

# Encoder 11mm Size Metal Shaft Type

EC11 Series

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



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	15				EC11E15204A3		
			7 <sup>+3</sup> / <sub>-4</sub>	Without	18				EC11E1530401		
			10±7	36	18				EC11E1820402		
			7 <sup>+3</sup> / <sub>-4</sub>	Without	18				EC11E1830401		
			10±7	18	9				EC11E09244AW		
				30	15				EC11E15244C0		
				Without	15				EC11E153440D		
			10±7	36	18				EC11E18244AE		
				7 <sup>+3</sup> / <sub>-4</sub>	Without				18		EC11E1834404
					18				9		EC11E09244AQ
				30	15				EC11E15244B2		
				7 <sup>+3</sup> / <sub>-4</sub>	Without				15		EC11E1534408
					18				18		EC11E18244A5
			7 <sup>+3</sup> / <sub>-4</sub>	Without	18				EC11E1834403		

Products Line


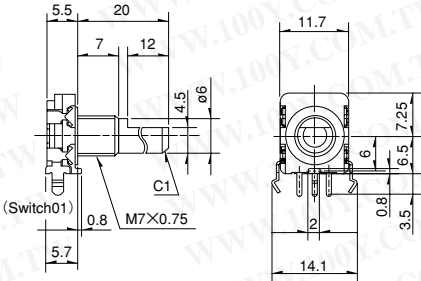
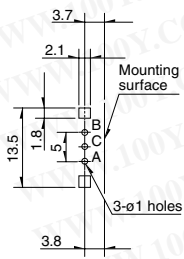
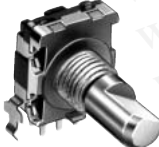
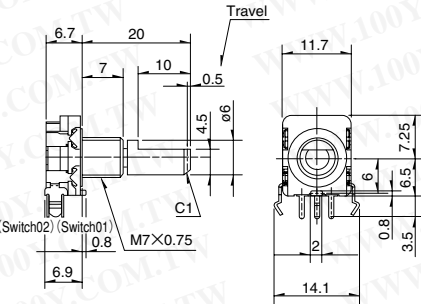
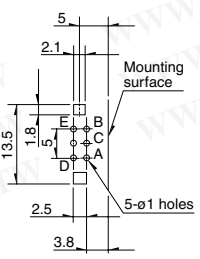
Style	Operating section	Length of operating section (mm)	Torque (mN·m)	Number of detent	Resolution	Push-on switch	Travel of push-on switch (mm)	Minimum packing unit (pcs.)	Products No.	Drawing No.
Less shaft wobble	20-tooth serration	18	10±7	30	15	With	1.5	1,200	EC11G1524402	6
			7 <sup>+3</sup> <sub>-4</sub>	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	
							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								

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		<p>Horizontal with push-on switch (travel 0.5mm)</p> 	

For other products, check varieties on P.189

For other specifications, see P.192, 193


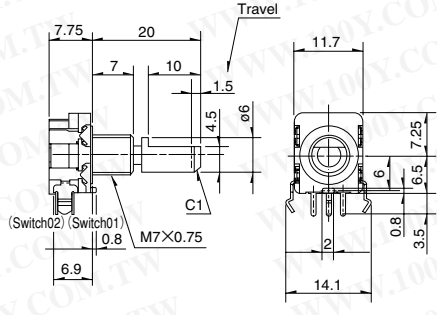
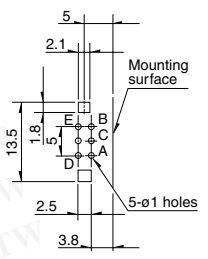

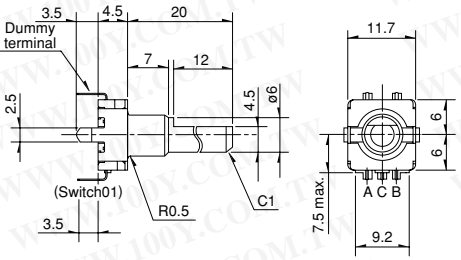
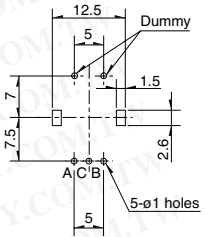
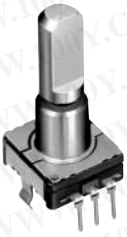
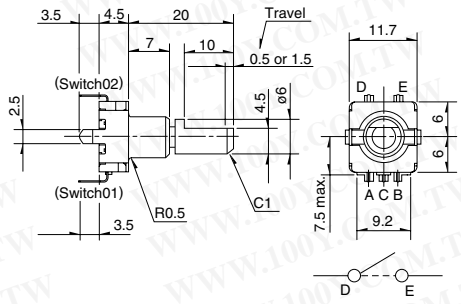
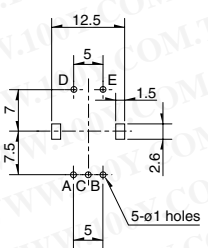

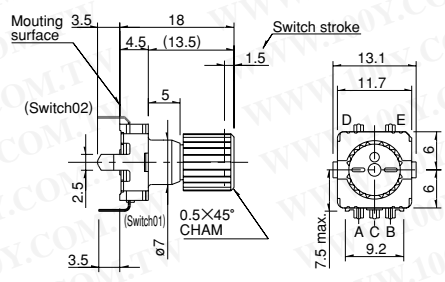
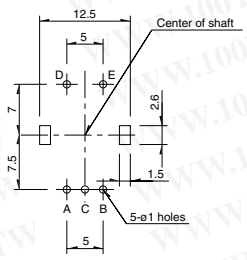
For attached parts, see P.233

# Encoder

## 11mm Size Metal Shaft Type | EC11 Series

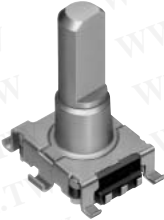
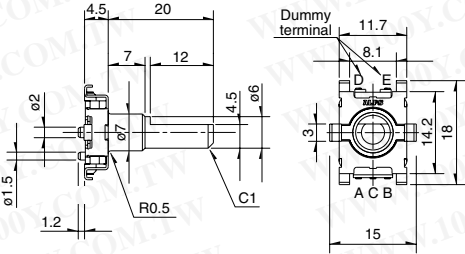
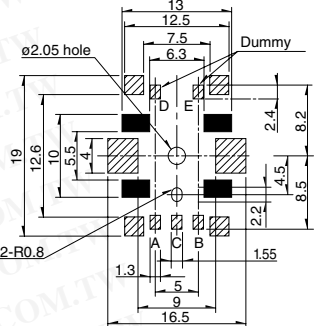

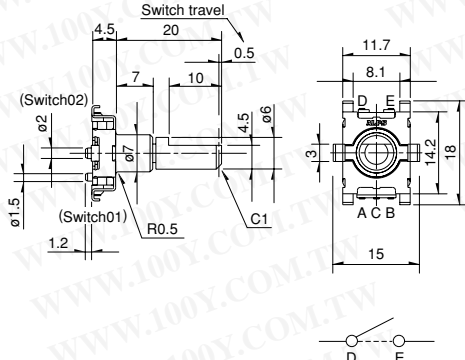
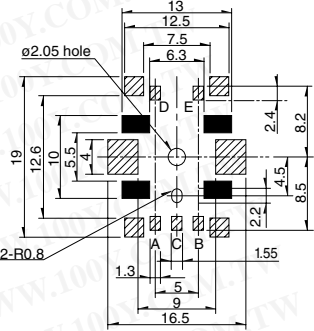

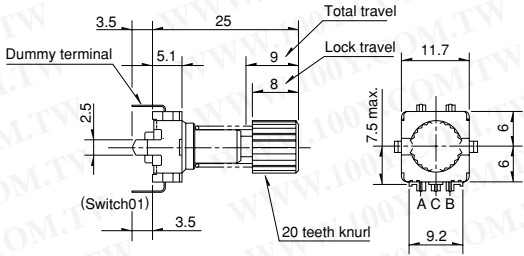
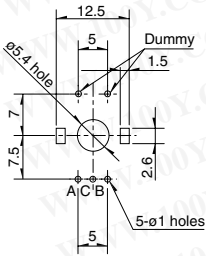

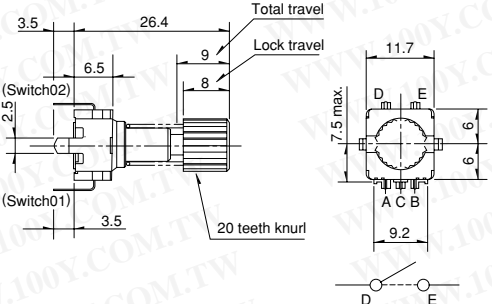
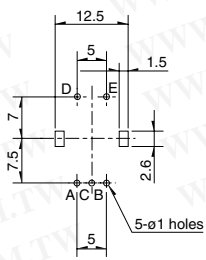
### Dimensions

Unit:mm

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

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

Multi Control  
Devices

TACT Switch™

Custom-  
Products

Incremental  
Type

Absolute  
Type

**Dimensions**

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
11			
12			
13	<p>Inside shaft: encoder Outside shaft: encoder</p>		
14	<p>Inside shaft: encoder Outside shaft : self-return switch</p>		

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

## Variety

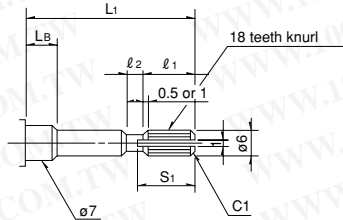
### Standard Dimensions of Shaft

#### 1. Single-shaft Type

##### 1) Knurled Type

Unit:mm

Style (Shaft diameter :  $\phi 6$ )



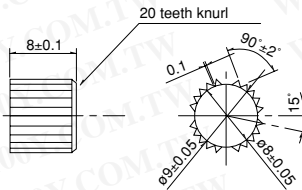
#### Detail dimensions

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

Style (Shaft diameter :  $\phi 9$ )

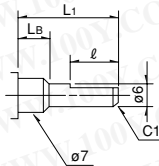
Applicable to models with a push lock mechanism and EC11G type.



##### 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

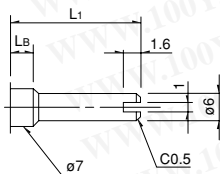
※Except EC111

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

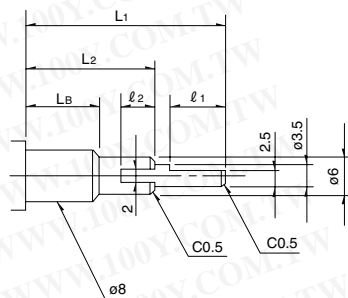
L <sub>1</sub>	L <sub>B</sub>
15	7
20	7
25	7

### 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. 192 and 193.
- Additional switches not included in the above list are also available. Contact us for details.

## Products Specifications

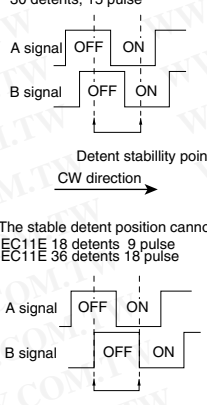
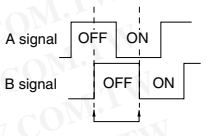
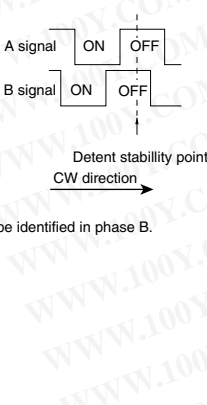
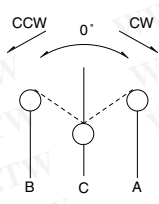
Items	EC11B		EC11E/EC11G		EC111	EC20A								
	Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch										
Detector														
Push	Operating temperature range					-30 to +85°C	-30 to +80°C							
Slide	Maximum operating current (Resistive load)					10mA	0.5mA							
Rotary	Rating					10mA 5V DC	0.5mA 5V DC							
Encoders	Electrical performance					Output signal	Output of A and B signals, proportionate to phase difference	Self-return switch	Self-return switch	Output of A and B signals, proportionate to phase difference				
Power	Insulation resistance					100MΩ min. 250V DC			10MΩ min. 50V DC					
Dual-in-line Package Type	Voltage proof					300V AC			50V AC					
Multi Control Devices	Rotational torque (without click feeling)					—	$7^{+3}_{-4}$ mN·m		3 to 30mN·m	—				
TACT Switch™	Detent torque					12±7mN·m	10±7mN·m	6±4mN·m	—	40±20mN·m				
Custom-Products	Mechanical performance					Push-pull strength					100N			
						Resistance to soldering heat					Manual soldering	350°C max. 3s max.		
											Dip soldering	260±5°C, 5±1s	—	260±5°C, 5±1s
											Reflow soldering	—	Please see P.212	—
Incremental Type	Durability					Rotational life				15,000 cycles	30,000 cycles			
Absolute Type	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		EC20A
Switch circuit · the number of contact	Single pole and single throw (Push-on)				
Travel of switch	0.5± $\frac{0.4}{0.3}$ mm	1.5±0.5mm	0.5±0.3mm	1.5±0.5mm	
Operating force of switch	6±3N	5±2N	6± $\frac{2.5}{2}$ N	4±2N	
Rating	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	EC20A													
Horizontal type	Vertical type	Vertical type Reflow type	Vertical type Self-return switch														
<p>EC11B, EC11E, EC11G 30 detents, 15 pulse</p>  <p>EC11E 18 detents 9 pulse EC11E 36 detents 18 pulse</p> 	<p>EC11B 20 detents, 20 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)																

Detector

Push

Slide

Rotary

Encoders

Power

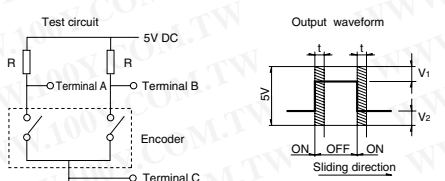
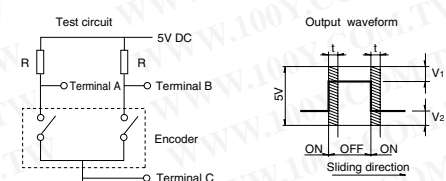
Dual-in-line Package Type

Multi Control Devices

TACT Switch™

Custom-Products

## Sliding Noise

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

Incremental Type

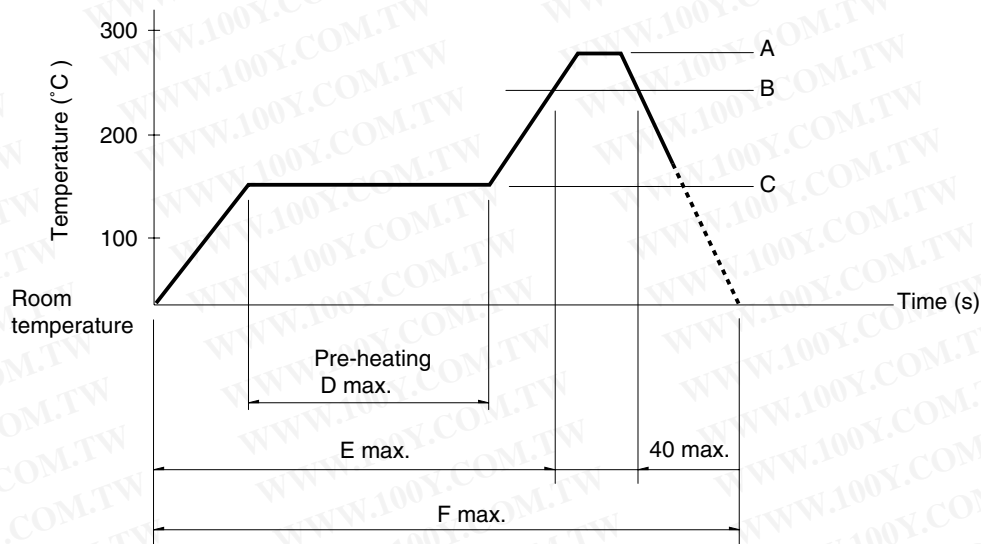
Absolute Type



## 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



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

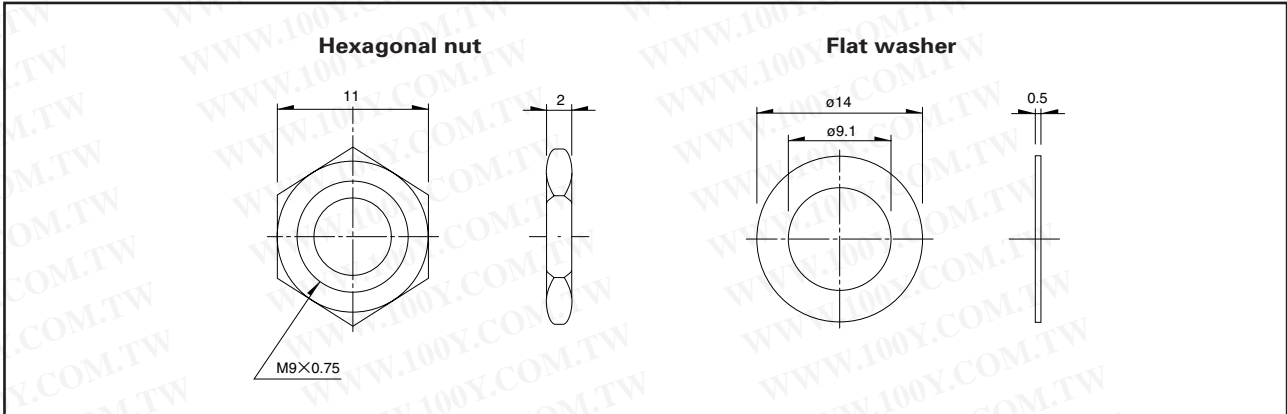
1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface 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.

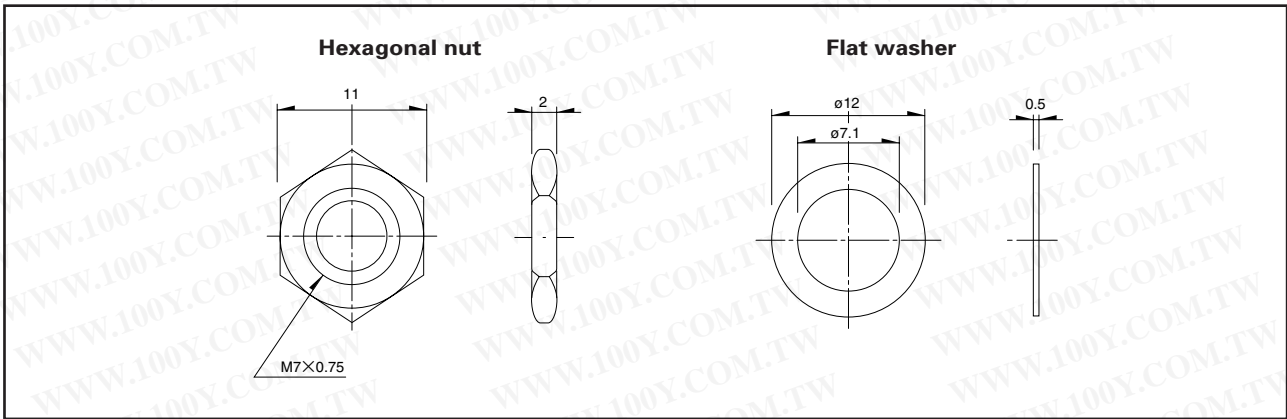
### SRGH Series

Unit:mm



### RK097, EC11B Series

Unit:mm



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Detector

Push

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Power

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