

Customer: ALGE GERMAN DISTRIBUTER

No. IX-2004-2924

Attention:

Your ref. No:

Your Part. No: ALBS 402147

Date: Jul. 21, 2004

## SPECIFICATIONS

ALPS';

MODEL <sup>RK09L12B0</sup>  
( 50k A X2 )

Spec. No. :

Sample No. : F1689807M

RECEIPT STATUS

RECEIVED

By Date

Signature

Name

Title

ALPS ELECTRIC CO., LTD.

HEAD OFFICE  
1-7, YUKIGAYA-OHTSUKA-CHO,  
OHTA-KU, TOKYO 145-8501 JAPAN

DSG'D

APP'D

Sales

24678

## SPECIFICATIONS

1. THIS SPECIFICATIONS APPLY TO RK09L12B0 POTENTIOMETER.

2. CONTENTS OF THIS SPECIFICATIONS.

F1689807M  
K092G000C

3. MARKING

· MARKING ON ALL UNITS  
DATE CODE, RESIST. VALUE, TAPER

4. REMARKS

· FURNISH PACKAGE  
NUT: 1, WASHER: 1

· CAUTION

Regardless of the suggested applications of these products being introduced in the specifications, when using them for equipment and devices requiring a high degree of safety, respective manufacturers will please preserve safety of the planned equipment and devices by providing necessary protective circuits and redundancy circuits and reconfirm if safety is being duly preserved.

Products being introduced in the specifications have been designed and manufactured for applications to ordinary electronic equipment and devices such as the AV equipment, electric home appliances, office machines and communications equipment. Consequently, when employing these products for applications requiring a high degree of safety and reliability such as the medical equipment, aviation and aircraft equipment, space equipment and burglar alarm equipment, the using manufacturers will please thoroughly study the proprieties of these products for the planned applications.

Although we are exerting our best efforts to maintain the quality of these products, we cannot guarantee that they will never cause short circuiting and open circuitry. Therefore, when designing an equipment or device with which the priority is given to the safety, you will please carefully study the influences to the whole equipment of a single function failure of Potentiometers and Encoders in advance to make out a fail-safe design providing.

# SPECIFICATIONS

## ELECTRICAL

1. Total resistance : 50k  $\Omega$   $\pm$  20%
2. Rated power : 0.05 W
3. Rated voltage :

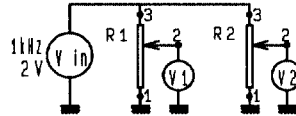
The rated voltage shall be the voltage of D.C. or A.C. (commercial frequency, effective value) corresponding to the rated power (dissipation), and be obtained from the following formula. When the obtained rated voltage exceeds the maximum working voltage given in the following, however, the maximum working voltage of the following shall be the rated voltage.

$$E = \sqrt{P \cdot R} \text{ (V)}$$

Where E : Rated voltage (V)  
P : Rated power (dissipation) (W)  
R : Nominal total resistance ( $\Omega$ )

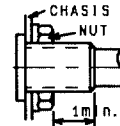
Maximum working voltage : 50 V A.C. , 10 V D.C.

4. Resistance taper : A
5. Maximum attenuation level at full C.C.W. position : 90 dBmin.
6. Insertion loss at full C.W. position : 0.1dB max.
7. Sliding noise : Less than 100mV. (Measured by JIS C 6443)
8. Insulation resistance : More than 100 M $\Omega$  at 250V D.C.
9. Withstand voltage: 300V A.C. for 1 minute.
10. Gang error : 3 dB max.  
to -40dB less than 0dB



## MECHANICAL

1. Total rotational angle : 300° $\pm$ 5°
2. Rotational torque : 2~25mN·m (Rotational speed 60°/sec.)
3. Stopper strength : No damage with an application of 0.5N·m.
4. Resistance to soldering heat : Please refer to the attached
5. Bushing nut tightening strength : Tightening torque to be no greater than 1N·m.  
\*Pay attention otherwise the strength may not be assured.




6. Push/pull strength :  
After installing the potentiometer, no damages with an application of push or pull force 80N for 10 seconds.
7. Shaft wobble :  
The resistor shall be mounted by soldering the mounting legs on the panel and a side thrust of 50mN·m at the end of the shaft shall be applied, then the total play of the shaft shall not exceed 0.6xL/20 mm-p.  
(L is the length between mounting surface and measuring point.)

## ENDURANCE

1. Rotational life : 15,000 cycles min.

## NOTE

1. Operating temperature range : -10~+70°C
2. Storage temperature range : -20~+80°C
3. The items except above mentioned items shall meet or exceed JIS C 6443.
4. The use for HomeAudio.
5. This type is protected against sulfides.

					 <b>ALPS ELECTRIC CO., LTD.</b>			
					APPD.	CHKD.	DSGD.	TITLE
					Aug. 19, '93	Aug. 19, '93	Aug. 19, '93	F 1689807M
					S. Aizawa	M. Satoh	Y. Saltoh	DOCUMENT NO.
SYMB	DATE	APPD	CHKD	DSGD	L X			

# SPECIFICATIONS

Resistance to soldering heat :

There shall be no evidence of poor contact between resistance element and terminals, or any physical damages as a result of soldering.

\*Dip soldering :

Condition of soldering :

Soldering shall be certified with following condition.

Substrate to be soldered :

Copper clad laminated phenol board in one surface of 1.6mm thickness.

Solder flux :

Flux of 0.82 specific weight in bubbling type solder fluxcoating apparatus shall be used and bubbling surface height shall be defined substantially as half thickness of substrate.

Flux shall not flow up on substrate surface.

Preheating

Surface temperature of substrate shall be settled within 100°C in two minutes.


Dip soldering :

To be performed in  $260 \pm 5^{\circ}\text{C}$  , 5 $\pm$ 1 sec.

Please use the above process only one or two times.

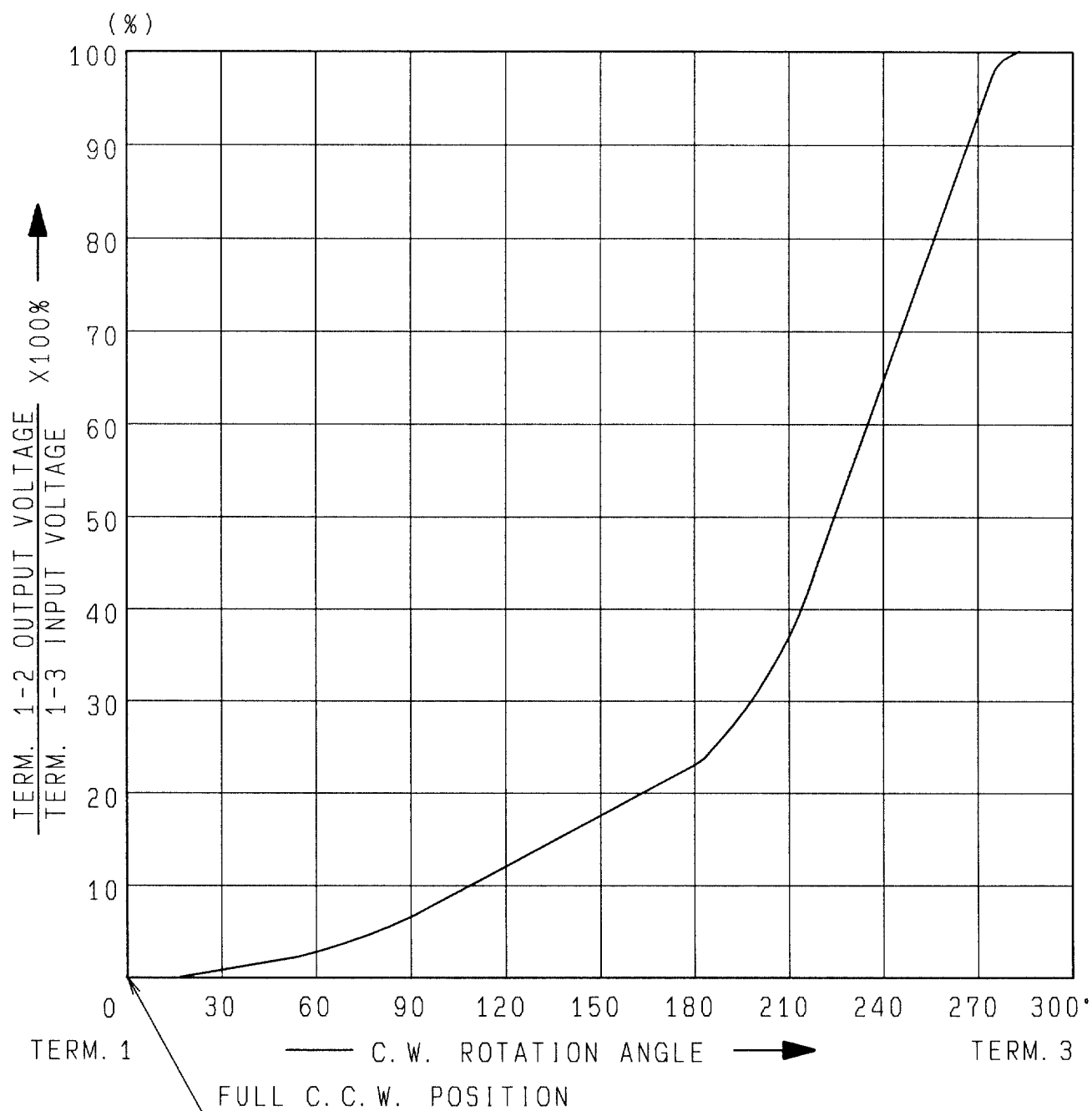
\*Manual soldering :

To be performed in three seconds within 350°C.

					 <b>ALPS ELECTRIC CO., LTD.</b>			
					APPD.	CHKD.	DSGD.	TITLE
					Aug. 19, '93	Aug. 19, '93	Aug. 19, '93	F 1689807M
					S. Aizawa	M. Satoh	Y. Saitoh	DOCUMENT NO.
SYMB	DATE	APPD	CHKD	DSGD				L X

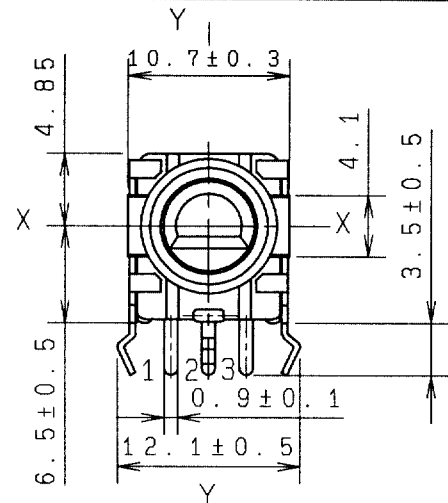
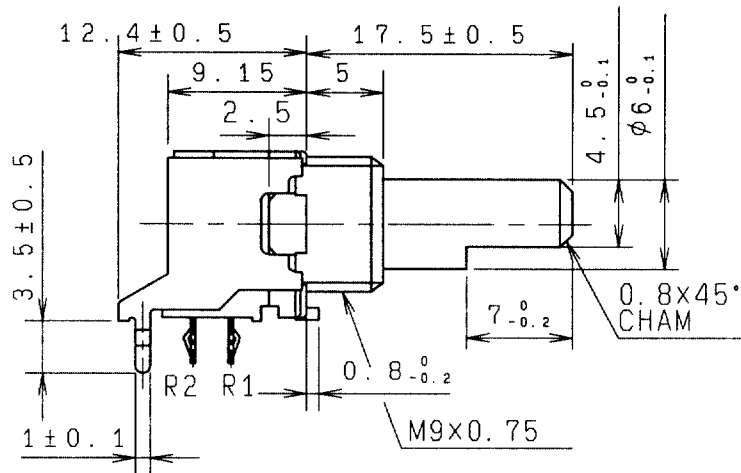


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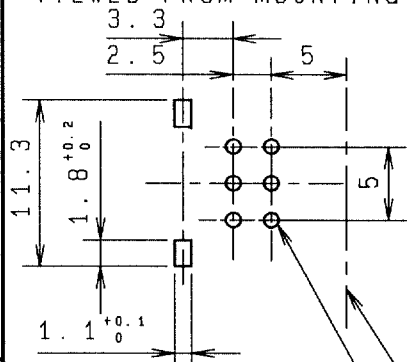


AT 150° C.W. SHAFT ROTATION FROM FULL C.C.W. POSITION VOLTAGE PERCENT SHALL FALL WITHIN THE LIMITS OF 10~25 PERCENT.

					APPD.	CHKD.	DSGD.	NAME
					Sep. 07. '93	Sep. 07. '93	Sep. 07. '93	RESISTANCE TAPER (A)
					K. Magami	K. Sasaki	K. Suzuki	DOCUMENT NO.
SYMB	DATE	APPD	CHKD	DSGD				F1689807M

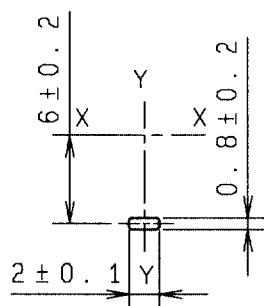


端子取付穴寸法図 (挿入側より見た図)  
(許容差 ± 0.1)  
MOUNTING HOLE DETAIL  
(TOLERANCE ± 0.1)  
VIEWED FROM MOUNTING SIDE



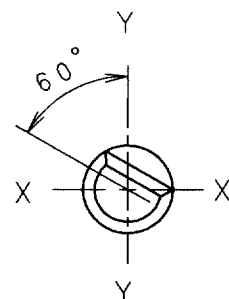
P. W. B. 板厚 T = 1.6

軸受取付面  
BUSHING  
MOUNTING  
SURFACE

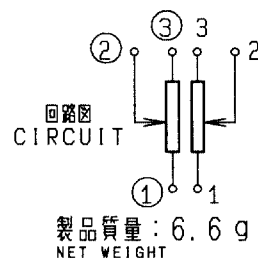


シャフト止め 詳細図  
LOCATING LUG  
DETAIL

軸はセンター位置を示す  
SHAFT SHOWN IN  
CENTER POSITION



軸は、反時計方向に  
回し切った状態を示す  
SHAFT SHOWN  
IN FULL C. C. W  
POSITION.



指定なき部分の許容差 TOLERANCES UNLESS OTHERWISE SPEC	
$L \leq 10$	± 0.3
$10 < L < 100$	± 0.5
$100 \leq L$	± 0.8
角度 ANGULAR DIMENSION	± 5°

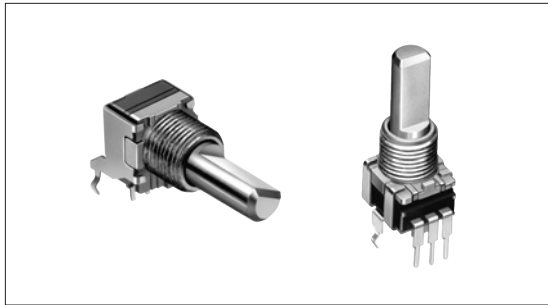
PART NO.		NAME		MATERIAL NAME / CODE		FINISH	
<b>ALPS ELECTRIC CO., LTD.</b>							
DSGN. 1-設計1課 Y. Saitoh 93-10-01				SCALE 2/1		NO. F1689807M	
CHKD. SEC M. Satoh 93-10-01						TITLE 9形1軸2連VR組立図 FIGURE	
APPD. SEC S. Aizawa 93-10-01							
SYMB	DATE	APPD	CHKD	DSGD	UNIT mm	DOCUMENT NO. K092G000C	

# Metal Shaft Potentiometer 9mm Size Metal Shaft Snap-in Type

RK09L Series



Single-unit and dual-unit type suits a variety of controls.



## Features

- Snap-in structure assures easy mounting.
- Closed structure improves dust and flux resistance.
- Available in horizontal and vertical type.

## Applications

- For various control in audio equipment products - DVD players/recorders, mini component systems, portable audio equipment
- For various control in mixing consoles and electronic musical instruments

Rotary  
Potentiometers

Slide  
Potentiometers

Multi Control  
Devices

Sensors

## Typical Specifications

Items	Specifications
Total resistance tolerance	±20%
Maximum operating voltage	50V AC , 10V DC
Total rotational angle	300±5°
Rotational torque	2 to 25mN·m
Operating life	15,000cycles
Operating temperature range	−10℃ to +70℃

Metal  
Shaft

Insulated  
Shaft

Hollow  
Type

Knob  
Operating

## Recommended Products List

Number of resistor elements	Mounting direction	Shaft type	Length of the shaft (mm)	Center detent	Total resistance (kΩ)	Resistance taper	Minimum packing unit (pcs.)	Products No.	Drawing No.	
Single-unit	Horizontal type	Flat	15	Without	10	15A	100	RK09L1120A2S	1	
				With		1B		RK09L1120036		
	20		Without	15A		RK09L1120A69				
	Vertical type			12.5	1B	RK09L1140A5E		2		
				15		50			RK09L1140A66	
				20		10			RK09L1140A5P	
				With		10			RK09L1140A2U	
	25		Without	5	RK09L114001T					
	Dual-unit		Horizontal type for tone	15	With	50		15A	RK09L1140A65	3
			Without		100	RK09L122002M				
Horizontal type for vol.		25		50	3B	RK09L1220A1B				
		20	10	1B	RK09L12B0A31					
Vertical type for tone		15	With	50	15A	RK09L12B0A3Z	4			
		20	Without	10		RK09L124000Z				
		15				RK09L1240A0W				
		20				RK09L12D0A1W				
Vertical type for vol.	20				RK09L12D0A1T					

## Note

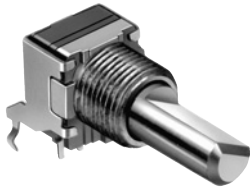
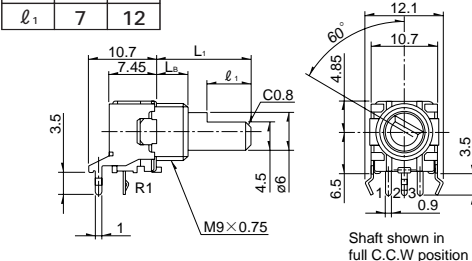
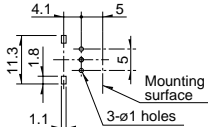
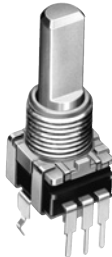
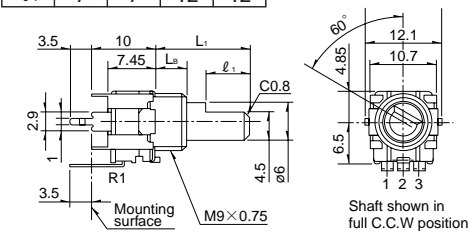
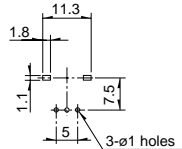
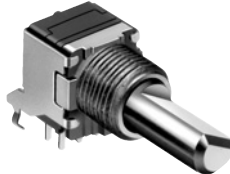
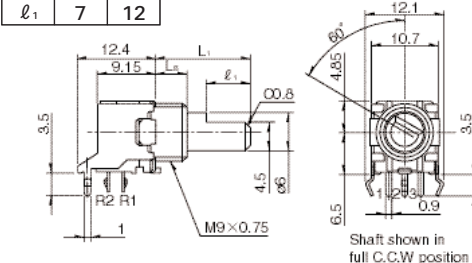
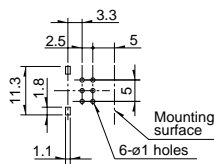

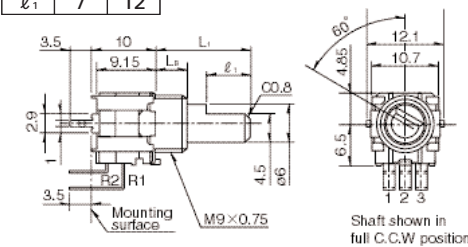
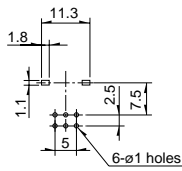
Products other than those listed in above recommended products are also available. Please contact us for details.

Refer to **P.13** for product varieties.  
Refer to **P.52** for product specifications.

Metal Shaft Potentiometer  
9mm Size Metal Shaft Snap-in Type | RK09L Series

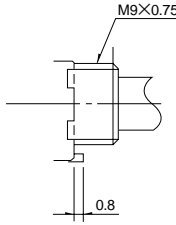
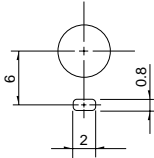
Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)															
1	<p>Single-shaft, single-unit Horizontal type RK09L1120</p> 	<table><tr><td>L<sub>1</sub></td><td>15</td><td>20</td></tr><tr><td>L<sub>B</sub></td><td>5</td><td>7</td></tr><tr><td>ℓ<sub>1</sub></td><td>7</td><td>12</td></tr></table>  <p>Shaft shown in full C.C.W position</p>	L <sub>1</sub>	15	20	L <sub>B</sub>	5	7	ℓ <sub>1</sub>	7	12							
L <sub>1</sub>	15	20																
L <sub>B</sub>	5	7																
ℓ <sub>1</sub>	7	12																
2	<p>Single-shaft, single-unit Vertical type RK09L1140</p> 	<table><tr><td>L<sub>1</sub></td><td>12.5</td><td>15</td><td>20</td><td>25</td></tr><tr><td>L<sub>B</sub></td><td>5</td><td>5</td><td>7</td><td>7</td></tr><tr><td>ℓ<sub>1</sub></td><td>7</td><td>7</td><td>12</td><td>12</td></tr></table>  <p>Shaft shown in full C.C.W position</p>	L <sub>1</sub>	12.5	15	20	25	L <sub>B</sub>	5	5	7	7	ℓ <sub>1</sub>	7	7	12	12	
L <sub>1</sub>	12.5	15	20	25														
L <sub>B</sub>	5	5	7	7														
ℓ <sub>1</sub>	7	7	12	12														
3	<p>Single-shaft, dual-unit Horizontal type RK09L1220 (For tone) RK09L12B0 (For vol.)</p> 	<table><tr><td>L<sub>1</sub></td><td>15</td><td>25</td></tr><tr><td>L<sub>B</sub></td><td>5</td><td>7</td></tr><tr><td>ℓ<sub>1</sub></td><td>7</td><td>12</td></tr></table>  <p>Shaft shown in full C.C.W position</p>	L <sub>1</sub>	15	25	L <sub>B</sub>	5	7	ℓ <sub>1</sub>	7	12							
L <sub>1</sub>	15	25																
L <sub>B</sub>	5	7																
ℓ <sub>1</sub>	7	12																
4	<p>Single-shaft, dual-unit Vertical type RK09L1240 (For tone) RK09L12D0 (For vol.)</p> 	<table><tr><td>L<sub>1</sub></td><td>15</td><td>20</td></tr><tr><td>L<sub>B</sub></td><td>5</td><td>7</td></tr><tr><td>ℓ<sub>1</sub></td><td>7</td><td>12</td></tr></table>  <p>Shaft shown in full C.C.W position</p>	L <sub>1</sub>	15	20	L <sub>B</sub>	5	7	ℓ <sub>1</sub>	7	12							
L <sub>1</sub>	15	20																
L <sub>B</sub>	5	7																
ℓ <sub>1</sub>	7	12																

Dimensions of Bushing and Fixing Lug

Unit:mm

 
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## Product Varieties

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

### Total Resistance Variety

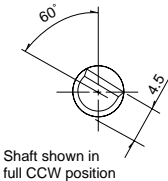
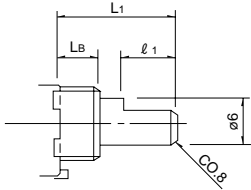
Total resistance (kΩ)	5	10	20	50	100
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### Resistance Taper

Resistance taper	15A	1B	3B	15C
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### Shaft Variety

Unit:mm

<div><p>Shaft shown in full CCW position</p></div>			<b>Detail dimensions</b>		
L <sub>1</sub>	L <sub>B</sub>	l <sub>1</sub>	L <sub>1</sub>	L <sub>B</sub>	l <sub>1</sub>
12.5	5	7	12.5	5	7
15	5	7	15	5	7
17.5	5	7	17.5	5	7
20	7	12	20	7	12
25	7	12	25	7	12

### Note

marked are specifications recommended by ALPS.

Rotary  
Potentiometers

Slide  
Potentiometers

Multi Control  
Devices

Sensors

Metal  
Shaft

Insulated  
Shaft

Hollow  
Type

Knob  
Operating

Refer to P.14, 211 for resistance taper.

## Orders For Specifications Not Listed In The Recommended Products

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

### Sample Part Number

**R K 0 9 L 1 1 4 0** — **F 1 5** — **C 0** — **B 1 0 3**

#### Model type

Code	Model type
112	Single-unit horizontal type
114	Single-unit vertical type
122	Dual-unit horizontal type for tone
124	Dual-unit vertical type for tone
12B	Dual-unit horizontal type for vol.
12D	Dual-unit vertical type for vol.

#### Shaft type

Code	Shaft type
F	Flat

\* Only available in flat format.

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

Code	Length of the shaft	Code	Length of the shaft	Code	Length of the shaft
12	12.5	17	17.5	25	25
15	15	20	20		

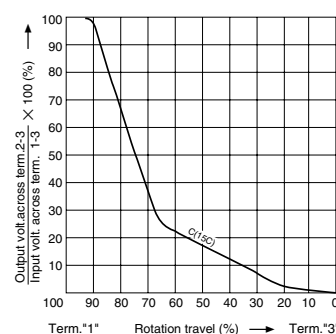
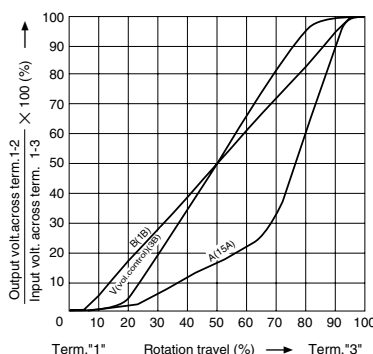
#### Detent

Code	Center detent
C0	Without
C1	With

#### Resistance taper

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

B:For tone & general(model type : 112,114,122,124)  
V:For vol.(model type : 112,114,12B,12D)



#### Total resistance

Code	Total resistance (kΩ)	Code	Total resistance (kΩ)
502	5	503	50
103	10	104	100
203	20		

#### Note

marked are specifications recommended by ALPS.

Product Specifications

Rotary Potentiometers

Slide Potentiometers

Multi Control Devices

Sensors

Metal Shaft

Insulated Shaft

Hollow Type

Knob Operating

Model		RK09L	RK097 RK098	RK117	RK119	RK163 RK168	
Items		−10℃ to +70℃	−20℃ to +70℃	−30℃ to +70℃	−40℃ to +85℃	−10℃ to +70℃	
Electrical performance	Total resistance tolerance	±20%					
	Rated power	0.05W					
	Maximum operating voltage	50V AC , 10V DC				RK163 :150V AC, 5V, DC RK168 : 50V AC	
	Residual resistance	$R \leq 10k \Omega$ $10k \Omega < R < 50k \Omega$ $50k \Omega \leq R$	20 $\Omega$ max. 30 $\Omega$ max. Nominal total resistance of 0.1% or less	$R \leq 10k \Omega$ 50 $\Omega$ max. $10k \Omega < R \leq 50k \Omega$ 80 $\Omega$ max. $50k \Omega < R$ Nominal total resistance of 0.2% or less	$R \leq 10k \Omega$ 20 $\Omega$ max. $10k \Omega < R \leq 50k \Omega$ 30 max. $50k \Omega < R$ Nominal total resistance of 0.1% or less		
	Maximum attenuation (Volume control)	$5k \Omega \leq R < 10k \Omega$ $10k \Omega \leq R < 50k \Omega$ $50k \Omega \leq R < 100k \Omega$ $100k \Omega \leq R$		70dB min. 80dB min. 90dB min. 100dB min.			
	Insulation resistance	100M $\Omega$ min. 250V DC				RK163:100M $\Omega$ min. 500V DC RK168:100M $\Omega$ min. 250V DC	
	Voltage proof	300V AC (for 1minute)				RK163:500V AC for minute RK168:300V AC for minute	
Mechanical performance	Total rotational angle	$300 \pm 5^\circ$	$300 \pm 5^\circ$ (Shaft movement type is $300 \pm 5^\circ$ )	$300 \pm 10^\circ$		RK163 : $300 \pm 3^\circ$ RK168 : $300 \pm 5^\circ$	
	Rotational torque	2 to 25mN•m		5 to 20mN•m	$7.5 \pm 3.5$ mN•m	RK163 : 3 to 25mN•m RK168 : 10 to 40mN•m	
	Stopper strength	0.5N•m (With push-lock mechanism type: 0.4N•m)			0.5N•m	0.9N•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				
	Solder heat resistance	Manual soldering	350℃ max. 3s max.			$350 \pm 10^\circ C$ $3 \pm 0.5$ s	350℃ max. 3s max. Motor terminal : 350℃ max 2s max.
		Dip soldering	$260 \pm 5^\circ C$ , $5 \pm 1$ s			—————	
Reflow soldering		—————			Please see P.35	—————	
Endurance	Operating life	15,000cycles					
Environ-mental performance	Cold	$-20^\circ C \pm 2^\circ C$ for 96h	$-30 \pm 2^\circ C$ for 96h		$-40 \pm 2^\circ C$ for 240h	$-20 \pm 2^\circ C$ for 96h	
	Dry heat	$70 \pm 2^\circ C$ for 96h			$85 \pm 2^\circ C$ for 240h	$70 \pm 2^\circ C$ for 96h	
	Damp heat	$40 \pm 2^\circ C$ , 90 to 95%RH for 96h			$60 \pm 2^\circ C$ , 90 to 95%RH for 240h	$40 \pm 2^\circ C$ , 90 to 95%RH for 96h	

Push-on Switch Specifications

Items	RK097		RK117		RK119	
Contact arrangement	Single pole and single throw (Push on)					
Travel (mm)	0.5	1.5	0.5	1.5	0.5±0.3	1.5±0.5
Operating force (N)	4 $\pm$ <sub>2</sub>	5±2	6±3	5±2		4±2
Rating	0.5A 12V DC		3A 16V DC		0.1A 5V DC (1mA 5V DC min.ratings)	0.5A 16V DC (1mA 16V DC min.ratings)
Contact resistance	100mΩ for initial period; 200mΩ after operating life					
Operating life	10,000 times min.	20,000 times min.	10,000 times min.	20,000 times min.	100,000 times min.	20,000 times min.

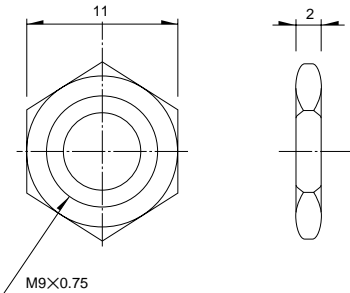
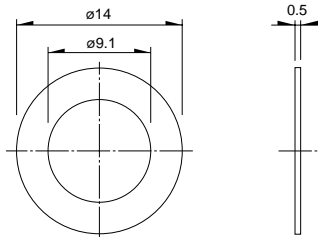
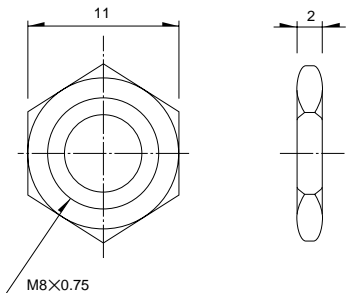
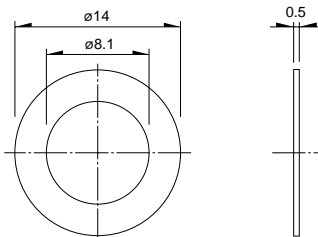
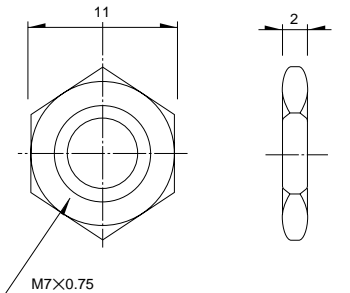
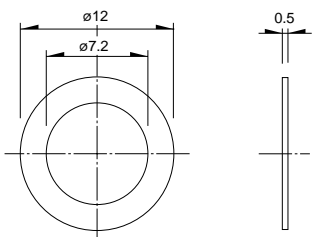
Note

The operating temperature range for automotive applications can be raised upon request. Please contact us for requirements of this kind.

## Attached Parts

The following parts are included with the product.

Unit:mm

Applicable products	Bearing screw diameter	Hexagonal nut	Flat washer
<b>RK09L</b> <b>RK168</b> <b>RK097</b> <b>RK203</b>	M9		
<b>RK271</b>	M8		
<b>RK097</b> <b>RK098</b> <b>RK163</b>	M7		
<b>RK097</b> <b>RK098</b>	M6	