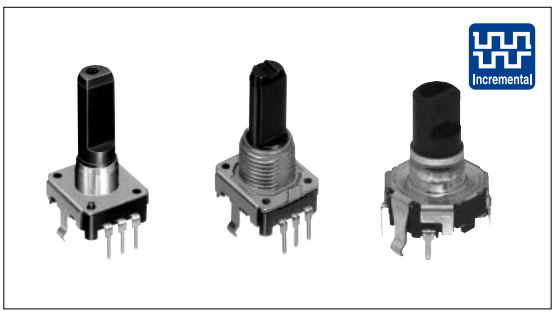
# 12mm Size Insulated Shaft Type

## EC12 Series

RoHS compliant

## Insulated shaft type with a wide variety of applications.






### Typical Specifications

| Items | | Specifications |
|---|---|---|
| Rating | | 0.5mA 5V DC |
| Operating life | Without detent | 15,000cycles<br>30,000cycles (Lightest (jog)) |
| | With detent | 30,000cycles |

### Product Line

| 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. |
|---|---|---|---|---|---|---|---|---|---|
| 15 | Standard 3 to 20 | 12 | 12 | Vertical | — | — | 1,200 | EC12E1220407 | 2 |
| 20 | | | | | | | | EC12E1220406 | 1 |
| 25 | | | | | | | | EC12E1220405 | |
| 8.5 (Hollow shaft) | | | | | | | | EC12E1220301 | 3 |
| 20 | Lightest (jog) 3±2 | | | | | | | EC12E1240405 | 1 |
| 25 | | | | | | | | EC12E1240406 | |
| 8.5 (Hollow shaft) | | | | | | | | EC12E1240301 | 3 |
| 15 | Standard 3 to 20 | 24 | 24 | | | | | EC12E24204A2 | 2 |
| 17.5 | | | | | | | | EC12E24204A7 | 1 |
| 20 | | | | | | | | EC12E24204A8 | |
| 25 | | | | | | | | EC12E24204A9 | |
| 8.5 (Hollow shaft) | | | | | | | | EC12E2420301 | 3 |
| 20 | Lightest (jog) 3±2 | | | | | | | EC12E24404A8 | 1 |
| 25 | | | | | | | | EC12E24404A6 | |
| 8.5 (Hollow shaft) | | | | | | | | EC12E2440301 | 3 |
| 20 | Lightest (jog) 10 max. | Without | | | | | | EC12E24104A6 | 1 |
| | Standard 25±15 | | | | | | | EC12E2430404 | |
| 25 | | | | | | | | EC12E2430401 | |

## Product Line

### With Bushing 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. |
|---|---|---|---|---|---|---|---|---|---|
| 25 | Standard 3 to 20 | 12 | 12 | Vertical | — | — | 950 | EC12E1220813 | 4 |
| 20 | | 24 | 24 | | | | | EC12E2420802 | |
| 25 | | | | | | | | EC12E2420801 | |
| 30 | | | | | | | | EC12E2420803 | |
| 20 | Standard 25±15 | Without | | | | | | EC12E2430804 | |
| 25 | | | | | | | | EC12E2430803 | |
| 30 | Heavy 40±15 | | | | | | | EC12E2460802 | |

### With Switch Type

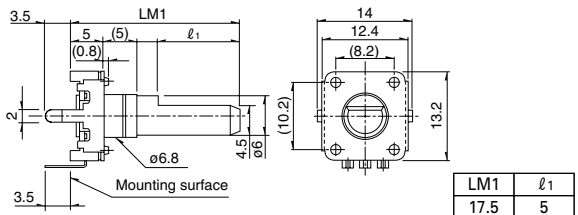
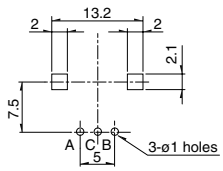
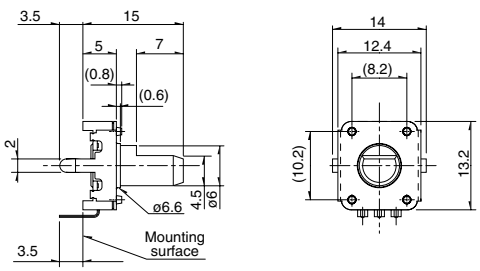
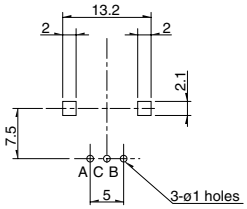
| Actuator length (mm) | Detent torque (mN•m) | Number of detent | Number of pulse | Operating direction | Operating force of switch (N) | Travel of push-on switch (mm) | Minimum order unit (pcs.) | Product No. | Drawing No. |
|---|---|---|---|---|---|---|---|---|---|
| 17.5 | 5±3 | 30 | 15 | Vertical | 3 | 0.5 | 1,280 | EC12D1524403 | 5 |
| | 10±5 | | | | | | | EC12D1564402 | |
| | 5±3 | | | | 6 | | | EC12D1524406 | |
| | 10±5 | | | | | | | EC12D1564404 | |

**Note**

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

## Dimensions

Unit:mm

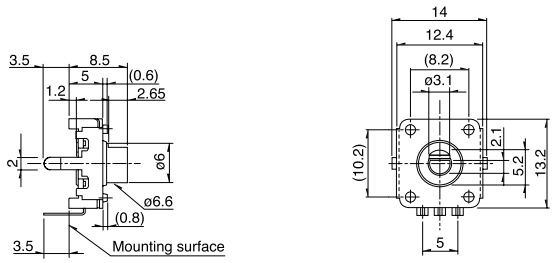
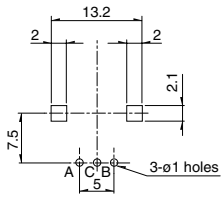
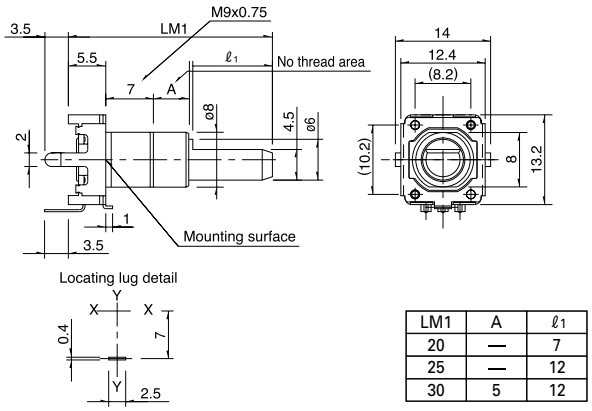
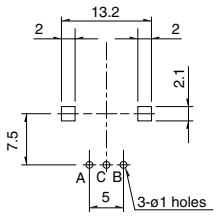
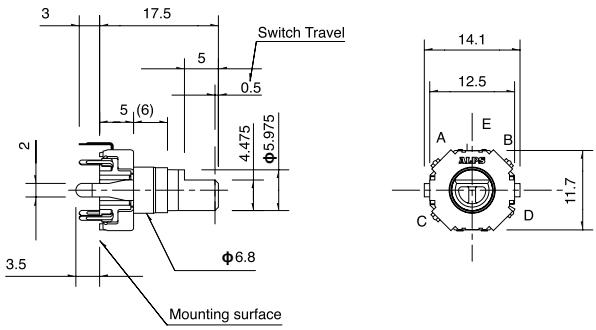
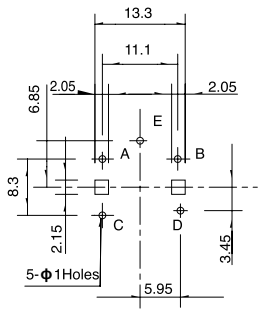
| No. | Photo | Style | PC board mounting hole dimensions (Viewed from mounting face) |
|---|---|---|---|
| 1 | High collar type  |   |   |
| 2 | Short shaft  |   |   |

| LM1 | ℓ1 |
|---|---|
| 17.5 | 5 |
| 20 | 7 |
| 25 | 12 |

Refer to **P.194** for product varieties.

## Dimensions

Unit:mm

| No. | Photo | Style | PC board mounting hole dimensions (Viewed from mounting side) |
|---|---|---|---|
| 3 | Hollow shaft  |   |   |
| 4 | With bushing  |   <table><tr><th>LM1</th><th>A</th><th>ℓ1</th></tr><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></table> |   |
| 5 | With push-on switch type  |   |   |

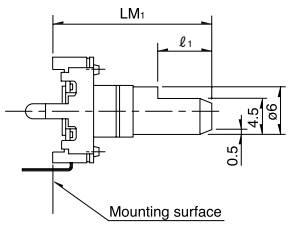
# Product Varieties

## Shaft Dimensions

**Flat Type**

Unit:mm

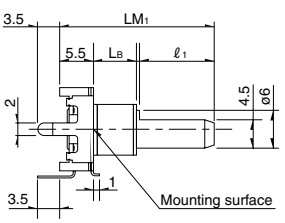
**With high collar type**




**Detailed dimensions**

| LM1 | ℓ1 |
|---|---|
| 17.5 | 5 |
| 20 | 7 |
| 22.5 | 7 |
| 25 | 12 |
| 30 | 12 |

**With bushing type**

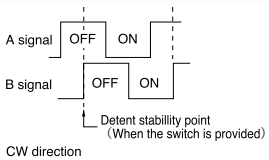
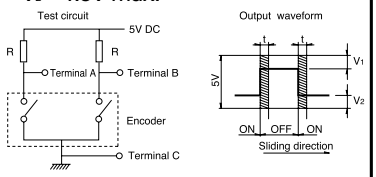



**Detailed dimensions**

| LM1 | LB | ℓ1 |
|---|---|---|
| 20 | 7 | 7 |
| 25 | 7 | 12 |
| 30 | 12 | 12 |
| 35 | 12 | 12 |

Excluding the 12 detent type

# List of Varieties

| Type | | Metal shaft | | | | Insulated shaft | |
|---|---|---|---|---|---|---|---|
| | | 11mm size | | | 20mm size | 12mm size | |
| Series | | EC11G | EC11J | EC11K | EC20A/RK203 | EC12E | EC12D |
| | | | | | | Standard detent / Without detent | With push-on switch |
| Photo | |  |  |  |  |  |  |
| Output | | Incremental | | | | | |
| Outline specifications | Shaft types | Single-shaft | | | | | |
| | Operating direction | Vertical | | | | | |
| | Number of pulse/ Number of detent | 15/30 | 9/18<br>15/30 | | 18/18 | 12/12<br>24/24 | 15/30 |
| | Push switch (Travel mm) | Without<br>With (1.5) | Without<br>With (0.5, 1.5) | | Without<br>With (1.5) | Without | With (0.5) |
| | Optional functions | ——— | | | | | |
| | Changeover angle | ——— | | | | | |
| Dimensions (mm) | W | 11.7 | | | 2.0 | 12.4 | 12.5 |
| | D | 12 | 14.2 | | 19.2 | 13.2 | 11.7 |
| | H | 4.5 | | | 10 | 5 | |
| Soldering | Manual soldering | 350℃ max. 3s max. | | | | | |
| | Dip soldering | 260±5℃, 5±1s | ——— | 260±5℃, 5±1s | | 260℃±5℃, 3±1s | |
| | Reflow soldering | ——— | Please see P.189 | ——— | | | |
| Operating temperature range | | –30℃ to +85℃ | –40℃ to +85℃ | | –30℃ to +80℃ | –10℃ to +70℃ | –40℃ to +85℃ |
| Maximum operating current (Resistive load) | | 10mA | | | 1mA | 5mA | 10mA |
| Electrical performance | Output signal | Output of A and B signals, proportionate to phase difference | | | | | |
| | Output wave | Please see P.191 | | | |  | |
| | Sliding noise | Please see P.191 | | | | $V_1=V_2=1.5V$ max.<br><br>Measurement condition : Rotation speed 360°/s t : Masking time to avoid chattering | |
| | | | | | | At R = 10kΩ<br>Chattering : 3ms max.<br>Bounce : 2ms max. | At R = 5kΩ<br>Chattering : 3ms max.<br>Bounce : 2ms max. |
| | Insulation resistance | 100MΩ min. 250V DC | | | 10MΩ min. 50V DC | | 100MΩ min. 250V DC |
| | Voltage proof | 300V AC for 1minute | | | 50V AC for 1minute | | 300V AC for 1minute or 360V AC for 1s. |
| Mechanical performance | Rotational torque | 7 +3/4 mN•m | ——— | | | 10mN•m max.<br>25±15mN•m<br>40±15mN•m | ——— |
| | Detent torque | 10±7mN•m | 12±5mN•m | | 40±20mN•m | 3±2mN•m<br>3 to 20mN•m | 5±3mN•m<br>10±5mN•m |
| | Push-pull strength | 100N | | | | 80N | 100N |
| Environmental performance | Cold | –40±3℃ for 240h | | | | –40±3℃ for 240h±10h | |
| | Dry heat | 85±3℃ for 240h | | | | 85±3℃ for 240h±10h | |
| | Damp heat | 60±2℃, 90 to 95% RH for 240h | | | | 60±2℃, 90 to 95%RH for 240h±10h | |
| Push-on Switch Specifications | Circuit • number of contacts | Single pole and single throw (Push-on) | | | | ——— | Single pole and single throw (Push-on) |
| | Travel (mm) | 0.5±0.3 | 1.5±0.5 | 0.5±0.3 / 1.5±0.5 / 0.5±0.3 | 1.5±0.5 | | 0.5±0.3 |
| | Operating force (N) | 6 +2.5 −2 | 4±2 | 5±2 / 4±2 / 5±2 | 4±2 | | 3 +1.5 −1.0 / 6 +2.5 −2 |
| | Rating | 0.5A 16V DC (1mA 16V DC min. ratings) | | 0.1A 5V DC | 0.5A 16V DC (1mA 16V DC min. ratings) | | 1mA 5V DC |
| | Contact esistance | 100mΩ for initial period; 200mΩ after operating life | | | | | 100mΩ for initial period; 200mΩ after operating life |
| | Operating life | 20,000times min. | 1,000,000 times min. | 500,000 times min. / 1,000,000 times min. / 100,000 times min. | 20,000times min. | | 30,000times min. |
| Page | | 181 | 187 | | 190 | 192 | |

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