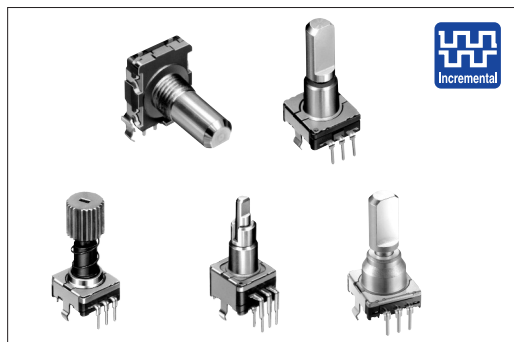


Encoder 11mm Size Metal Shaft Type

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 EC11K: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.									
Horizontal			12±7	30	15	Without	—	15,000	1,400	EC11B15202AA	1									
						With	0.5			EC11B15242AE	2									
							1.5			EC11B15242AF	3									
Vertical	Flat	20	10±7	18	9	Without	—	15,000	2,400	EC11E09204A4	4									
				30	15					EC11E15204A3										
			7 $\pm \frac{3}{4}$	Without	—	EC11E1530401														
			10±7	36	18	EC11E1820402														
			7 $\pm \frac{3}{4}$	Without	18	0.5	500,000			2,000	EC11E1830401									
			10±7	18							9	EC11E09244BS								
				30	15	EC11E15244G1														
			7 $\pm \frac{3}{4}$	Without	15	1.5					EC11E153440D									
			10±7	36							18	EC11E18244AU								
			7 $\pm \frac{3}{4}$	Without	18	0.5					EC11E183440C									
			10±7	18							9	EC11E09244AQ								
				30	15	EC11E15244B2														
			7 $\pm \frac{3}{4}$	Without	18	1.5					EC11E1534408									
			10±7	36							18	EC11E18244A5								
				7 $\pm \frac{3}{4}$	Without	1,000,000					2,000	EC11E1834403								
			Vertical									12±5	18	9	Without	—	100,000	2,000	EC11K0920401	6
													30	15					EC11K1520401	
													18	9	With	0.5			7	EC11K0924401
													30	15		EC11K1524402				
													18	9	Without	1.5			EC11K0925401	
													30	15					EC11K1525401	
18	9	Without	—	500,000	2,000			EC11K0920601												
30	15							EC11K1520601												
18	9	With	0.5					7	EC11K0924601											
30	15		EC11K1524601																	
18	9	Without	1.5				EC11K0925601													
30	15						EC11K1525601													
18	9	Without	—	1,000,000	2,000		EC11K0920801													
30	15						EC11K1520801													
18	9	With	0.5				7	EC11K0924801												
30	15		EC11K1524801																	
18	9	Without	1.5				EC11K0925801													
30	15						EC11K1525801													

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

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	Push lock	20-tooth serration	25	10±7	30	15	Without	—	15,000	1,600	EC11E152T409	8			
			26.4				With	8			EC11E152U402	9			
Push	Self-return switch		15	3 to 30	Without	Self-return switch	Without	—	15,000	2,400	EC1110120005	10			
Slide			20				10±7	ABC switch			With	0.5	30,000	EC111012010H	11
Rotary												1.5		EC1110120201	
Encoders	ABC switch	Flat	20	10±7	30	ABC switch	With	0.5	30,000	2,400	EC11EH124403	12			
Power								1.5			EC11EH224403				
Dual-in-line Package Type								0.5			EC11EH124404				
TACT Switch™	1.5	EC11EH224404													
Custom-Products	Dual-shaft	Slotted	Inner-shaft=25	30	30	15	Without	—	15,000	1,400	EC11EBB24C03	13			
			Outer-shaft=15					With			1.5	EC11E0B2LB01	14		
			Inner-shaft=25					Without			—	EC11E0B2LB01	14		
		Slotted	Outer-shaft=15	3 to 30	Without	Self-return switch	Without	—							

Packing Specifications

Tray

Product No.	Number of packages (pcs.)		Export package measurements (mm)
	1 case /Japan	1 case /export packing	
EC11B	700	1,400	370 × 520 × 201
EC11E09/15/18/EC11EH	1,200	2,400	540 × 360 × 250
EC11K	1,000	2,000	
EC11E152T/U	800	1,600	374 × 529 × 213
EC111	1,200	2,400	363 × 507 × 216
EC11E0B/BB	700	1,400	374 × 529 × 213

Notes

1. Products other than those listed in the above chart are also available. Please contact us for details.
2. Please place purchase orders per minimum order unit N (integer).

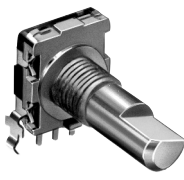
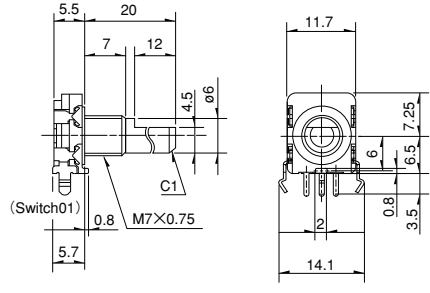
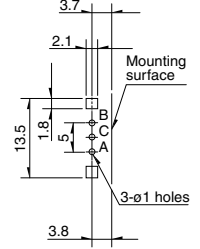
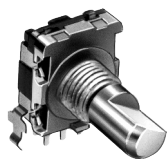
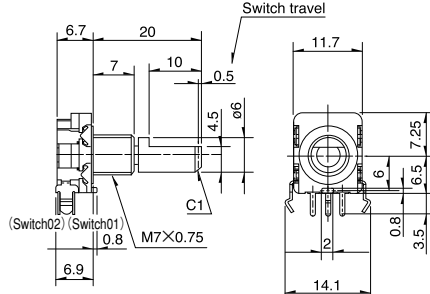
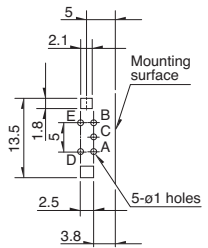
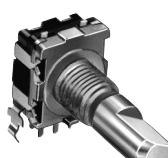
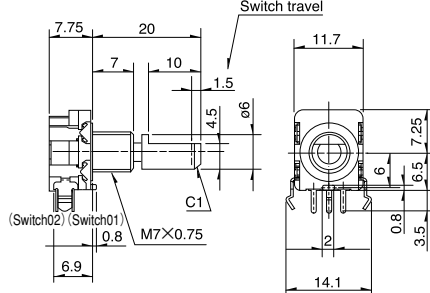
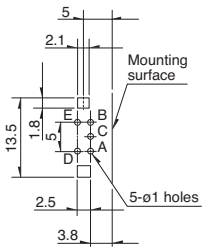
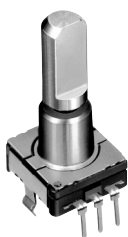
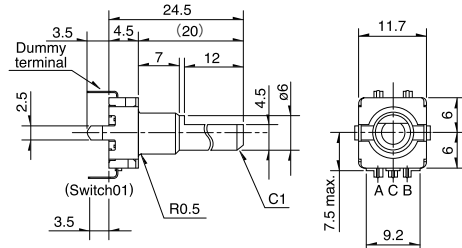
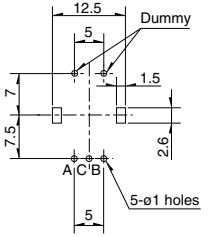
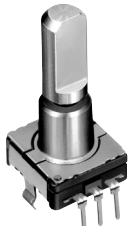
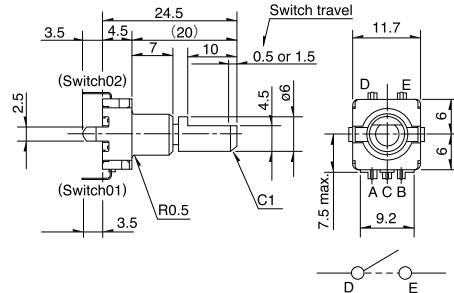
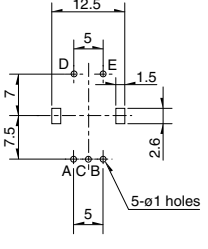


Automotive Use

Refer to P.209 for product varieties.
Refer to P.217 for product specifications.
Refer to P.217 for attached parts.

Dimensions

Unit:mm


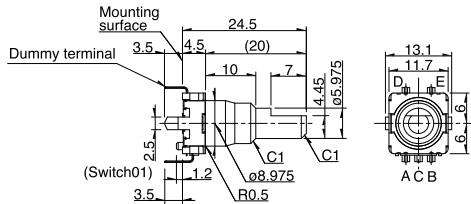
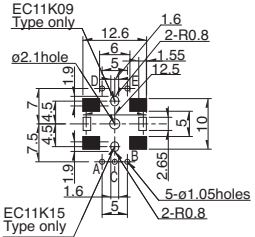

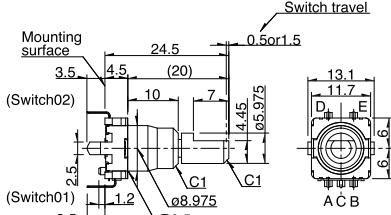
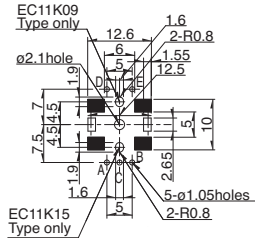

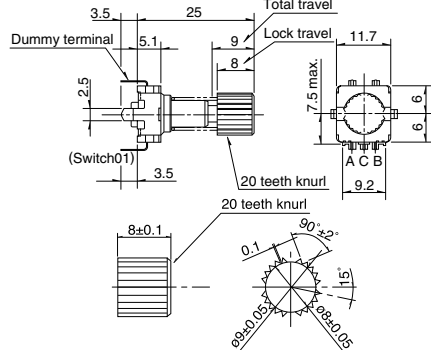
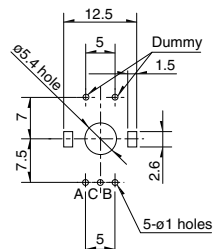

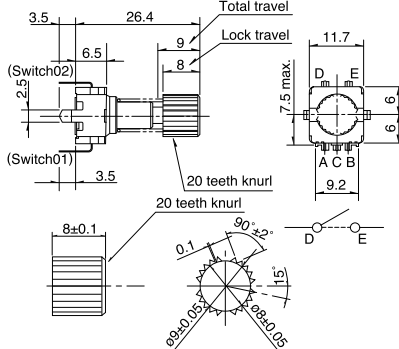
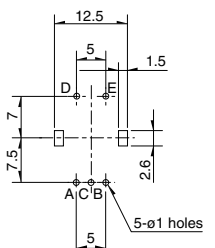

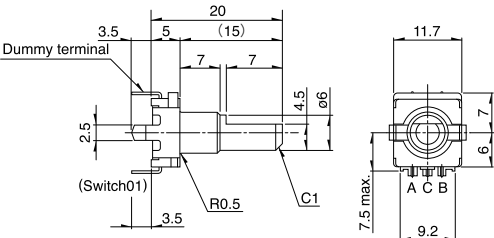
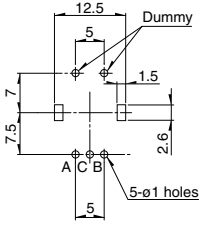
No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1			
2			
3			
4			
5			

Deta
 Push
 Slide
 Rota
 Enco
 Pow
 Dual-in
 Packag
 TACT S
 Cust
 Prod
 Meta
 Shaft
 Insul
 Shaft
 Holl
 Shaft
 Ring
 Type

Auto Use

Dimensions


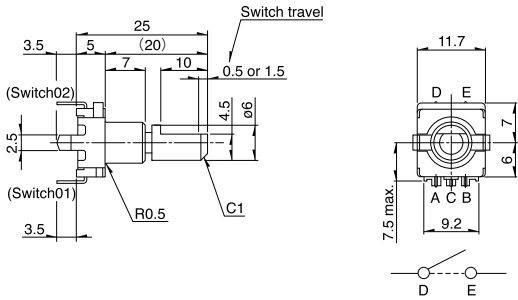
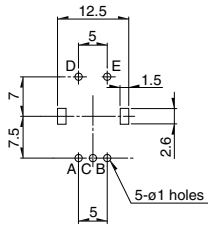

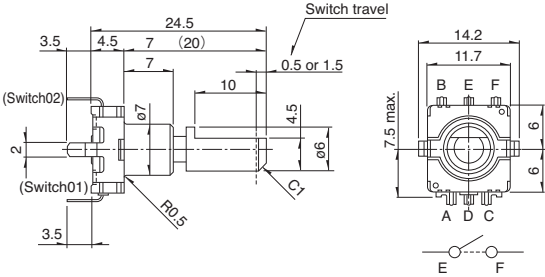
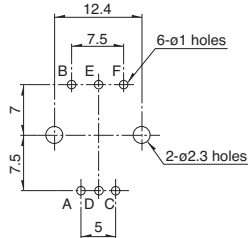
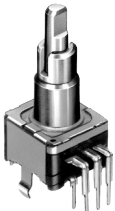
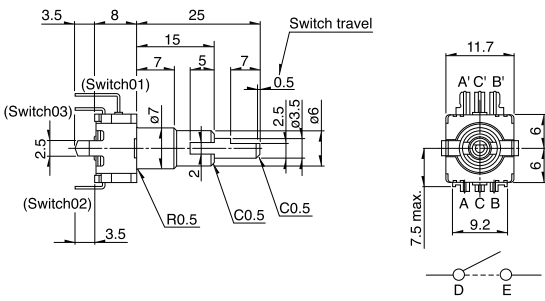
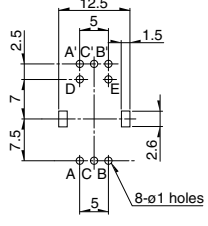
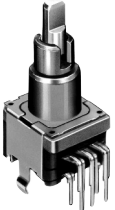
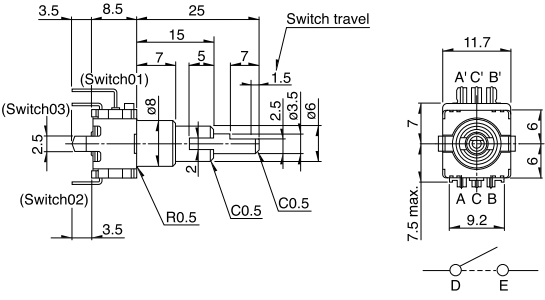
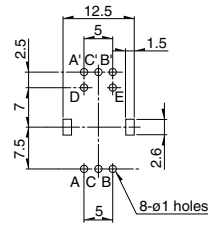
Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
6	<p>Vertical</p> 		 <p>EC11K09 Type only</p> <p>EC11K15 Type only</p> <p>PC board mounting detail A slant line part hows the solder land black part: Do not solder and wiring for electrical contact</p>
7	<p>Vertical with push-on switch (travel 0.5mm/1.5mm)</p> 		 <p>EC11K09 Type only</p> <p>EC11K15 Type only</p> <p>PC board mounting detail A slant line part hows the solder land black part: Do not solder and wiring for electrical contact</p>
8	<p>Push-lock mechanism</p> 		 <p>12.5, 5, 1.5, Dummy, ø5.4 hole, 7.5, 7, 2.6, 5-ø1 holes, A C B</p>
9	<p>Push-lock mechanism with push-lock switch</p> 		 <p>12.5, 5, 1.5, Dummy, ø5.4 hole, 7.5, 7, 2.6, 5-ø1 holes, A C B</p>
10	<p>Self-return switch</p> 		 <p>12.5, 5, 1.5, Dummy, ø5.4 hole, 7.5, 7, 2.6, 5-ø1 holes, A C B</p>

- 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

Dimensions

Unit:mm

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

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

Product Varieties

Shaft Dimensions

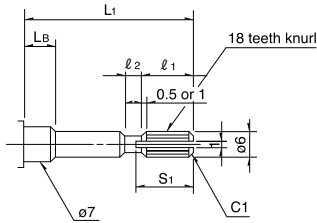
1. Single-shaft Type (EC11K is excluded. Refer to P.212 for EC11K)

1) Knurled Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)

Not applicable for EC11E with push-lock mechanism



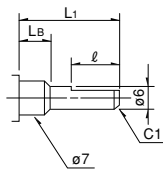
Detailed dimensions

L ₁	L _B	l ₁	l ₂	S ₁
20	7	6	1	7
25	10	10	2	11

2) Flat Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)



Detailed dimensions

L ₁	L _B	l
15	5	7
15	7	5 (6)
20	7	10 (12)
25	10	12

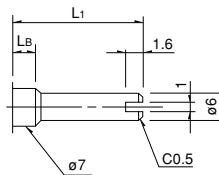
※ Does not comply with EC111

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

3) Slotted Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)



Detailed dimensions

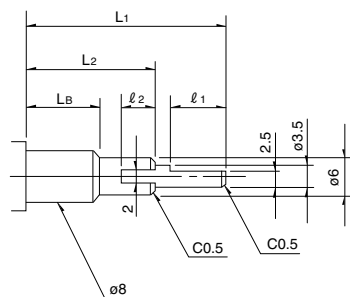
L ₁	L _B
15	7
20	7
25	10

2. Standard Dimensions and configuration of Dual-shaft Type

1) Flat Type

Unit:mm

Configuration (Inner-shaft : $\phi 3.5$ Outer-shaft : $\phi 6$)



Detailed dimensions

L ₁	L ₂	L _B	l ₁	l ₂
20	10	5	7	4
25	15	7	7	5
30	20	10	7	5

Notes

- The highlighted figures in shaft types refer to Product Specifications in P.204 and P.205.
- Products other than those listed in the above chart are also available. Please contact us for details

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

List of Varieties

Type	Metal shaft							
	9mm size		11mm size					
Series	EC09E	EC11B	EC11E		EC111	EC11EH		
Detector	Photo							
Push	Incremental							
Slide	Incremental				Self-return switch	ABC switch		
Rotary	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	11.7						
	D	9.5	13.8	12		13	12	
	H	4.5	5.5	4.5	8.5	5	4.5	
Soldering	Manual soldering	350°C max. 3s max.						
	Dip soldering	260±5°C, 3±1s	260±5°C, 5±1s					
Operating temperature range	-40°C to +85°C							
Automotive use	○ ○ ○ ○ ○ ○							
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.217						
	Sliding noise	Please see P.217						
	Insulation resistance	100MΩ min. 250V DC						
	Voltage proof	300V AC for 1minute						
Mechanical performance	Rotational torque	—		7 \pm $\frac{3}{4}$ mN·m	—	3~30mN·m	—	
	Detent torque	8±5mN·m	12±7mN·m	10±7mN·m		—	10±7mN·m	
	Push-pull strength	100N						
Environmental performance	Cold	-40±3°C for 240h						
	Dry heat	+85±3°C for 240h						
	Damp heat	60±2°C, 90 to 95%RH for 240h						
Page	203			204				





Push-on Switch Specifications

Items	EC09E		EC11B		EC11E		EC111		EC11EH	
Contact arrangement	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	1.5±0.5 8±0.8※	0.5±0.3	1.5±0.5	0.5±0.3	1.5±0.5
Operating force (N)	6 \pm $\frac{2.5}{-2}$	4±2	6±3	5±2	6 \pm $\frac{2.5}{-2}$	4±2 8 max. ※	6 \pm $\frac{2.5}{-2}$	4±2	6 \pm $\frac{2.5}{-2}$	4±2
Rating	10mA 5V DC		0.1A 5V DC (500μA 5V DC min. ratings)		0.1A 5V DC (500μA 5V DC min. ratings) 0.5A 12V DC ※		0.1A 5V DC (500μA 5V DC min. ratings)			
Contact resistance	100mΩ max. for initial period; 200mΩ max. after operating life.									
Operating life	10,000times min.		25,000 times min.	20,000 times min.	20,000times min. 10,000times min.※		20,000times min.			

Notes

- ※marked specification is only applicable to EC11E152U402.
- 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.

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	
	D	12	14.2	19.2	
	H	4.5		10	
Soldering	Manual soldering	350°C max. 3s max.			
	Dip soldering	260±5°C, 3±1s	—	260±5°C, 5±1s	
	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 _H : +4.0V min. V _o : 0.5V max. (I _{sink} =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
Page	204	210	213	215	

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 ^{+0.4} _{-0.3}
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

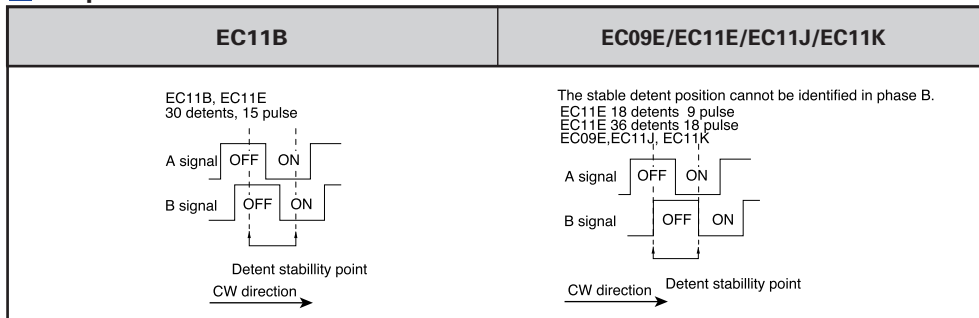
Dual-in-line
Package Type

TACT Switch™

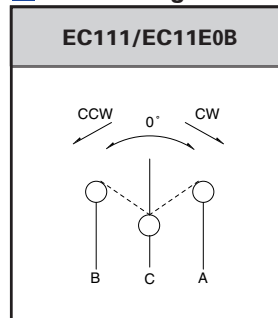
Custom-
ProductsMetal
ShaftInsulated
ShaftHollow
ShaftRing
Type

Product Specifications

Output Wave



Circuit Diagram



Detector

Push

Slide

Rotary

Encoders

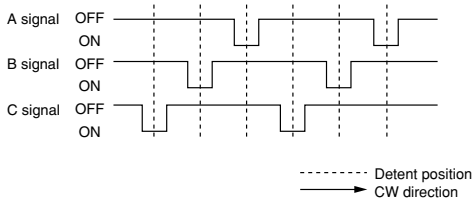
Power

Dual-in-line
Package Type

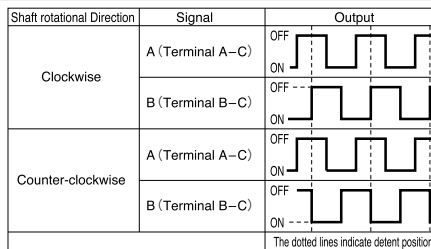
TACT Switch™

Custom-
Products

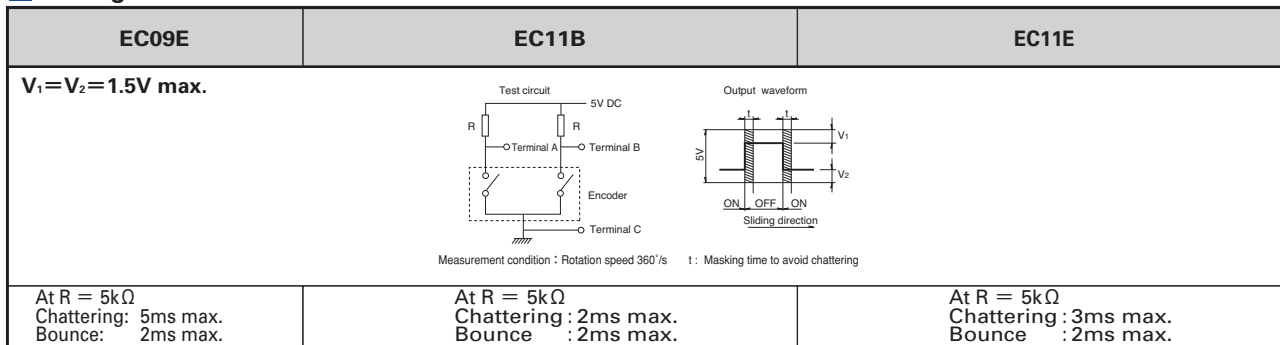
EC11EH



EC20A



Sliding Noise



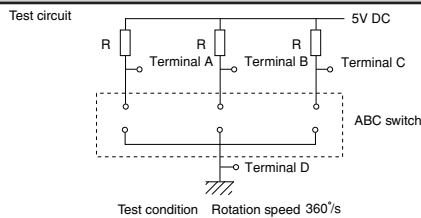
Metal
Shaft

Insulated
Shaft

Hollow
Shaft

Ring
Type

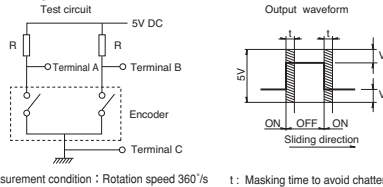
EC11EH



At R = 5kΩ
Chattering: 5ms max.
Bounce: 5ms max.

EC20A

$V_1 = V_2 = 2.5V$ max.



At R = 5kΩ
Chattering: 8ms max.
Bounce: 5ms max.

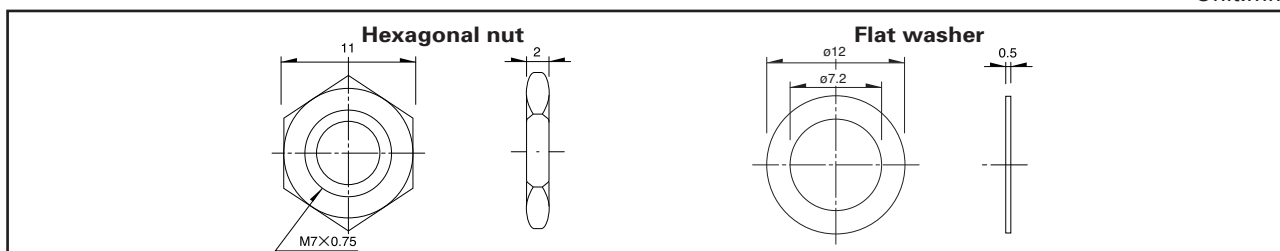
EC11J/EC11K

At R = 5kΩ
Chattering: 3ms max.
Bounce: 2ms max.

Attached Parts

EC11B Series

Unit:mm



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Use

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