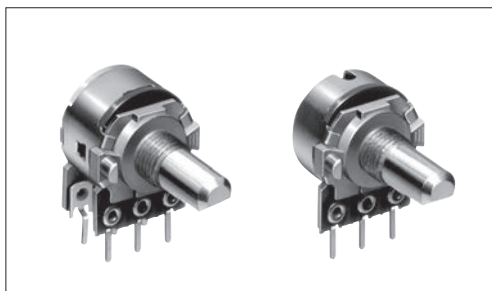


RK163 16mm Size Metal Shaft Type

A wide range of versatile products applicable for various types of control



Typical Specifications



Items	Specifications
Total resistance tolerance	±20%
Maximum operating voltage	150V AC, 5V DC
Total rotational angle	300° ±3°
Rotational torque	3 to 25mN·m
Operating life	15,000 cycles
Operating temperature range	-10°C to +70°C

Product Line

Number of resistor elements	Mounting direction	Shaft type	Terminal style	Length of the shaft L ₁ (mm)	Center detent	Total resistance (k Ω)	Resistance taper	Minimum order unit (pcs.)		Products No.	Drawing No.			
								Japan	Expert					
Single-unit	Horizontal type	Flat	For PC board	15	Without	10	1B	600	1,200	RK1631110TBK	1			
				20			15A			RK1631110TT3				
			Lead				1B			200		400	RK1631110U1Q	
		Serrated	For PC board			15		20	600	1,200	RK1631110TNP	2		
			Lead	10				600	1,200	RK1631110TTU	3			
		Serrated	For PC board				15	1B	200	400	RK1631110U0Q	4		
Flat			For PC board		20	With			10	600	1,200	RK1631210AWN	5	
		Serrated		15								Without		50
Flat							20	10						
					Serrated	15			Without				10	
	Flat	20		50								3B		RK16312A0BKH
Serrated							15	10						15A

Note

Other varieties are also available. Refer to "Other Specifications" (P.334).

Packing Specifications

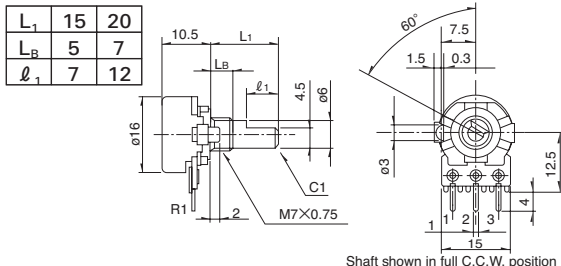
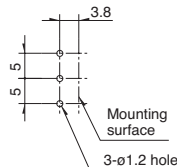
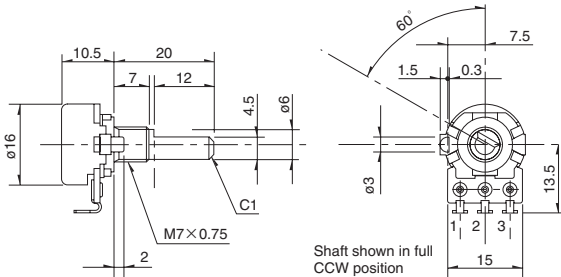
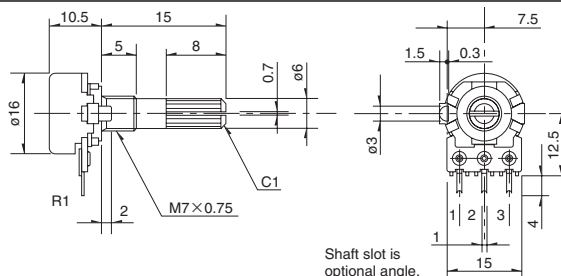
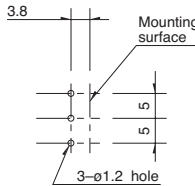
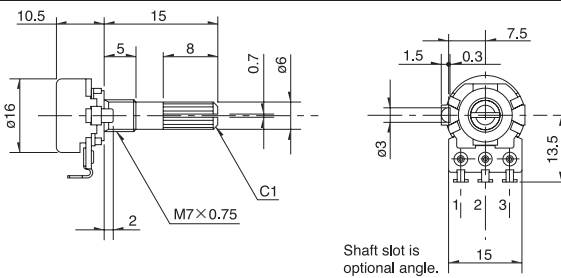
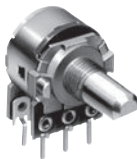
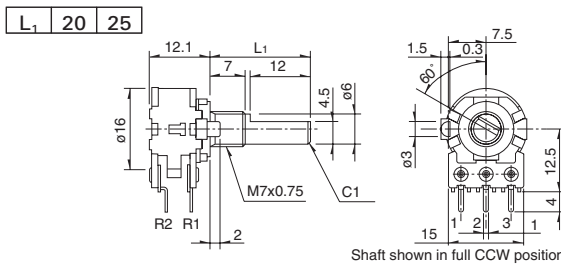
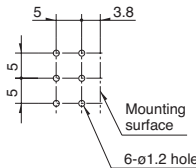
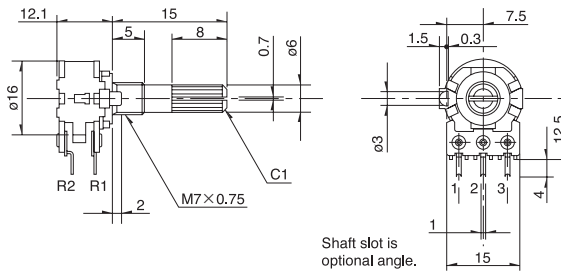
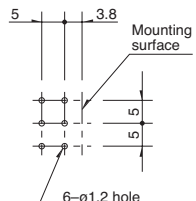
Bulk

Terminal style	Number of packages (pcs.)		Export package measurements (mm)
	1 case /Japan	1 case /export packing	
For PC board	600	1,200	326×532×386
Lead	200	400	270×360×155

Refer to P.334 for other specifications.
 Refer to P.335 for attached parts.
 Refer to P.336 for ordering products not listed.
 Refer to P.349 for soldering conditions

Unit:mm

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)									
1	Single-shaft, single-unit RK163111 	<table><tr><td>L_1</td><td>15</td><td>20</td></tr><tr><td>L_B</td><td>5</td><td>7</td></tr><tr><td>ℓ_1</td><td>7</td><td>12</td></tr></table>  Shaft shown in full C.C.W. position	L_1	15	20	L_B	5	7	ℓ_1	7	12	
L_1	15	20										
L_B	5	7										
ℓ_1	7	12										
2	Single-shaft, single-unit Lead terminal RK163111 	 Shaft shown in full CCW position										
3	Single-shaft, single-unit RK163111 	 Shaft slot is optional angle.										
4	Single-shaft, single-unit Lead terminal RK163111 	 Shaft slot is optional angle.										
5	Single-shaft, dual-unit RK163121 (For tone) RK16312A (For volume) 	<table><tr><td>L_1</td><td>20</td><td>25</td></tr></table>  Shaft shown in full CCW position	L_1	20	25							
L_1	20	25										
6	Single-shaft, dual-unit RK163121 (For tone) RK16312A (For volume) 	 Shaft slot is optional angle.										

16mm Size Metal Shaft Type / Other Specifications

In addition to the products listed, we can accommodate the follow specifications.

Product Specifications and Applications

Type	Model	Applications	Detent variety
Single-shaft, single-unit	RK16311	General	Center 21 31 41
Single-shaft, dual-unit	RK16312	General or Volume and tone control	

Total Resistance Variety

Total resistance (kΩ)	5	10	20	50	100	200
-----------------------	---	----	----	----	-----	-----

Resistance Taper

Resistance taper	15A	1B	3B	15C
------------------	-----	----	----	-----

Dimensions of Shaft

1) 18 teeth serrated type

Unit:mm

Die-casting shaft

Not specified slotting angle

M7x0.75

18 teeth Serrated

Detail dimensions

L ₁	L _B	l ₁
15	5	8
20	5	12
25	7	12
30	7	12

Shaft shown in full CCW position

● The serration angle shall be as shown.

2) Flat type

Unit:mm

60°

M7x0.75

C1

Detail dimensions

L ₁	L _B	l ₁
15	5	7
20	7	12
25	7	12
30	7	12

Shaft shown in full CCW position

3) Slotted type

Unit:mm

60°

M7x0.75

C0.5

Detail dimensions

L ₁	L _B
15	7
20	7
25	7
30	7

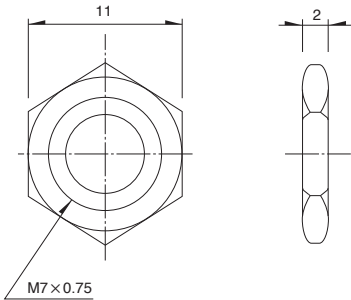
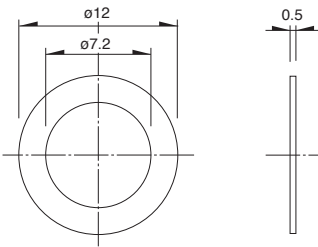
Shaft shown in full CCW position

Note

Marked are specifications recommended by Alps.

Refer to P.335 for attached parts.
Refer to P.336 for ordering products not listed.

The following parts are included with the product.

Unit:mm	
Nut	Washer
	

Rotary
Potentiometers

Slide
Potentiometers

Metal
Shaft

Insulated
Shaft

Knob
Operating

Ring
Type

16mm Size Metal Shaft Type / Ordering Products Not Listed

When ordering product varieties that are not listed, specify referring to the examples below.

■ Sample Part Number

R K 1 6 3 1 1 1 0 - F 2 0 - C 0 - B 1 0 3 - P

Model type

Code	Model type
111	Single-unit
121	Dual-unit for tone
12A	Dual-unit for vol.

Shaft type

Code	Shaft type
F	Flat
S	Slotted
K	Serrated

Length of the shaft L₁ (mm)

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

Detent

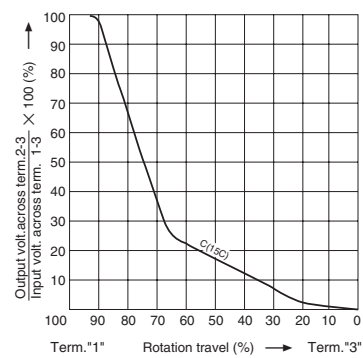
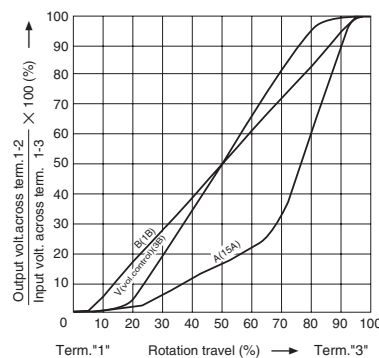
Code	Detent	Code	Detent
C0	Without	31	31
C1	Center	41	41
21	21	—	—

Resistance taper

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

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

V: For vol. (model type : 111, 12A)



Total resistance

Code	Total resistance (k Ω)	Code	Total resistance (k Ω)
502	5	503	50
103	10	104	100
203	20	204	200

Terminal Style

Code	Terminal style
P	For PC board
L	Lead terminal

Note

Marked are specifications recommended by Alps.

Metal Shaft Potentiometers

List of Varieties

Type		16mm size	20mm size	27mm size	50mm size	Rotary motor-driven
Series		RK163	RK203/EC20A	RK271	RK501	RK168
		Single-shaft				
Number of resistor elements		Single/dual	Single	Single/dual/quad	Dual/quad	Dual/quad/5-ganged/6-ganged
Photo						
Terminal mounting		Horizontal	Vertical	Horizontal		
Fixing method of bushing		Bushing screw clamp				
Operating temperature range		-10°C to +70°C	RK203: -40°C to +85°C EC20A: -30°C to +80°C	-10°C to +70°C		
Operating life		15,000 cycles	30,000 cycles	15,000 cycles		
Available for automotive use		—	○	—	—	—
Life cycle (availability)						
Electrical performance	Total resistance (k Ω)	5, 10, 20, 50, 100, 200	10	5, 10, 20, 50, 100, 250	10, 20, 50, 100	
	Resistance taper	15A, 1B, 3B, 15C	B	15A, 3B		
	Rated Power	0.1W 0.05W (15A)	0.05W		0.1W	0.05W
	Residual resistance	R≤10kΩ 20Ω max. 10kΩ<R≤50kΩ 30Ω max. 50kΩ<R<3MΩ Nominal total resistance of 0.1% or less%	—	R≤10kΩ 20Ω max. 10kΩ<R<50kΩ 30Ω max. 50kΩ≤R Nominal total resistance of 0.1% or less%	—	—
	Maximum attenuation (Volume control)	5kΩ≤R< 10kΩ 70dB min. 10kΩ≤R< 50kΩ 80dB min. 50kΩ≤R<100kΩ 90dB min. 100kΩ≤R 100dB min.		5kΩ≤R< 10kΩ 70dB min. 10kΩ≤R< 50kΩ 80dB min. 50kΩ≤R<100kΩ 90dB min. 100kΩ≤R 100dB min.	120dB min.	5kΩ≤R< 10kΩ 70dB min. 10kΩ≤R< 50kΩ 80dB min. 50kΩ≤R<100kΩ 90dB min. 100kΩ≤R 100dB min.
	Gang error applicable to Dual-unit parts for audio volume control purposes	-40dB to 0dB 3dB max.		—	-70dB to -60dB 3dB max. -60dB to 0dB 2dB max.	-100dB to 0dB 2dB max.
	Insulation resistance	100MΩ min. 500V DC	10MΩ min. 250V DC	100MΩ min. 500V DC		100MΩ min. 250V DC
	Voltage proof	500V AC for 1minute	300V AC for 1minute	500V AC for 1minute		300V AC for 1minute
	Center-taps	Without				
Mechanical performance	Detent	Without, Center, 21, 31, 41	17	Without, Center, 21, 31, 41	Without	
	Stopper strength	0.9	0.5	0.9	1.5	0.9
	Push-pull strength	100N max.			150N 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 for 2 hours respectively				
Shaft style		Serrated type, Flat type, Slotted type	Flat type	Slotted type, Flat type	Slotted type	Flat type
Terminal style		Insertion, Lead	Insertion			
Attached switch		—	EC20A: Momentary push switch	—	—	—
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Potentiometers Cautions	427
Potentiometers Measurement and Test Methods	429
Potentiometers Resistance Taper	431

Note

○ Indicates applicability to some products in the series.

Reference for Manual Soldering

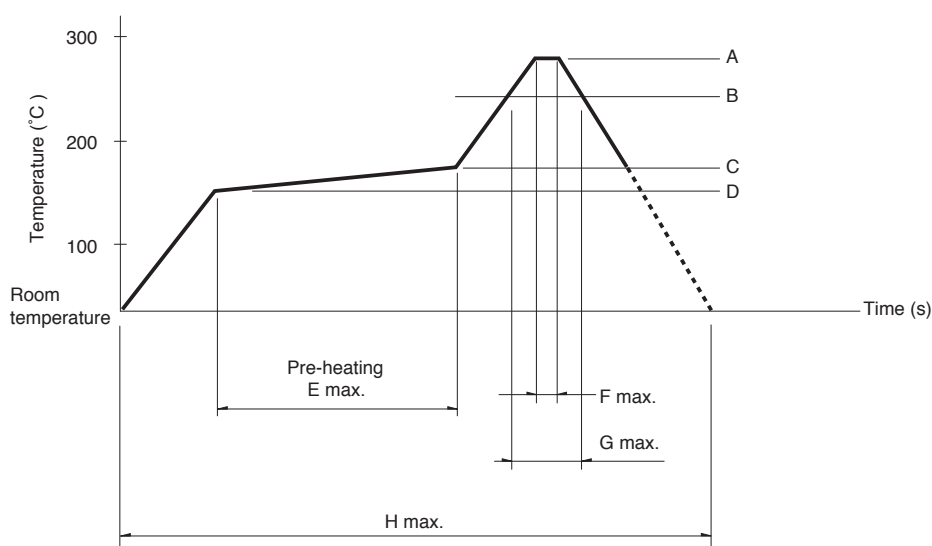
Series		Tip temperature	Soldering time	No. of solders
RK09L, RK097		350°C max.	3s max.	1 time
RK203		300°C max.	3s max.	1 time
RK119		350±10°C	3 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$ s	1 time
RK271		350°C max.	5s max.	1 time
RK501		350±10°C	5 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$ s	1 time
RK163		350°C max.	5s max.	1 time
RK168	Potentiometer terminal	300°C max.	3s max.	1 time
	Motor terminal	350°C max.	2s max.	1 time

Reference for Dip Soldering

Series	Preheating		Dip soldering		No. of solders
	Soldering surface temperature	Heating time	Soldering temperature	Soldering time	
RK09L, RK097, RK203	100°C max.	2 min. max.	260±5°C	5±1s	2 time max.
RK501	120±10°C	2 min. max.	260±5°C	5±1s	2 time

Example of Reflow Soldering Condition

Temperature profile



Series	A	B	C	D	E	F	G	H	No. of reflows
RK119	260°C	230°C	180°C	150°C	2 min.	3s	40s	4 min.	2 time max.

Notes

1. When using an infrared reflow oven, solder may sometimes not be applied. Be sure to use a hot air reflow oven or at type that uses infrared rays in combination with hot air.
2. The temperatures given above are the maximum temperatures at the terminals of the potentiometer when employing a hot air reflow method. The temperature of the PC board and the surface temperature of the potentiometer may vary greatly depending on the PC board material, its size and thickness. Ensure that the surface temperature of the potentiometer does not rise to 250°C or greater.
3. Conditions vary to some extent depending on the type of reflow bath used. Be sure to give due consideration to this prior to use.