# Explanation of Terms

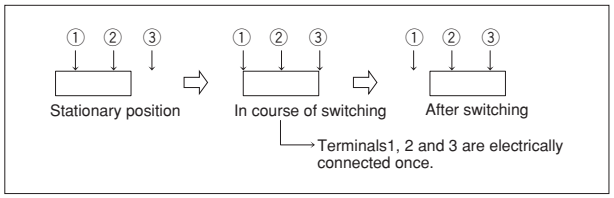
# Explanation of Terms

Some typical terms used in this catalog are explained below for your information.

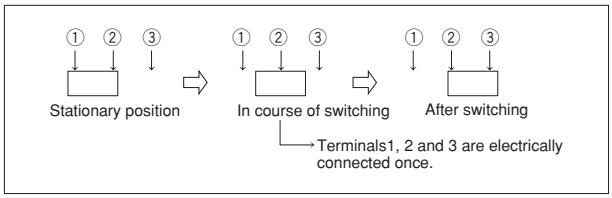
## ■ General

### Switchover Timing

●Shorting
Circuit switchover is carried out after electrical connections are once established between terminals.
〔Example〕



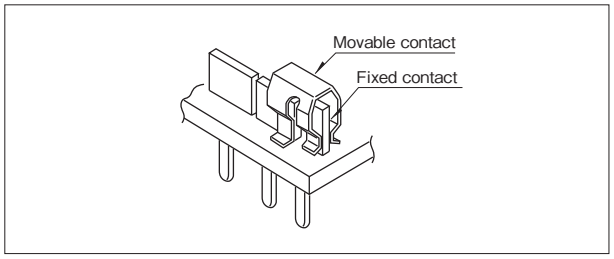

●Non-shorting
Circuit switchover is carried out after electrical connections between terminals are shut down once.
〔Example〕



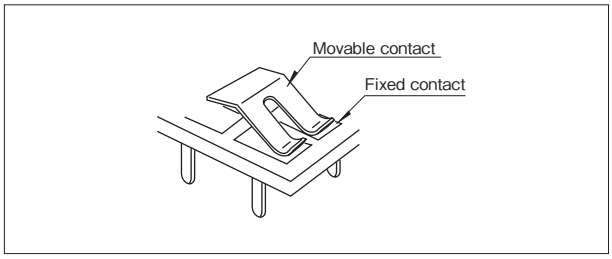

### Contact Structure

●Sliding Contact
Sliding contacts are constructed so that an insulator between contacts (a fixed contact and a movable contact) is removed by mechanical friction to keep the contact surface clean. Excellent for very low currents.

●Double-side Sliding
Sliding contact with fixed contact holding movable contact at both side.

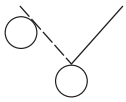
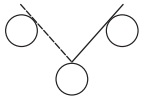
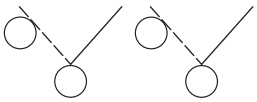



●Single-side Sliding
Sliding contact with fixed contact holding movable contact at one side.




### How to View the Circuit Diagram of Switch

The following circuits are mainly used in switches. The switch for very low current is expressed as □□ poles

| SPST (Single Pole Single Throw) | SPDT (Single Pole Double Throw) | DPST (Double Pole Single Throw) | DPDT (Double Pole Double Throw) |
|---|---|---|---|
|  |  |  |  |

### Snap-in

With kink-shaped terminals or frames, this is of a structure that keeps the switch from falling off after insertion into the PC board. We create a form that fits into a 1.6mm thick PC board, which is our standard.

# Explanation of Terms

## Taping (Packaging)

Delivery type, radial or embossed packaging.

●Embossed Taping

A polymer tape for packaging chips with emboss for automatic mounting.

●Radial Taping

A packaging method for automatic insertion; parts are mounted in a specified position on paper tape.

## Soldering Method

●Dip (Soldering)

A soldering method by moving PC board over flowing molten solder.

●Reflow (Soldering)

A soldering method for surface mounting; the entire board and part are soldered by cream soldering, etc. without using molten solder.

### ■Slide Switches

## Operation Mode

●Recoil

So that a key pushed to one side only stays in that position as long as it is held, a recoil mechanism is used to allow it to return to its original position when the force is released. There are three types depending on the direction the key is pushed: a left-side recoil for products operated only to the left; a right-side recoil for products operated only to the right; and a double-side recoil for products operated in both directions.

### ■Push Switches

## Operation Mode

●Latching

The switch stays On when the control knob is pushed and the knob locks in the pushed-in position. When pushed again, the switch unlocks and turns Off, with the control returning to its original position.

●Momentary

The switch stays On only as long as the control knob is pushed. Stop pushing and the switch turns Off as the knob returns to its original position.

●Alternate

The switch stays On when the control knob is pushed, but the knob returns to its original position. When pushed again, the switch turns Off and the knob again returns to its original position.

The knob's returning to its original position in both On and Off states is how this action differs from latching.

### ■TACT Switch™

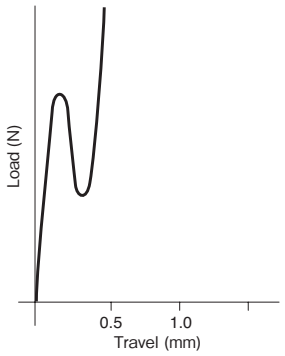
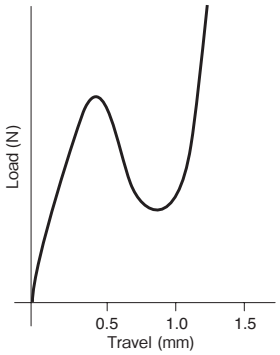
## Click (Tactile Feedback)

The feel indicated by the portion of each of the load – travel graphs on the next page where the curve turns back.
The greater this inversion portion is, the clearer it is to the operator that the switch has been activated.

〔Sharp Feeling〕
A sharp tactile feel corresponding to a feel of a metal spring type is obtainable. The travel is generally short, about 0.1 to 0.3mm.

〔Soft Feeling〕
A soft smooth tactile feedback feel corresponding to a feel of rubber spring type is obtainable. The travel is generally 1-2 mm.

# Explanation of Terms

| Sharp Feeling | Soft Feeling |
|---|---|
|  |  |



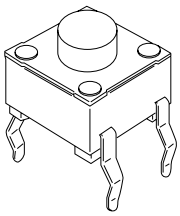
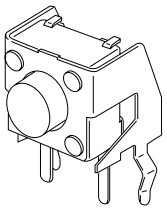


## Double Action

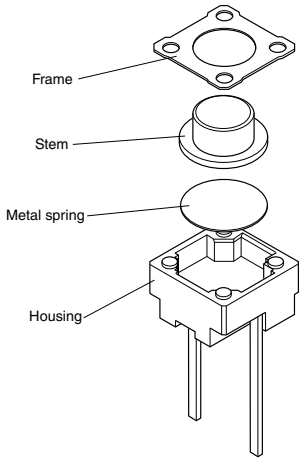
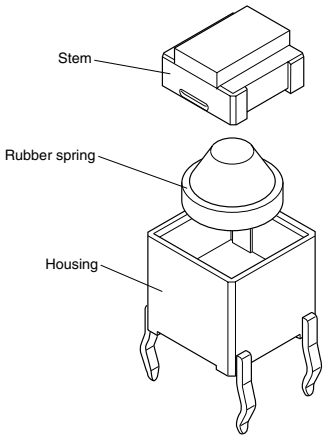
A structure that closes the first stage of the circuit with a light press on the switch and then closes the second stage of the circuit with a stronger press. A double-action switch is a keyswitch with two switch functions.
Our SKRN, SKSD and SKTC series are an example of this feature.

## Variety

The "Vertical Type" switch is operated by pressing it at right angles to the PC board. The "Horizontal Type" switch is operated by pressing it in parallel to the surface of the PC board.

| Top Push Type | Side Push Type |
|---|---|
|  |  |

〔Part Names of the TACT Switch™〕

| Sharp Feeling | Soft Feeling |
|---|---|
|  |  |

# Explanation of Terms

## ■Encoder

The rotation or travel of the operating shaft (operating knob) is output digitally as an electric signal. The encoder shown in this catalog is composed of a sliding contact and a pattern switch.

### Output Example of Absolute System

A type of encoder whose output consists of a code representing an absolute position, where different codes are assigned to each position. Rotary type encoders mainly employ Gray codes to indicate the shaft's current position.

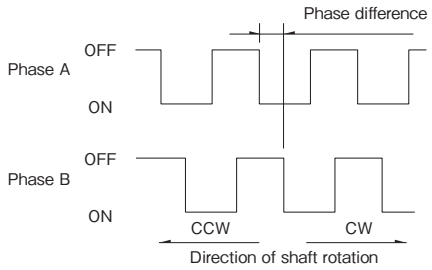
Output example for an absolute type (Gray code) encoder

| Position | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gray Code | 1 | | ON | ON | | | ON | ON | | | ON | ON | |
| | 2 | | | ON | ON | ON | ON | | | | | ON | ON |
| | 3 | | | | | ON | ON | ON | ON | ON | ON | ON | ON |
| | 4 | | | | | | | | | ON | ON | ON | ON |

### Output Example of Incremental System

Indicates a system which outputs the 2 different pulses (having phase differences) of the output timing. The pulses are output only to the extent where the shaft of the encoder is rotated and the direction of rotation is identified by phase differences.

Output example of incremental system




### Rotational Torque

Torque to turn the operating shaft (operating knob) .

### Detent (-type)

Mechanism that provides click feel during operation.

### Detent Torque

The torque required to rotate the control shaft (knob) of a potentiometer which has a detent.

### Maximum Resolution

Number of bits in case of an absolute-type encoder or number of pulses per rotation in case of an incremental-type encoder.

### Allowable Force in Push-pull Action for Shaft (Lever)

Maximum force at which the control part can endure without being broken when axial load is applied to the shaft (lever) .

### Insulation Resistance

The insulation between the active part (terminal) and the body or shaft (lever) of the product is expressed as the resistance value. The larger the value, the higher the insulation.

# Explanation of Terms

### Self-return Switch

Rotary switch that turns ON when the shaft is rotated either way; when it is released, the shaft automatically returns to the center position, which turns OFF.

### Knurl (Serration)

Shape of the encoder shaft. Regular crest pattern is formed on the outer circumference of shaft for fitting with the knob.

### Withstand Voltage

This is the voltage at which the insulation between the active part of the product and the insulated body or shaft (lever) is destroyed.

### Push Momentary

A momentary switch that is on only when the shaft is pressed.

## ■Potentiometers

### Allowable Operating Force

Maximum operating force that the lever can endure without breakage, when it is turned to full CW or CCW position.

### Rotational Torque

Torque to turn the operating shaft (operating knob) .

### Detent (-type)

Mechanism that provides click feel during operation.

### Detent Torque

The torque required to rotate the control shaft (knob) of a potentiometer which has a detent.

### Derating Curve

Curve that shows the relationship between the ambient temperature and maximum power. (Unit: percentage to rated power)

### Nominal Total Resistance

Resistance value that represents the specified values (reference resistance) .

### Maximum Allowable Operating Voltage

Maximum voltage applicable to the resistor specified for the potentiometer type.

### Maximum Attenuation Level

Ratio of voltage between terminal 1 and terminal 2 (or between terminal 2 and terminal 3) in relation with the voltage applied to both ends of the resistor when the operating shaft (operating knob) is in its full CW or CCW position. (Unit: decibels)

### Allowable Operating Torque

Maximum operating torque that the operating shaft (operating knob) can endure in its full CW or CCW position.

### Operating Force

Force to operate the control part.

### Residual Resistance

Resistance (value) between the end terminal (terminal 1 or terminal 3) and the sliding terminal (terminal 2) when the control shaft (control part) is in its full CW or CCW position.

# Explanation of Terms

## Shaft (Lever) Play

Play (tilt) of the shaft (lever) when a specified force is applied perpendicular to the shaft (lever) .

## Shaft Tilt

Parallel or perpendicular shift from the axial line or mounting surface with no load applied to the shaft, assuming the potentiometer mounting surface as reference.

## Chassis Stopper

Boss provided on a chassis in order to prevent unintentional rotation for a purpose of positioning a rotary potentiometer during assembly.

## Sliding Noise

Electrical noise that is generated when a potentiometer is operated, expressed as voltage or resistance ratio.

## Insulation Resistance

The insulation between the active part (terminal) and the body or shaft (lever) of the product is expressed as the resistance value. The larger the value, the higher the insulation.

## Total Rotational Angle

Rotational angle of the operating shaft between both ends.

## Center Detent

A detent positioned at a potentiometer's center of full rotation.

## Total Resistance and Tolerance

A basic performance item of a potentiometer. Resistance between terminal 1 and terminal 3 and its tolerance.

## Gang Error

Gap between respective resistance tapers of several potentiometers that make up a multi-ganged-type potentiometer.(Unit:decibel)

## Moisture Load Life

Variation of the electrical characteristics of a potentiometer when a test piece is allowed to stand under specified temperature and humidity conditions for many hours and is then returned to normal temperature and humidity conditions.

## Dummy Terminal

Terminal that does not function electrically.

## □-terminal

When describing the terminal numbers of a potentiometer, the terminals connected to both ends of a resistor element are called terminal 1 and terminal 3. The terminal connected to the sliding contact is called terminal 2.

## Carbon Film (Resistor)

Resistance element that is formed from a carbon-base film and used for general-purpose potentiometers.

## Mounting Height

Height from the surface of the PC board to the top of the shaft when a rotary potentiometer is soldered on the board.

## Load Life

Tolerance of the electrical characteristics after applying a voltage that is equivalent to rated power between specified terminals of a potentiometer for a specified period under certain temperature.

## Push Momentary

A momentary switch that is on only when the shaft is pressed.

# Explanation of Terms

## Push-and-lock

A product type that can be locked with the shaft pushed to house the control part (knob) in the set body when the product is set and no more operated.

## Printed Circuit Terminal

This is a terminal to be inserted in the mounting hole of a PW board and soldered.

## Resistance Taper

Characteristics that indicate the change in the resistance or output voltage of a potentiometer in reference with travel.

## Eccentricity

Deviation in the position of the shaft or lever from the original reference position (deflection).

## Lug Terminal

A conductive metal terminal used for joining wires.