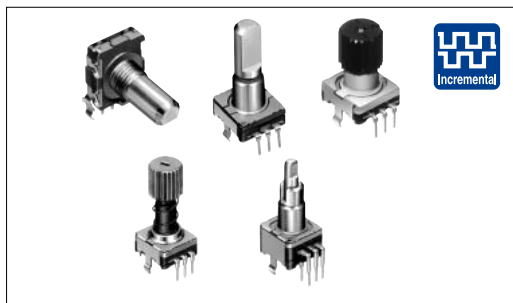


# Encoder 11mm Size Metal Shaft Type

EC11 Series



Compact and highly reliable type available in many varieties.



## Typical Specifications

Items	Specifications
Rating	10mA 5V DC
Operating life	15,000cycles EC11EH:30,000cycles

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

Incremental  
Type

Absolute  
Type

## 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.
Horizontal			12 ± 7	30	15	Without	—	15,000	700	EC11B15202AA	1
						With	0.5			EC11B15242AE	2
							1.5			EC11B15242AF	3
Vertical	Flat	20	10 ± 7	18	9	Without	—	15,000	1,200	EC11E09204A4	4
				30	15					EC11E15204A3	
				Without	18					EC11E1530401	
			10 ± 7	36	18	Without	—			EC11E1820402	
			7 <sup>+3</sup> / <sub>-4</sub>	Without						EC11E1830401	
			10 ± 7	18	9	With	0.5			EC11E09244BS	5
			30	15	EC11E15244G1						
			7 <sup>+3</sup> / <sub>-4</sub>	Without	18					EC11E153440D	
			10 ± 7	36	18	Without	—			EC11E18244AE	
			7 <sup>+3</sup> / <sub>-4</sub>	Without						18	
			10 ± 7	18	9	With	1.5			EC11E09244AQ	
			30	15	EC11E15244B2						
			7 <sup>+3</sup> / <sub>-4</sub>	Without	18					EC11E1534408	
			10 ± 7	36	18	Without	—			EC11E18244A5	
			7 <sup>+3</sup> / <sub>-4</sub>	Without						18	

**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.
Detector	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	
Push	Push lock	20-tooth serration	25	10 ± 7	30	15	Without	—	1,000	EC11E152T409	7
Slide										26.4	30
Rotary	Self-return switch	20-tooth serration	15	3 to 30	Without	Self-return switch	Without	—	1,200	EC1110120005	9
Encoders										Flat	20
	1.5	EC1110120201									
Power	ABC switch	Flat	20	10 ± 7	18	ABC switch	With	0.5	30,000	EC11EH124403	11
Dual-in-line Package Type										30	
TACT Switch™	18	0.5	EC11EH124404								
Custom-Products	30		EC11EH224404								
Dual-shaft	Slotted	Inner-shaft=25	30	30	15	Without	-	15,000	1,200	EC11EBB24C03	12
		Outer-shaft=15								With	
	Flat	Inner-shaft=25	Without	-	700	EC11E0B2LB01	13				
	Slotted	Outer-shaft=15	3 to 30	Without	Self-return switch	Without	-				

**Note**

Products other than those listed in the above chart are also available. Please contact us for details.

Incremental Type

Absolute Type

Refer to P.191 for product varieties.  
Refer to P.191 for attached parts.

Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1			
2			
3			
4			
5			

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™





Custom-  
Products

Incremental  
Type

Absolute  
Type


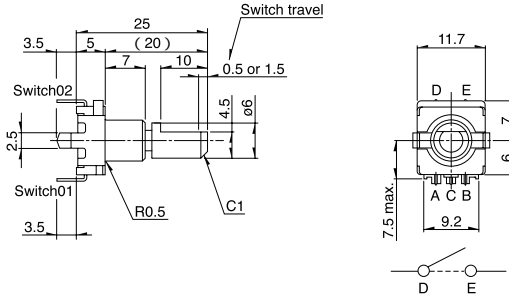
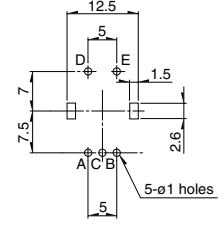
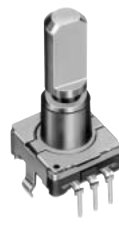
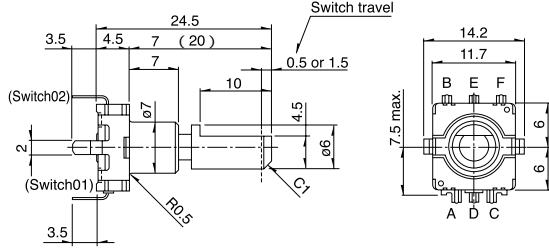
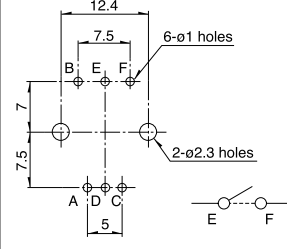
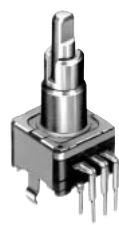
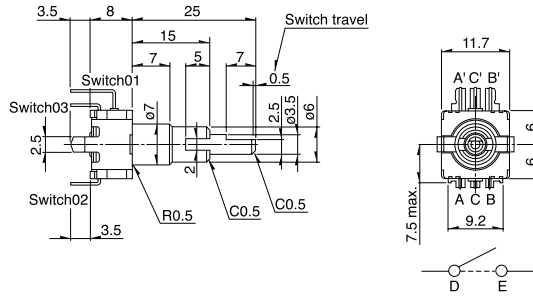
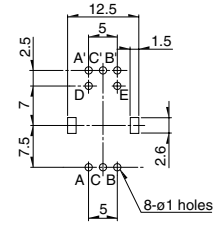
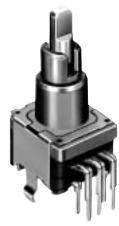
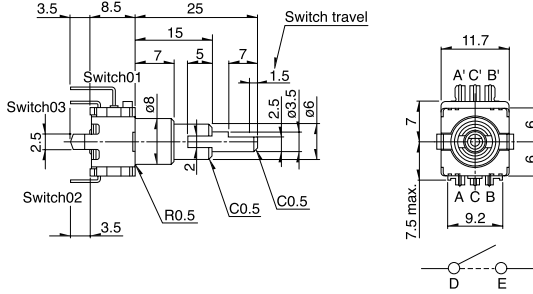
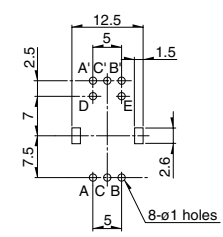
Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
6	<p><b>Less shaft wobble with push-on switch (travel 1.5mm)</b></p> 		
7	<p><b>Push-lock mechanism</b></p> 		
8	<p><b>Push-lock mechanism with push-lock switch</b></p> 		
9	<p><b>Self-return switch</b></p> 		

**Dimensions**

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
10	<p><b>Self-return switch with push-on switch (travel 0.5mm/1.5mm)</b></p> 		
11	<p><b>ABC switch with push-on switch (travel 0.5mm/1.5mm)</b></p> 		
12	<p><b>Dual-shaft type with push-on switch (travel 0.5mm)                      Inner shaft: encoder                      Outer shaft: encoder</b></p> 		
13	<p><b>Dual-shaft type with push-on switch (travel 1.5mm)                      Inner shaft: encoder                      Outer shaft: self-return switch</b></p> 		

Detector

Push

Slide

Rotary

**Encoders**

Power

Dual-in-line  
 Package Type

TACT Switch™

Custom-  
 Products

Incremental  
 Type

Absolute  
 Type

## Product Varieties

### Shaft Dimensions

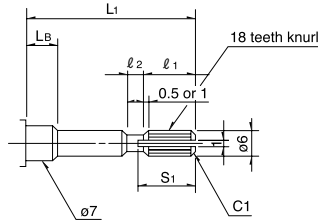
#### 1. Single-shaft Type

##### 1) Knurled Type

Unit:mm

Configuration ( Shaft diameter : 6 )

Not applicable for EC11E with push-lock mechanism and EC11G



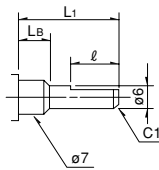
##### Detailed dimensions

L <sub>1</sub>	L <sub>B</sub>	l <sub>1</sub>	l <sub>2</sub>	S <sub>1</sub>
20	7	6	1	7
25	7	10	2	11

##### 2) Flat Type

Unit:mm

Configuration ( Shaft diameter : 6 )



##### Detailed dimensions

L <sub>1</sub>	L <sub>B</sub>	l
15	5	7
15	7	5( 6 )
20	7	10( 12 )
25	7	12

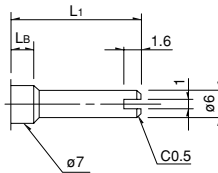
Does not comply with EC111

Dimensions marked with ( ) apply to products without push-on switches.

##### 3) Slotted Type

Unit:mm

Configuration ( Shaft diameter : 6 )



##### Detailed dimensions

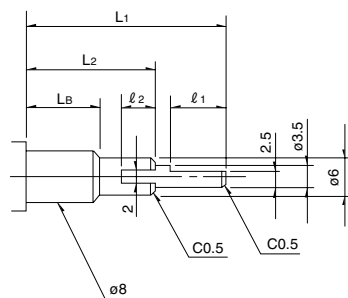
L <sub>1</sub>	L <sub>B</sub>
15	7
20	7
25	7

#### 2. Standard Dimensions and configuration of Dual-shaft Type

##### 1) Flat Type

Unit:mm

Configuration ( Inner-shaft : 3.5 Outer-shaft : 6 )



##### Detailed 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 highlighted figures in shaft types refer to Product Specifications in P.181 and P.182.
- Products other than those listed in the above chart are also available. Please contact us for details








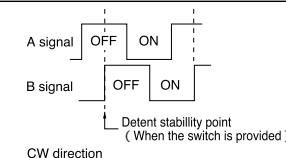
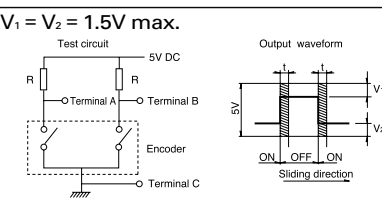
# List of Varieties

Type	Metal shaft										
	9mm size		11mm size								
Series	EC09E		EC11B	EC11E		EC111	EC11EH				
Detector	Photo										
Push	Incremental										
Slide	Single-shaft				Dual-shaft	Self-return switch					
Rotary	Vertical		Horizontal	Vertical							
Encoders	Number of pulse/ Number of detent	15/30		9/18 15/30 18/36		6×ABC/18 10×ABC/30					
	Push switch (Travel mm)	Without/With( 0.5, 1.5 )									
	Optional functions			Push-lock mechanism Without detent							
	Changeover angle					17 to 40°					
Dimensions (mm)	W	9.5		12.3	11.7						
	D			13.8	12	13	12				
	H	4.5		5.4	4.5	8.5	5	4.5			
Soldering	Manual soldering	350 max. 3s max.									
	Dip soldering	260 ± 5 , 3 ± 1s		260 ± 5 , 5 ± 1s							
Operating temperature range	-40 to +85			-30 to +85		-40 to +85					
Maximum operating current( Resistive load)	10mA										
Electrical performance	Output signal	Output of A and B signals, proportionate to phase difference				Self-return switch	Three phase A, B and C				
	Output wave			Please see P.191							
	Sliding noise			Please see P.191							
	Insulation resistance	100M min. 250V DC									
	Voltage proof	300V AC for 1minute									
	At R = 5 k Chattering:5ms max. Bounce :2ms max.										
Mechanical performance	Rotational torque			7 ± 3/4 mN·m		3 to 30mN·m					
	Detent torque	8 ± 5mN·m		12 ± 7mN·m	10 ± 7mN·m		10 ± 7mN·m				
	Push-pull strength	100N									
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	Circuit · number of contacts	Single pole and single throw( Push-on )									
	Travel( mm )	0.5 ± 0.3	1.5 ± 0.5	0.5 ± 0.4 0.3	1.5 ± 0.5	0.5 ± 0.3	1.5 ± 0.5	0.5 ± 0.4 0.3	1.5 ± 0.5		
	Operating force( N )	6 ± 2.5	4 ± 2	6 ± 3	5 ± 2	6 ± 2.5	4 ± 2	6 ± 2.5	4 ± 2		
	Rating	10mA 5V DC		3A 16V DC (10mA 16V DC min. ratings)		0.5A 16V DC( 1mA 16V DC min. ratings )		0.5A 12V DC		20mA 16V DC (1mA 16V DC min. ratings)	
	Contact esistance	100m max. for initial period; 200m max. after operating life.									
	Operating life	10,000times min.		25,000 times min.	20,000times min. 10,000times min.		20,000 cycles				
Page	180			181							

**Note**

marked specification is only applicable to EC11E152U402.

# List of Varieties

Type	Metal shaft					Insulated shaft			
	11mm size			20mm size	12mm size				
Series	EC11G	EC11J	EC11K	EC20A/RK203	EC12E Standard detent	EC12E Without detent	EC12D With push-on switch		
Photo									
Output	Incremental								
Outline specifications	Shaft types	Single-shaft							
	Operating direction	Vertical							
	Number of pulse/ Number of detent	15/30	9/18 15/30		18/18	12/12 24/24	15/30		
	Push switch (Travel mm)	Without With( 1.5 )	Without With( 0.5, 1.5 )		Without With( 1.5 )	Without	With( 0.5 )		
	Optional functions	_____							
	Changeover angle	_____							
Dimensions (mm)	W	11.7			2.0	12.4	12.5		
	D	12	14.2		19.2	13.2	11.7		
	H	4.5			10	5			
Soldering	Manual soldering	350 max. 3s max.							
	Dip soldering	260 ± 5 , 5 ± 1s	_____	260 ± 5 , 5 ± 1s		260 ± 5 , 3 ± 1s			
	Reflow soldering	_____	Please see P.189						
Operating temperature range	-30 to +85	-40 to +85		-30 to +80	-10 to +70	-40 to +85			
Maximum operating current( Resistive load)	10mA			1mA	5mA	10mA			
Electrical performance	Output signal	Output of A and B signals, proportionate to phase difference							
	Output wave	Please see P.191							
	Sliding noise	Please see P.191				<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 = 10k Chattering : 3ms max. Bounce : 2ms max. At R = 5k Chattering : 3ms max. Bounce : 2ms max.</p>			
	Insulation resistance	100M min. 250V DC			10M min. 50V DC		100M min. 250V DC		
	Voltage proof	300V AC for 1minute			50V AC for 1minute		300V AC for 1minute or 360V AC for 1s.		
Mechanical performance	Rotational torque	$7 \pm \frac{3}{4} mN \cdot m$		_____		$10 mN \cdot m$ max. $25 \pm 15 mN \cdot m$ $40 \pm 15 mN \cdot m$			
	Detent torque	$10 \pm 7 mN \cdot m$		$12 \pm 5 mN \cdot m$		$40 \pm 20 mN \cdot m$			
	Push-pull strength	100N			80N		100N		
Environmental performance	Cold	-40 ± 3 for 240h			-40 ± 3 for 240h ± 10h				
	Dry heat	85 ± 3 for 240h			85 ± 3 for 240h ± 10h				
	Damp heat	60 ± 2 , 90 to 95% RH for 240h			60 ± 2 , 90 to 95%RH for 240h ± 10h				
Push-on Switch Specifications	Circuit · number of contacts	Single pole and single throw ( Push-on )					Single pole and single throw ( Push-on )		
	Travel(mm)	$0.5 \pm 0.3$	$1.5 \pm 0.5$	$0.5 \pm 0.3$	$1.5 \pm 0.5$	$0.5 \pm 0.3$	$0.5 \pm 0.3$		
	Operating force(N)	$6 \pm \frac{2}{5}$	$4 \pm 2$	$5 \pm 2$	$4 \pm 2$	$5 \pm 2$	$3 \pm \frac{1.5}{1.0}$   $6 \pm \frac{2.5}{2}$		
	Rating	0.5A 16V DC (1mA 16V DC min. ratings)		0.1A 5V DC		0.5A 16V DC (1mA 16V DC min. ratings)		1mA 5V DC	
	Contact esistance	100m for initial period; 200m after operating life					100m for initial period; 200m after operating life		
	Operating life	20,000times min.	1,000,000 times min.	500,000 times min.	1,000,000 times min.	100,000 times min.	20,000times min.		
Page	181		187		190		192		

- Detector
- Push
- Slide
- Rotary
- Encoders
- Power
- Dual-in-line Package Type
- TACT Switch™
- Custom-Products

- Incremental Type
- Absolute Type



# Product Specifications

## Output Wave

EC11B	EC11E/EC11G/EC11J/EC11K	EC111/EC11E												
<p>EC11B, EC11E, EC11G 30 detents, 15 pulse</p> <p>A signal OFF ON B signal OFF ON</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 EC11J, EC11K</p> <p>A signal OFF ON B signal OFF ON</p> <p>CW direction → Detent stability point</p>	<p>CCW 0° CW</p> <p>B C A</p>												
EC11EH	EC20A													
<p>A signal OFF ON B signal OFF ON C signal OFF ON</p> <p>----- Detent position → 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>OFF ON</td> </tr> <tr> <td>B( Terminal B-C )</td> <td>OFF ON</td> </tr> <tr> <td rowspan="2">Counter-clockwise</td> <td>A( Terminal A-C )</td> <td>OFF ON</td> </tr> <tr> <td>B( Terminal B-C )</td> <td>OFF ON</td> </tr> </tbody> </table> <p>The dotted lines indicate detent positions</p>	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
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												

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

## Sliding Noise

EC11B	EC11E/EC11G/EC11J/EC11K	EC111/EC11E
<p><math>V_1 = V_2 = 1.5V \text{ max.}</math></p> <p>Test circuit 5V DC R Terminal A Terminal B Encoder Terminal C</p> <p>Output waveform 5V V1 V2 ON OFF ON Sliding direction</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p> <p>At R = 5k Chattering : 2ms max. Bounce : 2ms max.</p>	<p><math>V_1 = V_2 = 1.5V \text{ max.}</math></p> <p>Test circuit 5V DC R Terminal A Terminal B Encoder Terminal C</p> <p>Output waveform 5V V1 V2 ON OFF ON Sliding direction</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p> <p>At R = 5k Chattering : 3ms max. Bounce : 2ms max.</p>	
EC11EH	EC20A	
<p><math>V_1 = V_2 = 1.5V \text{ max.}</math></p> <p>Test circuit 5V DC R Terminal A Terminal B Terminal C ABC switch Terminal D</p> <p>Test condition : Rotation speed 360°/s</p> <p>At R = 5k Chattering : 5ms max. Bounce : 5ms max.</p>	<p><math>V_1 = V_2 = 1.5V \text{ max.}</math></p> <p>Test circuit 5V DC R Terminal A Terminal B Encoder Terminal C</p> <p>Output waveform 5V V1 V2 ON OFF ON Sliding direction</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p> <p>At R = 5k Chattering : 8ms max. Bounce : 5ms max.</p>	

Incremental  
Type

Absolute  
Type

# Attached Parts

## EC11B Series

Unit:mm

Hexagonal nut	Flat washer
<p>11 2 M7 x 0.75</p>	<p>ø12 ø7.1 0.5</p>