

Encoder 11mm Size Metal Shaft Type

EC11 Series



Compact and highly reliable type available in many varieties.

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

Multi Control
Devices

TACT Switch™

Custom-
Products



Features

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

Applications

- 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					EC11E15204A3						
			7 ⁺³ / ₋₄	Without	15				EC11E1530401						
			10±7	36					18		EC11E1820402				
			7 ⁺³ / ₋₄		Without						EC11E1830401				
			10±7	18	9				With		0.5	1,200	EC11E09244AW	5	
													30		15
				7 ⁺³ / ₋₄	Without										
													10±7		36
				7 ⁺³ / ₋₄	Without										
													18		9
				30	15										
													7 ⁺³ / ₋₄		Without
				10±7	36										
			7 ⁺³ / ₋₄						Without		18	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	Without					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	30	15	Without	—	1,000	EC11E152T409	9
		26.4				With	8	800	EC11E152U402	10
Self-return switch	Flat	20	3 to 30	Without	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	Without	—	700	EC11EBB24C03	13
	Slotted	Outer-shaft=15								
	Flat	Inner-shaft=25								
	Slotted	Outer-shaft=15								

Detector
Push
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Power
Dual-in-line Package Type
Multi Control Devices
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Note

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

Dimensions

Unit:mm


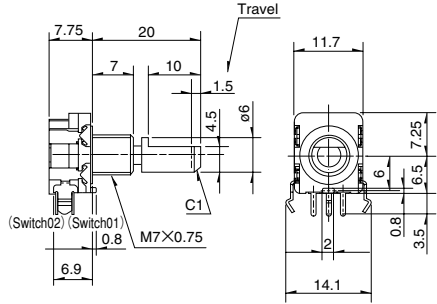
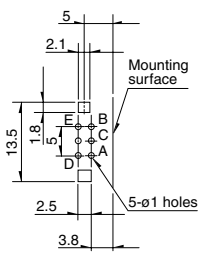

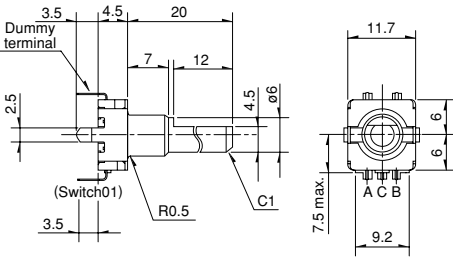
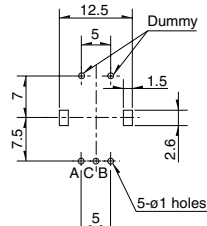

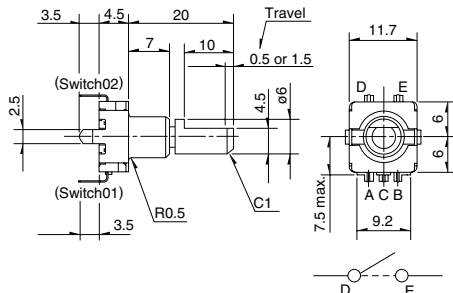
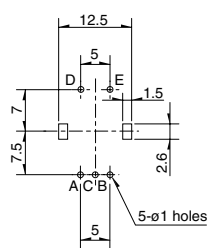

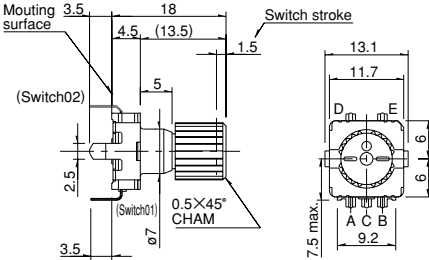
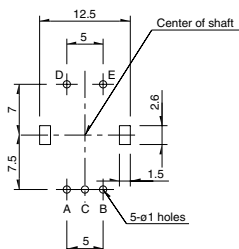
No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1			
2			

Incremental Type
Absolute Type

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

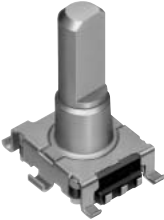
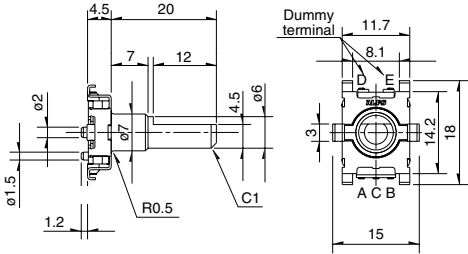
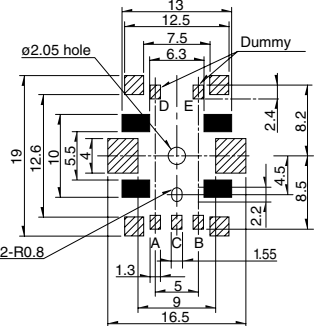

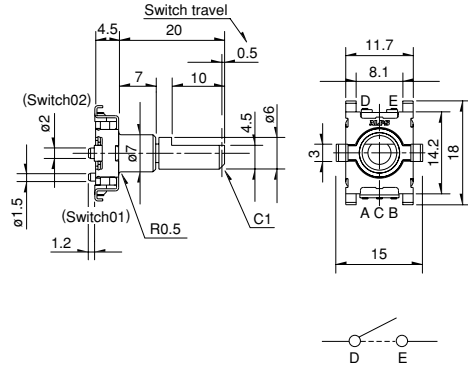
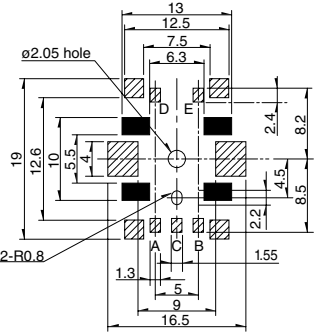

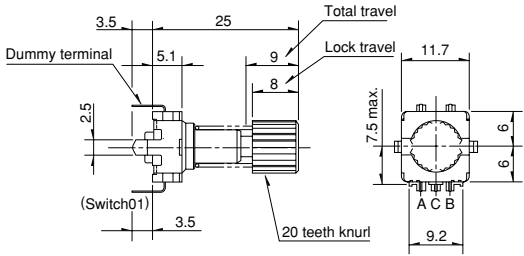
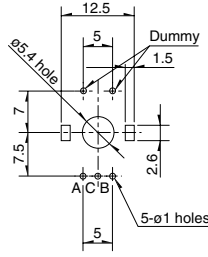

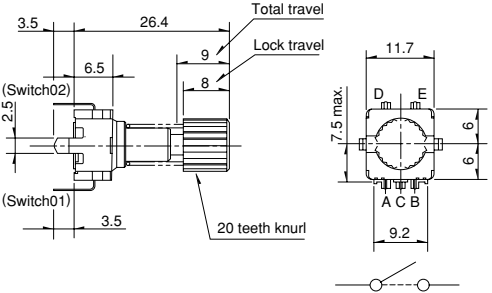
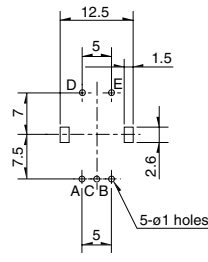
Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
3	<p>Horizontal with push-on switch (travel 1.5mm)</p> 		
4	<p>Vertical</p> 		
5	<p>Vertical with push-on switch (travel 0.5/1.5mm)</p> 		
6	<p>Less shaft wobble</p> 		

Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
7	<p>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>
8	<p>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>
9	<p>Push-lock mechanism</p> 		
10	<p>Push-lock mechanism with push-lock switch</p> 		

Detector

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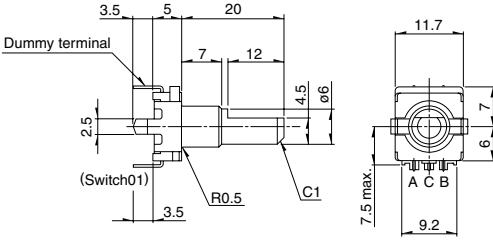
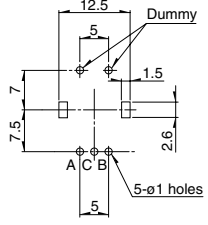

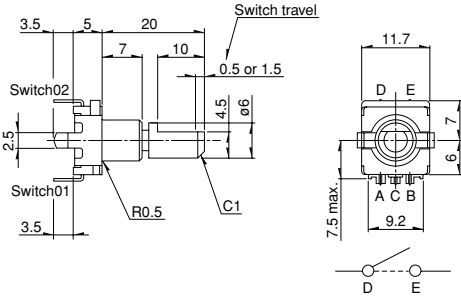
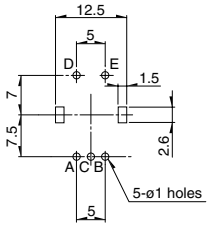
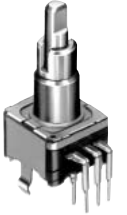
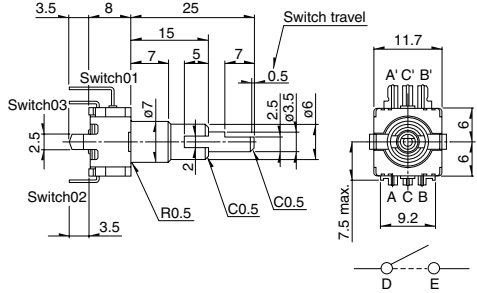
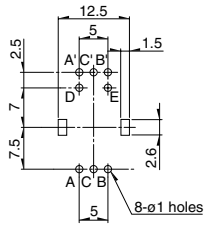
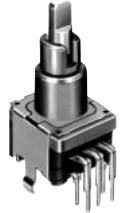
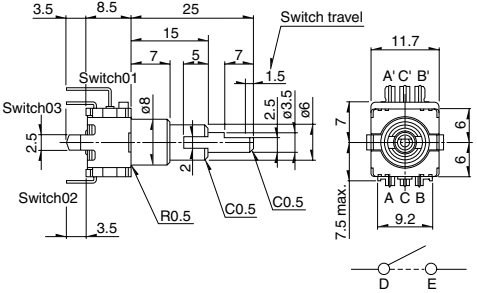
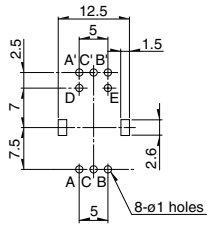
Custom-
Products

Incremental
Type

Absolute
Type

Dimensions

Unit:mm

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

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Incremental Type

Absolute Type

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

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 parts in the shaft type are applied to the specifications for the product line described in p. 192 and 193.
- Additional switches not included in the above list are also available. Contact us for details.

Products Specifications

Items	EC11B		EC11E/EC11G		EC111	EC20A	
	Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch			
Detector							
Push							
Slide							
Rotary							
Encoders	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		100M Ω min. 250V DC			10M Ω min. 50V DC	
	Voltage proof		300V AC			50V AC	
Power	Rotational torque (without click feeling)		—	7^{+3}_{-4} mN·m	3 to 30mN·m	—	
	Detent torque		12 ± 7 mN·m	10 ± 7 mN·m	6 ± 4 mN·m	40 ± 20 mN·m	
	Push-pull strength		100N				
	Resistance to soldering heat	Manual soldering		350°C max. 3s max.			
		Dip soldering		$260\pm 5^\circ\text{C}$, 5 ± 1 s	—	$260\pm 5^\circ\text{C}$, 5 ± 1 s	
Reflow soldering		—	Please see P.212	—			
Incremental Type	Rotational life		15,000 cycles			30,000 cycles	
	Cold		$-40\pm 3^\circ\text{C}$ for 240h				
	Dry heat		$85\pm 3^\circ\text{C}$ for 240h				
Absolute Type	Damp heat		$60\pm 2^\circ\text{C}$, 90 to 95%RH for 240h				

Push-on Switch Specifications

Items	EC11B		EC11E/EC111/EC11G		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 ± 0.5 mm	0.5 ± 0.3 mm	1.5 ± 0.5 mm	
Operating force of switch	6 ± 3 N	5 ± 2 N	$6^{+2.5}_{-2}$ N	4 ± 2 N	
Rating	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

EC11B	EC11E/EC11G		EC111	EC20A													
Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch														
<p>EC11B, EC11E, EC11G 30 detents, 15 pulse</p> <p>Detent stability point CW direction</p> <p>The stable detent position cannot be identified in phase B.</p> <p>EC11E 18 detents 9 pulse EC11E 36 detents 18 pulse</p> <p>Detent stability point CW direction</p> <p>EC11B 20 detents, 20 pulse</p> <p>Detent stability point CW direction</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)																

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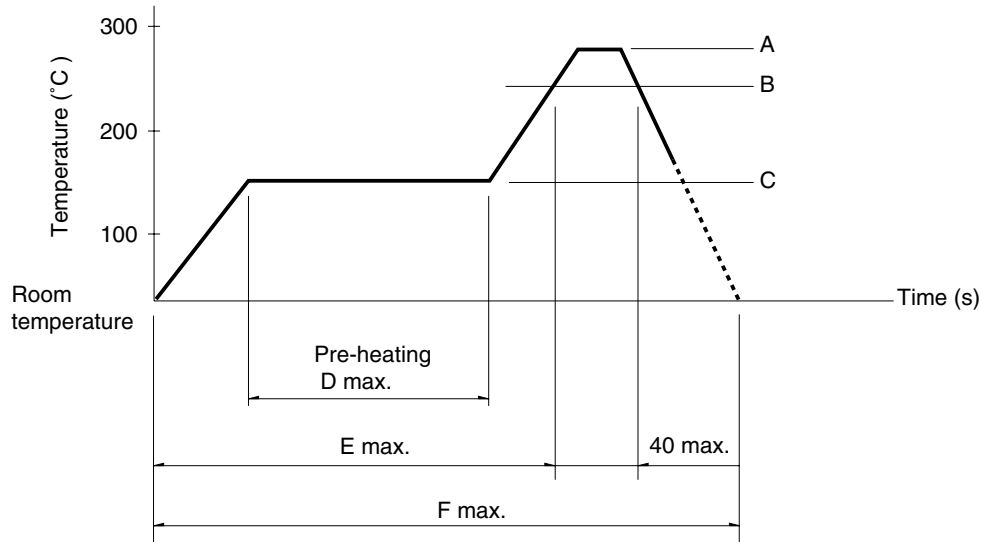
Sliding Noise

EC11B	EC11E/EC11G		EC111	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>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>	<p>Incremental Type</p> <p>Absolute Type</p>

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.

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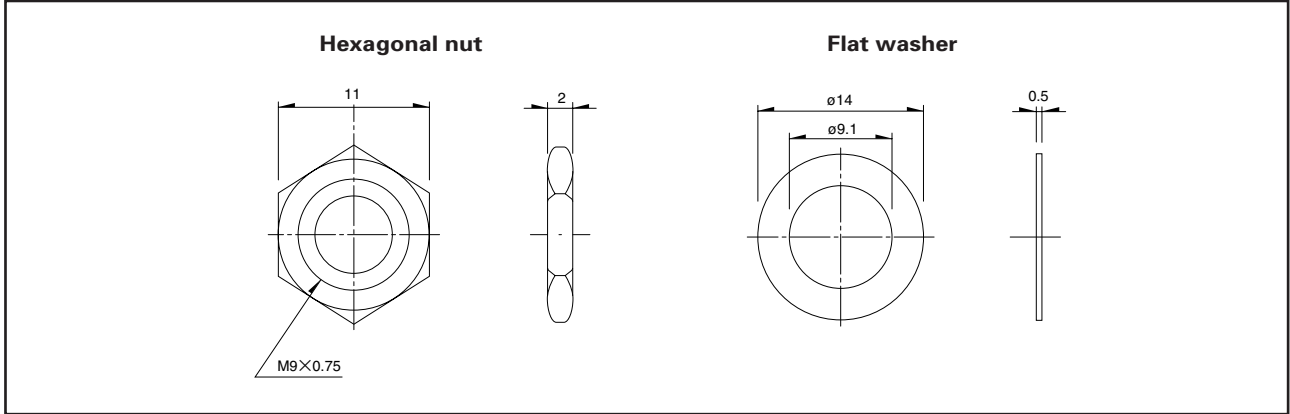
- Incremental Type
- Absolute Type

Attached Parts

These parts are attached to the following products.

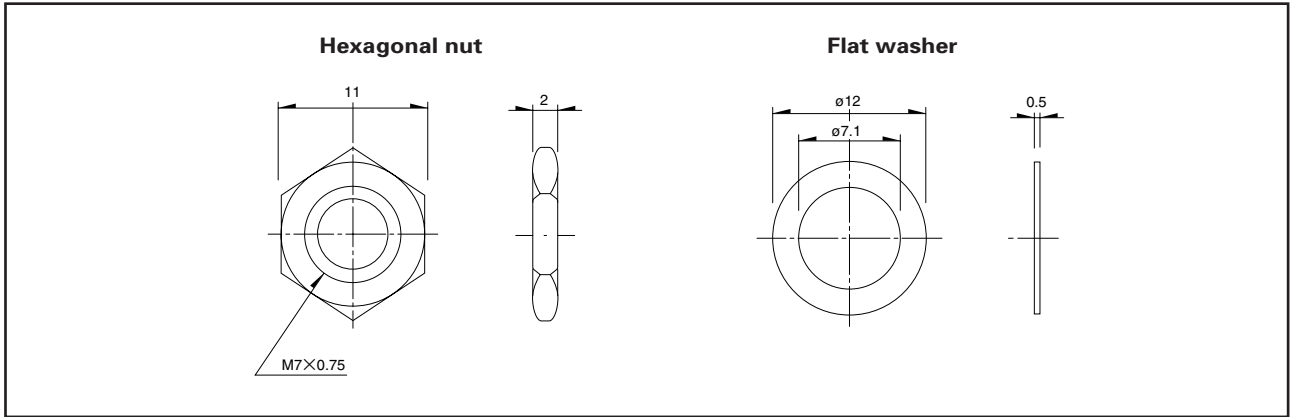
SRGH Series

Unit:mm



RK097, EC11B Series

Unit:mm



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Incremental
Type

**Absolute
Type**

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