

EC09E 9mm Size Metal Shaft Type

A compact 9.5mm size and round shape contribute to save space



Typical Specifications



Items	Specifications
Rating	10mA 5V DC
Operating life	15,000 cycles
Operating temperature range	-40°C to +85°C

Product Line

Shaft configuration	Length of the shaft (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Push-on switch	Travel of push-on switch (mm)	Minimum order unit (pcs.)		Product No.	Drawing No.
								Japan	Export		
Flat	15	8±5	30	15	Vertical	Without	—	700	1,400	EC09E1520406	1
	20					With	0.5			EC09E1524405	2
						1.5	EC09E1524404				

Note

Shaft design and other features are customizable.

Packing Specifications

Tray

Number of packages (pcs.)		Export package measurements (mm)
1 case /Japan	1 case /export packing	
700	1,400	374×529×213

Dimensions

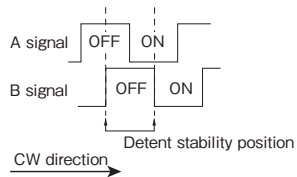
No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting face)
1			
2			

Refer to P.268 for switches.
Refer to P.307 for soldering conditions.

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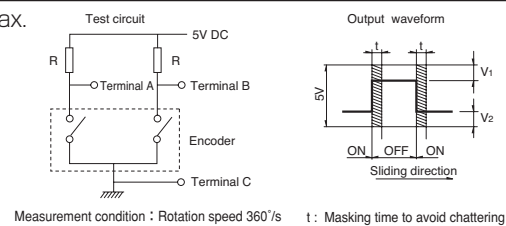
Output Wave

Detent stability position cannot be specified for B signal.



Sliding Noise

$V_1=V_2=2.5V$ max.



At $R = 5k\Omega$
Chattering: 5ms max. Bounce: 2ms max.

9mm Size Metal Shaft Type/Switch Specifications

Switch type		Momentary push switch	
Contact arrangement		Single pole and single throw (Push-on)	
Travel (mm)		0.5 ± 0.3	1.5 ± 0.5
Operating force		$6 \pm \frac{2}{5} N$	$4 \pm 2 N$
Operating life		10,000 times	
Electrical performance	Rating	10mA 5V DC (1mA 5V DC min. ratings)	
	Contact resistance	100mΩ max. for initial period, 200mΩ max. after operating life.	
	Insulation resistance	100MΩ min. 250V DC	
	Voltage proof	300V AC for 1 minute or 360V AC for 1s	

Encoders

List of Varieties

Encoders

Metal Shaft

Insulated Shaft

Hollow Shaft

Ring Type

Type		Metal shaft											
		9mm size		11mm size									
Series		EC09E		EC11B		EC11E				EC11G			
Photo													
Output		Incremental (Two phase A and B)											
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 or without 18 / 36 or without				15 / 30 or without			
Features		—		—		Without detent Push-lock mechanism		—		Less shaft wobble			
Dimensions (mm)	W	9.5		11.7									
	D			13.8		12							
	H	4.5		5.5		4.5		8 / 8.5		4.5			
Operating temperature range		-40℃ to+85℃											
Operating life		15,000 cycles											
Automotive use													
Life cycle (availability)													
Electrical performance	Rating	10mA 5V DC											
	Max./min. operating current (Resistive load)	10mA / 1mA											
	Insulation resistance	100MΩ min. 250V DC											
	Voltage proof	300V AC for 1 minute or 360V AC for 1s		300V AC for 1 minute or 360V AC for 2s									
Mechanical performance	Rotational torque (Without detent)	—		—		7 ± ³ / ₄ mN·m		—		8.5±5mN·m			
	Detent torque	8±5mN·m		12±7mN·m		10±7mN·m				12±7mN·m			
	Push-pull strength	100N											
Shaft configuration		Flat		Flat, Slotted, Serrated				Inner-shaft : Flat Outer-shaft : Slotted		Serrated			
Terminal type		Insertion											
Switch Specifications	Switch type	Push-on switch						Push-lock mechanism switch ※	Push-on switch				
	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	1.5±0.35		
	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	5±2		
	Rating	10mA 5V DC (500μA 5V DC min. ratings)		0.1A 5V DC (500μA 5V DC min. ratings)									
	Contact resistance	100mΩ max. for initial period; 200mΩ max. after operating life.											
	Operating life	10,000 times		25,000 times	20,000 times			10,000 times	20,000 times				
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Notes

- ※marked specification is only applicable to EC11E152U402.
- Indicates applicability to all products in the series.

Encoders Soldering Conditions

Reference for Manual Soldering

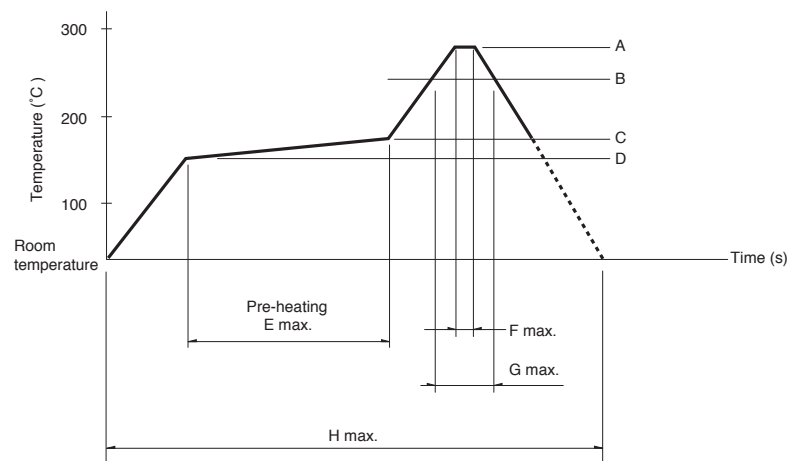
Series	Tip temperature	Soldering time	No. of solders
EC05E, EC09E, EC10E, EC111, EC11B, EC11E, EC11G, EC11K, EC12D, EC12E, EC18A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC40A, EC45A, EC50A, EC60B, EM11B, EM20B, EC21C	350°C max.	3s max.	1 time
EC11J	350±10°C	3 ⁺¹ ₀ s	2 time

Reference for Dip Soldering

Series	Preheating		Dip soldering		No. of solders
	Soldering surface temperature	Heating time	Soldering temperature	Soldering time	
EC09E, EC11B, EC111, EC11E, EC11G, EC11K, EC18A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC50A, EC60B	100°C max.	2 min. max.	260±5°C	5±1s	2 time max.
EC10E, EC12D, EC12E, EM11B	100°C max.	1 min. max.	260±5°C	3±1s	2 time max.
EC40A	110°C max.	1 min. max.	260°C max.	10s max.	1 time
EC45A	100°C max.	2 min. max.	260°C max.	5s max.	2 time max.
EM20B	80°C max.	1 min. max.	260°C max.	3s max.	2 time max.

Example of Reflow Soldering Condition

Temperature profile



Series	A	B	C	D	E	F	G	H	No. of reflows
EC11J	260°C	230°C	180°C	150°C	2 min. max.	3s	40s	4 min. max.	2 time max.
EC05E	250°C min.	230°C min.	180°C	150°C	60s to 120s	—	30s to 40s	—	2 time max.
EC21C	230°C to 245°C	220°C	200°C	150°C	60s to 120s	—	25s to 60s	300 max.	1 time max.

注記

- When using an infrared reflow oven, solder may sometimes not be applied. Be sure to use a hot air reflow oven or a type that uses infrared rays in combination with hot air.
- The temperatures given above are the maximum temperatures at the terminals of the encoder when employing a hot air reflow method. The temperature of the PC board and the surface temperature of the encoder may vary greatly depending on the PC board material, its size and thickness. Ensure that the surface temperature of the encoder does not rise to 250°C or greater.
- Conditions vary to some extent depending on the type of reflow bath used. Be sure to give due consideration to this prior to use.