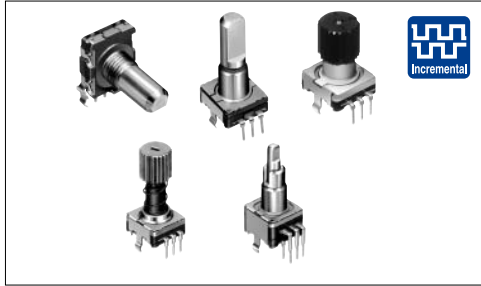


Encoder 11mm Size Metal Shaft Type

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

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	—	15,000	700	EC11B15202AA	1			
						With	0.5			EC11B15242AE	2			
							1.5			EC11B15242AF	3			
Vertical	Flat	20	10 ± 7	18	9	Without	—	15,000	1,200	EC11E09204A4	4			
				30	15					EC11E15204A3				
				Without	18					EC11E1530401				
			10 ± 7	36	18	EC11E1820402								
			7 ⁺³ / ₋₄	Without	18	EC11E1830401								
			With	10 ± 7	18	9	0.5			15,000	1,200	EC11E09244BS	5	
				30	15	EC11E15244G1								
				7 ⁺³ / ₋₄	Without	18	EC11E153440D							
				10 ± 7	36	18	EC11E18244AE							
				7 ⁺³ / ₋₄	Without	18	EC11E1834404							
				1.5	10 ± 7	18	9					1.5		EC11E09244AQ
					30	15	EC11E15244B2							
				Without	7 ⁺³ / ₋₄	Without	15					1.5		EC11E1534408
					10 ± 7	36	18							EC11E18244A5
					7 ⁺³ / ₋₄	Without	18							EC11E1834403

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 order unit (pcs.)	Product No.	Drawing No.	
Detector	Less shaft wobble	20-tooth serration	18	10 ± 7	30	15	With	1.5	15,000	1,200	EC11G1524402	6	
				$7 \begin{smallmatrix} +3 \\ -4 \end{smallmatrix}$	Without		EC11G1534403						
Push	Push lock	20-tooth serration	25	10 ± 7	30	15	Without	—	15,000	1,000	EC11E152T409	7	
Slide							With	8		800	EC11E152U402	8	
Rotary Encoders	Self-return switch	Flat	15	3 to 30	Without	Self-return switch	Without	—	15,000	1,200	EC1110120005	9	
							With	0.5			1,000		EC1110120103
								1.5					EC1110120201
Power Dual-in-line Package Type TACT Switch™ Custom-Products	ABC switch	Flat	20	10 ± 7	18	ABC switch	With	0.5	30,000	1,000	EC11EH124403	11	
											30		EC11EH224403
											18		EC11EH124404
											1.5		EC11EH224404
Dual-shaft	Dual-shaft	Slotted	Inner-shaft=25	30	30	15	Without	0.5	15,000	1,200	EC11EBB24C03	12	
			Outer-shaft=15					-					
		Flat	Inner-shaft=25	Without	1.5	700	EC11E0B2LB01	13					
			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.

Incremental Type

Absolute Type

Refer to P.191 for product varieties.
Refer to P.191 for attached parts.

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

TACT Switch™

Custom-
Products





Incremental
Type

Absolute
Type

Dimensions


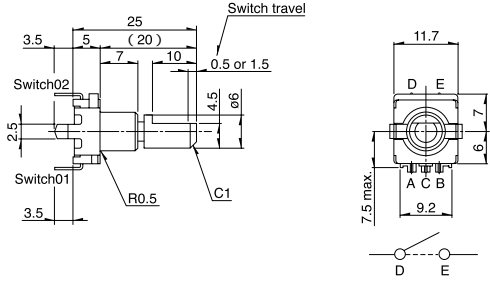
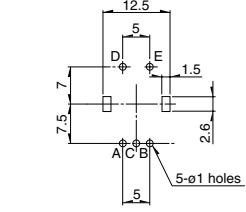

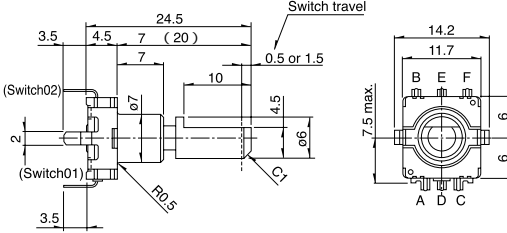
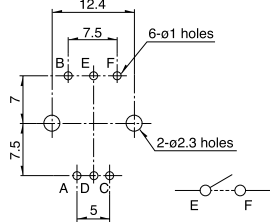
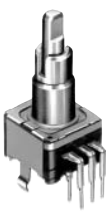
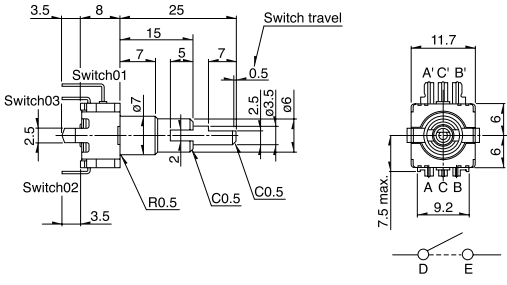
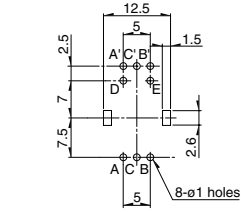

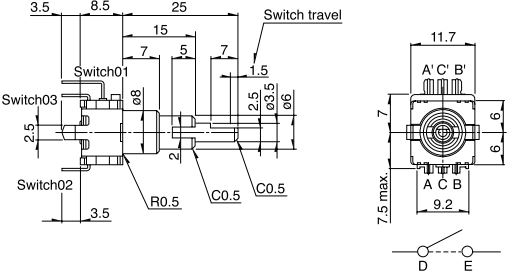
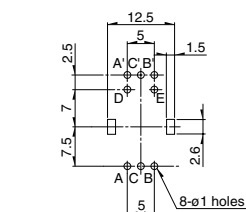
Unit:mm

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

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
6	<p>Less shaft wobble with push-on switch (travel 1.5mm)</p> 		
7	<p>Push-lock mechanism</p> 		
8	<p>Push-lock mechanism with push-lock switch</p> 		
9	<p>Self-return switch</p> 		

Dimensions

Unit:mm

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

Incremental
Type

Absolute
Type

Product Varieties

Shaft Dimensions

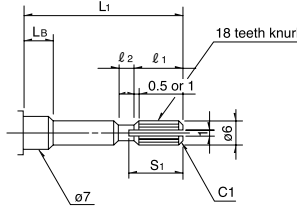
1. Single-shaft Type

1) Knurled Type

Unit:mm

Configuration (Shaft diameter : 6)

Not applicable for EC11E with push-lock mechanism and EC11G



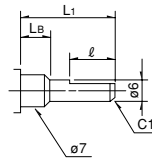
Detailed dimensions

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 : 6)



Detailed dimensions

L ₁	L _B	ℓ
15	5	7
15	7	5(6)
20	7	10(12)
25	7	12

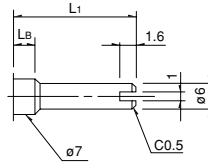
Does not comply with EC111

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

3) Slotted Type

Unit:mm

Configuration (Shaft diameter : 6)



Detailed dimensions

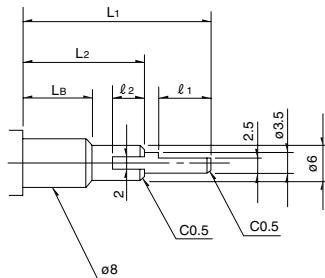
L ₁	L _B
15	7
20	7
25	7

2. Standard Dimensions and configuration of Dual-shaft Type

1) Flat Type

Unit:mm

Configuration (Inner-shaft : 3.5 Outer-shaft : 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

- The highlighted figures in shaft types refer to Product Specifications in P.181 and P.182.
- Products other than those listed in the above chart are also available. Please contact us for details







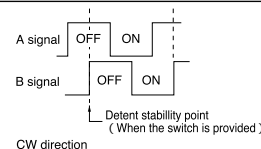
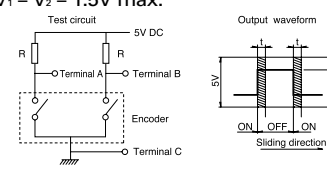
List of Varieties

Type	Metal shaft										
	9mm size		11mm size								
Series	EC09E	EC11B	EC11E	EC111	EC11EH						
Detector	Photo										
Push	Output										
Slide	Incremental				Self-return switch	ABC					
Rotary	Shaft types		Single-shaft		Dual-shaft	Single-shaft					
Encoders	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					
Power	Push switch (Travel mm)		Without/With(0.5, 1.5)								
	Optional functions		Push-lock mechanism Without detent								
Dual-in-line Package Type	Changeover angle				17 to 40°	—					
TACT Switch™	Dimensions (mm)	W	9.5	12.3	11.7						
Custom-Products		D	—	13.8	12	13	12				
		H	4.5	5.4	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		-30 to +85		-40 to +85					
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.191							
	Sliding noise	<p>$V_1 = V_2 = 1.5V$ max.</p> <p>At R = 5 k Chattering:5ms max. Bounce :2ms max.</p>		Please see P.191							
	Insulation resistance	100M min. 250V DC									
	Voltage proof	300V AC for 1minute									
Mechanical performance	Rotational torque	—		$7 \pm \frac{3}{4}$ mN·m	3 to 30mN·m						
	Detent torque	8 ± 5 mN·m	12 ± 7 mN·m	10 ± 7 mN·m	10 ± 7 mN·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									
Push-on Switch Specifications	Circuit · number of contacts	Single pole and single throw(Push-on)									
	Travel (mm)	0.5 ± 0.3	1.5 ± 0.5	$0.5 \pm \frac{0.4}{0.3}$	1.5 ± 0.5	0.5 ± 0.3	1.5 ± 0.5	$0.5 \pm \frac{0.4}{0.3}$	1.5 ± 0.5		
	Operating force(N)	$6 \pm \frac{2.5}{2}$	4 ± 2	6 ± 3	5 ± 2	$6 \pm \frac{2.5}{2}$	4 ± 2	$6 \pm \frac{2.5}{2}$	4 ± 2	6 ± 2.5	4 ± 2
	Rating	10mA 5V DC		3A 16V DC (10mA 16V DC min. ratings)		0.5A 16V DC, 1mA 16V DC min. ratings		0.5A 12V DC		20mA 16V DC (1mA 16V DC min. ratings)	
	Contact esistance	100m max. for initial period; 200m max. after operating life.									
Operating life	10,000times min.		25,000 times min.	20,000times min. 10,000times min.			20,000 cycles				
Page	180			181							

Note

marked specification is only applicable to EC11E152U402.

List of Varieties

Type	Metal shaft				Insulated shaft			
	11mm size		20mm size		12mm size			
Series	EC11G	EC11J	EC11K	EC20A/RK203	EC12E			
					Standard detent	Without detent	EC12D	
Photo								
	Output	Incremental						
Outline specifications	Shaft types	Single-shaft						
	Operating direction	Vertical						
	Number of pulse/ Number of detent	15/30	9/18 15/30		18/18	12/12 24/24	15/30	
	Push switch (Travel mm)	Without With(1.5)	Without With(0.5, 1.5)		Without With(1.5)	Without	With(0.5)	
	Optional functions	—						
	Changeover angle	—						
Dimensions (mm)	W	11.7		2.0	12.4	12.5		
	D	12	14.2		19.2	13.2	11.7	
	H	4.5		10	5			
Soldering	Manual soldering	350 max. 3s max.						
	Dip soldering	260 ± 5 , 5 ± 1s	—		260 ± 5 , 5 ± 1s	260 ± 5 , 3 ± 1s		
	Reflow soldering	Please see P.189		—				
Operating temperature range	-30 to +85	-40 to +85		-30 to +80	-10 to +70	-40 to +85		
Maximum operating current (Resistive load)	10mA		1mA		5mA	10mA		
Electrical performance	Output signal	Output of A and B signals, proportionate to phase difference						
	Output wave	Please see P.191						
	Sliding noise	Please see P.191				<p>$V_1 = V_2 = 1.5V \text{ max.}$</p>  <p>Measurement condition : Rotation speed 360°/s 1 : Masking time to avoid chattering</p> <p>At R = 10k Chattering : 3ms max. Bounce : 2ms max. At R = 5k Chattering : 3ms max. Bounce : 2ms max.</p>		
	Insulation resistance	100M min. 250V DC			10M min. 50V DC	100M min. 250V DC		
	Voltage proof	300V AC for 1minute			50V AC for 1minute	300V AC for 1minute or 360V AC for 1s.		
	Mechanical performance	Rotational torque	$7 \pm \frac{3}{4} \text{ mN}\cdot\text{m}$		—		10mN·m max. 25 ± 15mN·m 40 ± 15mN·m	
Detent torque		$10 \pm 7 \text{ mN}\cdot\text{m}$		$12 \pm 5 \text{ mN}\cdot\text{m}$	$40 \pm 20 \text{ mN}\cdot\text{m}$	$3 \pm 2 \text{ mN}\cdot\text{m}$ 3 to 20mN·m	$5 \pm 3 \text{ mN}\cdot\text{m}$ $10 \pm 5 \text{ mN}\cdot\text{m}$	
Push-pull strength		100N			80N	100N		
Environmental performance	Cold	-40 ± 3 for 240h				-40 ± 3 for 240h ± 10h		
	Dry heat	85 ± 3 for 240h				85 ± 3 for 240h ± 10h		
	Damp heat	60 ± 2 , 90 to 95% RH for 240h				60 ± 2 , 90 to 95%RH for 240h ± 10h		
Push-on Switch Specifications	Circuit · number of contacts	Single pole and single throw (Push-on)					Single pole and single throw (Push-on)	
	Travel (mm)	0.5 ± 0.3	1.5 ± 0.5	0.5 ± 0.3	1.5 ± 0.5	0.5 ± 0.3	0.5 ± 0.3	
	Operating force (N)	$6 \pm \frac{2.5}{2}$	4 ± 2	5 ± 2	4 ± 2	5 ± 2	4 ± 2	$3 \pm \frac{1.5}{1.0}$ $6 \pm \frac{2.5}{2}$
	Rating	0.5A 16V DC (1mA 16V DC min. ratings)		0.1A 5V DC		0.5A 16V DC (1mA 16V DC min. ratings)		1mA 5V DC
	Contact esistance	100m for initial period; 200m after operating life						100m for initial period; 200m after operating life
	Operating life	20,000times min.	1,000,000 times min.	500,000 times min.	1,000,000 times min.	100,000 times min.	20,000times min.	30,000times min.
Page	181		187		190	192		

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line Package Type

TACT Switch™

Custom-Products

Incremental Type

Absolute Type

Product Specifications

Output Wave

EC11B	EC11E/EC11G/EC11J/EC11K	EC111/EC11E													
<p>EC11B, EC11E, EC11G 30 detents, 15 pulse</p>	<p>The stable detent position cannot be identified in phase B. EC11E 18 detents 9 pulse EC11G 36 detents 18 pulse EC11J, EC11K</p>														
EC11EH	EC20A														
	<table border="1"> <thead> <tr> <th>Shaft rotational Direction</th> <th>Signal</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Clockwise</td> <td>A(Terminal A-C)</td> <td></td> </tr> <tr> <td>B(Terminal B-C)</td> <td></td> </tr> <tr> <td rowspan="2">Counter-clockwise</td> <td>A(Terminal A-C)</td> <td></td> </tr> <tr> <td>B(Terminal B-C)</td> <td></td> </tr> </tbody> </table> <p>The dotted lines indicate detent positions</p>		Shaft rotational Direction	Signal	Output	Clockwise	A(Terminal A-C)		B(Terminal B-C)		Counter-clockwise	A(Terminal A-C)		B(Terminal B-C)	
Shaft rotational Direction	Signal	Output													
Clockwise	A(Terminal A-C)														
	B(Terminal B-C)														
Counter-clockwise	A(Terminal A-C)														
	B(Terminal B-C)														

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line
Package Type

TACT Switch™

Custom-
Products

Sliding Noise

EC11B	EC11E/EC11G/EC11J/EC11K	EC111/EC11E
<p>$V_1 = V_2 = 1.5V \text{ max.}$</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p> <p>At R = 5k Chattering : 2ms max. Bounce : 2ms max.</p>	<p>At R = 5k Chattering : 3ms max. Bounce : 2ms max.</p>	
EC11EH	EC20A	
<p>Test circuit</p> <p>Test condition : Rotation speed 360°/s</p> <p>At R = 5k Chattering : 5ms max. Bounce : 5ms max.</p>	<p>$V_1 = V_2 = 1.5V \text{ max.}$</p> <p>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering</p> <p>At R = 5k Chattering : 8ms max. Bounce : 5ms max.</p>	

Incremental
Type

Absolute
Type

Attached Parts

EC11B Series

Unit:mm

