

# Metal Shaft Potentiometer 9mm Size Metal Shaft Multi-ganged Type

RK097 Series



9.5mm width potentiometer ideal for various types of control.



## Typical Specifications

Items	Specifications
Total resistance tolerance	±20%
Maximum operating voltage	50V AC , 10V DC
Total rotational angle	300±5° (For shaft movable type, 300 <sup>+10°</sup> <sub>-5°</sub> )
Rotational torque	2 to 25mN·m
Operating life	15,000cycles
Operating temperature range	-20°C to +70°C -40°C ~ +85°C (Vehicle-compatible)

## Product Line

### Single-shaft without switch type

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.	
Single-unit	Horizontal type	Flat	15	Without	10	15A	2,400 (A type)	RK097111080J	1	
					20	1B		RK0971110909		
				With	10	15A		RK0971110D7F		
					50	1B		RK097111020N		
			20	Without	10	15A		RK097111080R		
					10	1B		RK0971110D88		
				50	1B	RK09711100F8				
			25	Without	10	15A		1,600 (B type)		RK097111091M
					10	1B		1,600 (B type)		RK0971110D57
			Dual-unit for tone	Horizontal type	Flat	15		With		50
20	20	1,600 (B type)					RK0971210Z2M			
25	20	1,600 (B type)					RK0971210097			
Dual-unit for vol.	Horizontal type	Flat	15	Without	10	15A	2,400 (A type)	RK09712200MC		
					10	3B	2,400 (A type)	RK09712200MY		
			20		10	15A	1,600 (B type)	RK09712200HA		
					10	3B	1,600 (B type)	RK097122008T		
20	20	15A	1,600 (B type)	RK09712200MT						

## Notes

1. Products other than those listed in above products are also available. Please contact us for details.
2. For automotive use, please contact us with detailed specifications.
3. Please place purchase orders per minimum order unit N (integer).

Rotary Potentiometers

Slide Potentiometers

Metal Shaft

Insulated Shaft

Knob Operating

Ring Type Devices



Automotive Use

Refer to P.356, 357 for product varieties.  
Refer to P.356, 359, 470 for resistance taper.  
Refer to P.379 for attached parts.

**Product Line**

**Single-shaft with rotary switch type**

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.
Single-unit	Horizontal type	Flat	15	Without	20	15A	1,400 (C type)	RK0971111Z0P	3
					50			RK0971111Z32	
			20		10	1B		RK09711110AL	
Dual-unit for vol.			15		20	3B		RK0971221Z05	4
			20					RK0971221Z11	

**Single-shaft push-on push-off (1.5mm travel) sswitch type**

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.
Single-unit	Horizontal type	Flat	25	Without	10	15A	1,400 (C type)	RK097111202P	5
						1B		RK097111202Q	
Dual-unit for vol.			20		50	3B	1,200 (D type)	RK097122200G	6

**Single-shaft momentary push (0.5mm travel) switch type**

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.
Single-unit	Horizontal type	Flat	15	With	10	3B	1,400 (C type)	RK0971114D0B	7
Dual-unit for tone				Without		20		1B	RK0971214Z06
Dual-unit for vol.			15A					RK0971224Z01	

**Single-shaft momentary push (1.5mm travel) switch type**

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.
Single-unit	Horizontal type	Flat	20	Without	10	1B	1,400 (C type)	RK0971114Z07	9

**Notes**

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2. Please place purchase orders per minimum order unit N (integer).

Rotary Potentiometers  
Slide Potentiometers

Metal Shaft  
Insulated Shaft

Knob Operating  
Ring Type Devices



Automotive Use

Refer to P.356, 357 for product varieties.  
 Refer to P.358 for switches.  
 Refer to P.356, 359, 470 for resistance taper.  
 Refer to P.379 for attached parts.

**Product Line**

**Single-shaft with push-lock mechanism type**

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.	
Single-unit	Horizontal type	Flat	25	Without	10	1B	1,400 (C type)	RK097111T065	10	
					100	15A		RK097111TZ17		
				With	10	1B		RK097111T064		
					100			RK097111TD2M		
				Dual-unit for tone	Without	10		1,200 (D type)		RK097111TD44
						50				3B
Dual-unit for vol							RK097122T017	11		
							RK097122TZ0A			

**Dual-shaft, dual-unit without switch type**

Number of resistor elements	Mounting direction	shaft	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum order unit (pcs.)	Products No.	Drawing No.	
Dual-unit (Single-shaft, Single-unit)	Horizontal type	The outer shaft	Slotted	15	Without	10	15A	1,400 (C type)	RK097221005C	12	
		The inner shaft	Flat	25							
		The outer shaft	Slotted	15					15C		RK097221004C
		The inner shaft	Flat	25							

**Packing Specifications**

**Tray**

Minimum order unit type	Number of packages (pcs.)		Export package measurements (mm)
	1 case /Japan	1 case export packing	
A type	1,200	2,400	375 × 490 × 185
B type	800	1,600	373 × 540 × 207
C type	700	1,400	373 × 540 × 181
D type	600	1,200	373 × 540 × 225

**Notes**

1. Products other than those listed in above products are also available. Please contact us for details.
2. For automotive use, please contact us with detailed specifications.
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Refer to P.356, 357 for product varieties.  
 Refer to P.356, 359, 470 for resistance taper.  
 Refer to P.379 for attached parts.


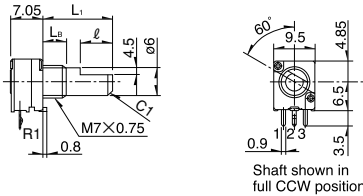
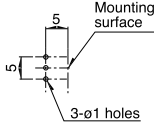

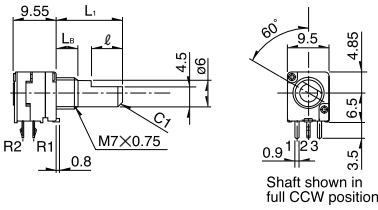
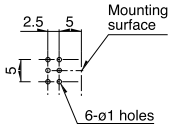

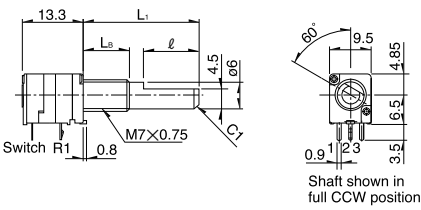
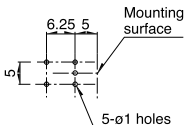

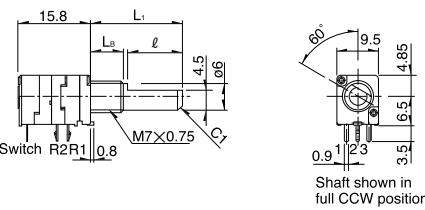
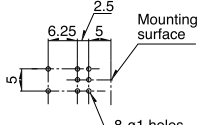
**Dimensions**

Unit:mm

Rotary Potentiometers  
 Slide Potentiometers

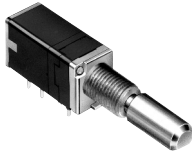
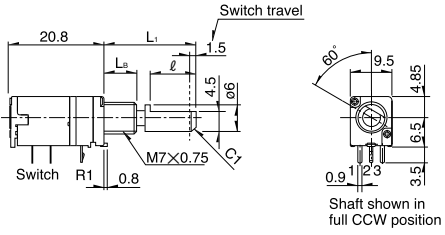
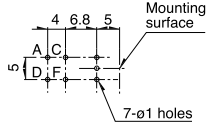

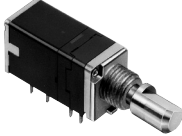
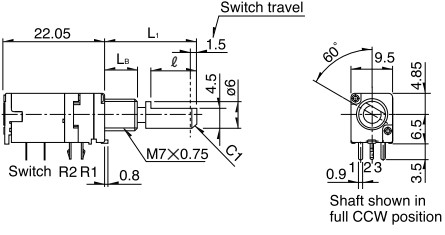
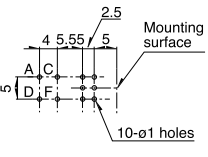


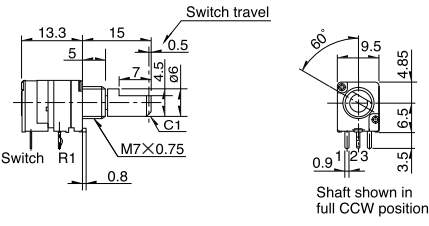
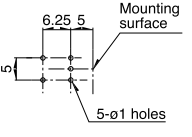


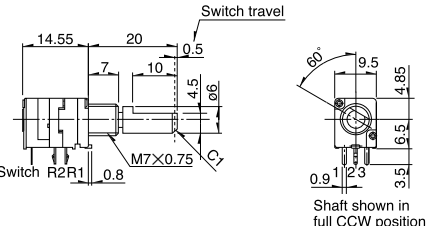
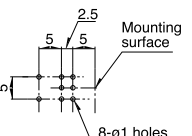

Metal Shaft  
 Insulated Shaft  
 Knob Operating  
 Ring Type Devices

Automotive Use

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)												
1		<table border="1"> <tr><td>L<sub>1</sub></td><td>15</td><td>20</td><td>25</td></tr> <tr><td>L<sub>B</sub></td><td>5</td><td>7</td><td>10</td></tr> <tr><td>ℓ</td><td>7</td><td>12</td><td>12</td></tr> </table> 	L <sub>1</sub>	15	20	25	L <sub>B</sub>	5	7	10	ℓ	7	12	12	
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L <sub>B</sub>	5	7													
ℓ	7	12													

Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)						
5	 <p>Single-shaft, single-unit with push-on push-off switch                      RK0971112-5R2412</p>	<table border="1"> <tr><td>L<sub>1</sub></td><td>25</td></tr> <tr><td>L<sub>B</sub></td><td>10</td></tr> <tr><td>ℓ</td><td>12</td></tr> </table> 	L <sub>1</sub>	25	L <sub>B</sub>	10	ℓ	12	 
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6	 <p>Single-shaft, dual-unit with push-on push-off switch                      RK0971222-5R2412 (For vol.)</p>	<table border="1"> <tr><td>L<sub>1</sub></td><td>20</td></tr> <tr><td>L<sub>B</sub></td><td>7</td></tr> <tr><td>ℓ</td><td>10</td></tr> </table> 	L <sub>1</sub>	20	L <sub>B</sub>	7	ℓ	10	 
L <sub>1</sub>	20								
L <sub>B</sub>	7								
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7	 <p>Single-shaft, single-unit with momentary push switch travel 0.5mm                      RK0971114-5R4211</p>		 						
8	 <p>Single-shaft, dual-unit with momentary push switch travel 0.5mm                      RK0971214-5R4211 (For tone)                      RK0971224-5R4211 (For vol.)</p>		 						

Rotary Potentiometers  
 Slide Potentiometers

Metal Shaft  
 Insulated Shaft  
 Knob Operating  
 Ring Type Devices



Automotive Use

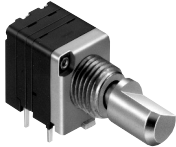
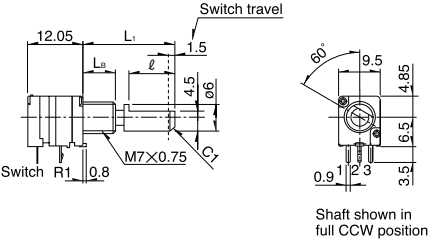
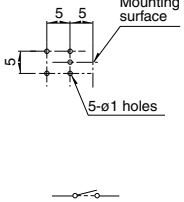
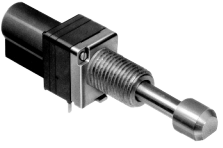
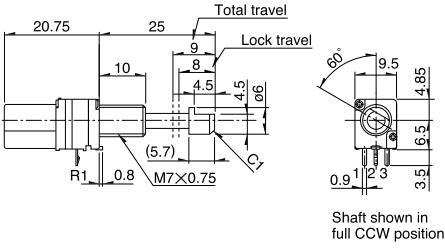
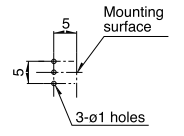

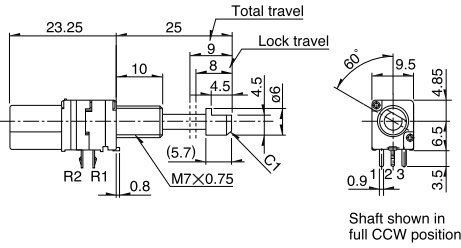
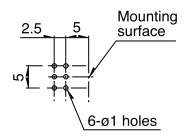

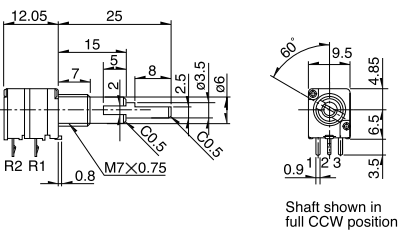
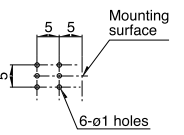
**Dimensions**

Unit:mm

Rotary Potentiometers  
 Slide Potentiometers

Metal Shaft  
 Insulated Shaft  
 Knob Operating  
 Ring Type Devices

Automotive Use

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)						
9	<p><b>Single-shaft, single-unit with momentary push switch travel 1.5mm</b>                      RK0971114-5R4611</p> 	<table border="1"> <tr> <td>L<sub>1</sub></td> <td>20</td> </tr> <tr> <td>L<sub>B</sub></td> <td>7</td> </tr> <tr> <td>ℓ</td> <td>10</td> </tr> </table> 	L <sub>1</sub>	20	L <sub>B</sub>	7	ℓ	10	
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L <sub>B</sub>	7								
ℓ	10								
10	<p><b>Single-shaft, single-unit with push-lock mechanism</b>                      RK097111T</p> 								
11	<p><b>Single-shaft, dual-unit with push-lock mechanism</b>                      RK097121T (For tone)                      RK097122T (For vol.)</p> 								
12	<p><b>Dual-shaft, dual-unit</b>                      RK0972210</p> 								

## Product Varieties

In addition to the recommended products, the following specifications can also be accommodated.

### Total Resistance Variety

Total resistance (kΩ)	10	20	50	100
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### Resistance Taper

Resistance taper	15A	1B	3B	15C
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### Note

Can be fitted with center-taps.

### Dimensions of Terminal

Unit:mm

※ Mounting height (H): 6.5mm (10mm and 12.5mm also available upon request.)  
 ※ For single-unit type with tap is only available with H=6.5mm.  
 ※ Tap is on the terminal 3 side only.

Outline drawing without tap      Outline drawing with tap      Detail of 2 terminal belong part

### Dimensions of Bushings

Unit:mm

Bushing	M6	M7	M9
Dimensions			
Applications	For single-shaft only	For single and dual-shaft	For dual-shaft only

### Single-shaft Dimension

Flat type

Unit:mm

<p><b>Style (Shaft diameter : <math>\phi 6</math>)</b></p> <p>Shaft shown in full CCW position.</p>	<p><b>Detail dimensions</b></p> <table border="1"> <thead> <tr> <th>L<sub>1</sub></th> <th>L<sub>B</sub></th> <th>l</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>5</td> <td>7</td> </tr> <tr> <td>20</td> <td>7</td> <td>12(10)</td> </tr> <tr> <td>25</td> <td>10</td> <td>12</td> </tr> <tr> <td>30</td> <td>10</td> <td>12</td> </tr> </tbody> </table> <p>Models in parenthesis apply to those with a push-on switch and those with a push-on, push-off switch.</p>	L <sub>1</sub>	L <sub>B</sub>	l	15	5	7	20	7	12(10)	25	10	12	30	10	12
L <sub>1</sub>	L <sub>B</sub>	l														
15	5	7														
20	7	12(10)														
25	10	12														
30	10	12														
<p><b>Style (Shaft diameter : <math>\phi 3.5</math>)</b></p> <p>Shaft shown in full CCW position.</p>	<p><b>Detail dimensions</b></p> <table border="1"> <thead> <tr> <th>L<sub>1</sub></th> <th>L<sub>B</sub></th> <th>l</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>5</td> <td>7</td> </tr> <tr> <td>20</td> <td>7</td> <td>12(10)</td> </tr> <tr> <td>25</td> <td>10</td> <td>12</td> </tr> <tr> <td>30</td> <td>10</td> <td>12</td> </tr> </tbody> </table> <p>Models in parenthesis apply to those with a push-on switch and those with a push-on, push-off switch.</p>	L <sub>1</sub>	L <sub>B</sub>	l	15	5	7	20	7	12(10)	25	10	12	30	10	12
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15	5	7														
20	7	12(10)														
25	10	12														
30	10	12														

Refer to P.359, 470 for resistance taper.  
Refer to P.379 for attached parts.

## Product Varieties

In addition to the recommended products, the following specifications can also be accommodated.

### Dimension of Dual-shaft Type

**Applications** Both switchless and rotary switch models are available.

**Flat type for inner shaft, slotted type for outer shaft**

Unit:mm

**Style (Inner-shaft :  $\phi 6$  Outer-shaft :  $\phi 8$ )**

Shaft shown in full CCW position.

L <sub>1</sub>	L <sub>2</sub>	L <sub>B</sub>	l <sub>1</sub>	l <sub>2</sub>
20	10	5	8	4
25	15	7	8	5
30	20	10	8	5
35	25	10	8	5

**Style (Inner-shaft :  $\phi 3.5$  Outer-shaft :  $\phi 6$ )**

Shaft shown in full CCW position.

L <sub>1</sub>	L <sub>2</sub>	L <sub>B</sub>	l <sub>1</sub>	l <sub>2</sub>
20	10	5	8	4
25	15	7	8	5
30	20	10	8	5
35	25	10	8	5

### Shaft Dimensions of with Push-lock Mechanism

Unit:mm

Shaft shown in full CCW position.

※L <sub>1</sub>	L <sub>B</sub>	A	l
25	10	(5.7)	4.5
30	10	(10.7)	7
35	10	(15.7)	12

※Dimensions in unlocked state

**Example of uses**

**Note**

marked are specifications recommended by ALPS.

Rotary Potentiometers  
Slide Potentiometers

Metal Shaft  
Insulated Shaft  
Knob Operating  
Ring Type Devices



# Switch Specifications

## Mechanical Characteristics

Switch type		Contact arrangement	Rating	Operating force	Changeover angle (travel)
Rotary switch	5R1211	SPST	3A 16V DC	50mN·m max.	50° max.
	5R1212	SPDT	1A 16V DC		
Push-on push-off switch	5R2412		DPST	3A 16V DC	12±8N
	5R2421				
Momentary push switch	5R4211	SPST	0.5A 12V DC	4 <sup>+4</sup> / <sub>-2</sub> N	0.5mm
	5R4611			5±2N	1.5mm

Rotary Potentiometers  
Slide Potentiometers

## Electrical Characteristics

Model	Contact resistance	Insulation resistance	Voltage proof
5R1211, 5R1212 5R2412, 5R2421 5R4211, 5R4611	100mΩ for initial period, 200mΩ after operating life	100MΩ min. Measured with a 250V DC insulation tester	300V AC 1 minute min.

## Durability

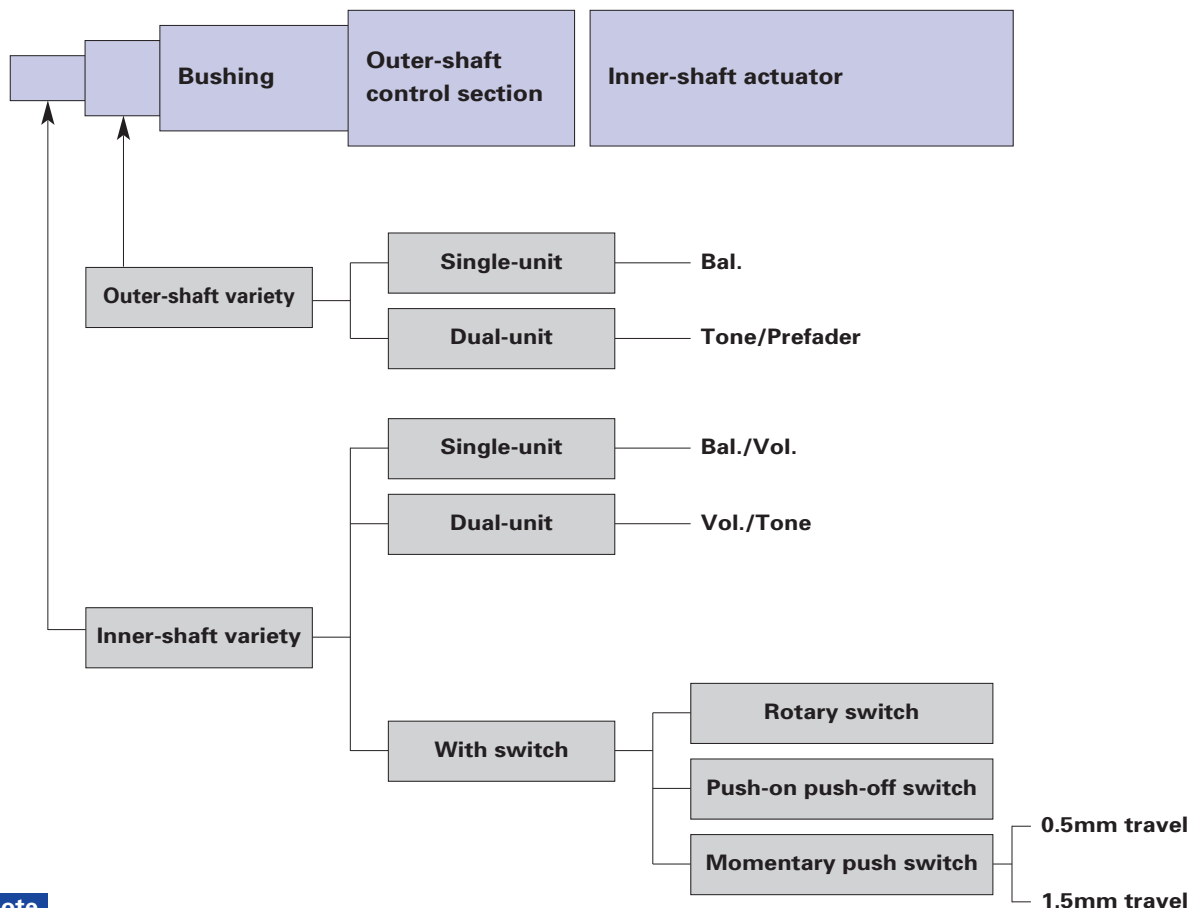
Operating life under load	5R1211,5R1212 5R2412,5R2421 5R4211	The switch under a rated resistance load shall be subjected to a total of 10,000 cycles of operation at a speed of 600 to 1,000 cycles per hour. The contact resistance after testing should not exceed 200mΩ.
	5R4611	The switch under a rated resistance load shall be subjected to a total of 20,000 cycles of operation at a speed of 600 to 1,000 cycles per hour. The contact resistance after testing should not exceed 200mΩ.

Metal Shaft  
Insulated Shaft  
Knob Operating  
Ring Type Devices

### Note

The operating current should be 10mA or greater.

# Configuration Chart



### Note

The single-shaft type product lineups are the same as those in the inner-shaft variety.

# Orders Other Than Recommended Products

When ordering product varieties that are not listed in the Product Line, please specify by referring to the below example.

## Sample Part Number



### Model type

Code	Model type
111	Single-shaft single-unit
121	Single-shaft dual-unit for tone
122	Single-shaft dual-unit for vol.

### Switch specifications

Code	Switch specifications
0	Without switch
1	With rotary switch
2	With push-on push-off switch
4	With momentary push switch(0.5mm travel)
T	With push-lock mechanism

\*Push on switch 1.5mm stroke is individually specified.

### Shaft type

Code	Shaft type
F	Flat(shaft diameter : 6)

\*Shaft diameter 3.5 is individually specified.

### Length of the shaft (L<sub>1</sub>) (mm)

Code	Length of the shaft	Code	Length of the shaft
15	15	25	25
20	20	30	30

### Detent

Code	Detent	Code	Detent
C0	Without	11	11
C1	Center	31	31

\*With rotary switch; for applications in types other than push-lock mechanism.

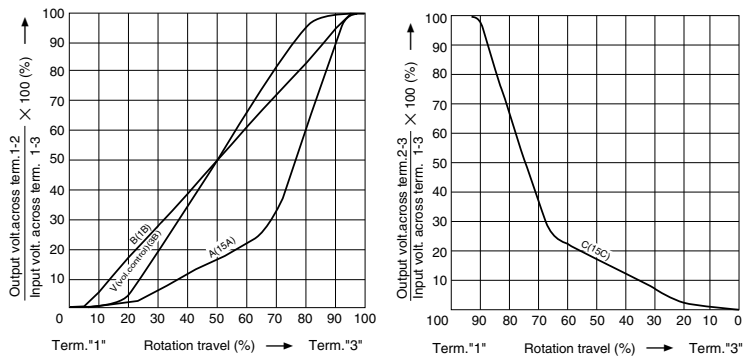
### Resistance taper

Code	Resistance taper	Code	Resistance taper
A	15A	V	3B
B	1B	C	15C

\*The resistance taper for rotary switches are individually defined.

B:For tone & general(model type : 111,121)

V:For vol.(model type : 111,122)



### Total resistance

Code	Total resistance (kΩ)	Code	Total resistance (kΩ)
103	10	503	50
203	20	104	100

### Notes

1. **111** marked are specifications recommended by ALPS.
2. The above specification is only applicable to the one-shaft single-unit model and dual-unit ganged model.






Rotary Potentiometers  
Slide Potentiometers

Metal Shaft  
Insulated Shaft  
Knob Operating  
Ring Type Devices

## List of Varieties

Rotary Potentiometers  
Slide Potentiometers

Metal Shaft  
Insulated Shaft  
Knob Operating  
Ring Type Devices

Type		9mm size metal shaft snap-in		9mm size metal shaft multi-ganged		11mm size metal shaft reflow	
Number of drive shafts		Single-shaft			Dual-shaft	Single-shaft	
Model		RK09L1		RK0971	RK0972	RK119	
Photo							
Fixing method of bushing		Bushing screw clamp				Bushing guide type	
Terminal mounting		Horizontal type	Vertical type	Horizontal type		Vertical type	
Attached switch		Without			Rotary switch ※1	Momentary push switch	
					Push-on push-off switch※1		
					Momentary push switch※1		
Gang error applicable to Dual-unit parts for audio volume control purposes		-40dB to 0dB 3dB max.				—	
Solder heat resistance	Manual soldering	350°C max. 3s max.				350±10°C 3 <sup>+1</sup> / <sub>0</sub> s	
	Dip soldering	260±5°C, 5±1s				—	
	Reflow soldering	—				Please see P.364	
Operating emperature range		-10°C to +70°C		-20°C to +70°C -40°C to +85°C (Vehicle-compatible)		-40°C to +85°C	
Automotive use		—		○	○	○	
Electrical performance	Rated power	0.05W					
	Residual resistance	10kΩ ≤ R ≤ 10kΩ 20Ω max. 10kΩ < R < 50kΩ 30Ω max. 50kΩ ≧ R			Nominal total resistance of 0.1% or less		R ≤ 10kΩ 50Ω max. 10kΩ < R ≤ 50kΩ 80Ω max. 50kΩ < R Nominal total resistance of 0.2% or less
	Maximum attenuation (Volume control)	5kΩ ≧ R < 10kΩ 10kΩ ≧ R < 50kΩ 50kΩ ≧ R < 100kΩ 100kΩ ≧ R		70dB min. 80dB min. 90dB min. 100dB min.			
	Insulation resistance	100MΩ min. 250V DC					
	Voltage proof	300V AC for 1minute					
Mechanical performance	Stopper strength	0.5N·m		0.5N·m (With push-lock mechanism type: 0.4N·m)		0.5N·m	
	Push-pull strength	80N max.		100N 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					
Environmental performance	Cold	-20°C±2°C for 96h		-30±2°C for 96h -40±2°C for 96h (Vehicle-compatible)		-40±2°C for 240h	
	Dry heat	70±2°C for 96h		70±2°C for 96h 85±2°C for 96h (Vehicle-compatible)		85±2°C for 240h	
	Damp heat	40±2°C, 90 to 95% RH for 96h				60±2°C, 90 to 95%RH for 240h	
Page		346		350		360	

### Push-on Switch Specifications

Items	RK097		RK119	
Contact arrangement	Single pole and single throw (Push on)			
Travel (mm)	0.5	1.5	0.5	1.5
Operating force (N)	4 <sup>+4</sup> / <sub>-2</sub>	5±2	5±2	4±2
Rating	0.5A 12V DC		0.1A 5V DC (0.1mA 5V DC min.ratings)	
Contact resistance	100mΩ for initial period;200mΩ after operating life			
Operating life	10,000 cycles min.	20,000 cycles min.	100,000 cycles min.	20,000 cycles min. (Operating life without Load)

- Metal Shaft Potentiometers Attached Parts .....379
- Metal Shaft Potentiometers Cautions .....380, 381

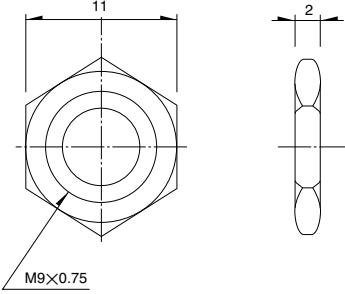
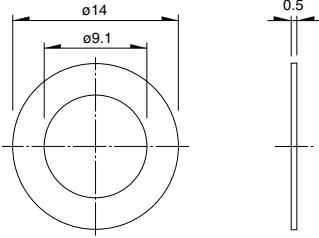
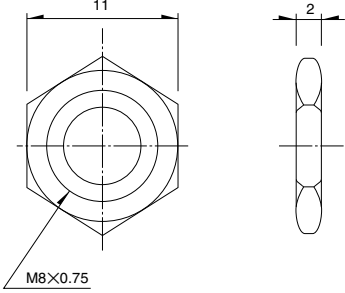
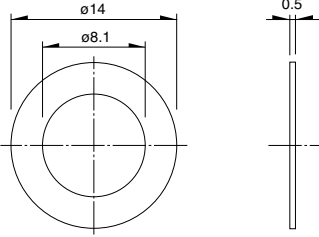
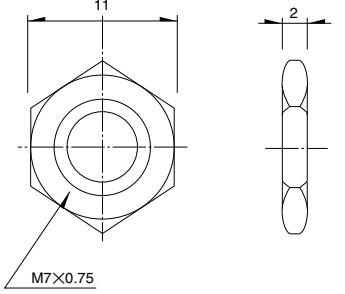
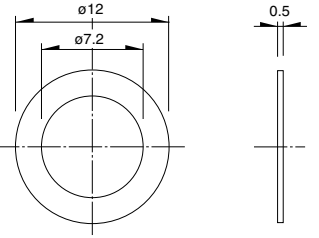
### Notes

- ※1. For the switch attached, the single-shaft or inner shaft of the dual-shaft type can be chosen.
- The operating temperature range for automotive applications can be raised upon request. Please contact us for details.
- marks in "Available for automotive use" indicate that some of the series products can work at the operating temperature range from -40°C to +85°C.

## Attached Parts

The following parts are included with the product.

Unit:mm

Applicable products	Bearing screw diameter	Hexagonal nut	Flat washer
Rotary Potentiometers Slide Potentiometers  RK09L RK168 RK097 RK203	M9		
Metal Shaft Insulated Shaft Knob Operating Ring Type Devices  RK271	M8		
RK097 RK163	M7		
RK097	M6	