Ø16mm X6 Series Emergency Stop Switches

Excellent safety and design. The shortest depth behind the panel in its class.

Tab terminal can be wired easily using quick connects.
Only 23.9 mm depth behind the panel

Two ways to reset, two button sizes.

Unparalleled design

The smooth button is ideal for applications that require utmost cleanliness, such as food processing machines or semiconductor manufacturing equipment. Also suitable for applications requiring a sleek design of emergency stop switches, such as medical equipment.

Variety

The X6 emergency stop switch can be reset either by pulling or turning. The button is available in ø30 mm and ø40 mm sizes. In addition to a red button, a yellow button is also available as a stop switch.

Smallest in its class

The short depth behind the panel reduces the required mounting space.

- Depth: 30% reduction
- Volume: 70% reduction

(Compared with conventional emergency stop switches)

Thus equipment and control panels can be made much smaller.

Prevents dust build-up

The smooth and ridgeless button surface prevents dust built-up, and is also easy to clean.

Excellent safety

IDEC’s unique Reverse Energy Structure, achieved as a result of in-depth failure analysis of emergency stop switches, has resulted in this innovative emergency stop switch.

X6 series emergency stop switches provide the highest level of safety, because the unibody design eliminates the possibility of the contact blocks falling off the switch (details on page 3).

*1: Based on IDEC research as of August 2012.
Developed before the establishment of international safety standards. Even more consideration has been taken into account on operator safety.

Compliant with international safety standards. Even more consideration has been taken into account on operator safety.

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Satisfies the requirements of:

1. **Red-colored, mushroom actuator, with yellow background.** (IEC 60947-5-5; 4.2, ISO 13850; 4.4, IEC 60204-1; 10.7)
2. **Normally closed contacts with a direct opening action** (IEC 60947-5-5; 5.2, IEC 60947-5-1; Annex K)
3. **The emergency stop function shall be maintained by latching of the operator until reset manually** (IEC 60947-5-5; 6.2, ISO 13850; 4.4)

With X series emergency stop switches, the potential energy level of the latched status is lower than that of normal status. In the event the switch is damaged due to excessive shocks, the NC contacts will turn off, thus stopping the machine (patented design).

**International Safety Standards Requirements**

1. Red-colored, mushroom actuator, with yellow background. (IEC 60947-5-5; 4.2, ISO 13850; 4.4, IEC 60204-1; 10.7)
2. Normally closed contacts with a direct opening action (IEC 60947-5-5; 5.2, IEC 60947-5-1; Annex K)
3. The emergency stop function shall be maintained by latching of the operator until reset manually (IEC 60947-5-5; 6.2, ISO 13850; 4.4)

**High functionality with sleek design**

X6 series emergency stop switches for various applications
Third-generation emergency stop switch with Reverse Energy Structure
Smallest in its class

- Two button sizes—ø30mm and ø40mm
- Two button colors—red for emergency stop and yellow for stop switch
- Two ways of resetting—pulling and turning
- Solder/tab terminal #110 makes for easy connections
- UL, c-UL recognized, EN compliant
- Safety lock mechanism (IEC 60947-5-5; 6.2)
- Direct opening action (IEC 60947-5-5; 5.2, IEC 60947-5-1, Annex K)

Specifications

<table>
<thead>
<tr>
<th>Standards</th>
<th>Mark</th>
<th>Approval Organization/ File No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL508 CSA C22.2 No.14</td>
<td></td>
<td>UL/c-UL File No.68961</td>
</tr>
<tr>
<td>EN60947-5-1 EN60947-5-5 (Note)</td>
<td>TÜV SÜD</td>
<td>European Commission’s Low Voltage Directive</td>
</tr>
<tr>
<td>GB14048.5</td>
<td>CCC No. 2010010305411598 (Stop switch: CCC No. 2010010305411587)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Except for stop switch (yellow button)

Contact Ratings

<table>
<thead>
<tr>
<th>Rated Insulation Voltage (Ui)</th>
<th>250V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Thermal Current (Ith)</td>
<td>5A</td>
</tr>
<tr>
<td>Rated Operating Voltage (Ue)</td>
<td>30V 125V 250V</td>
</tr>
<tr>
<td>Rated Operating Current (Note)</td>
<td>5A 3A 1.5A 0.75A 0.4A 0.2A 0.22A 0.1A</td>
</tr>
<tr>
<td>Main Contacts</td>
<td>AC 50/60 Hz</td>
</tr>
<tr>
<td>Resistive Load (AC-12)</td>
<td>2A</td>
</tr>
<tr>
<td>Inductive Load (AC-15)</td>
<td>1A</td>
</tr>
<tr>
<td>Resistive Load (DC-12)</td>
<td>0.4A</td>
</tr>
<tr>
<td>Inductive Load (DC-15)</td>
<td>0.22A</td>
</tr>
</tbody>
</table>

Note: Minimum applicable load: 5V AC/DC, 1 mA (reference value) (May vary depending on the operating conditions and load)

Operational current represents the classification by making and breaking currents (IEC 60947-5-1).

Note:
- TÜV rating: AC-15 0.75A/250V, DC-13 1A/30V
- UL rating: Standard Duty AC 0.75A/250V Standard Duty DC 1A/30V

Manufacturer:
IDEC CORP. 1-7-31 Nishimiyahara, Yodogawa-Ku, Osaka 532-8550, Japan
EU Authorized Representative:
IDEC Elektrotechnik GmbH
Wendenstrasse 331, D-20537 Hamburg, Germany

DECLARATION OF CONFORMITY:
We, IDEC CORPORATION 7-31 Nishimiyahara, Yodogawa-ku, Osaka 532-8550, Japan declare under our sole responsibility that the product:
Description: Emergency stop switches
Model No.: X6
to which this declaration relates is in conformity with the EC Directive on the following standard(s) or other normative document(s). In case of alteration of the product, not agreed upon by us, this declaration will lose its validity.
Applicable Standard(s): EN 60947-5-5

Applicable Standards
<table>
<thead>
<tr>
<th>Applicable Standards</th>
<th>IEC 60947-5-1, EN 60947-5-1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IEC 60947-5-5 (Note), EN 60947-5-5 (Note)</td>
</tr>
<tr>
<td></td>
<td>JIS C8201-5-1, JIS C8201-5-5, UL508</td>
</tr>
<tr>
<td></td>
<td>CSA C22.2 No.14, GB14048.5</td>
</tr>
</tbody>
</table>

Operating Temperature: –25 to +60°C (no freezing)
Operating Humidity: 45 to 85% RH (no condensation)
Storage Temperature: –45 to +80°C (no freezing)

Operating Force
- Push to lock: 10.5N
- Pull to reset: 8.8N
- Turn to reset: 0.17 N·m

Minimum Force Required for Direct Opening
Action
- 40N

Minimum Operator Stroke Required for Direct Opening
Action
- 4.5 mm

Maximum Operator Stroke
- 4.5 mm

Contact Resistance
- 50 mΩ maximum (initial value)

Insulation Resistance
- 100 MΩ minimum (500V DC megger)

Overvoltage Category
- II

Impulse Withstand Voltage
- 2.5 kV

Pollution Degree
- 3

Operation Frequency
- 900 operations/hour

Shock Resistance
- Operation extremes: 150 m/s² Damage limits: 100 m/s²

Vibration Resistance
- Operation extremes: 10 to 500 Hz amplitude 0.35 mm, acceleration 50 m/s² Damage limits: 10 to 500 Hz, amplitude 0.35 mm, acceleration 50 m/s²

Mechanical Life
- 100,000 operations minimum

Electrical Life
- 100,000 operations minimum

Degree of Protection
- IP65 (IEC 60529)

Short-circuit Protection
- 250V/10A fuse (Type aM IEC 60269-1/IEC 60269-2)

Conditional Short-circuit Current
- 1000A

Terminal Style
- Solder/tab terminal #110

Recommended Tightening Torque for Locking Ring
- 0.88 N·m

Applicable Wire Size
- 1.25 mm² maximum (AWG 16 maximum)

Terminal Soldering Condition
- 310 to 350°C, within 3 seconds

Weight (approx.)
- ø30mm button: 13g
- ø40mm button: 16g

Note: Except for stop switch (yellow button)
### Unmarked

**Pushlock Pull/Turn Reset Switch**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Main Contact (NC)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø30mm Mushroom</td>
<td>1NC</td>
<td>AB6E-3BV01PTRH</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>AB6E-3BV02PTRH</td>
</tr>
<tr>
<td>ø40mm Mushroom</td>
<td>1NC</td>
<td>AB6E-4BV01PTRH</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>AB6E-4BV02PTRH</td>
</tr>
</tbody>
</table>

- Pushlock pull/turn reset switches are locked when pressed, and reset when pulled or turned clockwise.

### Arrow Marked

**Pushlock Pull/Turn Reset Switch**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Main Contact (NC)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø30mm Mushroom</td>
<td>1NC</td>
<td>AB6E-3BV01PTRM</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>AB6E-3BV02PTRM</td>
</tr>
<tr>
<td>ø40mm Mushroom</td>
<td>1NC</td>
<td>AB6E-4BV01PTRM</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>AB6E-4BV02PTRM</td>
</tr>
</tbody>
</table>

- Pushlock pull/turn reset switches are locked when pressed, and reset when pulled or turned clockwise.

### Stop Switch

**Unmarked, Yellow Button, Pushlock Pull/Turn Reset Switch**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Operator</th>
<th>Main Contact (NC)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø30mm Mushroom</td>
<td>ø30mm button</td>
<td>1NC</td>
<td>AB6E-3BV01PTY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2NC</td>
<td>AB6E-3BV02PTY</td>
</tr>
<tr>
<td></td>
<td>ø40mm button</td>
<td>1NC</td>
<td>AB6E-4BV01PTY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2NC</td>
<td>AB6E-4BV02PTY</td>
</tr>
</tbody>
</table>

- Pushlock pull/turn reset switches are locked when pressed, and reset when pulled or turned clockwise.
- Do not use the stop switch as an emergency stop switch.
**Ø16 X6 Series Emergency Stop Switches (Unibody)**

### Dimensions (mm)

- Panel thickness: 0.8 to 4.5 mm
- Mounting Hole Layout
  - The values shown on the left are the minimum dimensions for mounting with other Ø16 mm pushbuttons. For other control units of different sizes and styles, determine the values according to dimensions, operation, and wiring.

### Mounting Hole Layout

- Ø16.2 mm
- Solder/tab terminal #110 (Depth behind the panel: 23.9 mm)
- Anti-rotation projection

### Terminal Arrangement (Bottom View)

- 1NC type: Terminals located near the TOP marking

### Accessories

<table>
<thead>
<tr>
<th>Shape</th>
<th>Material</th>
<th>Part Number</th>
<th>Package Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking Ring Wrench</td>
<td>Metal (nickel-plated brass)</td>
<td>MT-001</td>
<td>1</td>
<td>• Used to tighten the locking ring when installing the X6 switch onto a panel. • Recommended tightening torque: 0.88 N·m maximum</td>
</tr>
<tr>
<td>Locking Ring</td>
<td>Plastic</td>
<td>XA9Z-LPN10</td>
<td>10</td>
<td>• Black</td>
</tr>
</tbody>
</table>
Nameplate (for emergency stop switch)

<table>
<thead>
<tr>
<th>Description</th>
<th>Legend</th>
<th>Part Number</th>
<th>Material</th>
<th>Background Color</th>
<th>Legend Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>For ø30mm Button</td>
<td>Blank</td>
<td>HAAV-0</td>
<td>Polyamide</td>
<td>Yellow</td>
<td>Black</td>
</tr>
<tr>
<td></td>
<td>EMERGENCY STOP</td>
<td>HAAV-27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For ø40mm Button</td>
<td>Blank</td>
<td>HAAV4-0</td>
<td>Polyamide</td>
<td>Yellow</td>
<td>Black</td>
</tr>
<tr>
<td></td>
<td>EMERGENCY STOP</td>
<td>HAAV4-27</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Cannot be used with switch guard.

SEMI S2 Compliant Switch Guard

<table>
<thead>
<tr>
<th>Shape</th>
<th>Material</th>
<th>Part Number</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch Guard</td>
<td>Polyamide (PA6)</td>
<td>XA9Z-KG1</td>
<td>- IP65 degree of protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Color: yellow (Munsell 2.5Y8/10 or equivalent)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Cannot be used with nameplate.</td>
</tr>
</tbody>
</table>

Note:
Switch guards have been designed for applications in semiconductor manufacturing equipment only. Do not use the switch guards with emergency stop switches which are installed on other machines such as machine tools or food processing machines. Machinery Directive of the European Commission and IEC 60204-1 require that emergency stop switches be installed in a readily accessible area, and the usage of switch guards is not permitted.

White Nameplate (for stop switch)

<table>
<thead>
<tr>
<th>Description</th>
<th>Legend</th>
<th>Part Number</th>
<th>Material</th>
<th>Background Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>For ø30mm Button</td>
<td>Blank</td>
<td>HAAV-0-W</td>
<td>Polyamide</td>
<td>White (Munsell N9.5)</td>
</tr>
<tr>
<td>For ø40mm Button</td>
<td>Blank</td>
<td>HAAV4-0-W</td>
<td>Polyamide</td>
<td>White (Munsell N9.5)</td>
</tr>
</tbody>
</table>

Dimensions (mm)

- Remove the projection from the nameplate using pliers, otherwise the switch cannot be installed.
- Panel thickness when using a nameplate: 0.5 to 3 mm
**Panel Mounting**

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Face the side with the projection upward, and tighten the locking ring using the locking ring wrench MT-001.

**Wiring**

1. Applicable wire size is 1.25 mm² (16 AWG) maximum.
2. Solder the terminals using a soldering iron at 310 to 350°C for 3 seconds maximum. Do not use flow or dip soldering. SnAgCu type lead-free solder is recommended. Make sure that the soldering iron touches the terminals only, not plastic parts. Do not apply external force such as bending the terminals or applying tensile force on the wires.
3. Use a non-corrosive rosin flux. To prevent the flux from entering the switch while soldering, face the terminals downward.
4. Because the terminal spacing is narrow, use protective tubes or heat shrinkable tubes to avoid burning the wire sheath or causing a short circuit.
5. Apply force on the terminals in the vertical direction to the panel only, otherwise the terminals will be damaged.
6. When using tab connectors, specify quick connect #110 and 0.5mm tab thickness.

**Contacts**

When the button is reset by pulling or turning, the NC contacts will bounce. When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms).

**Handling**

Do not expose the switch to excessive shock and vibrations, otherwise the switch may be deformed or damaged, causing malfunction or operation failure.

**Notes for Panel Mounting**

Using the locking ring wrench MT-001, tighten the locking ring to a torque of 0.88 N·m. Do not use pliers. Do not apply excessive force, otherwise the locking ring will become damaged.

**Contact Bounce**

When the button is reset by pulling or turning, the NC contacts will bounce. When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms). Do not apply any external shock to the emergency stop switches, otherwise the contact will bounce.

**Specifications and other descriptions in this catalog are subject to change without notice.**

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