

**SERIES:** C14 | **DESCRIPTION:** PANEL MOUNT ENCODER

**FEATURES**

- 2-bit quadrature output
- compact
- rugged metal design
- 1 million cycle life
- multiple termination options
- IP65 rating option
- plastic shaft options available for medical applications


**ELECTRICAL**

| parameter         | conditions/description   | min   | typ   | max   | units |
|-------------------|--|-------|-------|-------|-------|
| power supply      | 3.3Vdc input models  | 3.168 | 3.3   | 3.432 | Vdc   |
|                   | 5Vdc input models  | 4.75  | 5     | 5.25  | Vdc   |
| supply current    | 3.3Vdc input models  |       |       | 40    | mA    |
|                   | 5Vdc input models  |       |       | 20    | mA    |
| output            | open collector   |       |       |       |       |
| output code       | 2-bit quadrature, channel A leads channel B by 90° with clockwise rotation |       |       |       |       |
| power consumption | 3.3Vdc input models  |       |       | 132   | mW    |
|                   | 5Vdc input models  |       |       | 100   | mW    |
| output resolution | 4 ppr (16 cpr), 8 ppr (32 cpr)   |       |       |       |       |
| angle of throw    | 16 detent position models  |       | 22.5  |       | °     |
|                   | 32 detent position models  |       | 11.25 |       | °     |

**PUSH SWITCH SPECIFICATIONS**

| parameter             | conditions/description | min | typ       | max | units  |
|-----------------------|------------------------|-----|-----------|-----|--------|
| rating                | 12 Vdc at 50 mA        |     |           |     |        |
| contact resistance    |                        |     |           | 200 | mΩ     |
| isolation voltage     | for 1 minute           |     | 250       |     | Vac    |
| insulation resistance |                        | 100 |           |     | MΩ     |
| operating push force  |                        | 3.5 | 4.5       | 5.5 | N      |
| travel                |                        | 0.2 | 0.5       | 0.8 | mm     |
| bounce                |                        |     |           | 10  | ms     |
| push switch life      |                        |     | 1,000,000 |     | cycles |

**ENVIRONMENTAL**

| parameter             | conditions/description                         | min | typ | max | units |
|-----------------------|--|-----|-----|-----|-------|
| operating temperature |  | -10 |     | 70  | °C    |
| storage temperature   |  | -20 |     | 80  | °C    |
| vibration             | 10-55Hz with a peak to peak amplitude of 1.5mm |     |     |     |       |
| shock                 | half sine wave for 11ms                        |     | 50  |     | G     |
| cold test             | at -20°C for 96 hours                          |     |     |     |       |
| heat test             | at +80°C for 96 hours                          |     |     |     |       |

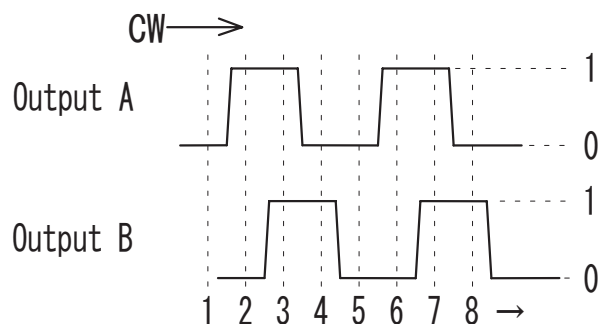
## ENVIRONMENTAL (CONTINUED)

| parameter               | conditions/description                | min | typ | max | units |
|-------------------------|---------------------------------------|-----|-----|-----|-------|
| temperature change test | at -10~70°C for 30 minutes each       |     |     |     |       |
| humidity test           | at 40°C, 90~95% humidity for 96 hours |     |     |     |       |
| RoHS                    | yes                                   |     |     |     |       |

## MECHANICAL

| parameter          | conditions/description | min | typ       | max | units  |
|--------------------|------------------------|-----|-----------|-----|--------|
| shaft load         | radial                 |     |           | 10  | N      |
|                    | axial                  |     |           | 15  | N      |
| operational torque | without detent         | 0.2 | 0.4       | 0.2 | N-cm   |
|                    | with detent            |     |           | 0.6 | N-cm   |
| mounting torque    |                        |     | 100       |     | N-cm   |
| rotational life    |                        |     | 1,000,000 |     | cycles |
| weight             |                        |     | 11        |     | g      |

## OUTPUT WAVEFORMS



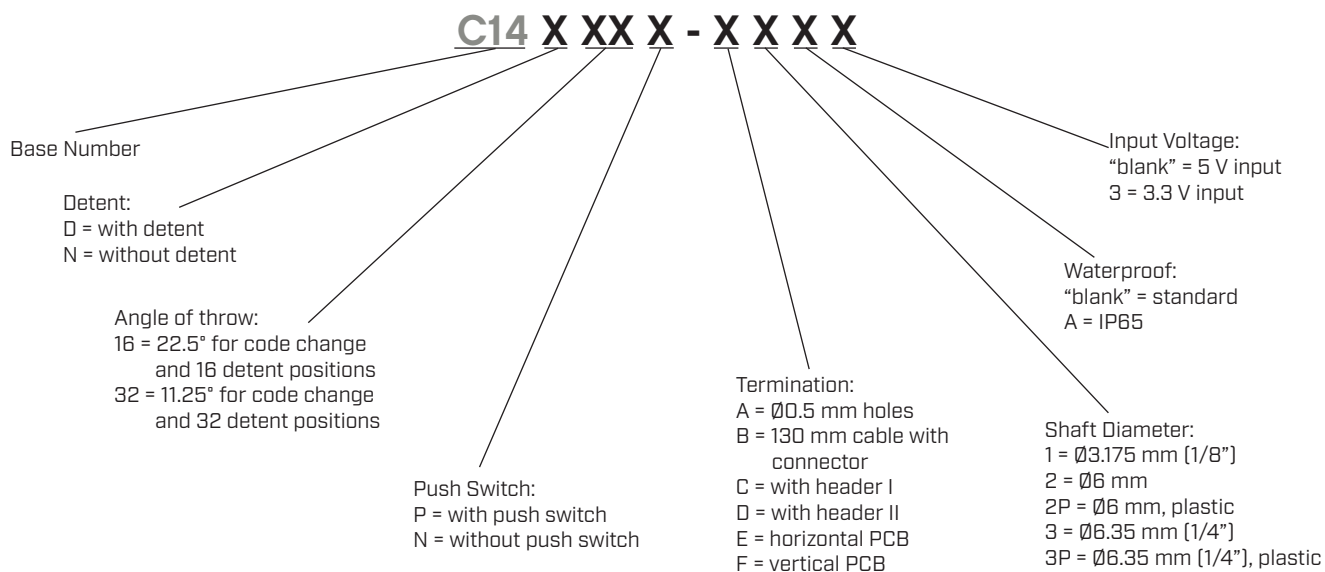
| Position \ Output | 1 | 2 | 3 | 4 | 5 |
|-------------------|---|---|---|---|---|
| A                 | 0 | 1 | 1 | 0 | 0 |
| B                 | 0 | 0 | 1 | 1 | 0 |

\*The code repeats from 1 to 4.

(1) 3.3V : "0":0.8V max. "1":2.3V min.

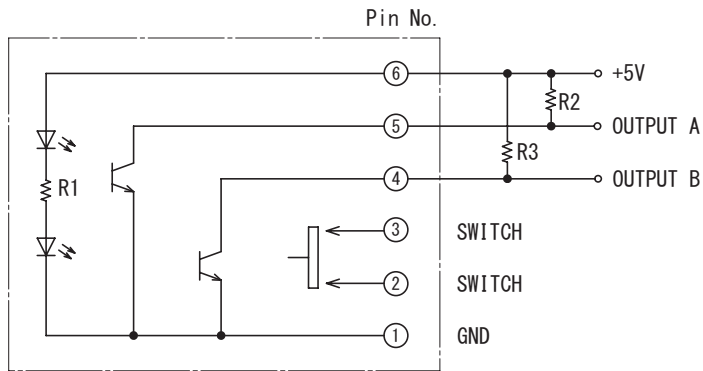
(2) 5V : "0":1.0V max. "1":3.0V min.

## PART NUMBER KEY



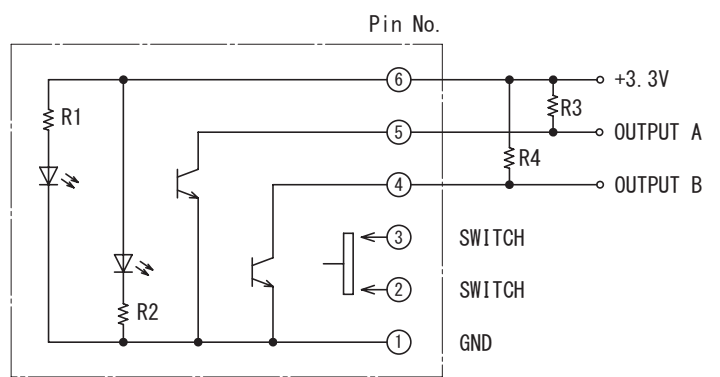
## OUTPUT CIRCUIT

5V Input



\* R2, R3: External pull-up resistors 5.1K $\Omega$

3.3V Input

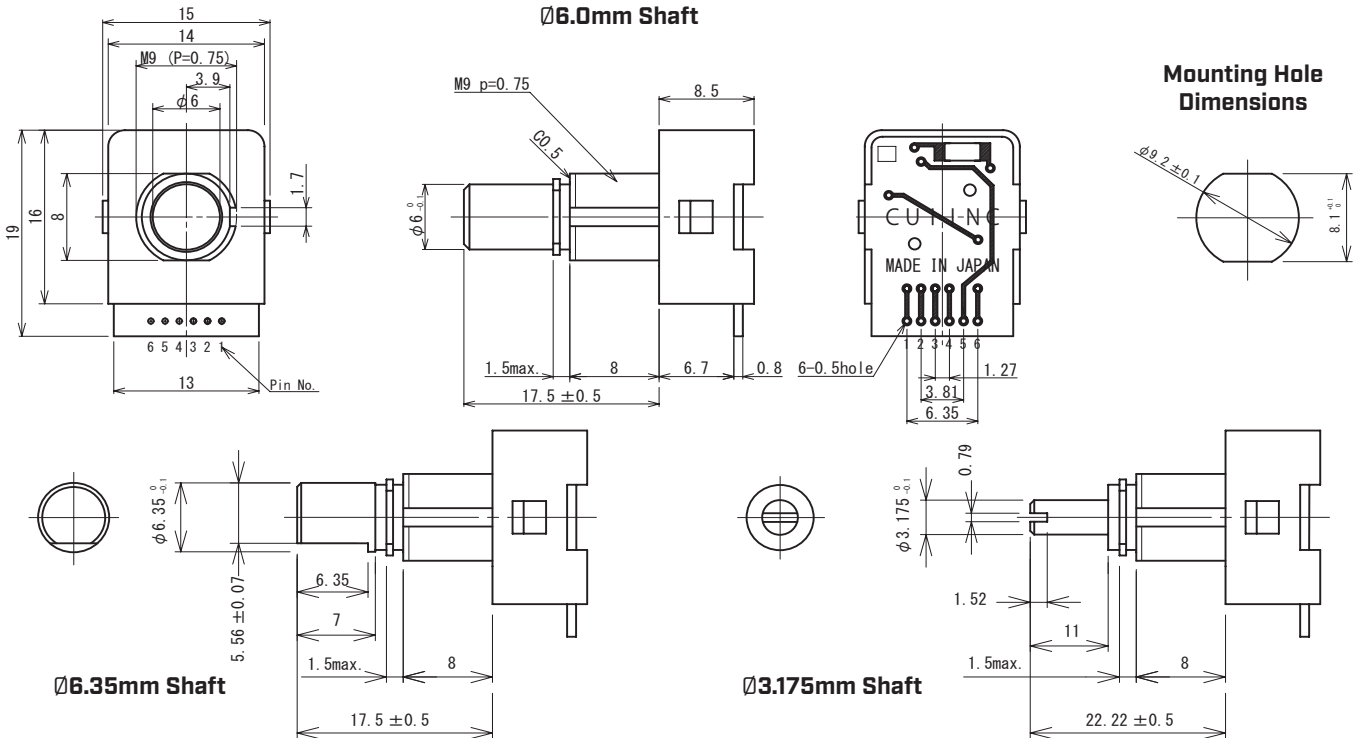


\* R3, R4: External pull-up resistors 5.1K $\Omega$

## MECHANICAL DRAWING

### 5V INPUT, WITH PUSH SWITCH

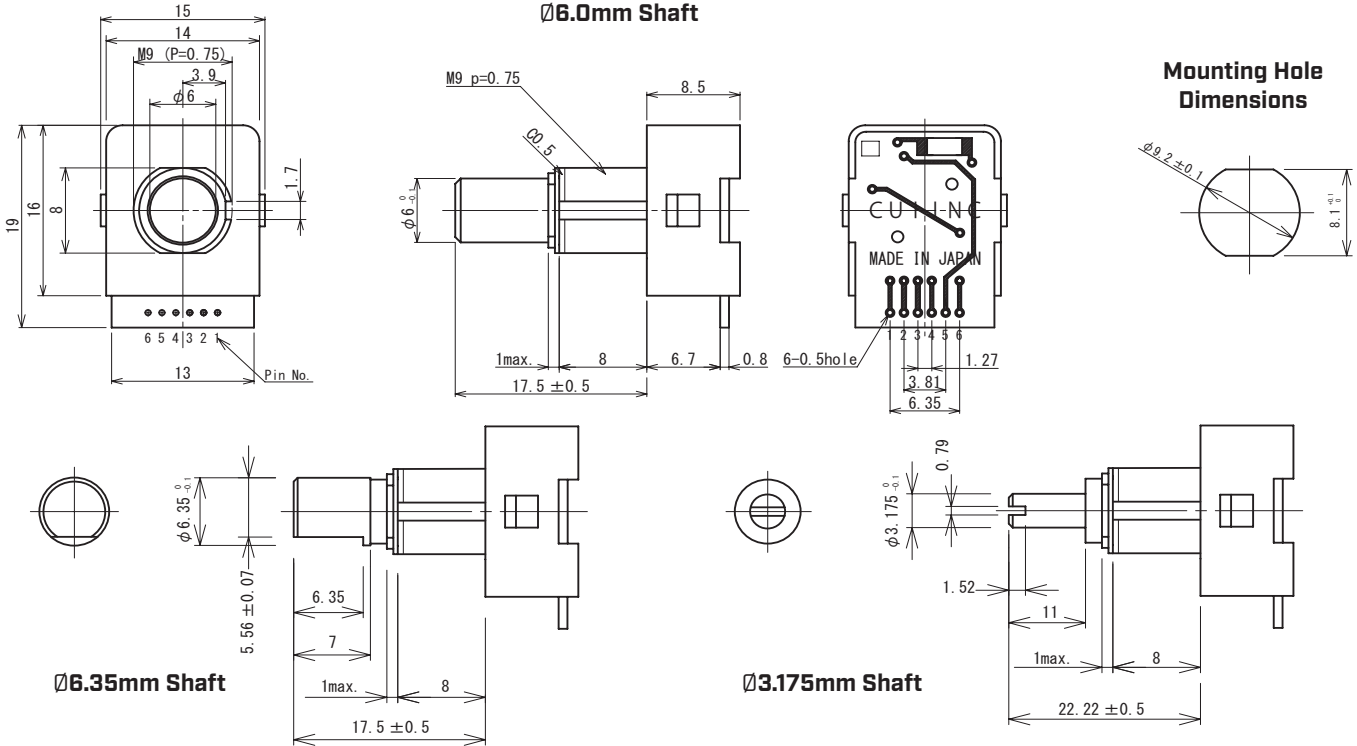
units: mm



## MECHANICAL DRAWING (CONTINUED)

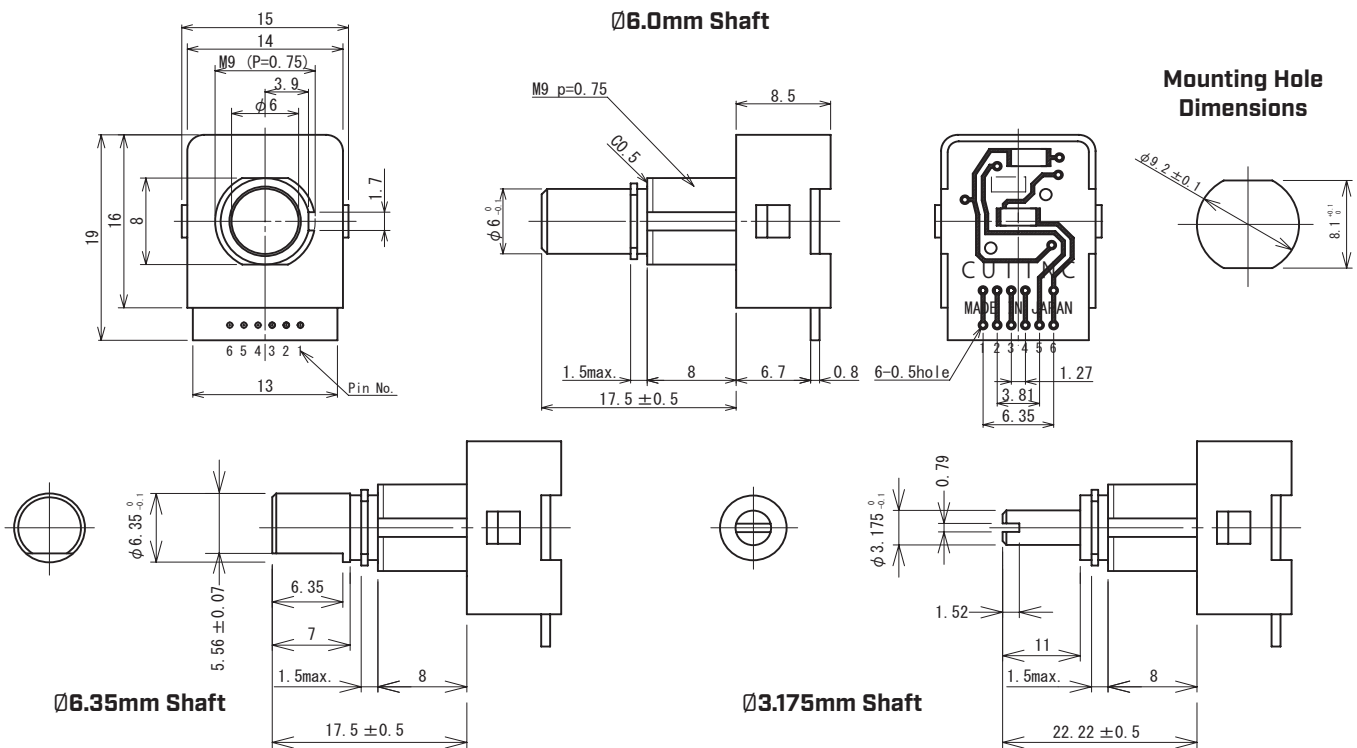
### 5V INPUT, WITHOUT PUSH SWITCH

units: mm



### 3.3V INPUT, WITH PUSH SWITCH

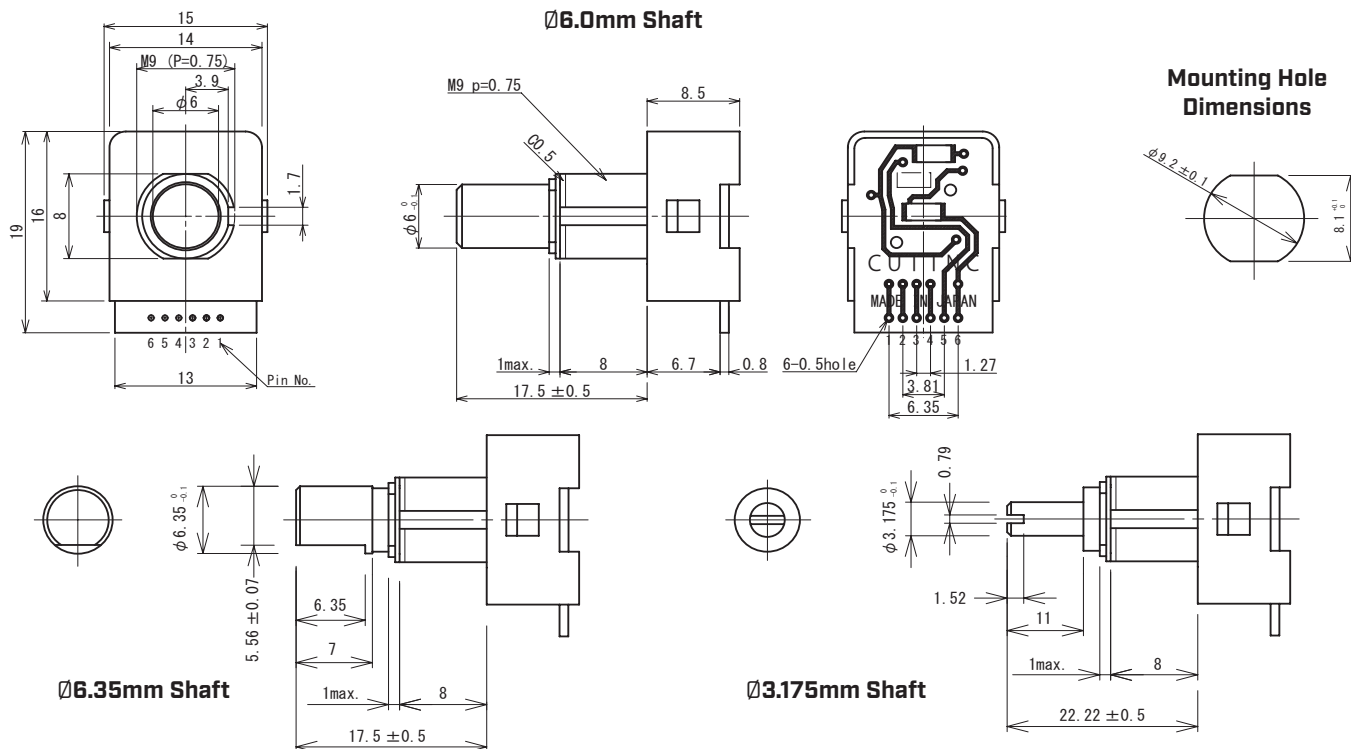
units: mm



## MECHANICAL DRAWING (CONTINUED)

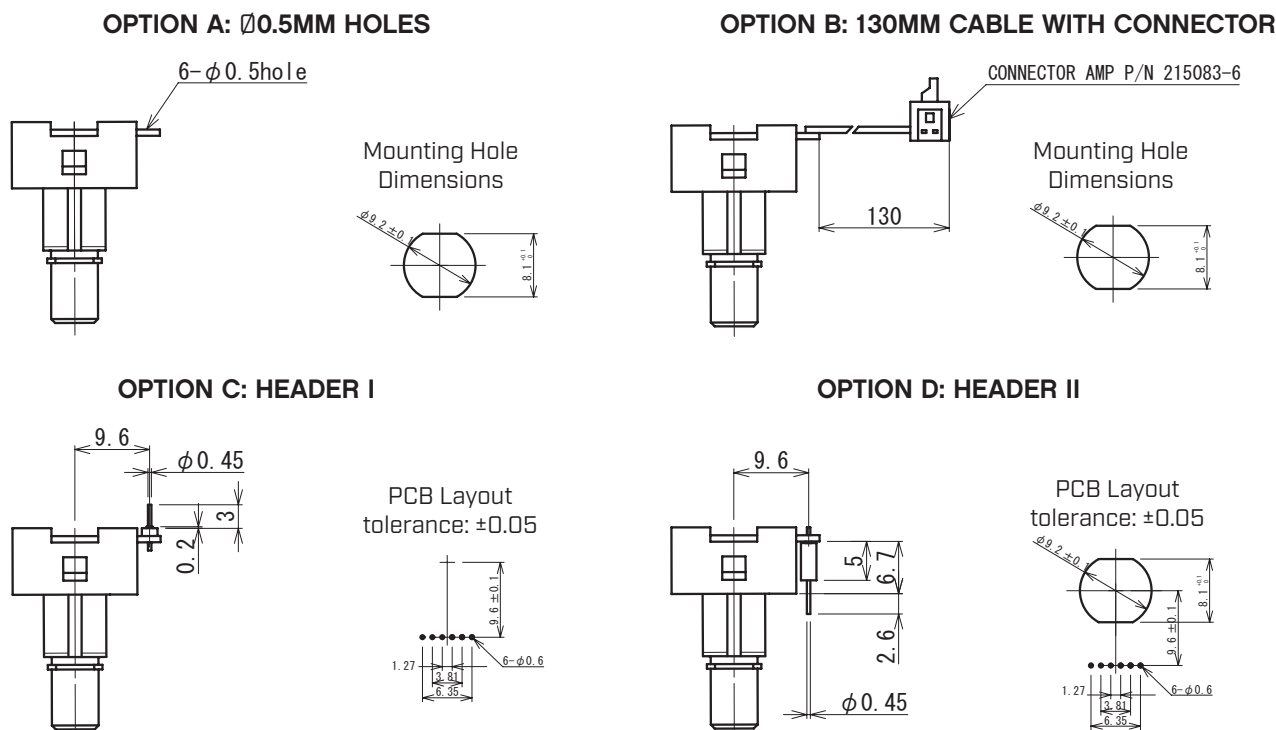
### 3.3V INPUT, WITHOUT PUSH SWITCH

units: mm



## MECHANICAL DRAWING, TERMINATION OPTIONS

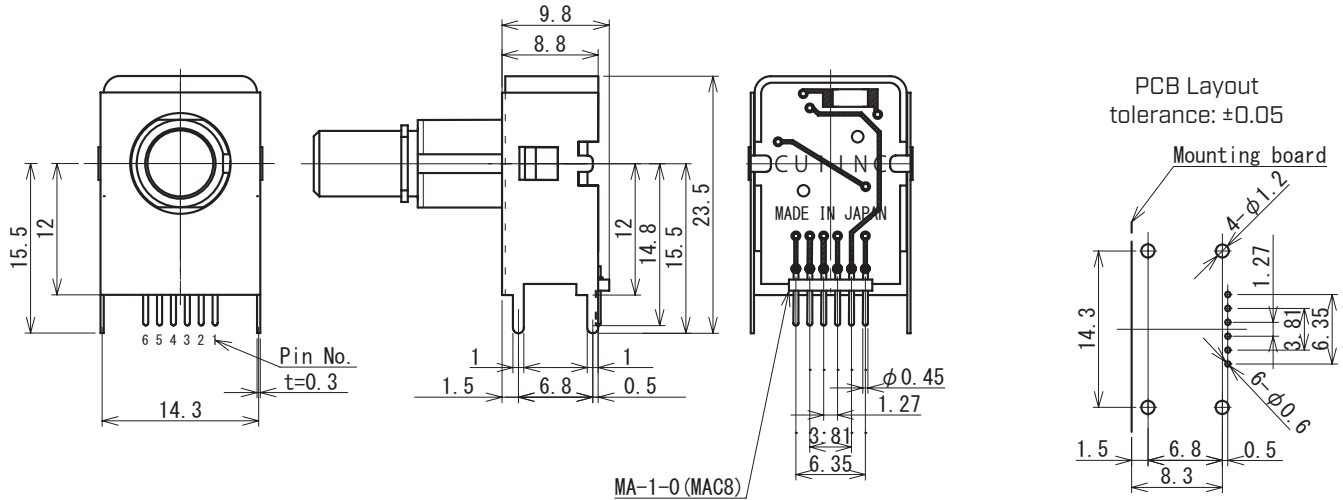
units: mm



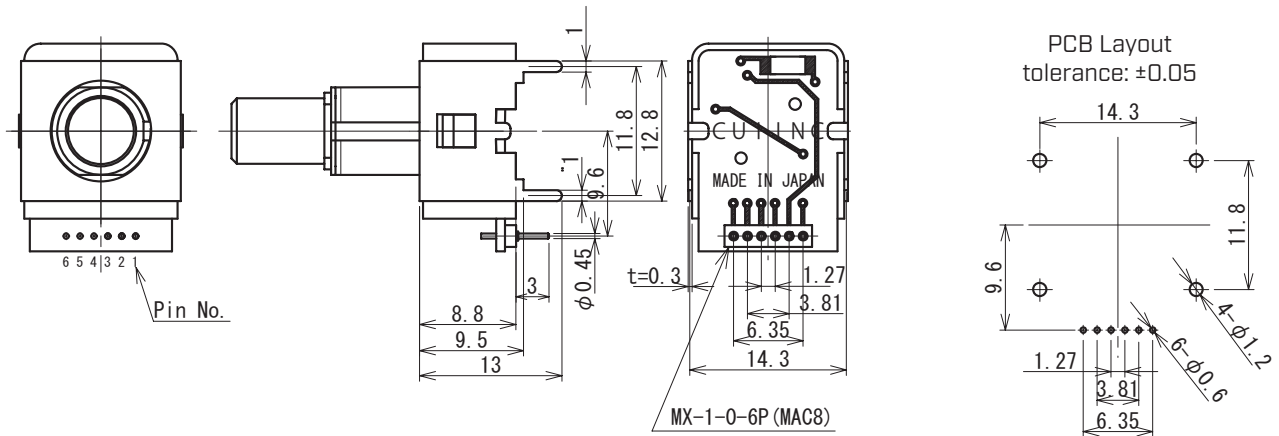
## MECHANICAL DRAWING, TERMINATION OPTIONS (CONTINUED)

units: mm

### OPTION E: HORIZONTAL PCB



### OPTION F: VERTICAL PCB



## WATERPROOF MOUNTING



| No. | Qty. | Component           |
|-----|------|---------------------|
| 1   | 1    | waterproof washer   |
| 2   | 1    | panel               |
| 3   | 1    | toothed lock washer |
| 4   | 1    | nut                 |

Note: 1. Protects against ingress of water (IP65) from front side of panel only.