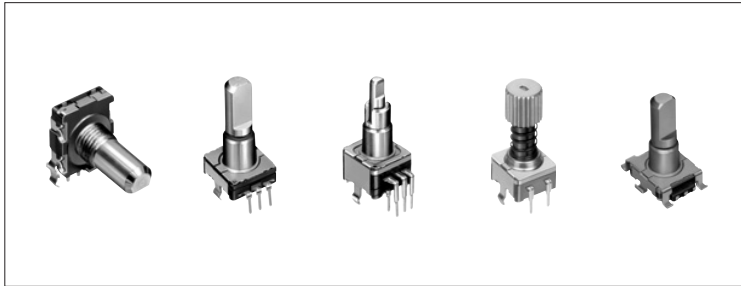


11mm Size Metal Shaft Type Encoder Variety

EC11 Series

Compact and highly reliable type type available in many varieties.



Car Use

Features

- Compact and highly reliable, sliding contact type.
- 4.5mm-body height with a 1.5mm-travel push switch is available.
- Incremental type.

Applications

- Level controls for car audio and car navigation system. Various controls for devices in automotive
- Controls for image/sound devices, including DVD players, mini component stereos, CD players and portable audio players

Typical Specifications

Items	Specifications
Rating	10mA 5V DC
Operating life	15,000 cycles

Products Line

Style	Operating section	Length of operating section (mm)	Torque (mN·m)	Number of detent	Resolution	Push-on switch	Travel of push-on switch (mm)	Minimum packing unit (pcs.)	Products No.	Drawing No.	
Horizontal			12±7	30	15	Without	—	700	EC11B15202AA	1	
						With	0.5		EC11B15242AE	2	
							1.5		EC11B15242AF	3	
Vertical	Flat	20	10±7	18	9	Without	—	1,200	EC11E09204A4	4	
				30	15				EC11E15204A3		
			7 ⁺³ ₋₄	Without	15				EC11E1530401		
			10±7	36	18				EC11E1820402		
				7 ⁺³ ₋₄	Without				18		EC11E1830401
			10±7	18	9				EC11E09244AW		5
				30	15				EC11E15244C0		
			7 ⁺³ ₋₄	Without	15				EC11E153440D		
			10±7	36	18				EC11E18244AE		
				7 ⁺³ ₋₄	Without				18		
			10±7	18	9				EC11E09244AQ		
				30	15				EC11E15244B2		
			7 ⁺³ ₋₄	Without	15				EC11E1534408		
			10±7	36	18				EC11E18244A5		
				7 ⁺³ ₋₄	Without				18		

Power

Push

Slide

Rotary

Encoders

Detector

Dual-in-line Package Type

Multi Control Devices

TACT

Custom-Products

Incremental Type

Absolute Type

Products Line

	Style	Operating section	Length of operating section (mm)	Torque (mN·m)	Number of detent	Resolution	Push-on switch	Travel of push-on switch (mm)	Minimum packing unit (pcs.)	Products No.	Drawing No.
Power	Less shaft wobble	20-tooth serration	18	10±7	30	15	With	1.5	1,200	EC11G1524402	6
				7 ⁺³ ₋₄	—					EC11G1534403	
Push	Reflow	Flat	20	6±4	30	15	Without	—	1,600	EC11E1540503	7
Slide							With	0.5		EC11E154450G	8
Rotary	Push lock	20-tooth serration	25	10±7	30	15	Without	—	1,000	EC11E152T409	9
Encoders			26.4				With	8	800	EC11E152U402	10
Detector	Self-return switch	Flat	20	3 to 30	—	Self-return switch	Without	—	1,200	EC1110120001	11
Dual-in-line Package Type							With	0.5		EC1110120103	
Multi Control Devices	Dual-shaft	Flat	Inner-shaft=25	10±7	30	15	With	1.5	700	EC1110120201	12
TACT			Outer-shaft=15				0.5	EC11EBB24C03			
Custom-Products		Flat	Inner-shaft=25	3 to 30	—	Self-return switch	—	—	700	EC11E0B2LB01	14
		Slotted	Outer-shaft=15				With	1.5			

Note

We have many other products in stock. Please contact our sales department if you are interested.

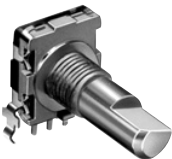
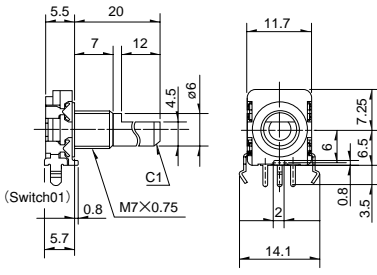
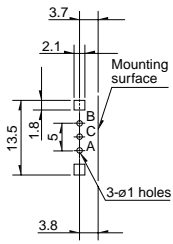
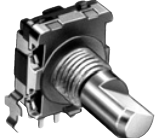
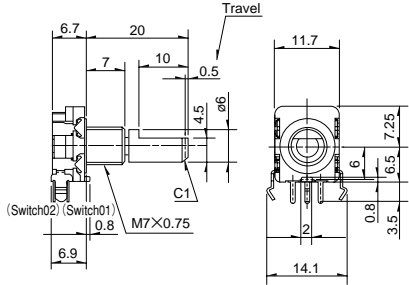
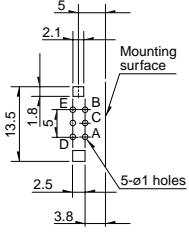

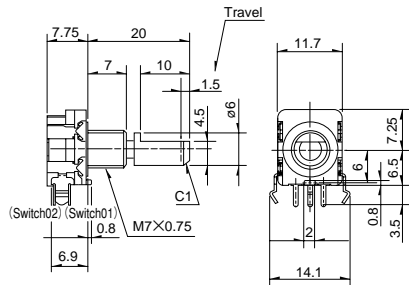
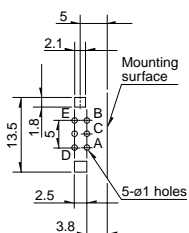

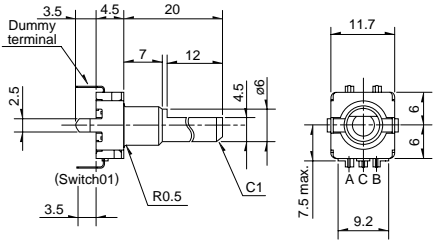
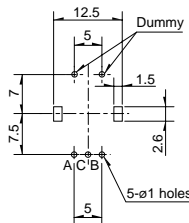
Incremental Type

Absolute Type

For other products, check varieties on P.185
 For other detailed specifications, see P.188, 189
 For attached parts, see P.233

■ Dimensions

Unit:mm

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
1	Horizontal 		
2	Horizontal with push-on switch (travel 0.5mm) 		
3	Horizontal with push-on switch (travel 1.5mm) 		
4	Vertical 		

Power

Push

Slide

Rotary

Encoders

Detector

Dual-in-line
Package Type

Multi Control
Devices

TACT

Custom-
Products

Incremental
Type

Absolute
Type

Dimensions


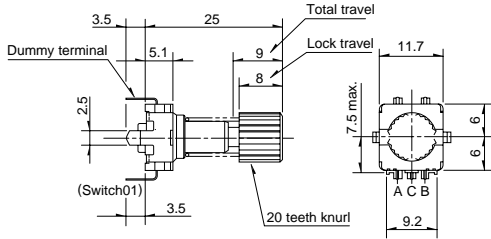
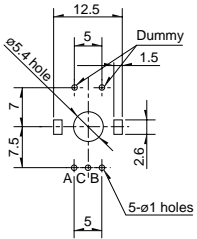

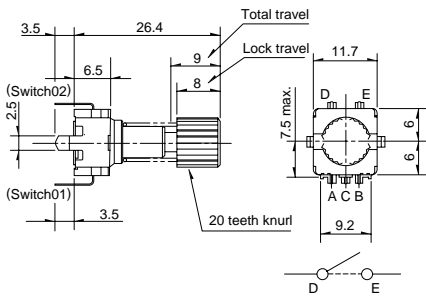
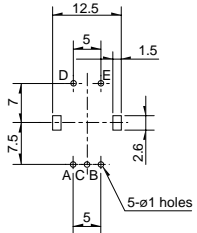

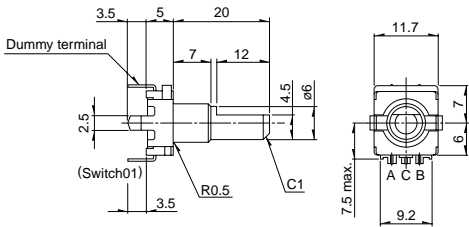
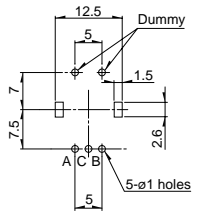

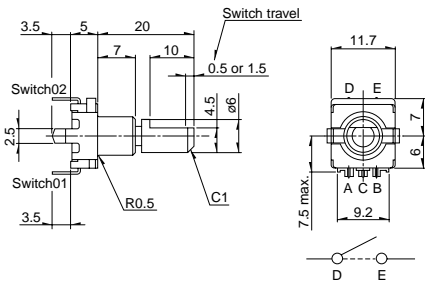
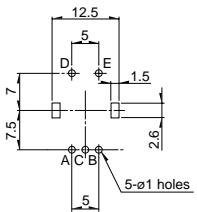
Unit:mm

- Power
- Push
- Slide
- Rotary
- Encoders
- Detector
- Dual-in-line Package Type
- Multi Control Devices
- TACT
- Custom-Products
- Incremental Type
- Absolute Type

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
5	Vertical with push-on switch (travel 0.5/1.5mm)		
6	Less shaft wobble		
7	Reflow applicable parts		<p>PC board Mounting detail A slant line part shows the solder land Black part: Do not solder and no wiring for electrical contact</p>
8	Reflow applicable parts with push-on switch (travel 0.5mm)		<p>PC board Mounting detail A slant line part shows the solder land Black part: Do not solder and no wiring for electrical contact</p>

Dimensions

Unit:mm

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
9	<p>Push-lock mechanism</p> 		
10	<p>Push-lock mechanism with push-lock switch</p> 		
11	<p>Self-return switch</p> 		
12	<p>Self-return switch with push-on switch (travel 0.5mm/1.5mm)</p> 		

Power

Push

Slide

Rotary

Encoders

Detector

Dual-in-line
Package Type

Multi Control
Devices

TACT

Custom-
Products

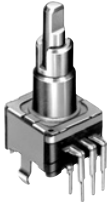
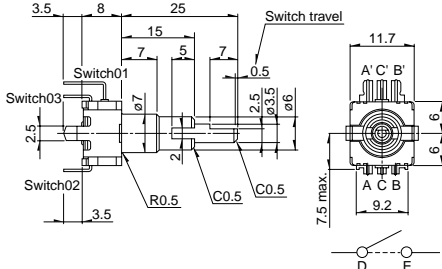
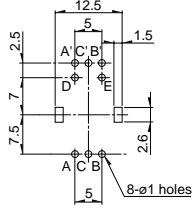

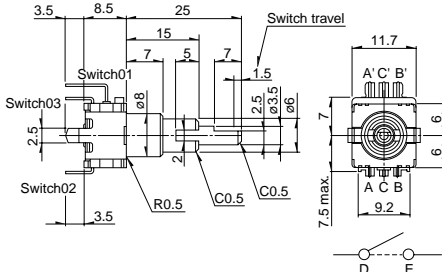
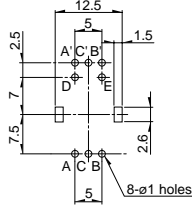
Incremental
Type

Absolute
Type

Dimensions

Unit:mm

- Power
- Push
- Slide
- Rotary
- Encoders
- Detector
- Dual-in-line Package Type
- Multi Control Devices
- TACT
- Custom-Products
- Incremental Type
- Absolute Type

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
13	<p>Dual-shafts type with push-on switch (travel 0.5mm) Inside shaft: encoder Outside shaft: encoder</p> 		
14	<p>Dual-shafts type with push-on switch (travel 1.5mm) Inside shaft: encoder Outside shaft : self-return switch</p> 		

Variety

Standard Dimensions of Shaft

1. Single-shaft Type

1) Knurled Type

Unit:mm

Style (Shaft diameter : $\phi 6$)

Detail dimensions

L ₁	L _B	l ₁	l ₂	S ₁
15	5	6	1	7
15	7	4	1	5
20	7	6	1	7
25	7	10	2	11

※Except EC111

Style (Shaft diameter : $\phi 9$)
Applicable to models with a push lock mechanism and EC11G type.

Power

Push

Slide

Rotary

Encoders

Detector

Dual-in-line
Package Type

Multi Control
Devices

TACT

Custom-
Products

2) Flat Type

Unit:mm

Style (Shaft diameter : $\phi 6$)

Detail dimensions

L ₁	L _B	l
15	5	7
15	7	5 (6)
20	7	10 (12)
25	7	12

※Except EC111

Dimensions in parentheses () are given for the type without a push-on switch.

3) Slotted Type

Unit:mm

Style (Shaft diameter : $\phi 6$)

Detail dimensions

L ₁	L _B
15	7
20	7
25	7

Incremental
Type

Absolute
Type

2. Standard Dimensions of Dual-shaft Type

1) Flat Type

Unit:mm

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

Detail dimensions

L ₁	L ₂	L _B	l ₁	l ₂
20	10	5	7	4
25	15	7	7	5
30	20	7	7	5

Notes

- The shaded parts in the shaft type are applied to the specifications for the product line described in p. 179 and 180.
- Additional switches not included in the above list are also available. Contact us for details.

Products Specifications

	Items	EC11B	EC11E/EC11G		EC111	20mm size EC20A	
		Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch		
Power	Operating temperature range	-30 to +85°C				-30 to +80°C	
Push	Maximum operating current (Resistive load)	10mA				0.5mA	
Slide	Electrical performance	Rating				0.5mA 5V DC	
Rotary		Output signal				Output of A and B signals, proportionate to phase difference	
Encoders		Insulation resistance				10MΩ min. 250V DC	
Detector		Voltage proof				300V AC	
Dual-in-line Package Type	Mechanical performance	Rotational torque (without click feeling)		7 ⁺³ ₋₄ mN·m	3 to 30mN·m	—	
Multi Control Devices		Detent torque		12±7mN·m	10±7mN·m	6±4mN·m	—
TACT		Push-pull strength		100N			
Custom- Products		Resistance to soldering heat	Manual soldering		300°C max. 3s max.		
Incremental Type	Dip soldering		260±5°C, 5±1s	—	260±5°C, 5±1s		
	Reflow soldering		—	Please see P.186	—		
Absolute Type	Durability	Rotational life				15,000 cycles	30,000 cycles
Environmental performance		Cold				-40±3°C for 240h	
		Dry heat				85±3°C for 240h	
		Damp heat				60±2°C, 90 to 95%RH for 240h	

Push-on Switch Specifications

Items	EC11B	EC11E/EC111/EC11G		20mm size EC20A
Switch circuit · the number of contact	Single pole and single throw (Push-on)			
Travel of switch	0.5 ^{+0.4} _{-0.3} mm	1.5±0.5mm	0.5±0.3mm	1.5±0.5mm
Operating force of switch	6±3N	5±2N	6 ^{+2.5} ₋₂ N	4±2N
Rating	DC 16V 3A (10mA 16V DC min. ratings)		DC 16V 0.5A (1mA 16V DC min. ratings)	
Contact resistance	100mΩ for initial period; 200mΩ after rotational life			
Operating life	25,000 times min.	20,000 times min.		

Products Specifications

Output Wave

EC11B	EC11E/EC11G		EC111	20mm size EC20A													
Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch														
<p>EC11B, EC11E, EC11G 30 detents, 15 pulse</p> <p>EC11B 20 detents, 20 pulse</p> <p>The stable detent position cannot be identified in phase B. EC11E 18 detents 9 pulse EC11E 36 detents 18 pulse</p> <p>EC111</p>				<table border="1"> <thead> <tr> <th>Shaft rotational Direction</th> <th>Signal</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Clockwise</td> <td>A (Terminal A-C)</td> <td></td> </tr> <tr> <td>B (Terminal B-C)</td> <td></td> </tr> <tr> <td rowspan="2">Counter-clockwise</td> <td>A (Terminal A-C)</td> <td></td> </tr> <tr> <td>B (Terminal B-C)</td> <td></td> </tr> </tbody> </table> <p>The broken line shows Detent stability position</p>	Shaft rotational Direction	Signal	Output	Clockwise	A (Terminal A-C)		B (Terminal B-C)		Counter-clockwise	A (Terminal A-C)		B (Terminal B-C)	
Shaft rotational Direction	Signal	Output															
Clockwise	A (Terminal A-C)																
	B (Terminal B-C)																
Counter-clockwise	A (Terminal A-C)																
	B (Terminal B-C)																

Power

Push

Slide

Rotary

Encoders

Detector

Dual-in-line
Package Type

Multi Control
Devices

TACT

Custom-
Products

Sliding Noise

EC11B	EC11E/EC11G		EC111	20mm size EC20A
Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch	
<p>$V_1=V_2=1.5V$ max.</p> <p>Measurement condition : Rotation speed 360°/s t: Masking time to avoid chattering</p> <p>At R = 5kΩ Chattering : 2ms max. Bounce : 2ms max.</p>	<p>$V_1=V_2=1.5V$ max.</p> <p>Measurement condition : Rotation speed 360°/s t: Masking time to avoid chattering</p> <p>At R = 5kΩ Chattering : 3ms max. Bounce : 2ms max.</p>			<p>$V_1=V_2=1.5V$ max.</p> <p>Measurement condition : Rotation speed 360°/s t: Masking time to avoid chattering</p> <p>At R = 5kΩ Chattering : 8ms max. Bounce : 5ms max.</p>

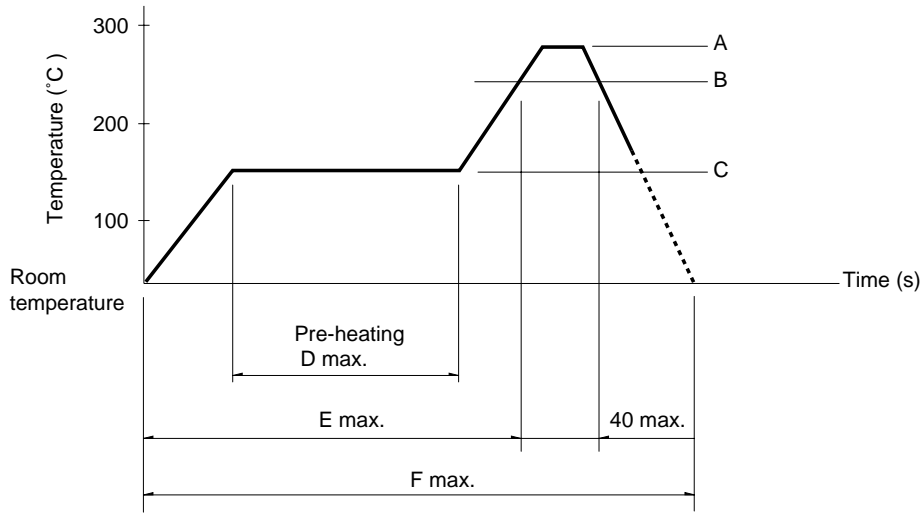
Incremental
Type

Absolute
Type

Soldering Condition

Example of Reflow Soldering Condition

1. Heating method: Double heating method with infrared heater.
2. Temperature measurement: Thermocouple 0.1 to 0.2 φ CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.
3. Temperature profile



- Power
- Push
- Slide
- Rotary
- Encoders
- Detector
- Dual-in-line Package Type
- Multi Control Devices
- TACT
- Custom-Products

- Incremental Type
- Absolute Type

Series (Reflow type)	A (°C) 10s max.	B (°C)	C (°C)	D (s)	E (s)	F (s)
EC11E154□5	240±10	200	150	120	—	240

Notes

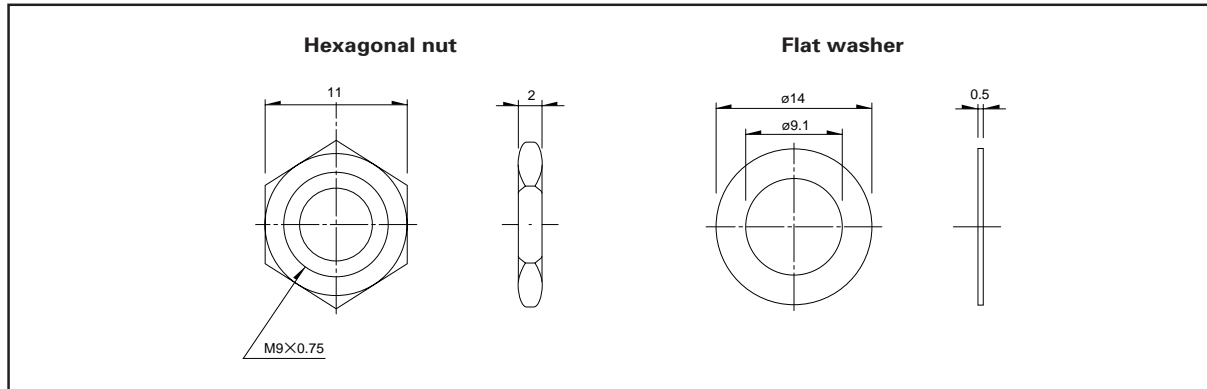
1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface temperatures.
2. Soldering conditions differ depending on reflow soldering machines. You are requested to verify the soldering conditions thoroughly beforehand.

Attached Parts

These parts are attached to the following products.

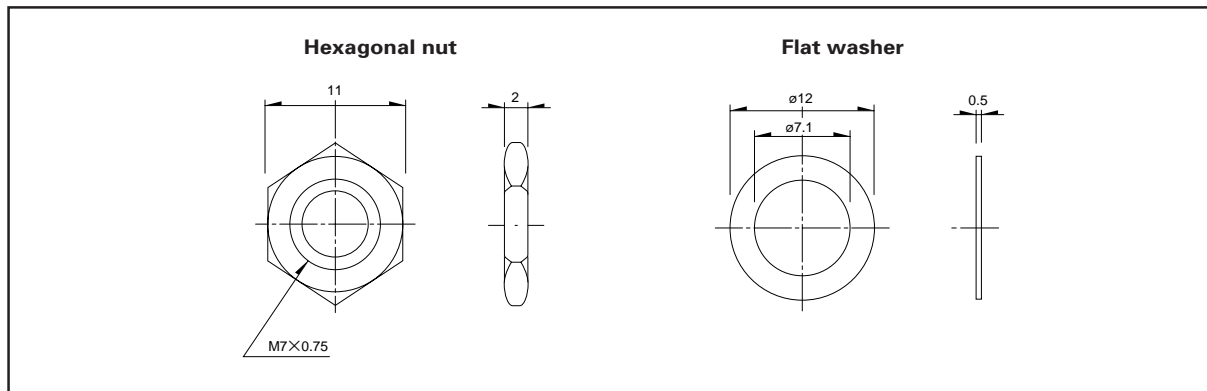
SRGH Series

Unit:mm



RK09710E, EC11B Series

Unit:mm



Power

Push

Slide

Rotary

Encoders

Detector

Dual-in-line
Package Type

Multi Control
Devices

TACT

Custom-
Products

Incremental
Type

Absolute
Type