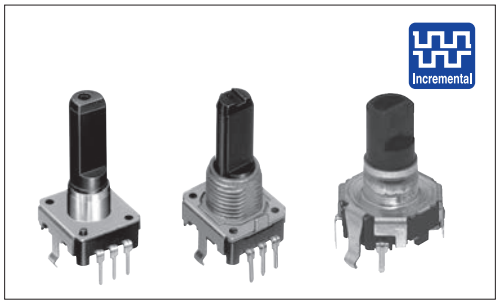
EC12 12mm Size Insulated Shaft Type

Insulated shaft type with a wide variety of applications.



Typical Specifications

Items		Specifications
Rating		0.5mA 5V DC
Operating life	Without detent	15,000cycles 30,000cycles (Lightest (jog))
	With detent	30,000cycles
Operating temperature range		EC12E: − 10℃ to + 70℃ EC12D: − 40℃ to + 85℃

Product Line

Standard type

Length of the shaft (LM_1) (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Minimum order unit (pcs.) Japan	Minimum order unit (pcs.) Export	Product No.	Drawing No.
15	Standard 3 to 20	12	12	Vertical	2,400	2,400	EC12E1220407	2
20							EC12E1220406	1
25							EC12E1220405	
8.5 (Hollow shaft)					3,000	3,000	EC12E1220301	3
20	Lightest (jog) 3 ± 2				2,400	2,400	EC12E1240405	1
25							EC12E1240406	
8.5 (Hollow shaft)					3,000	3,000	EC12E1240301	3
15	Standard 3 to 20	24	24		2,400	2,400	EC12E24204A2	2
17.5							EC12E24204A7	1
20							EC12E24204A8	
25							EC12E24204A9	
8.5 (Hollow shaft)					3,000	3,000	EC12E2420301	3
20	Lightest (jog) 3 ± 2				2,400	2,400	EC12E24404A8	1
25							EC12E24404A6	
8.5 (Hollow shaft)					3,000	3,000	EC12E2440301	3
20	Lightest (jog) 10 max.	Without			2,400	2,400	EC12E24104A6	1
	Standard 25 ± 15						EC12E2430404	
25							EC12E2430401	

With Bushing Type

Length of the shaft (LM_1) (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Minimum order unit (pcs.) Japan	Minimum order unit (pcs.) Export	Product No.	Drawing No.
25	Standard 3 to 20	12	12	Vertical	1,900	1,900	EC12E1220813	4
20		24	24				EC12E2420802	
25							EC12E2420801	
30							EC12E2420803	
20	Standard 25 ± 15	Without					EC12E2430804	
25							EC12E2430803	
30	Heavy 40 ± 15						EC12E2460802	

Note

Nuts and washers are not included. If required, please contact us.

Refer to **P.176** for product varieties.
Refer to **P.193** for soldering conditions.

Product Line

With Switch Type

Length of the shaft (LM_1) (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Operating force of switch (N)	Travel of push-on switch (mm)	Minimum order unit (pcs.) Japan	Minimum order unit (pcs.) Export	Product No.	Drawing No.
17.5	5 ± 3	30	15	Vertical	3	0.5	1,280	2,560	EC12D1524403	5
	10 ± 5								EC12D1564402	
	5 ± 3				6				EC12D1524406	
	10 ± 5								EC12D1564404	

Packing Specifications

Tray

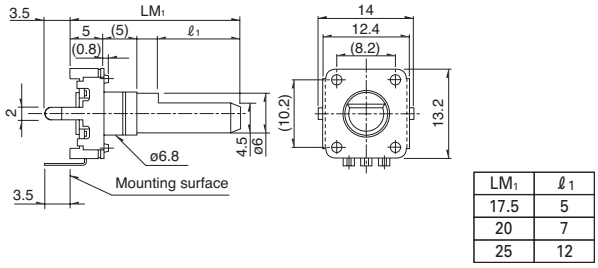
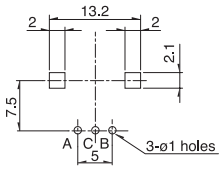
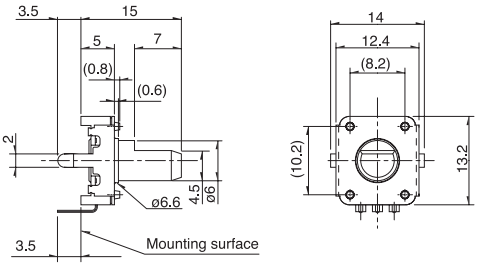
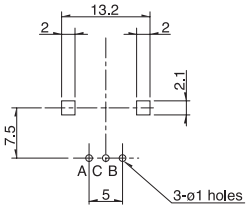
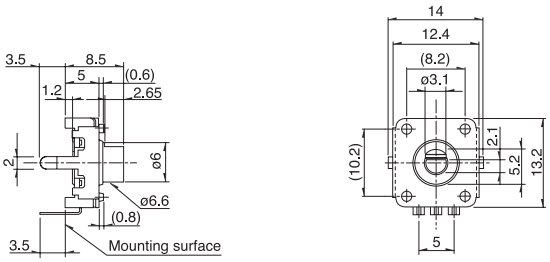
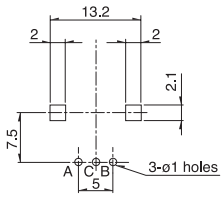
Product No.	Number of packages (pcs.) 1 case / Japan	Number of packages (pcs.) 1 case / export packing	Export package measurements (mm)
EC12E □□□ 03	3,000	3,000	369 × 525 × 204
EC12E □□□ 04	2,400	2,400	
EC12E □□□ 08	1,900	1,900	
EC12D	1,280	2,560	360 × 540 × 290

Notes

EC12D is suitable for automotive use.

Dimensions

Unit:mm

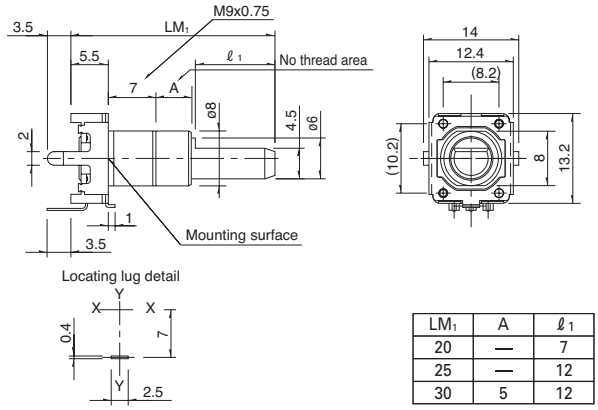
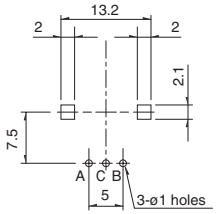
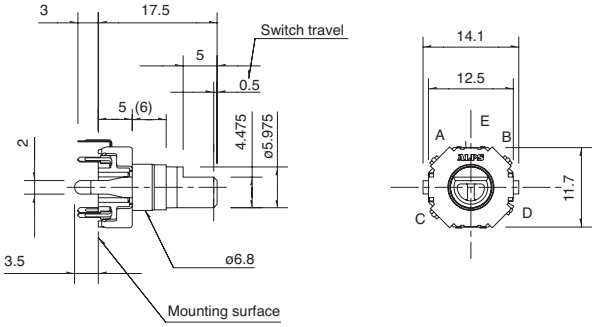
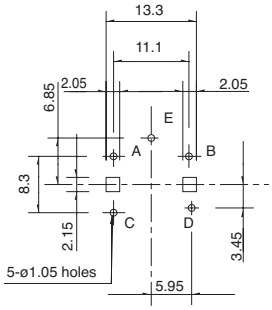
No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
1	High collar type 		
2	Short shaft 		
3	Hollow shaft 		

Refer to **P.176** for product varieties.
Refer to **P.193** for soldering conditions.

12mm Size Insulated Shaft Type

Dimensions

Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
4	With bushing 		
5	With push-on switch type Car Use 		

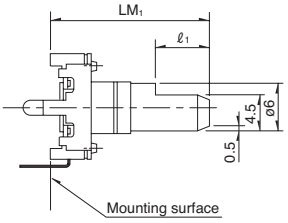
LM1	A	ℓ1
20	—	7
25	—	12
30	5	12

12mm Size Insulated Shaft Type Product Varieties

Shaft Dimensions

Flat Type

Unit:mm

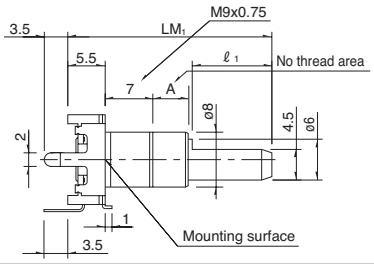


Detailed dimensions

	LM1	ℓ1
※	17.5	5
	20	7
※	22.5	7
	25	12
	30	12

※ Not available for types without detents

With bushing type



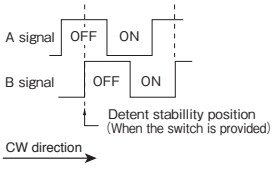
Detailed dimensions

LM1	A	ℓ1
20	—	7
25	—	12
30	5	12
35	5	12

Excluding the 12 detent type

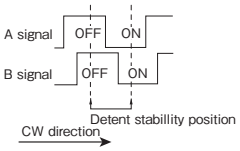
Output wave

EC12E

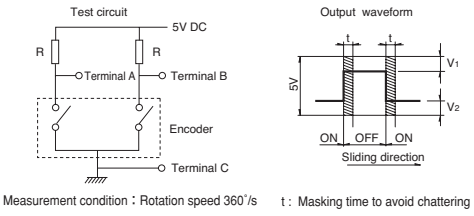


※Detent position cannot be specified for B signal.

EC12D



Sliding noise



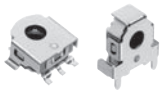
EC12E

$V_1 = V_2 = 1.5V$ max.
At R = 10k Ω
Chattering : 3ms max.
Bounce : 2ms max.

EC12D

$V_1 = V_2 = 2.5V$ max.
At R = 5k Ω
Chattering : 3ms max.
Bounce : 2ms max.

List of Varieties

Type		Insulated Shaft Type			Hollow Shaft Type		
		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	20	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	——	——		——
	Contact resistance	——	100mΩ max. for initial period; 200mΩ max. after operating life.	——	——		——
	Operating life	——	30,000times min.	——	——		——
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● Encoders Cautions ··· 194

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.

Encoders Soldering Conditions

Reference for Hand Soldering

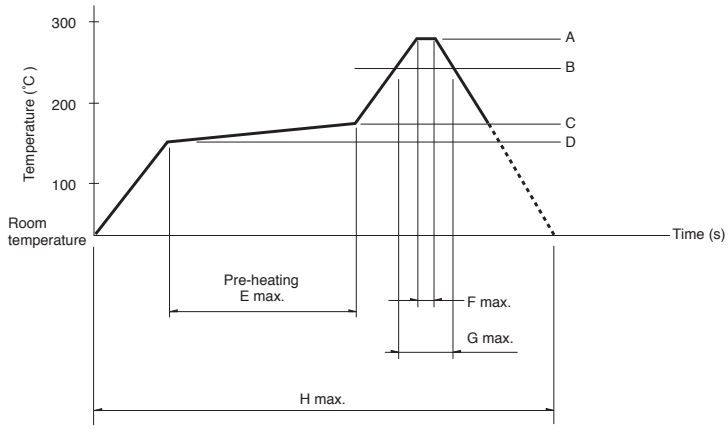
Series	Tip temperature	Soldering time	No. of solders
EC05E, EC09E, EC10E, EC111, EC11B, EC11E, EC11G, EC11K, EC12D, EC12E, EC18A, EC20A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC40A, EC45A, EC50A, EC60A, EM20B	350℃ max.	3s max.	1 time
EC11J	350±10℃	3^{+1}_{0} s	2 time

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, EC20A, EC21A, EC28A, EC35A, EC35AH, EC35B, EC50A	100℃ max.	2 min. max.	260±5℃	5±1s	2 time max.
EC10E, EC12D, EC12E	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, EC60A	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.

Condition for Reflow

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.

Notes

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 potentiometer when employing a hot air reflow method. The temperature of the PC board and the surface temperature of the potentiometer may vary greatly depending on the PC board material, its size and thickness. Ensure that the surface temperature of the potentiometer does not rise to 250°C 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.