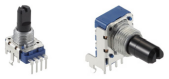
Potentiometers

# Rotary Potentiometer (Insulated shaft type)

## List of Varieties

| Series | | RK09K/RK09D | RK09Y11L | RK11K | RK12L | RK14K |
|---|---|---|---|---|---|---|
| Photo | | | |  | | |
| Dimensions | | 9mm Size | | 11mm Size | 12mm Size | 14mm Size |
| Control part orientation | Horizontal | ● | ● | ● | ● | ● |
| | Vertical | ● | — | ● | ● | ● |
| Number of resistor elements | | Single-unit | | | Dual-unit | |
| Shaft types | | Driver<br>Flat<br>Knob | Flat | | | |
| Length of the shaft LM1 (mm) | | 15.0<br>20.0<br>25.0 | — | 22.5 | 25.0<br>30.0 | 22.5 |
| Detent | | Center detent<br>Without | Without | Center detent<br>Without | | |
| Operating temperature range | | -10℃ to +70℃ | | | | |
| Operating life (cycles) | | 5,000 | 1,000,000 | 15,000 | | |
| Electrical performance | Total resistance | 10kΩ | | | | |
| | Resistance taper | 1B | Linear | 1B<br>15A | | |
| | Total resistance tolerance | ±20% | ±30% | ±20% | | |
| | Rated power | 0.05W | 0.01W | 0.05W | | |
| | Maximum operating voltage | 50V AC, 20V DC | 50V AC, 5V DC | 50V AC, 20V DC | 50V AC for AC only | |
| | Gang error | — | | | -40dB to 0dB 3dB max.<br>Within 2dB at center | |
| | Insulation resistance | 100MΩ min. 250V DC | | 100MΩ min. 500V DC | 100MΩ min. 250V DC | |
| | Voltage proof | 250V AC for 1 minute | | 500V AC for 1 minute | 300V AC for 1 minute | |
| Mechanical performance | Total rotational angle | 280° ±5°<br>300° ±5° | 300° ±5°<br>(Effective electrical rotational angle 60° ±5° ) | 300° ±5° | | |
| | Rotational torque | 1 to 8mN·m | 5mN·m max. | 3 to 20mN·m | 2 to 15mN·m | 3 to 20mN·m |
| | Stopper strength | 0.3N·m | — | 0.6N·m | 0.5N·m | 0.6N·m |
| | Push-pull strength | 50N max. | 30N max. | 80N max. | | |
| | Vibration | 10 to 55 to 10Hz/min., the amplitude is 1.5mm for all the frequencies, in the 3 direction of X, Y and Z and for 2 hours respectively | | | | |
| Automotive | | — | — | — | — | — |

⚠Note

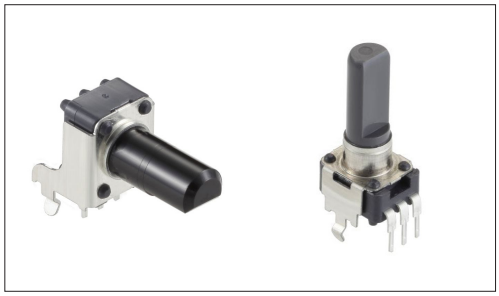
● Indicates applicability to all products in the series, while ○ indicates applicability to some products in the series.

Potentiometers | Rotary Potentiometer (Insulated shaft type)

## 9mm Size Insulated Shaft Snap-in Type

# RK09K/RK09D Series

**Compact type with a 9.8mm body width, supporting high-density set designs.**



- Total resistance tolerance:±20%
- Maximum operating voltage:50V AC, 20V DC
- Rotational torque:1 to 8mN·m
- Operating life:5,000 cycles
- Operating temperature range:-10℃ to +70℃

Applications:Home:Major home appliances,Office equipment
Audio_TV:Visual,Audio,Pro audio

■ Product List

| Products No. | Type | Number of resistor elements | Control part orientation (Mounting height) | Shaft types | Length of the shaft LM1 (mm) | Detent | Total resistance | Resistance taper | Automotive | Drawing No. |
|---|---|---|---|---|---|---|---|---|---|---|
| RK09K113004U | — | Single-unit | Vertical | Flat | 15.0 | Center detent | 10kΩ | 1B | — | 1 |
| RK09K1130A6S | | Single-unit | Vertical | Flat | 15.0 | Without | 10kΩ | 1B | — | |
| RK09K11300DR | | Single-unit | Vertical | Knob | 15.0 | Center detent | 10kΩ | 1B | — | 2 |
| RK09K1130A8G | | Single-unit | Vertical | Knob | 15.0 | Without | 10kΩ | 1B | — | |
| RK09K1130081 | | Single-unit | Vertical | Knob | 20.0 | Center detent | 10kΩ | 1B | — | 3 |
| RK09K1130A5R | | Single-unit | Vertical | Knob | 20.0 | Without | 10kΩ | 1B | — | |
| RK09K1130AP5 | | Single-unit | Vertical | Driver | 15.0 | Without | 10kΩ | 1B | — | 4 |
| RK09K1130AST | | Single-unit | Vertical | Driver | 20.0 | Without | 10kΩ | 1B | — | 5 |
| RK09K111009J | | Single-unit | Horizontal | Flat | 15.0 | Center detent | 10kΩ | 1B | — | 6 |
| RK09K1110AK4 | | Single-unit | Horizontal | Flat | 15.0 | Without | 10kΩ | 1B | — | |
| RK09K11100DN | | Single-unit | Horizontal | Flat | 20.0 | Center detent | 10kΩ | 1B | — | 7 |
| RK09K1110AAR | | Single-unit | Horizontal | Flat | 20.0 | Without | 10kΩ | 1B | — | |
| RK09K1110077 | | Single-unit | Horizontal | Knob | 20.0 | Center detent | 10kΩ | 1B | — | 8 |
| RK09K1110A0J | | Single-unit | Horizontal | Knob | 20.0 | Without | 10kΩ | 1B | — | |
| RK09K1110AMJ | | Single-unit | Horizontal | Flat | 15.0 | Without | 10kΩ | 1B | — | 9 |
| RK09K1110B26 | | Single-unit | Horizontal | Flat | 20.0 | Without | 10kΩ | 1B | — | 10 |
| RK09D1130C3W | | Single-unit | Vertical | Flat | 20.0 | Center detent | 10kΩ | 1B | — | 11 |
| RK09D1130C1B | | Single-unit | Vertical | Flat | 20.0 | Without | 10kΩ | 1B | — | |
| RK09D1130C3C | | Single-unit | Vertical | Flat | 25.0 | Center detent | 10kΩ | 1B | — | 12 |
| RK09D1130C2P | | Single-unit | Vertical | Flat | 25.0 | Without | 10kΩ | 1B | — | |
| RK09D1110C1A | | Single-unit | Horizontal | Flat | 25.0 | Without | 10kΩ | 1B | — | 13 |
| RK09K1130D62 | Clear-shaft | Single-unit | Vertical | Knob | 20.0 | Without | 10kΩ | 1B | — | 14 |

⚠Note

1. This catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. Please place purchase orders per minimum order unit (integer).
3. Products other than those listed in above products are also available. Please contact us for details.

9mm Size Insulated Shaft Snap-in Type

# RK09K/RK09D Series

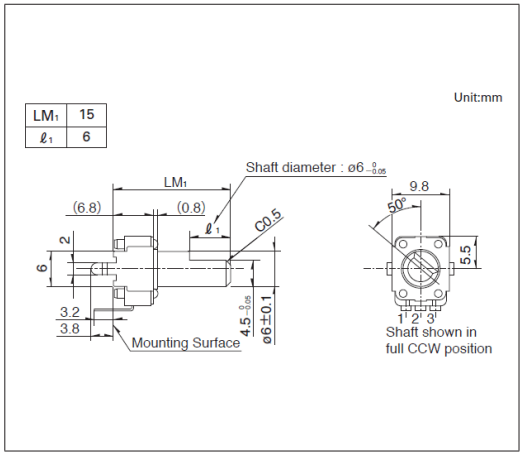
## ■ Packing Specifications

Bulk

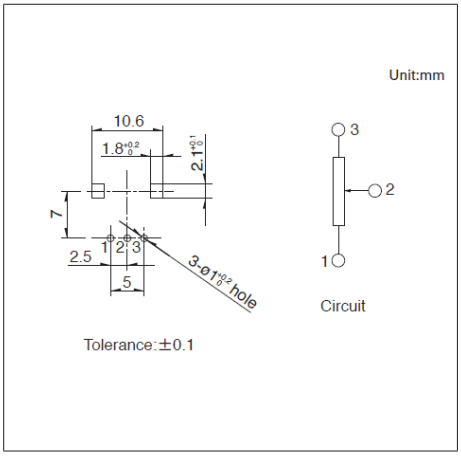
| Number of packages(pcs.) | | Export package measurements (mm) |
|---|---|---|
| 1 case / Japan | 1 case / export packing | |
| 1,000 | 2,000 | 528 x 369 x 178 |

## Drawing No.1

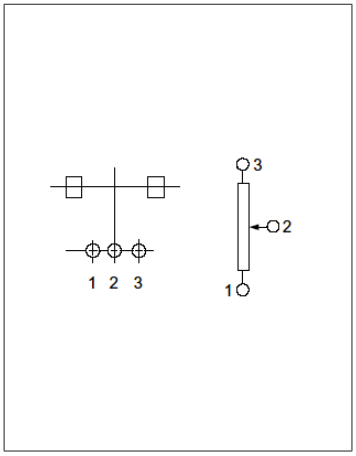
■ Dimensions




■ Mounting Hole Dimensions



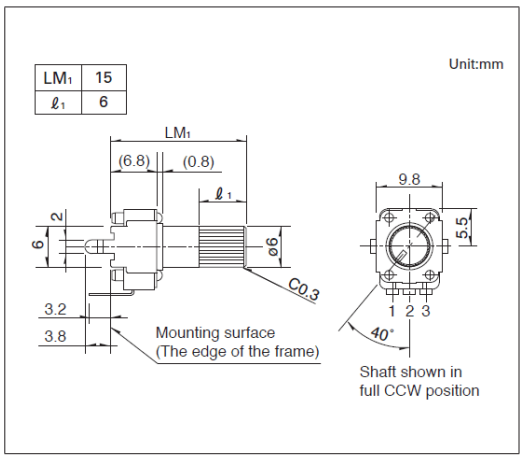

■ Terminal Layout / Circuit Diagram



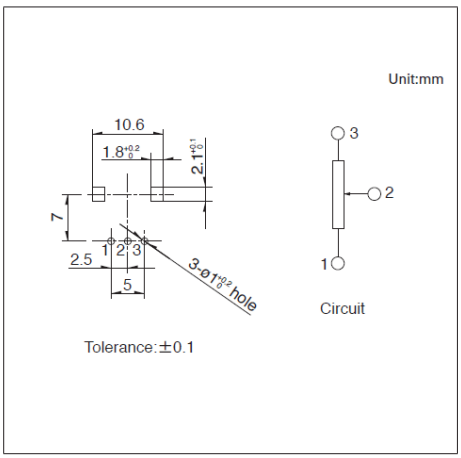

Viewed from mounting side.

## Drawing No.2

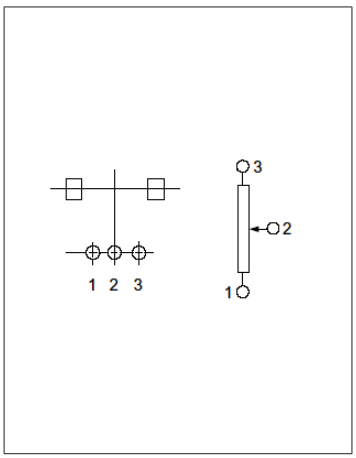
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



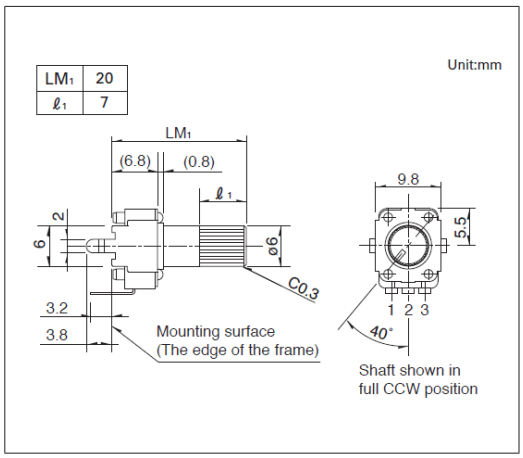

Viewed from mounting side.

9mm Size Insulated Shaft Snap-in Type

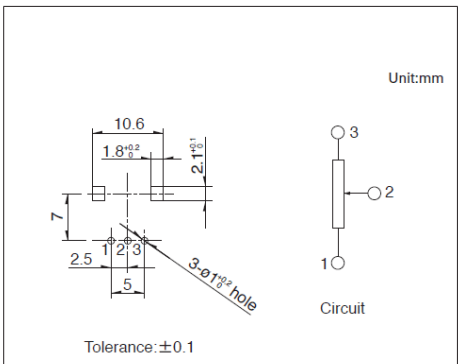
# RK09K/RK09D Series

## Drawing No.3

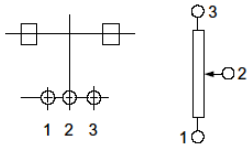
■ Dimensions




■ Mounting Hole Dimensions



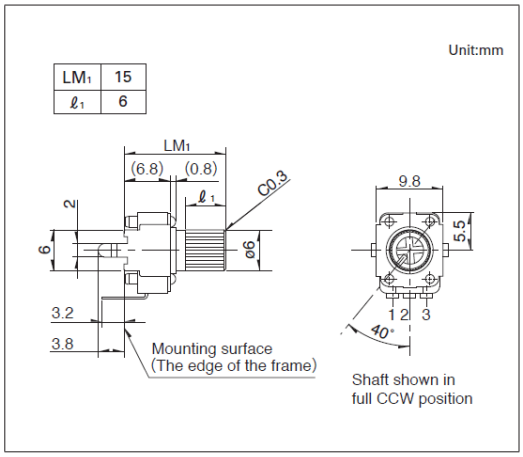

■ Terminal Layout / Circuit Diagram



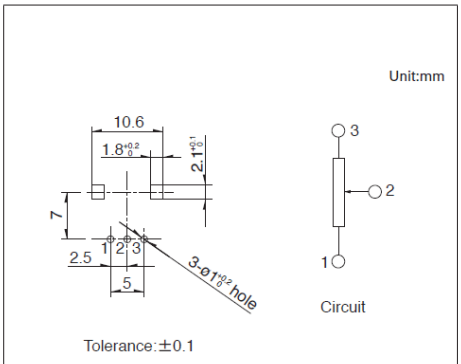

Viewed from mounting side.

## Drawing No.4

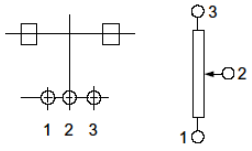
■ Dimensions




■ Mounting Hole Dimensions



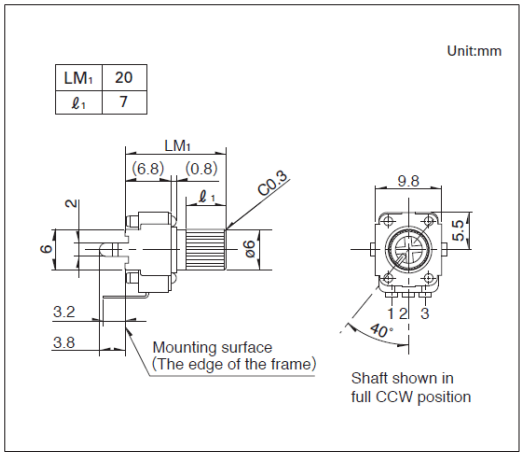

■ Terminal Layout / Circuit Diagram



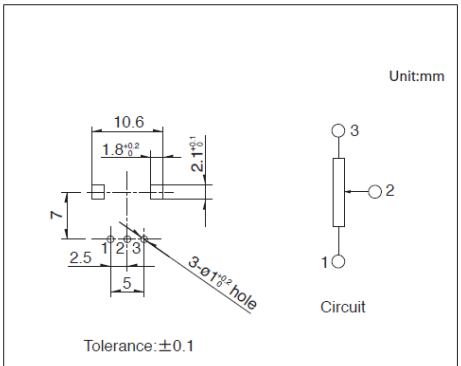

Viewed from mounting side.

## Drawing No.5

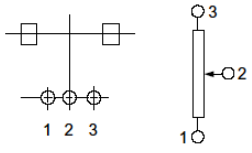
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



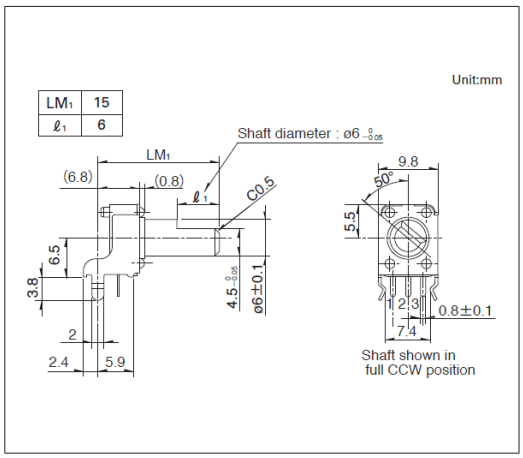

Viewed from mounting side.

9mm Size Insulated Shaft Snap-in Type

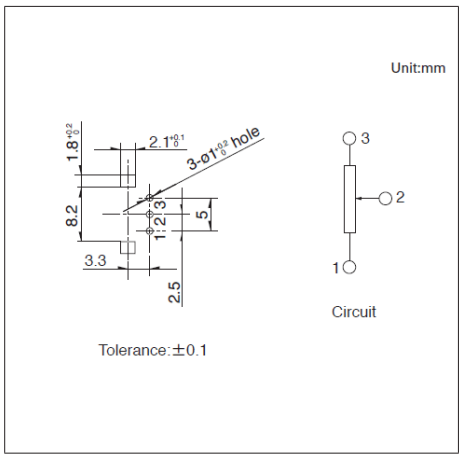
# RK09K/RK09D Series

## Drawing No.6

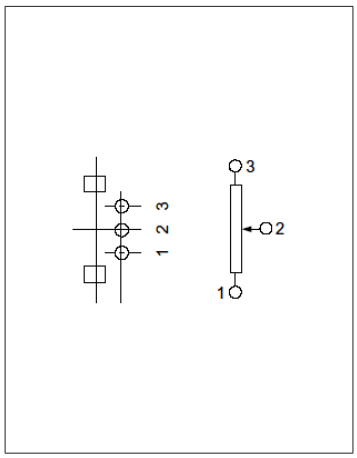
■ Dimensions




■ Mounting Hole Dimensions



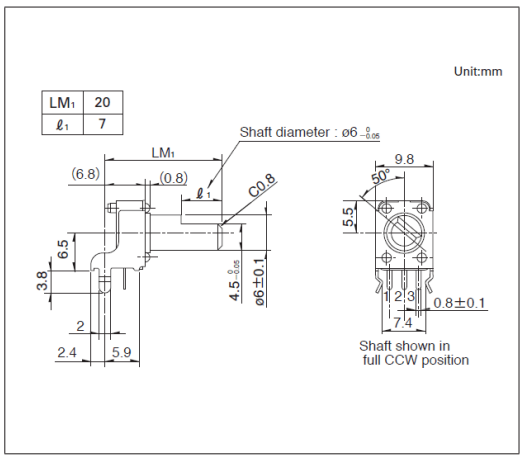

■ Terminal Layout / Circuit Diagram



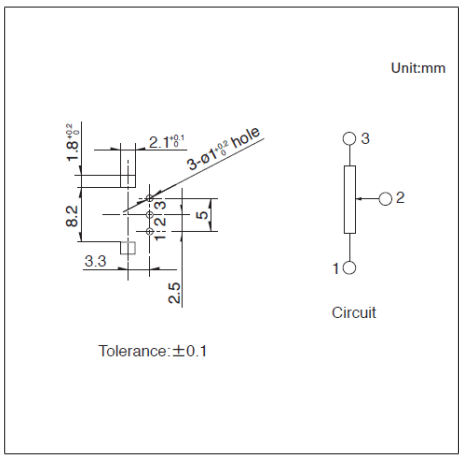

Viewed from mounting side.

## Drawing No.7

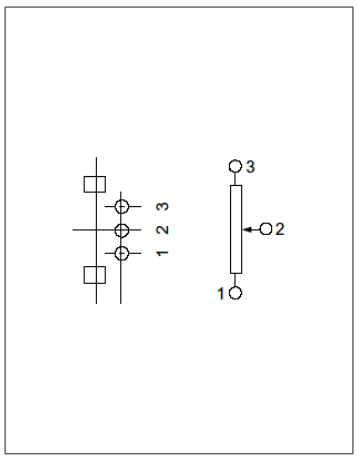
■ Dimensions




■ Mounting Hole Dimensions



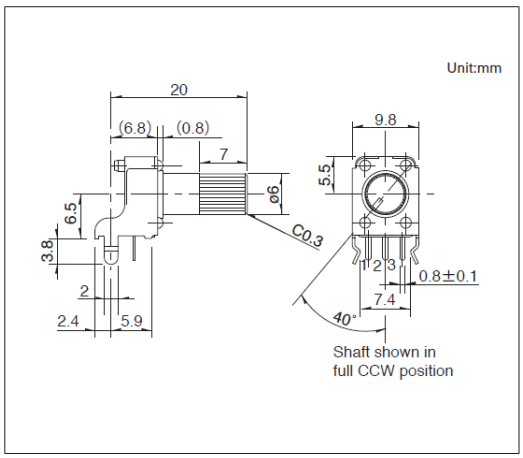

■ Terminal Layout / Circuit Diagram



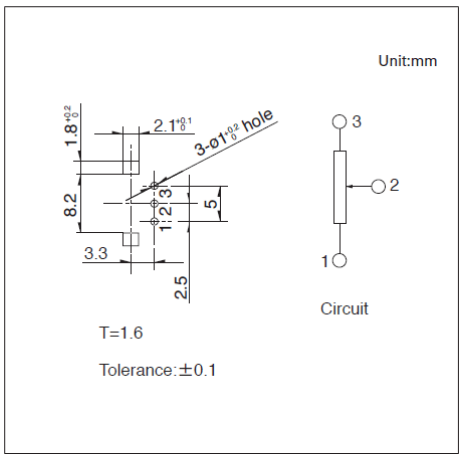

Viewed from mounting side.

## Drawing No.8

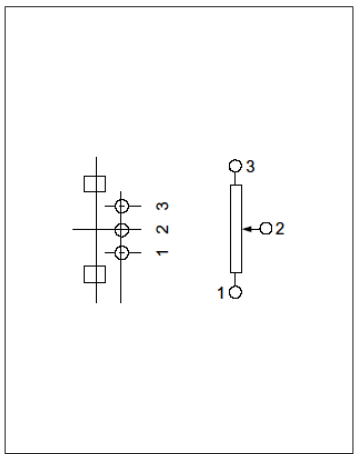
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



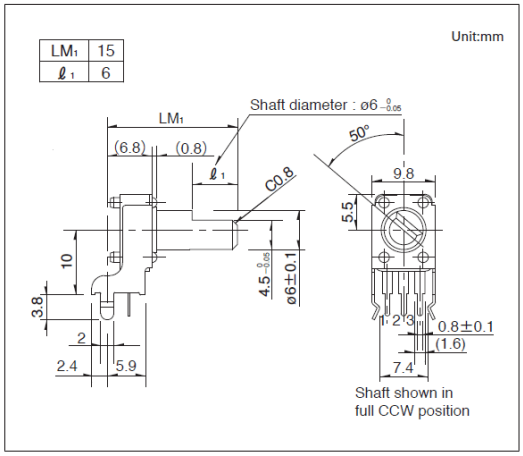

Viewed from mounting side.

9mm Size Insulated Shaft Snap-in Type

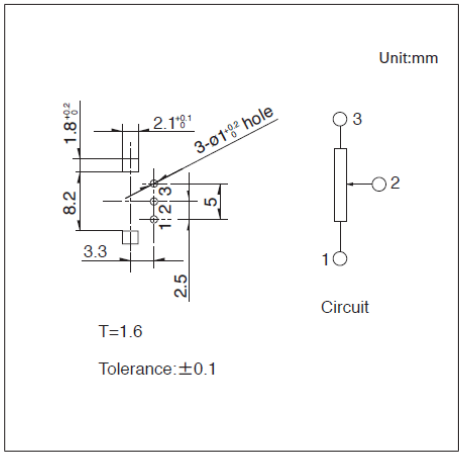
# RK09K/RK09D Series

## Drawing No.9

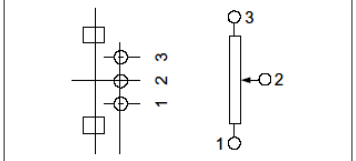
■ Dimensions




■ Mounting Hole Dimensions



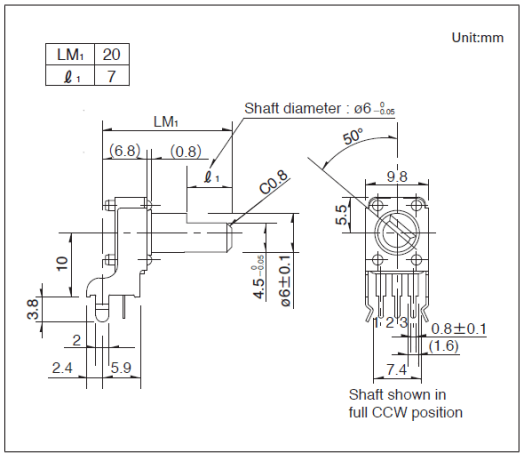

■ Terminal Layout / Circuit Diagram



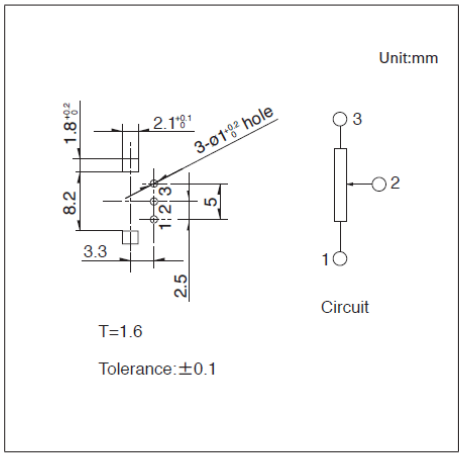

Viewed from mounting side.

## Drawing No.10

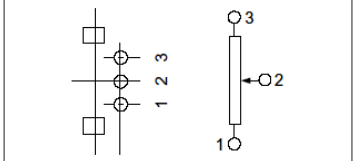
■ Dimensions




■ Mounting Hole Dimensions



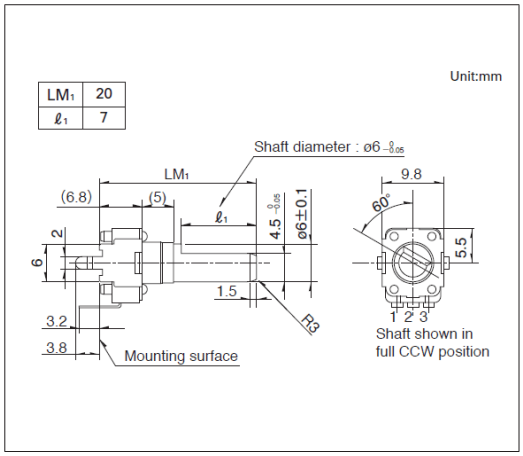

■ Terminal Layout / Circuit Diagram



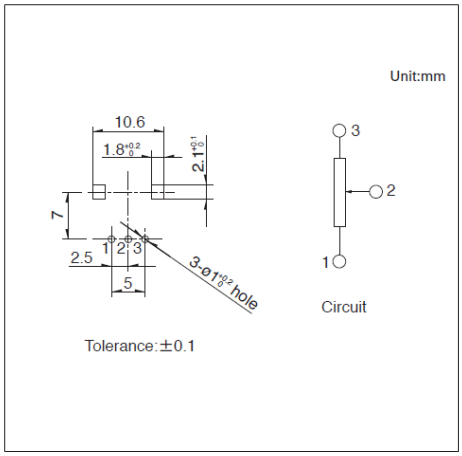

Viewed from mounting side.

## Drawing No.11

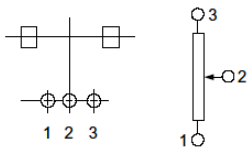
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



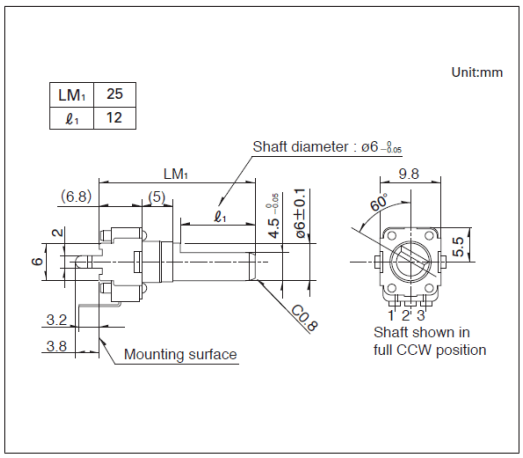

Viewed from mounting side.

9mm Size Insulated Shaft Snap-in Type

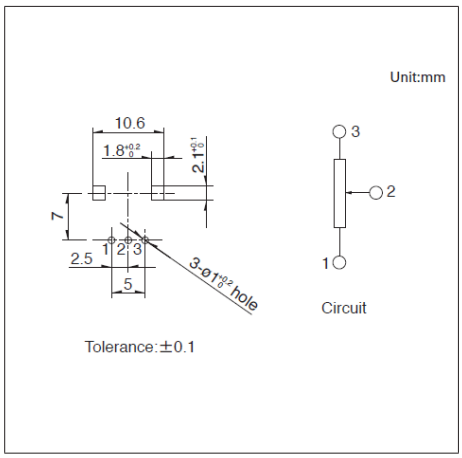
# RK09K/RK09D Series

## Drawing No.12

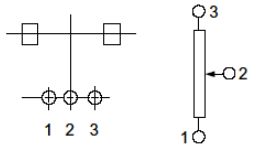
■ Dimensions




■ Mounting Hole Dimensions



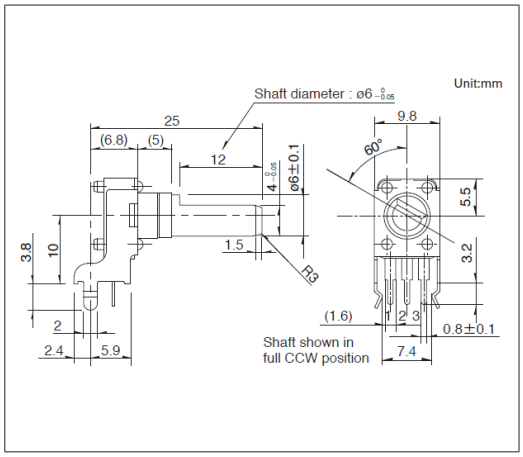

■ Terminal Layout / Circuit Diagram



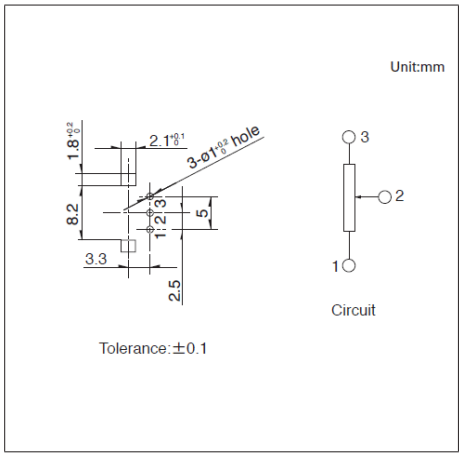

Viewed from mounting side.

## Drawing No.13

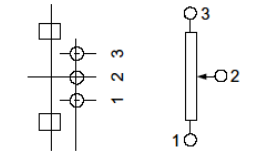
■ Dimensions




■ Mounting Hole Dimensions



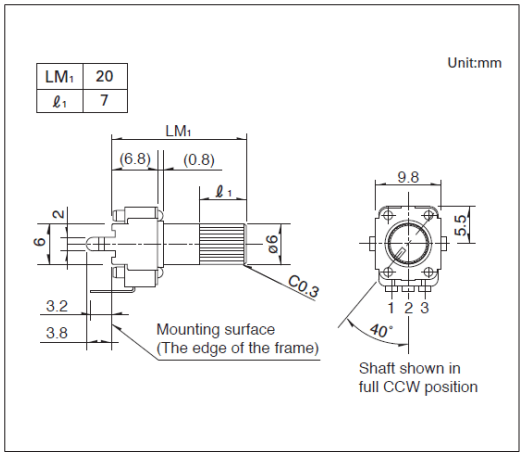

■ Terminal Layout / Circuit Diagram



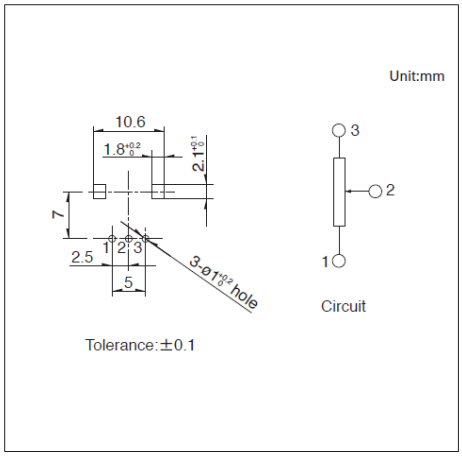

Viewed from mounting side.

## Drawing No.14

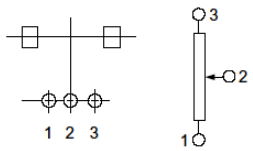
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram




Viewed from mounting side.

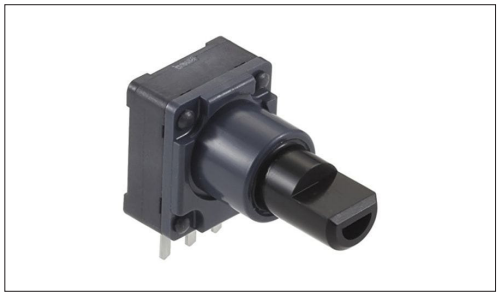
# Potentiometers

Rotary Potentiometer (Insulated shaft type)

## 9mm Size Insulated Shaft Long-life Type

# RK09Y11L Series

## Compact design with a rotational life of 1 million cycles.



- Total resistance tolerance:±30%
- Maximum operating voltage:50V AC, 5V DC
- Rotational torque:5mN·m max.
- Operating life:1,000,000 cycles
- Operating temperature range:-10℃ to +70℃

Applications:Game:Home handheld consoles,Virtual/augmented reality

■ Product List

| Products No. | Number of resistor elements | Control part orientation | Shaft types | Length of the shaft | Detent | Total resistance | Resistance taper | Automotive | Drawing No. |
|---|---|---|---|---|---|---|---|---|---|
| **RK09Y11L0001** | Single-unit | Horizontal | Flat | 12.0mm | Without | 10kΩ | Linear | — | 1 |

⚠Note

1. This catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. Please place purchase orders per minimum order unit (integer).

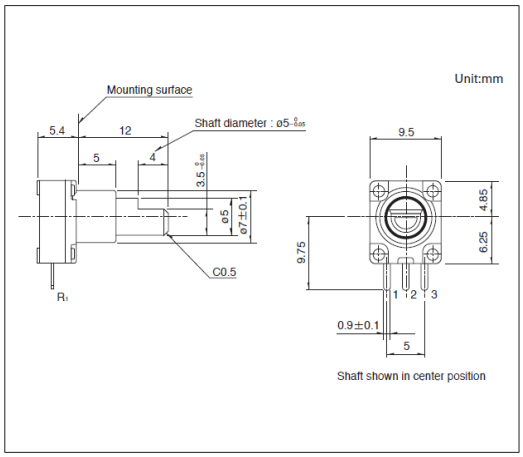
■ Packing Specifications

Bulk

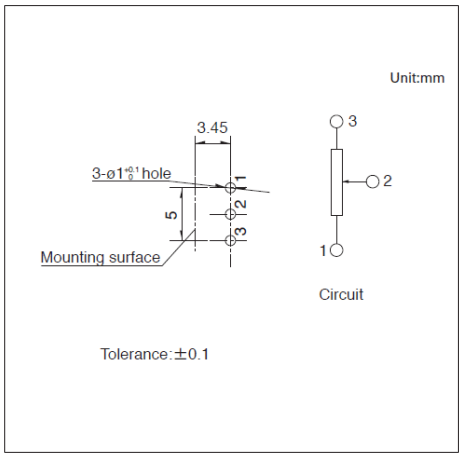
| Number of packages(pcs.) | | Export package measurements (mm) |
|---|---|---|
| 1 case / Japan | 1 case / export packing | |
| 3,500 | 7,000 | 528 x 369 x 178 |

## Drawing No.1

■ Dimensions




■ Mounting Hole Dimensions




Viewed from mounting side.

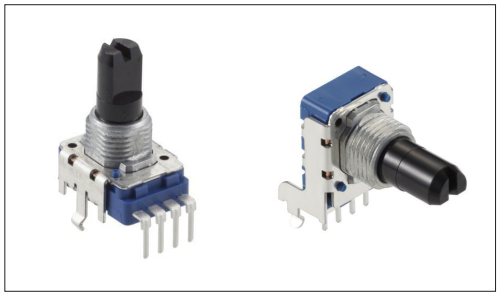
# Potentiometers

Rotary Potentiometer (Insulated shaft type)

## 11mm Size Insulated Shaft Snap-in Type

# RK11K Series

**Body width of 11mm, widely compatible with audio, video, and electronic musical instruments.**



- Total resistance tolerance:±20%
- Maximum operating voltage:50V AC, 20V DC
- Rotational torque:3 to 20mN·m
- Operating life:15,000 cycles
- Operating temperature range:-10℃ to +70℃

Applications:Home:Major home appliances,Office equipment
Audio_TV:Visual,Audio,Pro audio

■ Product List

| Products No. | Number of resistor elements | Control part orientation | Shaft types | Length of the shaft LM1 (mm) | Detent | Total resistance | Resistance taper | Automotive | Drawing No. |
|---|---|---|---|---|---|---|---|---|---|
| **RK11K1140AHZ** | Single-unit | Vertical | Flat | 22.5 | Without | 10kΩ | 15A | — | 1 |
| **RK11K1140097** | Single-unit | Vertical | Flat | 22.5 | Center detent | 10kΩ | 1B | — | |
| **RK11K1120A13** | Single-unit | Horizontal | Flat | 22.5 | Without | 10kΩ | 15A | — | 2 |
| **RK11K112000P** | Single-unit | Horizontal | Flat | 22.5 | Center detent | 10kΩ | 1B | — | |

⚠Note

1. This catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. Please place purchase orders per minimum order unit (integer).
3. Products other than those listed in above products are also available. Please contact us for details.
4. Nut and washer are not attached. Please specify if required.

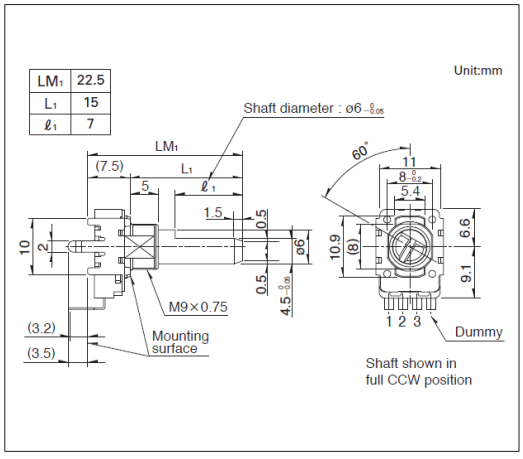
■ Packing Specifications

Tray

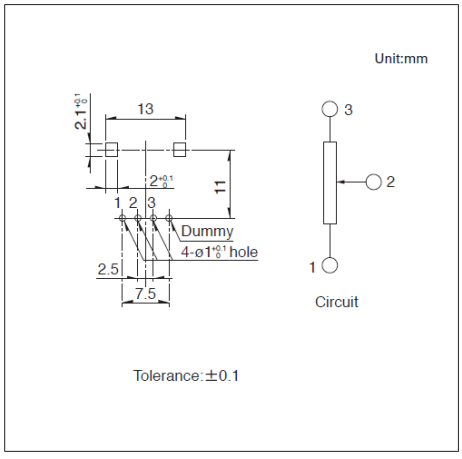
| Number of packages(pcs.) | | Export package measurements (mm) |
|---|---|---|
| 1 case / Japan | 1 case / export packing | |
| 1,000 | 2,000 | 543 x 377 x 250 |

## Drawing No.1

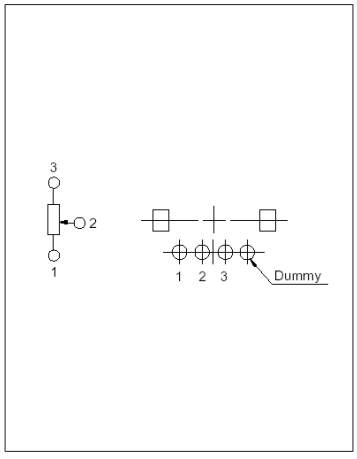
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



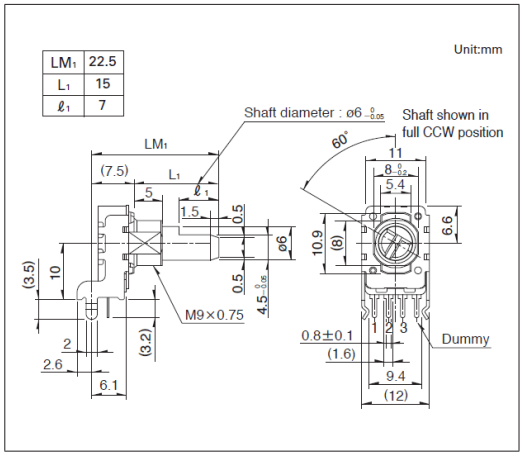

Viewed from mounting side.

11mm Size Insulated Shaft Snap-in Type

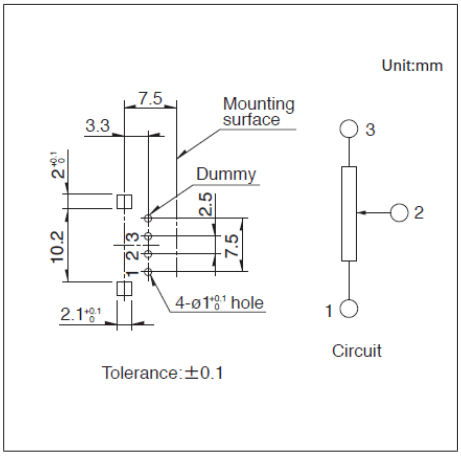
# RK11K Series

## Drawing No.2

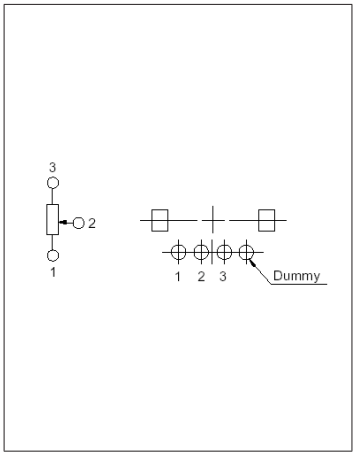
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



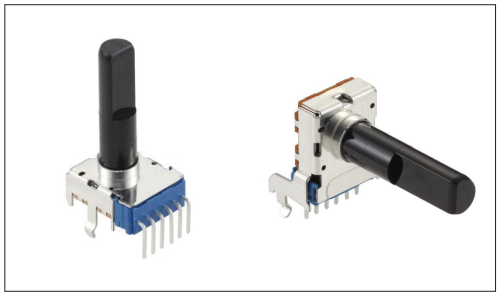

Viewed from mounting side.

Potentiometers Rotary Potentiometer (Insulated shaft type)

## 12mm Size Insulated Shaft Snap-in Type

# RK12L Series

## Body width of 12mm, delivering high performance.



- Total resistance tolerance:±20%
- Maximum operating voltage:50V AC for AC only
- Rotational torque:2 to 15mN·m
- Operating life:15,000 cycles
- Operating temperature range:-10℃ to +70℃

Applications:Home:Major home appliances,Office equipment
Audio_TV:Visual,Audio,Pro audio

■ Product List

| Products No. | Number of resistor elements | Control part orientation | Shaft types | Length of the shaft LM1 (mm) | Detent | Total resistance | Resistance taper | Automotive | Drawing No. |
|---|---|---|---|---|---|---|---|---|---|
| **RK12L1230C1K** | Dual-unit | Vertical | Flat | 25.0 | Center detent | 10kΩ | 1B | — | 1 |
| **RK12L1230C0Q** | Dual-unit | Vertical | Flat | 25.0 | Without | 10kΩ | 1B | — | |
| **RK12L123000G** | Dual-unit | Vertical | Flat | 30.0 | Center detent | 10kΩ | 1B | — | 2 |
| **RK12L1230A08** | Dual-unit | Vertical | Flat | 30.0 | Without | 10kΩ | 1B | — | |
| **RK12L1210C1T** | Dual-unit | Horizontal | Flat | 30.0 | Center detent | 10kΩ | 1B | — | 3 |
| **RK12L1210C0V** | Dual-unit | Horizontal | Flat | 30.0 | Without | 10kΩ | 1B | — | |
| **RK12L12C0A0E** | Dual-unit | Vertical | Flat | 25.0 | Without | 10kΩ | 15A | — | 1 |
| **RK12L12C0A0G** | Dual-unit | Vertical | Flat | 30.0 | Without | 10kΩ | 15A | — | 2 |
| **RK12L12A0C0R** | Dual-unit | Horizontal | Flat | 30.0 | Without | 10kΩ | 15A | — | 3 |

⚠Note

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2. Please place purchase orders per minimum order unit (integer).
3. Products other than those listed in above products are also available. Please contact us for details.

■ Packing Specifications

Tray

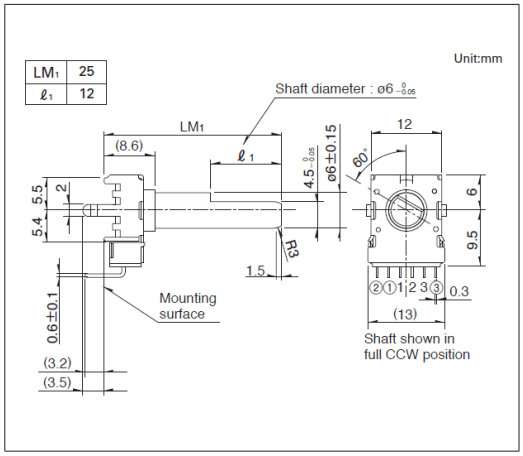
| Number of packages(pcs.) | | Export package measurements (mm) |
|---|---|---|
| 1 case / Japan | 1 case / export packing | |
| 800 | 1,600 | 543 x 377 x 250 |

12mm Size Insulated Shaft Snap-in Type

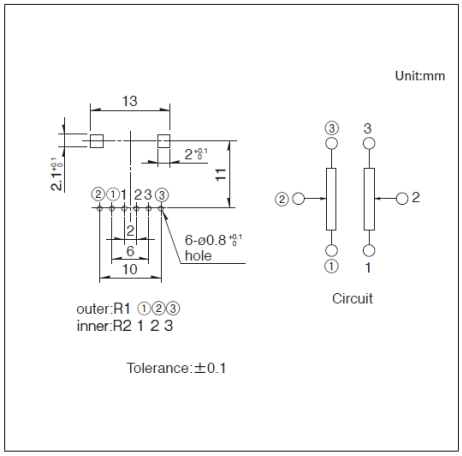
# RK12L Series

## Drawing No.1

■ Dimensions



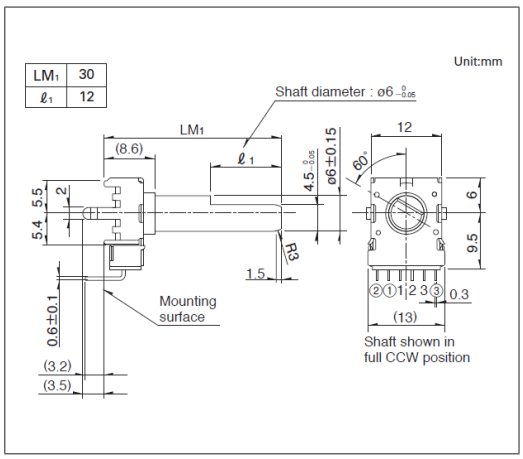

■ Mounting Hole Dimensions



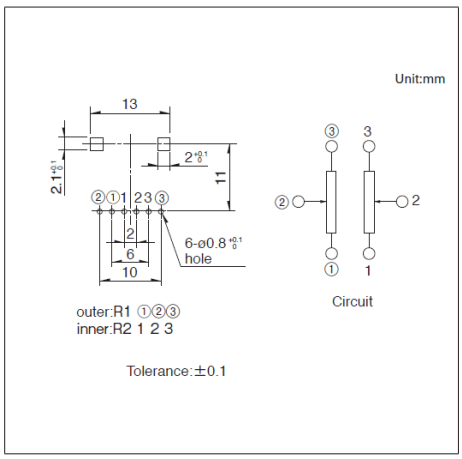

Viewed from mounting side.

## Drawing No.2

■ Dimensions



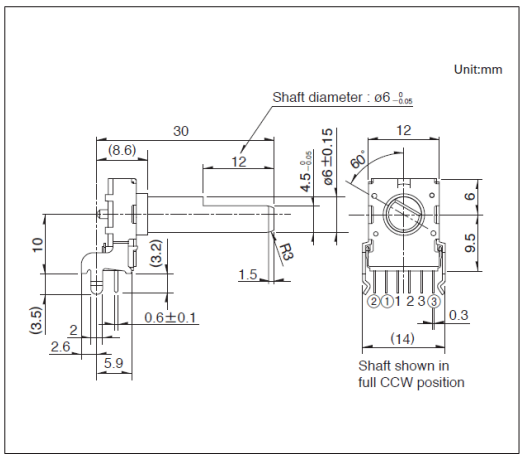

■ Mounting Hole Dimensions



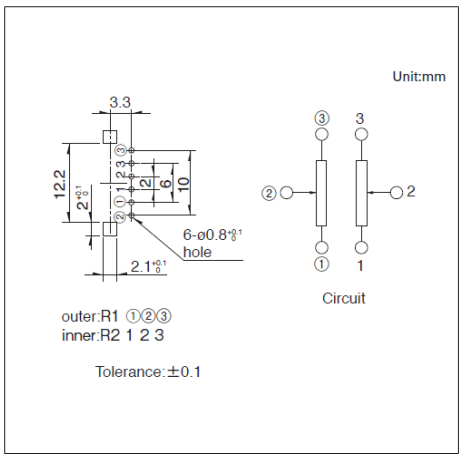

Viewed from mounting side.

## Drawing No.3

■ Dimensions




■ Mounting Hole Dimensions




Viewed from mounting side.

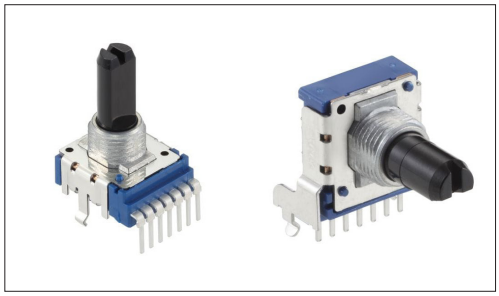
# Potentiometers

Rotary Potentiometer (Insulated shaft type)

## 14mm Size Insulated Shaft Snap-in Type

# RK14K Series

**Body width of 14mm, widely compatible with audio, video, and electronic musical instruments.**



- Total resistance tolerance:±20%
- Maximum operating voltage:50V AC for AC only
- Rotational torque:3 to 20mN·m
- Operating life:15,000 cycles
- Operating temperature range:-10℃ to +70℃

Applications:Home:Major home appliances,Office equipment
Audio_TV:Visual,Audio,Pro audio

■ Product List

| Products No. | Number of resistor elements | Control part orientation | Shaft types | Length of the shaft LM1 (mm) | Detent | Total resistance | Resistance taper | Automotive | Drawing No. |
|---|---|---|---|---|---|---|---|---|---|
| **RK14K124003H** | Dual-unit | Vertical | Flat | 22.5 | Center detent | 10kΩ | 1B | — | 1 |
| **RK14K1220012** | Dual-unit | Horizontal | Flat | 22.5 | Center detent | 10kΩ | 1B | — | 2 |
| **RK14K12D0A5V** | Dual-unit | Vertical | Flat | 22.5 | Without | 10kΩ | 15A | — | 3 |
| **RK14K12B0A0E** | Dual-unit | Horizontal | Flat | 22.5 | Without | 10kΩ | 15A | — | 4 |

⚠Note

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2. Please place purchase orders per minimum order unit (integer).
3. Products other than those listed in above products are also available. Please contact us for details.
4. Nut and washer are not attached. Please specify if required.

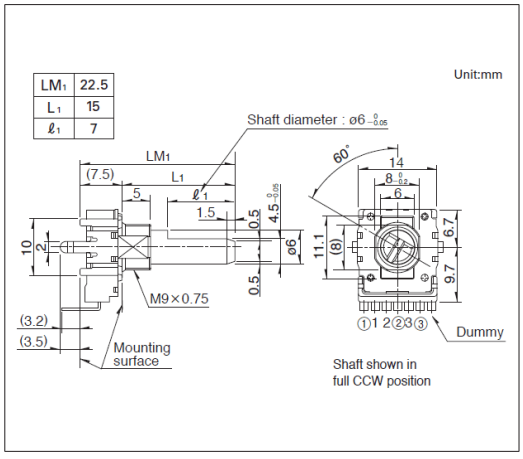
■ Packing Specifications

Tray

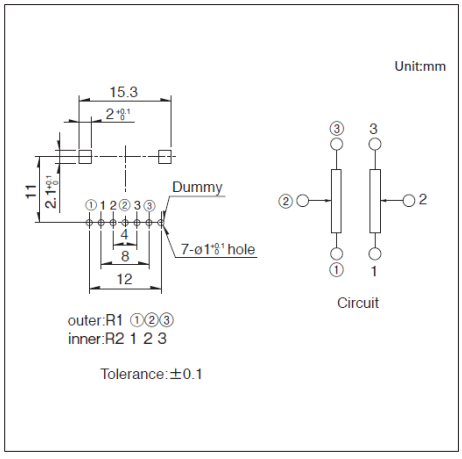
| Number of packages(pcs.) | | Export package measurements (mm) |
|---|---|---|
| 1 case / Japan | 1 case / export packing | |
| 1,000 | 2,000 | 543 x 377 x 250 |

## Drawing No.1

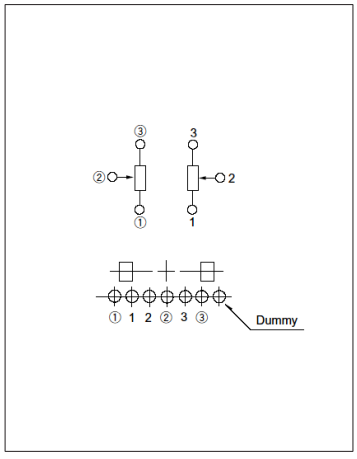
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram



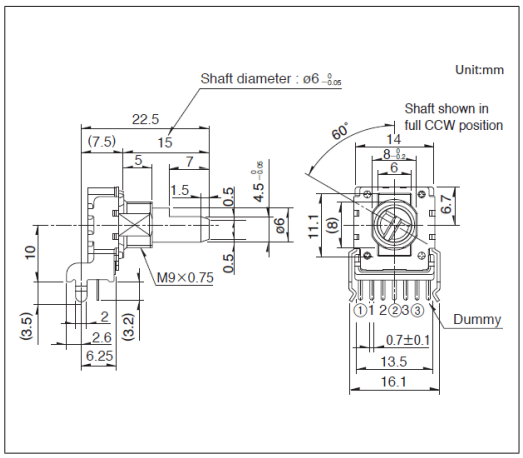

Viewed from mounting side.

14mm Size Insulated Shaft Snap-in Type

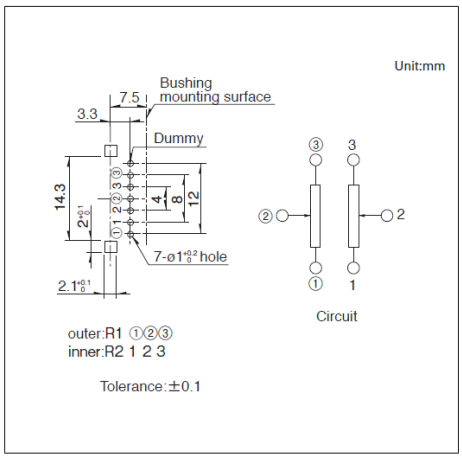
# RK14K Series

## Drawing No.2

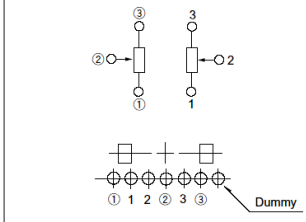
■ Dimensions




■ Mounting Hole Dimensions



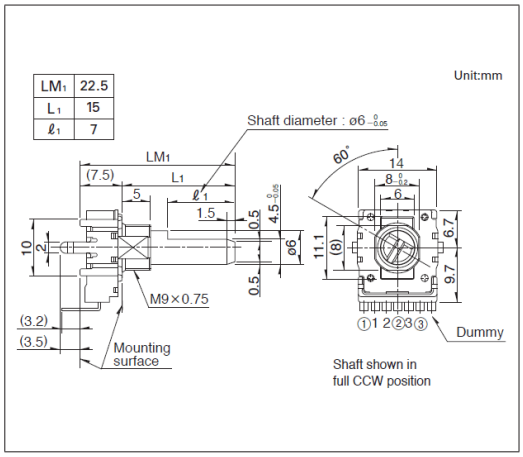

■ Terminal Layout / Circuit Diagram



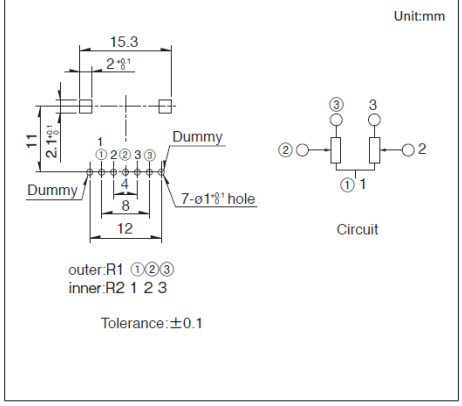

Viewed from mounting side.

## Drawing No.3

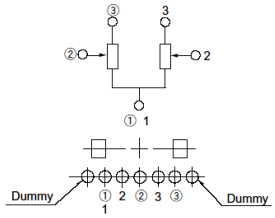
■ Dimensions




■ Mounting Hole Dimensions



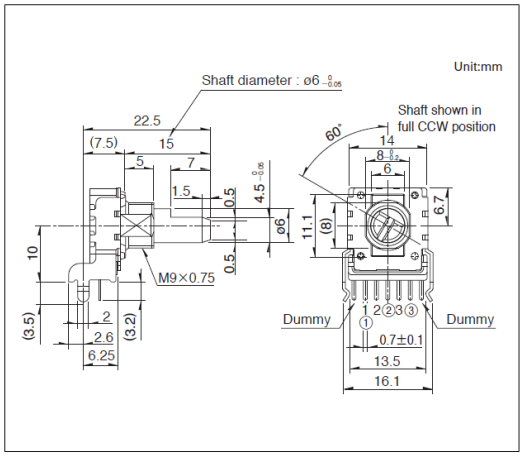

■ Terminal Layout / Circuit Diagram



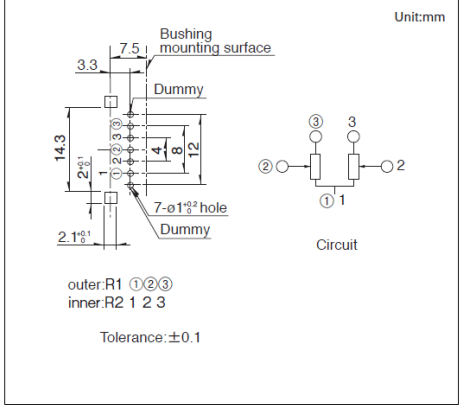

Viewed from mounting side.

## Drawing No.4

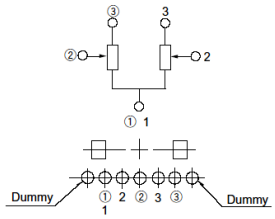
■ Dimensions




■ Mounting Hole Dimensions




■ Terminal Layout / Circuit Diagram




Viewed from mounting side.

# Rotary Potentiometer (Insulated shaft type) / Soldering Conditions

## ■ Reference for Manual Soldering

| Series | Tip temperature | Soldering time | No. of solders |
|---|---|---|---|
| **RK09D, RK09K, RK09Y11L, RK11K, RK12L, RK14K** | 350℃ max. | 3s max. | 1 time |

## ■ Reference for Dip Soldering

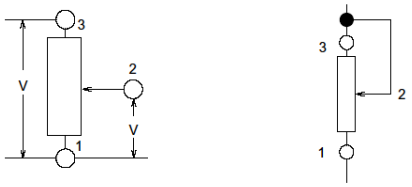
| Series | Preheating | | Dip soldering | | No. of solders |
|---|---|---|---|---|---|
| | Soldering surface temperature | Heating time | Soldering temperature | Soldering time | |
| **RK12L** | 100℃ | 1 min. max. | 260℃ max. | 5s max. | 2 time max. |

# Potentiometers / Cautions

## Recommended Circuit Configuration

Please use the potentiometer in the voltage adjustment circuit (Fig. A). Avoid using it in the current adjustment circuit (Fig. B) as it is affected by the contact resistance between the resistive element and the wiper.

A.Voltage divider type B.Current controller type




## Direct Voltage

When direct voltage is flown through this part, terminal to terminal insulation may deteriorate depending on the use environment. This is due to a migration phenomenon. Contact us if you are planning to use this part under direct voltage.

## Impedance on the Output Side

There is a possibility that might de affected by contact resistance of resistive element and wiper in case of low impedance of output side in voltage regulation circuit. For this reason, we require that you adjust to impedance of output side more than 100 times of total resistance.

## Residual Resistance

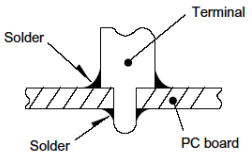
Although electric poles of resistors are generally formed by silver printing, we provide carbon coating over the silver poles to enhance reliability against sulfurization. Contact us if you wish to use the part in a low residual resistance state.

## Dew Condensation

Avoid using the potentiometer where dew or water drops might occur on the surface of the resistor, etc. Deterioration of insulation or shorting may occur.

## Soldering

To avoid potential contact issues, please do not solder wires to the top surface of the printed circuit board as shown in the diagram.
Solder all metal lugs into a substrate before use.




## Stress Being Applied to the Terminals

Always pay special attention not to apply excessive stress when handling the terminals. Also, be sure to design appropriate soldering conditions.

## Looseness of the Shaft

When lengthy shaft lengths are being employed, the looseness (deviation) tends to grow in proportion to the shaft length. Conducting a test under actual operating conditions is recommended.

# Potentiometers / Cautions

## Chassis Mounting

The use of a nut to fasten this part may lead to excessive tightening and can deteriorate the rotary contact performance, or strip the threads. Handle with care when tightening the nut.

## Use of Chemicals

Since synthetic resins such as polycarbonate are being used as the material for the insulated type shafts, avoid using this part under gassy environments of such chemicals as ammonia, amines, alkali water solutions, aromatic hydrocarbons, ketones, esters and halogenated hydrocarbons, especially, under their intensive gas environments.

## Operation at Low Temperature

When these products are expected to be used under low temperature environments such as applications for car radios and car stereos, we can customize them for easier and more smooth rotary movements. When placing orders, indicate whether the low temperature specification is necessary or not.

## Storage

1. Store the products as delivered, at a normal temperature and humidity, without direct sunshine and corrosive gas ambient. Use them at an earliest possible timing, not later than six months upon receipt.

2. After breaking the seal, keep the products in a plastic bag to shut out ambient air, store them in the same environment as above, and use them up as soon as possible.

3. Do not stack too many switches.

The above operation notes are quoted from the
“Precaution and Guideline of Potentiometer for Electrical Devices” , which is a technical report issued by the Japan Electronics and Information Technology Industries Association RCR-2191A (in March 2002).
For details, see the above technical report.