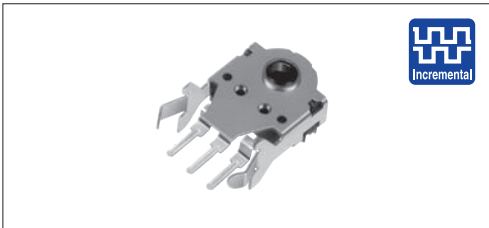


EC10E 10mm Size Hollow Shaft Type

A series of compact and long-life encoders with unique hollow shaft design



Typical Specifications

Items	Specifications
Rating	1mA 5V DC
Operating life	100,000 cycles
Operating temperature range	-5°C to +45°C -30°C to +85°C (For Automotive)

Product Line

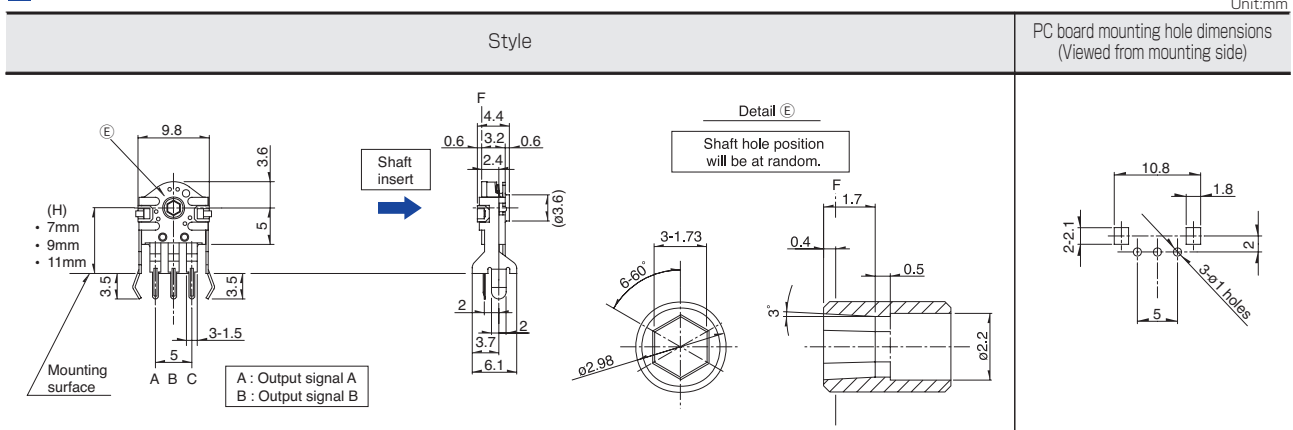
Mount height (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Minimum order unit (pcs.)		Product No.
					Japan	Export	
7	5±3	24	12	Horizontal	1,600	3,200	EC10E1220505
9							EC10E1220501
11							EC10E1220503
7	6±3	12					EC10E1260502

Packing Specifications

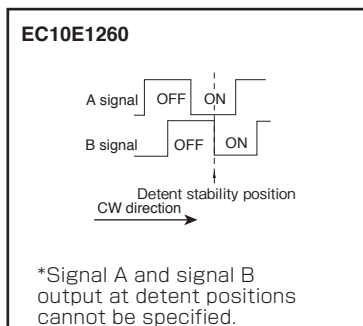
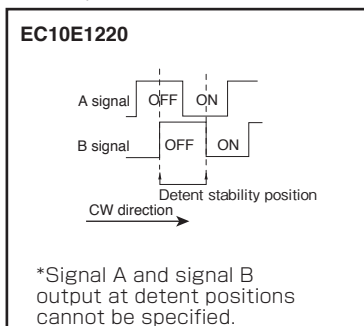
Bulk

Number of packages (pcs.)		Export package measurements (mm)
1 case /Japan	1 case /export packing	
1,600	3,200	270×360×155

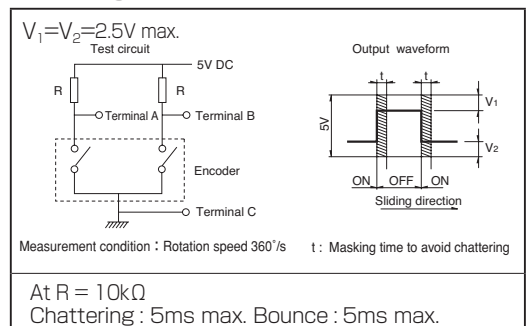
Dimensions



Output Wave






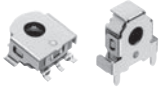






Sliding Noise



Refer to P.307 for soldering conditions.

Encoders

List of Varieties

Type		Insulated shaft			Hollow shaft				
		12mm size		18mm size	5mm size		10mm size		
Series		EC12E	EC12D	EC18A	EC05E		EC10E		
Photo									
Output		Incremental (Two phase A and B)			Absolute type		Incremental (Two phase A and B)		
Shaft types		Single-shaft			Hollow shaft				
Operating direction		Vertical			Vertical	Horizontal	Horizontal		
Number of pulse / Number of detent		12 / 12 24 / 24 24 / Without	15 / 30	12 positions 16 positions	12 / 12		12 / 24 12 / 12		
Features		—	With push-on switch	Water resisting performance (IPX7)	Surface mount type		—		
Dimensions (mm)		W	12.4	12.5	18.8	5.7	7.5	9.8	
		D	13.2	11.7	18	6	3.3	4.4	
		H	5			8.75	2.7	7.25	10.6 / 12.6 / 14.6
Operating temperature range		-10°C to +70°C	-40°C to +85°C	-20°C to +60°C	-30°C to +85°C		-5°C to +45°C -30°C to +85°C (For Automotive)		
Operating life		15,000 cycles 30,000 cycles	30,000 cycles			100,000 cycles			
Automotive use		—	●	—	—	—	○		
Life cycle (availability)									
Electrical performance		Rating	0.5mA 5V DC	1mA 5V DC	1mA 10V DC	0.55mA 5.5V DC		1mA 5V DC	
		Max./min. operating current (Resistive load)	5mA / 0.5mA	10mA / 1mA	—	0.55mA / —		—	
		Insulation resistance	10MΩ min. 50V DC	100MΩ min. 250V DC	10MΩ min. 250V DC	50MΩ min. 50V DC			
		Voltage proof	50V AC for 1 minute	300V AC for 1 minute or 360V AC for 1s	50V AC for 1 minute or 60V AC for 2s	50V AC for 1 minute			
Mechanical performance		Rotational torque (Without detent)	10mN·m max. 25±15mN·m 40±15mN·m	—	—	—		—	
		Detent torque	3±2mN·m 3 to 20mN·m	5±3mN·m 10±5mN·m	60±20mN·m	1.6±1.3mN·m		5±3mN·m 6±3mN·m	
		Push-pull strength	80N	100N	Push 100N / pull 50N	—			
Shaft configuration		Flat, Hollow Shaft	Flat			Hollow shaft			
Terminal type		Insertion			Reflow		Insertion		
Switch Specifications		Switch type	—	Push-on switch	—	—		—	
		Contact arrangement	—	Single pole and single throw (Push-on)	—	—		—	
		Travel (mm)	—	0.5±0.3	—	—		—	
		Operating force (N)	—	3 ^{+1.5} ₋₁	6 ^{+2.5} ₋₂	—	—		—
		Rating	—	1mA 5V DC (10mA 5V DC max. ratings)		—	—		—
		Contact resistance	—	100mΩ max. for initial period; 200mΩ max. after operating life.		—	—		—
		Operating life	—	30,000 times		—	—		—
Page		287			291	293		295	

Encoders Soldering Conditions	307
Encoders Cautions	308

Notes

- The operating temperature range for automotive applications can be raised upon request. Please contact us for details.
- Indicates applicability to all products in the series, while ○ indicates applicability to some products in the series.

Reference for Manual Soldering

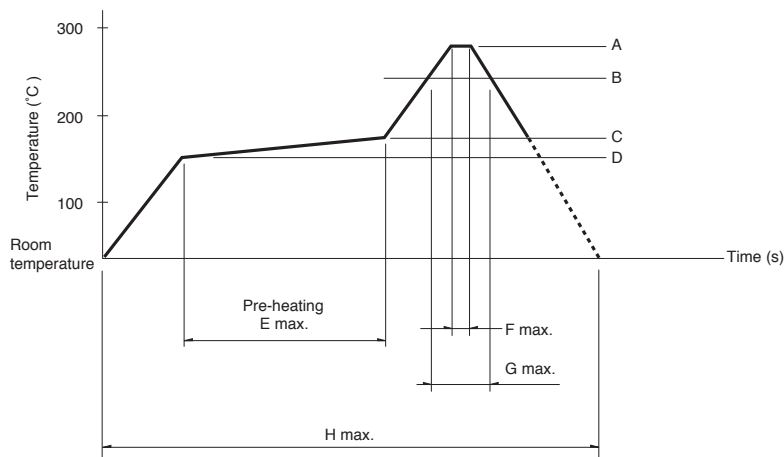
Series	Tip temperature	Soldering time	No. of solders
EC05E, EC09E, EC10E, EC111, EC11B, EC11E, EC11G, EC11K, EC12D, EC12E, EC18A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC40A, EC45A, EC50A, EC60B, EM11B, EM20B, EC21C	350°C max.	3s max.	1 time
EC11J	350±10°C	3 ⁺¹ ₀ s	2 time

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.