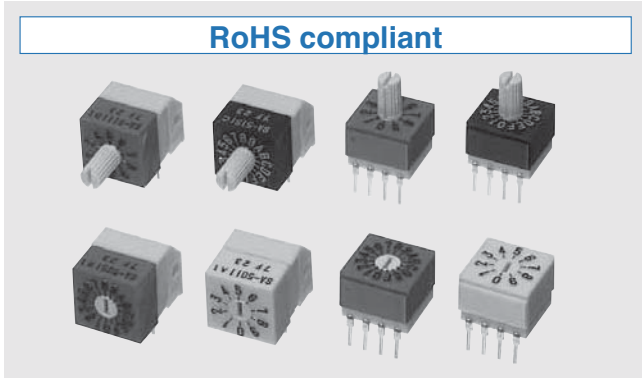


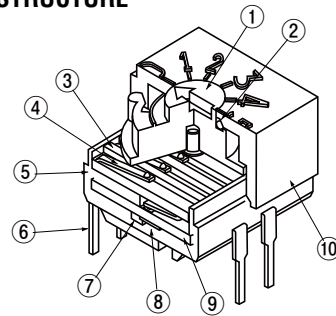
RoHS compliant



FEATURES

- RoHS compliant
- Washable
- Easy pulling-up or pulling-off (A & B type)
- PC board space saving due to contained resistor/diode
- No need of cross pattern P.C.B. design

INTERNAL STRUCTURE



| Part name | | Material | Flammability |
|-----------|----------------|---|--------------|
| ① | Insert rotor | Rotor : Polyoxymethylene Pattern : Copper alloy, Gold-plated | UL94HB |
| ② | “0” ring | Silicone rubber | |
| ③ | Contact holder | Polybutyleneterephthalate | — |
| ④ | Contact | Copper alloy, Gold-plated | |
| ⑤ | Base | Polybutyleneterephthalate | |
| ⑥ | Terminal pin | Copper alloy, Sn-Cu-plated | — |
| ⑦ | Diode | — | |
| ⑧ | Resistor | Chip resistor | |
| ⑨ | Board | Gold-plated epoxy board, Gold-plated | |
| ⑩ | Housing | Polybutyleneterephthalate | UL94HB |

The “SA-5000 Series” are divided into 3 types according to the kind of a built-in circuit.

● **A type: Built-in resistors (Housing color Yellow)**

In order to use conventional code switches in a digital circuit, pull-up or pull-down resistors must be connected externally. This type contains these resistors.

● **B type: Pulling-up resistors and built-in diodes (Housing color Red)**

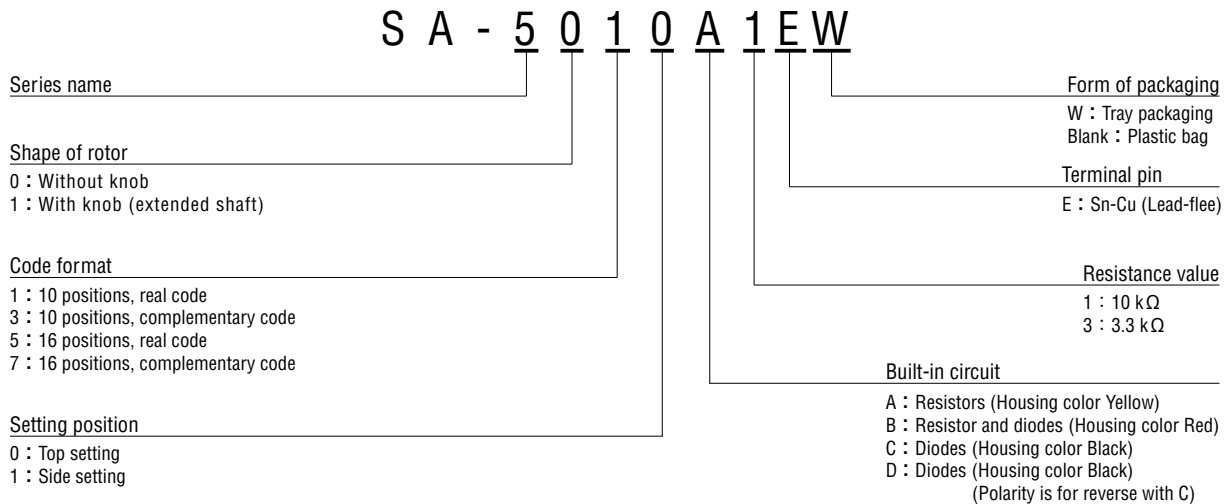
● **C and D type: Built-in diodes (Housing color Black)**

When using more than one code switch arranged as a code of plural figures, the digital circuit makes a comparison of signals received through a line called a common bus line as its own method. For this, it is necessary to connect a diode for preventing reverse current to the middle of output terminal of each switch and a bus line. The product is a hybrid switch integrating such a diode. Diodes of C and D types are set in a reverse direction.

SA-5000

ROTARY CODED SWITCHES

■ PART NUMBER DESIGNATION



■ STANDARD SPECIFICATIONS

| | |
|-----------------------------|--|
| Circuit type | BCD (Real code, complementary code) BCH (Real code, complementary code) |
| Operating temperature range | -25 ~ 75 °C |
| Storage temperature range | |
| Sealing | Washable by "O" ring ※Please refer to 150,151 |
| Net weight | Approx. 1.5 g (Top setting) Approx. 2.0 g (Side setting) Approx. 1.6 g (Top setting with knob) Approx. 2.0 g (Side setting with knob) |

■ MECHANICAL CHARACTERISTICS

| | |
|-------------------|---|
| No. of positions | 16, 10 |
| Adjustment torque | 10 ~ 35 mN·m {102 ~ 357 gf·cm} |
| Stepping angle | 22.5° (16 positions) 36° (10 positions) |
| Terminal strength | 10 N {1.02 kgf} minimum |
| Solderability | 245 ± 3 °C, 2 ~ 3 s |
| Soldering heat | Flow : 260 ± 3 °C, 5 ~ 6 s, two times maximum Manual soldering : 380 ± 10 °C, 3 ~ 4 s |

{ } : Reference only

■ ELECTRICAL CHARACTERISTICS

| | |
|--|-------------------------------|
| Contact rating Non-switching Switching | DC50 V 100 mA DC5 V 100 mA |
| Contact resistance | 1 Ω maximum |
| Insulation resistance | 1000 MΩ (DC100 V) minimum |
| Dielectric strength | AC250 V, 60 s |

■ ENVIRONMENTAL CHARACTERISTICS

| | |
|---------------------------|--|
| Vibration | (Amplitude) 1.5 mm or (Acceleration) 98 m/s ² , 10-500-10 Hz, 3 directions for 2 h each |
| Shock | 490 m/s ² , 11 ms 6 directions for 3 times each |
| Load life | 10000 steps minimum DC5 V, 100 mA |
| Humidity (Steady state) | 40 °C, Relative humidity 90 ~ 95 %, 240 h |
| High temperature exposure | 75 °C, 16 h |
| Low temperature exposure | -25 °C, 16 h |
| Thermal shock | -25 (0.5 h) ~ 75 °C (0.5 h), 5 cycles |

SA-5000

ROTARY CODED SWITCHES

LIST OF PART NUMBERS

| Shape | Internal circuit | Resistance value | Form of packaging | Binary coded decimal | | Binary coded hexadecimal | | Pieces in package | |
|----------------|------------------|-----------------------------|-------------------|----------------------|--------------------|--------------------------|--------------------|-------------------|--------------|
| | | | | Real code | Complementary code | Real code | Complementary code | | |
| Top setting | Without knob | Built-in resistor | 10 kΩ | Tray packaging | SA-5010A1EW | SA-5030A1EW | SA-5050A1EW | SA-5070A1EW | 50 pcs./tray |
| | | | Plastic bag | SA-5010A1E | SA-5030A1E | SA-5050A1E | SA-5070A1E | 25 pcs./pack | |
| | | 3.3 kΩ | Tray packaging | SA-5010A3EW | SA-5030A3EW | SA-5050A3EW | SA-5070A3EW | 50 pcs./tray | |
| | | | Plastic bag | SA-5010A3E | SA-5030A3E | SA-5050A3E | SA-5070A3E | 25 pcs./pack | |
| | | Built-in resistor and diode | 10 kΩ | Tray packaging | SA-5010B1EW | SA-5030B1EW | SA-5050B1EW | SA-5070B1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5010B1E | SA-5030B1E | SA-5050B1E | SA-5070B1E | 25 pcs./pack |
| | | | 3.3 kΩ | Tray packaging | SA-5010B3EW | SA-5030B3EW | SA-5050B3EW | SA-5070B3EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5010B3E | SA-5030B3E | SA-5050B3E | SA-5070B3E | 25 pcs./pack |
| | | Built-in diode | — | Tray packaging | SA-5010CEW | SA-5030CEW | SA-5050CEW | SA-5070CEW | 50 pcs./tray |
| | | | | Plastic bag | SA-5010CE | SA-5030CE | SA-5050CE | SA-5070CE | 25 pcs./pack |
| | — | | Tray packaging | SA-5010DEW | SA-5030DEW | SA-5050DEW | SA-5070DEW | 50 pcs./tray | |
| | | | Plastic bag | SA-5010DE | SA-5030DE | SA-5050DE | SA-5070DE | 25 pcs./pack | |
| | With knob | Built-in resistor | 10 kΩ | Tray packaging | SA-5110A1EW | SA-5130A1EW | SA-5150A1EW | SA-5170A1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5110A1E | SA-5130A1E | SA-5150A1E | SA-5170A1E | 25 pcs./pack |
| | | | 3.3 kΩ | Tray packaging | SA-5110A3EW | SA-5130A3EW | SA-5150A3EW | SA-5170A3EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5110A3E | SA-5130A3E | SA-5150A3E | SA-5170A3E | 25 pcs./pack |
| | | Built-in resistor and diode | 10 kΩ | Tray packaging | SA-5110B1EW | SA-5130B1EW | SA-5150B1EW | SA-5170B1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5110B1E | SA-5130B1E | SA-5150B1E | SA-5170B1E | 25 pcs./pack |
| | | | 3.3 kΩ | Tray packaging | SA-5110B3EW | SA-5130B3EW | SA-5150B3EW | SA-5170B3EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5110B3E | SA-5130B3E | SA-5150B3E | SA-5170B3E | 25 pcs./pack |
| Built-in diode | | — | Tray packaging | SA-5110CEW | SA-5130CEW | SA-5150CEW | SA-5170CEW | 50 pcs./tray | |
| | | | Plastic bag | SA-5110CE | SA-5130CE | SA-5150CE | SA-5170CE | 25 pcs./pack | |
| | — | Tray packaging | SA-5110DEW | SA-5130DEW | SA-5150DEW | SA-5170DEW | 50 pcs./tray | | |
| | | Plastic bag | SA-5110DE | SA-5130DE | SA-5150DE | SA-5170DE | 25 pcs./pack | | |

※ Verify the above part numbers when placing orders.
Tray version can be supplied only in tray units.

SA-5000

ROTARY CODED SWITCHES

LIST OF PART NUMBERS

| Shape | Internal circuit | Resistance value | Form of packaging | Binary coded decimal | | Binary coded hexadecimal | | Pieces in package | |
|--------------|------------------|-----------------------------|-------------------|----------------------|--------------------|--------------------------|--------------------|-------------------|--------------|
| | | | | Real code | Complementary code | Real code | Complementary code | | |
| Side setting | Without knob | Built-in resistor | 10 kΩ | Tray packaging | SA-5011A1EW | SA-5031A1EW | SA-5051A1EW | SA-5071A1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5011A1E | SA-5031A1E | SA-5051A1E | SA-5071A1E | 25 pcs./pack |
| | | 3.3 kΩ | Tray packaging | SA-5011A3EW | SA-5031A3EW | SA-5051A3EW | SA-5071A3EW | 50 pcs./tray | |
| | | | Plastic bag | SA-5011A3E | SA-5031A3E | SA-5051A3E | SA-5071A3E | 25 pcs./pack | |
| | | Built-in resistor and diode | 10 kΩ | Tray packaging | SA-5011B1EW | SA-5031B1EW | SA-5051B1EW | SA-5071B1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5011B1E | SA-5031B1E | SA-5051B1E | SA-5071B1E | 25 pcs./pack |
| | | | 3.3 kΩ | Tray packaging | SA-5011B3EW | SA-5031B3EW | SA-5051B3EW | SA-5071B3EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5011B3E | SA-5031B3E | SA-5051B3E | SA-5071B3E | 25 pcs./pack |
| | | Built-in diode | — | Tray packaging | SA-5011CEW | SA-5031CEW | SA-5051CEW | SA-5071CEW | 50 pcs./tray |
| | | | | Plastic bag | SA-5011CE | SA-5031CE | SA-5051CE | SA-5071CE | 25 pcs./pack |
| | | | — | Tray packaging | SA-5011DEW | SA-5031DEW | SA-5051DEW | SA-5071DEW | 50 pcs./tray |
| | | | | Plastic bag | SA-5011DE | SA-5031DE | SA-5051DE | SA-5071DE | 25 pcs./pack |
| | With knob | Built-in resistor | 10 kΩ | Tray packaging | SA-5111A1EW | SA-5131A1EW | SA-5151A1EW | SA-5171A1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5111A1E | SA-5131A1E | SA-5151A1E | SA-5171A1E | 25 pcs./pack |
| | | | 3.3 kΩ | Tray packaging | SA-5111A3EW | SA-5131A3EW | SA-5151A3EW | SA-5171A3EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5111A3E | SA-5131A3E | SA-5151A3E | SA-5171A3E | 25 pcs./pack |
| | | Built-in resistor and diode | 10 kΩ | Tray packaging | SA-5111B1EW | SA-5131B1EW | SA-5151B1EW | SA-5171B1EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5111B1E | SA-5131B1E | SA-5151B1E | SA-5171B1E | 25 pcs./pack |
| | | | 3.3 kΩ | Tray packaging | SA-5111B3EW | SA-5131B3EW | SA-5151B3EW | SA-5171B3EW | 50 pcs./tray |
| | | | | Plastic bag | SA-5111B3E | SA-5131B3E | SA-5151B3E | SA-5171B3E | 25 pcs./pack |
| | | Built-in diode | — | Tray packaging | SA-5111CEW | SA-5131CEW | SA-5151CEW | SA-5171CEW | 50 pcs./tray |
| | | | | Plastic bag | SA-5111CE | SA-5131CE | SA-5151CE | SA-5171CE | 25 pcs./pack |
| | | | — | Tray packaging | SA-5111DEW | SA-5131DEW | SA-5151DEW | SA-5171DEW | 50 pcs./tray |
| | | | | Plastic bag | SA-5111DE | SA-5131DE | SA-5151DE | SA-5171DE | 25 pcs./pack |

※ Verify the above part numbers when placing orders.
Tray version can be supplied only in tray units.

SA-5000

ROTARY CODED SWITCHES

DIODE CHARACTERISTICS


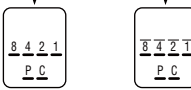
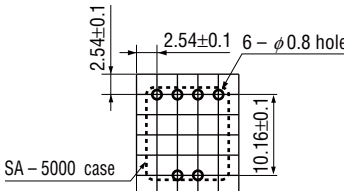
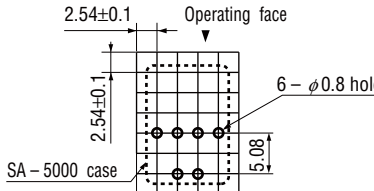
| | |
|-----------------|---|
| Material | Silicone diode |
| Structure | Epitaxial planar type |
| Maximum rating | DC reverse voltage V_R 40 V Peak reverse voltage (peak) V_{RM} 40 V DC forward current I_F 100 mA Peak forward current I_{FM} 225 mA |
| Forward voltage | 1.2 V maximum $I_F=100$ mA 0.6 V standard $I_F=1$ mA |
| Reverse voltage | $V_R=40$ V 100 μ A |
| Reverse current | $I_R=100$ nA 35 V |

CODE FORMAT

| No. of positions | | 16 positions | | | | | | | | | | | | | | | | |
|------------------|--------------------|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 positions | | | | | | | | | | A | B | C | D | E | F | |
| Position | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F | |
| 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) |  |  |

SA-5000

ROTARY CODED SWITCHES

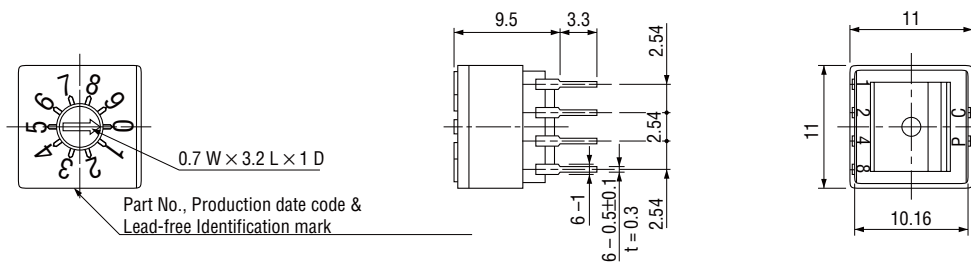
OUTLINE DIMENSIONS

Unless otherwise specified, tolerance: ± 0.3 (Unit: mm)

- SA-5010AE~DE

- SA-5030AE~DE

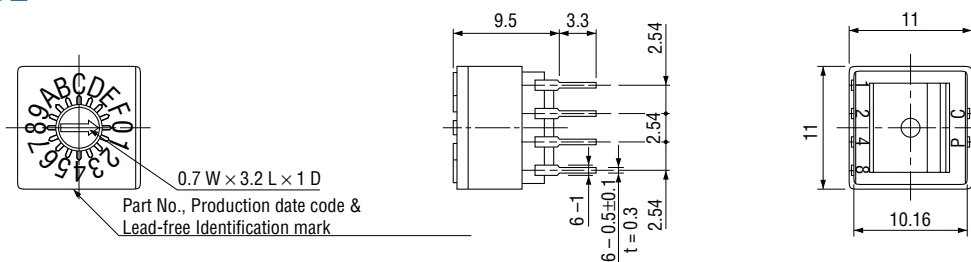
Top setting



- SA-5050AE~DE

- SA-5070AE~DE

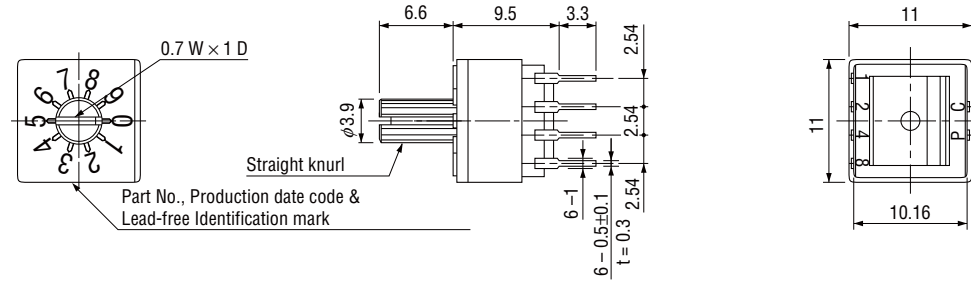
Top setting



- SA-5110AE~DE

- SA-5130AE~DE

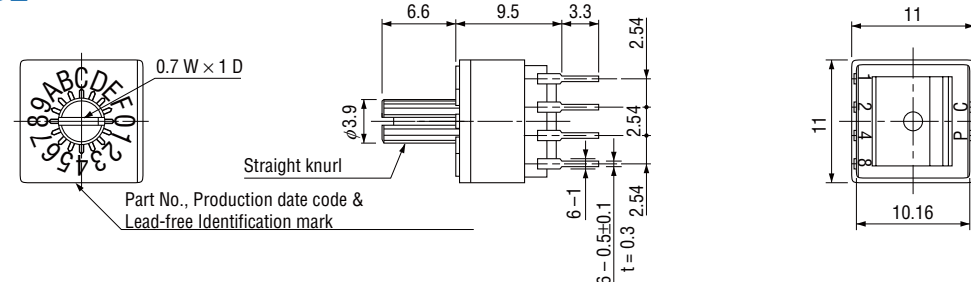
Top setting



- SA-5150AE~DE

- SA-5170AE~DE

Top setting



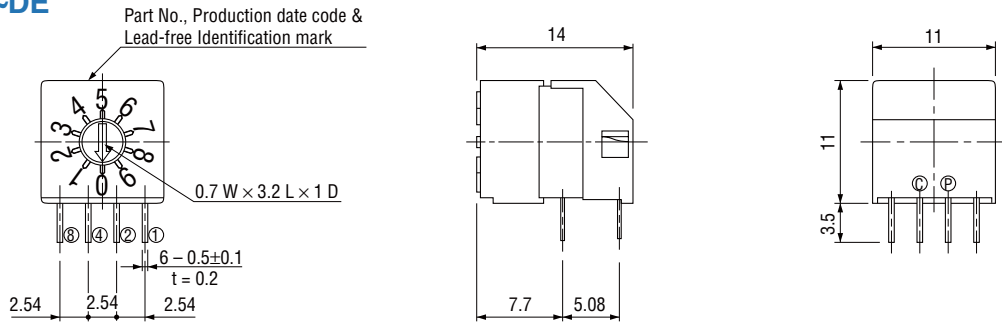
SA-5000

ROTARY CODED SWITCHES

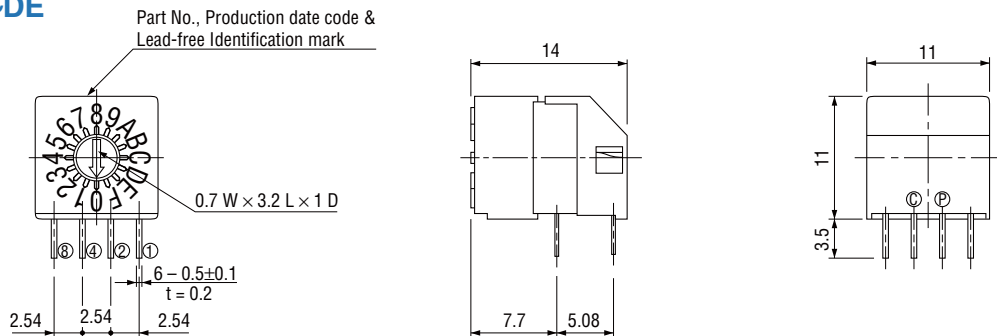
OUTLINE DIMENSIONS

Unless otherwise specified, tolerance: ± 0.3 (Unit: mm)

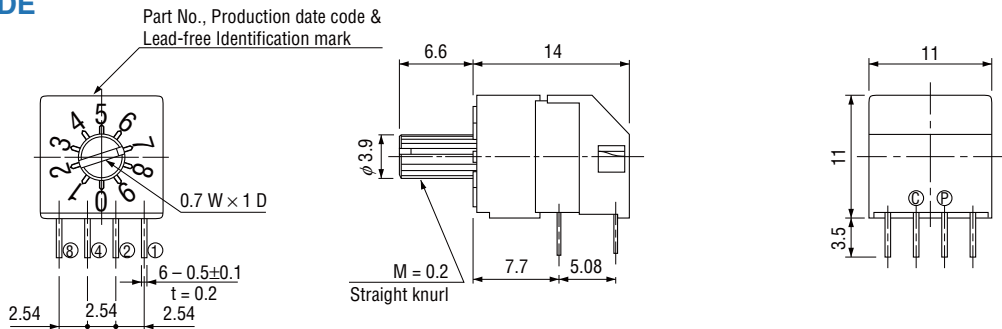
- SA-5011AE~DE
 - SA-5031AE~DE
- Side setting



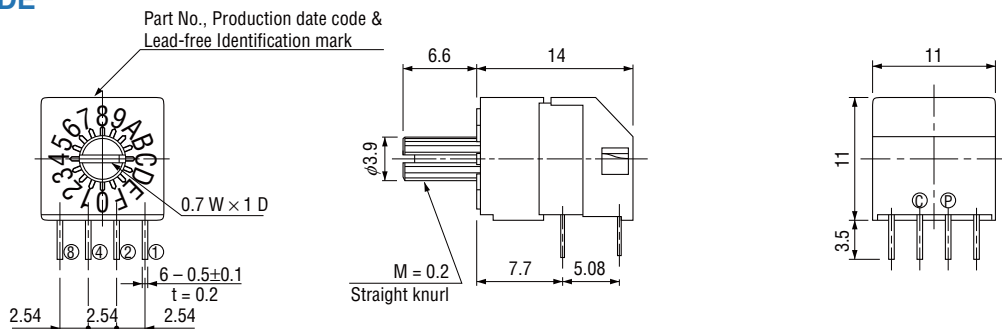
- SA-5051AE~DE
 - SA-5071AE~DE
- Side setting



- SA-5111AE~DE
 - SA-5131AE~DE
- Side setting



- SA-5151AE~DE
 - SA-5171AE~DE
- Side setting



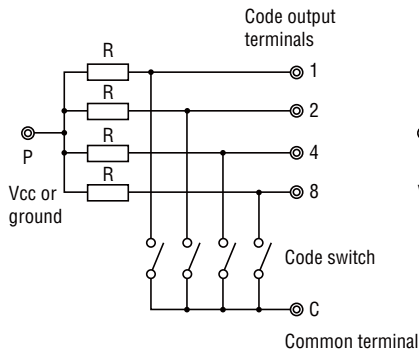
SA-5000

ROTARY CODED SWITCHES

SCHEMATIC DIAGRAMS

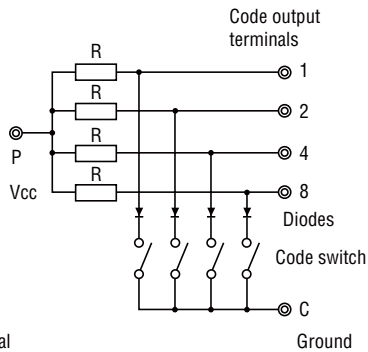
● A type

Built-in resistors
(Housing color Yellow)



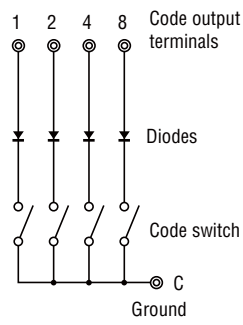
● B type

Built-in pull-up resistors and built-in diodes
(Housing color Red)



● C type

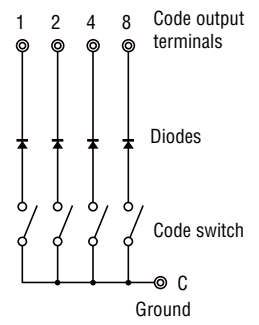
Built-in diodes
(Housing color Black)



The terminal P is a vacant terminal.

● D type

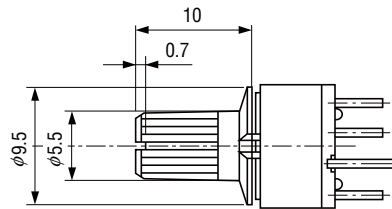
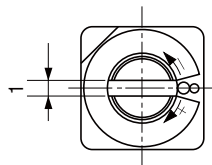
Built-in diodes
(Housing color Black)



The terminal P is a vacant terminal.

SWITCHES WITH KNOB AS EXTENDED SHAFT

(Unit: mm)



The large knob is common to S-1000A, S-2000A, SA-5000 and SS-10 series.

※ Knob can't be detached due to being fixed. Simple knob can't be sold.

PACKAGING SPECIFICATIONS

<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 10 pcs. (Top setting type is 50 pcs., side setting type is 25 pcs.) per box.