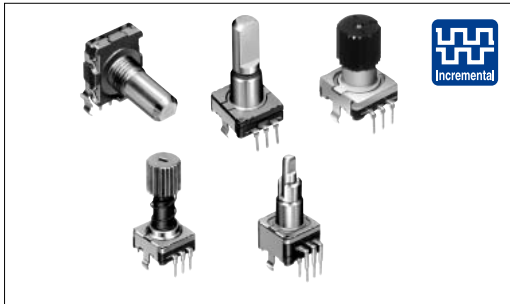


# Encoder 11mm Size Metal Shaft Type

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	With	0.5			EC11E1820402			
				7 <sup>+3</sup> / <sub>-4</sub>							Without	EC11E1830401	
											10 ± 7	18	9
			10 ± 7	30	15	With	1.5			EC11E15244G1			
				7 <sup>+3</sup> / <sub>-4</sub>	Without						18	EC11E153440D	
					10 ± 7						36	18	EC11E18244AE
			10 ± 7	36	18	With	1.5			EC11E1834404			
				7 <sup>+3</sup> / <sub>-4</sub>							Without	9	EC11E09244AQ
											10 ± 7	18	9
			10 ± 7	30	15	With	1.5			EC11E1534408			
				7 <sup>+3</sup> / <sub>-4</sub>	Without						15	EC11E1534408	
					10 ± 7						36	18	EC11E18244A5
10 ± 7	36	18	With	1.5	EC11E1834403								
	7 <sup>+3</sup> / <sub>-4</sub>					Without	15	EC11E1834403					
						10 ± 7	36	18	EC11E1834403				

**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	—	15,000	1,000	EC11E152T409	7			
Slide							With	8		800	EC11E152U402	8			
Rotary	Self-return switch	20-tooth serration	15	3 to 30	Without	Self-return switch	Without	—	1,200	EC1110120005	9				
Encoders							With	0.5		1,000	EC1110120103	10			
	1.5	EC1110120201													
Power	ABC switch	Flat	20	10 ± 7	18	ABC switch	With	0.5	30,000	1,000	EC11EH124403	11			
Dual-in-line Package Type											30		15	1.5	EC11EH224403
TACT Switch™	18	0.5	EC11EH124404												
Custom-Products	30		EC11EH224404												
Dual-shaft	Slotted	Inner-shaft=25	30	30	15	Without	Without	-	15,000	1,200	EC11EBB24C03	12			
		Outer-shaft=15									With	1.5	700	EC11E0B2LB01	13
		Inner-shaft=25													
	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™


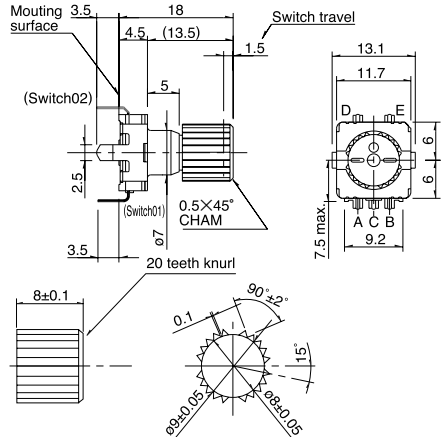
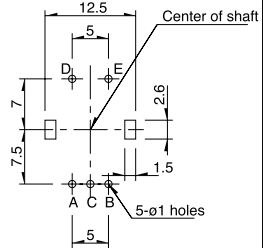

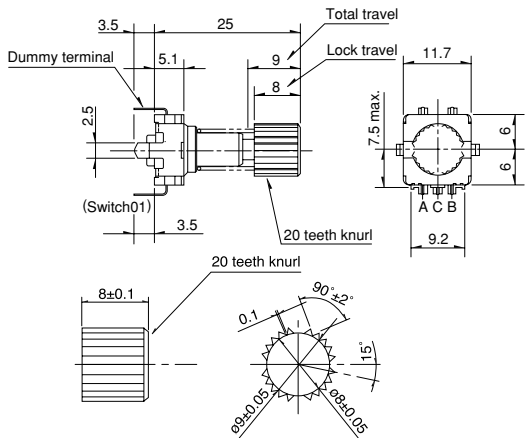
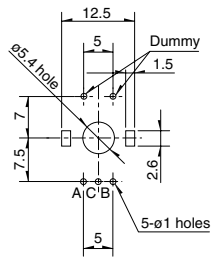

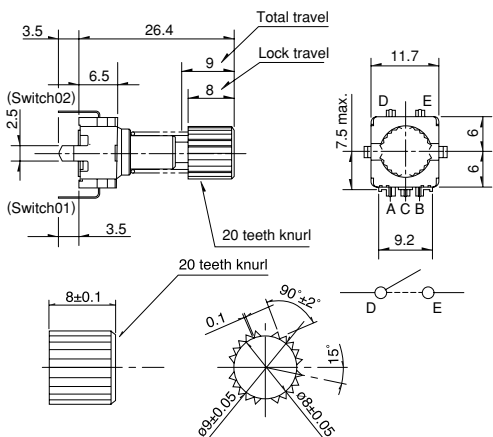
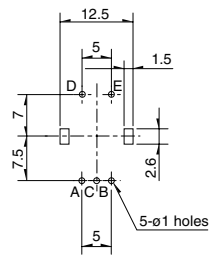

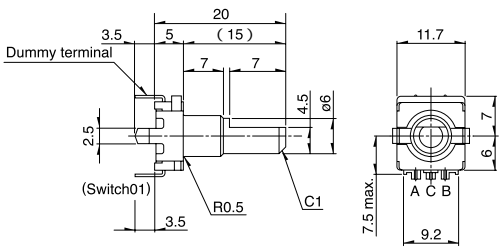
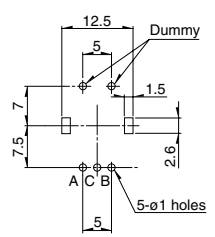
Custom-  
Products

Incremental  
Type

Absolute  
Type


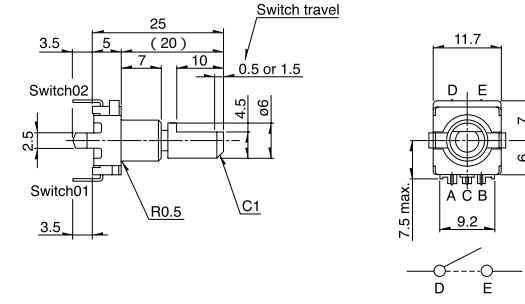
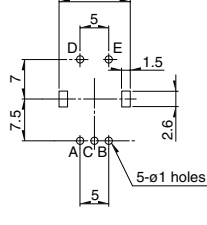
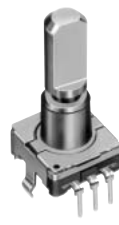
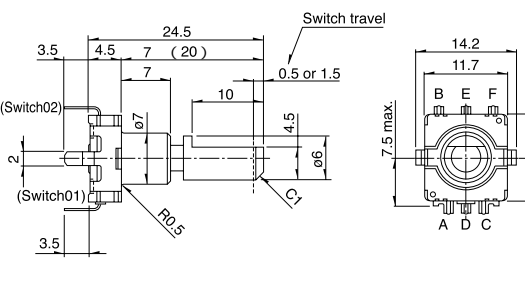
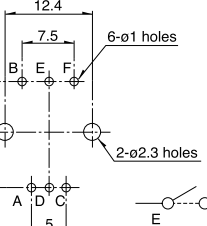
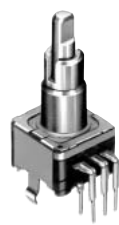
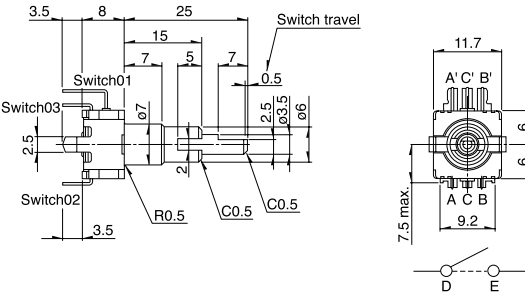
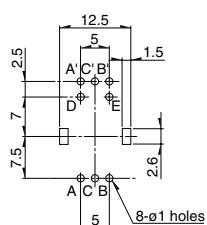
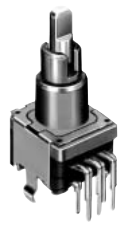
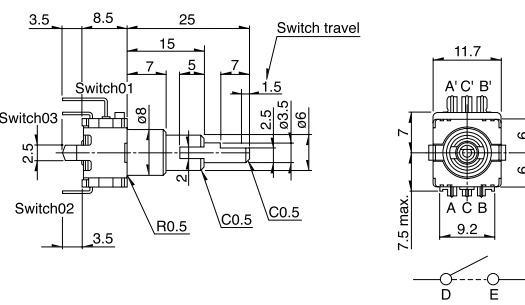
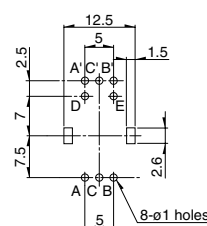
Dimensions

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

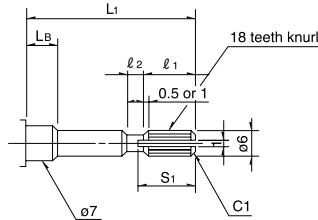
#### 1. Single-shaft Type

##### 1) Knurled Type

Unit:mm

Configuration ( Shaft diameter : 6 )

Not applicable for EC11E with push-lock mechanism and EC11G



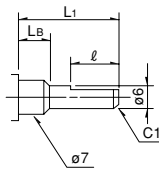
##### Detailed dimensions

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

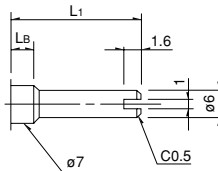
Does not comply with EC111

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

##### 3) Slotted Type

Unit:mm

Configuration ( Shaft diameter : 6 )



##### Detailed dimensions

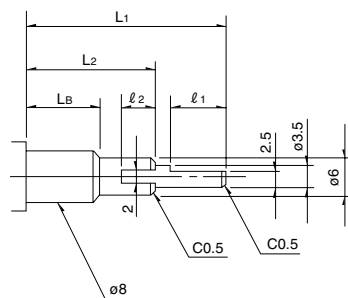
L <sub>1</sub>	L <sub>B</sub>
15	7
20	7
25	7

### 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







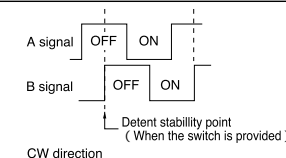
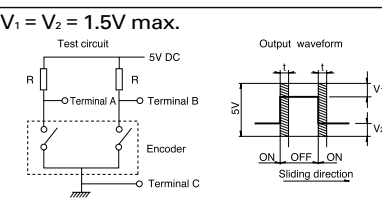
# List of Varieties

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	Operating direction		Vertical		Horizontal			
	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					
Power	Changeover angle				17 to 40°			
Dual-in-line Package Type	W		9.5		12.3		11.7	
	D		4.5		5.4		4.5	
	H		13.8		12		13	
TACT Switch™	Manual soldering		350 max. 3s max.				Dip soldering	
Custom-Products	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	
	Output wave						Please see P.191	
	Sliding noise		<p><math>V_1 = V_2 = 1.5V \text{ max.}</math></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					
	Rotational torque				7 ± 3 mN·m		3 to 30mN·m	
Mechanical performance	Detent torque		8 ± 5mN·m		12 ± 7mN·m		10 ± 7mN·m	
	Push-pull strength		100N					
	Cold		-40 ± 3 for 240h					
Environmental performance	Dry heat		85 ± 3 for 240h					
	Damp heat		60 ± 2 , 90 to 95%RH for 240h					
	Circuit · number of contacts		Single pole and single throw( Push-on )					
Push-on Switch Specifications	Travel( mm )		0.5 ± 0.3		1.5 ± 0.5		0.5 ± 0.3	
	Operating force( N )		6 ± 2.5		4 ± 2		6 ± 2.5	
	Rating		10mA 5V DC		3A 16V DC (10mA 16V DC min. ratings)		0.5A 12V DC	
	Contact esistance		100m max. for initial period; 200m max. after operating life.					
	Operating life		10,000times min.		25,000 times min.		20,000times min.	
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	EC12D 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	$7 \pm \frac{3}{4} \text{ mN}\cdot\text{m}$		—		$10 \text{ mN}\cdot\text{m}$ 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			
	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

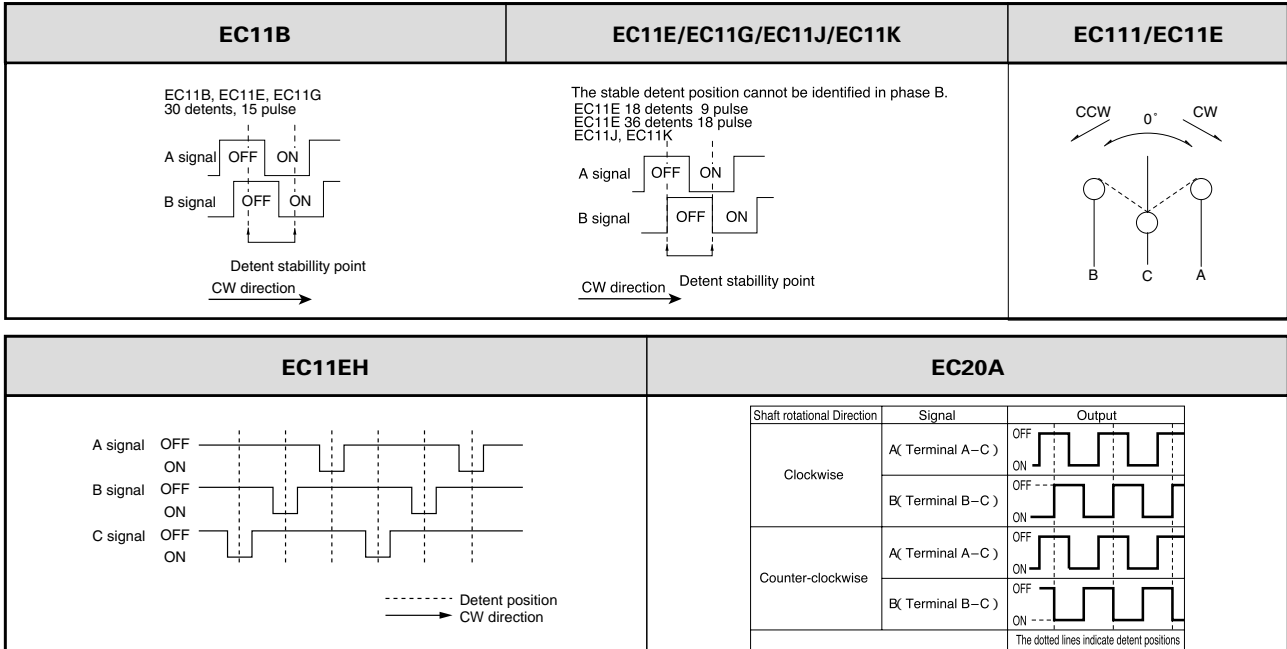
Dual-in-line Package Type  
TACT Switch™  
Custom-Products

Incremental Type  
Absolute Type



# Product Specifications

## Output Wave



Detector

Push

Slide

Rotary

Encoders

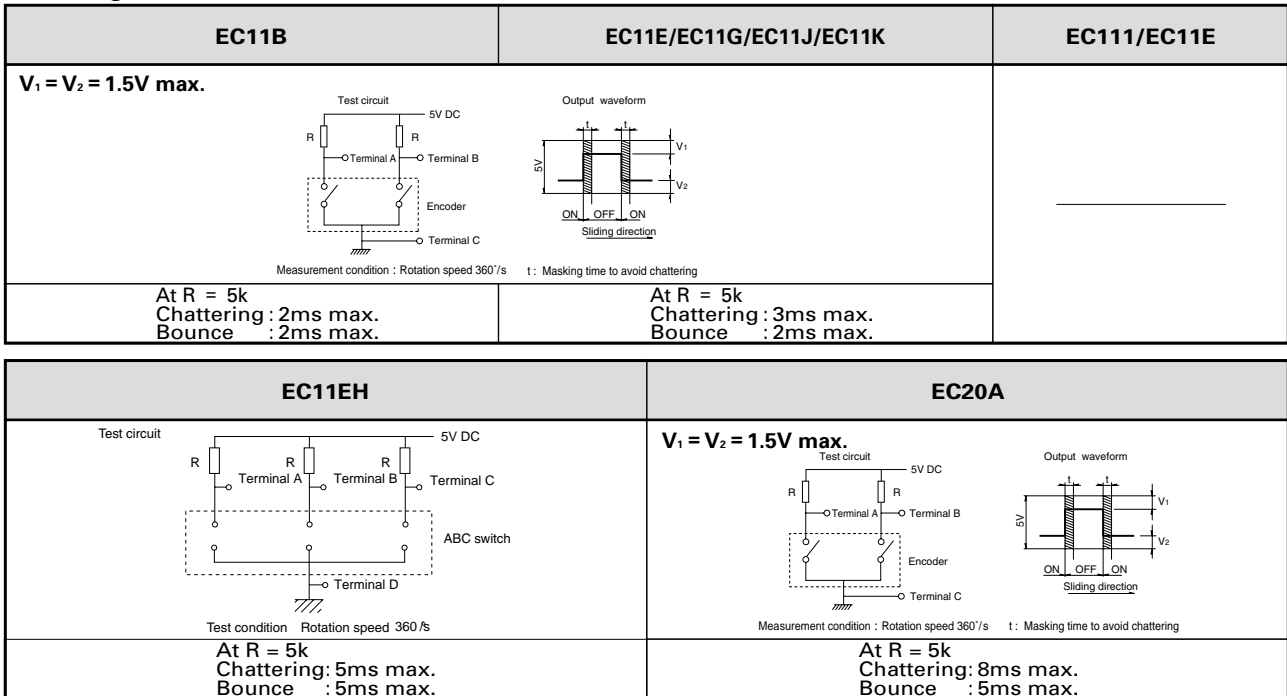
Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

## Sliding Noise



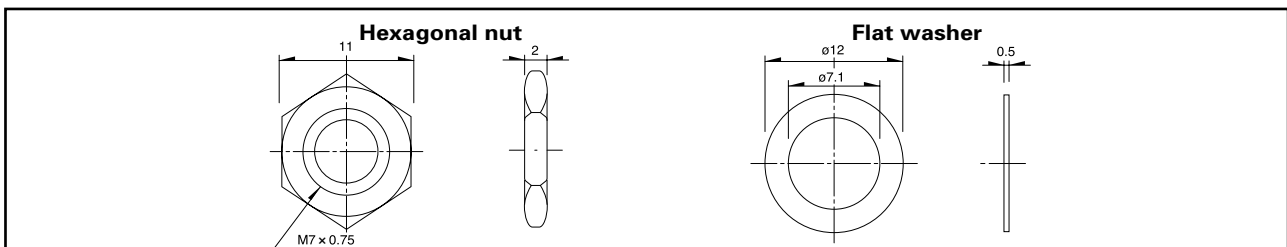
Incremental  
Type

Absolute  
Type

# Attached Parts

## EC11B Series

Unit:mm



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