

Encoder 11mm Size Metal Shaft Type

EC11 Series



Compact and highly reliable type available in many varieties.



Features

- Compact and highly accurate sliding contact type encoder.
- 1.5mm-travel push switch with compliance to 4.5mm height.
- Incremental type.
- Operation life 1,000,000cycles can be supported (EC11J).

Applications

- For controlling volume in car AV equipment, volume and menu selection in car navigation systems and various in-car components where less mounting surface is required
- For various types of controlling in DVD players/recorders, mini component stereos, CD players, portable audio players and various AV equipment
- For home appliances (microwave ovens)

Typical Specifications

Items	Specifications
Rating	10mA 5V DC
Operating life	15,000cycles EC11J:100,000cycles / 500,000cycles / 1,000,000cycles

Product Line

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 packing unit (pcs.)	Product No.	Drawing No.
Horizontal	Flat	20	12±7	30	15	Without	—		700	EC11B15202AA	1
						With	0.5			EC11B15242AE	2
							1.5			EC11B15242AF	3
Vertical			10±7	18	9	Without	—	15,000	1,200	EC11E09204A4	4
				30	15					EC11E15204A3	
			7 ⁺³ ₋₄	Without						EC11E1530401	
			10±7	36	18					EC11E1820402	
			7 ⁺³ ₋₄	Without						EC11E1830401	
			10±7	18	9	With	0.5			EC11E09244BS	5
				30	15					EC11E15244G1	
			7 ⁺³ ₋₄	Without						EC11E153440D	
			10±7	36	18					EC11E18244AU	
			7 ⁺³ ₋₄	Without						EC11E183440C	
			10±7	18	9		1.5			EC11E09244AQ	
				30	15					EC11E15244B2	
7 ⁺³ ₋₄	Without	EC11E1534408									
10±7	36	18	EC11E18244A5								
7 ⁺³ ₋₄	Without		EC11E1834403								

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

Multi Control
Devices

TACT Switch™

Custom-
Products

Incremental
Type

Absolute
Type

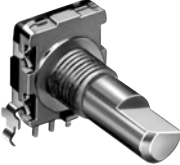
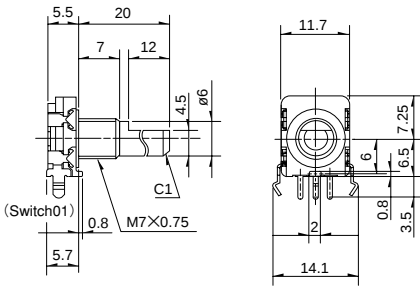
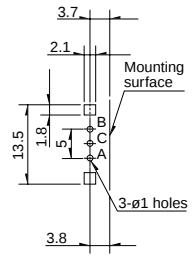
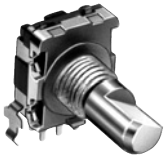
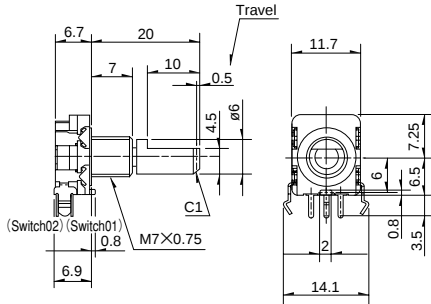
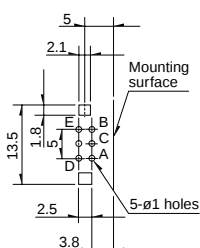
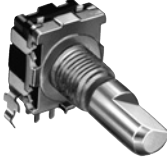
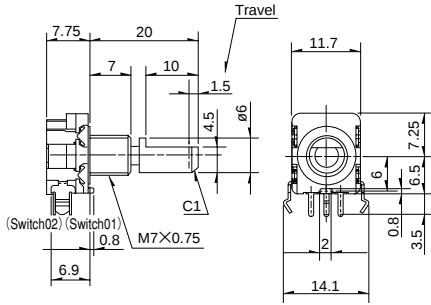
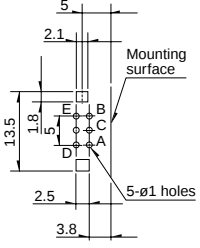
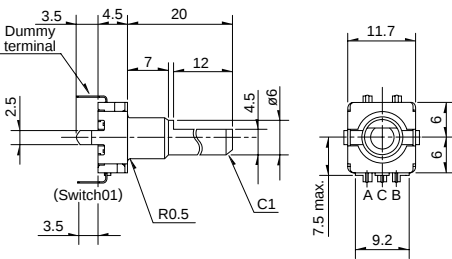
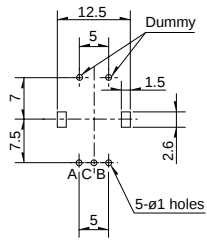
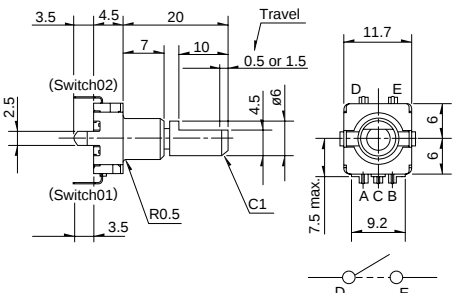
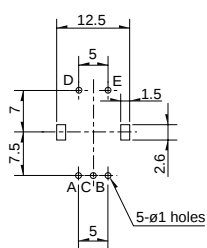
Product Line

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 packing unit (pcs.)	Product No.	Drawing No.					
Less shaft wobble	20-tooth serration	18	10±7	30	15	With	1.5	15,000	1,200	EC11G1524402	6					
			7 ⁺³ ₋₄	Without						EC11G1534403						
Reflow	Flat	20	12±5	18	9	Without	—	100,000	300	EC11J0920401	7					
				30	15					EC11J1520401						
				18	9	With	0.5			EC11J0924401	8					
				30	15					EC11J1524401						
				18	9		1.5			EC11J0925401						
				30	15					EC11J1525401						
				18	9	Without	—	EC11J0920601		7						
				30	15			EC11J1520601								
				18	9	With	0.5	EC11J924601		8						
				30	15			EC11J1524601								
				18	9		1.5	EC11J0925601								
				30	15			EC11J1525601								
				18	9	Without	—	EC11J0920801		7						
				30	15			EC11J1520801								
				18	9	With	0.5	EC11J092481		8						
				30	15			EC11J1524801								
				18	9		1.5	EC11J0925801								
				30	15			EC11J1525801								
				Push lock	20-tooth serration	25	10±7	30		15	Without	—	15,000	1,000	EC11E152T409	9
						26.4					With	8		800	EC11E152U402	10
				Self-return switch	Flat	20	3 to 30	Without		Self-return switch	Without	—		1,200	EC1110120001	11
											With	0.5			EC111012010H	12
				Dual-shaft	Flat	Inner-shaft=25	10± 7	30		15		Without			1.5	
					Slotted	Outer-shaft=15					0.5				EC11EBB24C03	
Flat	Inner-shaft=25	Without	1.5		700	EC11E0B2LB01			14							
Slotted	Outer-shaft=15	3 to 30	Without				Self-return switch	Without		—						

Note
Products other than those listed in the above chart are also available. Please contact us for details.

Dimensions

Unit:mm

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

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

Multi Control
Devices

TACT Switch™

Custom-
Products

Incremental
Type

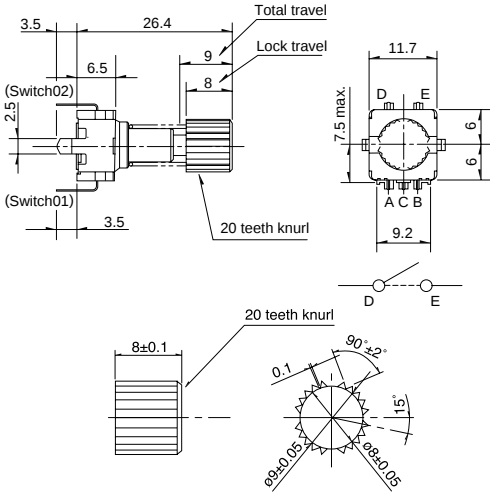
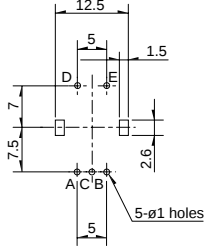
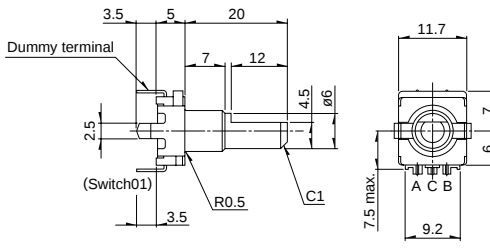
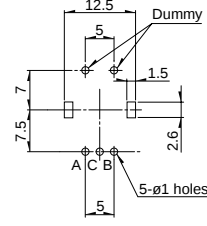
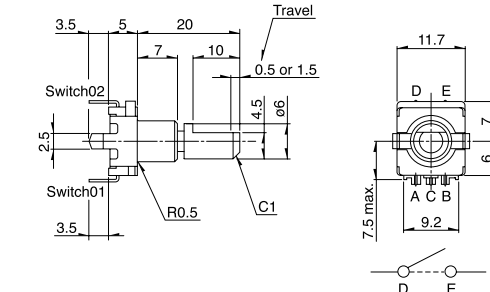
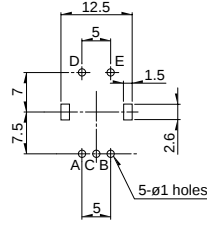
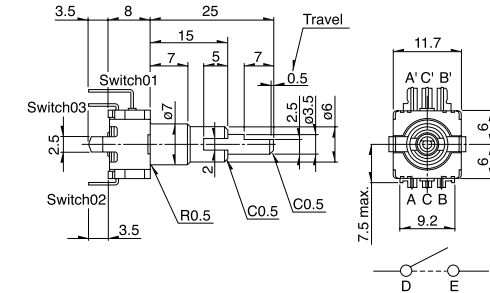
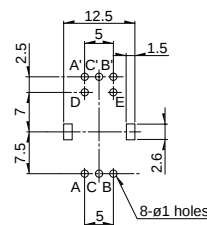
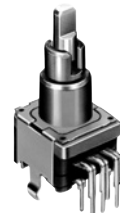
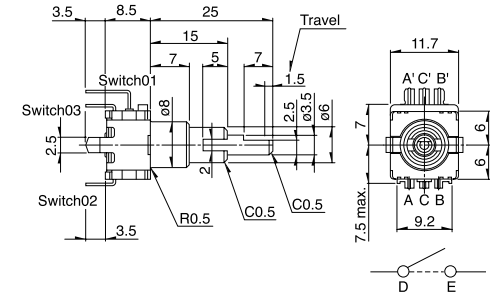
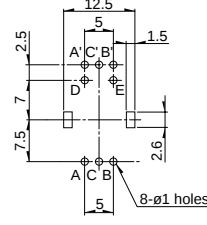
Absolute
Type

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
6	Less shaft wobble with push-on switch (travel 1.5mm)		
7	Reflow applicable parts		PC board mounting detail A slant line part shows the solder land Black part : Do not solder and wiring for electrical contact
8	Reflow applicable parts with push-on switch (travel 0.5/1.5mm)		PC board mounting detail A slant line part shows the solder land Black part : Do not solder and wiring for electrical contact
9	Push-lock mechanism		

Dimensions

Unit:mm

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

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

Multi Control
Devices

TACT Switch™

Custom-
Products

Incremental
Type

Absolute
Type

Product Varieties

Shaft Dimensions

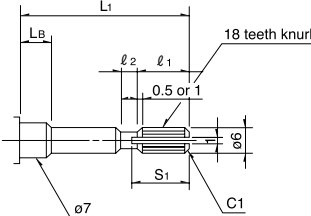
1. Single-shaft Type

1) Knurled Type

Unit:mm

Configuration (Shaft diameter : $\phi 6$)

Not applicable for EC11E and EC11G with push-lock mechanism



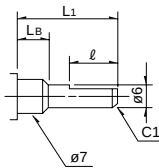
Detailed dimensions

L ₁	L _B	ℓ ₁	ℓ ₂	S ₁
20	7	6	1	7
25	7	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	7	12

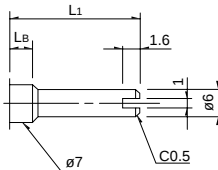
※Does not comply with EC111

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

3) Slotted Type

Unit:mm

Configuration (Shaft diameter : $\phi 6$)



Detailed dimensions

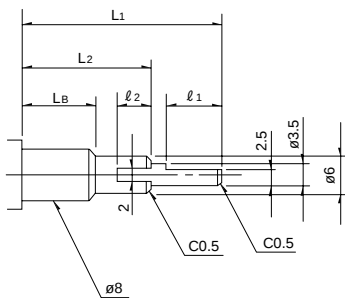
L ₁	L _B
15	7
20	7
25	7

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	7	7	5

Notes

1. The highlighted figures in shaft types refer to Product Specifications in P.194 and P.195.
2. Products other than those listed in the above chart are also available. Please contact us for details

Product Specifications

Items		EC11B	EC11E/EC11G	EC11J	EC111	EC20A
Detector	Operating temperature range	-30°C to +85°C		-40°C to +85°C	-30°C to +85°C	-30°C to +80°C
	Maximum operating current (Resistive load)	10mA				0.5mA
Push	Electrical performance	Rating				0.5mA 5V DC
Slide		Output signal				Output of A and B signals, proportionate to phase difference
Rotary		Insulation resistance				10MΩ min. 250V DC
Encoders		Voltage proof				300V AC for 1minute
Power	Mechanical performance	Rotational torque (without click feeling)				7 ⁺³ ₋₄ mN·m
Dual-in-line Package Type		Detent torque				12±7mN·m
Multi Control Devices		Push-pull strength				100N
TACT Switch™		Resistance to soldering heat				350°C max. 3s max.
Custom-Products		Manual soldering				260±5°C, 5±1s
		Dip soldering				260±5°C, 5±1s
		Reflow soldering				Please see P.235
Incremental Type	Durability	Rotational life		15,000cycles	100,000cycles	15,000cycles
Absolute 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

Push-on Switch Specifications

Items	EC11B	EC11E/EC111/EC11G	EC11J	EC20A
Circuit · number of contacts	Single pole and single throw (Push-on)			
Travel (mm)	0.5± ^{0.4} _{0.3}	1.5±0.5	0.5±0.3	1.5±0.5
Operating force(N)	6±3	5±2	6± ^{2.5} ₂	4±2
Rating	3A 16V DC (10mA 16V DC min. ratings)	0.5A 16V DC (1mA 16V DC min. ratings) 0.5A 12V DC ※	0.1A 5V DC	0.5A 16V DC (1mA 16V DC min. ratings)
Contact resistance	100mΩ for initial period; 200mΩ after rotational life			
Operating life	25,000 times min.	20,000times min. 10,000times min.※	1,000,000 times min.	100,000 times min.

Note

※marked specification is only applicable to EC11E152U402.

Product Specifications

Output Wave

EC11B	EC11E/EC11G/EC11J	EC111	EC20A																
EC11B, EC11E, EC11G 30 detents, 15 pulse A signal B signal Detent stability point CW direction The stable detent position cannot be identified in phase B. EC11E 18 detents 9 pulse EC11G 36 detents 18 pulse EC11J A signal B signal Detent stability point CW direction		CCW 0° CW B C A	<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><tr><td colspan="2"></td><td>The dotted lines indicate detent positions</td></tr></table>	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
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

EC11B	EC11E/EC11G/EC11J	EC111	EC20A
$V_1=V_2=1.5V$ max. Test circuit 5V DC R Terminal A Terminal B Encoder Terminal C Output waveform 5V ON OFF ON Sliding direction Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering At R = 5kΩ Chattering : 2ms max. Bounce : 2ms max.		—	$V_1=V_2=1.5V$ max. Test circuit 5V DC R Terminal A Terminal B Encoder Terminal C Output waveform 5V ON OFF ON Sliding direction Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering At R = 5kΩ Chattering : 8ms max. Bounce : 5ms max.

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package TypeMulti Control
Devices

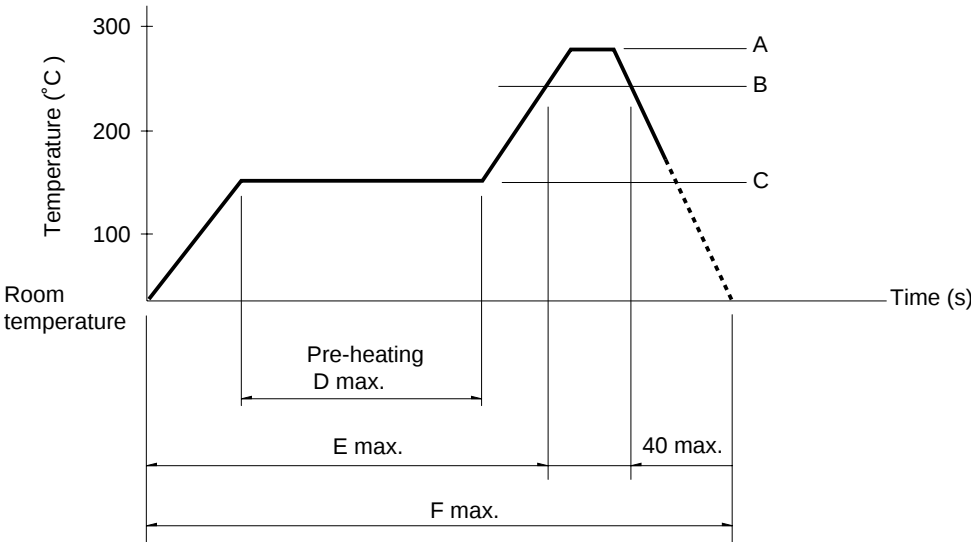
TACT Switch™

Custom-
ProductsIncremental
TypeAbsolute
Type

Soldering Conditions

Example of Reflow Soldering Condition

- 1. Heating method: Double heating method with infrared heater.
- 2. Temperature measurement: Thermocouple 0.1 to 0.2 ϕ CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.
- 3. Temperature profile



Series(Reflow type)	A (°C) 3s max.	B (°C)	C (°C)	D (s)	E (s)	F (s)
EC11J	260	230	150	120	—	240

Notes

- 1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface temperatures.
- 2. Soldering conditions differ depending on reflow soldering machines. Prior verification of soldering condition is highly recommended.

Detector

Push

Slide

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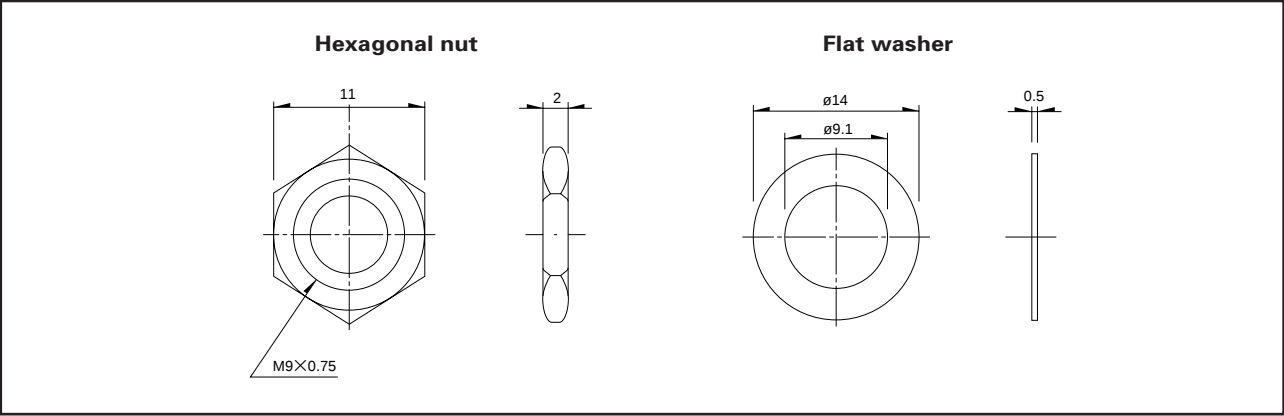
Absolute
Type

Attached Parts

The following parts are included with the product.

SRGH Series

Unit:mm



RK097, EC11B Series

Unit:mm

