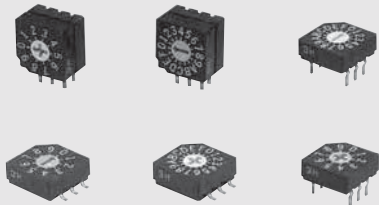
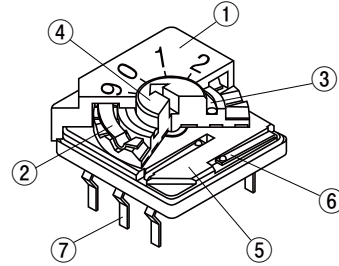


RoHS compliant



INTERNAL STRUCTURE  
SD-1000 / 2000 series

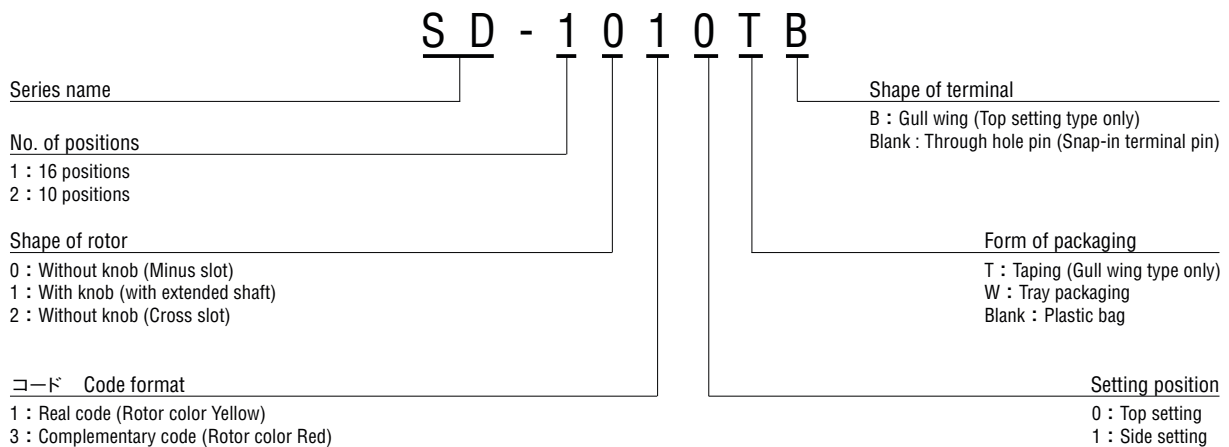


## FEATURES

- RoHS compliant
- Fine click with metallic spring
- Low profile of 3.9 mm makes perfect for high density board mounting applications
- Gold plated contact provides excellent reliability
- Cross and minus slot are available
- Terminal pin arrangement 3-3

| Part name         | Material   | Flammability |
|-------------------|--|--------------|
| ① Housing         | Polyphenylenesulphide                                    | UL94V-0      |
| ② Metallic spring | Stainless (SUS 301)                                      | —            |
| ③ “0” ring        | Silicone rubber  | UL94HB       |
| ④ Insert rotor    | Rotor : Polyamide<br>Pattern : Copper alloy, Gold-plated | UL94V-0      |
| ⑤ Base            | Polyphenylenesulphide                                    | UL94V-0      |
| ⑥ Contact         | Copper alloy, Gold-plated                                | —            |
| ⑦ Terminal pin    |  |              |

## PART NUMBER DESIGNATION



※ Please refer to the LIST OF PART NUMBERS when placing orders.

# SD-1000/2000

## ROTARY CODED SWITCHES

### LIST OF PART NUMBERS

#### Binary coded decimal

| Shape of rotor                     |                           | Form of packaging | Real code | Complementary code | Pieces in package |
|------------------------------------|---------------------------|-------------------|-----------|--------------------|-------------------|
| Top setting<br>(Through hole pin)  | Without knob (Minus slot) | Plastic bag       | SD-2010   | SD-2030            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2010W  | SD-2030W           | 50 pcs./tray      |
|                                    | With knob                 | Plastic bag       | SD-2110   | SD-2130            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2110W  | SD-2130W           | 50 pcs./tray      |
|                                    | Without knob (Cross slot) | Plastic bag       | SD-2210   | SD-2230            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2210W  | SD-2230W           | 50 pcs./tray      |
| Side setting<br>(Through hole pin) | Without knob (Minus slot) | Plastic bag       | SD-2011   | SD-2031            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2011W  | SD-2031W           | 50 pcs./tray      |
|                                    | With knob                 | Plastic bag       | SD-2111   | SD-2131            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2111W  | SD-2131W           | 50 pcs./tray      |
|                                    | Without knob (Cross slot) | Plastic bag       | SD-2211   | SD-2231            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2211W  | SD-2231W           | 50 pcs./tray      |
| Top setting<br>(Gull wing)         | Without knob (Minus slot) | Plastic bag       | SD-2010B  | SD-2030B           | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2010WB | SD-2030WB          | 50 pcs./tray      |
|                                    |                           | Taping            | SD-2010TB | SD-2030TB          | 500 pcs./reel     |
|                                    | Without knob (Cross slot) | Plastic bag       | SD-2210B  | SD-2230B           | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-2210WB | SD-2230WB          | 50 pcs./tray      |
|                                    |                           | Taping            | SD-2210TB | SD-2230TB          | 500 pcs./reel     |

#### Binary coded hexadecimal

| Shape of rotor                     |                           | Form of packaging | Real code | Complementary code | Pieces in package |
|------------------------------------|---------------------------|-------------------|-----------|--------------------|-------------------|
| Top setting<br>(Through hole pin)  | Without knob (Minus slot) | Plastic bag       | SD-1010   | SD-1030            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1010W  | SD-1030W           | 50 pcs./tray      |
|                                    | With knob                 | Plastic bag       | SD-1110   | SD-1130            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1110W  | SD-1130W           | 50 pcs./tray      |
|                                    | Without knob (Cross slot) | Plastic bag       | SD-1210   | SD-1230            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1210W  | SD-1230W           | 50 pcs./tray      |
| Side setting<br>(Through hole pin) | Without knob (Minus slot) | Plastic bag       | SD-1011   | SD-1031            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1011W  | SD-1031W           | 50 pcs./tray      |
|                                    | With knob                 | Plastic bag       | SD-1111   | SD-1131            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1111W  | SD-1131W           | 50 pcs./tray      |
|                                    | Without knob (Cross slot) | Plastic bag       | SD-1211   | SD-1231            | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1211W  | SD-1231W           | 50 pcs./tray      |
| Top setting<br>(Gull wing)         | Without knob (Minus slot) | Plastic bag       | SD-1010B  | SD-1030B           | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1010WB | SD-1030WB          | 50 pcs./tray      |
|                                    |                           | Taping            | SD-1010TB | SD-1030TB          | 500 pcs./reel     |
|                                    | Without knob (Cross slot) | Plastic bag       | SD-1210B  | SD-1230B           | 25 pcs./pack      |
|                                    |                           | Tray packaging    | SD-1210WB | SD-1230WB          | 50 pcs./tray      |
|                                    |                           | Taping            | SD-1210TB | SD-1230TB          | 500 pcs./reel     |

※ Verify the above part numbers when placing orders.

※ Taping and tray version can be supplied only in reel or tray units.

# SD-1000/2000

## ROTARY CODED SWITCHES

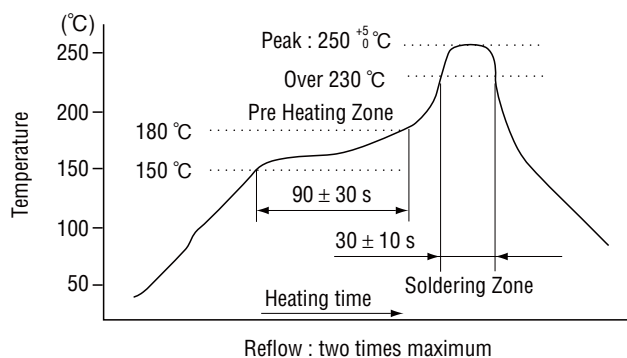
### STANDARD SPECIFICATIONS

|                             |  |
|-----------------------------|--|
| Circuit type                | BCD (Real code, complementary code)<br>BCH (Real code, complementary code)   |
| Operating temperature range | -40 ~ 85 °C  |
| Storage temperature range   |  |
| Sealing                     | Non washable   |
| Net weight                  | Without knob Top setting 0.65 g<br>With knob Top setting 0.76 g<br>Without knob Side setting 0.95 g<br>With knob Side setting 1.05 g |

### ENVIRONMENTAL CHARACTERISTICS

|                           |  |
|---------------------------|--|
| Vibration                 | (Amplitude) 1.5 mm or<br>(Acceleration) 98 m/s <sup>2</sup> ,<br>10-500-10 Hz, 3 directions for 2 h each |
| Shock                     | 490 m/s <sup>2</sup> , 11 ms<br>6 directions for 3 times each  |
| Humidity                  | Resistance load DC50V 100mA<br>40 °C, Relative humidity 90 ~ 95 %, 240 h                                 |
| Load life                 | 20000 steps<br>DC5 V, 100 mA   |
| High temperature exposure | 85 °C, 96 h  |
| Low temperature exposure  | -40 °C, 96 h   |
| Thermal shock             | -40 (0.5 h) ~ 85 °C (0.5 h), 5 cycles  |

### <Reflow profile for soldering heat evaluation>



### ELECTRICAL CHARACTERISTICS

|                       |   |
|-----------------------|---|
| Contact rating        | DC50 V 100 mA<br>DC5 V 100 mA<br>DC20 mV 1 μA |
| Non-switching         |   |
| Switching             |   |
| Minimum               |   |
| Contact resistance    | 100 mΩ maximum                                |
| Insulation resistance | 1000 MΩ (DC100 V) minimum                     |
| Dielectric strength   | AC250 V, 60 s                                 |

### MECHANICAL CHARACTERISTICS

|   |                                     |  |
|---|-------------------------------------|--|
| No. of positions                          | 16 (SD-1000), 10 (SD-2000)          |  |
| Adjustment torque                         | 4 ~ 25 mN·m {41 ~ 255 gf·cm}        |  |
| Stepping angle                            | 22.5° (SD-1000), 36° (SD-2000)      |  |
| Terminal strength (Through hole pin only) | 10 N {1.02 kgf} minimum             |  |
| Stop strength (With knob only)            | 10 N {1.02 kgf}, 10 s               |  |
| Solderability                             | 245 ± 3 °C, 2 ~ 3 s                 |  |
| Soldering heat                            | Gull wing                           | Reflow : Peak temperature 255 °C<br>(Please refer to the profile below.)<br>Manual soldering : 350 ± 10 °C, 3 ~ 4 s  |
|   | Through hole pin                    | Flow : 260 ± 3 °C as the temperature in a pot of molten solder, immersion from head of terminal to backside of board 5 ~ 6 s, two times maximum<br>Manual soldering : 380 ± 10 °C, 3 ~ 4 s |
| Shear (Gull wing only)                    | 5 N {0.51 kgf}, 10 s                |  |
| Substrate bending (Gull wing only)        | Width 90 mm, bend 3 mm, 5 s, 1 time |  |
| Pull-off strength (Gull wing only)        | 5 N {0.51 kgf}, 10 s                |  |

{ } : Reference only

# SD-1000/2000

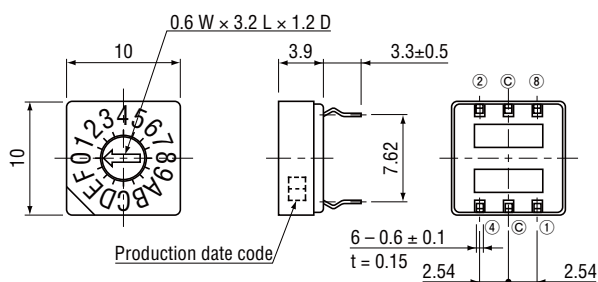
## ROTARY CODED SWITCHES

### OUTLINE DIMENSIONS

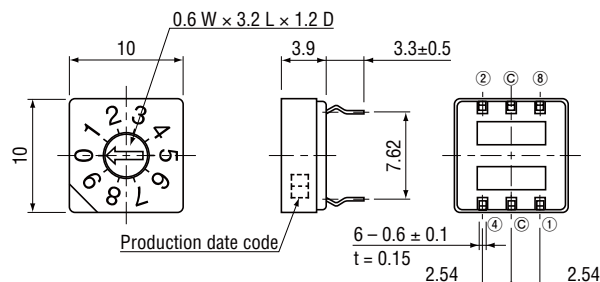
Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)

#### <Through hole pin, Top setting>

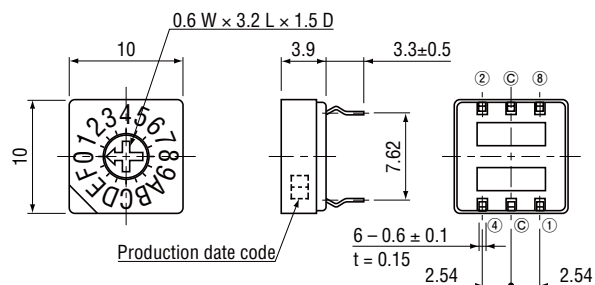
- SD-1010 (Real code)
- SD-1030 (Complementary code)



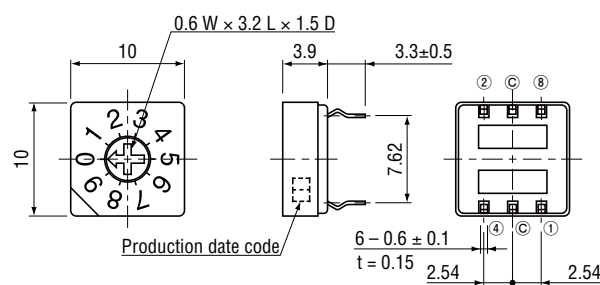
- SD-2010 (Real code)
- SD-2030 (Complementary code)



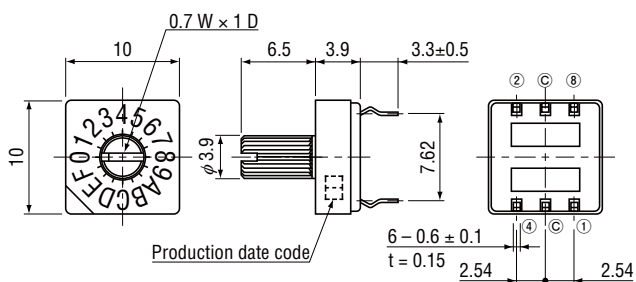
- SD-1210 (Real code)
- SD-1230 (Complementary code)



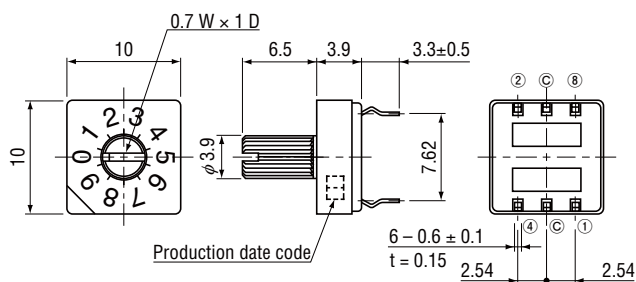
- SD-2210 (Real code)
- SD-2230 (Complementary code)



- SD-1110 (Real code)
- SD-1130 (Complementary code)



- SD-2110 (Real code)
- SD-2130 (Complementary code)



# SD-1000/2000

## ROTARY CODED SWITCHES

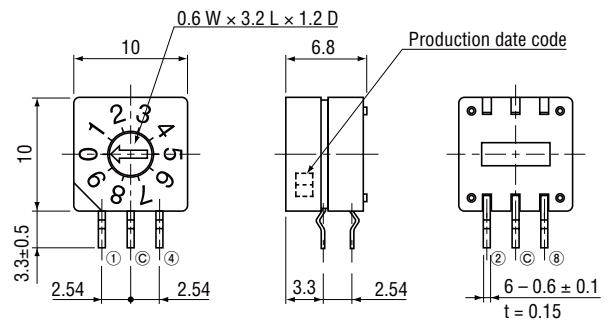
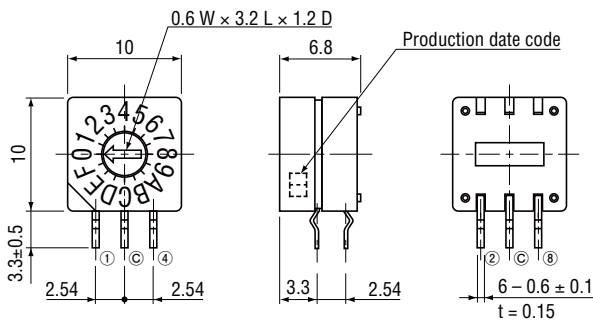
### OUTLINE DIMENSIONS

Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)

#### <Through hole pin, Side setting>

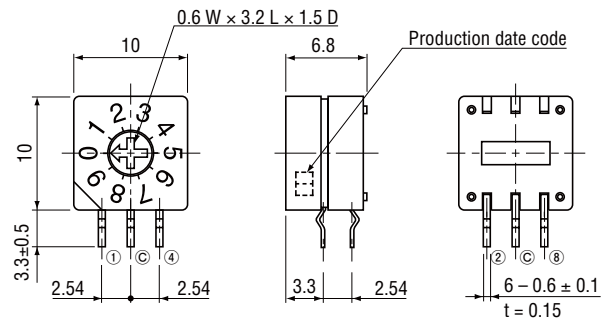
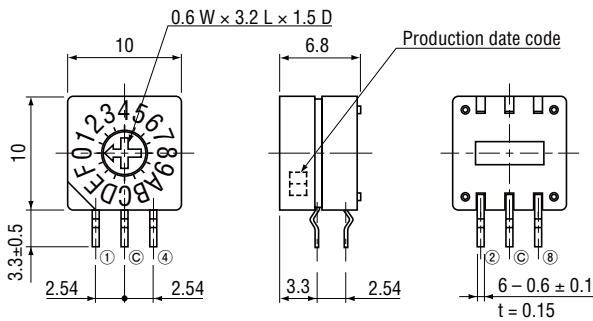
- SD-1011 (Real code)
- SD-1031 (Complementary code)

- SD-2011 (Real code)
- SD-2031 (Complementary code)



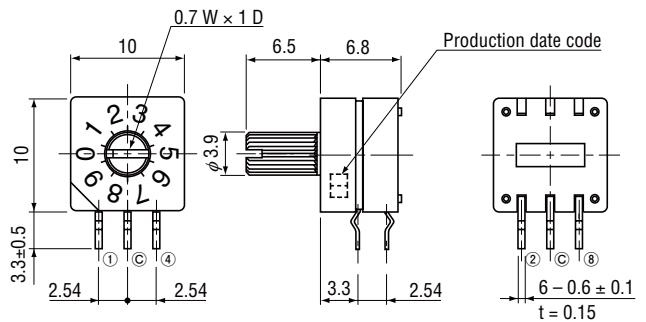
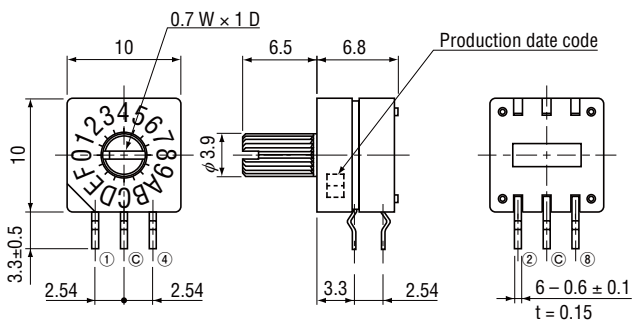
- SD-1211 (Real code)
- SD-1231 (Complementary code)

- SD-2211 (Real code)
- SD-2231 (Complementary code)



- SD-1111 (Real code)
- SD-1131 (Complementary code)

- SD-2111 (Real code)
- SD-2131 (Complementary code)



# SD-1000/2000

## ROTARY CODED SWITCHES

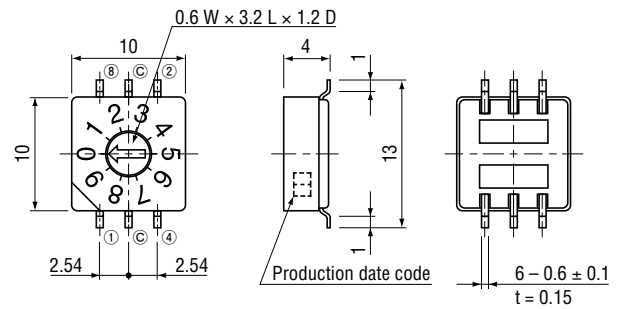
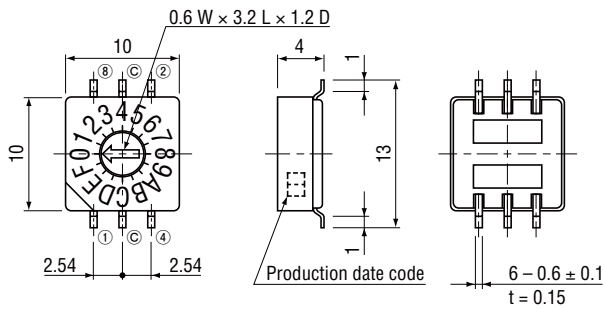
### OUTLINE DIMENSIONS

Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)

#### <Gull wing, Top setting>

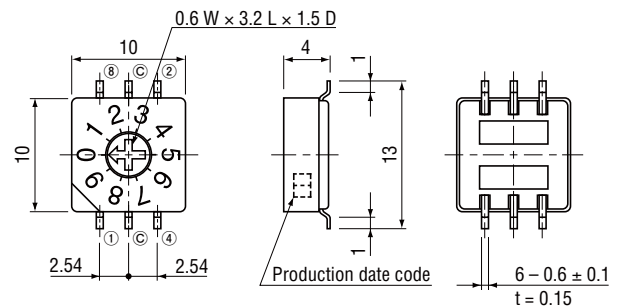
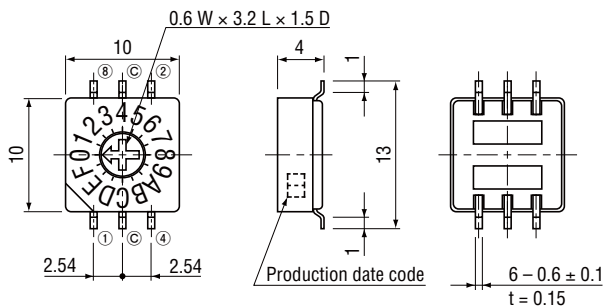
- SD-1010B (Real code)
- SD-1030B (Complementary code)

- SD-2010B (Real code)
- SD-2030B (Complementary code)



- SD-1210B (Real code)
- SD-1230B (Complementary code)

- SD-2210B (Real code)
- SD-2230B (Complementary code)



# SD-1000/2000

## ROTARY CODED SWITCHES

### CODE FORMAT

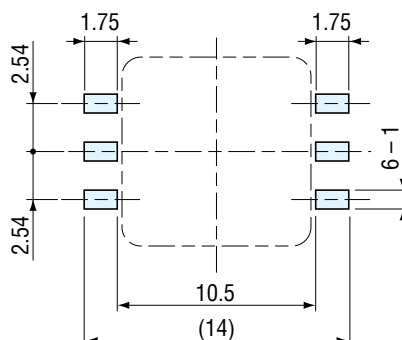
| No. of positions |                    | SD-1000 series (16 positions) |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|------------------|--------------------|-------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                  |                    | SD-2000 series (10 positions) |   |   |   |   |   |   |   |   |   | A | B | C | D | E | F |
| Position         |                    | 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |   |   |   |   |   |   |
| Code             | Real code          | 8                             |   |   |   |   |   |   |   | ● | ● | ● | ● | ● | ● | ● |   |
|                  |                    | 4                             |   |   |   |   | ● | ● | ● | ● |   |   |   |   |   |   |   |
|                  |                    | 2                             |   |   | ● | ● |   |   | ● | ● |   |   | ● | ● | ● | ● | ● |
|                  |                    | 1                             |   | ● |   | ● |   |   | ● | ● |   | ● |   |   | ● |   | ● |
|                  | Complementary code | 8                             | ● | ● | ● | ● | ● | ● | ● | ● |   |   |   |   |   |   |   |
|                  |                    | 4                             | ● | ● | ● | ● |   |   |   |   | ● | ● | ● | ● |   |   |   |
|                  |                    | 2                             | ● | ● |   |   | ● | ● |   |   | ● | ● |   | ● | ● |   |   |
|                  |                    | 1                             | ● |   | ● |   | ● |   | ● |   | ● |   | ● |   | ● |   | ● |

● ...Contact closed

### TERMINAL CONNECTION / P.C.B. THROUGH HOLE DIMENSIONS (Unit: mm)

|                                   | Top setting                              | Side setting   |
|-----------------------------------|--|--|
| Terminal pin layout (Bottom view) | <p>Real code      Complementary code</p> | <p>Operating face of real code      Operating face of complementary code</p> |
| P.C.B. dimensions (Bottom view)   | <p>SD-1000/2000 case</p>                 | <p>SD-1000/2000 case</p>   |

### RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS



# SD-1000/2000

## ROTARY CODED SWITCHES

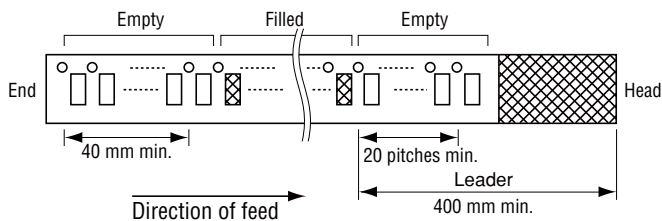
### PACKAGING SPECIFICATIONS

#### <Taping packaging specifications>

- Taping version is packaged in 500 pcs. per reel.  
Orders will be accepted for units of 500 pcs., i.e., 500, 1000, 1500 pcs., etc.
- Taping version is boxed with one reel (500 pcs.).

Maximum number of consecutive missing pieces=2  
Leader length and reel dimension are shown in the diagrams below:

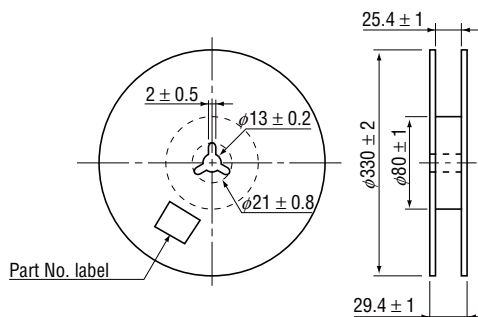
#### ● Embossed tape dimensions



#### ● Reel dimensions

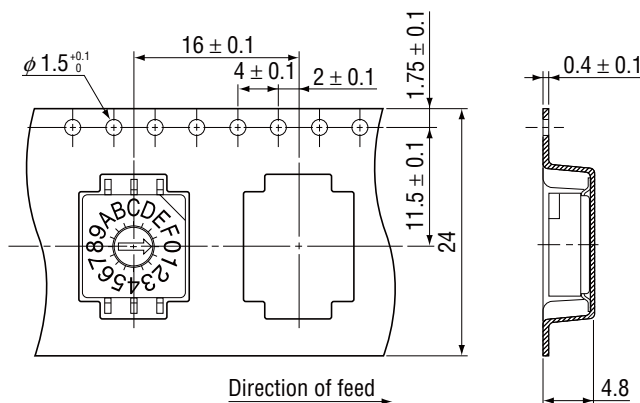
(Unit: mm)

(In accordance with EIAJ ET-7200A)



(Unit: mm)

(In accordance with EIAJ RC-1009B)



#### <Tray packaging specifications>

- Tray version is packaged in 50 pcs. per tray. Orders will be accepted for units of 50 pcs., i. e., 50, 100, 150 pcs. etc.
- Tray version is boxed with 10 trays.

#### <Bulk pack specifications>

- The smallest unit of bulk pack in a plastic bag is 10 pcs. per pack. Orders will be accepted for unit of minimum 10 pcs., i.e., 10, 20, 30 pcs. , etc.
- Boxing of bulk in a plastic bag is performed with 25 pcs. (standard 50 pcs.) per box.