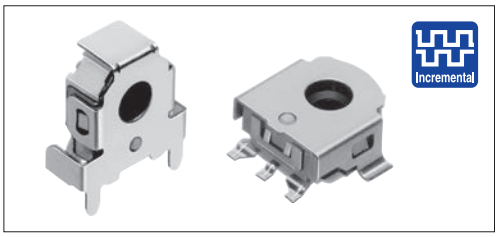
EC05E 5mm Size Hollow Shaft Type

Compact type employing Alps' DRUMCODE™ technology



Typical Specifications

Items	Specifications
Rating	0.55mA 5V DC
Operating life	100,000 cycles
Operating temperature range	−30℃ to +85℃

Product Line

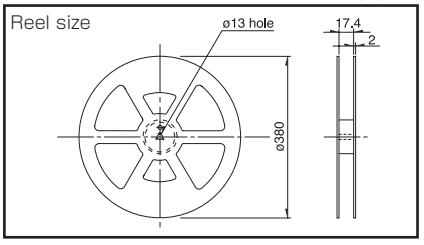
Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Mount height (mm)	Minimum order unit (pcs.)		Product No.	Drawing No.
					Japan	Export		
1.6±1.3	12	12	Horizontal	4.5	4,000	8,000	**EC05E1220202**	1
							EC05E1220203	2
			Vertical	—	8,000	16,000	**EC05E1220401**	3

Packing specifications

Taping

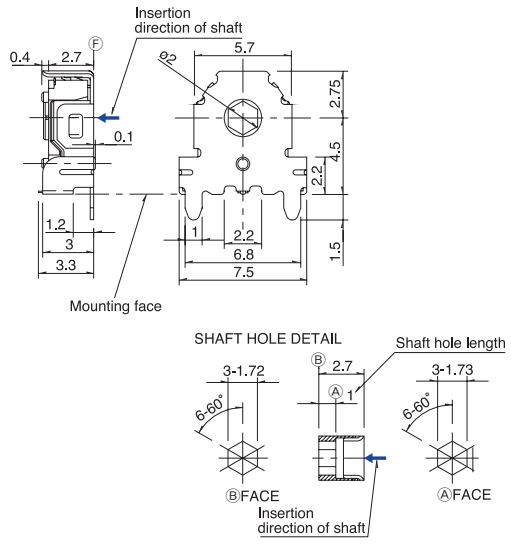
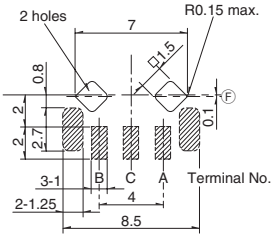
Operating direction	Number of packages (pcs.)			Tape width (mm)	Export package measurements (mm)
	1 reel	1 case /Japan	1 case /export packing		
Horizontal	1,000	4,000	8,000	16	410×485×246
Vertical	2,000	8,000	16,000		

Unit:mm



Dimensions

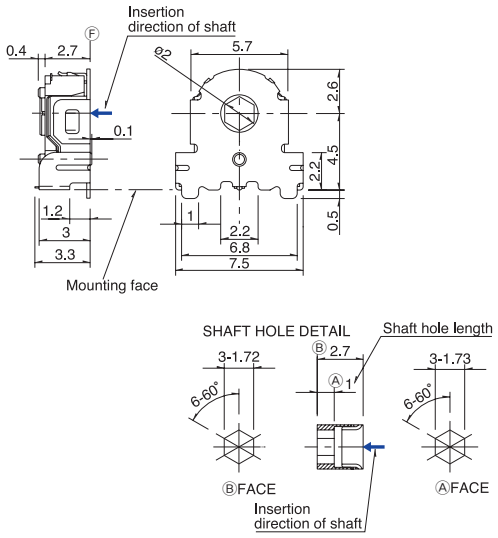
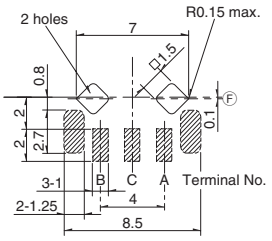
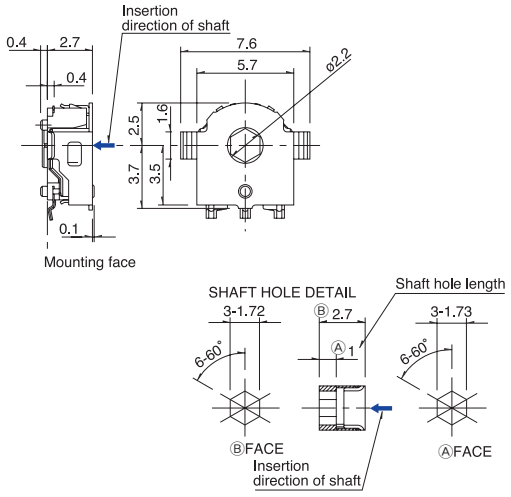
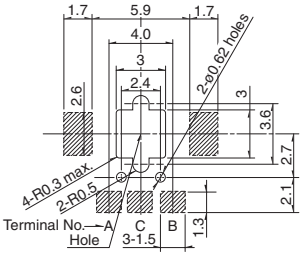
Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1	**Horizontal type** 		 Shaded areas are solder lands.

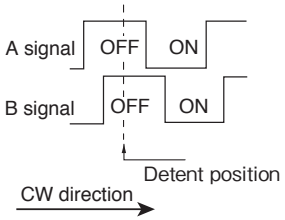
Refer to P.307 for soldering conditions.

Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
2	**Horizontal type** 		 Shaded areas are solder lands.
3	**Vertical type** 		 Shaded areas are solder lands.

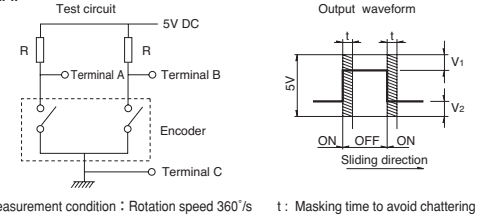
Output Wave



*Signal A and signal B output at detent positions cannot be specified.

Sliding Noise

V_1=V_2=2.5V max.



Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering

At R = 10k Ω
Chattering : 6ms max. Bounce : 6ms max.

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℃ to +70℃	−40℃ to +85℃	−20℃ to +60℃	−30℃ to + 85℃		−5℃ to + 45℃ −30℃ to + 85℃ (For Automotive)
Operating life			15,000 cycles 30,000 cycles	30,000 cycles		100,000 cycles		
Automotive use			—	●	—	—		○
Life cycle (availability)			★2	★2	★2	★2		★2
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		—	100m Ω max. for initial period; 200m Ω max. after operating life.	—	—		—
	Operating life		—	30,000 times	—	—		—
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Encoders Soldering Conditions 307
Encoders Cautions 308

Notes

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

ALPS

Reference for Manual Soldering

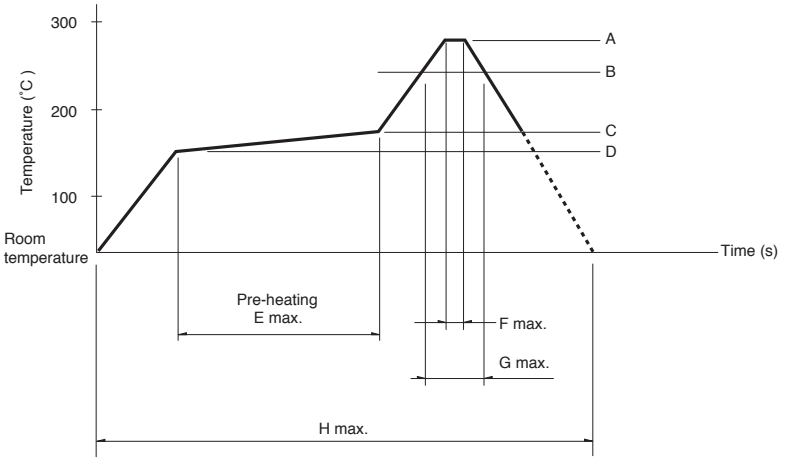
Series	Tip temperature	Soldering time	No. of solders
EC05E, EC09E, EC10E, EC111, EC11B, EC11E, EC11G, EC11K, EC12D, EC12E, EC18A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC40A, EC45A, EC50A, EC60B, EM11B, EM20B, EC21C	350℃ max.	3s max.	1 time
EC11J	350±10℃	3^{+1}_{0}s	2 time

Reference for Dip Soldering

Series	Preheating		Dip soldering		No. of solders
	Soldering surfacetemperature	Heating time	Soldering temperature	Soldering time	
EC09E, EC11B, EC111, EC11E, EC11G, EC11K, EC18A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC50A, EC60B	100℃ max.	2 min. max.	260±5℃	5±1s	2 time max.
EC10E, EC12D, EC12E, EM11B	100℃ max.	1 min. max.	260±5℃	3±1s	2 time max.
EC40A	110℃ max.	1 min. max.	260℃ max.	10s max.	1 time
EC45A	100℃ max.	2 min. max.	260℃ max.	5s max.	2 time max.
EM20B	80℃ max.	1 min. max.	260℃ 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℃	230℃	180℃	150℃	2 min. max.	3s	40s	4 min. max.	2 time max.
EC05E	250℃ min.	230℃ min.	180℃	150℃	60s to 120s	—	30s to 40s	—	2 time max.
EC21C	230℃ to 245℃	220℃	200℃	150℃	60s to 120s	—	25s to 60s	300 max.	1 time max.

注記

1. 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.
2. 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℃ or greater.
3. Conditions vary to some extent depending on the type of reflow bath used. Be sure to give due consideration to this prior to use.