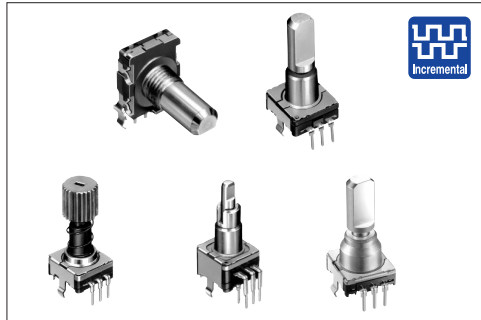


Encoder 11mm Size Metal Shaft Type

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		EC11E1530401	
				10±7						36		EC11E1820402	
				7 ⁺³ ₋₄						Without		EC11E1830401	
				10±7						18	9	EC11E09244BS	
			10±7	18	9	With	0.5			EC11E15244G1	5		
				30	15					EC11E153440D			
				7 ⁺³ ₋₄						Without		EC11E18244AU	
				10±7						36		EC11E183440C	
				7 ⁺³ ₋₄						Without		EC11E09244AQ	
				10±7						18		9	EC11E15244B2
			10±7	18	9	With	1.5			EC11E1534408		6	
				30	15					EC11E18244A5			
				7 ⁺³ ₋₄						Without			EC11E1834403
				10±7						36			100,000
				7 ⁺³ ₋₄						Without	EC11K1520401		
				10±7						18	9		
			12±5	18	9	With	0.5			EC11K1524402	7		
				30	15					EC11K0925401			
				18	9					EC11K1525401			
				30	15					500,000			EC11K0920601
				18	9							EC11K1520601	
				30	15						EC11K0924601		
			12±5	18	9	With	1.5				EC11K1524601	7	
				30	15						EC11K0925601		
				18	9					EC11K1525601			
30	15	1,000,000		EC11K0920801									
18	9			EC11K1520801									
30	15			EC11K0924801									
12±5	18		9	With	0.5	EC11K1524801	7						
	30		15			EC11K0925801							
	18	9	EC11K1525801										
	30	15	1,000,000			EC11K1525801							
	18	9				1,000,000		EC11K1525801					
	30	15					EC11K1525801						

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	—		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		EC1110120005	10						
Slide							20	18			30	18	ABC switch	With	0.5	30,000	EC111012010H	11
																	1.5	
Rotary	ABC switch	Flat	20	10±7	30	Self-return switch	With	0.5	30,000	2,400	EC11EH124403	12						
Encoders											30		0.5	EC11EH224403				
											18		1.5	EC11EH124404				
Power	Dual-shaft	Flat	20	10±7	30	Self-return switch	With	1.5	30,000	2,400	EC11EH224404							
Dual-in-line Package Type											0.5		EC11EBB24C03	13				
TACT Switch™											Without	—	EC11E0B2LB01	14				
											With	1.5	EC11E0B2LB01	14				
Custom-Products		Slotted	Outer-shaft=15	3 to 30	Without	Self-return switch	Without	—	15,000	1,400	EC11E0B2LB01	14						

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).

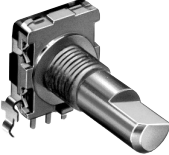
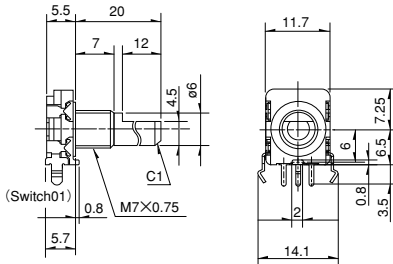
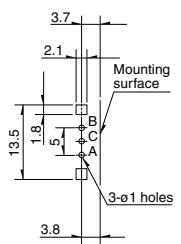
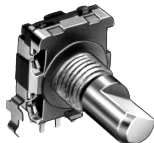
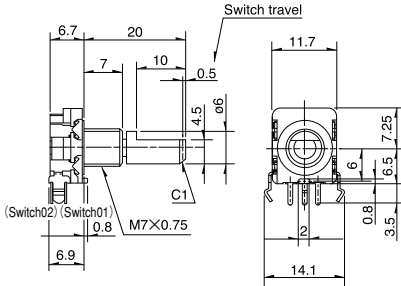
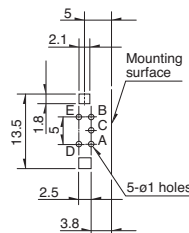
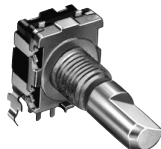
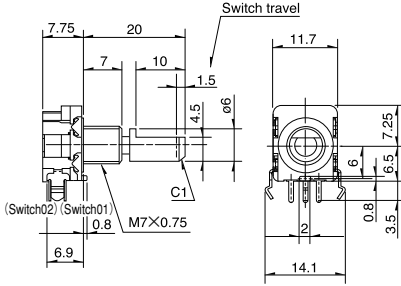
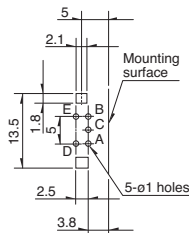
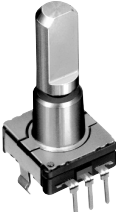
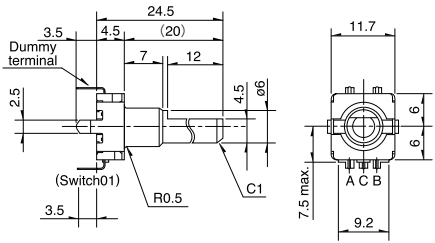
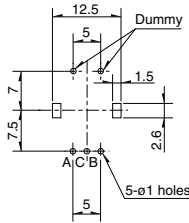
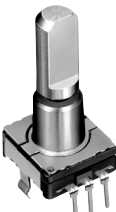
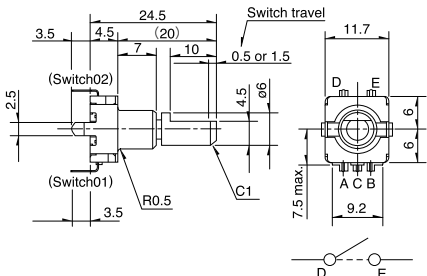
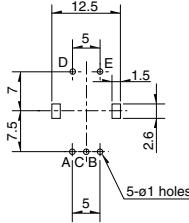


Automotive Use

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	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) 		

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

Unit:mm

Automotive Use

Product Varieties

Shaft Dimensions

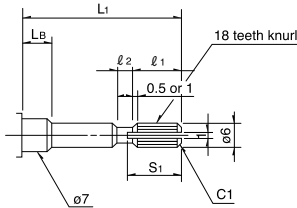
1. Single-shaft Type (EC11K is excluded. Refer to P.212 for EC11K)

1) Knurled Type

Unit:mm

Configuration(Shaft diameter: $\phi 6$)

Not applicable for EC11E with push-lock mechanism



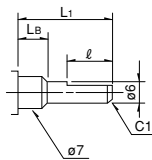
Detailed dimensions

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

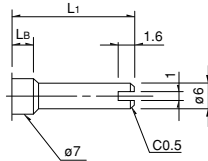
※Does not comply with EC111

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

3) Slotted Type

Unit:mm

Configuration(Shaft diameter: $\phi 6$)



Detailed dimensions

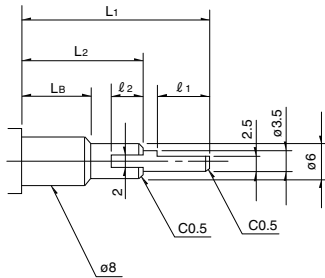
L ₁	L _B
15	7
20	7
25	10

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

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

TACT Switch™

Custom-
Products

Metal Shaft

Insulated Shaft

Hollow Shaft

Ring Type

Type		Metal shaft						
		9mm size	11mm size					
Series		EC09E	EC11B	EC11E		EC111	EC11EH	
Photo								
Output		Incremental				Self-return switch	ABC switch	
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	9.5	11.7					
	D		13.8		12	13	12	
	H	4.5	5.5	4.5	8.5	5	4.5	
Soldering	Manual soldering	350℃ max. 3s max.						
	Dip soldering	260±5℃, 3±1s		260±5℃, 5±1s				
Operating temperature range		-40℃ to +85℃						
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± 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℃ for 240h						
	Dry heat	+85±3℃ for 240h						
	Damp heat	60±2℃, 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 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		20.2	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™

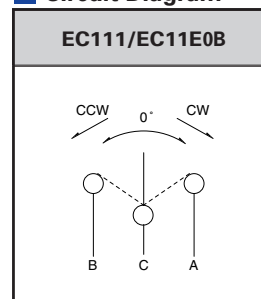
Custom-
ProductsMetal
ShaftInsulated
ShaftHollow
ShaftRing
Type

Product Specifications

Output Wave

EC11B	EC09E/EC11E/EC11J/EC11K
EC11B, EC11E 30 detents, 15 pulse 	The stable detent position cannot be identified in phase B. EC11E 18 detents 9 pulse EC11E 36 detents 18 pulse EC09E, EC11J, EC11K

Circuit Diagram



EC11EH	EC20A													
A signal OFF ON B signal OFF ON C signal OFF ON ----- Detent position -----> CW direction	<table><tr><th>Shaft rotational Direction</th><th>Signal</th><th>Output</th></tr><tr><td rowspan="2">Clockwise</td><td>A (Terminal A-C)</td><td>OFF ON</td></tr><tr><td>B (Terminal B-C)</td><td>OFF ON</td></tr><tr><td rowspan="2">Counter-clockwise</td><td>A (Terminal A-C)</td><td>OFF ON</td></tr><tr><td>B (Terminal B-C)</td><td>OFF ON</td></tr></table> The dotted lines indicate detent positions	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
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												

Sliding Noise

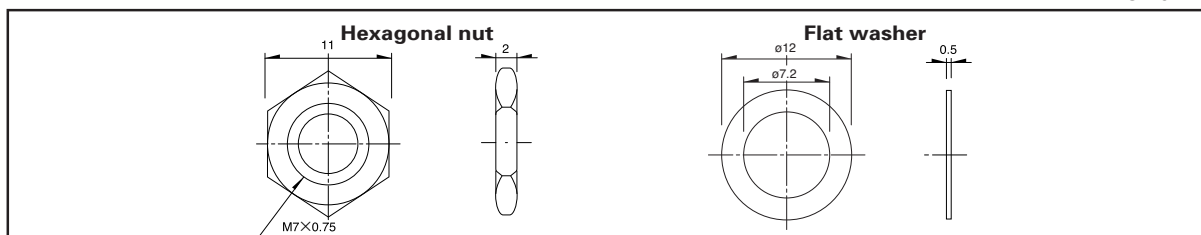
EC09E	EC11B	EC11E
$V_1 = V_2 = 1.5V \text{ max.}$		
Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering		
At R = 5kΩ Chattering: 5ms max. Bounce: 2ms max.	At R = 5kΩ Chattering: 2ms max. Bounce: 2ms max.	At R = 5kΩ Chattering: 3ms max. Bounce: 2ms max.

EC11EH	EC20A	EC11J/EC11K
$V_1 = V_2 = 2.5V \text{ max.}$		
Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering		
At R = 5kΩ Chattering: 5ms max. Bounce: 5ms max.	At R = 5kΩ Chattering: 8ms max. Bounce: 5ms max.	At R = 5kΩ Chattering: 3ms max. Bounce: 2ms max.

Attached Parts

EC11B Series

Unit:mm



Automotive Use