

### ■ Checklist Before Inquiry

When specifying Detector Switches, please take advantage of our standard products for better pricing and delivery. Please inquire about the following items before ordering.

Item			Information (Requirements)		
Common	C-1	Inquiry purpose		New use, Modification, Others ( )	
	C-2	Modification	Previous supplier		
			Conventional part No.		
			Purpose		
	C-3	Application	Equipment		
			Design standard of pushing distance of lever		At switching on (when not pushing) : Pushing distance (Pushing the point of lever <input type="text"/> mm) At switching off (when not pushing) : Object of detection is <input type="checkbox"/> apart from the point of lever <input type="checkbox"/> not apart from the point of lever (Pushing about <input type="text"/> mm)
Operation frequency			<input type="checkbox"/> Operate the switches every day. ( <input type="text"/> times a day) <input type="checkbox"/> Almost everytime, the switches are stayed in the released condition. ( <input type="text"/> times a week / month / year) <input type="checkbox"/> Almost everytime, the switches are pushed in the designed position. ( <input type="text"/> times a week / month / year)		
Temperature			( °C) to ( °C)		
Rating			<input type="text"/> mA <input type="text"/> V <input type="text"/> dc <input type="text"/> mA <input type="text"/> V <input type="text"/> ac Do you give "inrush current" to switches ? : <input type="checkbox"/> YES <input type="checkbox"/> NO		
Shapes/Dimensions	M-1	Operation	Operation type		Vertical, Horizontal
	M-2	Mounting	Mounting height	Vertical	PWB to upper surface of housing: ( mm)
				Horizontal	PWB to center rod: ( mm)
M-3	Terminals		PWB, Solder lug		
Others	L-1	Surface Mount	Connection		Manual soldering, Wave soldering, Reflow Soldering
			Packing Unit		Polyethylene Bag (Bulk), Embossed Taping (Reel Pack)
	L-2	Special requirements for endurance			
	L-3	Special requirements for safety			
L-4	Other questionnaires				

\* The Electrical Appliance and Material Safety Law (Japan) was revised on March 1st. 1988.  
Power switches described here are not under jurisdiction of this law, but comply with its technical requirements.

Notes:

1. When selecting Switches, please consider using our standard products for better prices and short delivery times.
2. Please inform the following items when ordering.

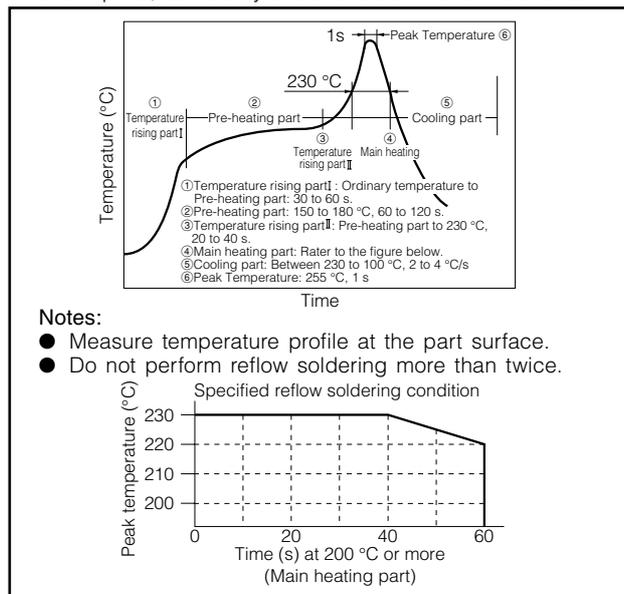
## Application Notes

When using our Slide Switches, please observe the following items ("prohibited items") and be cautious of the following in order to prevent dangerous accidents and deterioration of performance.

### 1. Prohibited items and notes on mounting

- When soldering (including preheating), set the lever to the release position.
- When soldering using a soldering iron, soldering conditions vary with the tip shape of the soldering iron, wattage, and PWB thickness. Thoroughly check the conditions in advance, including the heat resistance rating of the solder.
- Do not apply a load to terminals when soldering. Care should be taken in this regard because a load may deteriorate electric and mechanical characteristics.
- Since the detector switches are not sealed, do not wash them.
- When mounting a detector switch to a through-hole type PWB, the influence of thermal stress on the switch is greater than that on one-sided PWB. Be sure to check the influence as well as the heat resistance rating of the solder.
- For reflow soldering

When performing reflow soldering using a hot-air oven or an infrared oven, observe the following conditions. Since the temperature applied to a switch and its terminals varies with the type and size of the PWB and the mounting density of the parts, sufficiently check the conditions in advance.



### 2. Notes on circuit conditions

- To ensure reliability, use detector switches within the rated range, as designated in "Product Specifications for Information."
- To avoid malfunction of a set due to bounce generated by turning the switch ON and OFF, and/or due to chatter generated by external vibrations, etc., take the following into consideration in design.
  - Read contact multiple times.  
(In Case of microcomputer Processing )
  - Set a delay time.  
(Recommendation: 3 or more times of reading with the cycle of 3 ms or over)
  - Prepare a CR integrating circuit.  
(Recommendation: A time constant of 6 ms or over )

### 3. Prohibited items and notes on mounting and operating conditions

- Design so that the load applied to the lever when a set is used is within the rated range of the switch's lever strength.

- If multiple switches are placed side by side, or a switch is placed near another part, the gap between the switch and the adjacent switch/part must be at least 1 mm to prevent affect of flux and to ensure proper insulation distance.
- Design and use so that external stress is not continuously applied to the soldering parts in a set in any direction. External stress may cause pattern peeling and solder cracks on a PWB.
- When mounting a switch (mounting to chassis or button mounting), take care so that no foreign matter enters the switch.
- Contact lubricant, which is used in detector switches, may flow out to the exterior of the switch due to the structure. For design review, sufficiently check the operating conditions.
- Avoid the following ambient surroundings and other conditions because they may affect performance:
  - Under an atmosphere of corrosive gas such as Cl<sub>2</sub>, H<sub>2</sub>S, NO<sub>x</sub>, or SO<sub>2</sub>
  - In atmospheres of residual water drops, dew condensation, or adhesive water drops
  - In liquids such as water, salt solution, oil, chemicals, and organic solvents
  - In direct sunlight
  - In dusty locations

### 4. Prohibited items and notes on storage conditions

Since contact characteristics and soldering quality may deteriorate due to sulfuration and oxidation of contacts and terminals, pay heed to the following items.

- For storage and transport of the switches, avoid unpacking them, and store them at room temperature and room humidity. Use them as soon as possible, generally within 3 months, or within a maximum of 6 months after delivery.
- Do not store the switches under conditions of high temperature and/or high humidity, or in a location where corrosive gas may be generated.
- If some units remain after unpacking, store them after applying adequate moisture-proof and gas-proof treatment.

### 5. For use in equipment for which safety is requested

Although care is taken to ensure switch quality, variation of contact resistance (increase), short circuits, open circuits, and temperature rise are some problems that might be generated.

To design a set which places maximum emphasis on safety, review the affect of any single fault of a switch in advance and perform virtually fail-safe design to ensure maximum safety by:

- preparing a protective circuit or a protective device to improve system safety, and
- preparing a redundant circuit to improve system safety so that the single fault of a switch does not cause a dangerous situation.

### 6. For actual use, be sure to refer to "Product Specifications for Information."

### ■ Common Specifications (Standard)

Mechanical Specifications	Lever Strength	To withstand 10 N push force applied in operating direction for 15 seconds (ESE11, 22, 24, 31) To withstand 2 N push force applied in operating direction for 15 seconds (ESE13, 16, 18, 23) To withstand 1 N push force applied in operating direction for 15 seconds (ESE58)
	Terminal Strength	To withstand 3 N push force applied on the end of terminal in any direction for 1 minute [0.5 N : ESE13, 16, 18, 23, 58]
Electrical Specifications	Contact Resistance	500 mΩ max.
	Insulation Resistance	Terminal to Terminal and Terminal to Outer Metal Part: 100 MΩ min. (at 100 Vdc)
	Dielectric Withstanding Voltage	Terminal to Terminal and Terminal to Outer Metal Part: 100 Vac for 1 minute
Environmental Specifications	Operating Temperature Range	-10 °C to +70 °C (ESE11, 22, 24, 31) -10 °C to +60 °C (ESE13, 16, 18, 23, 58)
	Heat Resistance	+80 °C for 96 hours (ESE11, 22, 24) +85 °C for 96 hours (ESE31) +70 °C for 96 hours (ESE13, 16, 18, 23, 58)
	Low Temperature Resistance	-25 °C for 96 hours -40 °C for 96 hours (ESE31)
	Humidity Resistance	40 °C, 90 % to 95 % RH for 96 hours 60 °C, 90 % to 95 % RH for 96 hours (ESE31)
	Non-loaded Life	Number of operations 50000 cycles Contact resistance : 1 Ω max. (ESE11, 13, 24) Contact resistance : 3 Ω max. (ESE22, 31) Voltage drop : 1.5 V max. (ESE16, 18, 58) Voltage drop : 1.0 V max. (ESE23)
	Loaded Life	Number of operations 50000 cycles Contact resistance : 1 Ω max. (ESE11, 13, 24) Contact resistance : 3 Ω max. (ESE22, 31) Voltage drop : 1.5 V max. (ESE16, 18, 58) Voltage drop : 1.0 V max. (ESE23)

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Sep. 2010