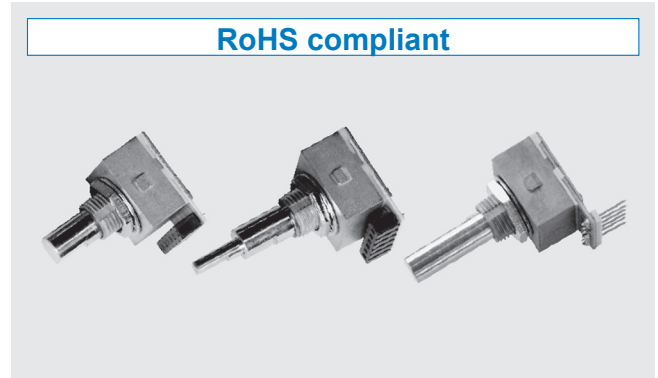


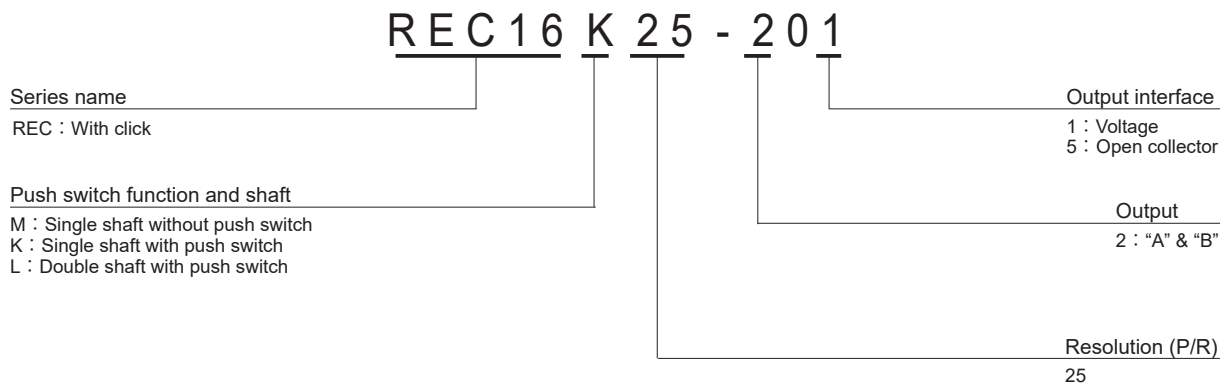
# MANUAL SETTING TYPE OPTICAL ENCODERS **REC16K/REC16L/REC16M**

## FEATURES

- 16mm square compact size
- Excellent click & switch feelings
- Long life of 2 million cycles



## PART NUMBER DESIGNATION



## LIST OF PART NUMBERS

| Resolution | Click      | Push switch function | Shaft        | Output interface             | Part number                     |
|------------|------------|----------------------|--------------|------------------------------|---------------------------------|
| 25 (P/R)   | With Click | No                   | Single Shaft | Voltage<br>(PIN HEADER Type) | REC16M25-201                    |
|            |            | Yes                  |              | Double Shaft                 | Open Collector<br>(SOCKET Type) |
|            |            |                      |              |                              |                                 |

The products indicated by ⊕ mark are manufactured upon receipt of order basis.

※ The knob are sold separately as an optional item only for the single shaft and voltage output pin header type (P/N: REC16M25-201, REC16K25-201) of the above table. (Ref. P.314)

# REC16K/REC16L/REC16M

## OPTICAL ENCODERS

### STANDARD SPECIFICATIONS

#### Electrical characteristics

|                                   |                         |                 |
|-----------------------------------|-------------------------|-----------------|
| Input voltage                     | DC5 V $\pm$ 5 %         |                 |
| Input current                     | 30 mA maximum           |                 |
| Output wave form                  | Square wave             |                 |
| Output phases                     | A, B                    |                 |
| Resolution(P/R)                   | 25                      |                 |
| Phase difference of outputs A & B | $90^\circ \pm 45^\circ$ |                 |
| Maximum frequency response        | 100 Hz                  |                 |
| Output signal                     | "1 (High)"              | + 4.5 V minimum |
|                                   | "0 (Low)"               | + 0.5 V maximum |
| Light source                      | LED                     |                 |
| Output Sink Current               | 30 mA maximum           |                 |

#### Switch characteristics

|                        |                                    |
|------------------------|------------------------------------|
| Maximum contact rating | DC15 V, 20 mA                      |
| Contact resistance     | 2 $\Omega$ maximum (Initial value) |

Note) Manual setting only.

#### Mechanical characteristics

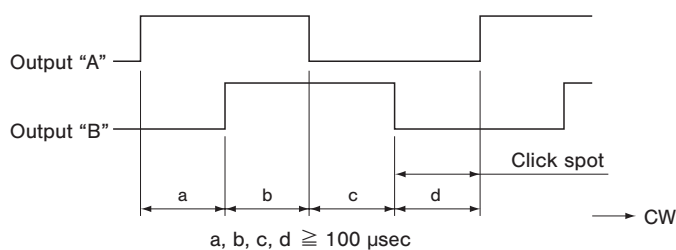
|                               |  |                         |
|-------------------------------|--|-------------------------|
| Click torque                  | 7.35 mN·m $\pm$ 2.5 maximum<br>(75 $\pm$ 25 gf·cm)<br>(REC : With click) |                         |
| Click number                  | 25   |                         |
| Shaft loading (Pull-push)     | 19.6 N maximum (2 kgf)   |                         |
| Switch operation force        | 2.45 $\pm$ 1.47 N (250 $\pm$ 150 gf)                                     |                         |
| Switch stroke                 | 0.3 $\pm$ 0.2 mm   |                         |
| Rotational life (Mechanical)  | 2 million cycles   |                         |
| Switching life                | 1 million cycles   |                         |
| Shaft loading (When mounting) | Radial   | 4.90 N maximum (500 gf) |
|                               | Axial  | 2.94 N maximum (300 gf) |
| Net weight                    | Approx. 12 g   |                         |
| Strength of tighten screw     | 1 N·m {10.2 kgf·cm} maximum  |                         |

#### Environmental characteristics

|                       |              |
|-----------------------|--------------|
| Operating temp. range | 0 ~ 50 °C    |
| Storage temp. range   | - 20 ~ 80 °C |
| Protection grade      | IP40         |

### OUTPUT

#### Click spot for 25P/R



The click spot is located somewhere outputs A & B are at Lo level.

# REC16K/REC16L/REC16M

## OPTICAL ENCODERS

### RELIABILITY TEST

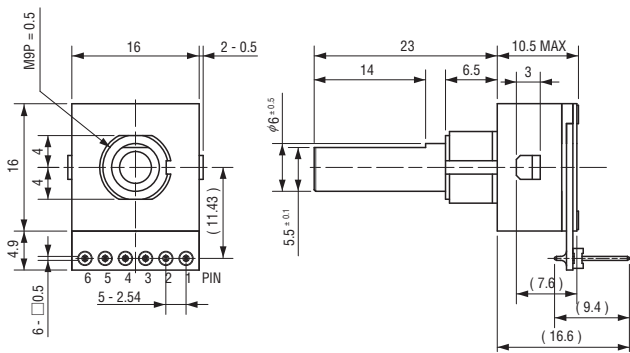
The output shall satisfy the criteria below after the following tests.

| Test item                 |           | Test conditions  |   |
|---------------------------|-----------|--|---|
| Vibration                 | Power OFF | Amplitude : 1.52 mm or 98.1 m/s <sup>2</sup> (10 G) whichever is smaller.<br>10 ~ 500 Hz excursion 15 min/cycle, 8 cycles each for X, Z, directions.                                 |   |
| Shock                     | Power OFF | 3 times each in directions (X, Z) at 490 m/s <sup>2</sup> (50 G), 11 ms.   |   |
| High temperature exposure | Power OFF | 80 °C 96 h   | To be measured after leaving samples for 1 h at normal temperature and humidity after the test. |
|                           | Power ON  | 50 °C 96 h   |   |
| Low temperature exposure  | Power OFF | - 20 °C 96 h   |   |
|                           | Power ON  | 0 °C 96 h  |   |
| Humidity                  | Power OFF | To be measured after wiping out moisture and leaving samples for 1 h at normal temperature and humidity after the test.  |   |
| Thermal shock             | Power OFF | To be done 10 cycles with the following condition<br>(To be measured after leaving samples for 1 h at normal temperature and humidity after the test.)<br>80 °C 0.5 h, - 20 °C 0.5 h |   |

### OUTLINE DIMENSIONS

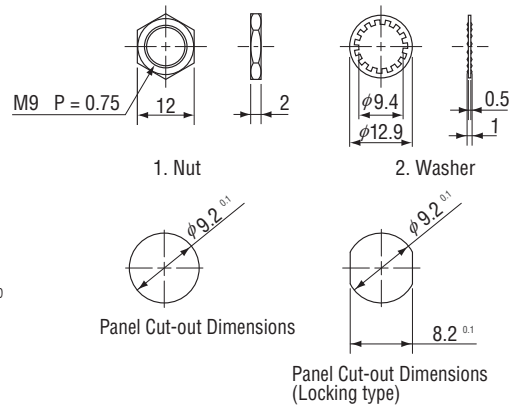
#### Single shaft and PIN HEADER

Unless otherwise specified, tolerance: ± 0.4 (Unit: mm)



PIN HEADER :  
Made by IRISO ELECTRONICS CO., LTD  
9208B - 1 - 6Z032 - PT1

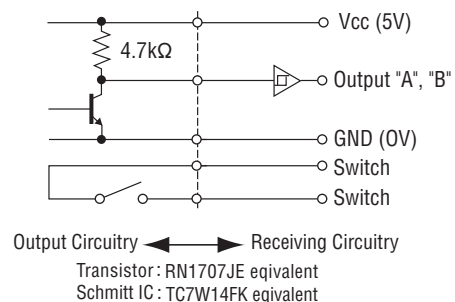
#### < Accessories >



### PIN ASSIGNMENT

| Pin No. | Without switch | With switch |
|---------|----------------|-------------|
| 1       | Power 0 (V)    | Power 0 (V) |
| 2       | N C            | For switch  |
| 3       | N C            | For switch  |
| 4       | Output "B"     | Output "B"  |
| 5       | Output "A"     | Output "A"  |
| 6       | Power + 5 V    | Power + 5 V |

### OUTPUT CIRCUITRY AND RECEIVING CIRCUITRY



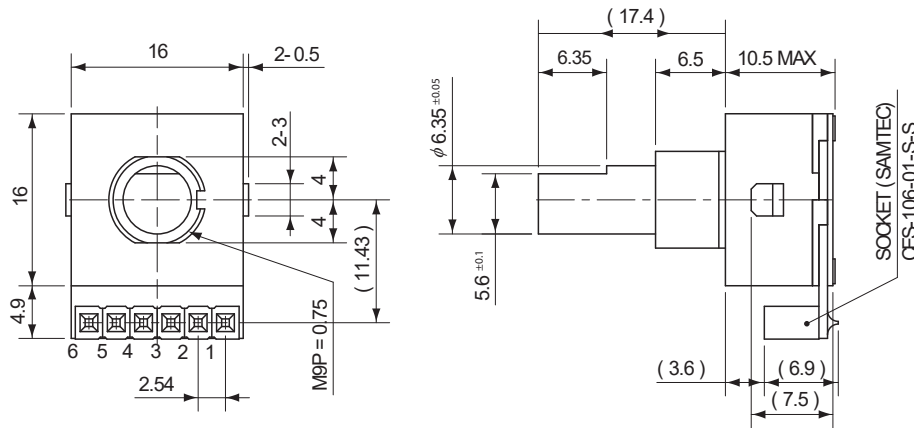
# REC16K/REC16L/REC16M

## OPTICAL ENCODERS

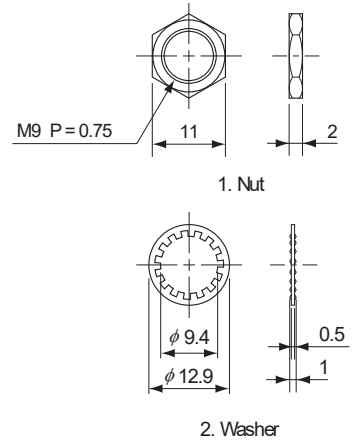
### OUTLINE DIMENSIONS

Unless otherwise specified, tolerance:  $\pm 0.4$  (Unit: mm)

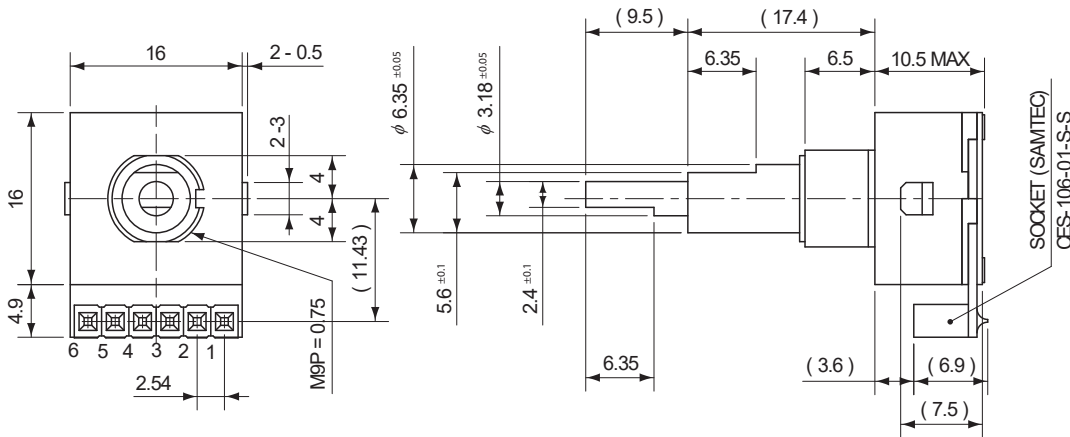
#### Single shaft and SOCKET



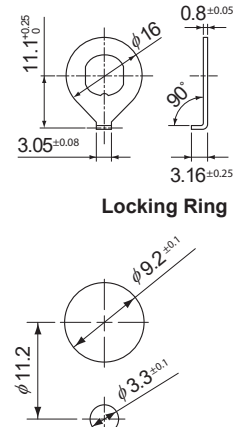
#### <Accessories>



#### Double shaft and SOCKET



#### <Option>

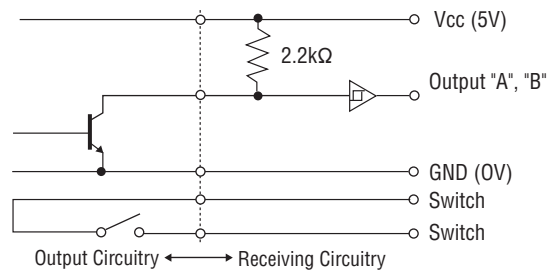


Panel Cut-out Dimensions

### PIN ASSIGNMENT

| Pin No. | Function    |
|---------|-------------|
| 1       | Power 0 (V) |
| 2       | For switch  |
| 3       | For switch  |
| 4       | Output "B"  |
| 5       | Output "A"  |
| 6       | Power +5 V  |

### OUTPUT CIRCUITRY AND RECEIVING CIRCUITRY



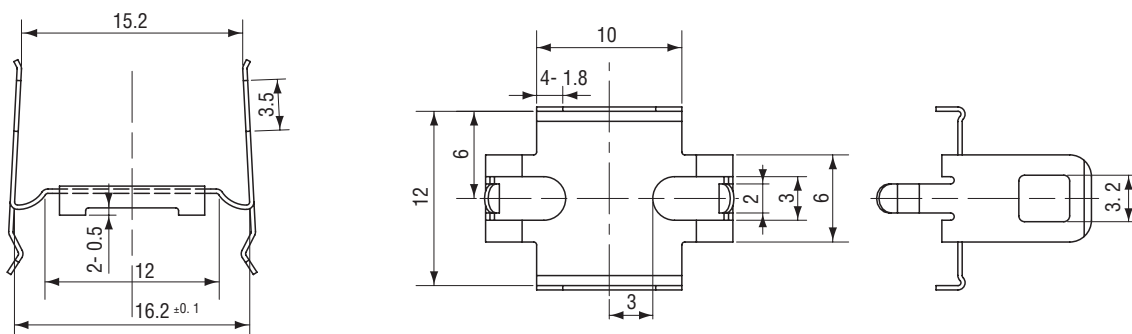
Transistor : RN1707JE equivalent  
Schmitt IC : TC7W14FK equivalent

# REC16K/REC16L/REC16M

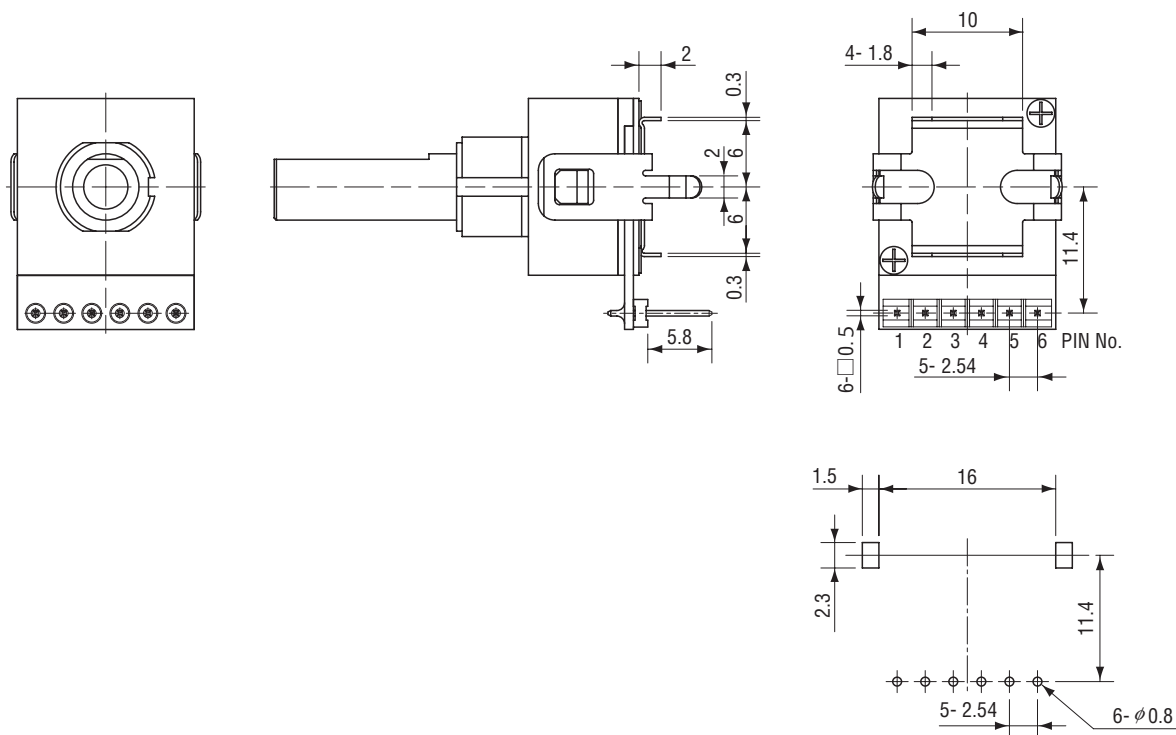
## OPTICAL ENCODERS

### Option(Snap-in Holder)

Available mounting on PC board with Snap-in Holder as an optional item separately.



### With Snap-in Holder



Mounting hole dimensions  
 ( Tolerance :  $\pm 0.1$  )  
 ( Thickness :  $t=1.6$  )