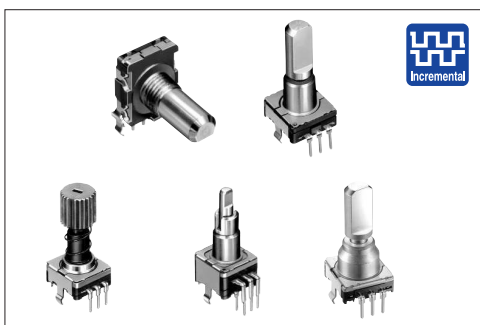


Encoder 11mm Size Metal Shaft Type

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

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

TACT Switch™

Custom-
Products

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	—		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 ⁺³ / ₋₄	Without					15		EC11E1530401							
				10±7	36					18		EC11E1820402							
				7 ⁺³ / ₋₄	Without					18		EC11E1830401							
				10±7	18					9		EC11E09244BS	5						
				30	15	EC11E15244G1													
			7 ⁺³ / ₋₄	Without	15	EC11E153440D													
			10±7	36	18	EC11E18244AU													
			7 ⁺³ / ₋₄	Without	18	EC11E183440C													
			10±7	18	9	EC11E09244AQ													
				30	15	EC11E15244B2	6												
			7 ⁺³ / ₋₄	Without	15	EC11E1534408													
			10±7	36	18	EC11E18244A5													
			7 ⁺³ / ₋₄	Without	18	EC11E1834403													
			12±5					18	9	Without	—	100,000	2,000	EC11K0920401	6				
								30	15					EC11K1520401					
							18	9	With					0.5		EC11K0924401	7		
																30		15	EC11K1524402
																18		9	EC11K0925401
																30		15	EC11K1525401
18	9	EC11K0920601														6			
30	15	EC11K1520601																	
18	9	With					0.5	EC11K0924601	7										
								30						15		EC11K1524601			
								18						9		EC11K0925601			
								30						15		EC11K1525601			
			18	9	Without	—		EC11K0920801		6									
								30			15	EC11K1520801							
18	9	With					0.5	EC11K0924801	7										
								30			15	EC11K1524801							
			18	9	EC11K0925801														
30	15	EC11K1525801																	

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	Flat	15	3 to 30	Without	Self-return switch	Without	—	15,000	2,400	EC1110120005	10			
Slide			20				18	ABC switch			With	0.5	1.5	EC111012010H	11
Encoders	ABC switch	Flat	20	10±7	30	ABC switch	With	0.5	30,000	2,400	EC11EH124403	12			
											Power		Dual-in-line Package Type	18	15
TACT Switch™	Inner-shaft=25	30	Self-return switch	With	1.5	EC11EH124404									
							Custom-Products	Dual-shaft	Slotted	Outer-shaft=15	3 to 30		Without	Self-return switch	Without
Flat	Inner-shaft=25	30	With	1.5	EC11EH224404										
						Slotted	Outer-shaft=15	3 to 30	Without	Self-return switch	Without	—	15,000	1,400	EC11E0B2LB01

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

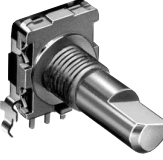
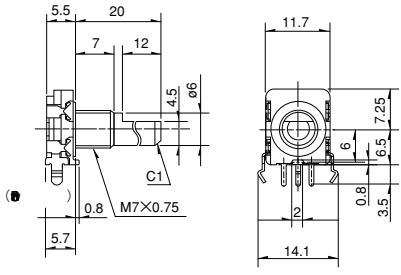
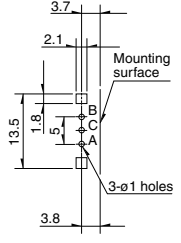
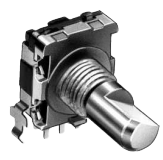
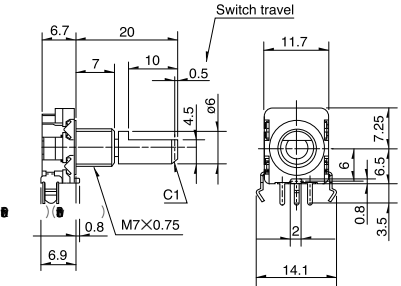
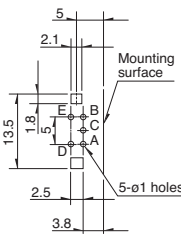
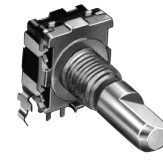
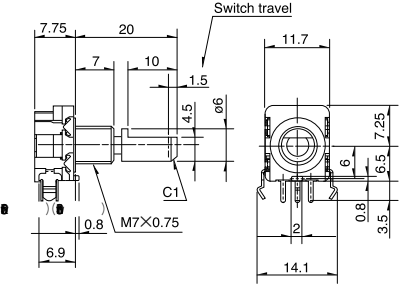
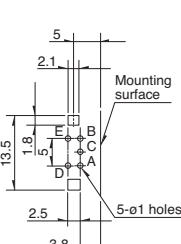
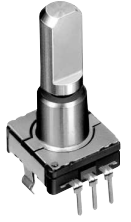
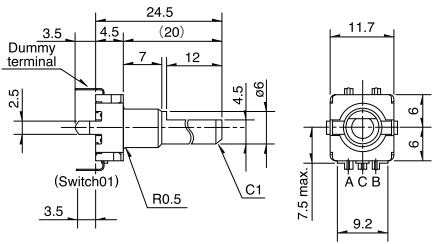
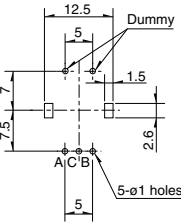

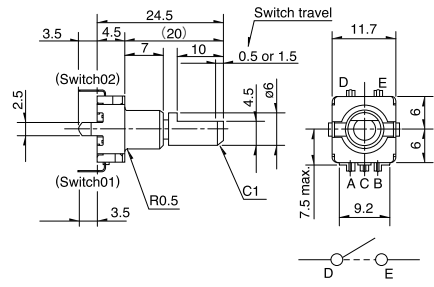
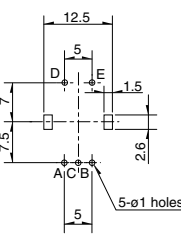
1. Products other than those listed in the above chart are also available. Please contact us for details.
2. Please place purchase orders per minimum order unit N (integer).



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	<p>Horizontal</p> 		
2	<p>Horizontal with push-on switch (travel 0.5mm)</p> 		
3	<p>Horizontal with push-on switch (travel 1.5mm)</p> 		
4	<p>Vertical</p> 		
5	<p>Vertical with push-on switch (travel 0.5/1.5mm)</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

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


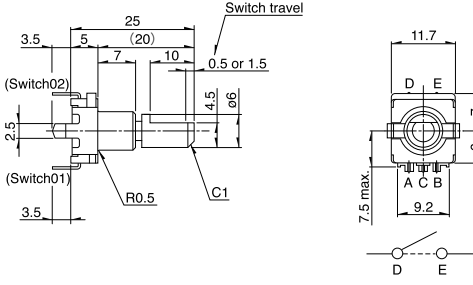
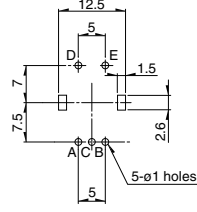

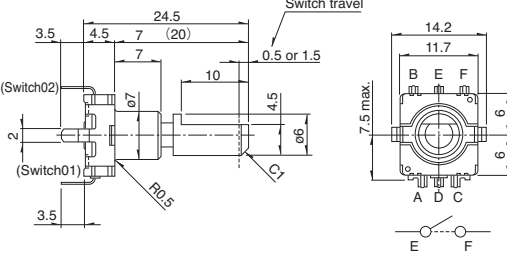
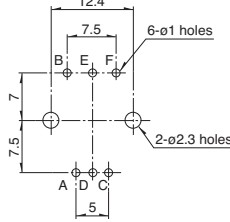
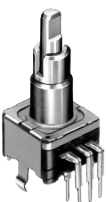
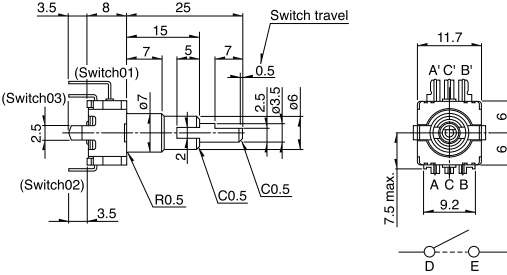
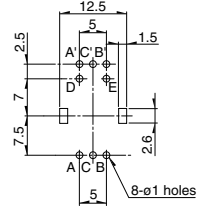

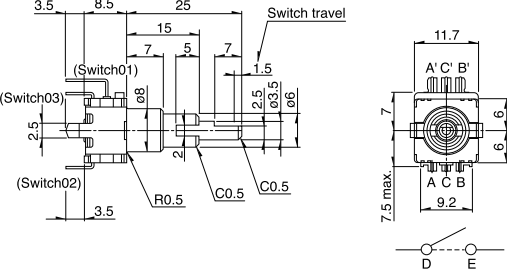
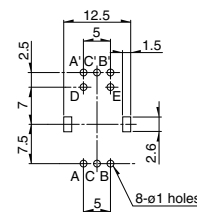
- Metal Shaft
- Insulated Shaft
- Hollow Shaft
- Ring Type



No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
6		<p>Mounting surface 24.5 (20) 4.5 3.5 Dummy terminal 3.5 1.2 3.5 (Switch01) 1.2 3.5 4.45 6.5 9.75 C1 C1 R0.5 13.1 11.7 6 1.6 D E A C B</p>	<p>EC11K09 Type only 12.6 1.6 2-R0.8 6 5 1.55 12.5 2.1 hole 1.9 1.0 10 7 4.5 4.5 7.5 1.8 1.6 EC11K15 Type only 5-φ1.05holes 2-R0.8</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>
7		<p>Mounting surface 24.5 (20) 4.5 3.5 (Switch02) 4.5 1.2 3.5 (Switch01) 1.2 3.5 4.45 6.5 9.75 C1 C1 R0.5 13.1 11.7 6 1.6 D E A C B Switch travel 0.5 or 1.5</p>	<p>EC11K09 Type only 12.6 1.6 2-R0.8 6 5 1.55 12.5 2.1 hole 1.9 1.0 10 7 4.5 4.5 7.5 1.8 1.6 EC11K15 Type only 5-φ1.05holes 2-R0.8</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>
8		<p>Dummy terminal 3.5 2.5 5.1 25 9 8 11.7 (Switch01) 3.5 20 teeth knurl 7.5 max. 6 6 20 teeth knurl 9.2 8±0.1 0.1 90±3° 15° 89±0.05 98±0.05</p>	<p>12.5 5 1.5 Dummy 25.4 hole 7.5 7 2.6 5 A C B 5-φ1 holes</p>
9		<p>3.5 2.5 6.5 26.4 9 8 11.7 (Switch02) 3.5 20 teeth knurl 7.5 max. 6 6 (Switch01) 3.5 20 teeth knurl 9.2 8±0.1 0.1 90±3° 15° 89±0.05 98±0.05 D E A C B</p>	<p>12.5 5 1.5 7.5 7 2.6 5 A C B 5-φ1 holes</p>
10		<p>Dummy terminal 3.5 5 20 (15) 7 7 4.5 6 (Switch01) 3.5 R0.5 C1 7.5 max. 6 7 11.7 9.2</p>	<p>12.5 5 1.5 Dummy 7.5 7 2.6 5 A C B 5-φ1 holes</p>

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

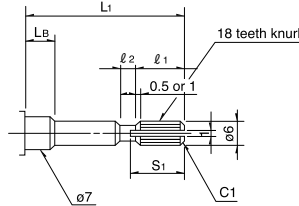
1. Single-shaft Type (EC11K is excluded. Refer to P.212 for EC11K)

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

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line Package Type

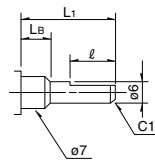
TACT Switch™

Custom-Products

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

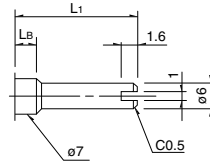
※De s o t o mply with EC1

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

Metal Shaft

Insulated Shaft

Hollow Shaft

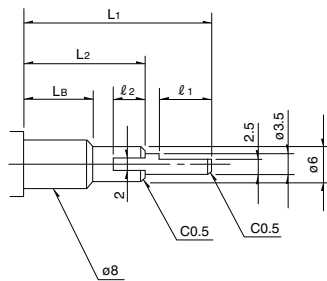
Ring Type

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



Automotive Use

List of Varieties

	Type	Metal shaft							
		9mm size		11mm size					
	Series	EC09E	EC11B	EC11E	EC111	EC11EH			
Detector	Photo								
Push	Output	Incremental			Self-return switch	ABC switch			
Slide	Outline specifications	Shaft types		Single-shaft		Dual-shaft	Single-shaft		
Rotary		Operating direction		Vertical	Horizontal		Vertical		
Encoders		Number of pulse/Number of detent		15/30		9/18 15/30 18/36	—	6×ABC/18 10×ABC/30	
Power		Push switch (Travel mm)		Without/With (0.5, 1.5)					
Dual-in-line Package Type		Optional functions		—		Push-lock mechanism Without detent		—	
TACT Switch™		Changeover angle		—		17 to 40°		—	
Custom-Products	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						
Metal Shaft	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					
Hollow Shaft	Mechanical performance	Rotational torque		—		7 ± 3/4 N·m	—	3~30N·m	—
		Detent torque		8±5mN·m	2 ± 7N·m	10±7N·m		—	10±7N·m
		Push-pull strength		100N					
Ring Type	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 ± 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 ± 2.5 -2	4±2	6±3	5±2	6 ± 2.5 -2	4±2 8 max. ※	6 ± 2.5 -2	4±2	6 ± 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 EC11E and UQ.
- 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		20.2	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
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

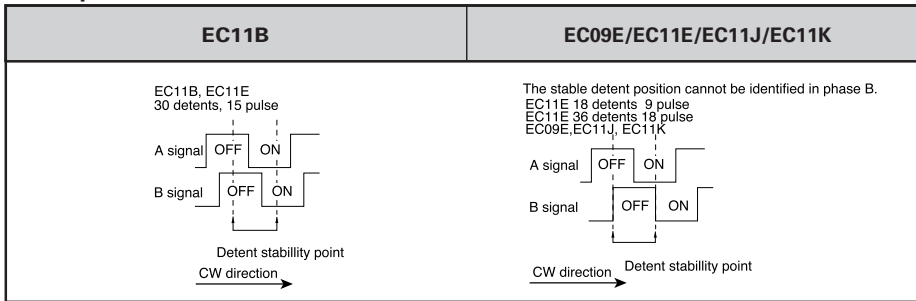
Dual-in-line
Package Type

TACT Switch™

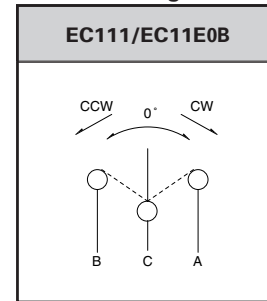
Custom-
ProductsMetal
ShaftInsulated
ShaftHollow
ShaftRing
Type

Product Specifications

Output Wave



Circuit Diagram



Detector

Push

Slide

Rotary

Encoders

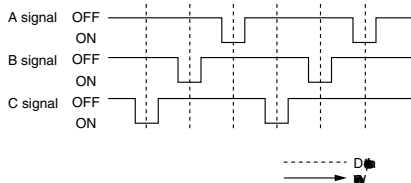
Power

Dual-in-line
Package Type

TACT Switch™

Custom-
Products

EC11EH

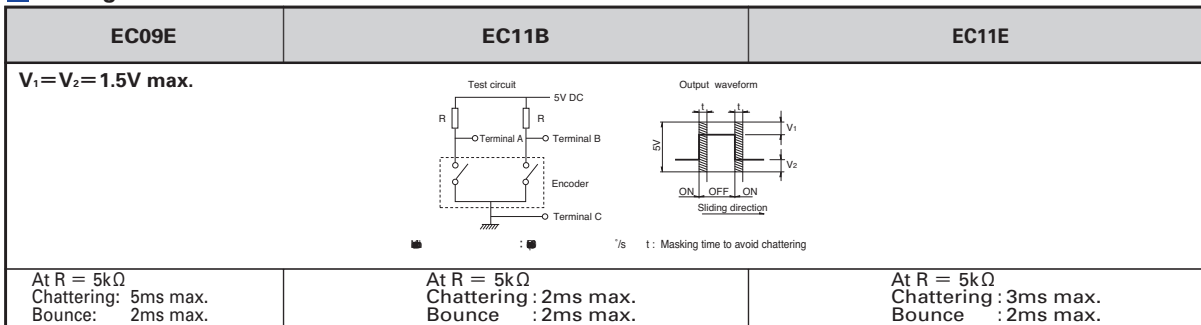


EC20A

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



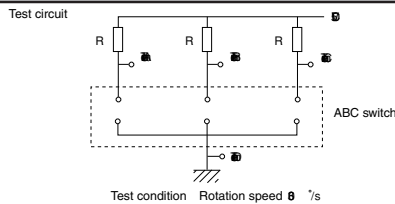
Metal
Shaft

Insulated
Shaft

Hollow
Shaft

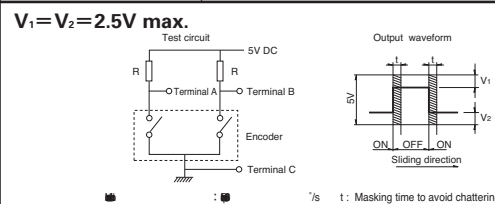
Ring
Type

EC11EH



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

EC20A



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

EC11J/EC11K

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



Automotive
Use

Attached Parts

EC11B Series

Unit:mm

