, and application, of the country or region where the enabling switch is used. Also, perform a risk assessment before using the enabling switch.
- Do not hold the enabling switch to position 2 using tapes or strings. Otherwise the loss of enabling switch function may cause serious accidents.
- Do not use with the grip switch installed on a machine.
- Use wires of the proper size to meet voltage and current requirements.
- Do not apply excessive force to the enabling switch.
- Make sure that dust, water and oil do not enter the grip switch during wiring.
- Be sure to choose cables according to the operating environment.
- If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstance.
- The entire concept of the control system, in which the safety component is integrated, must be validated to EN ISO 13849-2.

Instructions

Operating Instructions

- This grip style three-position enabling switch is a device used for enabling a machine such as robots when teaching the machine in a hazardous area manually. Configure the enabling system so that the machine can operate when the switch is in position 2 and an separate start switch is required to initiate the system.
- To achieve a high level of safety, connect the two contacts of the 3-position switch to a disparity detection circuit (terminal No. N01-C1 and N02-C2) to a discrepancy detection circuit such as a safety relay module. (ISO13849-1/ EN954-1)
- The base and the plastic part of rubber boot frame are made of glass-reinforced ABS/PBT. The rubber boot is made of silicone rubber or NBR/PVC polyblend. The screw is made of iron. When cleaning the grip style three-position enabling switch, use a detergent compatible with the materials.
- When adding momentary pushbutton switch and key selector switch, do not connect NO and NC contacts of a microswitch to different voltages or different power sources to prevent a dead short-circuit.
- When operating a additionally installed key selector switch, be sure to fully insert the key. Otherwise, failure may occur.
- The rubber boot may deteriorate depending on the operating environment and conditions. When the rubber boot is deformed or cracked, replace with new ones.

Wiring Instructions

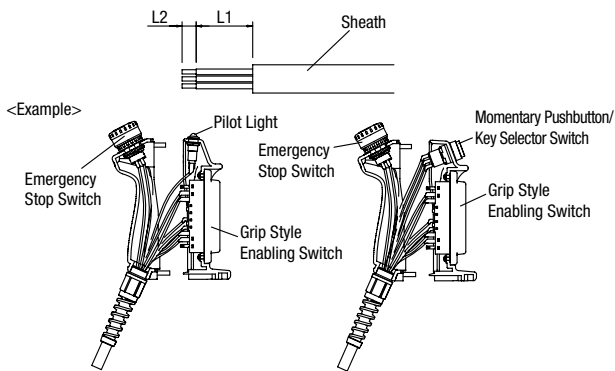
- Solder the terminal at a temperature of 310 to 350°C within 3 seconds using a soldering iron. Sn-Ag-Cu type is recommended when using lead-free solder. Do not use flow or dip soldering.
- When soldering, take care not to touch the enabling switch with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal.
- Use non-corrosive liquid rosin as soldering flux.
- Because the terminal spacing is narrow, use protective tubes or heat shrinkable tubes to avoid burning of wire coating or short circuit.
- When using a stranded wire, make sure that adjoining terminals are not short-circuited
- with protruding core wires.
- Use copper Wire 60/75 degree C only. (UL508)
- The wiring has to be installed according to GS-ET-22, 4.2.6.

Instructions

Solder Terminal

Wire Length inside the Switch

| | Grip Style Enabling Switch | | | | | | | | Momentary Pushbutton/ Key Selector Switch | | | Emergency Stop Switch | | Pilot Light | |
|-------------------------------|----------------------------|----|----|----|----|----|-----|----|---|----|----|-----------------------|---|-------------|---|
| | N01 | C1 | 11 | 12 | 31 | 32 | N02 | C2 | C | NO | NC | 1 | 2 | + | - |
| Wire stripping length L1 (mm) | 40 | 45 | 50 | 60 | 50 | 60 | 85 | 80 | 120 | | | 110 | | 115 | |
| Wire stripping length L2 (mm) | L2=5mm | | | | | | | | | | | | | | |



Applicable Wire Size

0.5mm² maximum (Observe the requirements of IEC 60204-1 for wiring.)

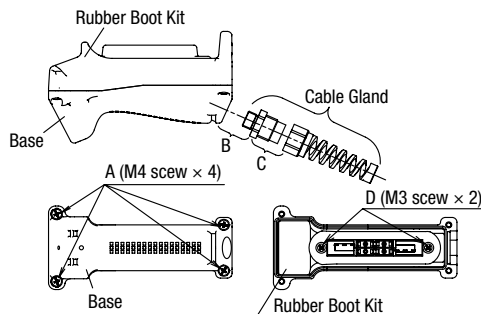
Recommended Tightening Torque

| Parts for tightening | | Torque |
|----------------------|--|----------------|
| A | Base and rubber kit (M4 screw × 4) | 1.1 to 1.3 N·m |
| B | Cable gland and grip style enabling switch | 2.7 to 3.3 N·m |
| C | Cable gland | 2.7 to 3.3 N·m |
| D | HE2B Enabling Switch (M3 screws × 2) * | 0.5 to 0.8 N·m |

Note: The recommended tightening torques of B and C are for the supplied cable gland. When using another cable gland, refer to the tightening torque of the cable gland used.

* For replacing HE2B enabling switch or rubber boot only

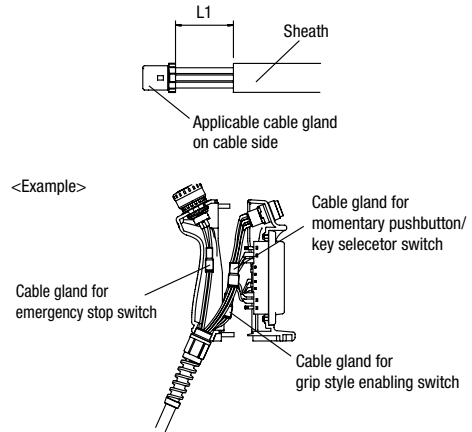
mended connector is used. When using another connector, refer to the specifications of the connector used.



Connector Terminal

Wire Length inside the Switch

| | Grip Style Enabling Switch | Momentary Pushbutton/Key Selector Switch | Emergency Stop Switch |
|-------------------------------|----------------------------|--|-----------------------|
| Wire stripping length L1 (mm) | 20 | 60 | 75 |



Applicable wire size for the cable gland on cable side

- 0.05 to 0.86mm² (AWG18 to 30): Check the compliance with receptacle and contact.

Tool: 1762846-1 (manual tool)

Note: When using stranded wires, make sure that loose wires do not cause short circuit. Also, do not over-tighten the terminals to prevent loose wires. Use copper wire of 60°C or 75°C temperature rating in order to comply with UL508. Observe the requirements of GS-ET-22: 2003, 4.2.6 for wiring.

APEM

Switches & Pilot Lights

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HE1B

HE2B

HE3B

HE5B

HE6B

HE2G

HE1G-L

Actuator w/ Plastic Holder