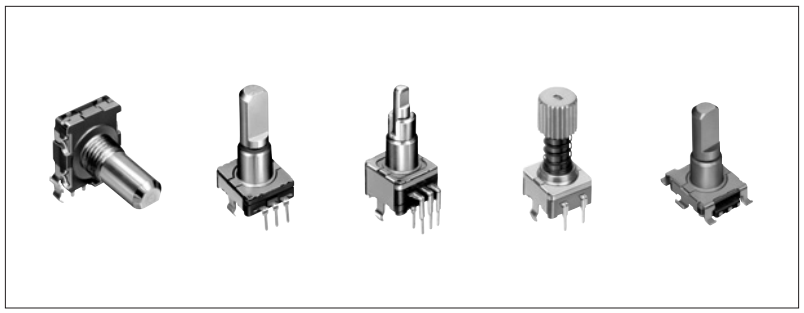
11mm Size Metal Shaft Type Encoder Variety

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 (mN·m)	Number of detent	Resolution	Push-on switch	Travel of push-on switch (mm)	Minimum packing unit (pcs.)	Products No.	Drawing No.
Horizontal	Flat	20	12±7	30	15	Without	——	700	EC11B15202AA	1
						With	0.5		EC11B15242AE	2
							1.5		EC11B15242AF	3
Vertical			10±7	18	9	Without	——	1,200	EC11E09204A4	4
				30	15				EC11E15204A3	
			7^{+3}_{-4}	Without					EC11E1530401	
			10±7	36	18				EC11E1820402	
			7^{+3}_{-4}	Without					EC11E1830401	
			10±7	18	9	With	0.5		EC11E09244AW	5
				30	15				EC11E15244C0	
			7^{+3}_{-4}	Without					EC11E153440D	
			10±7	36	18				EC11E18244AE	
			7^{+3}_{-4}	Without					EC11E1834404	
			10±7	18	9		1.5		EC11E09244AQ	
				30	15				EC11E15244B2	
			7^{+3}_{-4}	Without					EC11E1534408	
			10±7	36	18				EC11E18244A5	
			7^{+3}_{-4}	Without					EC11E1834403	

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.
Less shaft wobble	20-tooth serration	18	10±7	30	15	With	1.5	1,200	EC11G1524402	6
			7^{+3}_{-4}	——					EC11G1534403	
Reflow	Flat	20	6±4	30	15	Without	——	1,600	EC11E1540503	7
						With	0.5		EC11E154450G	8
Push lock	20-tooth serration	25	10±7			Without	——	1,000	EC11E152T409	9
		26.4				With	8	800	EC11E152U402	10
Self-return switch	Flat	20	3 to 30	——	Self-return switch	Without	——	1,200	EC1110120001	11
						With	0.5		EC1110120103	12
							1.5		EC1110120201	
Dual-shaft	Flat	Inner-shaft=25	10± 7	30	15		0.5		EC11EBB24C03	13
	Slotted	Outer-shaft=15				——	——			
	Flat	Inner-shaft=25				With	1.5	700	EC11E0B2LB01	14
	Slotted	Outer-shaft=15	3 to 30	——	Self-return switch	——	——			

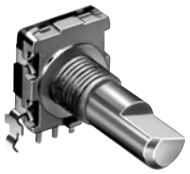
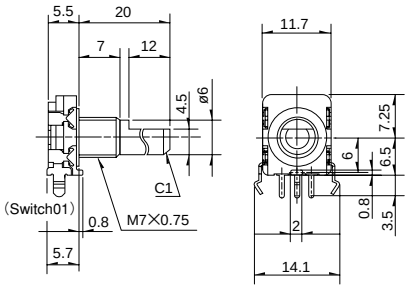
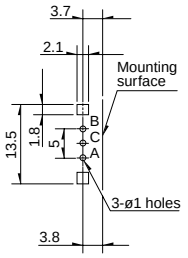
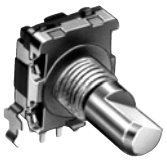
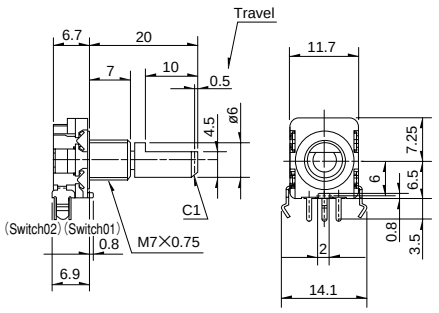
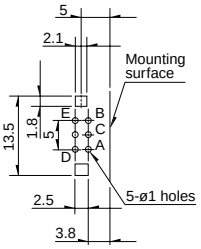
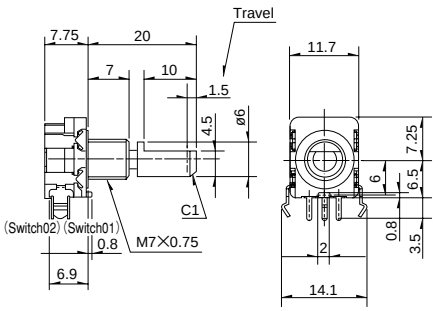
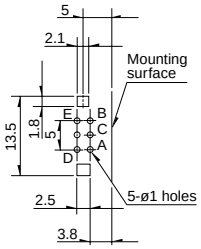
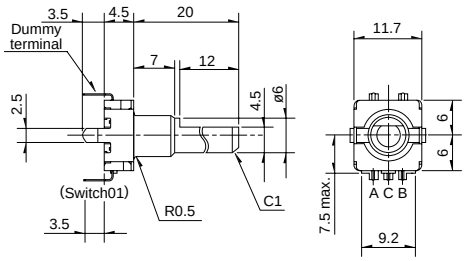
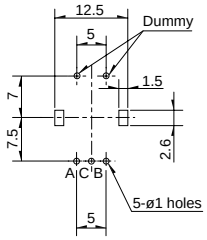
Note

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

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

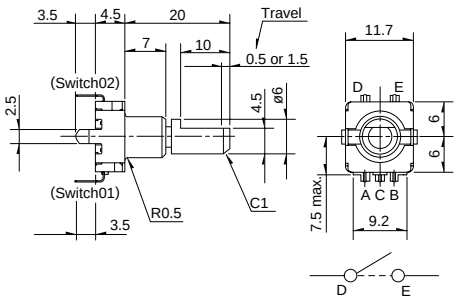
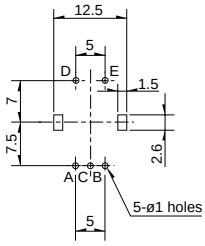
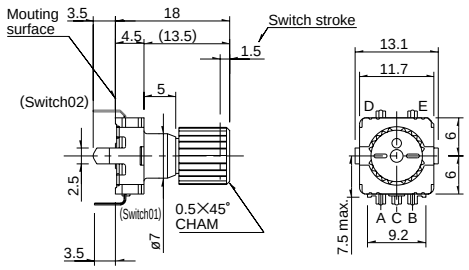
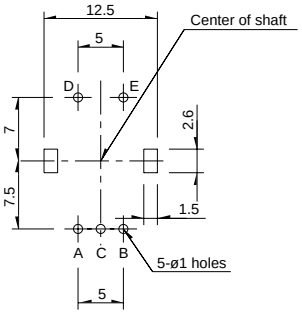
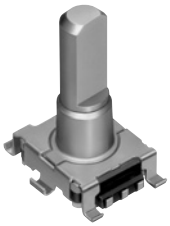
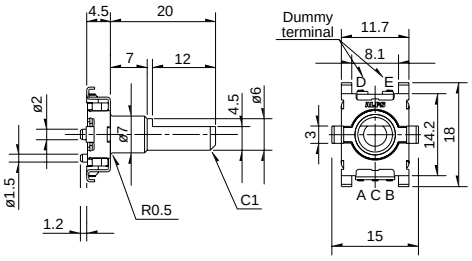
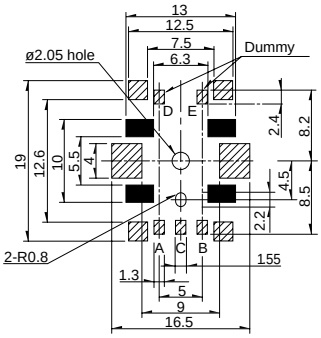
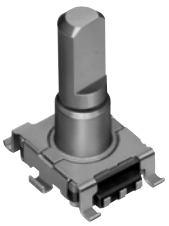
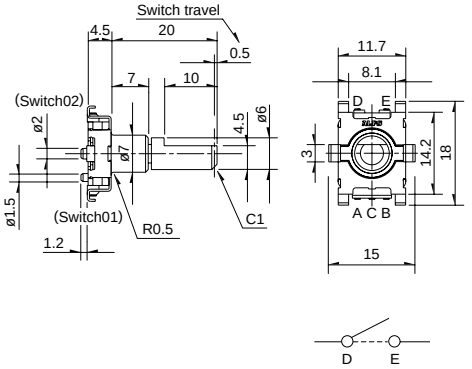
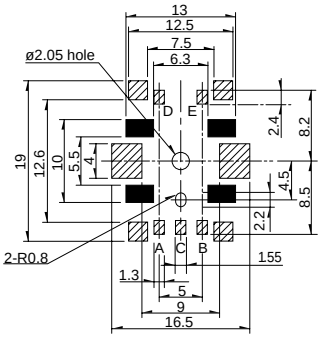
Dimensions

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 		

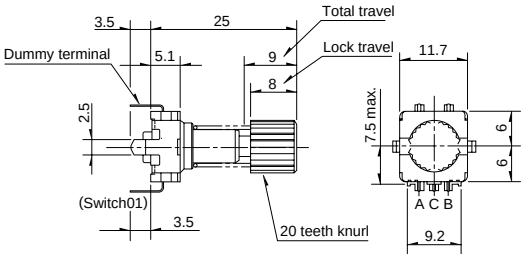
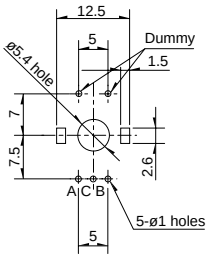
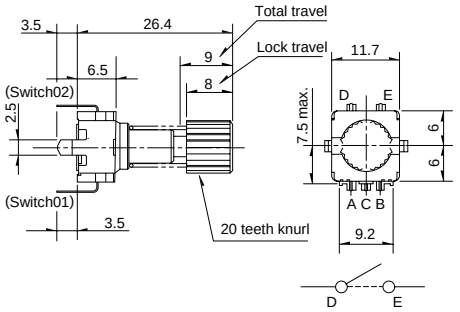
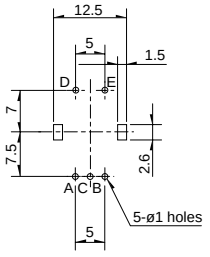
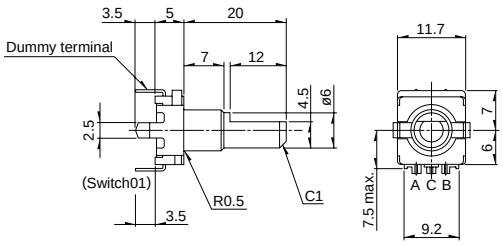
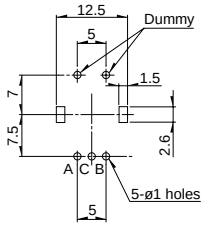
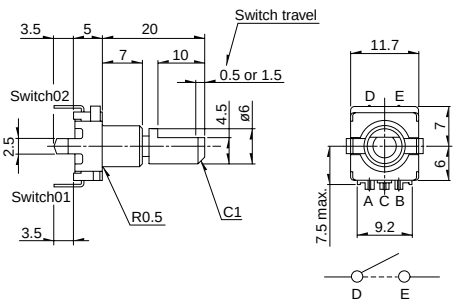
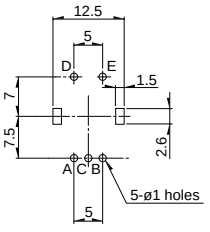
Dimensions

Unit:mm

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** 		 PC board Mounting detail A slant line part shows the solder land Black part:Do not solder and no wiring for electrical contact
8	**Reflow applicable parts with push-on switch (travel 0.5mm)** 		 PC board Mounting detail A slant line part shows the solder land Black part:Do not solder and no wiring for electrical contact

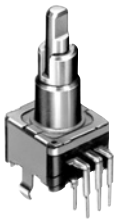
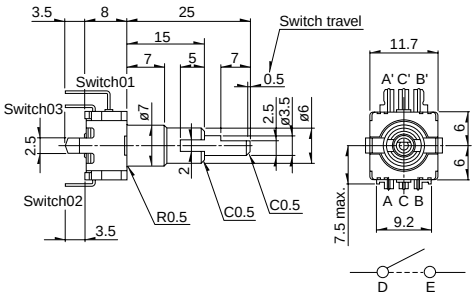
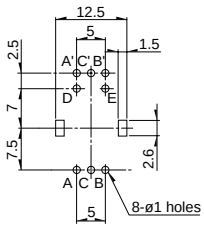
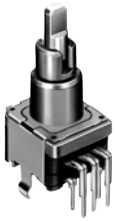
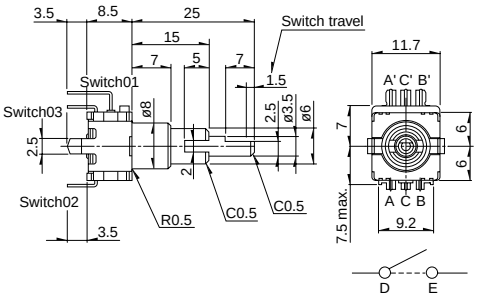
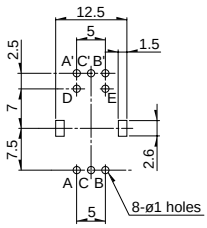
Dimensions

Unit:mm

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

Dimensions

Unit:mm

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

Variety

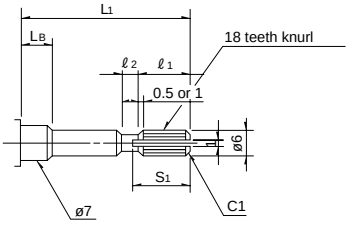
Standard Dimensions of Shaft

1. Single-shaft Type

1) Knurled Type

Unit:mm

Style (Shaft diameter : ϕ6)



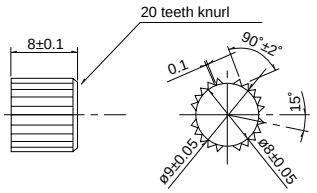
Detail dimensions

	L1	LB	ℓ1	ℓ2	S1
※	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 : ϕ9)

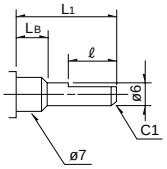
Applicable to models with a push lock mechanism and EC11G type.



2) Flat Type

Unit:mm

Style (Shaft diameter : ϕ6)



Detail dimensions

	L1	LB	ℓ
※	15	5	7
	15	7	5 (6)
	20	7	10 (12)
	25	7	12

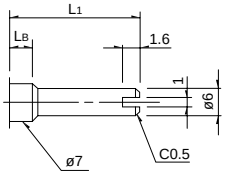
※Except EC111

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

3) Slotted Type

Unit:mm

Style (Shaft diameter : ϕ6)



Detail dimensions

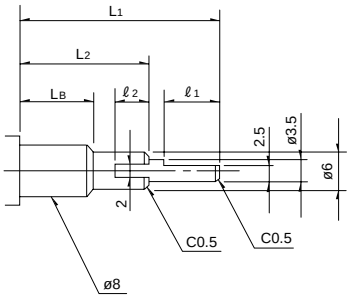
L1	LB
15	7
20	7
25	7

2. Standard Dimensions of Dual-shaft Type

1) Flat Type

Unit:mm

Style (Inner-shaft : ϕ3.5 Outer-shaft : ϕ6)



Detail dimensions

L1	L2	LB	ℓ1	ℓ2
20	10	5	7	4
25	15	7	7	5
30	20	7	7	5

Notes

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

Products Specifications

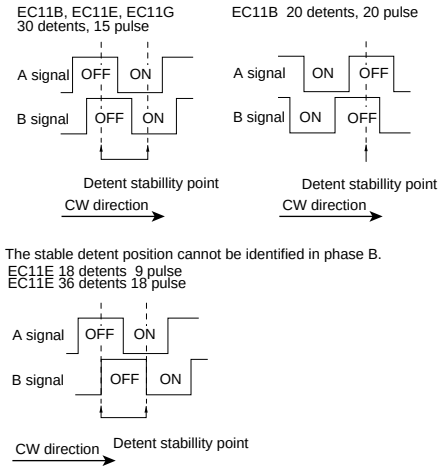
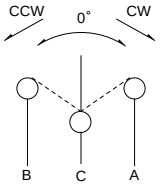
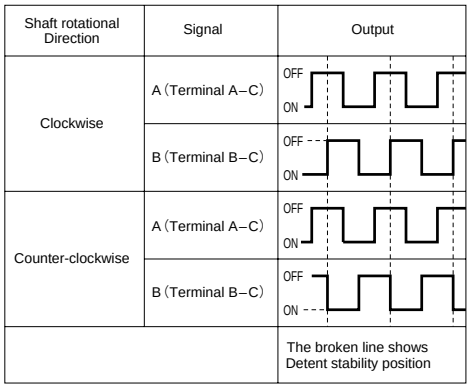
Items			EC11B	EC11E/EC11G		EC111	20mm size EC20A
			Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch	
Operating temperature range			–30 to +85℃				–30 to +80℃
Maximum operating current (Resistive load)			10mA				0.5mA
Electrical performance	Rating		10mA 5V DC				0.5mA 5V DC
	Output signal		Output of A and B signals, proportionate to phase difference			Self-return switch	Output of A and B signals, proportionate to phase difference
	Insulation resistance		100MΩ min. 250V DC				10MΩ min. 50V DC
	Voltage proof		300V AC				50V AC
Mechanical performance	Rotational torque (without click feeling)		—	7^{+3}_{-4}mN・m		3 to 30mN・m	—
	Detent torque		12±7mN・m	10±7mN・m	6±4mN・m	—	40±20mN・m
	Push-pull strength		100N				
	Resistance to soldering heat	Manual soldering	300℃ max. 3s max.				
		Dip soldering	260±5℃, 5±1s		—	260±5℃, 5±1s	
		Reflow soldering	—		Please see P.186	—	
Durability	Rotational life		15,000 cycles				30,000 cycles
Environmental performance	Cold		–40±3℃ for 240h				
	Dry heat		85±3℃ for 240h				
	Damp heat		60±2℃, 90 to 95%RH for 240h				

Push-on Switch Specifications

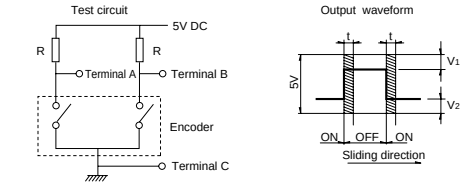
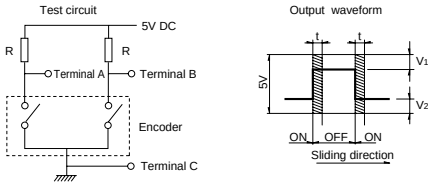
Items	EC11B		EC11E/EC111/EC11G	20mm size EC20A
Switch circuit・the number of contact	Single pole and single throw (Push-on)			
Travel of switch	$0.5^{+0.4}_{-0.3}$mm	1.5±0.5mm	0.5±0.3mm	1.5±0.5mm
Operating force of switch	6±3N	5±2N	$6^{+2.5}_{-2}$N	4±2N
Rating	DC 16V 3A (10mA 16V DC min. ratings)		DC 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	
				

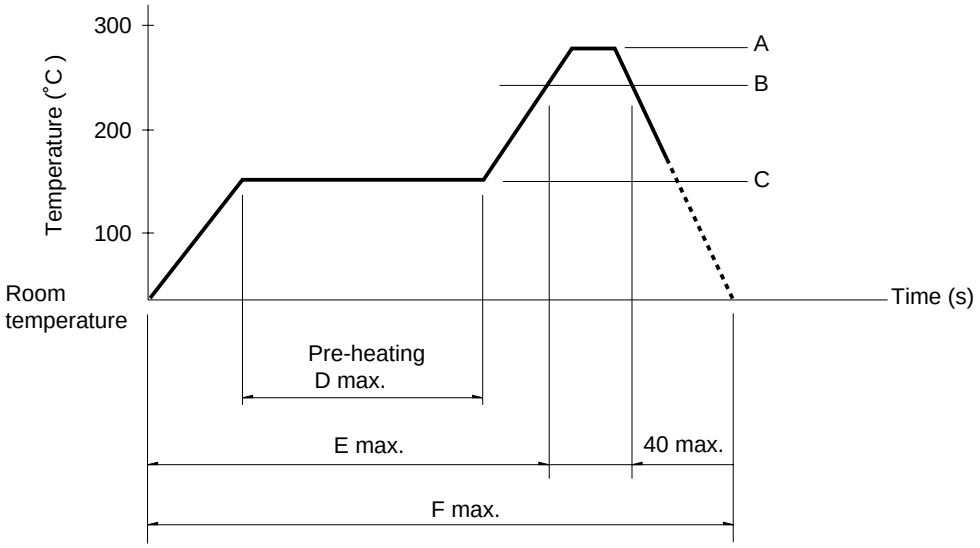
Sliding Noise

EC11B	EC11E/EC11G		EC111	20mm size EC20A
Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch	
$V_1=V_2=1.5V$ max.			—	$V_1=V_2=1.5V$ max.
				
At R = 5kΩ Chattering : 2ms max. Bounce : 2ms max.	At R = 5kΩ Chattering : 3ms max. Bounce : 2ms max.			At R = 5kΩ Chattering : 8ms max. Bounce : 5ms max.

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 (℃) 10s max.	B (℃)	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.

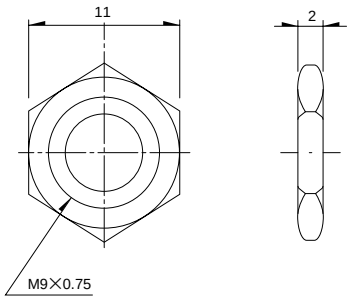
Attached Parts

These parts are attached to the following products.

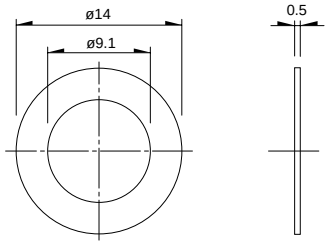
SRGH Series

Unit:mm

Hexagonal nut



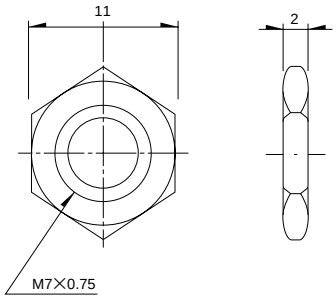
Flat washer



RK09710E, EC11B Series

Unit:mm

Hexagonal nut



Flat washer