TOCOS®

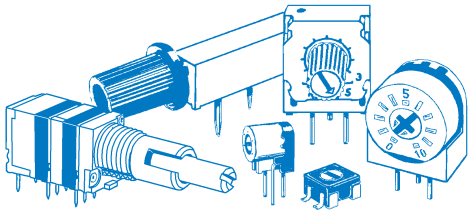
POTENTIOMETERS
ENCODERS & CODED SWITCHES

TP/RH7 & TP/RH9

www.tocos.com


Potentiometers
for On-Off &
Volume Control
Encoders &
Coded Switches
for Volume Control
& Channel Selection

We are TOCOS®



TOCOS America, Inc. is a wholly owned subsidiary of Tokyo Cosmos Electric Co., Ltd. (TOCOS), a worldwide supplier of electronic components specializing in quality potentiometer products.

Established in 1957, TOCOS has kept pace with the demands of electronic technology for more than 50 years, supplying superior quality components at competitive prices around the world.

Our wide range of products represent the cutting edge of the electronics industry in major areas such as telecommunications, instrumentation, automotive technology, computer peripherals, consumer products, and the military. All TOCOS products are manufactured in ISO 9001 and ISO 14001 certified facilities.

The continuing technological demand for products with higher accuracy, longer life, and better reliability has led us to utilize the ingenuity of all our employees through an innovative "think and create" philosophy, encouraging company-wide contributions to product research and development. With the help of this program, TOCOS continues to develop better potentiometers as well as other innovative products.

Our "total quality control environment" is supported by a start to finish inspection program that begins with the sales person who takes your order and ends with the supplier who must be certified to guarantee just-in-time delivery. Every work station is an inspection point in the manufacturing process and the finished products are always inspected for electrical and mechanical specifications as well as environmental reliability.

TOCOS is very sensitive to the ecological impact of its products. The majority of TOCOS product series comply with RoHS standards.

Table of Contents

1177 East Tower Road, Schaumburg, IL 60173 Tel: 847-884-6664 Fax: 847-884-6665 E-mail: sales@tocos.com www.tocos.com

TP7/RH7 Series... World's Smallest Potentiometers!

- Compact, lightweight design optimizes customers' space saving requirements
- Industry-proven durability and performance
- Shaft and bushing flexibility for custom design requirements

Features

- **Compact 7mm design**

- **Durability**
Stainless shafts are available as an option. Stainless shafts are 1.5 times stronger than conventional brass and aluminum shafts. Stainless shafts are ideal for hand-held, 2-way radios which have a high drop risk.

- **Variations of switches available**
Rotary and momentary push types are available as options. On-Off switch function and Band Selector function can be combined into one multi-function unit.

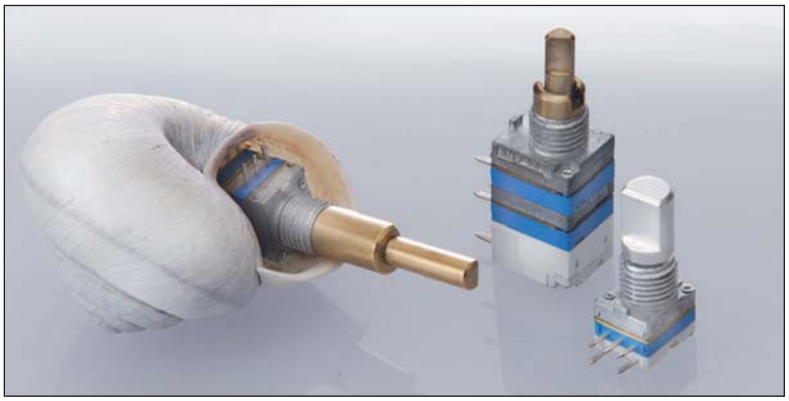
- **Waterproof option meets IP67**
Rubber O-ring installed between the shaft and bushing to prevent water intrusion is available as an option.

- **High torque models**

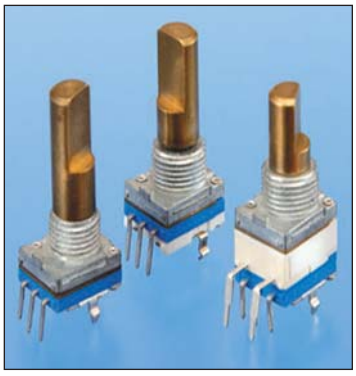
- **Vertical and horizontal mounts**

- **Wide temperature range**
Standard: −20 to +70°C
Optional: −30 to +70°C

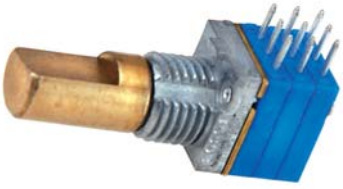
RoHS Compliant



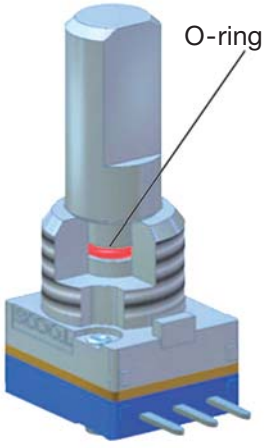
Compact 7mm and 9mm Models



Vertical Mount Models



Multi-function Switches



Waterproof Option

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HUNDREDS OF CUSTOM-BUILT COMBINATIONS! BUILD YOUR OWN CUSTOM PART NUMBER...

Part Numbering System

Example: TP76N00N 20 S B203

Bushing: M6-5mm length Shaft: 3.5mm diameter

TP 7 6 N 00 N 20 S B 203

Style
TP = PC Pin, Horizontal Mount
RH = PC Pin, Vertical Mount

Size
7 = 7mm

Type
0 = Non-Element, Encoder or Switch
6 = 300° Rotation

Structure
N = Single Shaft, Single Unit
G = Single Shaft, Dual Unit
T = Single Shaft, Triple Unit
Q = Single Shaft, Quad Unit
S = Single Shaft, Five Gang Unit
P = Single Shaft, Six Gang Unit
E = Single Shaft, Eight Gang Unit
D = Dual Shaft, Dual Unit
F = Dual Shaft, Triple Unit
H = Dual Shaft, Quad Unit
C = Dual Shaft, Five Gang Unit
R = Dual Shaft, Six Gang Unit

Combinations
00 = No Combination
01 = Center Detent (Outer Shaft)
10 = Center Detent (Inner Shaft)
17 = High Torque
82 = 11-Detent
97 = Sealed with Shaft O-ring
239 = 16-Detent

Switch Type
Blank = No Switch
N = Rotary Switch
A = Momentary Push-On
NA = Rotary + Momentary Push-On
E20 = Rotary Encoder

Standard Shaft Length
Includes Bushing Length
15 = 15mm (from mounting surface)
20 = 20mm (from mounting surface)

Shaft End Style
R = Round
F = Flatted
S = Screw Driver Slot
H = Deep Slot
SK = Slotted and Knurled

Resistance Taper
A = Audio (CW Log)
B = Linear
C = CCW Log

Resistance Code
First and Second Digit = Value
Third Digit = Multiplier
Example: 203 = 20,000 Ω

Call TOCOS for *more* Options / Combinations.

How to Build a Part Number

1. **Choose the potentiometer structure.**
2. **Select a combination, if none use 00.**
3. **Select switch type, if none leave blank.**
4. **Select shaft length, including the bushing. Standards are 15 and 20mm.**
5. **Select shaft end style.**
6. **Select taper and ohmic value.**
7. **Determine bushing and shaft sizes.**

See Page 35 for Bushing and Shaft Styles.

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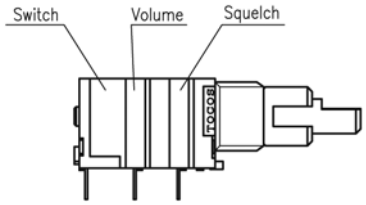
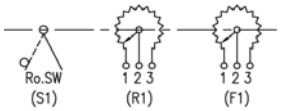
TP7/ RH7 SERIES

1. For Volume + Power On-Off Switches:
   TP76N00N
2. For Volume + Squelch + Power On-Off Switches:
   TP76D00N

Rotary Switch



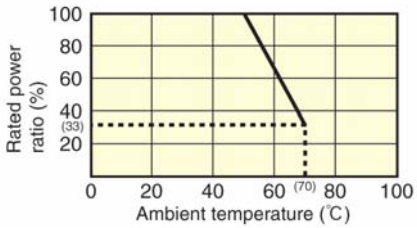
TP76D00N



Circuit Diagram

7mm Electrical

- Nominal total resistance: 1, 2, 5, 10, 20, 50, 100, 200, 500 (kΩ)
- Resistance tolerance: ±20%
- Resistance taper: A, B, C, D, W
- End resistance: 5Ω max.
- Power rating: 0.05W
- Noise: 100mV max.
- Insulation resistance: 100MΩ min. at 250VDC
- Dielectric strength: 1 minute at 300VAC
- Max. operating voltage: 10VDC, 50VAC
- Tracking error: Volume cont.: 3dB max. at 0 to −40dB
  Tone cont.: 2dB max. at 50% of rotational angle
- Derating curve



7mm Mechanical

- Total rotational angle: 300° (Mechanical)
- Tolerance for total rotational angle: ±5°C, +10/−5°C: Push-pull drive shaft
- Rotational torque: 2~24.5mN • m (20 to 250gf • cm) at +20°C
  49.1mN • m (500gf • cm max.) at −20°C
- Shaft wobble and bend
  Radial direction tip of the shaft, applied 2.45N (250gf): 0.5mm P-P
  Thrust direction: 0.5mm max.
- Detent position: Center
- Detent torque: +2.9~29.4mN • m (30 to 300gf • cm)
- Shaft stopper strength
  Inner shaft of dual shaft: 0.3N • m (3kgf • cm min.)
  Others: 0.4N • m (4kgf • cm min.)
- Shaft push-pull strength: 98.1 N (10kgf min.)
- Nut tightening strength: 0.98N • m (10kgf • cm min.)

Environment

- Soldering heat resistance: 350±5°C at 3 sec.
- Operating temperature range: −20°C to +70°C
- Rotational life: Permissible resistance change after 15,000±200 cycles on 600rph without load: ±15% max.
- Shaft Seal (Optional O-ring seal between the bushing and shaft): After mounting to a panel, there shall be no leak between shaft and bushing at 0.1kgf/cm by hydraulic pressure for 30 minutes

Switch Specifications

- Rotary switch, N: SPST: 16VDC-3A; 50° max.
- Momentary push, A: SPST: 12VDC-0.5A; 0.5mm stroke
- Switch life: 10,000 cycles without load
- Switch contact resistance: Initial 50mΩ max.
  After 10,000 cycles-200mΩ max.

♦ All products in this catalog are not for use in life support equipment.

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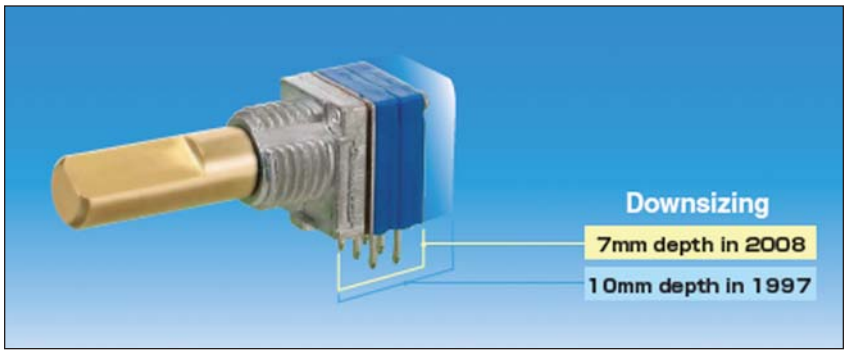
TP76N00B with Low Profile Switch

NEW! Potentiometer with Special, Smaller Rotary On-Off Switch B!

Innovative rotational switch design is an industry breakthrough in downsizing from the conventional 10mm depth to a 7mm depth!

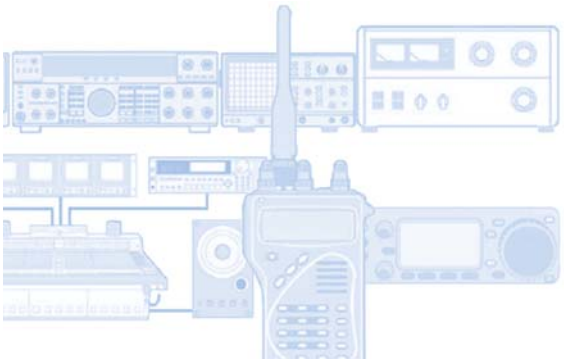
Features

- Compact 7mm depth
- Consistent performance
- Long Life
- Flexible Custom Design Options
- Excellent Linearity



Applications

- 2-way Radios
- Communication Devices
- Measuring Instruments
- Audio/Visual Equipment

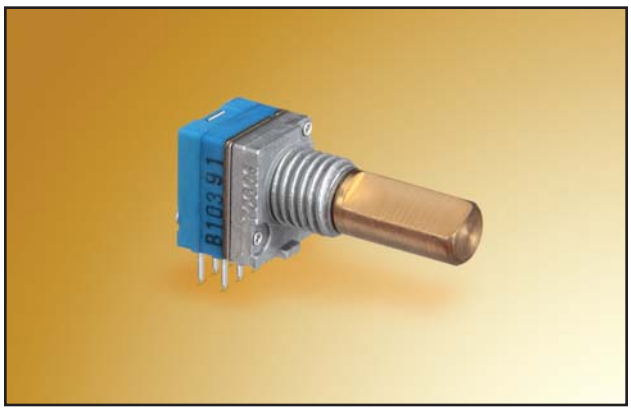


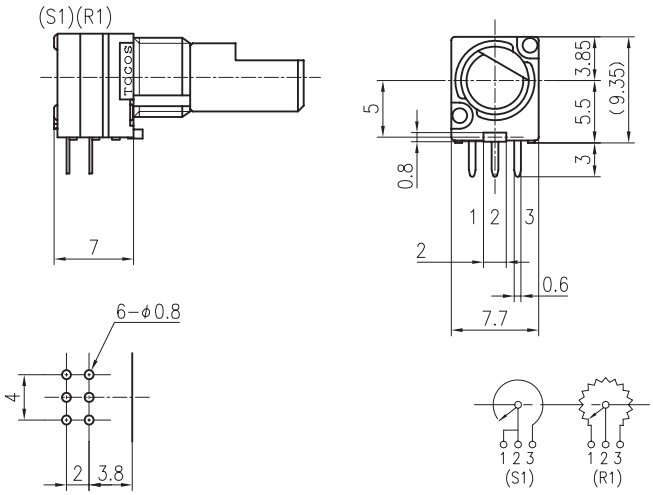
TP76N00B Specifications

• Total Resistance	B: 2k to 1MΩ A: 5k to 500kΩ
• End Resistance	50Ω max.
• Noise	100mV max. (JIS method A)
• Insulation resistance	100MΩ min. at 250VDC
• Dielectric strength	1 minute min. at 300VAC
• Rotational angle (Mechanical)	300° ±5°
• Rotational torque	2.0 to 24.5mN • m (20 to 250gf • cm)
• Shaft stopper strength	0.3N • m min. (3kgf • cm min.)
• Shaft push-pull strength	98.1 N (10kgf min.)
• Shaft wobble and bend	Thrust: 0.5mm max. Radial: 0.5 x (shaft/30) mm max.
• Rotational life	15,000 cycles
• Switch configuration	SPST
• Switch rating	10VDC 0.1A
• Switch angle	50° max.
• Switch torque	78.4mN • m (800gf • cm) max.
• Switch contact resistance	200mΩ max.
• Switch life	10,000 cycles

TP76N00B

Single Shaft, Single Unit, Volume Pot, Low Profile Switch





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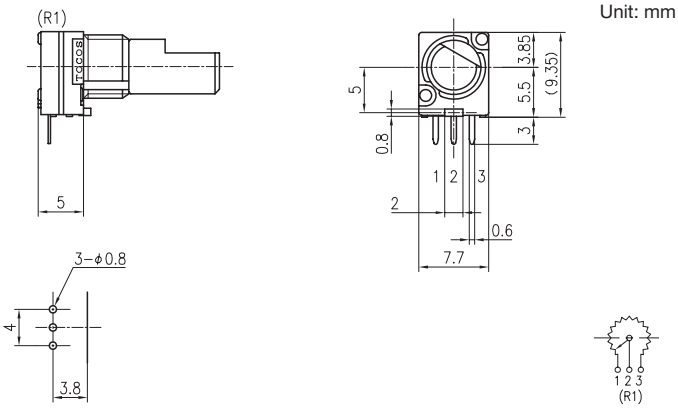
TP76N00

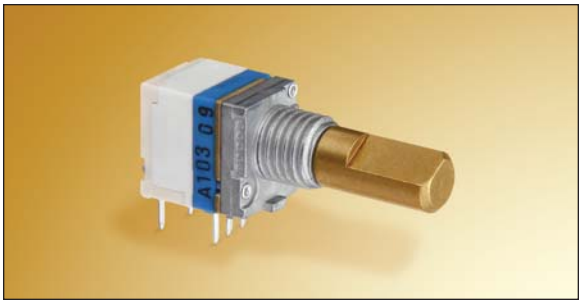
Single Shaft, Single Unit

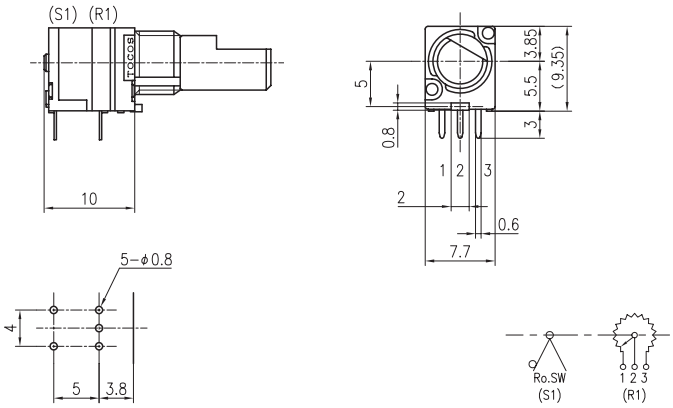
Unit: mm



TP76N00N

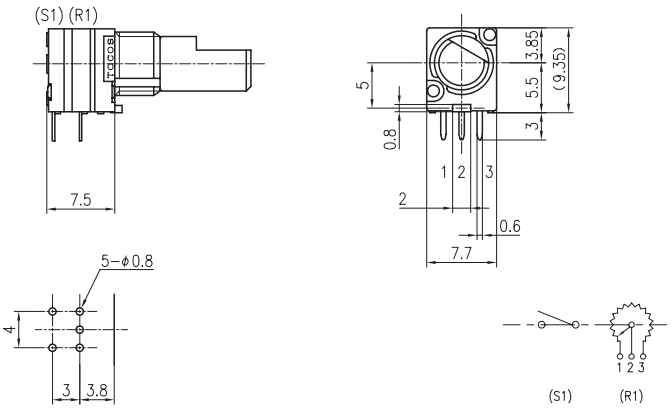
Single Shaft, Single Unit, Rotary Switch





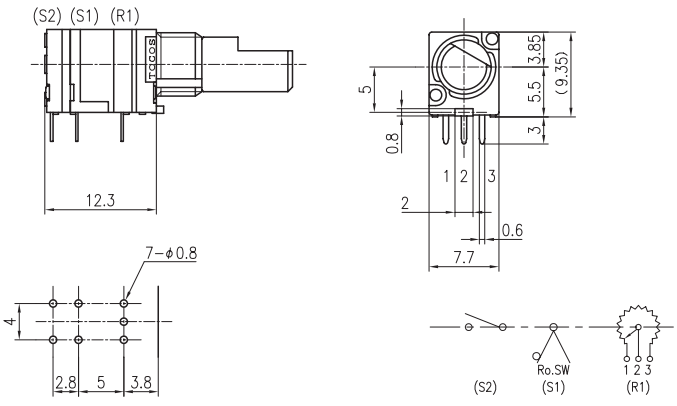
TP76N00A

Single Shaft, Single Unit, Momentary Push-on Switch



TP76N00NA

Single Shaft, Single Unit, Rotary + Momentary Push-on Switches



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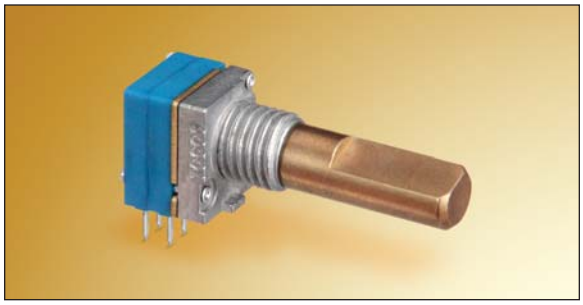
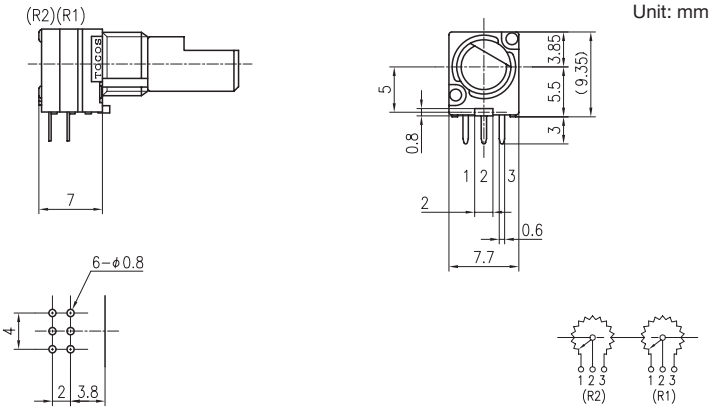
TP76G00

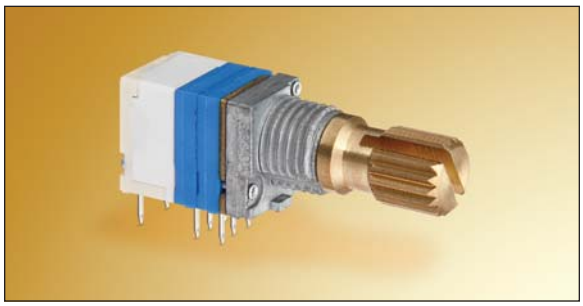
Single Shaft, Dual Unit

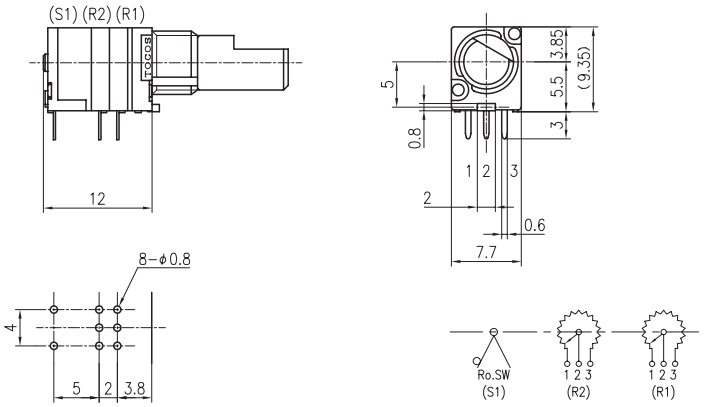




TP76G00N

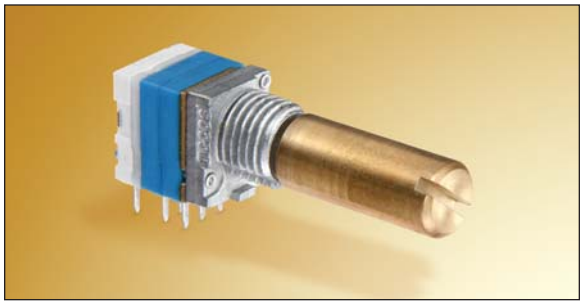
Single Shaft, Dual Unit, Rotary Switch

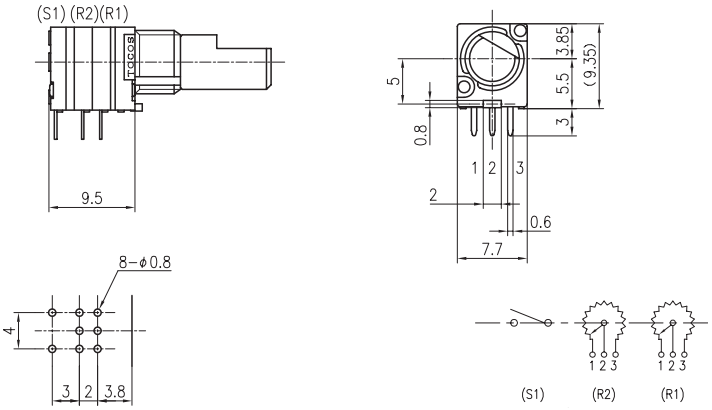




TP76G00A

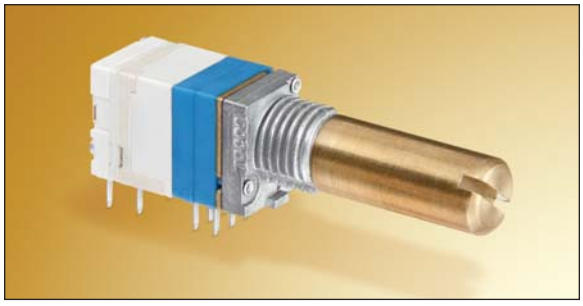
Single Shaft, Dual Unit, Momentary Push-on Switch

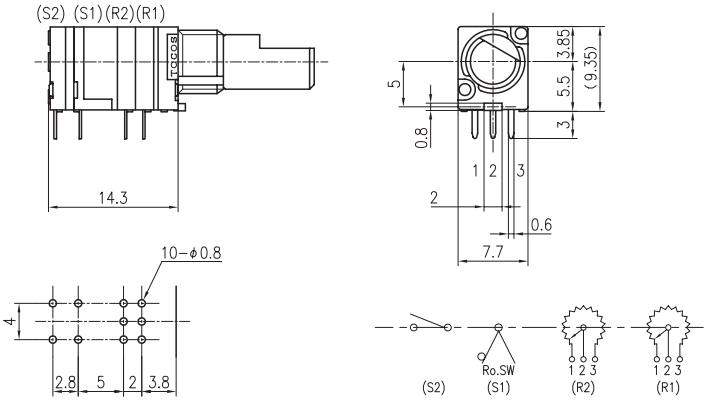




TP76G00NA

Single Shaft, Dual Unit, Rotary + Momentary Push-on Switches





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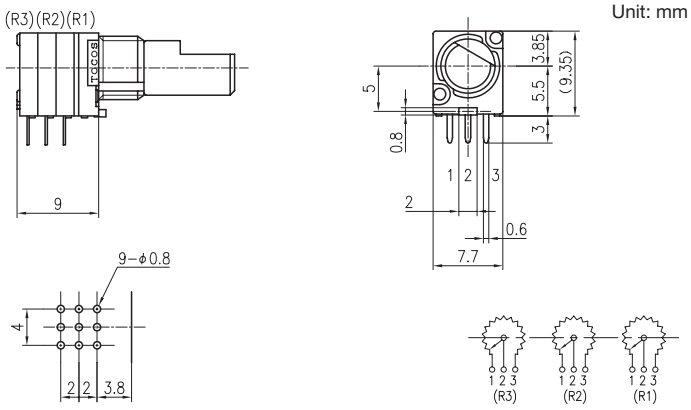
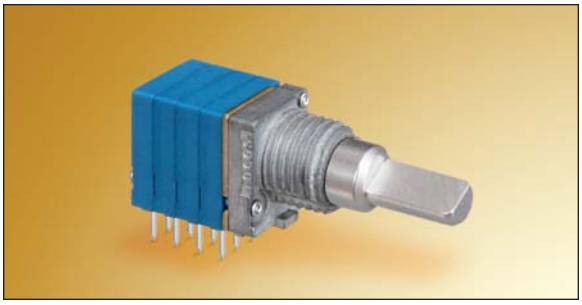
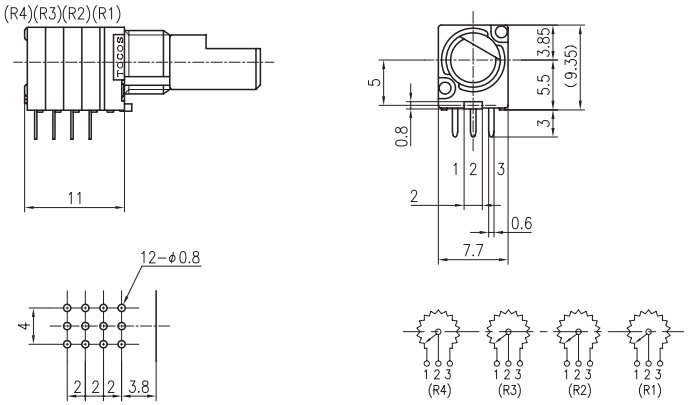
Unit: mm

TP76T00
Single Shaft, Triple Unit

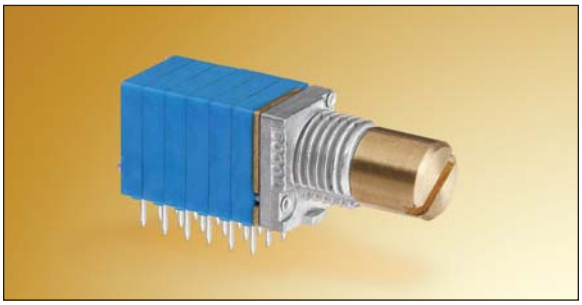


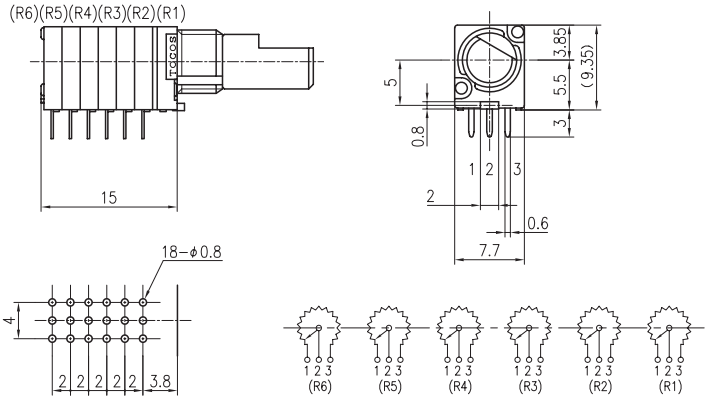
TP76Q00
Single Shaft, Quad Unit



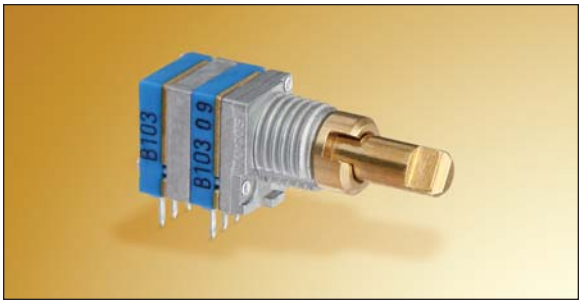


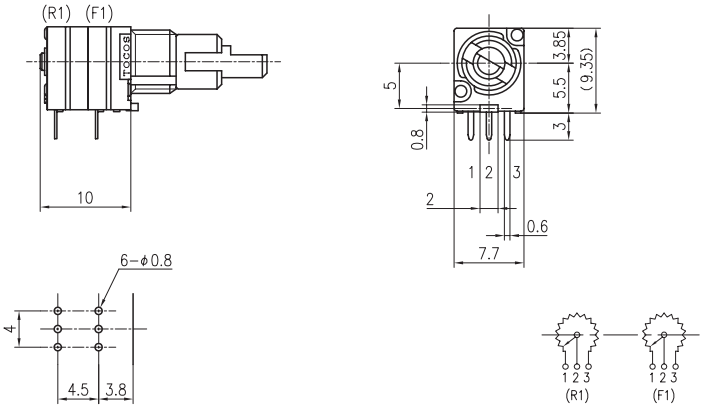
TP76P00
Single Shaft, Six-Gang Unit





TP76D00
Dual Shaft, Dual Unit





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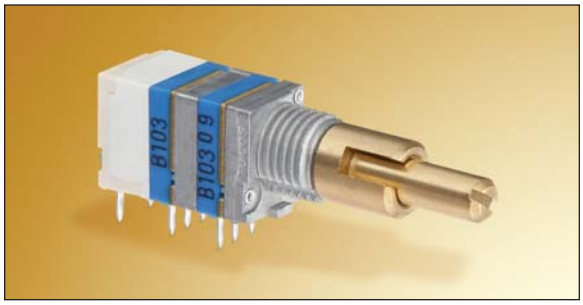
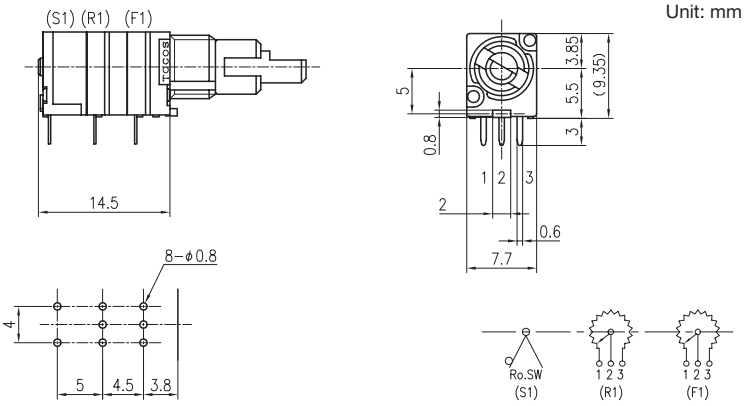
Unit: mm

TP76D00N

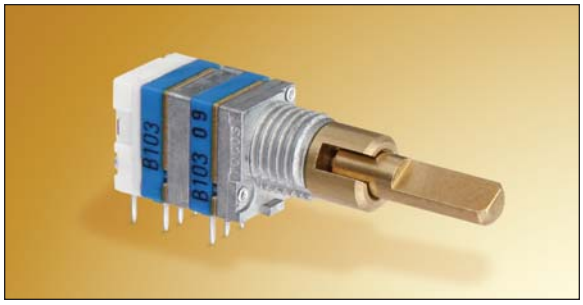
Dual Shaft, Dual Unit, Rotary Switch

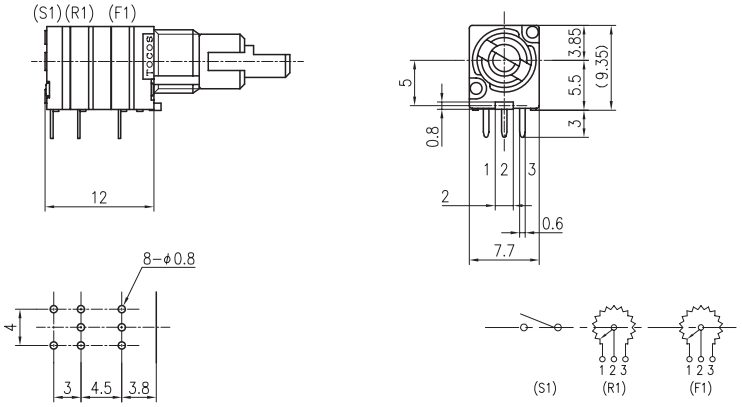




TP76D00A

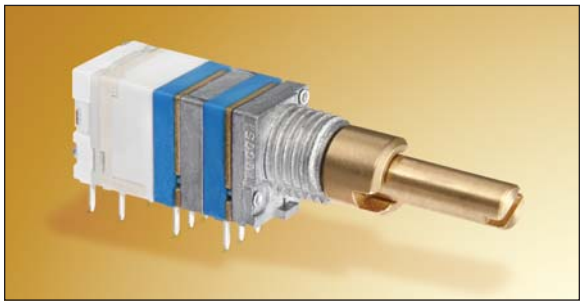
Dual Shaft, Dual Unit, Momentary Push-on Switch

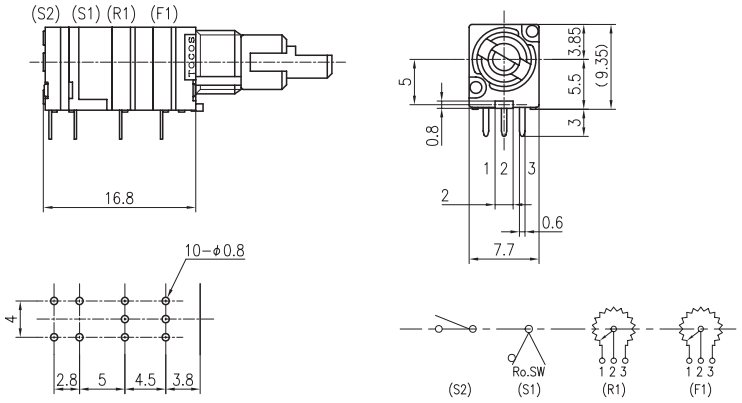




TP76D00NA

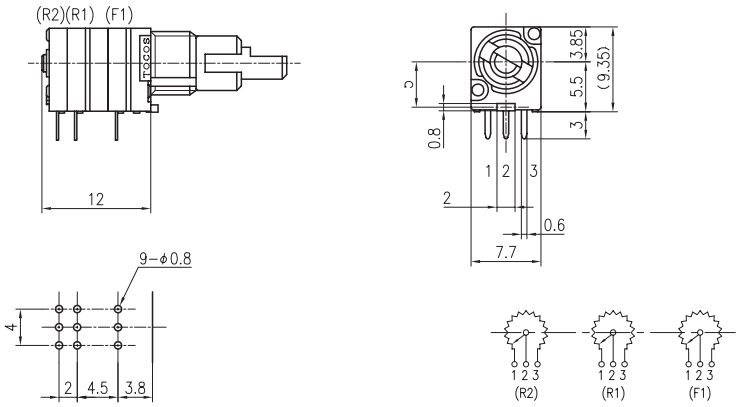
Dual Shaft, Dual Unit, Rotary + Momentary Push-on Switches





TP76F00

Dual Shaft, Triple Unit



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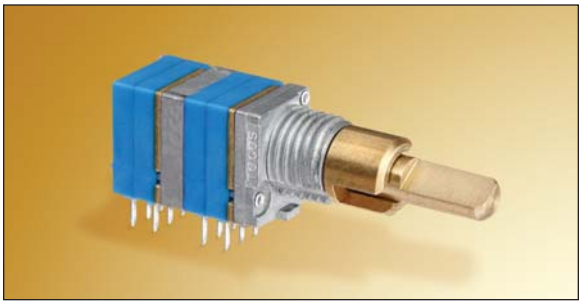
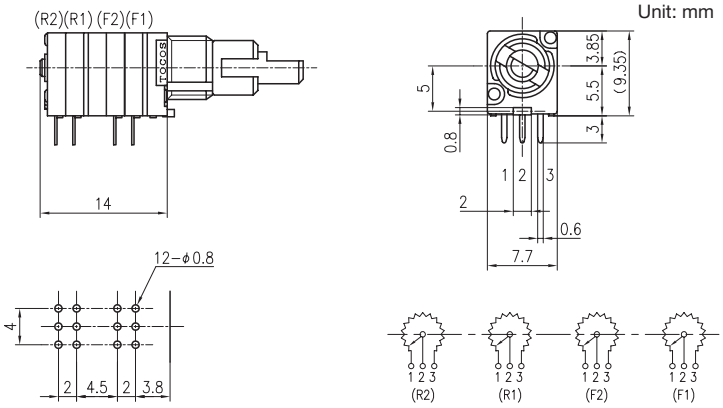
TP76H00

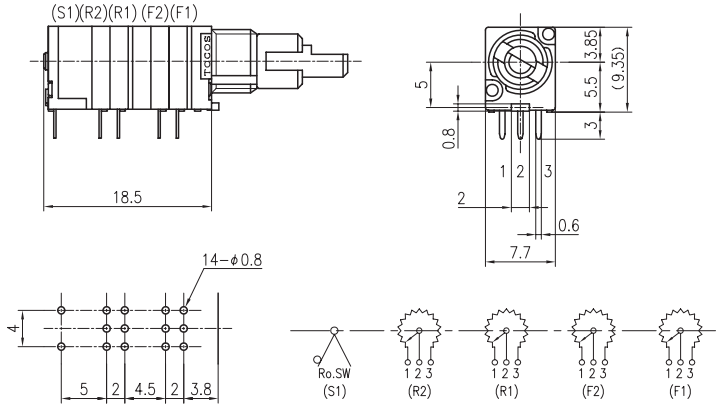
Dual Shaft, Quad Unit





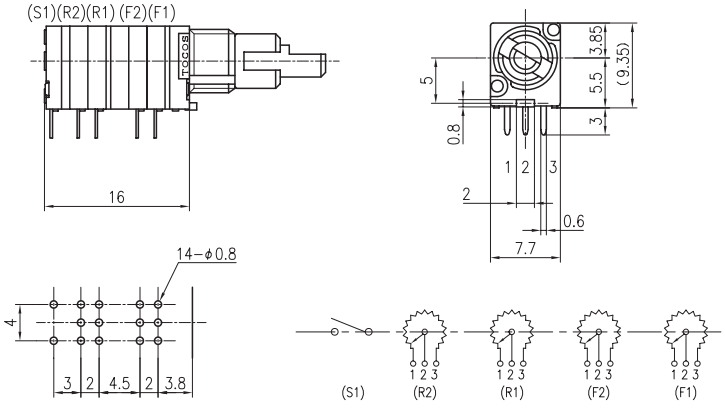
TP76H00N

Dual Shaft, Quad Unit, Rotary Switch



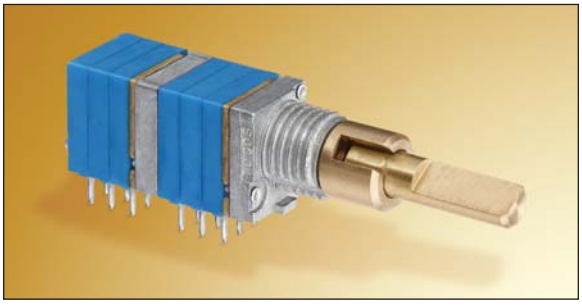
TP76H00A

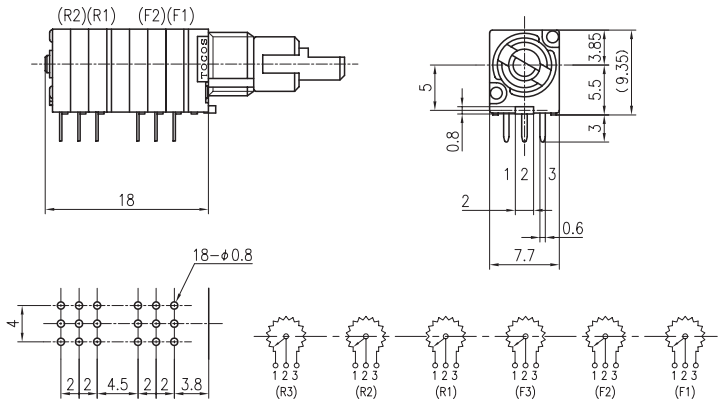
Dual Shaft, Quad Unit, Momentary Push-on Switch



TP76R00

Dual Shaft, Six-Gang Unit





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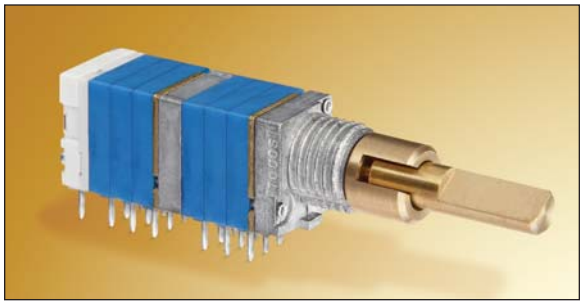
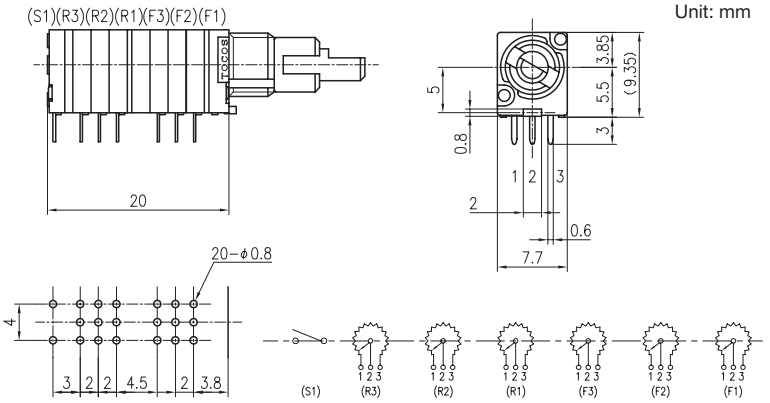
TP76R00A

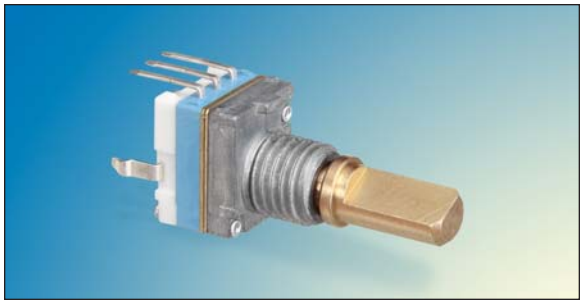
Dual Shaft, Six-Gang Unit, Momentary Push-on Switch

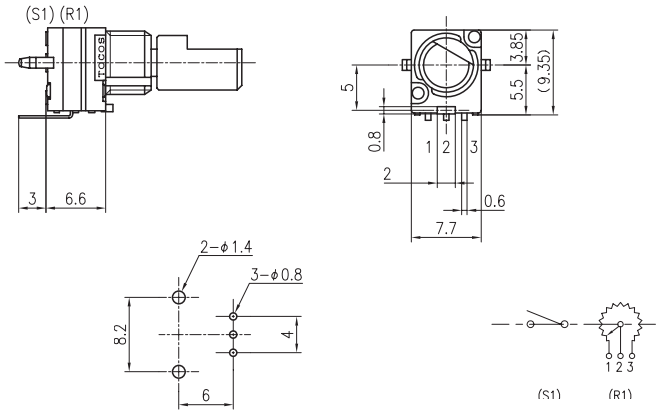




RH76N00A

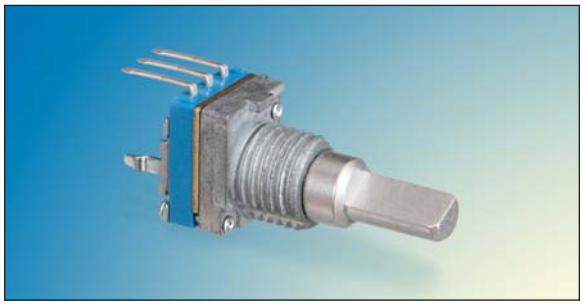
Vertical Mount, Single Shaft, Single Unit, Momentary Push-on Switch, Snap-in Mounting Pins

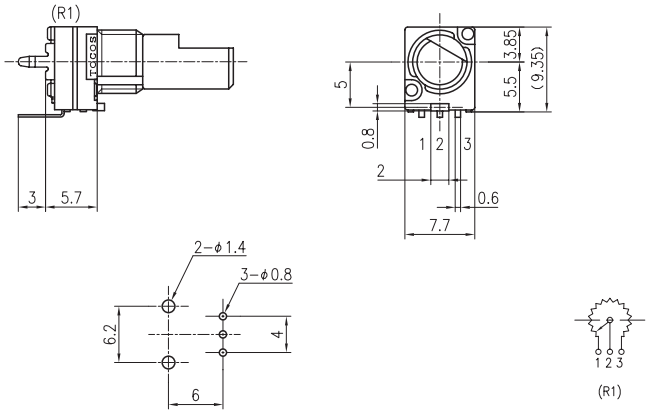




RH76N74

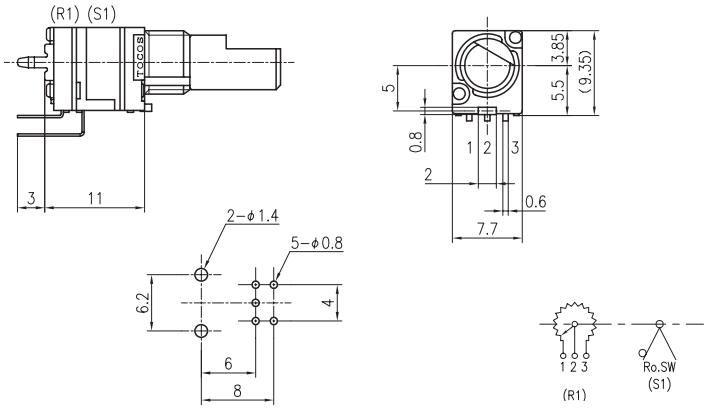
Vertical Mount, Single Shaft, Single Unit, Bracket with Snap-in Mounting Pins





RH76N74N

Vertical Mount, Single Shaft, Single Unit, Rotary Switch, Bracket with Snap-in Mounting Pins



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