

# Encoder 11mm Size Metal Shaft Reflow Type

EC11J Series



Compact and highly reliable type type available in many varieties.



## Typical Specifications

Items	Specifications
Rating	10mA 5V DC
Operating life	100,000cycles 500,000cycles 1,000,000cycles
Operating temperature range	-40°C to +85°C

## Product Line

Structure	Actuator configuration	Actuator length (mm)	Torque (mN·m)	Number of detent	Number of pulse	Push-on switch	Travel of push-on switch (mm)	Operating life (cycles)	Minimum order unit (pcs.)	Product No.	Drawing No.
Reflow	Flat	20	12±5	18	9	Without	—	100,000	600	EC11J0920402	1
				30	15					EC11J1520402	
				18	9	With	0.5			EC11J0924411	2
				30	15					EC11J1524413	
				18	9	1.5	EC11J0925403				
				30	15		EC11J1525402				
				18	9	Without	—	500,000	600	EC11J0920602	1
				30	15					EC11J1520602	
				18	9	With	0.5	1,000,000	600	EC11J0924602	2
				30	15					EC11J1524604	
				18	9	1.5	EC11J0925602				
				30	15		EC11J1525602				
				18	9	Without	—	1,000,000	600	EC11J0920802	1
				30	15					EC11J1520803	
				18	9	With	0.5	1,000,000	600	EC11J0924802	2
				30	15					EC11J1524802	
				18	9	1.5	EC11J0925802				
				30	15		EC11J1525802				

## Notes

- The operating temperature range for automotive applications can be raised upon request. Please contact us for details.
- Please place purchase orders per minimum order unit N (integer).

## Packing Specifications

### Tray

Number of packages (pcs.)		Export package measurements (mm)
1 case /Japan	1 case /export packing	
300	600	369 × 283 × 263

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

Metal  
Shaft

Insulated  
Shaft

Hollow  
Shaft

Ring  
Type




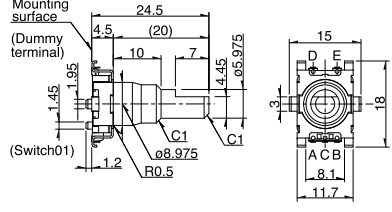
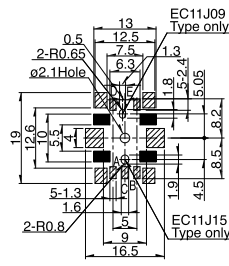
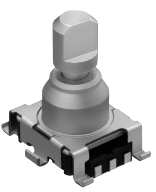
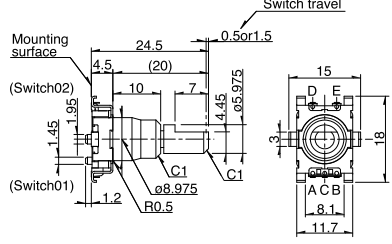
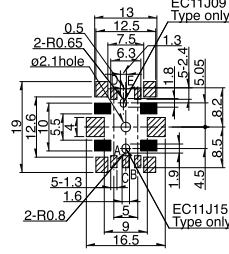
Automotive  
Use

Refer to P.212 for product varieties.  
Refer to P.217 for product specifications.  
Refer to P.212 for soldering conditions.

**Dimensions**

Unit:mm

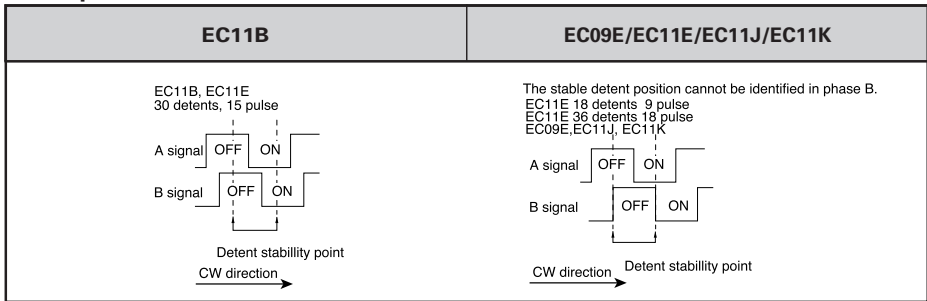
- Detector
- Push
- Slide
- Rotary
- Encoders
- Power
- Dual-in-line  
Package Type
- TACT Switch™
- Custom-  
Products
- Metal  
Shaft
- Insulated  
Shaft
- Hollow  
Shaft
- Ring  
Type

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1	<p><b>Reflow applicable parts</b></p> 		 <p>PC board mounting detail  A slant line part shows the solder land black part:  Do not solder and wiring for electrical contact</p>
2	<p><b>Reflow applicable parts with push-on switch (travel 0.5mm/1.5mm)</b></p> 		 <p>PC board mounting detail  A slant line part shows the solder land black part:  Do not solder and wiring for electrical contact</p>

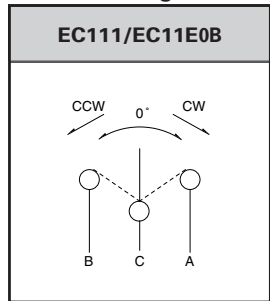


# Product Specifications

## Output Wave



## Circuit Diagram



Detector

Push

Slide

Rotary

Encoders

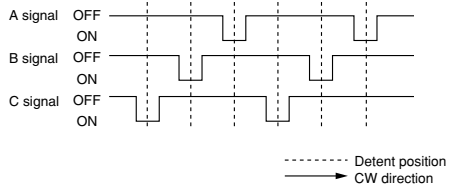
Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

## EC11EH

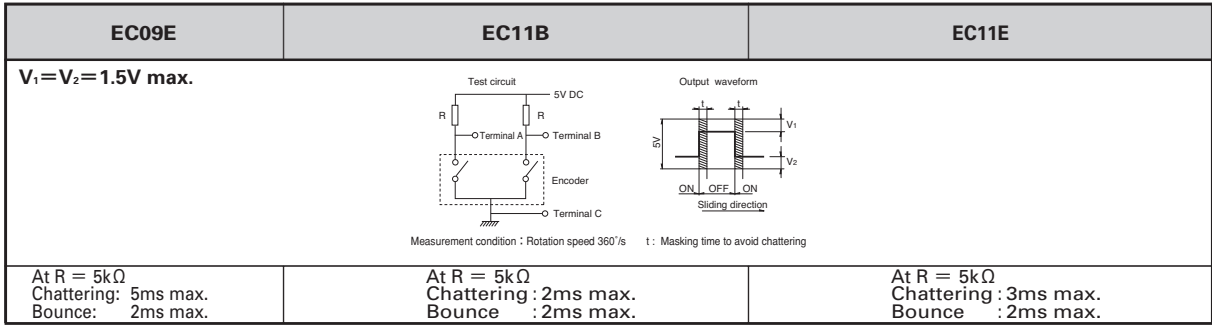


## EC20A

Shaft rotational Direction	Signal	Output
Clockwise	A (Terminal A-C)	OFF ON
	B (Terminal B-C)	OFF ON
Counter-clockwise	A (Terminal A-C)	OFF ON
	B (Terminal B-C)	OFF ON

The dotted lines indicate detent positions

## Sliding Noise



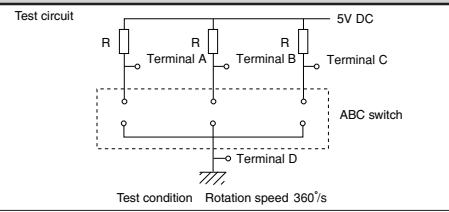
Metal  
Shaft

Insulated  
Shaft

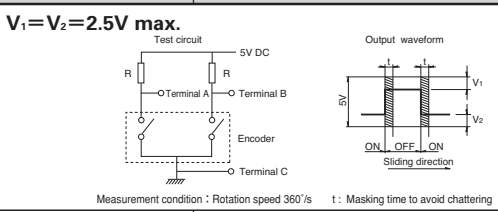
Hollow  
Shaft

Ring  
Type

## EC11EH



## EC20A



## EC11J/EC11K

At  $R = 5k\Omega$   
Chattering: 8ms max.  
Bounce: 5ms max.

At  $R = 5k\Omega$   
Chattering: 3ms max.  
Bounce: 2ms max.

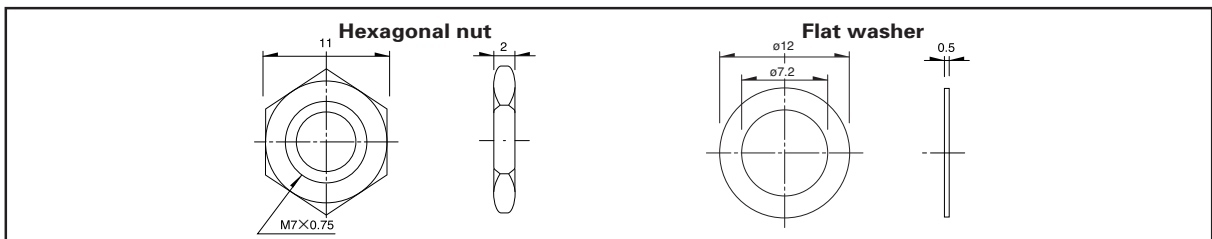


Automotive  
Use





# Attached Parts

## EC11B Series

Unit:mm



## List of Varieties

Type		Metal shaft			
		11mm size		20mm size	
Series		EC11K	EC11J	EC20A/RK203	EM20B
Photo					
Output		Incremental			
Outline specifications	Shaft types	Single-shaft			
	Operating direction	Vertical			
	Number of pulse/ Number of detent	9/18 15/30		18/18	40/40
	Push switch (Travel mm)	Without With (0.5, 1.5)		Without With (1.5)	Without With (0.5)
	Optional function	—————			Display function
Dimensions (mm)	W	11.7		20.2	20
	D	12	14.2	19.2	22.25
	H	4.5		10	13
Soldering	Manual soldering	350°C max. 3s max.			
	Dip soldering	260±5°C, 3±1s	—————	260±5°C, 5±1s	260°C max. 3s max.
	Reflow soldering	—————	Please see P.212	—————	—————
Operating temperature range		-40°C to +85°C			-10°C to +70°C
Automotive use		○	○	○	—
Maximum operating current (Resistive load)		10mA			—————
Electrical performance	Output signal	Output of A and B signals, proportionate to phase difference			$V_{HI} : +4.0V \text{ min.}$ $V_{LO} : 0.5V \text{ max. (Isink=5mA)}$
	Output wave	Please see P.217			—————
	Output phase	—————			A, B (Squarewave)
	Sliding noise	Please see P.217			—————
	Insulation resistance	100MΩ min. 250V DC		10MΩ min. 50V DC	100MΩ min. 250V DC
	Voltage proof	300V AC for 1minute		50V AC for 1minute	300V AC for 1minute
Mechanical performance	Rotational torque	—————			7mN·m max.
	Detent torque	12±5mN·m		40±20mN·m	8±5mN·m
	Push-pull strength	100N			
Environmental performance	Cold	-40±2°C for 240h		-40±3°C for 240h	-30±3°C for 240h
	Dry heat	85±2°C for 240h		85±3°C for 240h	80±3°C for 240h
	Damp heat	60±2°C, 90 to 95% RH for 240h		60±3°C, 90 to 95%RH for 240h	40±2°C, 90 to 95%RH for 240h
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## Push-on Switch Specifications

Items	EC11K/EC11J		EC20A	EM20B
Contact arrangement	Single pole and single throw (Push-on)			
Travel (mm)	0.5±0.3	1.5±0.5		0.5 <sup>+0.4</sup> <sub>-0.3</sub>
Operating force (N)	5±2	4±2		6±3
Rating	0.1A 5V DC		0.5A 16V DC (1mA 16V DC min. ratings)	0.1A 5V DC
Contact resistance	100mΩ for initial period; 200mΩ after operating life			
Operating life	1,000,000 times min.	100,000 times min.	20,000times min.	25,000times min.

## Note

○marks in "Available for automotive use" indicate that some of the series products can work at the operating temperature range from -40°C to +85°C.

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
ProductsMetal  
ShaftInsulated  
ShaftHollow  
ShaftRing  
Type

## Product Varieties

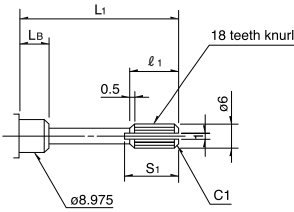
### Shaft Dimensions

#### 1. Single-shaft Type

##### 1) Knurled Type

Unit:mm

Configuration (Shaft diameter:  $\phi 6$ )



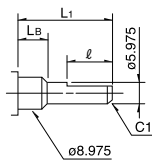
**Detailed dimensions**

L <sub>1</sub>	L <sub>B</sub>	l <sub>1</sub>	S <sub>1</sub>
15	5	6	7
20	10	6	7

##### 2) Flat Type

Unit:mm

Configuration (Shaft diameter:  $\phi 5.975$ )



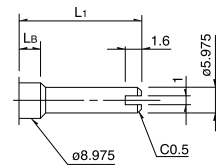
**Detailed dimensions**

L <sub>1</sub>	L <sub>B</sub>	l
15	7	5
20	10	7

##### 3) Slotted Type

Unit:mm

Configuration (Shaft diameter:  $\phi 5.975$ )



**Detailed dimensions**

L <sub>1</sub>	L <sub>B</sub>
15	7
20	10

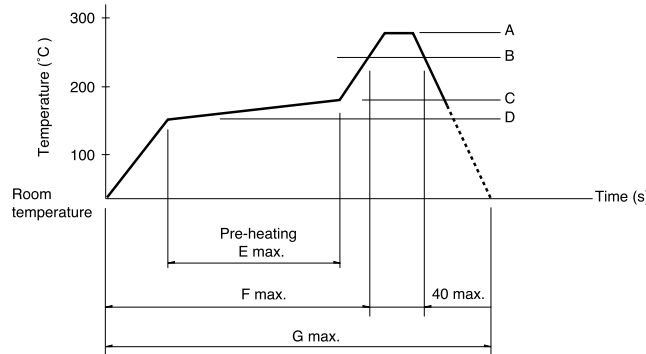
### Notes

- The highlighted figures in shaft types refer to Product Specifications in P.215.
- Products other than those listed in the above chart are also available. Please contact us for details

## Soldering Conditions

### Example of Reflow Soldering Condition

- Heating method: Double heating method with infrared heater.
- Temperature measurement: Thermocouple 0.1 to 0.2 $\phi$  CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.
- Temperature profile



Series (Reflow type)	A (°C) 3s max.	B (°C)	C (°C)	D (°C)	E (s)	F (s)	G (s)
EC11J	260	230	180	150	120	—	240

### Notes

- 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.
- Soldering conditions differ depending on reflow soldering machines. You are requested to verify the soldering conditions thoroughly beforehand.

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

Metal  
Shaft

Insulated  
Shaft

Hollow  
Shaft

Ring  
Type