

For better use of our Catalog

⟨For specifications⟩

Specifications in this product catalog are subject to change without prior notice. Detailed specifications are omitted for some of the products due to limited space. Please inquire and ask for individual specification sheets when ordering.

⟨Information⟩

Our product catalog consists of two volumes.

This catalog, the first volume, carries product information on switches, trimmers, attenuators, circuit protectors,

Please see the second volume for other products such as sensors and motors.

The switches described in this catalog include DIP switches and Operating switches.

Concerning Operating switches such as order to be made products and standard products, there is a common annotation related to switches at last half catalog. Please refer it.

For other products, in each product catalog  logo or a description to point out order to be made products on each item at the catalog.

If there is no indication, it is a standard products.

Note prior to placing order

Please do not use our products under conditions or environments not described in this catalog. Even under the conditions or environments described in this catalog, if you want to use our products for applications requiring high reliability (These include, but are not limited to, nuclear power control equipment, railroad equipment, aviation equipment, vehicle equipment, combustion equipment, medical equipment, entertainment equipment, and disaster prevention equipment), be sure to contact our point of contact beforehand.

The details of warranty shall be as per the descriptions in this document and we shall not be liable for any damage on you resulting from the use of any equipment or device (including control systems) which is not in accordance with this document (hereinafter referred to as "use in violation"). In the case where you resell our products, we shall not be liable for any damage on a third party resulting from use in violation by the third party, and even if we make payment to the third party in connection with such use in violation regardless of the name by which such payment may be called, we may demand the whole amount thereof from you.

〈Warranty Period〉

The warranty period is one year from the date of delivery. The warranty is only applicable to the product itself, not applicable to consumable products such as batteries and etc.

〈Warranty Coverage〉

If any malfunctions should occur due to our fault, NIDEC COMPONENTS warrants any part of our product within one year from the date of delivery by repair or replacement at free of charge. However, warranty is not applicable if the causes of defect should result from the following conditions:

- Failure or damages caused by inappropriate use, inappropriate conditions, and inappropriate handling.
- Failure or damages caused by inappropriate modifications, adjustment, or repair.
- Failure or damage caused by technically and Scientifically unpredictable factors.
- Failure or damage caused by natural disaster, fire or unavoidable factors.

For Ordering & Handling

■Product classification

The following table shows the product classification including the standard and the made-to-order products.

| Display | Classification | Concerning delivery |
|---------|-----------------|---|
| No mark | Standard | Always keep constant stocks. However, it depends on order quantity that we may request for some lead time. |
| ☆ | Semi-standard | It depends on the order quantity that we do keep the parts to support the production, 2 weeks lead time for the delivery. However, There is a fluctuation that it depends on the order status. For the details, please contact our sales department. |
| ★ | Made to order | It is an order to made products. The delivery (1.5 month) is our standard lead time. However, There is a fluctuation that it depends on the order status. For the details, please contact our sales department. |
| ▲ | Ask for details | Concerning lead time, please contact our sales department. |

■Placing an order for accessory parts

- (1) Accessory parts include the standard and optional accessories. The classification is stated on the List of Accessories by Models. The standard accessory parts come with the product. The cost of the optional accessory part is not included in the main body price and is sold separately.
- (2) For placing an order for an accessory part, be sure to specify the part number. The accessory parts do not come with the product at the time of delivery. It is attached separately.
- (3) When purchasing an accessory part only, irrespective of the standard or the optional accessory, it is sold in units of 10 pieces.

■Placing an order for UL- or CSA-approved product

Even if the products are of UL- or CSA-approved ones, the products in stock do not carry the UL mark of the CSA mark. When placing an order, be sure to specify "With UL/CSA Mark." For the products with the UL mark or the CSA mark, extra costs will be added, excluding A, LP, SLE6, SL10, SLE10, SLE210 Series products.

■How to place an order

When an order is place for the switch and the accessories at the same time, specify the "product name (part number)" and the "part number of accessory." Note, however, that the standard accessories for panel mount (lock nut, locking washer, locking ring, etc.) will be attached, if not specified. For the accessory parts except the lock nut, locking washer and locking ring, be sure to specify the part numbers even if they are the standard accessories (buttons, caps, levers, rockers, for example) since they will not be attached if they are not specified.

■Packaging style

Delivery in the packaging style of respective series products shall be made for orders for the whole number multiple of the minimum packaging unit of respective series products.

■Indication of ratings

The ratings described on the catalog show the maximum value under the resistance load. All rated voltage and current values are indicated in "RMS values."

■Types of load

(1) Resistance load

The resistance load implies the load of a resistive component only where the power factor is 1 ($\cos\phi=1$). The ratings are indicated in the rated voltage and current under the resistance load.

(2) DC load

For the DC load, being different from the AC load, the arc-length continuation time becomes longer under the same voltage condition. Therefore, it is recommended that the current at 30 VDC should be the same value as the rated current at 125 VAC. Be sure to connect the common terminal to the (-) side.

(3) Lamp load

When the switch is turned on to illuminate a lamp, the rush current 10 to 15 times the steady current flows momentarily, which may cause fusion of contacts. Be sure to choose a switch, considering such transient current.

(4) Induction load

For the induction loads (transformer, solenoid, relay, etc.), peak current flows when the circuit is turned on and an arc is generated due to the reverse voltage when the switch is turned off, which results in much more wear and transition of contacts than the resistance load, making the electrical life shorter. Use the switch at 60% or below of the rated current with the reference power factor of 0.6 ($\cos\phi=0.6$).

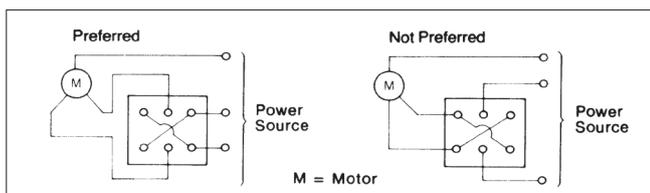
(5) Motor load

With the motor, the striking current three times to eight times the steady current flows at the time of start, which may cause fusion of contacts. Choose the switch by referring to the values shown in Table 1, since the electric current several times the nominal current will flow depending on the types of motor. In addition, to rotate the motor reversely, it should be considered to prevent the synergistic current (starting current + reverse current) by using the ON-OFF-ON type switch.

Table 1. JIS C4201 (1959)

| MOTOR | TYPE | INRUSH CURRENT |
|------------------------|-------------------|---------------------------|
| 3 Phase Induction | Squirrel Cage | 5 to 8 Times Steady State |
| Single Phase Induction | Spilt Phase Start | 6 Times Steady State |
| | Condenser Start | 4 to 5 Times Steady State |
| | Repulsion Start | 3 Times Steady State |

When you use the motor in reverse rotation mode, contact us. We will recommend the switch suitable to the performance of each load. Be sure to observe the circuit description shown below.



(6) Capacitor load

For the capacitor load, the charging current of two to 100 times as much will flow when the switch is used for the strobe circuit, welding machine, DC power supply, etc., which may differ according to the capacity of capacitor used. Therefore, be sure to use the switch in the range not exceeding the rated current. In addition, it is recommended to insert a resistor in series and insert the protective circuit, etc. across the switch contacts.

(7) Current capacity according to types of load

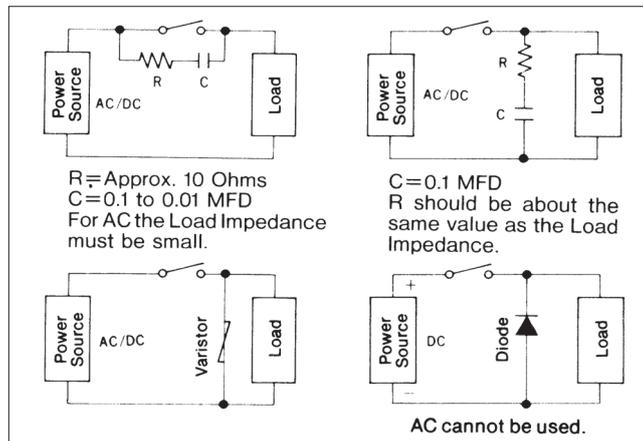
| LOAD TYPE | MAX. VOLTAGE AND CURRENT |
|------------|-------------------------------|
| Resistive | Rated Voltage and Current |
| DC Load | 1/4 of Rated Voltage |
| Lamp Load | 1/15 to 1/10 of Rated Current |
| Inductive | 1/10 to 1/3 of Rated Current |
| Motor Load | 1/8 to 1/4 of Rated Current |
| Capacitor | 1/100 to 1/2 of Rated Current |

The above-stated values vary according to conditions and should be used just as references.

Contact Wear Protection Circuits

For the cases of induction load, etc., it is recommended that CRs, diodes, varistors, etc., should be inserted into the circuit to reduce contact wear due to arc resulting from abnormal voltage/current generated during switch operations.

EXAMPLES OF PROTECTION CIRCUITS



■Low-Current (Dry Circuit) Applications

For silver contacts, the contact surfaces are likely to be sulfurized due to aging, peripheral environment, etc., and contacting may become unstable when the switch is used in dry circuits. In addition, due to the similar causes, insulation may be deteriorated due to generation of migration. Therefore, when the switch is used in dry circuits, it is recommended that our gold-plated switches should be used.

■Use Environment

- (1) If the switch is used under the environment where gases (hydrogen sulfide, ammonia gas, etc.) are present, be sure to use the gold-plated switches that offer excellent resistance to corrosion.
- (2) If the switch is used under the environment where water drops, dust, etc. are present, be sure to use the waterproof types (8F and 8P types). The waterproof caps are also available as optional parts.
- (3) When the switch is used under low atmospheric pressure atmosphere, contact arcing is more likely to occur than under normal pressure atmosphere. Carefully consider voltage and current values when selecting the switch.
- (4) When the switch is used under temperatures below -20°C , operation failure due to grease freezing and cracks on molded materials may occur. Under temperatures exceeding $+80^{\circ}\text{C}$, the internal temperature may rise abnormally due to joule heat, thereby causing deterioration in the insulation materials. Be sure to use the switch within the operating temperature range.

Note: Some series products offer the operating temperature range from -40°C to $+85^{\circ}\text{C}$. Be sure to check the specifications of the series products when selecting the switch.

(5) Operating temperature range

We guarantee the operating temperature range according to the evaluation based on the product specifications and we do not permanently guarantee the use within the temperature range.

■Storage Environment

(1) We recommend the following storage environment:

(The independent specifications of each product shall take precedence.)

- Temperature

Refer to the individual specification drawing or product specification.

- Humidity

The humidity must be 85% RH or below.

- Places not suitable for storage

The room where temperature and/or humidity changes severely or condensation occurs. Places around the air supply opening or around the window through which outside air is always taken in. Places where corrosive gases such as the exhaust gas of vehicle or sulfur components may be generated or come in.

- Others

Do not take the out products unnecessarily before they are used. Make consideration regarding the storage environment of products or parts in process.

(2) Consider the following storage environment:

- Blister phenomenon

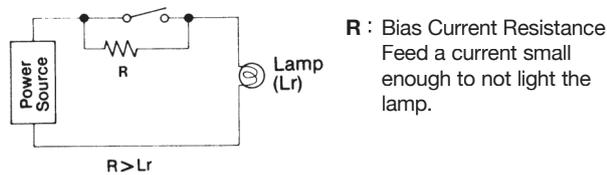
If the surface-mount type of product is left for a long period of time under the high temperature and high humidity atmosphere before it is mounted, blisters might be formed inside the resin due to the soldering heat. To store the product for a long period of time, take measures to avoid high humidity or reduce absorption of moisture by using silica gel.

- Discoloration of terminal

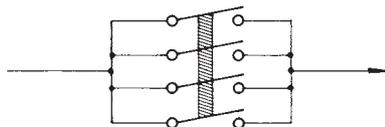
To avoid terminal discoloration, pack the product with a plastic bag or the like for storage and avoid storage in high-temperature and high-humidity places or in places where gas atmosphere exists around the places. When the product is delivered with the silica gel, keep the silica gel in the package and store the product in the sealed stage as much as possible.

■Advice for Using the Switch

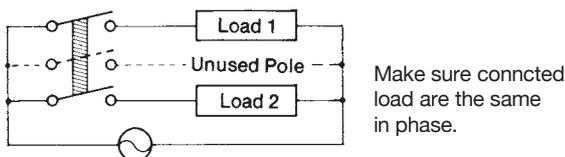
- (1) Even for the resistance load, it is general that not only the pure resistance, but also inductive or capacitive components are included. Therefore, for actual use, it is recommended that the switch should be used at 80% of the rated current.
- (2) To extend the service life of the lamp-illuminated switch, the bias current circuit as shown below is recommended.



- (3) To enhance the contact reliability, the max. current should be kept below the rated value even if 2-, 3- or 4-pole switches are used as single pole switch.



- (4) For the induction circuit or the capacity circuit in which transient current flows during switch operations, measure the transient current value with a synchroscope or the like and use the switch in the range where the transient value does not exceed the rated value.
- (5) For use with the circuit where the operation frequency is very low and the current value is 10 mA or below, use the switch whose contacts are gold-plated.
- (6) In case short-circuiting across poles is concerned, provide an unused pole as shown below.



- (7) For an example to easily identify the operation circuit, effectively use color caps or color buttons.
When the switch of PC terminal is used as a soldering terminal, use a thinner lead wire and solder the wire after wrapping it around the terminal.
- (8) The panel sealing capability of the waterproof switch ensures no problem when it is left in water 1 meter deep for 30 minutes. However, do not operate the switch in water.
- (9) When the switch is used for changeover of motor or meter, use the center-off type (ON-OFF-ON) switch to prevent dead short-circuit due to switching time lag or adhesion caused by reverse voltage arcing.

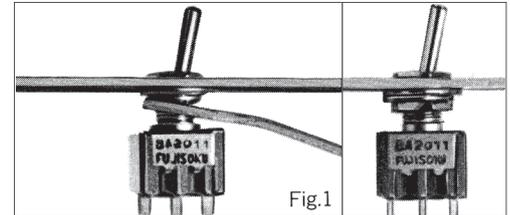
■Operating Frequency of Switch

When the switch is used in the minute electric current range (50 VDC, 0.1 A or below), be sure to operate the switch at least once a month.

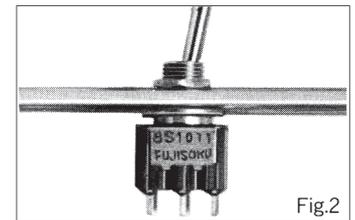
Mounting Procedures

■Mounting the Switch on Panel

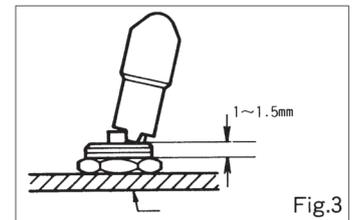
- (1) Sandwich a panel with two nuts provided and tighten the nuts. Usually, the panel will not be damaged and the even bushing height will be ensured when tightening the nut at the back of the panel, while holding the upper nut. (Fig.1)



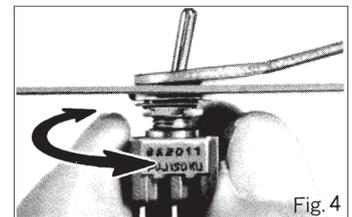
- (2) When mounting the switch on a thick panel, the switch can be mounted with a single nut since the seat is provided at the base of the bushing (excluding **8B** and **8Y** types). (Fig.2)



- (3) The locking lever type (**8E**) should be mounted by allowing 1 to 1.5 mm from the top surface of bushing. Neglecting this caution may result in operation failure. (Fig.3)



- (4) Do not turn the switch body to fasten it onto the panel. (Fig.4)



- (5) To reposition the switch, loosen the nut on the back of the panel, move the switch to the desired position and retighten the nut.

Be careful rotating the switch body with the nut fastened will damage the switch.

- (6) After mounting the switch, do not place the device in such a way that the device weight will be applied on the knob of the switch. Do not press the knob of toggle switch or lever switch, or the button of the pushbutton switch with a load exceeding the specified load.



- (7) To replace the cap of the lever lock toggle switch (**8E** and **ATLE** types), set the knob in the locked position and tighten the cap with 9.8 to 14.7 N · cm torque.

■Mounting Procedures of Accessory Parts

- (1) The accessory parts should normally be mounted in the order as shown in Fig. A at the right.

Tightening torque

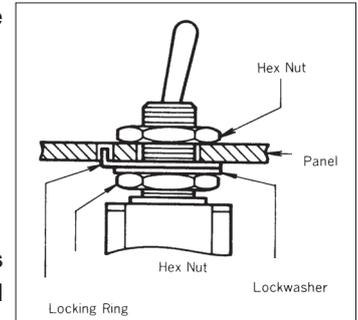
M6 and 1/4"-40 THD screw

: 49 N • cm

M12 and 15/32"-32 THD screw

: 137 N • cm

In particular, when the switch without bushing is mounted on the panel, apply hex nuts on both sides of the panel. Mounting the switch with the hex nut on the top side only will cause failure.



(Fig.A)

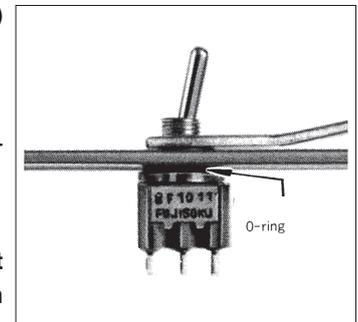
- (2) For the 8F and 8P waterproof types, use the O-ring under the panel as shown in Fig. (B) at the right.

- (3) Use the locking ring provided to mount the switch in a desired direction.

- (4) Be sure to use the lock washers provided not to allow the hex nut to become loose after tightening. Do not tighten the hex nut more than necessary.

- (5) Effective thickness of mounting panel

For the values of the effective thickness of mounting panel on the **Panel Cut-Out Dimensions** of each Series products, if the locking ring is not used, the thickness can be 1 mm thicker than the specified effective panel thickness since the thickness of the locking ring is 1 mm.



(Fig.B)

Common Specifications

■Common Specifications for Miniature Switches (JIS C 6571)

〈Toggle, Pushbutton, Rocker, and Slide Switches〉

1. Initial Contact Resistance

The initial contact resistance is measured at each contact when opening and closing operations are conducted five times in a row at 2 to 4 VDC, 1A and the value shall be 20 mΩ or below.

2. Dielectric Strength

There is no problem when the 50-60 Hz AC current of 1,000 V at rated max. voltage is 125 V or 1,500 V at 250 V is applied for one minute across the terminals and across terminals and the ground that are insulated under the normal pressure.

3. Insulation Resistance

The insulation resistance is measured across the insulated terminal and across terminals and ground with a 500 VDC insulation resistance tester and the value shall be 100 MΩ or over.

4. Electrical Life

5,000 to 30,000 opening and closing operations are possible at the rate of 12 cycles a minute while applying the rated voltage and current.

5. Cold Resistance

There is no problem regarding electrical and mechanical operations such as cracks, breaks, and rattling on the housing and insulation materials even after the switch is left for two hours in the constant temperature bath of $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$. In addition, after the test, the insulation resistance is measured after removing moisture sufficiently and leaving the switch as it is for one hour or longer and the value shall be 10 MΩ or over.

6. Heat Resistance

There is no excessive loosening and rattling even after the switch is left as it is for 16 hours in the constant temperature bath of $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$. In addition, after the test, the insulation resistance is measured after being left for one hour, and the value shall be 100 MΩ or over.

7. Humidity Resistance

After leaving the switch as it is for 96 hours in the atmosphere of 95% relative humidity at temperature of $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$, moisture is removed, the insulation resistance is measured within five minutes, and the value shall be 10 MΩ or over.

8. Vibration Resistance

There is no problem such as wrong operations and breakage when vibrations of 10-55 Hz and total amplitude of 1.5 mm are applied to the switch in three directions for two hours, respectively.

9. Shock Resistance

There is no problem such as wrong operations and breakage when a shock of 490 m/s^2 (50 G) acceleration and 11 msec duration is applied to the switch in six directions three times, respectively.

10. Electrostatic Capacity

When the electrostatic capacity is measured across terminals at an AC voltage of 1 MHz \pm 200 Hz frequency, the value shall be 5 pF or below.

11. Operating Temperature Range

The range shall be -15°C to $+70^{\circ}\text{C}$.

Soldering Precautions

1. Manual soldering

The temperature and the time of soldering are shown. For details of the temperature and the time, refer to the specifications of each Series product.

2. Auto soldering

Execute the auto soldering by using the jet wave type or dip type apparatus and control the dip temperature and the time. For details of soldering, refer to the specifications of each Series product.

- For the fluxer process of automatic dip, be sure to adjust the forming amount so that the flux (including form) will not splash on the switch.

3. Reflow soldering

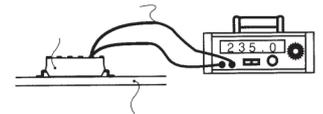
Execute the reflow soldering by using the inline type or the batch type apparatus. The reflow curves show the temperature profiles measured under the conditions of:

Device: Infrared type

Measuring point: Switch surface

For details of soldering, refer to the specifications of each Series product.

Since the temperature profiles will change delicately according to the size, thickness, and material of PC board, the packaging density of parts mounted on the board, vapor phase or hot air, other conditions of devices, be sure to set up the conditions after checking them in advance.



4. Mounting of accessory parts

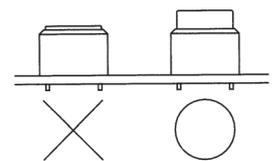
Mount the accessory parts including button, mounting frame and cap when the switch body is cooled down to room temperature after the solder dip (auto and reflow). In addition, solder dipping is conducted with the accessory parts mounted on the switch, the spring function of the snap-in button or the mounting frame will be deteriorated. Do not conduct dip soldering with the accessory parts mounted.

5. Removal of accessory parts

When the button or the cap is removed from the lock type switches (**TPL**, **LP** Series), the removal should be done under the free state with the lock released. When the part is removed under the locked state, the locking mechanism of the switch may be damaged.

6. Precautions for dipping the pushbutton switch

When the lock-type switch of the switching function type (**TPL**, **LP** Series) is subjected to dip soldering, do it under the free state with the lock released. Do not conduct dip soldering under the locked state since the resin or the pin may be deformed due to the soldering heat, resulting in occurrence of locking failure.



7. Printed circuit board

The PC Hole Layout stated on the catalog shows the hole diameter with the single-side through hole glass-epoxy board having the thickness of 1.6 mm set as the standard. The mounting condition may differ according to the finishing degree of board. Be sure to check the condition in advance.

8. Switch operation

Avoid any switch operation right after the soldering work.



Cleaning Precautions

1. Cleaning solution

For the solvent, use the alcohol-based solvent. Cleaning with organic solvents is prohibited. Cleaning with other cleaning solutions (water, Kao Cleanthru, Pine Alpha, etc.) shall not be guaranteed.

2. Non-washable switches

For non-washable switches, clean the solder surface with a brush to prevent the switch body from being exposed to the cleaning solution.

3. Immersion washing

- When the switch is cleaned after soldering, cleaning should be done when the terminal temperature is cooled down to 90°C or below.
- For immersion washing or shower washing, the temperature of the cleaning solvent should be 43°C or below. Regarding the cleaning time, be sure to set up the conditions after prior check, since the cleaning solution may enter into the switch depending on the cleaning conditions.

4. Do not use the ultrasonic cleaning system.

Do not use the ultrasonic cleaning system since the ultrasonic waves will adversely affect the airtightness or contact mechanism of the switch.

5. Switch operation

Avoid any switch operation right after washing.

Overseas Standards

UL



(RECOGNIZED MARK)

1) UL Standards

UL (Underwriters' Laboratories, Inc.) is a private testing institution established in 1894 under the sponsorship of National Bureau of Fire Underwriters (NBFU). The institution executes scientific surveys, research, and experiments concerning human life, fire, and other disasters; formulates safety standards to prevent losses caused by such disasters; and certifies the standards. In the United States, the government does not require the acquisition of the approval of this standard, but some states and cities require the acquisition by ordinances. The UL Standard is registered as one of the national standards and, for equipment to be exported, the use of UL-approved products is normal.

2) UL-approved Product

The  mark is indicated on the side of the switch body. Even if the product is UL-approved, it is not identified as the UL-approved product unless the  mark is indicated.

3) Method for placing order for UL-approved product

Even if the product is UL-approved, the product is not stocked with the  mark indicated. When placing an order, be sure to specify "With  Mark." For products with the mark, extra costs will be added (excluding A, LP, SLE6, SL10, SLE10, SLE210 Series products).

4) There are two methods where UL certification is necessary for the switch that is not listed in the List of UL-Approved Products.

① The case where we newly applies for UL certification

Contact us for details. We will inform you of the application fee, the number of lots, delivery date, etc.

② The case where the set manufacturer applies for UL certification as an assembled set

When the manufacturer contacts us, we will work together regarding the material certification. Since we may have changed the design for the reason of improving the quality, be sure to contact us in advance to prevent unexpected problems.

CSA



(CSA monogram)

1) CSA Standards

The CSA Standards are national standards of Canada, and the Canadian Standard Association was established in 1919. The CSA Standards are discretionary, but they are sometimes applied subject to federal or state laws. The standards attach weight to the safety standards for electrical shock hazards and fire concerning electrical wiring, etc.

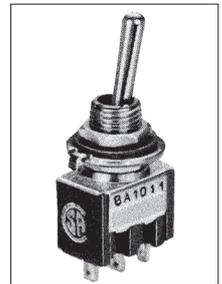
2) CSA-approved Product

The CSA mark is indicated on the side of the switch body. Even if the product is CSA-approved, it is not identified as a CSA-approved product unless the mark is indicated.

3) Method for placing order for CSA-approved product

Even if the product is CSA-approved, the product is not stocked with the  mark indicated. When placing an order, be sure to specify "With CSA Mark." For the products with the  mark, extra costs will be added (excluding LP, SLE6, SL10, SLE10 Series products).

4) For the CSA-approved products, contact the salespersons.



C-UL



●C-UL Standards

UL is certified as the safety certification institution and the testing institution for Canada by the Standards Council of Canada. According to the certification, the UL-certification institution is able to implement tests that conform to the Canadian Standards (CSA Standards) and the institution can certify the indication of the UL Mark for Canada ( Mark).

The product that carries the  mark can be marketed in Canada.

<PSE>



●Electrical Appliances and Material Safety Act

It is required by the Ministry Ordinance of Ministry of Economy, Trade and Industry to implement the conformance test for conformance to technical standards by restricting manufacturing and marketing of electrical appliances in Japan, thereby preventing risk and failure. The  mark is indicated on the electrical appliances that passed the conformance test. **The Electrical Appliances and Material Safety Act** is the successor to **the Electrical Appliances and Material Control Act** and was signed into law on April 1, 2001.

C - US UL



● **C - US UL Standards**

The C - US UL Standards mean that **UL** tests products regarding the UL Standards and the Canadian **CSA** Standards and indicates the **CULUS** mark on the electrical products that cleared the two standards.

The product carrying the **CULUS** mark can be marketed in both the United States and Canada,

SEMKO



● **SEMKO**

The **SEMKO** mark is indicated on the product that is certified by **ITS/ETL SEMKO**.

VDE



● **VDE Standards**

The **VDE** Standards stands for **Verband Deutscher Elektrotechniker e.v. (Association of German Electrical Engineers)**/ The association is a private institution based on **the Confederation of German Electrical Engineers** established in 1893. They have their unique **VDE** Standards to implement testing and screening.

For the products that carry the  mark, extra costs will be added (excluding **SLE6, SLE10, SL10K and SLE10K**).

TÜV



● **TÜV Standards**

The **TÜV** Standards is the abbreviation of **Technischer Überwachungs-Verein e.v. (technical inspection association)**, which is the aggregate of 11 independent organizations and is a private inspection organization officially approved by the German government.

The predecessor is the Steam Boiler Inspection Association, which inspects boiler containers, and the association has been broadening their activities into the fields of electric appliances, machines, and automotive and nuclear power.

ENEC



● **Common Mark thru Europe**

The **ENEC** mark is the European certification mark that enables manufacturers to enter all **EU** member countries, EFTA (European Free Trade Area), and East European countries.

The mark shown above is an example of the certification mark Operating switches acquired. A certification authority identification number is attached to the license mark.14 means it is released by the Sweden **SEMKO**.

Meaning of Term

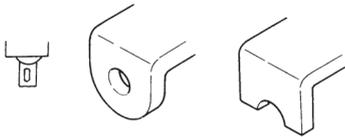
The terms listed in this section appear in this catalog. For the purpose of classification employed by catalog, the nuance may be slightly different from the synonyms used by other companies.

[Types of Terminal Shape]

Soldering Terminal

(Catalog Code: **SD** or **S/D**)

Terminal that has a hole or a cut-out to enable soldering by tangling the lead wire.

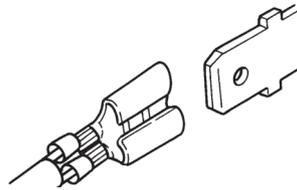


Tab Terminal

(Catalog Code: **TAB**)

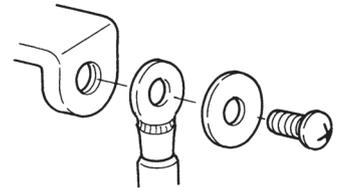
Standardized terminal to enable the use in pairs with the receptacle.

The code #187 means the terminal width is 0.187 inches.



Screw Terminal

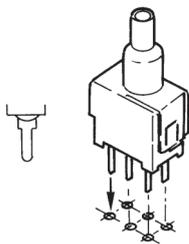
The terminal is threaded to enable fixing a lug terminal or a lead wire on the terminal with a screw.



PC Terminal

(Catalog Code: **PC** or **P/C**)

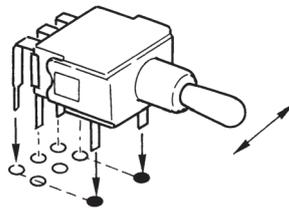
Terminal that enables dip soldering by inserting the terminals into the holes on the PC board.



Right Angle Terminal

(Catalog Code: **R/A**)

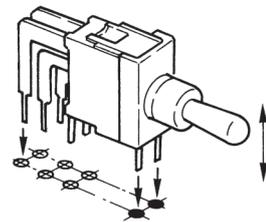
Terminal for direct mount on PC board (PC terminal). The terminals are bent at a right angle so that the operation direction of the knob becomes parallel with the PC board surface.



Vertical Mount Terminal

(Catalog Code: **V/M**)

Terminal for direct mount on PC board (PC terminal). The terminals are bent at a right angle so that the operation direction of the knob becomes vertical to the PC board surface.

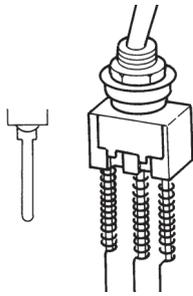


Meaning of Term

【Types of Terminal Shape】

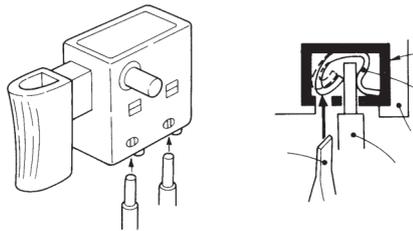
Wire Wrap Terminal

Long bar-like terminal to enable wrapping of lead wires around the terminals.



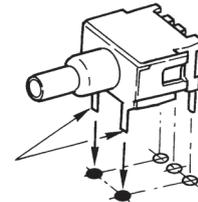
Insertion Terminal

Terminal where single-core cables are inserted into the terminal holes and the cables are fixed by holding them with spring pressure. The cable can be easily disconnected by inserting a blade-head screwdriver into the switch.



Support Terminal

With a single-pole switch, right-angle terminal, vertical-mount terminal, they are unstably mounted on PC board because the terminals are arranged in line and the transverse strength is insufficient. Therefore, the reinforcement terminals are provided to support the switch.



■Indication of Circuit Characteristics

The codes in English stated above the switch photo are as follows:

1-pole 1-throw: SPST (Single Pole Single Throw)

2-pole 2-throw: DPDT (Double Pole Double Throw)

3-pole 2-throw: 3PDT (3 Poles Double Throw)

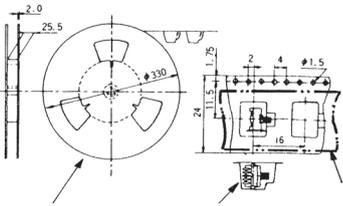
The front two letters **SP**, **DP** and **3P** show the number of poles; the following two letters **ST** and **DT** show the switching function: **ST** (ON-OFF function); **DT** (ON-ON). Other combinations include **SPDT**, **DPST** and others.

Meaning of Term

【Packaging Specifications】

Emboss Tape

This is the collective term including the reel, carrier tape, and cover tape. Switches are sandwiched between the strip-shaped carrier tape and cover tape and are spooled.



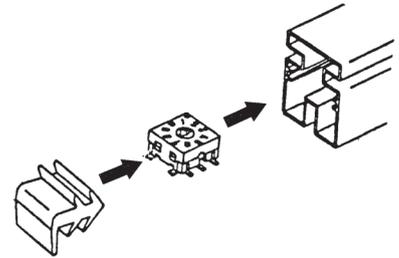
Partitioned Box

Switches that are individually packed in a vinyl bag are put in a cardboard box.



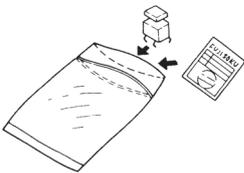
Stick

The stick is also referred to as the magazine and the switch is put in a long tube that is formed to fit the switch shape. This is mainly used to accommodate DIP switches.



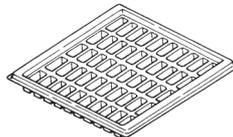
Plastic Bag with Zipper

Switches are put in a bulk state in a plastic bag with zipper.



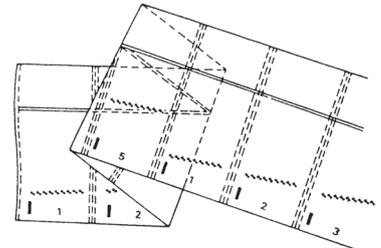
Tray

A tray consists of a plastic tray and a lid to accommodate switches.



Plastic Bag with Perforations

Twenty-five plastic bags are connected for accommodation of switches, and standard accessories including hex nut, lock washer and locking ring in a set.



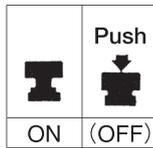
Note: The above-stated packaging specifications shall apply to the case that switches are delivered in whole number multiple of the unit packaging number. Therefore, if switches are delivered not in the whole number multiple of the unit packaging number (for example, delivery of 20 switches in the packaging specification of stick containing 64 switches), the packaging specifications will be different from those that are applicable to each Series product.

Meaning of Term

【Operation System】

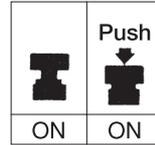
Momentary (Snapback)

The mechanism where, when a force is applied to the actuator, the connection circuit is switched over together with the actuator from the initial state and, when the force is removed, the connection circuit will be switched over together with the actuator to the initial state. In this catalog, such temporary connection state is indicated by using ().



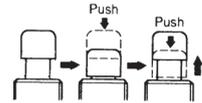
Alternate

The mechanism where, when a force is applied to the actuator, the connection circuit is switched over together with the actuator from the initial state and, when the force is removed, the actuator is restored to the initial state, but the circuit state will be held unchanged. When a force is applied again to the actuator, the actuator will also be restored to the initial state together with the connection circuit.



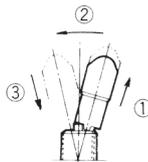
Push-Lock

As is the case with the pushbutton switches TPL Series, when the button is pressed, the button is held (locked) in the pressed state and the circuit is also locked in the switched-over state. A next pressing of the button will release the locking and the button and the circuit will be reset. One cycle (one operation) is achieved by two operations.



Locking Toggle

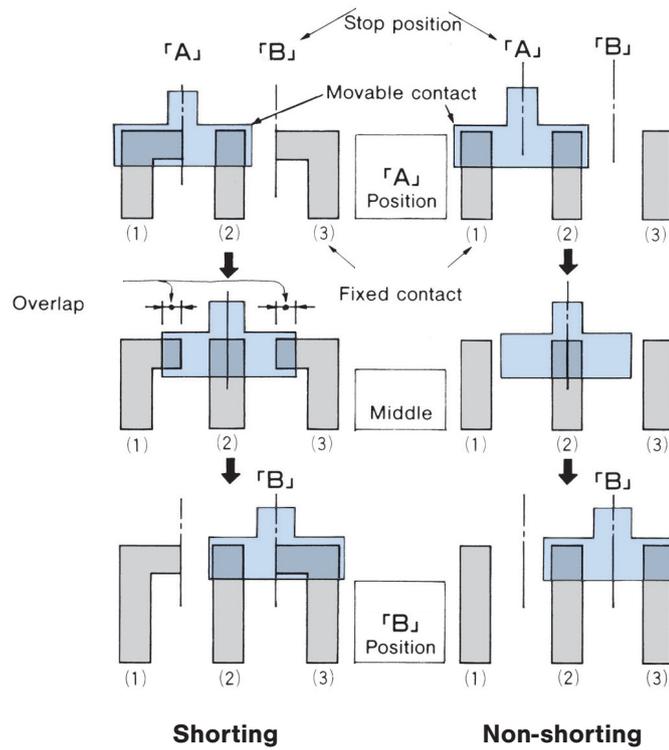
The malfunction prevention mechanism as is employed with the toggle switches 8E and ATLE Series, the actuator is designed not to move even if an object hits the lever. To activate the lever, intentionally lift up the lever and tilt it to the opposite side.



■ Shorting (Make-Before-Break)

A switch which momentarily connects both circuits when the actuator is moved from Point A to B in the below figure.

All switches which are not marked as "Shorting" are "Non-shorting" (Break-Before-Make).



[Fig.1]