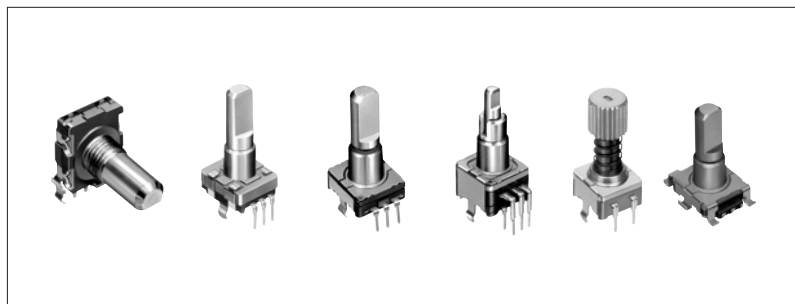


# 11mm Size Metal Shaft Type Encoder Variety

EC11 Series

Compact and highly reliable 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	Number of detent	Resolution	Operating direction	Push-on switch	Travel of push-on switch (mm)	Minimum packing uni (pcs.)	Products No.	Drawing No.									
Standard			$12 \pm 7 \text{ mN} \cdot \text{m}$	30	15	Vertical	Without	—	1,000	EC11B15203AD EC11B20203A3	1									
				20	20															
				30	15															
				$16 \pm 7 \text{ mN} \cdot \text{m}$	20		20	With				0.5	EC11B15243BB EC11B15243BC EC11B2024304 EC11B15243BD EC11B15243BE EC11B2024305	2						
					30		15													
					20		20													
			$12 \pm 7 \text{ mN} \cdot \text{m}$			$12 \pm 7 \text{ mN} \cdot \text{m}$	20	20	Horizontal	Without	—	700			EC11B15202AA EC11B15242AE EC11B15242AF	4 5 6				
							30	15												
							30	15												
							30	15		Vertical	Without		—	1,200			EC11E09204A4 EC11E15204A3 EC11E1530401 EC11E1820402 EC11E1830401	7		
																			Without	18
																			36	18
Low-profile	Flat	20	$10 \pm 7 \text{ mN} \cdot \text{m}$	18	9	Vertical	Without	—	0.5	EC11E09244AW EC11E15244C0 EC11E153440D EC11E18244AE EC11E1834404 EC11E09244AQ EC11E15244B2 EC11E1534408 EC11E18244A5 EC11E1834403	8									
				30	15															
				Without	15															
				36	18															
				Without	18															
				18	9															
				30	15		Vertical	Without	15			1.5	With		0.5	1.5				
																			Without	18
																			18	9
														30			15			
														Without			18			
														36			18			

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration Sensors

Dual-in-line Package Type

Multi Control Devices


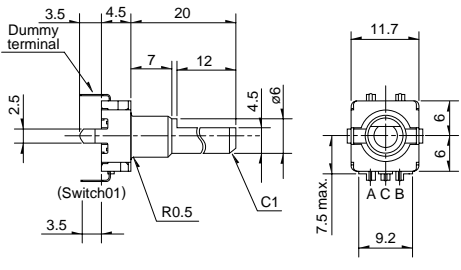
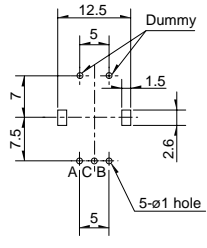

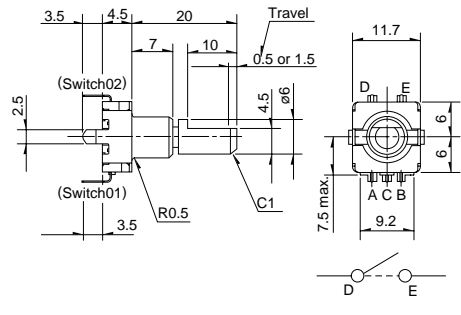
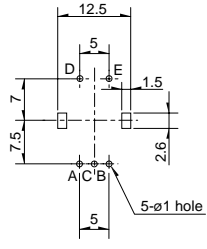
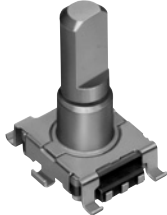
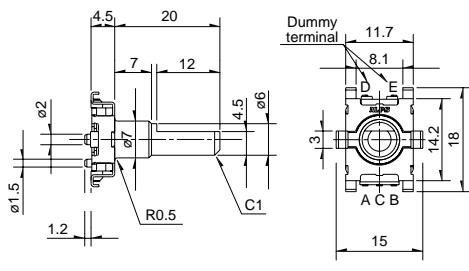
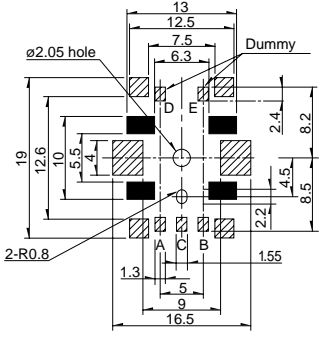
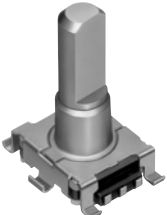
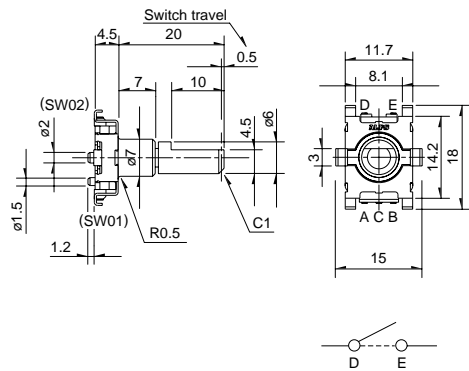
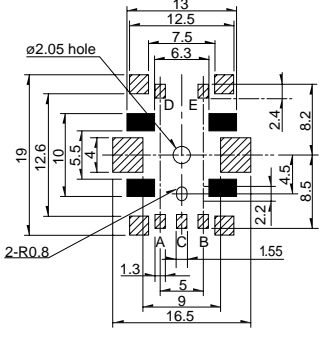
TACT

Incremental Type

Absolute Type

Dimensions

Unit : mm

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
7	<p>Low-profile type</p> 		
8	<p>Low-profile type with push-on switch (travel 0.5/1.5mm)</p> 		
9	<p>Low-profile type and reflow applicable parts</p> 		 <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>
10	<p>Low-profile type and reflow applicable parts with push-on switch (travel 0.5mm)</p> 		 <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>

## Products Specifications

Items	Standard type EC11B		Low-profile type EC11E		Low-profile type EC111	20mm size EC20A		
	Standard type	Double torque type	Standard type	Reflow 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	Rating					10mA 5V DC	0.5mA 5V DC	
Rotary	Output signal				Self-return switch	Output of A and B signals, proportionate to phase difference		
Encoders	Insulation resistance					250V DC 100MΩ min.	50V DC 10MΩ min.	
Jog Shuttle	Voltage proof					300V AC	50V AC	
Telephone-hook	Rotational torque				3 to 30mN·m	—		
Detector	Detent torque		12±7mN·m	16±7mN·m	10±7mN·m	6±4mN·m	—	40±20mN·m
Vibration Sensors	Push-pull strength					100N		
Dual-in-line Package Type	Resistance to soldering heat						300°C or less, or within 3s	
Multi Control Devices	Manual soldering		260±5°C, 5±1s				—	260±5°C, 5±1s
TACT	Dip soldering		—		Please see P.190	—		
	Reflow soldering		—		—	—		
Durability	Rotational life					15,000 cycles	30,000 cycles	
Incremental Type	Cold					-40±3°C for 240h		
Absolute Type	Dry heat					85±3°C for 240h		
	Damp heat					60±2°C, 90 to 95%RH for 240h		

### Push-on Switch Specifications

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

# Products Specifications

## Output Wave

Standard type EC11B		Low-profile type EC11E		Low-profile type EC111	20mm size EC20A														
Standard type	Heavy torque type	Standard type	Reflow type	Self-return switch															
<p>EC11B, EC11E 30 detents, 15 pulse    EC11E 18 detents, 9 pulse                      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>						<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)																		

## Sliding Noise

Standard type EC11B		Low-profile type EC11E		Low-profile type EC111	20mm size EC20A			
Standard type	Heavy torque type	Standard type	Reflow type	Self-return switch				
<p><math>V1=V2=1.5V</math> max.</p> <p>Measurement condition : Rotation speed 360°/s    t : Masking time to avoid chattering</p>					<p><math>V1=V2=1.5V</math> max.</p> <p>Measurement condition : Rotation speed 360°/s    t : Masking time to avoid chattering</p>	<p>At <math>R = 5k\Omega</math>                      Chattering :2ms max.                      Bounce :2ms max.</p>	<p>At <math>R = 5k\Omega</math>                      Chattering :3ms max.                      Bounce :2ms max.</p>	<p>At <math>R = 5k\Omega</math>                      Chattering :8ms max.                      Bounce :5ms max.</p>

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

Incremental Type

Absolute Type

# Variety

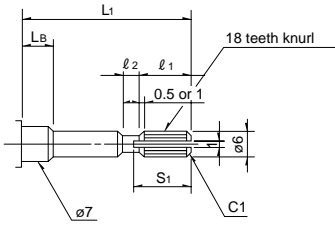
## Standard Dimensions of Shaft

### 1. Single-shaft Type

#### 1) Knurled Type

Unit : mm

**Style (Shaft diameter :  $\phi 6$ )**



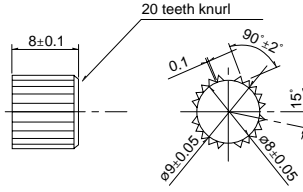
**● Detail dimensions**

L <sub>1</sub>	L <sub>B</sub>	l <sub>1</sub>	l <sub>2</sub>	S <sub>1</sub>
15	5	6	1	7
15	7	4	1	5
20	7	6	1	7
25	7	10	2	11

※ Except EC111

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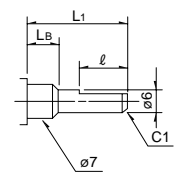
**Style (Shaft diameter :  $\phi 9$ )**  
Applicable to models with a push lock mechanism only.



#### 2) Flat Type

Unit : mm

**Style (Shaft diameter :  $\phi 6$ )**



**● Detail dimensions**

L <sub>1</sub>	L <sub>B</sub>	l
15	5	7
15	7	5 (6)
20	7	10 (12)
25	7	12

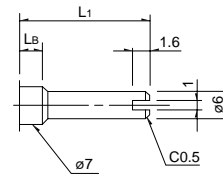
※ Except EC111

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**

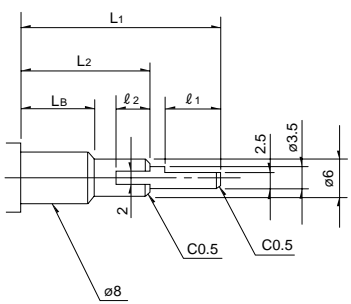
L <sub>1</sub>	L <sub>B</sub>
15	7
20	7
25	7

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

### Notes

- The  parts in the shaft type are applied to the specifications for the product line described in p. 183 and 184.
- Additional switches not included in the above list are also available. Contact us for details.

Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

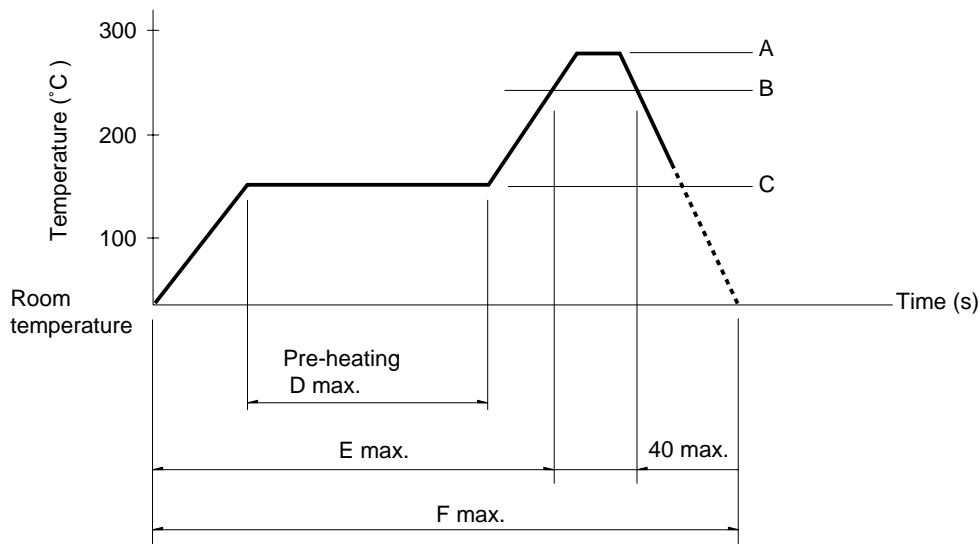
Incremental Type

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



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.

- Power
- Push
- Slide
- Rotary
- Encoders**
- Jog Shuttle
- Telephone-hook
- Detector
- Vibration Sensors
- Dual-in-line Package Type
- Multi Control Devices
- TACT

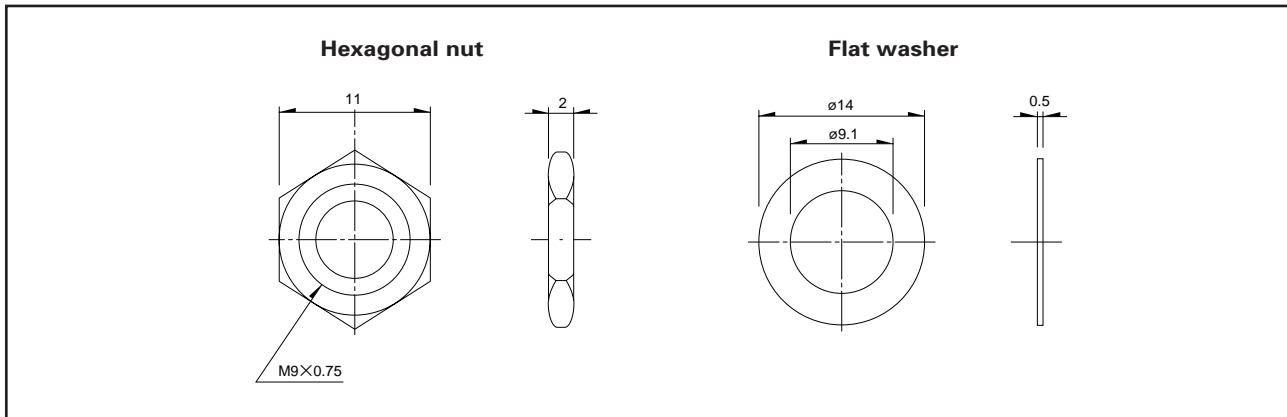
- Incremental Type
- Absolute Type

## Attached Parts

These parts are attached to the following products.

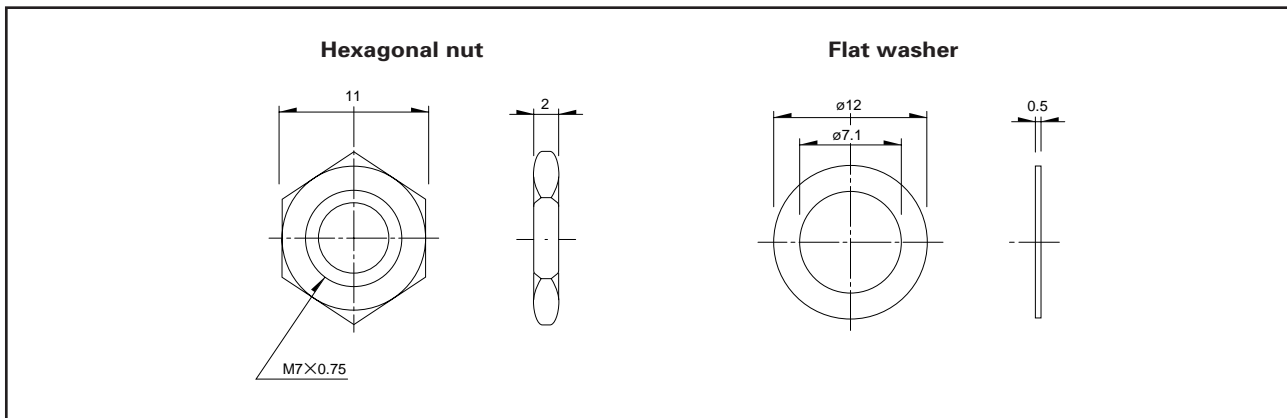
### SRGH Series

Unit : mm



### RK09710E, EC11B Series

Unit : mm



Power

Push

Slide

Rotary

Encoders

Jog Shuttle

Telephone-hook

Detector

Vibration Sensors

Dual-in-line Package Type

Multi Control Devices

TACT

Incremental Type

Absolute Type