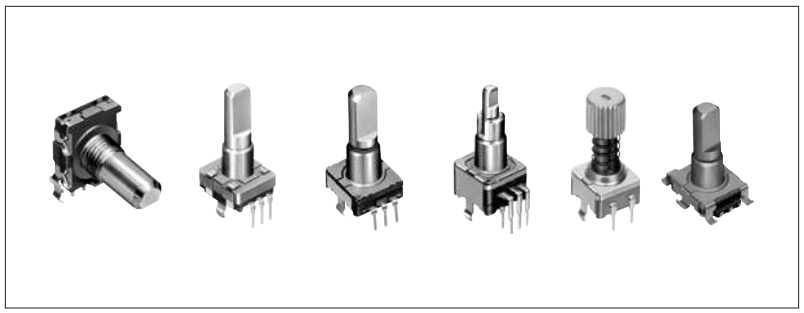
11mm Size Metal Shaft Type Encoder Variety

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	Flat	20	12±7 mN・m	30	15	Vertical	Without	——	1,000	EC11B15203AD	1
				20	20					EC11B20203A3	
			16±7 mN・m	30	15		With	0.5		EC11B15243BB	2
										EC11B15243BC	
			12±7 mN・m	20	20					EC11B2024304	
			16±7 mN・m	30	15			1.5		EC11B15243BD	3
										EC11B15243BE	
			12±7 mN・m	20	20					EC11B2024305	
				30	15	Horizontal	Without	——	700	EC11B15202AA	4
							With	0.5		EC11B15242AE	5
								1.5		EC11B15242AF	6
Low-profile			10±7 mN・m	18	9	Vertical	Without	——	1,200	EC11E09204A4	7
				30	15					EC11E15204A3	
				Without						EC11E1530401	
				36	18					EC11E1820402	
				Without						EC11E1830401	
				18	9		With	0.5		EC11E09244AW	8
				30	15					EC11E15244C0	
				Without						EC11E153440D	
				36	18					EC11E18244AE	
				Without						EC11E1834404	
				18	9			1.5		EC11E09244AQ	
				30	15					EC11E15244B2	
				Without						EC11E1534408	
				36	18					EC11E18244A5	
				Without						EC11E1834403	

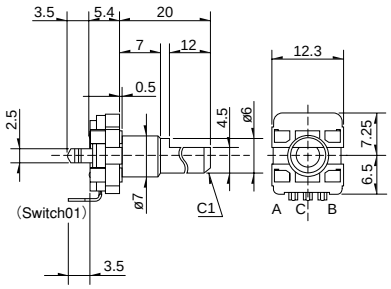
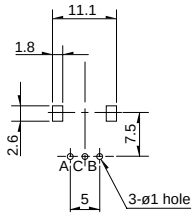
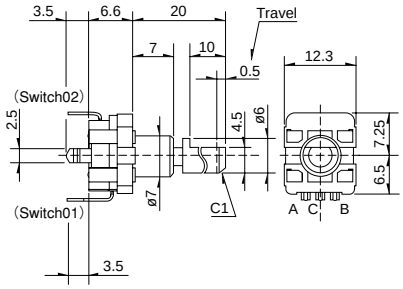
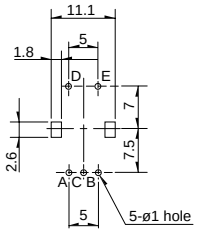
Products Line

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 unit (pcs.)	Products No.	Drawing No.
Low-profile (Reflow)	Flat	20	6±4 mN・m	30	15	Vertical	Without	——	1,600	EC11E1540503	9
							With	0.5		EC11E154450G	10
Push lock	20-tooth serration	25	10±7 mN・m				Without	——	1,000	EC11E152T409	11
		26.4					With	8	800	EC11E152U402	12
Self-return	Flat	20	3 to 30 mN・m	——	Self-return switch		Without	——	1,200	EC1110120001	13
							With	0.5		EC1110120103	14
								1.5		EC1110120201	
Dual-shaft	Flat	Inner-shaft=25	10± 7 mN・m	30	15			0.5		EC11EBB24C03	15
	Slotted	Outer-shaft=15					——	——			
	Flat	Inner-shaft=25					With	1.5	700	EC11E0B2LB01	16
	Slotted	Outer-shaft=15	3 to 30 mN・m	——	Self-return switch		——	——			

Note

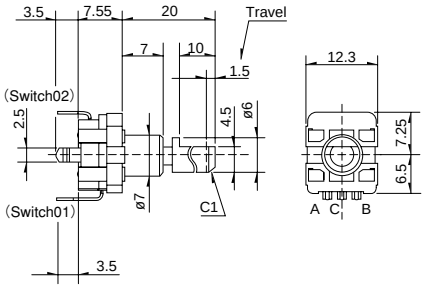
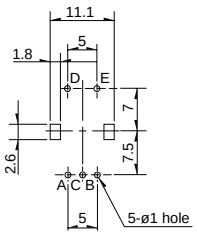
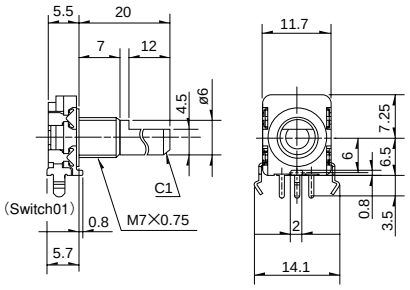
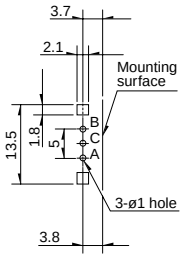
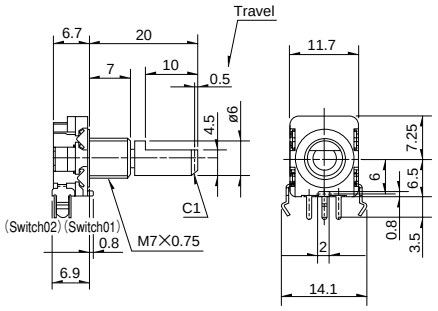
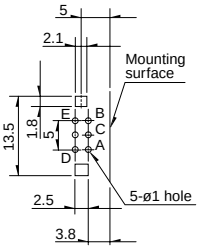
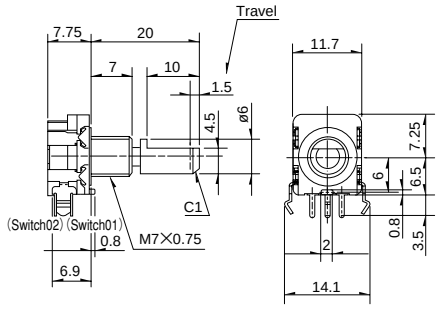
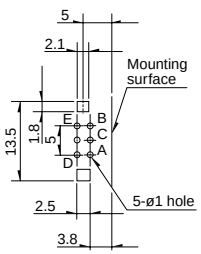
We have many other products in stock. Please contact our sales department if you are interested.

Dimensions

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting face)
1	**Standard** 		
2	**Standard with push-on switch (travel 0.5mm)** 		

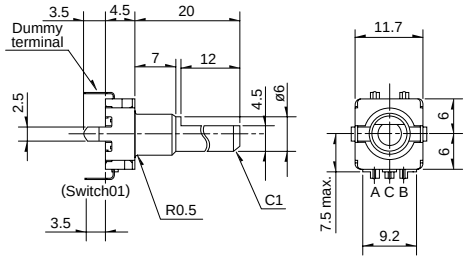
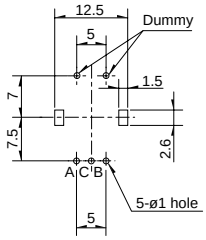
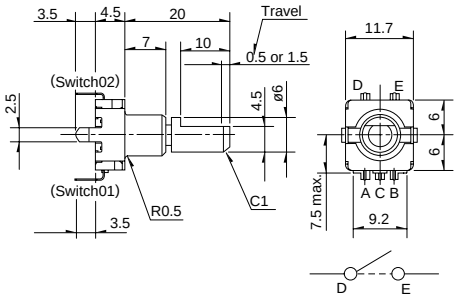
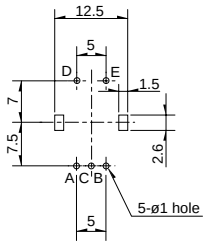
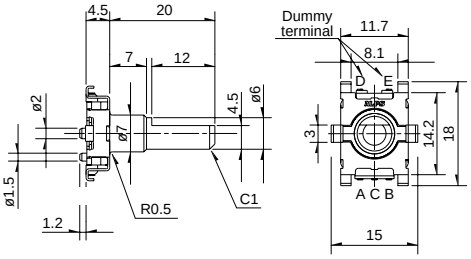
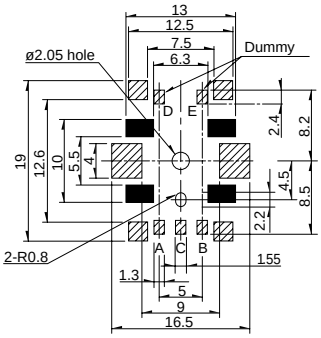
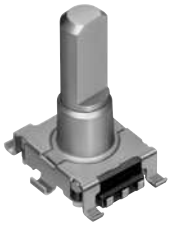
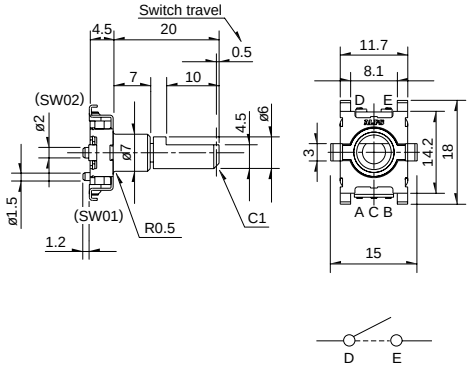
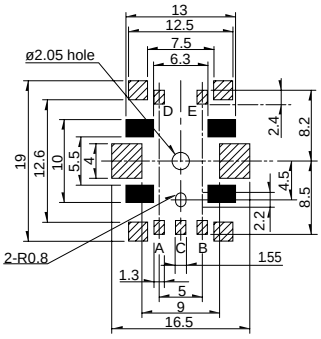
For other products, check varieties on **P.189**
For other detailed specifications, see **P.192, 193**
For attached parts, see **P.233**

Dimensions

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
3	**Standard with push-on switch (travel 1.5mm)** 		
4	**Standard** 		
5	**Standard with push-on switch (travel 0.5mm)** 		
6	**Standard with push-on switch (travel 1.5mm)** 		

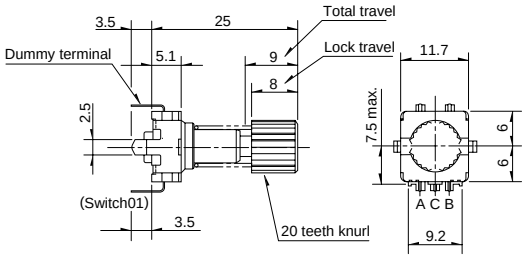
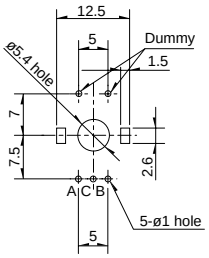
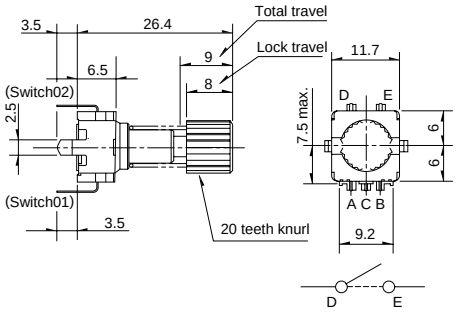
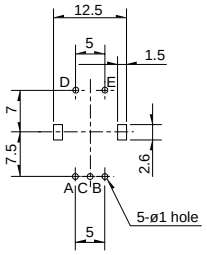
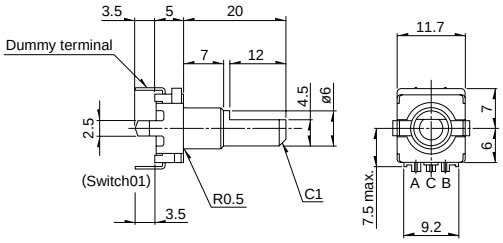
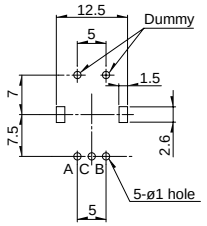
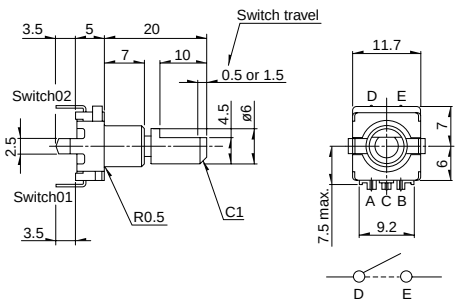
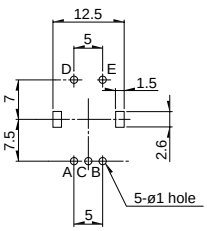
Dimensions

Unit : mm

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

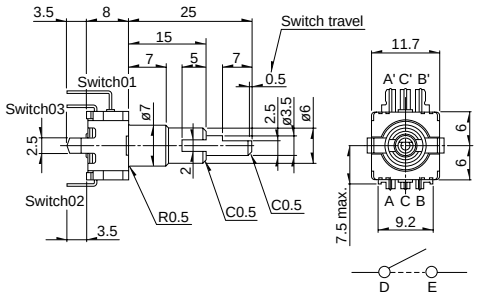
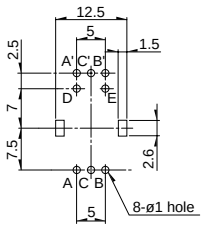
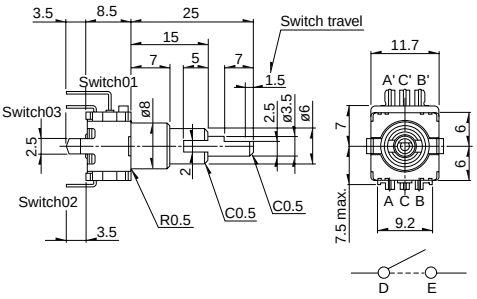
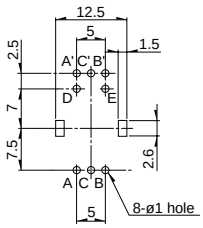
Dimensions

Unit : mm

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
11	Low-profile type with push-lock mechanism	 	
12	Low-profile type with push-lock switch	 	
13	Low-profile type with self-return switch	 	
14	Low-profile type with self-return switch (travel 0.5mm /1.5mm)	 	

Dimensions

Unit : mm

No.	Model	Style	PC board mounting hole dimensions (Viewed from mounting side)
15	**Low-profile dual-shafts type** **Inside shaft: encoder** **Outside shaft: encoder** 		
16	**Low-profile dual-shafts type** **Inside shaft: encoder** **Outside shaft : self-return switch** 		

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	
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		250V DC 100MΩ min.					50V DC 10MΩ min.
	Voltage proof		300V AC					50V AC
Mechanical performance	Rotational torque		—				3 to 30mN·m	—
	Detent torque		12±7mN·m	16±7mN·m	10±7mN·m	6±4mN·m	—	40±20mN·m
	Push-pull strength		100N					
	Resistance to soldering heat	Manual soldering	300℃ or less, or within 3s					
		Dip soldering	260±5℃, 5±1s			—	260±5℃, 5±1s	
		Reflow soldering	—			Please see P.190	—	
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					

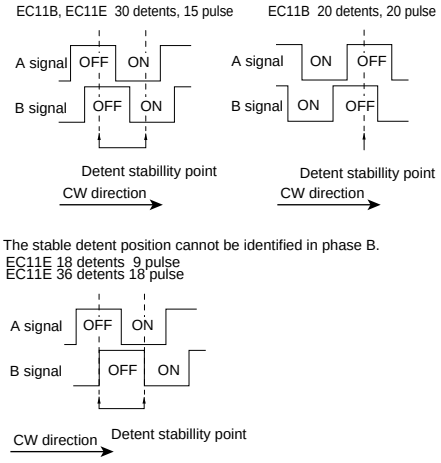
Push-on Switch Specifications

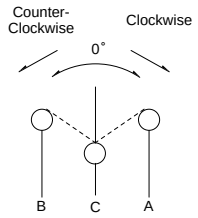
Items	Standard type EC11B		Low-profile type EC11E / EC111		20mm size EC20A
Switch circuit・the number of contact	Single pole and single throw (Push-on)				
Travel of switch	$0.5^{+0.4}_{-0.3}$mm	1.5±0.5mm	0.5±0.3mm	1.5±0.5mm	
Operating force of switch	6±3N	5±2N	$6^{+2.5}_{-2}$N	4±2N	
Rating	DC 16V 3A (10mA 16V DC min ratings)		DC 16V 0.5A (1mA 16V DC min ratings)		
Contact resistance	100m Ω for initial period; 200mΩ 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	

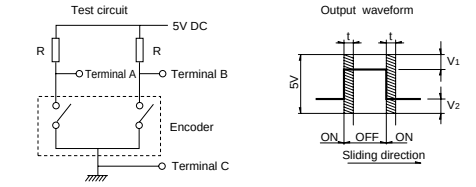


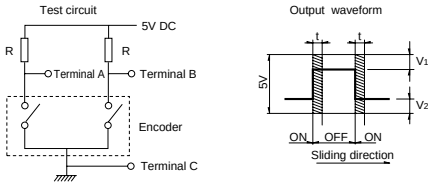


Shaft rotational Direction	Signal	Output
Clockwise	A (Terminal A–C)	
	B (Terminal B–C)	
Counter-clockwise	A (Terminal A–C)	
	B (Terminal B–C)	
		The broken line shows Detent stability position

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	
V1=V2=1.5V max.				—	V1=V2=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.





Variety

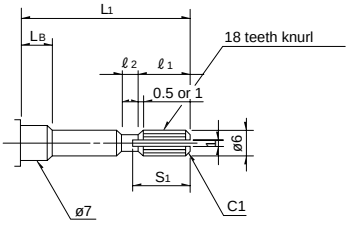
Standard Dimensions of Shaft

1. Single-shaft Type

1) Knurled Type

Unit : mm

Style (Shaft diameter : ϕ6)



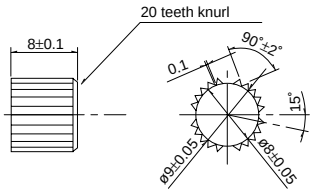
Detail dimensions

	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)

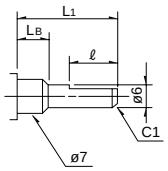
Applicable to models with a push lock mechanism only.



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

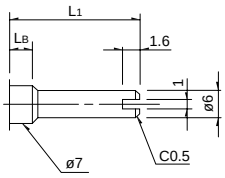
※Except EC111

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

3) Slotted Type

Unit : mm

Style (Shaft diameter : ϕ6)



Detail dimensions

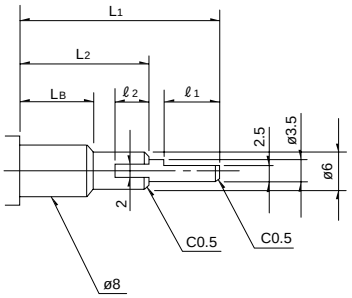
L1	LB
15	7
20	7
25	7

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

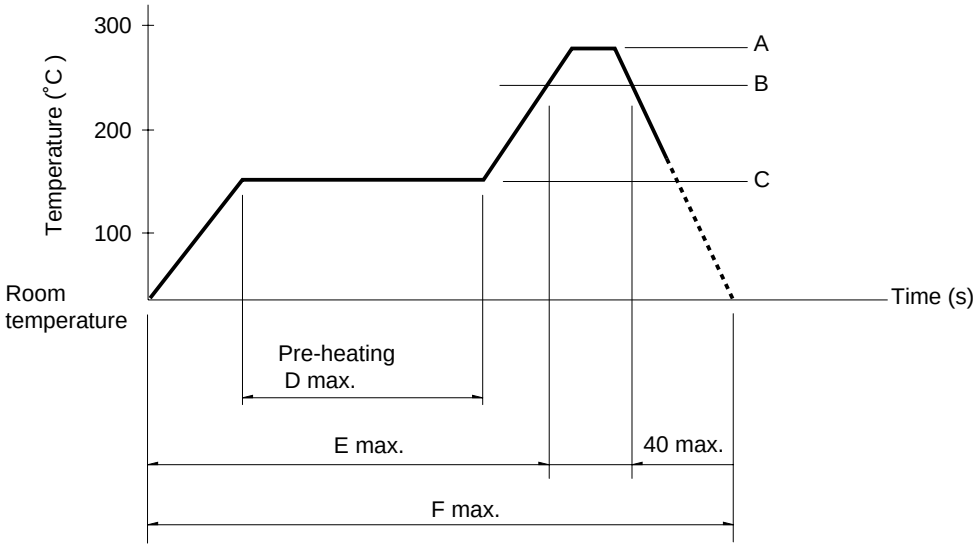
Notes

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

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.

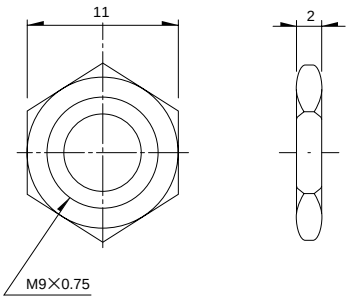
Attached Parts

These parts are attached to the following products.

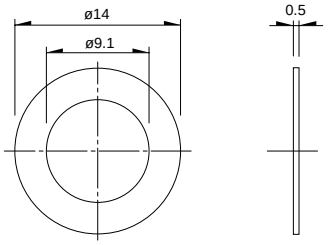
SRGH Series

Unit : mm

Hexagonal nut



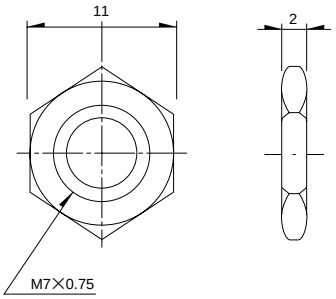
Flat washer



RK09710E, EC11B Series

Unit : mm

Hexagonal nut



Flat washer