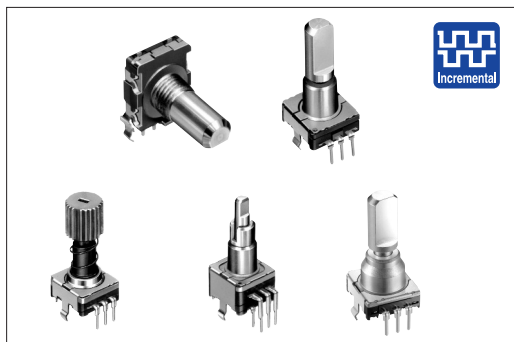


Encoder 11mm Size Metal Shaft Type

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

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	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				18	ABC switch			With	0.5	30,000	EC111012010H	11	
											1.5		EC1110120201		
Rotary	ABC switch	20	10±7	18	ABC switch	With	0.5	30,000	2,400	EC11EH124403	12				
Encoders										Flat		30	18	1.5	EC11EH224403
Dual-in-line Package Type										Inner-shaft=25		30	15	0.5	EC11EH224404
	TACT Switch™	Slotted	Outer-shaft=15	Without	—	15,000	1,400	EC11EBB24C03	13						
Custom-Products		Flat	Inner-shaft=25					With		1.5	EC11E0B2LB01				
		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.

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

TACT Switch™

Custom-
Products

Metal
Shaft

Insulated
Shaft

Hollow
Shaft

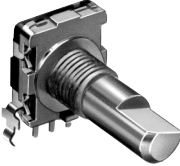
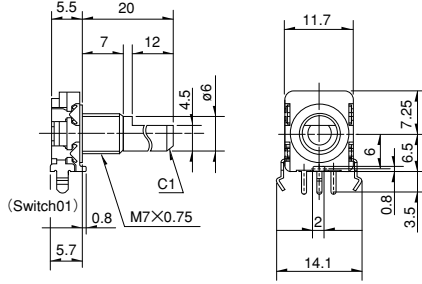
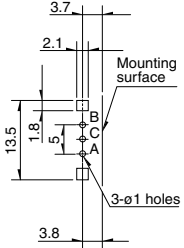
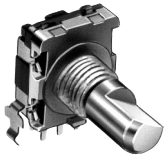
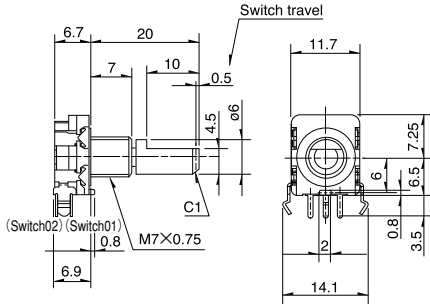
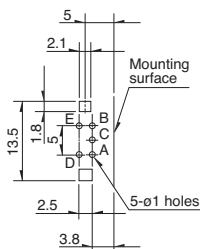
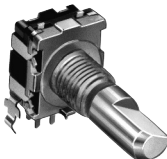
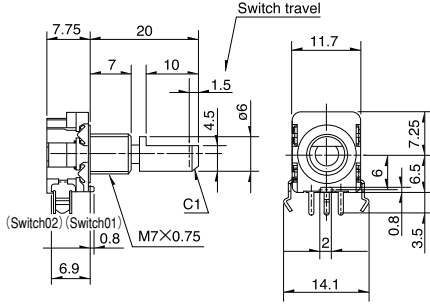
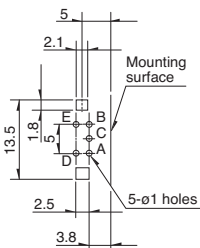
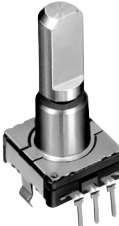
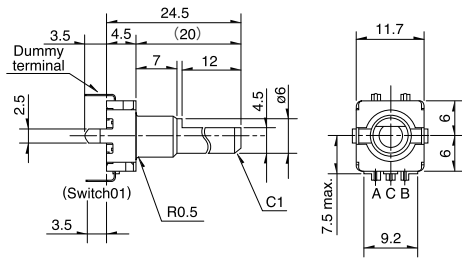
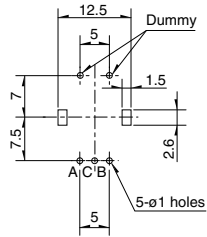
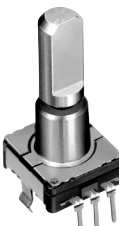
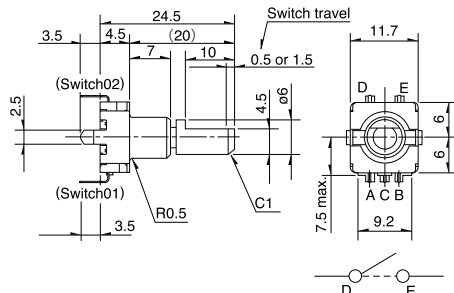
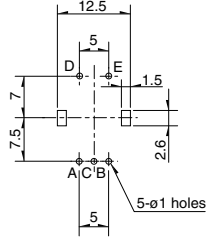
Ring
Type



Automotive
Use


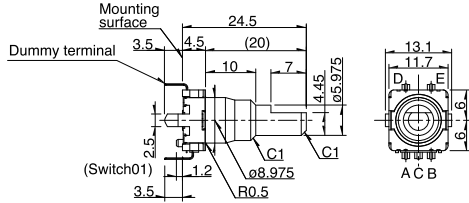
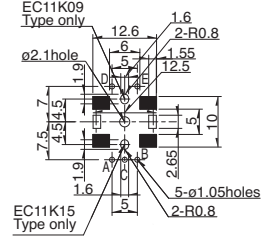

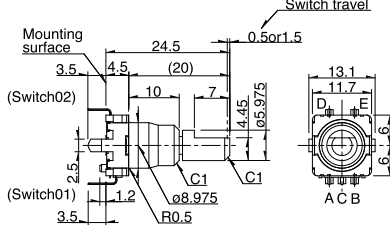
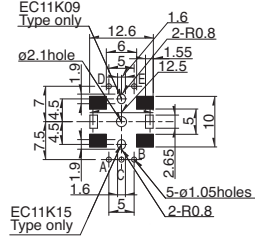

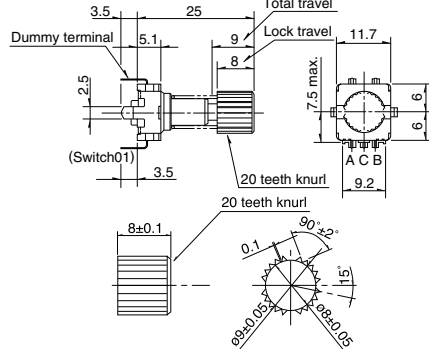
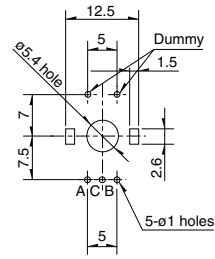

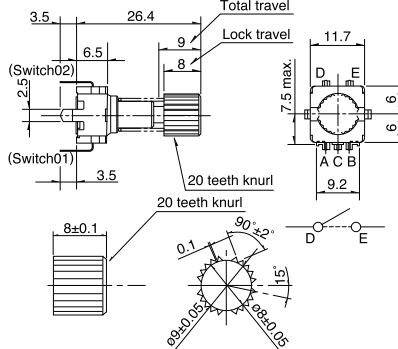
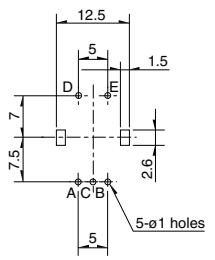

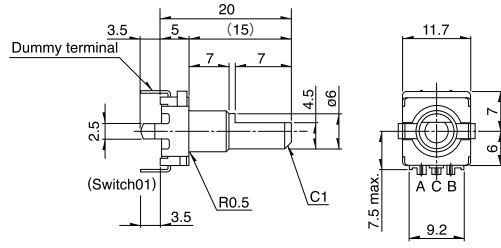
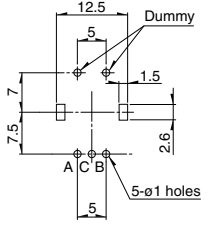
Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1	Horizontal 		
2	Horizontal with push-on switch (travel 0.5mm) 		
3	Horizontal with push-on switch (travel 1.5mm) 		
4	Vertical 		
5	Vertical with push-on switch (travel 0.5/1.5mm) 		

Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
6			 <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>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>5-ϕ1 holes</p>
9			 <p>5-ϕ1 holes</p>
10			 <p>5-ϕ1 holes</p>

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

TACT Switch™

Custom-
Products

Metal
Shaft

Insulated
Shaft

Hollow
Shaft


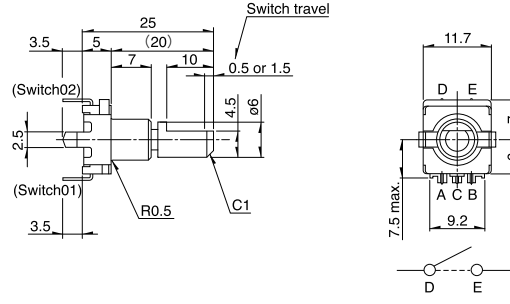
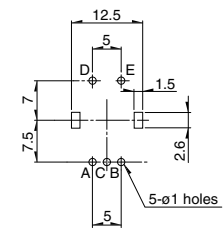

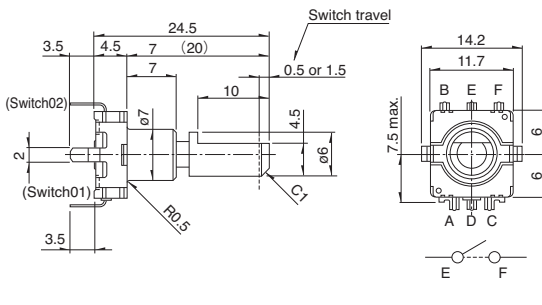
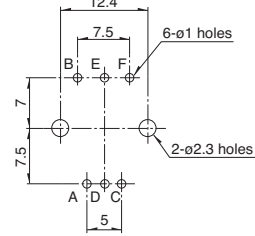
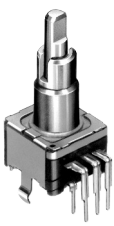
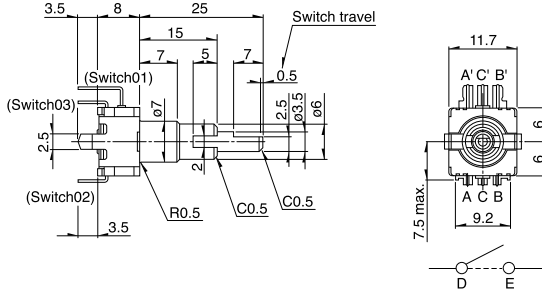
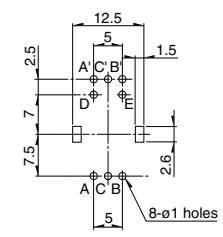
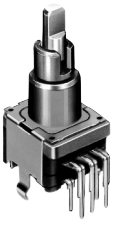
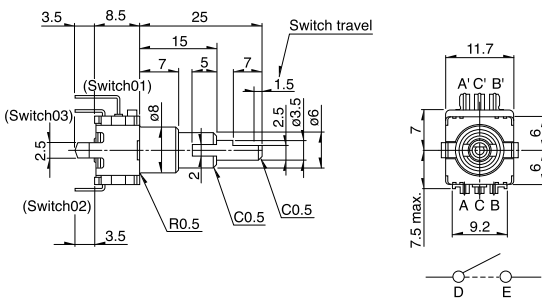
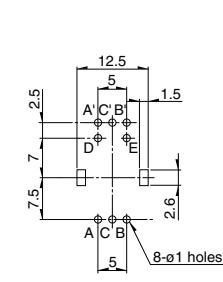
Ring
Type



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

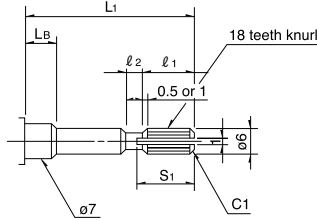
1. Single-shaft Type (EC11K is excluded. Refer to P.212 for EC11K)

1) Knurled Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)

Not applicable for EC11E with push-lock mechanism



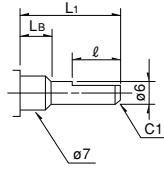
Detailed dimensions

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

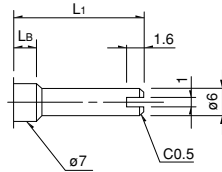
※ Does not comply with EC111

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

3) Slotted Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)



Detailed dimensions

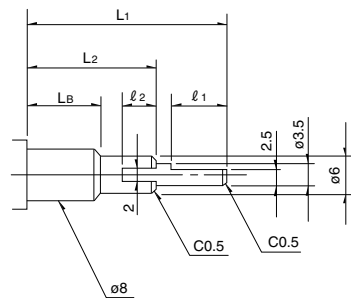
L ₁	L _B
15	7
20	7
25	10

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	Self-return switch												
Rotary	ABC switch												
Encoders	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°		—			
Power	Dimensions (mm)	W		11.7									
		D		9.5		13.8		12		13		12	
		H		4.5		5.5		4.5		8.5		5	
Dual-in-line Package Type	Soldering	Manual soldering											
		350°C max. 3s max.											
TACT Switch™	Soldering	Dip soldering		260±5°C, 3±1s		260±5°C, 5±1s							
		Operating temperature range											
Custom-Products	-40°C to +85°C												
	Automotive use												
Metal Shaft	○												
	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											
Hollow Shaft	Mechanical performance	Rotational torque		—		7 ⁺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									
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. ※			

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 (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 _H : +4.0V min. V _{LO} : 0.5V 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		0.1A 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

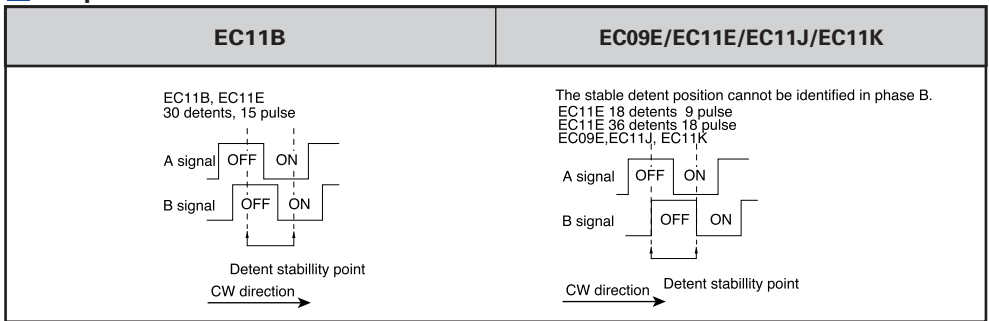
Dual-in-line
Package Type

TACT Switch™

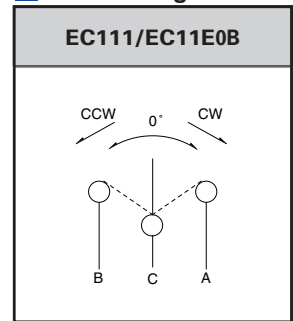
Custom-
ProductsMetal
ShaftInsulated
ShaftHollow
ShaftRing
Type

Product Specifications

Output Wave



Circuit Diagram

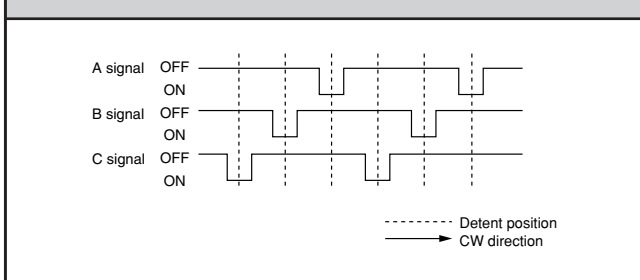


Detector
Push
Slide
Rotary
Encoders

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

Metal Shaft
Insulated Shaft
Hollow Shaft
Ring Type

EC11EH



EC20A

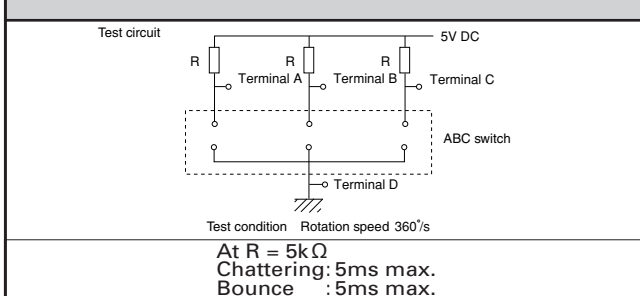
Shaft rotational Direction	Signal	Output
Clockwise	A (Terminal A-C)	OFF ON
	B (Terminal B-C)	OFF ON
Counter-clockwise	A (Terminal A-C)	OFF ON
	B (Terminal B-C)	OFF ON

The dotted lines indicate detent positions

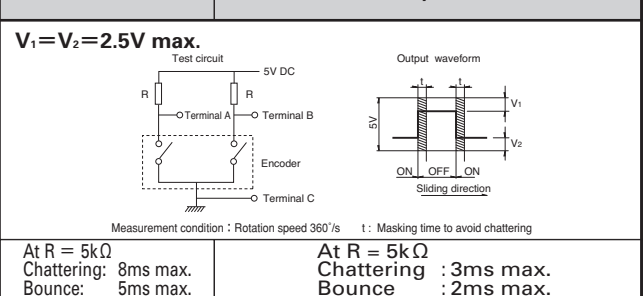
Sliding Noise

EC09E	EC11B	EC11E
<p>$V_1 = V_2 = 1.5V$ max.</p>		
<p>At R = 5kΩ Chattering: 5ms max. Bounce: 2ms max.</p>	<p>At R = 5kΩ Chattering: 2ms max. Bounce: 2ms max.</p>	<p>At R = 5kΩ Chattering: 3ms max. Bounce: 2ms max.</p>

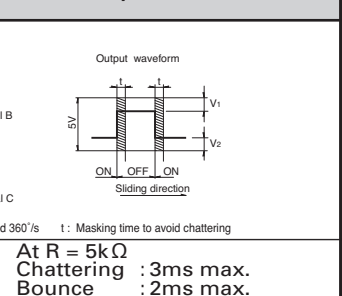
EC11EH



EC20A



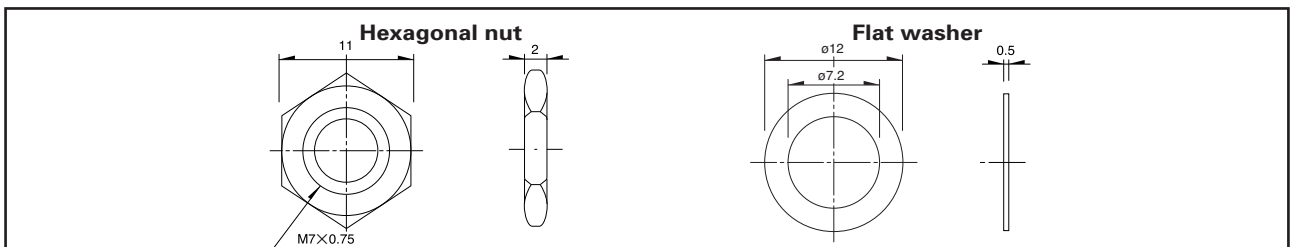
EC11J/EC11K



Attached Parts

EC11B Series

Unit:mm



Automotive Use