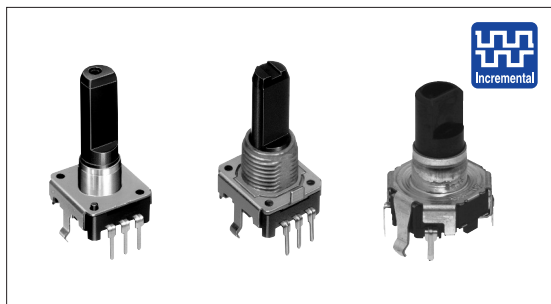


# Encoder 12mm Size Insulated Shaft Type

EC12 Series



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°C to +70°C EC12D: -40°C to +85°C

## Product Line

Actuator length (mm)	Detent torque (mN·m)	Number of detent	Number of pulse	Operating direction	Minimum order unit (pcs.)	Product No.	Drawing No.	
15	Standard 3 to 20	12	12	Vertical	2,400	EC12E1220407	2	
20						EC12E1220406	1	
25						EC12E1220405		
8.5 (Hollow shaft)	Lightest (jog) 3±2				3,000	EC12E1220301	3	
20						2,400	EC12E1240405	1
25							EC12E1240406	
8.5 (Hollow shaft)	Standard 3 to 20	24	24		3,000	EC12E1240301	3	
15						2,400	EC12E24204A2	2
17.5							EC12E24204A7	1
20	EC12E24204A8							
25	EC12E24204A9							
8.5 (Hollow shaft)	Lightest (jog) 3±2				3,000	3	EC12E2420301	3
20		2,400	EC12E24404A8	1				
25			EC12E24404A6					
8.5 (Hollow shaft)	Lightest (jog) 10 max.	3,000	3	EC12E2440301	3			
20				2,400	EC12E24104A6	1		
25					EC12E2430404			
	EC12E2430401							

## With Bushing Type

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

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

Metal  
Shaft

Insulated  
Shaft

Hollow  
Shaft

Ring  
Type

Refer to P.220 for product varieties.

**Product Line**  
With Switch Type

	Actuator length (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.)	Product No.	Drawing No.
Detector	17.5	5±3	30	15	Vertical	3	0.5	2,560	EC12D1524403	5
Push		10±5							EC12D1564402	
Slide		5±3				EC12D1524406				
		10±5				EC12D1564404				

**Packing Specifications**  
Tray


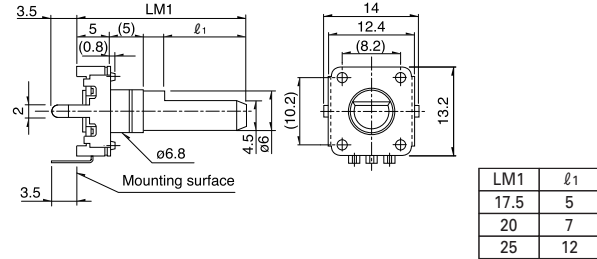
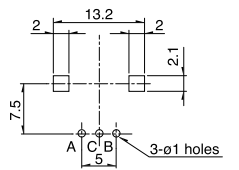

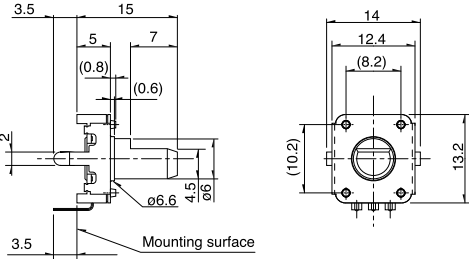
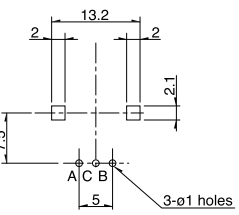

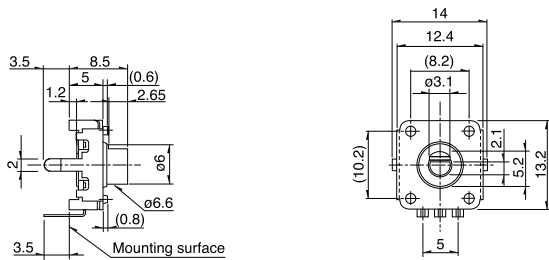
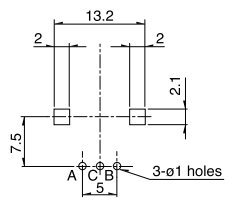
	Product No.	Number of packages (pcs.)		Export package measurements (mm)
		1 case /Japan	1 case /export packing	
Power	EC12E□□□03	3,000	3,000	369×525×204
Dual-in-line Package Type	EC12E□□□04	2,400	2,400	
TACT Switch™	EC12E□□□08	1,900	1,900	
Custom-Products	EC12D	1,280	2,560	360×540×290

**Note**

- Nuts and washers are not included. If required, please contact us.
- Please place purchase orders per minimum order unit N (integer).

**Dimensions**


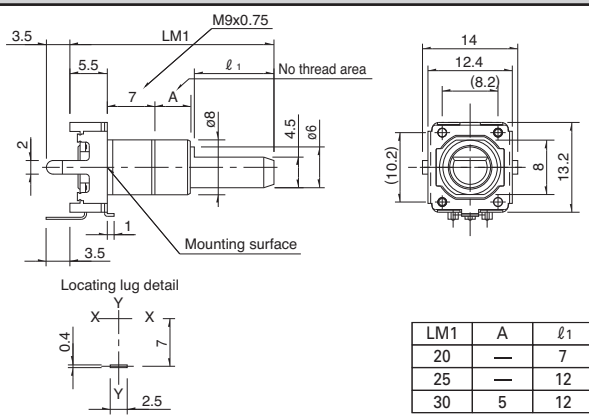
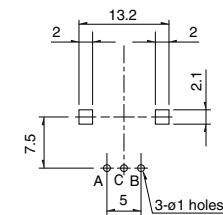

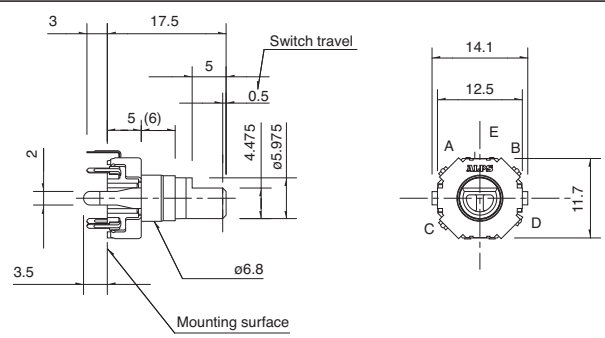
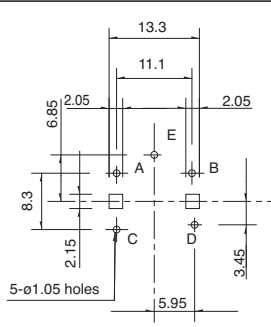
Unit:mm

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting face)								
1		 <table border="1" data-bbox="981 1332 1101 1433"> <thead> <tr> <th>LM1</th> <th>ℓ1</th> </tr> </thead> <tbody> <tr> <td>17.5</td> <td>5</td> </tr> <tr> <td>20</td> <td>7</td> </tr> <tr> <td>25</td> <td>12</td> </tr> </tbody> </table>	LM1	ℓ1	17.5	5	20	7	25	12	
LM1	ℓ1										
17.5	5										
20	7										
25	12										
2											
3											

Refer to P.220 for product varieties.

- Detector
- Push
- Slide
- Rotary
- Encoders
- Power
- Dual-in-line Package Type
- TACT Switch™
- Custom-Products

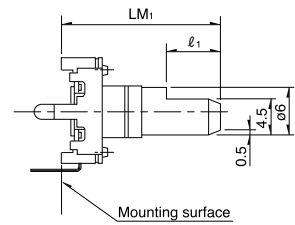
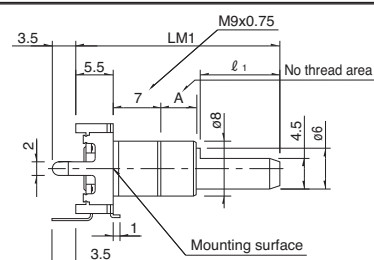
- Metal Shaft
- Insulated Shaft
- Hollow Shaft
- Ring Type

No.	Photo	Style	PC board mounting hole dimensions (Viewed from mounting side)
4			
5			

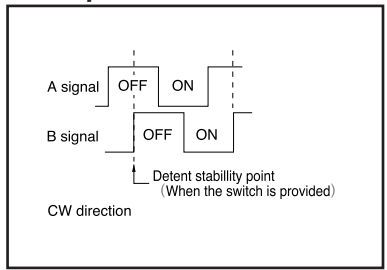
## Product Varieties

### Shaft Dimensions Flat Type

Unit:mm

<p>With high collar type</p> 	<p><b>Detailed dimensions</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>LM<sub>1</sub></th> <th>l<sub>1</sub></th> </tr> </thead> <tbody> <tr><td>17.5</td><td>5</td></tr> <tr><td>20</td><td>7</td></tr> <tr><td>22.5</td><td>7</td></tr> <tr><td>25</td><td>12</td></tr> <tr><td>30</td><td>12</td></tr> </tbody> </table>	LM <sub>1</sub>	l <sub>1</sub>	17.5	5	20	7	22.5	7	25	12	30	12			
LM <sub>1</sub>	l <sub>1</sub>															
17.5	5															
20	7															
22.5	7															
25	12															
30	12															
<p>With bushing type</p> 	<p><b>Detailed dimensions</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>LM<sub>1</sub></th> <th>A</th> <th>l<sub>1</sub></th> </tr> </thead> <tbody> <tr><td>20</td><td>—</td><td>7</td></tr> <tr><td>25</td><td>—</td><td>12</td></tr> <tr><td>30</td><td>5</td><td>12</td></tr> <tr><td>35</td><td>5</td><td>12</td></tr> </tbody> </table> <p>Excluding the 12 detent type</p>	LM <sub>1</sub>	A	l <sub>1</sub>	20	—	7	25	—	12	30	5	12	35	5	12
LM <sub>1</sub>	A	l <sub>1</sub>														
20	—	7														
25	—	12														
30	5	12														
35	5	12														

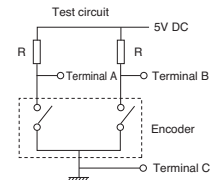
### Output wave



### Sliding noise

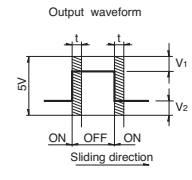
$V_1 = V_2 = 1.5V$  max.

Test circuit



Measurement condition : Rotation speed 360°/s

Output waveform






**EC12E**  
At R = 10kΩ  
Chattering : 3ms max.  
Bounce : 2ms max.

**EC12D**  
At R = 5kΩ  
Chattering : 3ms max.  
Bounce : 2ms max.

t : Masking time to avoid chattering

## List of Varieties

	Type	Insulated shaft				
		12mm size		Insulated shaft		
		EC12E	EC12D		EC18A	
Series	Standard detent	With out detent	With push-on switch			
Detector	Photo					
Push	Output	Incremental		Absolute type		
Slide	Outline specifications	Shaft types			Single-shaft	
Rotary		Operating direction			Vertical	
Encoders		Number of pulse/ Number of detent		15/30	—	
Power		Push switch (Travel mm)		With (0.5)	Without	
		Changeover angle			30/22.5	
Dual-in-line Package Type	Dimensions (mm)	W	12.4	12.5	20	
TACT Switch™		D	13.2	11.7	18	
Custom- Products		H	5		8.75	
	Soldering	Manual soldering	350°C max. 3s max.		350°C max.	
		Dip soldering	260±5°C, 3±1s		260±5°C, 5±1s	
	Operating temperature range	-10°C to +70°C		-40°C to +85°C	-20°C to +60°C	
	Automotive use	—		○	—	
Metal Shaft Insulated Shaft Hollow Shaft Ring Type	Electrical performance	Maximum operating current (Resistive load)	10mA		—	
		Initial contact resistance	—		10Ω max.	
		Output signal	Output of A and B signals, proportionate to phase difference			—
		Output phase	Please see P.220			—
		Sliding noise	Please see P.220			—
		Insulation resistance	10MΩ min. 50V DC	100MΩ min. 250V DC	100MΩ min. 250V DC	10MΩ min. 250V DC
		Voltage proof	50V AC for 1minute	300V AC for 1minute or 360V AC for 1s	300V AC for 1minute or 360V AC for 1s	50V AC for 1minute
Mechanical performance	Rotational torque	—	10mN·m max. 25±15mN·m N·m 40±15mN·m	—	60±20mN·m	
	Terminal strength	—			3N for 10s	
	Detent torque	3±2mN·m 3 to 20mN·m	—	5±3mN·m 10±5mN·m	—	
	Push-pull strength	80N		100N	Push 100N / Pull 50N	
	Vibration	—			10 to 55 to 10Hz/min., the amplitude is 1.5mm for all the frequencies, in the 3 direction of X, Y and Z for 2 hours respectively	
Environmental performance	Cold	-40±3°C for 10h		-40±3°C for 240h		
	Dry heat	85±3°C for 10h		70±3°C for 240h		
	Damp heat	60±2°C, 90 to 95% RH for 10h		60±2°C, 90 to 95% for 240h		
	Page	218		221		

### Push-on Switch Specifications

Items	EC12D	
Contact arrangement	Single pole and single throw (Push-on)	
Travel (mm)	0.5±0.3	
Operating force (N)	3 <sup>+1.5</sup> <sub>-1</sub>	6 <sup>+2.5</sup> <sub>-2</sub>
Rating	1mA 5V DC	
Contact resistance	100mΩ for initial period; 200mΩ after operating life	
Operating life	30,000 times min.	

- Encoders Attached Parts .....217, 229
- Encoders Cautions .....244, 245

### Notes

1. ※ The operating temperature range for automotive applications can be raised upon request. Please contact us for details.
2. ○marks in "Available for automotive use" indicate that some of the series products can work at the operating temperature range from -40°C to +85°C.