

# Encoder 12mm Size Insulated Shaft Type

EC12 Series



Insulated shaft type has a wide variety of applications.

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

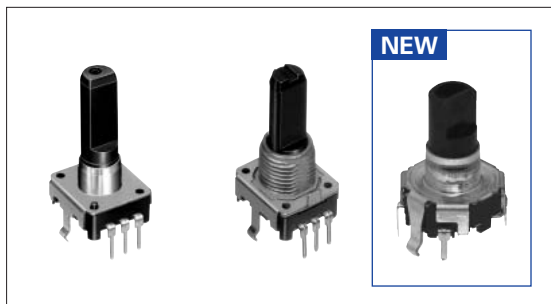
Multi Control  
Devices

TACT Switch™

Custom-  
Products

Incremental  
Type

Absolute  
Type



## Features

- A 12mm sized unit achieved high resolution, 12 pulse/12 detent and 24 pulse/24 detent.
- Used a new structure for the shaft and bushing, and achieved a high precision, responsive system.
- Incremental type.
- New circular shape with a push switch for added variety. (15 pulse/30 detent) EC12D type.

## Applications

- Controls for image / sound devices, including DVD players, mini component stereos, CD players, portable audio players and monitors
- Controls for audio mixers and electronic instruments
- New type (EC12D) with push switch for volume control of car audio and navigation systems.

## Typical Specifications

| Items          | Specifications |               |
|----------------|----------------|---------------|
| Rating         | 0.5mA 5V DC    |               |
| Operating life | Without detent | 15,000 cycles |
|                | Other          | 30,000 cycles |

## Products Line

With High Collar Type

| Length of operating section (mm) | Detent torque (mN·m)      | Number of detent | Resolution | Operating direction | Operating force of switch (N) | Travel of push-on switch (mm) | Minimum packing unit (pcs.) | Products No. | Drawing No. |
|----------------------------------|---------------------------|------------------|------------|---------------------|-------------------------------|-------------------------------|-----------------------------|--------------|-------------|
| 15                               | Standard<br>3 to 20       | 12               | 12         | Vertical            | —                             | —                             | 1,200                       | EC12E1220407 | 2           |
| 20                               |                           |                  |            |                     |                               |                               |                             | EC12E1220406 | 1           |
| 25                               |                           |                  |            |                     |                               |                               |                             | EC12E1220405 |             |
| 8.5<br>(Hollow shaft)            | Lightest (jog)<br>3±2     | 12               | 12         |                     |                               |                               |                             | EC12E1220301 | 3           |
| 20                               |                           |                  |            |                     |                               |                               |                             | EC12E1240405 | 1           |
| 25                               |                           |                  |            |                     |                               |                               |                             | EC12E1240406 |             |
| 8.5<br>(Hollow shaft)            | Standard<br>3 to 20       | 24               | 24         |                     |                               |                               |                             | EC12E1240301 | 3           |
| 15                               |                           |                  |            |                     |                               |                               |                             | EC12E24204A2 | 2           |
| 17.5                             |                           |                  |            |                     |                               |                               |                             | EC12E24204A7 | 1           |
| 20                               | EC12E24204A8              |                  |            |                     |                               |                               |                             |              |             |
| 25                               | EC12E24204A9              |                  |            |                     |                               |                               |                             |              |             |
| 8.5<br>(Hollow shaft)            | Lightest (jog)<br>3±2     | 24               | 24         |                     |                               |                               |                             | EC12E2420301 | 3           |
| 20                               |                           |                  |            | EC12E24404A8        | 1                             |                               |                             |              |             |
| 25                               |                           |                  |            | EC12E24404A6        |                               |                               |                             |              |             |
| 8.5<br>(Hollow shaft)            | Lightest (jog)<br>10 max. | Without          | 24         | EC12E2440301        | 3                             |                               |                             |              |             |
| 20                               |                           |                  |            | EC12E24104A6        | 1                             |                               |                             |              |             |
| 20                               |                           |                  |            | EC12E2430404        |                               |                               |                             |              |             |
| 25                               | EC12E2430401              |                  |            |                     |                               |                               |                             |              |             |

### Products Line

#### With Bushing Type

| Length of operating section (mm) | Detent torque (mN·m) | Number of detent | Resolution | Operating direction | Operating force of switch (N) | Travel of push-on switch (mm) | Minimum packing unit (pcs.) | Products No. | Drawing No. |
|----------------------------------|----------------------|------------------|------------|---------------------|-------------------------------|-------------------------------|-----------------------------|--------------|-------------|
| 25                               | Standard<br>3 to 20  | 12               | 12         | Vertical            | —                             | —                             | 950                         | EC12E1220813 | 4           |
| 20                               |                      | 24               | 24         |                     |                               |                               |                             | EC12E2420802 |             |
| 25                               |                      |                  |            |                     |                               |                               |                             | EC12E2420801 |             |
| 30                               |                      | EC12E2420803     |            |                     |                               |                               |                             |              |             |
| 20                               | Standard<br>25±15    | Without          | 24         | EC12E2430804        |                               |                               |                             |              |             |
| 25                               |                      |                  |            | EC12E2430803        |                               |                               |                             |              |             |
| 30                               |                      |                  |            | EC12E2460802        |                               |                               |                             |              |             |
| 30                               | Heavy 40±15          |                  |            |                     |                               |                               |                             |              |             |

#### With Switch Type


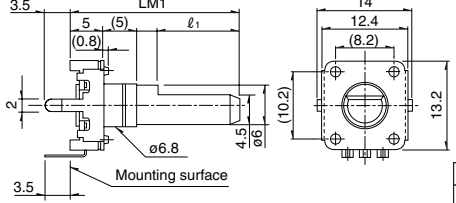
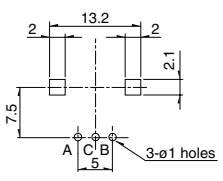

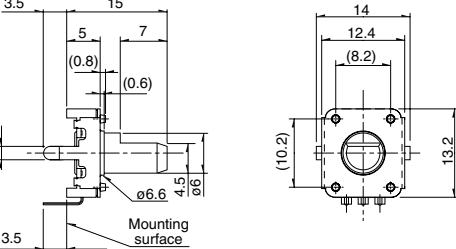
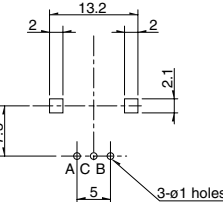
| Length of operating section (mm) | Detent torque (mN·m) | Number of detent | Resolution | Operating direction | Operating force of switch (N) | Travel of push-on switch (mm) | Minimum packing unit (pcs.) | Products No. | Drawing No. |
|----------------------------------|----------------------|------------------|------------|---------------------|-------------------------------|-------------------------------|-----------------------------|--------------|-------------|
| 17.5                             | 5±3                  | 30               | 15         | Vertical            | 3                             | 0.5                           | 1,200                       | EC12D1524401 | 5           |
|                                  | 10±5                 |                  |            |                     |                               |                               |                             | EC12D1564401 |             |

### Note

No nuts or washers attached. If necessary, contact us.

### Dimensions

Unit:mm

| No.  | Photo  | Style  | PC board mounting hole dimensions (Viewed from mounting face)                         |                |      |   |    |   |    |    |   |
|------|--|--|---|----------------|------|---|----|---|----|----|---|
| 1    |                 |  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>LM1</td> <td>l<sub>1</sub></td> </tr> <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> </table> | LM1   | l <sub>1</sub> | 17.5 | 5 | 20 | 7 | 25 | 12 |  |
| LM1  | l <sub>1</sub>   |  |   |                |      |   |    |   |    |    |   |
| 17.5 | 5  |  |   |                |      |   |    |   |    |    |   |
| 20   | 7  |  |   |                |      |   |    |   |    |    |   |
| 25   | 12   |  |   |                |      |   |    |   |    |    |   |
| 2    | Short shaft<br> |   |  |                |      |   |    |   |    |    |   |

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Multi Control Devices

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Custom-Products

Incremental Type

Absolute Type


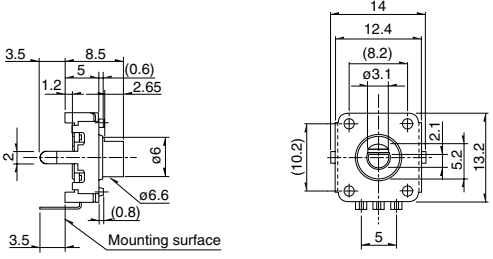
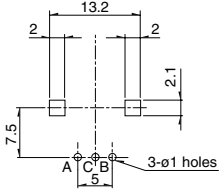

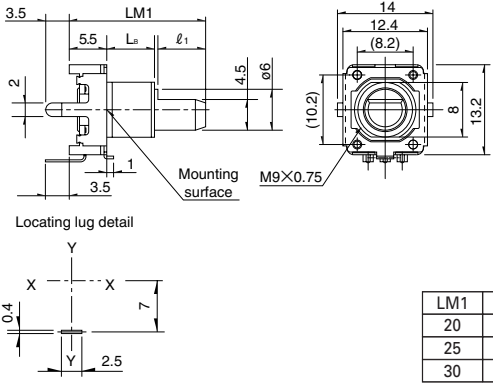
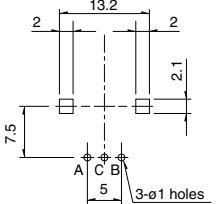

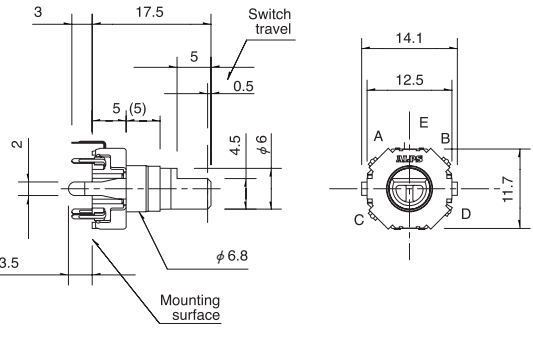
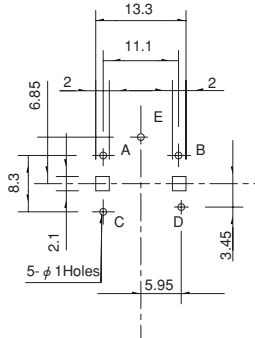
For other products, check varieties on P.197  
For other specifications, see P.198

# Encoder

## 12mm Size Insulated Shaft Type | EC12 Series

### Dimensions

Unit:mm

| No. | Photo   | Style  | PC board mounting hole dimensions<br>(Viewed from mounting side)                      |                |                |    |   |   |    |   |    |    |    |    |  |
|-----|---|--|---|----------------|----------------|----|---|---|----|---|----|----|----|----|--|
| 3   |    |    |    |                |                |    |   |   |    |   |    |    |    |    |  |
| 4   |   |  <table border="1" data-bbox="965 1041 1141 1131"> <thead> <tr> <th>LM1</th> <th>L<sub>b</sub></th> <th>l<sub>1</sub></th> </tr> </thead> <tbody> <tr> <td>20</td> <td>7</td> <td>7</td> </tr> <tr> <td>25</td> <td>7</td> <td>12</td> </tr> <tr> <td>30</td> <td>12</td> <td>12</td> </tr> </tbody> </table> | LM1   | L <sub>b</sub> | l <sub>1</sub> | 20 | 7 | 7 | 25 | 7 | 12 | 30 | 12 | 12 |  |
| LM1 | L <sub>b</sub>  | l <sub>1</sub>   |   |                |                |    |   |   |    |   |    |    |    |    |  |
| 20  | 7   | 7  |   |                |                |    |   |   |    |   |    |    |    |    |  |
| 25  | 7   | 12   |   |                |                |    |   |   |    |   |    |    |    |    |  |
| 30  | 12  | 12   |   |                |                |    |   |   |    |   |    |    |    |    |  |
| 5   |  |    |  |                |                |    |   |   |    |   |    |    |    |    |  |

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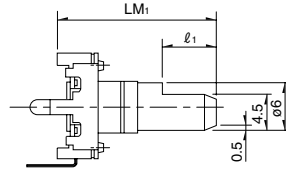
# Variety

## Shaft Dimensions

Flat Type

Unit:mm

With high collar type

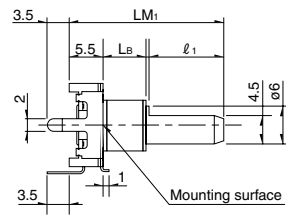


Vertical type

**Detail dimensions**

| LM <sub>1</sub> | l <sub>1</sub> |
|-----------------|----------------|
| 17.5            | 5              |
| 20              | 7              |
| 22.5            | 7              |
| 25              | 12             |
| 30              | 12             |

With bushing type



Mounting surface

**Detail dimensions**

| LM <sub>1</sub> | L <sub>B</sub> | l <sub>1</sub> |
|-----------------|----------------|----------------|
| 20              | 7              | 7              |
| 25              | 7              | 12             |
| 30              | 12             | 12             |
| 35              | 12             | 12             |

Except 12 detent.

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## Products Specifications

| Items   | EC12E                               |  | EC12D                             |               |
|---|-------------------------------------|--|-----------------------------------|---------------|
|   | Standard detent                     | Without detent   | With switch                       |               |
| <b>Operating temperature range</b>                | -40°C to +70°C                      |  |                                   |               |
| <b>Maximum operating current (Resistive load)</b> | 5mA                                 |  |                                   |               |
| <b>Electrical performance</b>                     | <b>Rating</b>                       | 0.5mA 5V DC  |                                   |               |
|   | <b>Output signal</b>                | Output of A and B signals, proportionate to phase difference |                                   |               |
|   | <b>Output wave</b>                  |  |                                   |               |
|   | <b>Sliding noise</b>                | $V_1=V_2=1.5V$ max.<br>                                      |                                   |               |
|   | <b>Insulation resistance</b>        | 10MΩ min. 250V DC  |                                   |               |
|   | <b>Voltage proof</b>                | 300V AC 1min, or 360V AC 1sec.                               |                                   |               |
|   | <b>At R = 10kΩ</b>                  | Chattering : 3ms max.<br>Bounce : 2ms max.                   |                                   |               |
| <b>Mechanical performance</b>                     | <b>Rotational torque</b>            | —  | 25±15mN·m, 10mN·m max., 40±15mN·m |               |
|   | <b>Detent torque</b>                | 3±2mN·m, 3 to 20mN·m   | —                                 |               |
|   | <b>Push-pull strength</b>           | 80N  | 100N                              |               |
|   | <b>Resistance to soldering heat</b> | <b>Manual soldering</b>                                      | 350°C or less, or within 3s       |               |
|   |                                     | <b>Dip soldering</b>   | 260°C±5°C, 3±1s                   |               |
| <b>Reflow soldering</b>                           |                                     | —  |                                   |               |
| <b>Durability</b>                                 | <b>Rotational life</b>              | 30,000 cycles  | 15,000 cycles                     | 30,000 cycles |
| <b>Environmental performance</b>                  | <b>Cold</b>                         | -40±3°C for 240h±10h   |                                   |               |
|   | <b>Dry heat</b>                     | 85±3°C for 240h±10h  |                                   |               |
|   | <b>Damp heat</b>                    | 60±2°C, 90 to 95%RH for 240h±10h                             |                                   |               |

### Push-on Switch Specifications

| Items   | EC12D                                  |
|---|--|
| <b>Switch circuit · the number of contact</b> | Single pole and single throw (Push-on) |
| <b>Travel of switch</b>                       | 0.5±0.3mm                              |
| <b>Operating force of switch</b>              | 3 <sup>+1.5</sup> <sub>-1.0</sub> N    |
| <b>Rating</b>                                 | 1mA 5V DC                              |
| <b>Contact resistance</b>                     | 100mΩ max.                             |
| <b>Operating life</b>                         | 30,000 times min.                      |