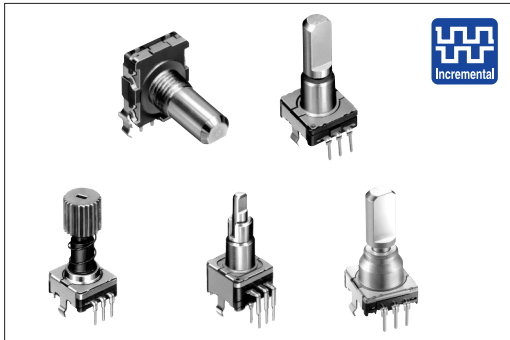


Encoder 11mm Size Metal Shaft Type

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	2,400	EC11E09204A4	4					
				30	15					EC11E15204A3						
				7 ⁺³ / ₋₄	Without					18		EC11E1530401				
				10±7	36							EC11E1820402				
				7 ⁺³ / ₋₄	Without					9		0.5	EC11E1830401			
				10±7	18								EC11E09244BS			
			7 ⁺³ / ₋₄	Without	15	1.5	EC11E15244G1									
			10±7	36	EC11E153440D											
			7 ⁺³ / ₋₄	Without	18	5	EC11E18244AU									
			10±7	18	EC11E183440C											
			7 ⁺³ / ₋₄	Without	15	6	EC11E09244AQ									
			10±7	30	EC11E15244B2											
			12±5			18	9	Without	—	100,000	2,000	EC11K0920401	6			
							30					15		EC11K1520401		
							18					9		With	0.5	EC11K0924401
							30					15			EC11K1524402	
							18					9		1.5	EC11K0925401	
							30					15			EC11K1525401	
						18	9	Without	—	EC11K0920601						
						30	15			EC11K1520601						
						18	9	With	0.5	EC11K0924601						
30	15	EC11K1524601														
18	9	1.5				EC11K0925601										
30	15					EC11K1525601										
18			9	9	Without	—	500,000	2,000	EC11K0920801	6						
									30		15	EC11K1520801				
									18		9	With	0.5	EC11K0924801		
									30		15		EC11K1524801			
									18		9	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	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	14			
		Slotted	Outer-shaft=15					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


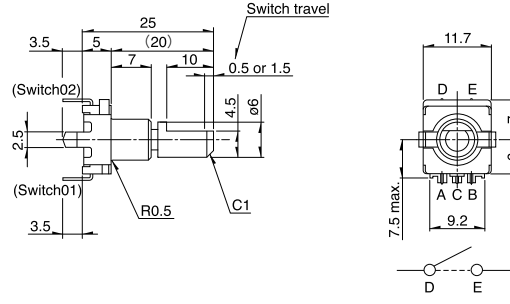
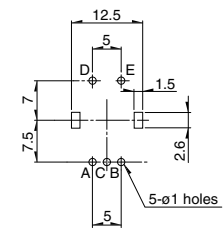

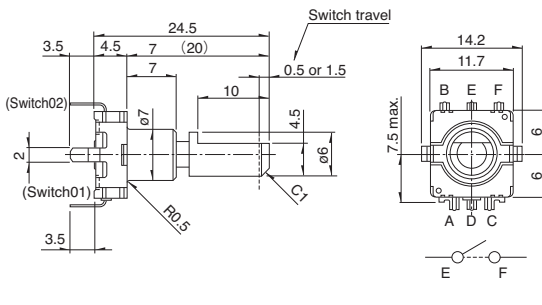
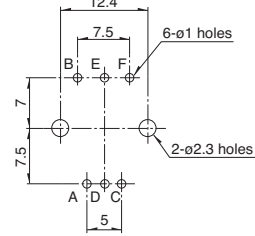
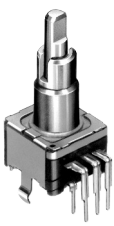
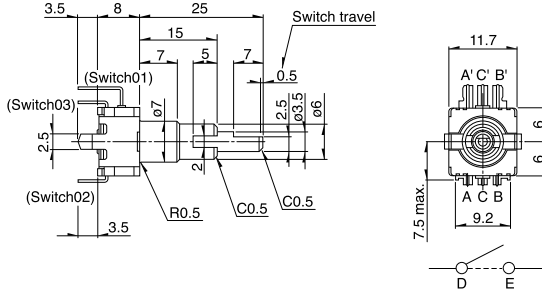
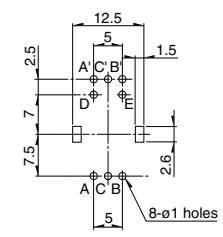
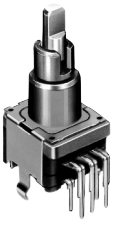
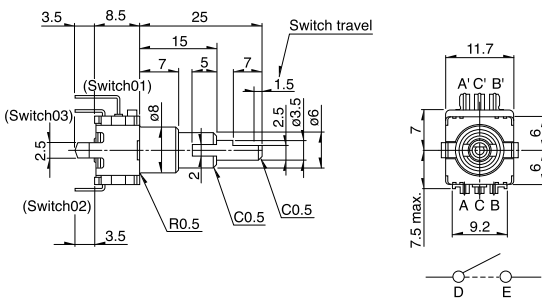
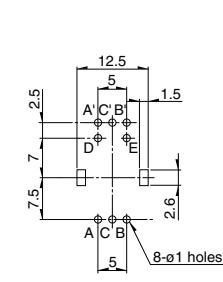
Dimensions

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)
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

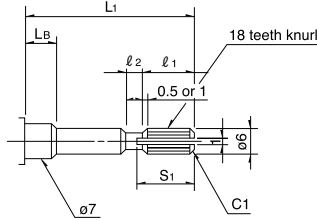
1. Single-shaft Type (EC11K is excluded. Refer to P.212 for EC11K)

1) Knurled Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)

Not applicable for EC11E with push-lock mechanism



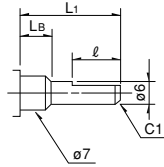
Detailed dimensions

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

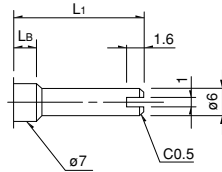
※ Does not comply with EC111

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

3) Slotted Type

Unit:mm

Configuration (Shaft diameter: $\phi 6$)



Detailed dimensions

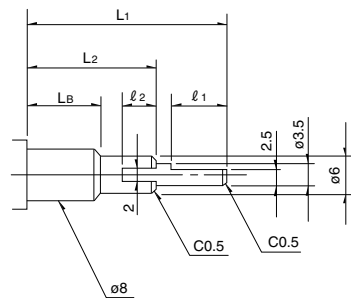
L ₁	L _B
15	7
20	7
25	10

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	      													
Slide	Output					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°		—				
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		
Power	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										
Ring Type	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										
Hollow Shaft	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	
	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

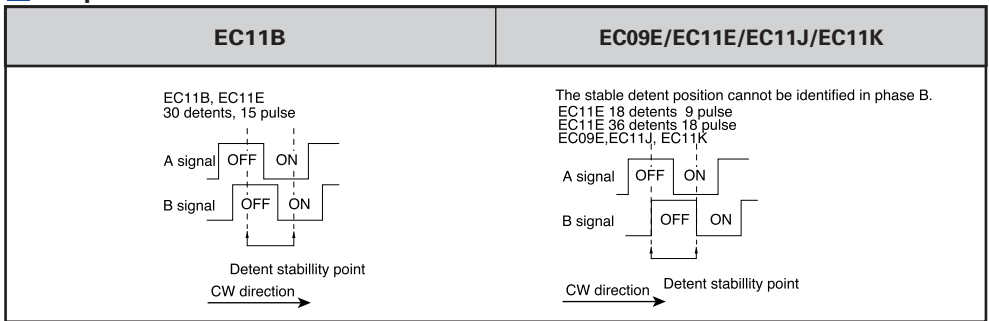
Dual-in-line
Package Type

TACT Switch™

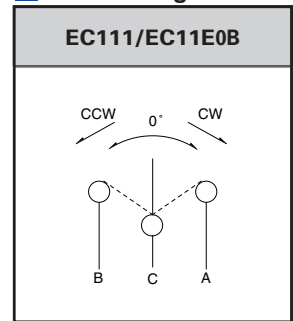
Custom-
ProductsMetal
ShaftInsulated
ShaftHollow
ShaftRing
Type

Product Specifications

Output Wave



Circuit Diagram



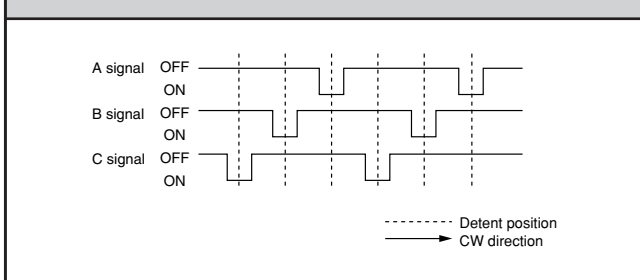
Detector
Push
Slide
Rotary
Encoders

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

Metal Shaft
Insulated Shaft
Hollow Shaft
Ring Type



EC11EH



EC20A

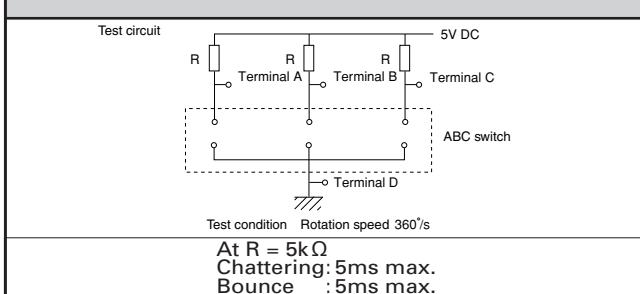
Shaft rotational Direction	Signal	Output
Clockwise	A (Terminal A-C)	OFF ON
	B (Terminal B-C)	OFF ON
Counter-clockwise	A (Terminal A-C)	OFF ON
	B (Terminal B-C)	OFF ON

The dotted lines indicate detent positions

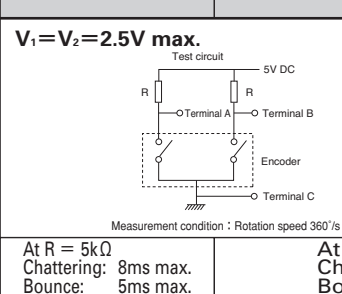
Sliding Noise

EC09E	EC11B	EC11E
<p>$V_1 = V_2 = 1.5V$ max.</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</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>

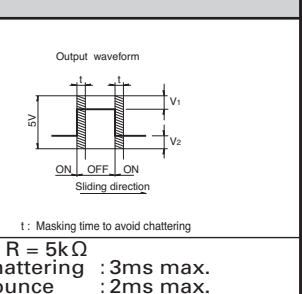
EC11EH



EC20A



EC11J/EC11K



Attached Parts

EC11B Series

Unit:mm

