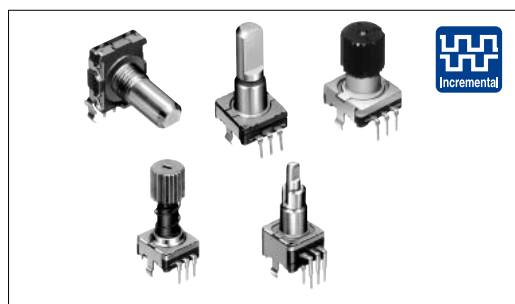


# Encoder 11mm Size Metal Shaft Type

## 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	Flat	20	12 ± 7	30	15	Without	—		700	EC11B15202AA	1
						With	0.5			EC11B15242AE	2
							1.5			EC11B15242AF	3
Vertical			10 ± 7	18	9	Without	—	15,000	1,200	EC11E09204A4	4
				30	15					EC11E15204A3	
				7 <sup>+3</sup> <sub>-4</sub>						Without	
			10 ± 7	36	18	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	
			10 ± 7	36	18	EC11E18244AE					
			7 <sup>+3</sup> <sub>-4</sub>	Without		EC11E1834404					
			10 ± 7	18	9	1.5	EC11E09244AQ				
				30	15		EC11E15244B2				
				7 <sup>+3</sup> <sub>-4</sub>			Without			EC11E1534408	
	10 ± 7	36	18	EC11E18244A5							
	7 <sup>+3</sup> <sub>-4</sub>	Without		EC11E1834403							

Encoder 11mm Size Metal Shaft Type   EC11 Series												
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	15,000	1,200	EC11G1524402	6
				7 <sup>+3</sup> <sub>-4</sub>	Without					EC11G1534403		
Push	Push lock		25	10 ± 7	30		Without	—		1,000	EC11E152T409	7
Slide			26.4				With	8		800	EC11E152U402	8
Rotary	Self-return switch	Flat	15	3 to 30	Without	Self-return switch	Without	—	1,200	EC1110120005	9	
Encoders							0.5	1.5		EC1110120103	10	
			EC1110120201									
Power	ABC switch		20	10 ± 7	18	ABC switch	With	0.5	30,000	1,000	EC11EH124403	11
Dual-in-line Package Type											EC11EH224403	
TACT Switch™								1.5			EC11EH124404	
											EC11EH224404	
Custom-Products	Dual-shaft		Inner-shaft=25	30	30	15	0.5	15,000	1,200	EC11EBB24C03	12	
Slotted		Outer-shaft=15	-									
		Flat	Inner-shaft=25				With		1.5	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												

## Dimensions

Unit:mm

[illegible]

### Detector

## Push

## Slide

## Rotary

## Encoders

## Power

Dual-in-line  
Package Type

TACT Switch™


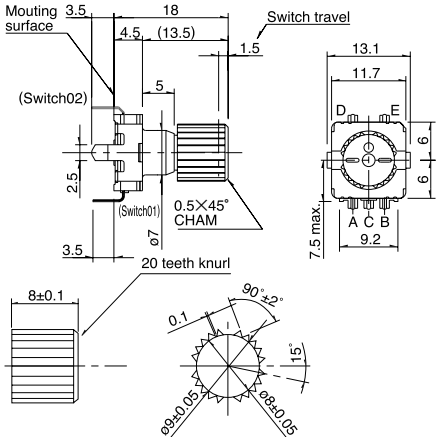
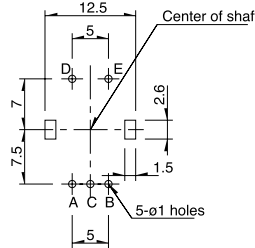

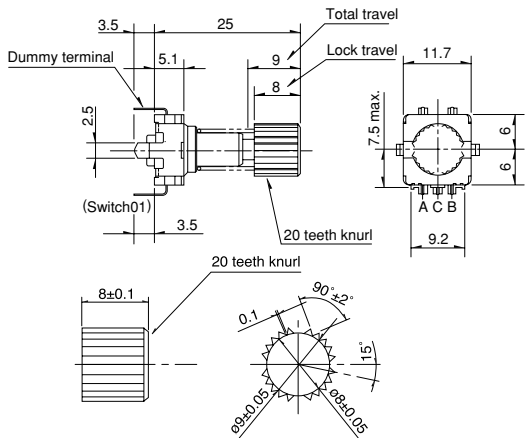
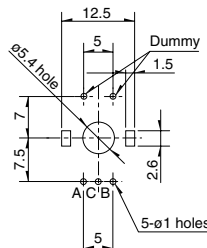

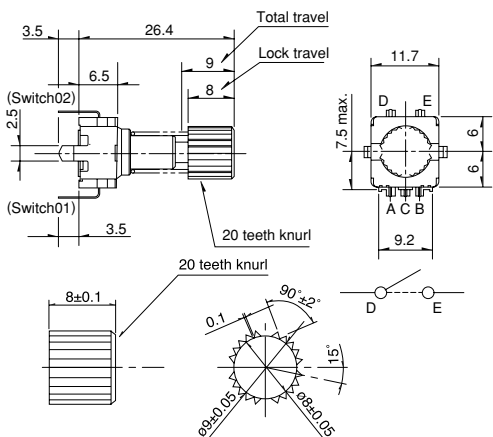
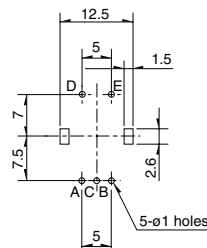

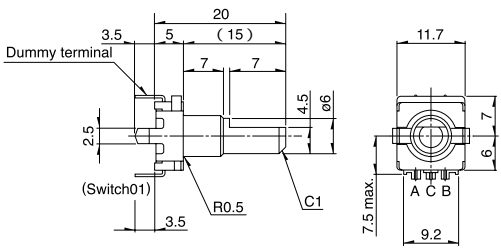
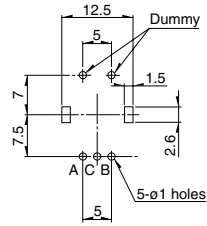
## Custom-Products

Incremental  
Type

**Absolute Type**


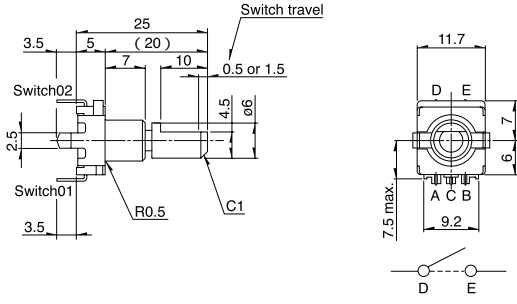
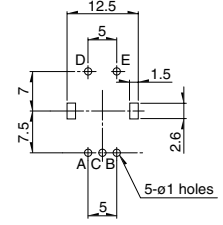
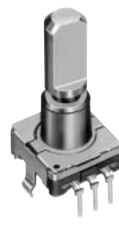
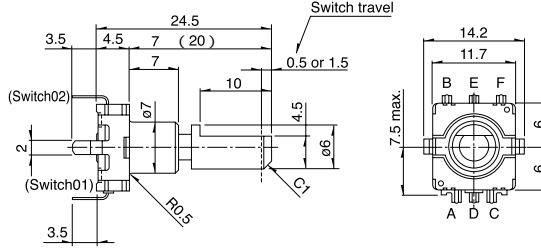
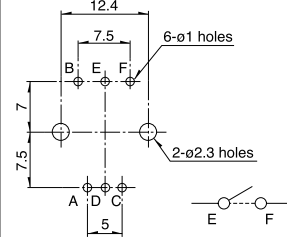
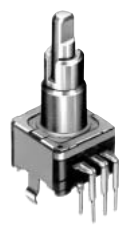
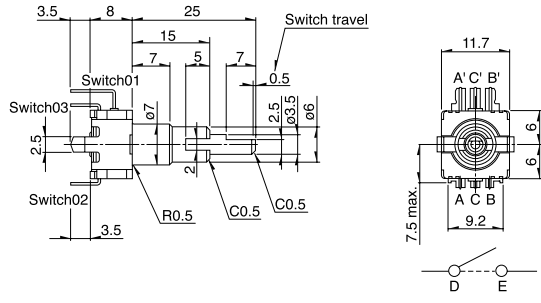
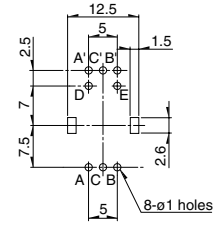
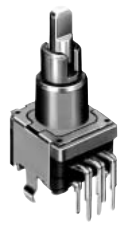
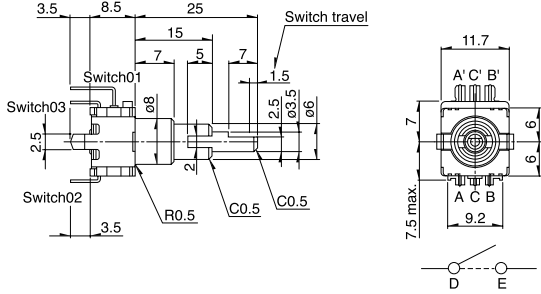
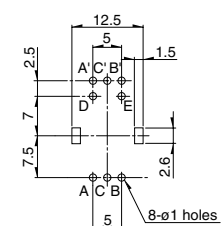
Dimensions

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

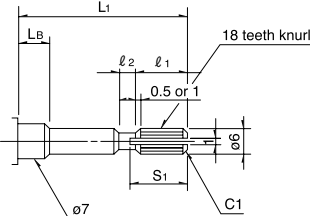
Shaft Dimensions

1. Single-shaft Type

1 ) Knurled Type Unit:mm

Configuration ( Shaft diameter : 6 )

Not applicable for EC11E with push-lock mechanism and EC11G

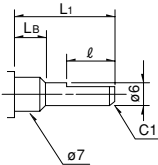


Detailed dimensions

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

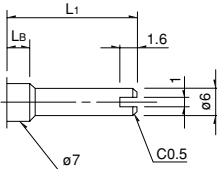
L <sub>1</sub>	L <sub>B</sub>	ℓ
15	5	7
15	7	5( 6 )
20	7	10( 12 )
25	7	12

Does not comply with EC111

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

3 ) Slotted Type Unit:mm

Configuration ( Shaft diameter : 6 )



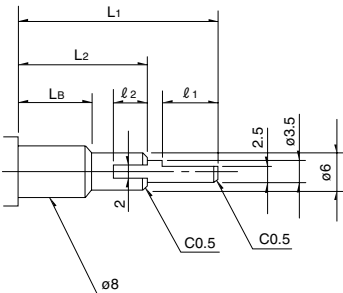
Detailed dimensions

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 )








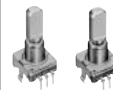
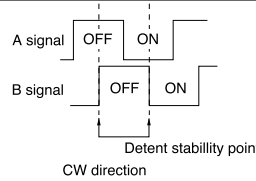
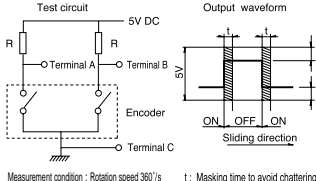
Detailed dimensions

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

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







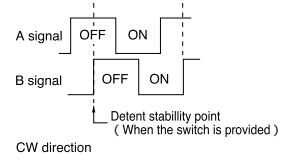
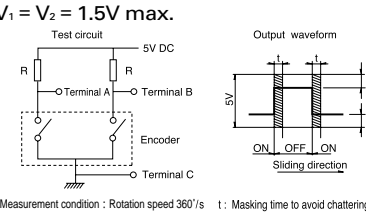
## List of Varieties

Type		Metal shaft									
		9mm size		11mm size							
Series		EC09E		EC11B	EC11E		EC111	EC11EH			
Photo											
Output		Incremental						Self-return switch	ABC		
Outline specifications	Shaft types	Single-shaft				Dual-shaft		Single-shaft			
	Operating direction	Vertical		Horizontal		Vertical					
	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	<p>V<sub>1</sub> = V<sub>2</sub> = 1.5V max.</p>  <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p> <p>At R = 5 k Chattering: 5ms max. Bounce : 2ms max.</p>			Please see P.191						
	Insulation resistance	100M min. 250V DC									
	Voltage proof	300V AC for 1minute									
Mechanical performance	Rotational torque				7 $\pm$ $\frac{3}{4}$ 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 $\pm$ $\frac{0.4}{0.3}$	1.5 ± 0.5	0.5 ± 0.3	$\frac{1.5 \pm 0.5}{8 \pm 0.8}$	0.5 ± 0.3	1.5 ± 0.5	0.5 $\pm$ $\frac{0.4}{0.3}$	1.5 ± 0.5
	Operating force( N )	6 $\pm$ $\frac{2.5}{2}$	4 ± 2	6 ± 3	5 ± 2	6 $\pm$ $\frac{2.5}{2}$	$\frac{4 \pm 2}{8 \text{ max.}}$	6 $\pm$ $\frac{2.5}{2}$	4 ± 2	6 ± 2.5	4 ± 2
	Rating	10mA 5V 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	EC12D	
						Standard detent    Without detent	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.</p> <p>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	$7 \pm \frac{3}{4} \text{ mN} \cdot \text{m}$				$10 \text{ mN} \cdot \text{m}$ max. $25 \pm 15 \text{ mN} \cdot \text{m}$ $40 \pm 15 \text{ mN} \cdot \text{m}$	
	Detent torque	$10 \pm 7 \text{ mN} \cdot \text{m}$		$12 \pm 5 \text{ mN} \cdot \text{m}$		$40 \pm 20 \text{ mN} \cdot \text{m}$	$3 \pm 2 \text{ mN} \cdot \text{m}$ 3 to 20mN·m	$5 \pm 3 \text{ mN} \cdot \text{m}$ $10 \pm 5 \text{ mN} \cdot \text{m}$
	Push-pull strength	100N				80N		100N
Environmental performance	Cold	$-40 \pm 3$ for 240h				$-40 \pm 3$ for 240h ± 10h		
	Dry heat	$85 \pm 3$ for 240h				$85 \pm 3$ for 240h ± 10h		
	Damp heat	$60 \pm 2$ , 90 to 95% RH for 240h				$60 \pm 2$ , 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 )	$0.5 \pm 0.3$	$1.5 \pm 0.5$	$0.5 \pm 0.3$	$1.5 \pm 0.5$	$0.5 \pm 0.3$	$1.5 \pm 0.5$	
	Operating force( N )	$6 \pm \frac{2.5}{2}$	$4 \pm 2$	$5 \pm 2$	$4 \pm 2$	$5 \pm 2$	$4 \pm 2$	
	Rating	$0.5A$ 16V DC (1mA 16V DC min. ratings)		$0.1A$ 5V DC		$0.5A$ 16V DC (1mA 16V DC min. ratings)		
	Contact esistance	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-  
ProductsIncremental  
TypeAbsolute  
Type



## Product Specifications

### Output Wave

EC11B	EC11E/EC11G/EC11J/EC11K	EC111/EC11E													
<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. EC11E 18 detents 9 pulse EC11G 36 detents 18 pulse EC11J, EC11K</p> <p>Detent stability point CW direction</p>														
EC11EH	EC20A														
<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>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>At R = 5k Chattering : 3ms max. Bounce : 2ms max.</p>	
EC11EH	EC20A	
<p>Test circuit</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>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  
TypeAbsolute  
Type

## Attached Parts

### EC11B Series

Unit:mm

Hexagonal nut	Flat washer