

40mm Size Ring Type

Less shaft wobble achieves good operation feel



■ Typical Specifications

Items	Specifications
Rating	0.5mA 5V DC
Operating life	30,000 cycles
Operating temperature range	−40°C to +85°C

■ Product Line

Actuator length (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Minimum order unit (pcs.)		Product No.
				Japan	Export	
22	20±11	30	15	200	400	EC40A1520403
	40±16					EC40A1520405

■ Packing Specifications

Tray

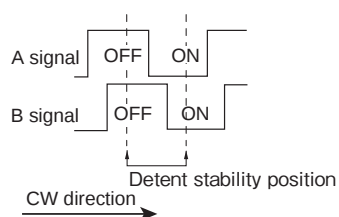
Number of packages (pcs.)		Export package measurements (mm)
1 case /Japan	1 case /export packing	
200	400	540×360×380

■ Dimensions

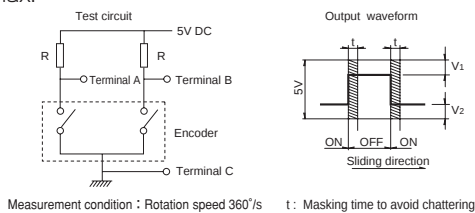
Unit:mm

[illegible]

■ Output Wave



■ Sliding Noise

$$V_1 = V_2 = 2.5V \text{ max.}$$


At $R = 10k\Omega$
Chattering: 3ms max. Bounce: 2ms max.

Type			Ring type	
			40mm size	50mm size
Series			EC40A	EC50A
Photo				
Output			Incremental (Two phase A and B)	Incremental (Two phase A and B)
Shaft types			Ring type	
Number of pulse / Number of detent			15/30	9/18
Dimensions (mm)	W		40.4	50.8
	D		43	50
	H		9	6.5
Operating temperature range			-40℃ to +85℃	
Operating life			30,000 cycles	40,000 cycles
Automotive use				
Life cycle (availability)				
Electrical performance	Rating		0.5mA 5V DC	1mA 5V DC
	Max./min. operating current (Resistive load)		—	—
	Insulation resistance		10MΩ min. 50V DC	10MΩ min. 250V DC
	Voltage proof		50V AC for 1 minute	50V AC for 1 minute or 60V AC for 2s
Mechanical performance	Detent torque		20±11mN·m 40±16mN·m	40±14mN·m
	Push-pull strength	Push	100N	
		Pull	50N	
Shaft configuration			Ring type	
Terminal type			Insertion	
Switch Specifications	Switch type		—	—
	Contact arrangement		—	—
	Travel (mm)		—	—
	Operating force (N)		—	—
	Switch ON position		—	—
	Rotational torque		—	—
	Rating		—	—
	Contact resistance		—	—
	Operating life		—	—
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Notes

● Indicates applicability to all products in the series.

Reference for Manual Soldering

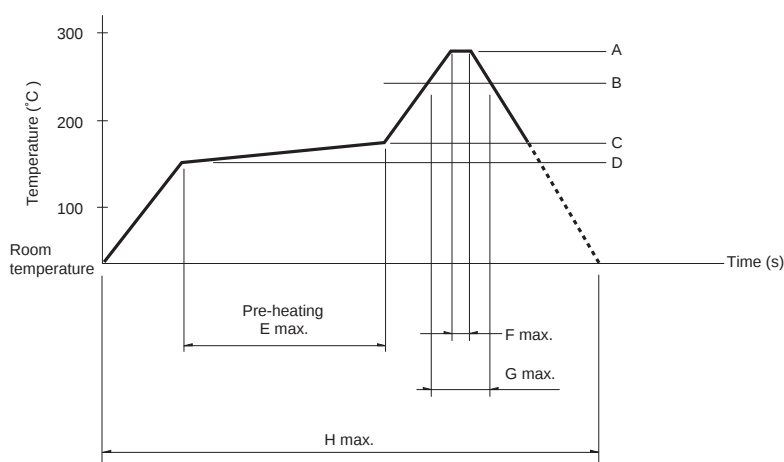
Series	Tip temperature	Soldering time	No. of solders
EC05E, EC09E, EC10E, EC111, EC11E, EC11M, EC11N, EC12D, EC12E, EC18A, EC21A, EC28A, EC35A, EC35AH, EC40A, EC50A, EM11B, EC21C, EC28C, EC35CH	350°C max.	3s max.	1 time

Reference for Dip Soldering

Series	Preheating		Dip soldering		No. of solders
	Soldering surface temperature	Heating time	Soldering temperature	Soldering time	
EC09E, EC111, EC11E, EC11M, EC11N, EC18A, EC21A, EC28A, EC35A, EC35AH, EC50A	100°C max.	2 min. max.	260±5°C	5±1s	2 times max.
EM11B	100°C max.	1 min. max.	260°C max.	3s max.	2 times max.
EC10E, EC12D, EC12E	100°C max.	1 min. max.	260±5°C	3±1s	2 times max.
EC40A	110°C max.	1 min. max.	260°C max.	10s max.	1 time

Example of Reflow Soldering Condition

Temperature profile



Series	A	B	C	D	E	F	G	H	No. of reflows
EC05E	250°C min.	230°C min.	180°C	150°C	60s to 120s	—	30s to 40s	—	2 times max.
EC21C	230°C to 245°C	220°C	200°C	150°C	60s to 120s	—	25s to 60s	300s max.	1 time max.
EC28C, EC35CH	260°C	230°C	180°C	150°C	2 min. min.	3s	40s	230s max.	1 time max.

Notes

- 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.