

TOKYO SOKUTEIKIZAI CO., LTD.

Rotary Switch

| | |
|-------|------|
| RS300 | P. 5 |
| RS400 | P. 5 |
| RS500 | P. 5 |
| MR8A | P. 7 |

Code Switch

| | |
|------|------|
| DP | P.11 |
| MR8C | P.15 |

Rotary Encoder

| | |
|------|------|
| RE29 | P.19 |
| RE25 | P.21 |
| RE24 | P.23 |
| RE23 | P.25 |

Manual Pulse Generator

| | |
|-------|------|
| RE45T | P.29 |
| RE45B | P.31 |
| RE46 | P.33 |
| RE47 | P.35 |

Handy Manual Pulse Generator

| | |
|-----|------|
| HT | P.39 |
| HC1 | P.43 |
| HM | P.49 |
| HR | P.53 |
| HS | P.57 |

Trackball

| | |
|------|------|
| TB36 | P.61 |
|------|------|

TOKYO SOKUTEIKIZAI CO., LTD.

Rotary Switch Catalogue

| | | |
|-------|-----------------------------------------------------------|---------|
| RS300 | _____ | P . 0 5 |
| | high blocking voltage model available | |
| RS400 | _____ | P . 0 5 |
| | compact, shorting/non shorting selectable | |
| RS500 | _____ | P . 0 5 |
| | various step angles: 15/20/30/45/60 degrees | |
| MR8A | _____ | P . 0 7 |
| | 8mm square tiny rotary switch, waterproof model available | |

RS300/400/500 Series

Outline

Our RS series embody the manufacturing history of our company. All series are sturdy and solid with high dependability designed for control units of plants, installations, audio equipments, etc.

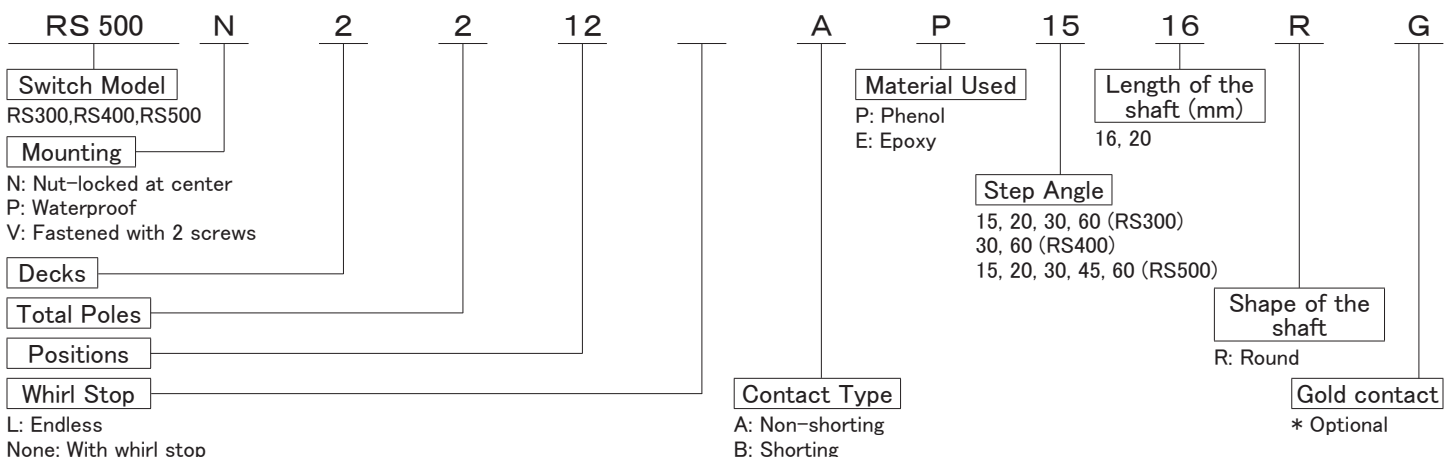
Features

- Free to change the number of switch positions by replacing self-tapping screws
- Various combinations of double shafted model available
- RoHS compliant

Specifications

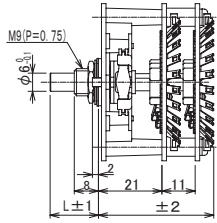
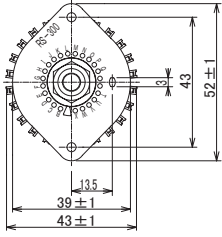
| | RS300 | RS400 | RS500 | |
|---------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------|--------------------|
| Step Angles | 15/20/30/60 | 30/60 | 15/20/30/45/60 | |
| Switching Mechanism | 15/20: Shorting 30/60: Non-shorting | Shorting and Non-shorting selectable | 15/20: Shorting 30/45/60: Non-shorting | |
| Water Proofing | ----- | Adapter panel and rubber o-rings provided at requests | | |
| Gold Contacts | Available | | | |
| High-Voltage Withstanding | Available (Up to 6,000V) | ----- | | |
| Operating Temperature | -20°C +70°C | | | |
| Storage Temperature | -40°C +C70°C | | | |
| Rotational Torque | 0.12N · m ~ 0.35N · m | 0.10N · m ~ 0.25N · m | | |
| Terminal Strength | 10N | | | |
| Nut Tightening Torque | 2N · m | | | |
| Vibration Resistance | 10Hz ~ 55Hz ~ 10Hz/min (vibrated for 1.5mm to each XYZ direction) No defect found under conditions above | | | |
| Heat Resistance of Solder | 350±10°C , 3 seconds ±1 | | | |
| Contact Resistance | (1kHz±200Hz of voltage 20mV. 50mA or less) | | | |
| | 5mΩ max. | 15mΩ max. | 10mΩ max. | |
| Insulation Resistance | After 1 min. of 500VDC terminal-terminal 1,000MΩ ≤ terminal-ground 50,000MΩ ≤ | | | |
| Withstanding Voltage | 1,000VAC 1min. | 500VAC 1min. | | |
| Rated Value | AC | 30V 3.0A/200V 0.5A | 30V 1.0A/200V 0.2A | 30V 1.5A/200V 0.2A |
| | DC | 20V 3.0A/200V 0.2A | 20V 1.0A/200V 0.1A | 20V 1.5A/200V 0.1A |
| Durability | at least 50,000 strokes | | | |

Part Number Designation

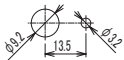


RS300_Dimensions (mm)

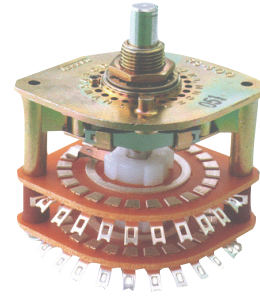
Bushing



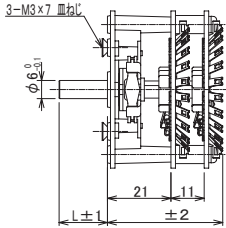
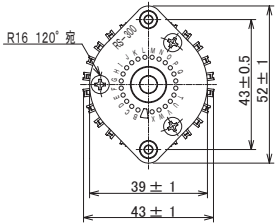
Panel Mounting Hole Dimensions (mm)



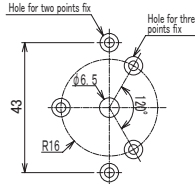
RS300/400/500N accessories
M9 Nut (t=2mm)
M9 Toothed lock washer (t=1mm)
Washer (t=0.5mm)



Two screws fix



Panel Mounting Hole Dimensions (mm)



RS300V accessory
Three M3x7 screws
(for two points fix, with two screws)

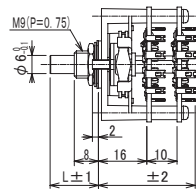
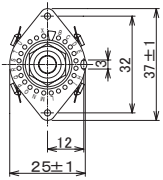
Length

| L | Standard shaft length (mm) | | | |
|---|----------------------------|----|----|----|
| | | 16 | 18 | 20 |

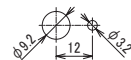
| Number of Layers (mm) | 1 | 2 | 3 | 4 |
|-----------------------|----|----|----|----|
| | 27 | 38 | 49 | 60 |

RS400_Dimensions (mm)

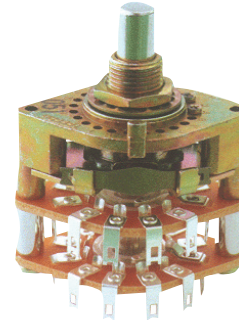
Bushing



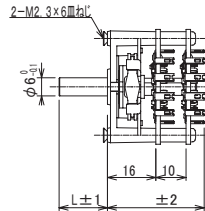
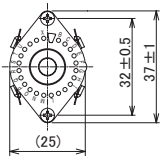
Panel Mounting Hole Dimensions (mm)



* $\phi 3.2$ hole not needed for waterproof
RS300/400/500N accessories
M9 Nut (t=2mm)
M9 Toothed lock washer (t=1mm)
Washer (t=0.5mm)



Two screws fix



Panel Mounting Hole Dimensions (mm)



RS400V accessory
Two M2.3x6 screw

Length

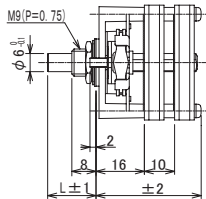
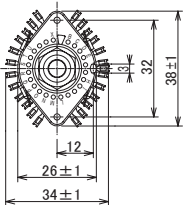
| L | Standard shaft length (mm) | | | |
|---|----------------------------|----|----|----|
| | | 16 | 18 | 20 |

| Number of Layers (mm) | 1 | 2 | 3 | 4 |
|-----------------------|--------|--------|--------|--------|
| | 22(26) | 32(41) | 42(56) | 52(71) |

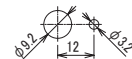
() : for all contacts type

RS500_Dimensions (mm)

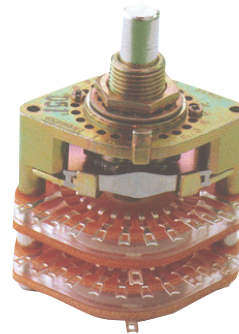
Bushing



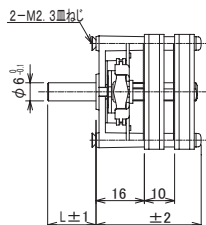
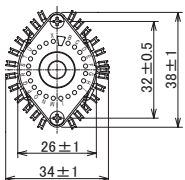
Panel Mounting Hole Dimensions (mm)



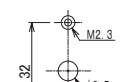
* $\phi 3.2$ hole not needed for waterproof
RS300/400/500N accessories
M9 Nut (t=2mm)
M9 Toothed lock washer (t=1mm)
Washer (t=0.5mm)



Two screws fix



Panel Mounting Hole Dimensions (mm)



RS500V accessory
Two M2.3x6 screw

Length

| L | Standard shaft length (mm) | | | |
|---|----------------------------|----|----|----|
| | | 16 | 18 | 20 |

| Number of Layers (mm) | 1 | 2 | 3 | 4 |
|-----------------------|----|----|----|----|
| | 26 | 36 | 46 | 56 |

Ultra Compact Rotary Switch



MR8A Series



Outline

MR8A is our tiniest rotary switch designed for compact devices, used for many different equipments which has very limited space inside.

Features

- 8mm square compact (8.0x8.0 mm)
- Gold plated contacts
- Monolithic sealed structure of the terminals to prevent entry of a soldering flux
- RoHS compliant
- Waterproofed model available

Specifications

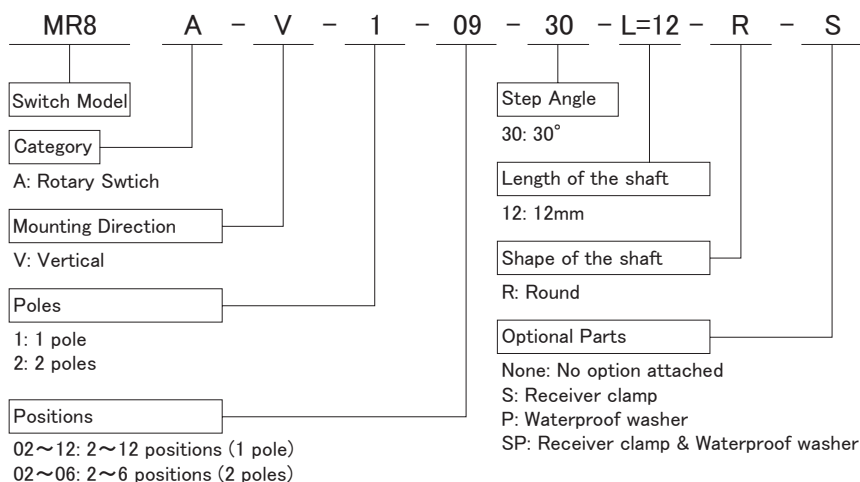
| | | | |
|--------------------------|-----------------------------|----------------------------------------------------------------------------------|------------------------|
| Operating temperature | | -20°C ~ +70°C -4F ~ 158F | Keep the body unfrozen |
| Storage temperature | | -40°C ~ +70°C -40F ~ 158F | |
| Mechanical Specification | Rotational Torque | 0.02±0.01N·m | |
| | Terminal Strength | 3N (of static load applied to the tip of the terminal once and in any direction) | |
| | Rotation Stopper Strength | 0.4N·m | |
| | Panel Nut Tightening Torque | 0.8N·m | |
| | Heat Resistance of Solder | 300°C ±10°C , 3±1 sec. | |
| | Water Resistance | Water resistant through the mounted panel (2m deep in the water for 2h) | |
| Electrical Specification | Contact Capacity | 0.4VA (AC&DC) | |
| | Maximum Voltage | 25V (AC&DC) | |
| | Working Electric Current | 0.1mA ~ 50mA (AC&DC) | |
| | Contact Resistance | 80mΩ max. | |

| | | | | |
|--------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------|
| Electrical Specification | Insulation Resistance | 500MΩmin. (250VDC): Between terminals | | |
| | | 1000MΩmin. (500VDC): Between Terminals and Ground | | |
| | Withstanding Voltage | 300VAC 1min.: Between terminals | | |
| | | 300VAC 1min.: Between terminals and ground | | |
| Insulation Resistance | | DC100V (1min later) | terminal – terminal | 100MΩ ≤ |
| | | DC500V (1minLater) | terminal – ground | 500MΩ ≤ |
| Weight | | 5.5g | | |
| Durability | | 50,000 strokes (Rotational Torque: ±20% the initial value, Contact Resistance: Not more than 100mΩ, Insulation Resistance: After 1min 250VDC electrification) | | |
| Humidity Proof | | Temperature : +40 ± 2°C Relative Humidity : 90 ~ 95% (Duration : 48 ± 2h) | | |

Warranty

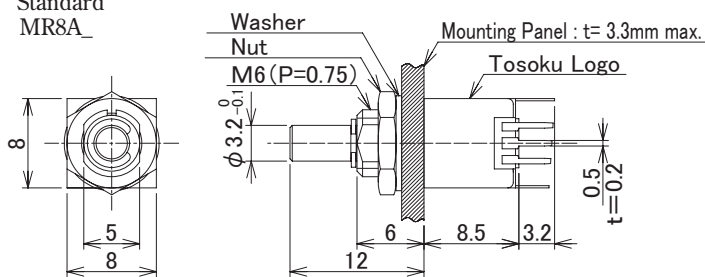
- 1 year from the date of shipment.

Part Number Designation

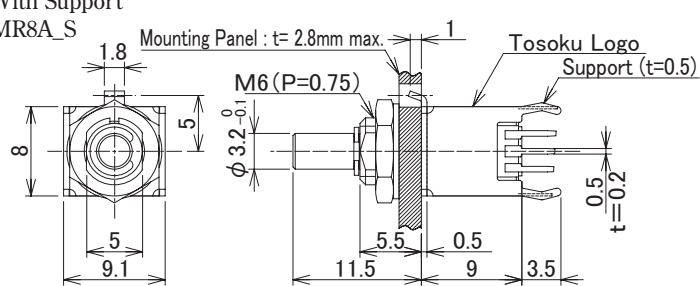


Dimensions (mm)

Standard
MR8A_

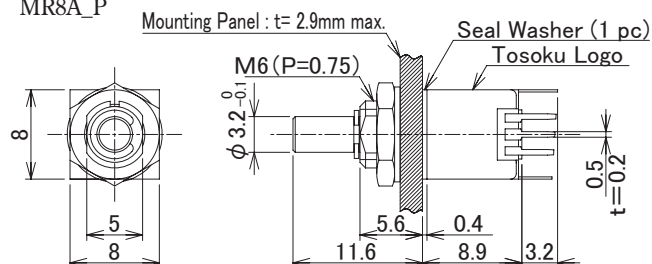


With Support
MR8A_S



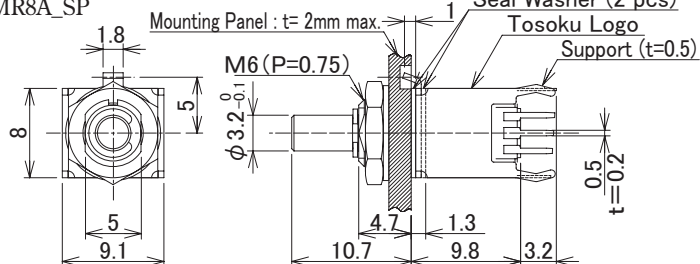
With Seal Washer (Front panel seal)

MR8A_P



With Support & Seal Washer (Front panel seal)

MR8A_SP



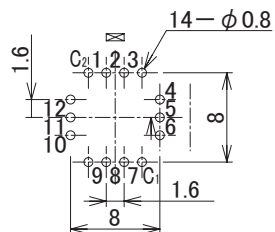
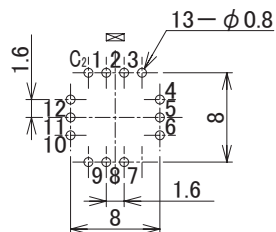
※Use 2 seal washers

PWB Mounting Hole Dimensions (mm)

Standard / With Seal Washer

Seal Washer (2 pcs)

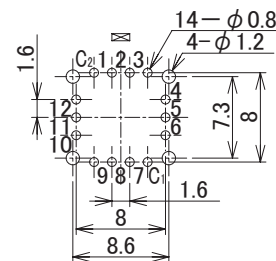
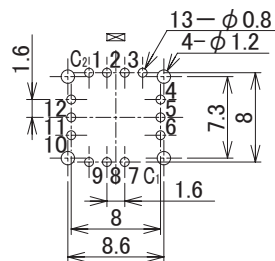
※Use 2 seal washers



With Support (& Seal Washer)

Seal Washer (2 pcs)

※Use 2 seal washers

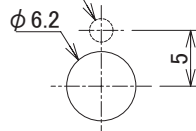
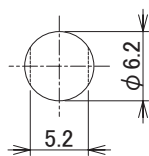


Mounting Hole Dimension (mm)

Standard / With Seal Washer

With Support (& Seal Washer)

※ $\phi 2.1$



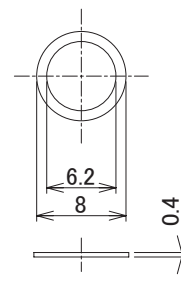
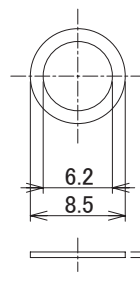
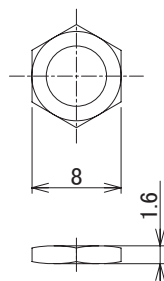
With seal washer,
keep the hole closed.

Accessories

Nut

Washer

Seal Washer (1 pc)



TOKYO SOKUTEIKIZAI CO., LTD.

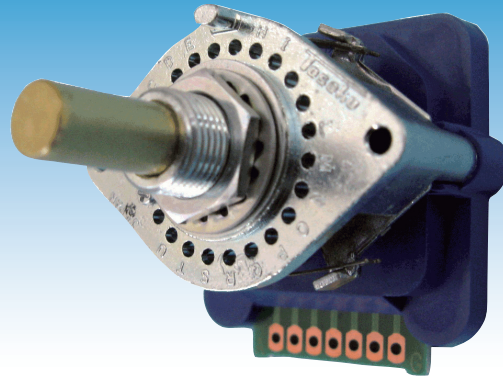
Code Switch Catalogue

| | | |
|-------------------------------------------------|-------|---------|
| DP | _____ | P . 1 1 |
| hermetically sealed, long life, various options | | |
| MR 8 C | _____ | P . 1 5 |
| tightly sealed, 2 types of mouting positions | | |

Digital Code Switch



DP Series



Outline

DP – the market leading digital code switch – series are designed for use in wide range of industrial instruments.

Features

- High reliability with double gold-plated sliding contacts.
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Step angles: 13.85°, 15°, 20°, 27.69°, 30°
- Various types of codes: real binary, complementary binary, real gray, complementary gray (either inhibit and/or parity circuit enclosed in all codes for safety). Special codes also available.
- Duration of over 50000 switching cycles
- Waterproofed model available

Specifications

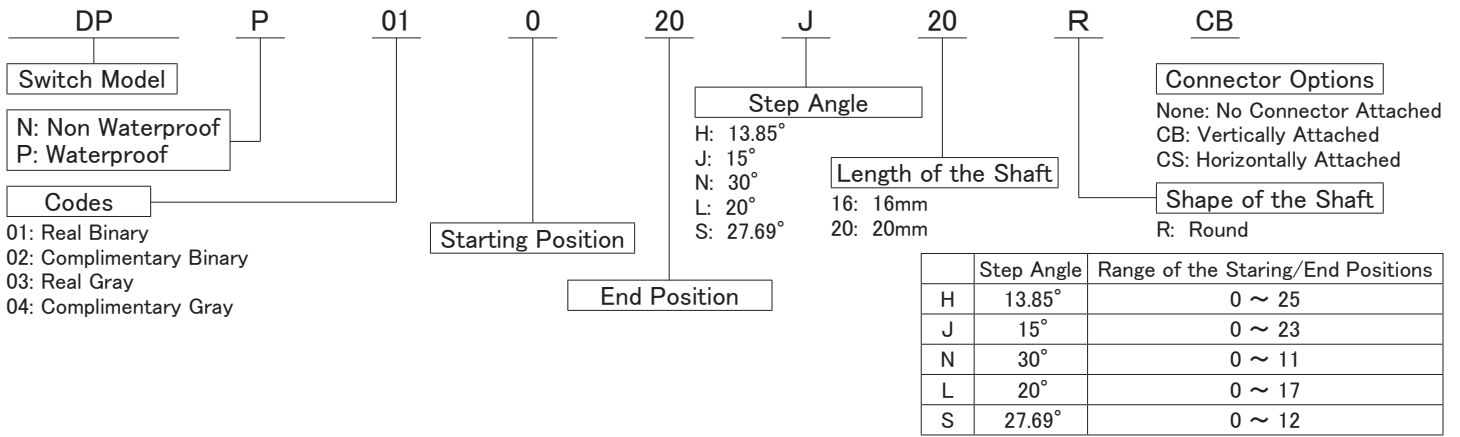
| Items | Rated Value | |
|-----------------------------|------------------------------------------------------------------------------|------------------------|
| Operating temperature | -20°C ~ +70°C (-4F ~ 158F) | Keep the body unfrozen |
| Storage temperature | -40°C ~ +70°C (-40F ~ 158F) | |
| Rotational torque | 0.1N ~ 0.2N | |
| Terminal strength | 3N | |
| Panel nut tightening torque | 2N · m | |
| Stopper strength | 3N · m | |
| Vibration Durability | Range 10 ~ 55 ~ 10Hz/min | |
| | No defect found after 2h of vibration stroke for 1.5mm to each XYZ direction | |
| Contact resistance | ≤ 100mΩ | |

| | | | |
|-----------------------|-----------------------|------------------------------|----------|
| Insulation resistance | DC250V/ After 1min | Terminal to terminal | 500MΩ ≤ |
| | DC500V/ After 1min | Terminal to ground | 5000MΩ ≤ |
| Withstanding voltage | AC250/1min | Terminal to terminal | |
| | AC1500V/1min | Terminal to ground | |
| Load resistance | AC | 5V 0.5A/ 48V 0.05A | |
| | DC | 5V 0.25A/ 25V 0.05A | |
| Durability | Rotational | Over 50000 times rotations | |
| | Contact resistance | ≤ 150mΩ | |
| | Insulation resistance | DC250V/50mΩ ≤ , (Over a min) | |

Warranty

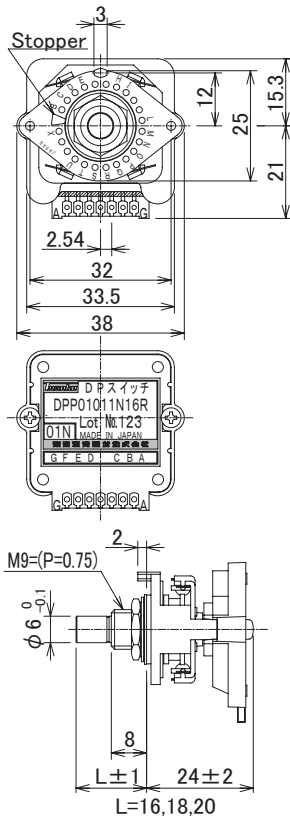
- 1 year from the date of shipment

Part Number Designation

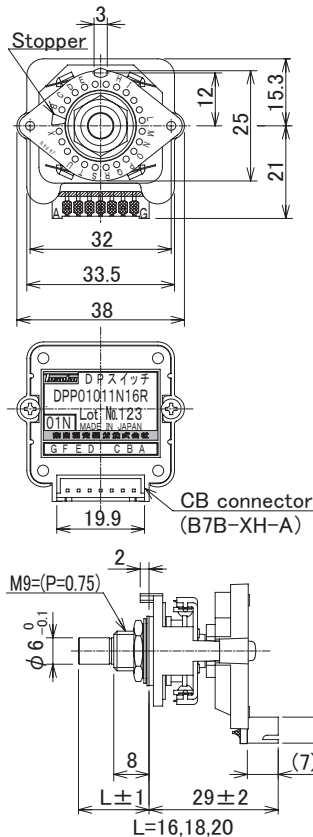


Dimensions (mm)

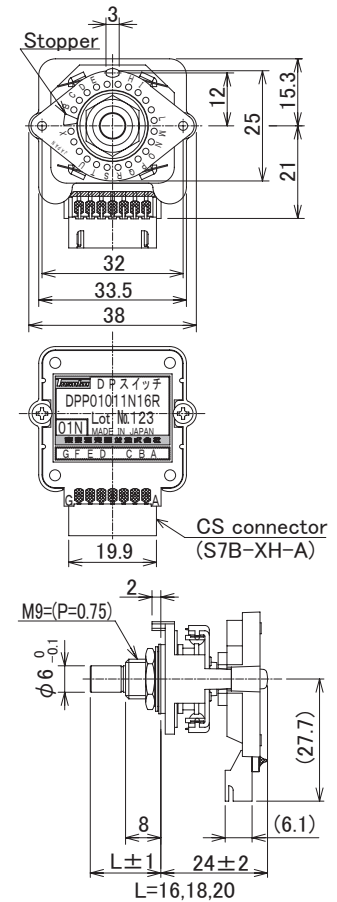
DPN/DPP



DPN/DPP with Connector CB

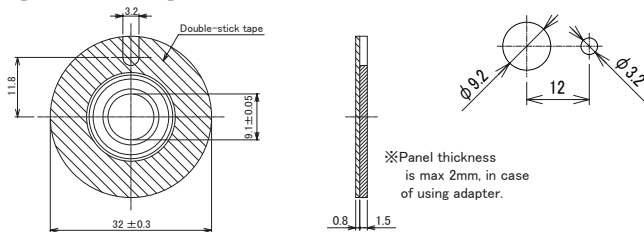


DPN/DPP with Connector CS

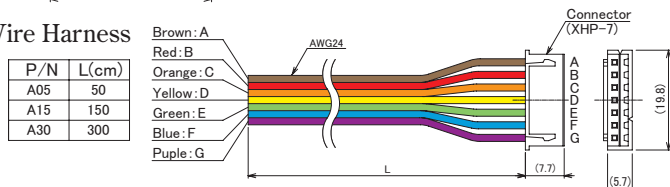


DP Accessory

Adapter (for waterproof)



Wire Harness



Precautions

How to connect panel

1. Peel double-sided tape off.
2. Stick double-sided tape to the panel (Pay attention to direction of adapter)
3. Use M9nut, toothed lock washer and washer to tighten panel and adapter.
4. M9 nut tightening torque shall be up to 2N.m.
5. Use double-sided tape under clean condition.

PLEASE NOTE

1. Panel thickness shall be up to 2mm (to use adapter)
2. Panel thickness shall be up to 4mm (without adapter)

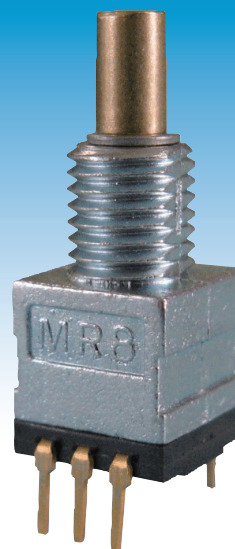
Mounting hole dimensions

1. Make $\phi 9.2$ dimensions hole at the panel (to use adapter)
2. Check out left example to use without adapter

Ultra Compact Code Switch



MR8C Series



Outline

MR8C is an ultra compact rotary code switch with resin enclosure designed especially for – but not limited to - usage in devices with limited space for switch units inside.

Features

- 8mm square compact (8.0x8.0 mm)
- Two different step angles; (22.5°, 30°)
- Gold plated contacts
- Monolithic sealed structure of the terminals to prevent entry of a soldering flux
- RoHS compliant
- Dripproofed model available

Specifications

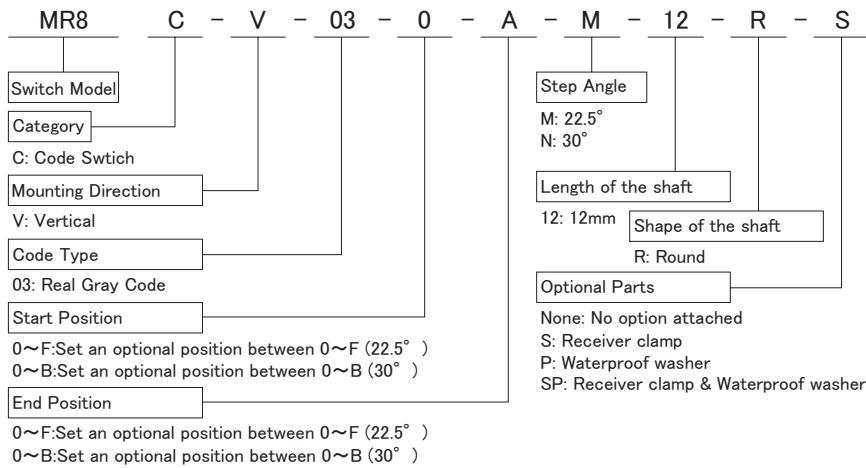
| | | | |
|--------------------------|-----------------------------|----------------------------------------------------------------------------------|------------------------|
| Operating temperature | | -20°C ~ +70°C -4F ~ 158F | Keep the body unfrozen |
| Storage temperature | | -40°C ~ +70°C -40F ~ 158F | |
| Mechanical Specification | Rotational Torque | 0.02±0.01N·m | |
| | Terminal Strength | 5N (of static load applied to the tip of the terminal once and in any direction) | |
| | Rotation Stopper Strength | 0.4N·m | |
| | Panel Nut Tightening Torque | 0.6N·m | |
| | Heat Resistance of Solder | 350°C ±10°C , 3±1 sec. | |
| | Water Resistance | Water resistant through the mounted panel (1m deep in the water for 2h) | |
| Electrical Specification | Contact Capacity | 0.2VA (AC&DC) | |
| | Maximum Voltage | 15V (AC&DC) | |
| | Working Electric Current | 0.1mA ~ 20mA (AC&DC) | |
| | Contact Resistance | 200mΩ max. | |

| | | |
|--------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrical Specification | Insulation Resistance | 100MΩ minimum (100VDC 1min.): Between terminals |
| | | 500MΩ minimum (500VDC 1min.): Between Terminals and Ground |
| | Withstanding Voltage | 100VAC 1min.: Between terminals |
| | | 500VAC 1min.: Between terminals and ground |
| Weight | | 3.5g |
| Durability | | 30,000 strokes (Rotational Torque: ±50% the initial value, Contact Resistance: Not more than 1Ω, Insulation Resistance: After 1min 100VDC electrification) |
| Humidity Proof | | Temperature : +40 ± 2°C Relative Humidity : 90 ~ 95% (Duration : 48 ± 2h) |

Warranty

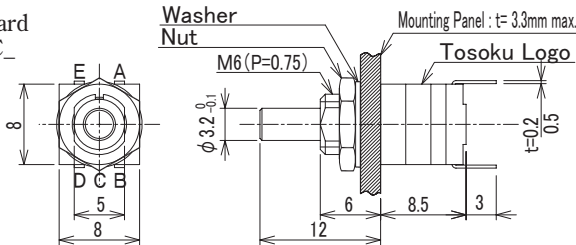
- 1 year from the date of shipment

Part Number Designation

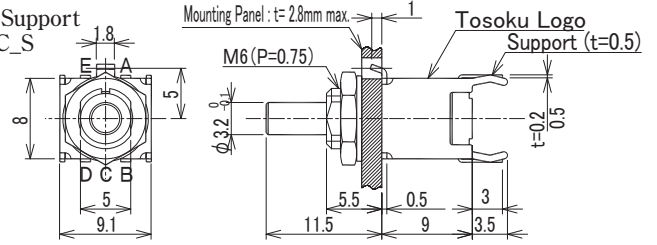


Dimensions (mm)

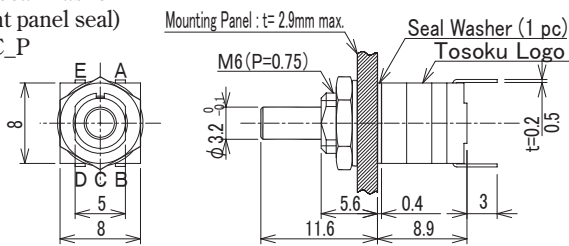
Standard
MR8C_



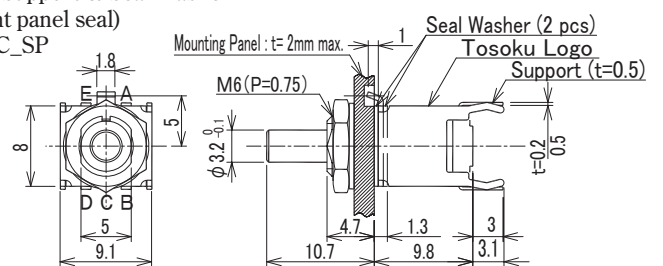
With Support
MR8C_S



With Seal Washer
(Front panel seal)
MR8C_P



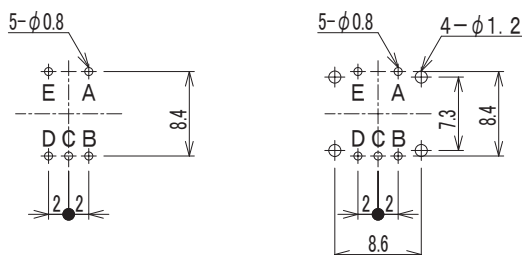
With Support & Seal Washer
(Front panel seal)
MR8C_SP



※Use 2 seal washers

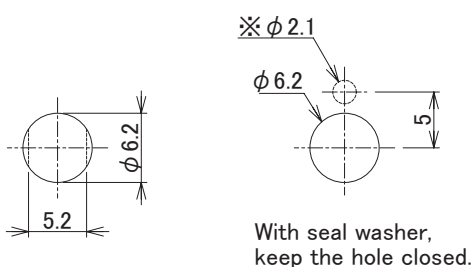
PWB Mounting Hole Dimensions (mm)

Standard / With Seal Washer With Support (+ Seal Washer)



Mounting Hole Dimension (mm)

Standard / With Seal Washer With Support (+ Seal Washer)



Code table

22.5° Step angle

Code Type 03 (Real gray code) ● indicates terminal connection to common

| Terminal No. | Bit No. | Switch Position | | | | | | | | | | | | | | | |
|--------------|---------|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| A | 1 | | ● | | | | | | | | | | | | | | |
| E | 2 | | | ● | | | | | | | | | | | | | |
| B | 4 | | | | ● | | | | | | | | | | | | |
| D | 8 | | | | | ● | | | | | | | | | | | |
| C | common | | | | | | ● | | | | | | | | | | |

30° Step angle

Code Type 03 (Real gray code) ● indicates terminal connection to common

| Terminal No. | Bit No. | Switch Position | | | | | | | | | | | |
|--------------|---------|-----------------|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B |
| E | 1 | | ● | | | | | | | | | | |
| A | 2 | | | ● | | | | | | | | | |
| B | 4 | | | | ● | | | | | | | | |
| D | 8 | | | | | ● | | | | | | | |
| C | common | | | | | | ● | | | | | | |

Code Type 01 (Real binary code) ● indicates terminal connection to common

| Terminal No. | Bit No. | Switch Position | | | | | | | | | | | |
|--------------|---------|-----------------|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B |
| D | 1 | | ● | | | | | | | | | | |
| B | 2 | | | ● | | | | | | | | | |
| E | 4 | | | | ● | | | | | | | | |
| A | 8 | | | | | ● | | | | | | | |
| C | common | | | | | | ● | | | | | | |

Attention: Terminal A and E of 30° is reverse to 22.5°

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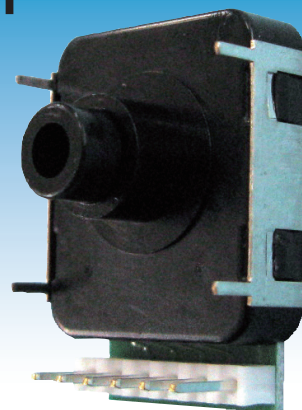
Rotary Encoder Catalogue

- RE 2 9 _____ P . 1 9
thin, lightweight, resin shaft/case
- RE 2 5 _____ P . 2 1
waterproof model available, operated at 3.3V/5V
- RE 2 4 _____ P . 2 3
dual (inner/outer) shaft: inner for push button, outer for rotation
- RE 2 3 _____ P . 2 5
push button function added to the rotating shaft, low price

Ultra Slimline Rotary Encoder with Push Switch



RE29 Series



Outline

RE29 series pack compact rotary encoder with dual-functional resin shaft into the space-saving resin enclosure. RE29 is recommended for wide range of machines including measurement components, medical and telecommunication devices.

Features

- Extremely thin (6.6mm) and lightweight (7g)
- Multi-functional with 2 way acting – push switch function and rotating function – shaft
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Designed to be soldered to printed circuit board

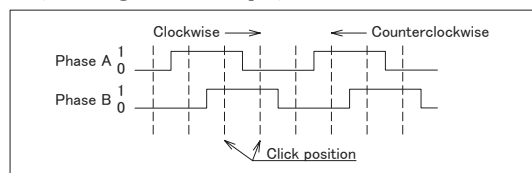
Specifications

| 1. Electrical and Mechanical specifications | | | |
|---------------------------------------------|-------------------|-------------------------------------------|--------------------------------|
| Items | | Rated Value | |
| Rotary Encoder | Number of Pulses | 6 PPR | |
| | Number of Clicks | 24 Clicks | |
| | Supply Voltage | DC3.3V \pm 5% \leq 20mA 6mA TYP | |
| | | DC5V \pm 5% \leq 10mA 4mA TYP | |
| | Output Signals | Channel A/B: Square Wave CMOS chip | |
| | Output Voltage | High | (Supply Voltage – 2.5V) \leq |
| | | Low | \leq 0.5V |
| Response Frequency | 100Hz | | |
| Rotational Torque | 4 \pm 2 mN · m | | |
| Push switch | Rating of contact | \leq DC12V 0.1 ~ 10mA (Resistance load) | |
| | Travel of switch | 0.2 \pm 0.1 mm | |
| | Operational Force | 5 \pm 2 N | |
| Weight | | 7g | |

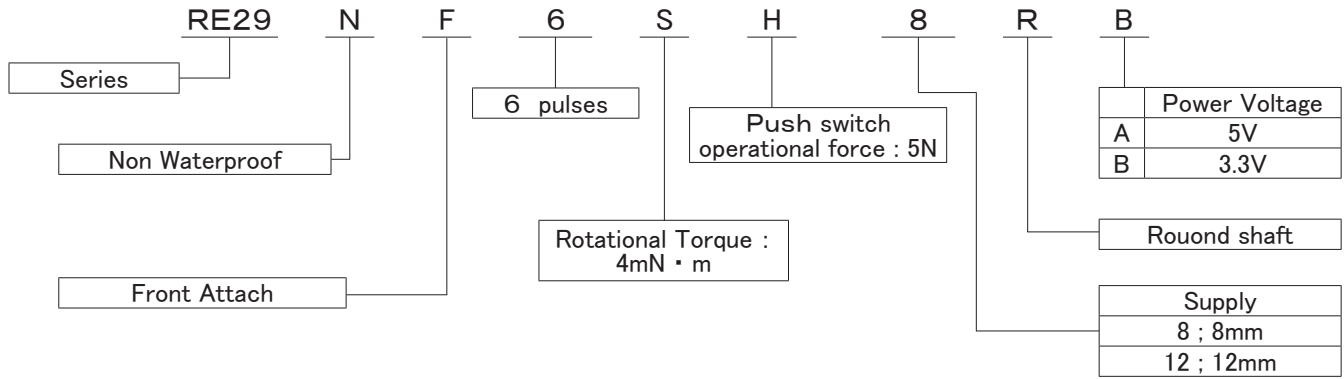
| 2. Reliability and Environmental Specifications | | |
|-------------------------------------------------|-----------------------------|------------------------------------|
| Items | | Rated Value |
| Durability of operating area | Thrust direction | 100N |
| | Push Pull | 50N |
| | Radial | 1N · m |
| Rotational durability | | 1 million strokes (No load) |
| Screw Torque | | Not more than 1N · m |
| Heat resistance of solder | Solder bit temp.: MAX 350°C | Within 3 seconds for each terminal |
| Operating temperature | | -0°C ~ +55°C 32F ~ 131F |
| Storage temperature | | - 40°C ~ +85°C - 40F ~ 185F |

Output Waveform

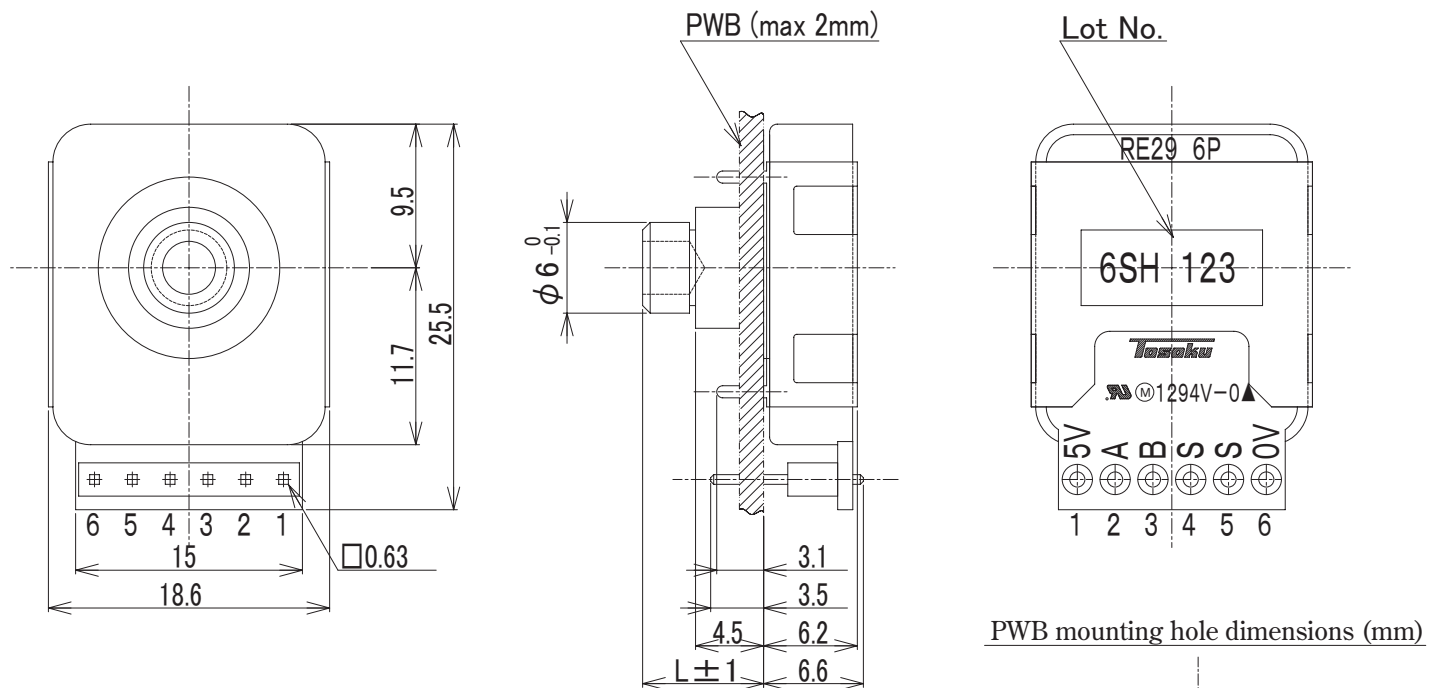
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage(1);
- 3) Either signal A or B switches from 0→1 or 1→0 for every single click (Quad edge evaluation spec).



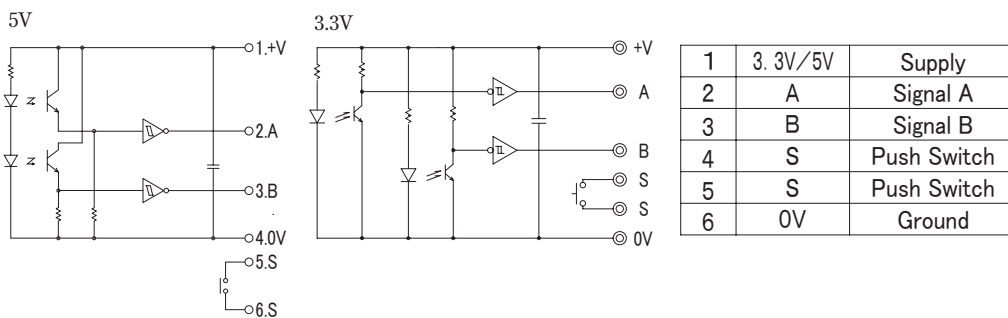
Part Number Designation



Dimensions (mm)



Circuitry



Precautions

| | |
|-----------|--------------------------------------------------------------------------------|
| Wiring | Use buffering amplifier when extending lead wire over 30cm. |
| Soldering | Do not put a load on the terminal area during and immediately after soldering. |
| Operation | Do not use flow/reflow soldering machines. |
| Power | Use under specified power voltage and connect properly. |

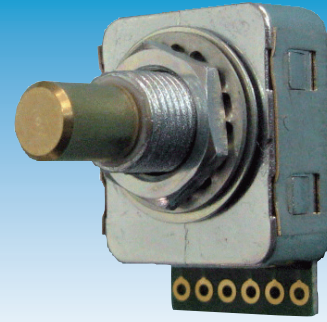
Warranty

- 1 year from the date of shipment

Optical Rotary Encoder



RE25 Series



Outline

RE25 is a VA designed eco friendly – power-saving and low cost with lesser parts – rotary encoder. Its size, mounting procedures and inner-structures have been designed for a wide-array of uses; measurement devices, medical equipments, industrial machineries, telecommunication devices and machine tools.

Features

- Eco friendly:
 - 1) Power-saving
 - 2) Low cost and lesser parts by VA design
 - 3) RoHS compliant
- Thin-line (18.8x25.5x8.9mm) and lightweight (18g)
- Various types of models with options: lead wire with or without connector, clamp for horizontal/vertical mounting
- Long-lasting without “contact chatter” due to its optical switching function
- Waterproofed model available

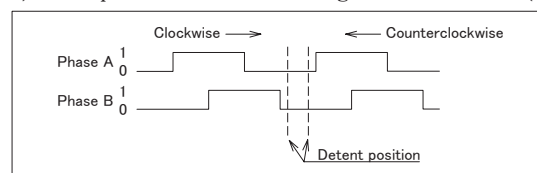
Specifications

| 1. Electrical and Mechanical specifications | | |
|---------------------------------------------|------------------------------------|---------------------------------------------------------|
| Items | Rated Value | |
| Number of pulses | 16PPR, 25PPR | |
| Supply voltage | 3.3V±10% | 5V±10% |
| | 20mA | 10mA |
| Output signals | Channel A/B: Square Wave CMOS chip | |
| Output voltage | High | Supply Voltage(3.3V): $-0.3V \leq$, (5V): $-0.5V \leq$ |
| | Low | $\leq 0.4V$ |
| Response frequency | 200Hz | |
| Rotational Torque | Light: S | $4 \pm 1 \text{mN} \cdot \text{m}$ |
| | Standard: C | $6 \pm 2 \text{mN} \cdot \text{m}$ |
| | Medium: M | $10.5 \pm 3.5 \text{mN} \cdot \text{m}$ |
| | High: H | $16 \pm 5 \text{mN} \cdot \text{m}$ |
| Weight | 18g | |

| 2. Reliability and Environmental specifications | | | |
|-------------------------------------------------|-----------------------------|-------------------------------------------|--------------------------------|
| Items | Rated Value | | |
| Durability of operating area | Thrust direction | Push | 100N |
| | | Pull | 50N |
| | Radial | | $1 \text{N} \cdot \text{m}$ |
| Rotational durability | Light: S | | 1 million strokes (No load) |
| | Standard: C | | |
| | Medium: M | | |
| | High: H | | 100 thousand strokes (No load) |
| Screw Torque | | Not more than $1 \text{N} \cdot \text{m}$ | |
| Heat resistance of solder | Solder bit temp.: MAX 350°C | Within 3 seconds for each terminal | |
| Operating temperature | | 0°C ~ 32F | +55°C ~ 131F |
| Storage temperature | | -40°C ~ -40F | +85°C ~ 185F |

Output Waveform

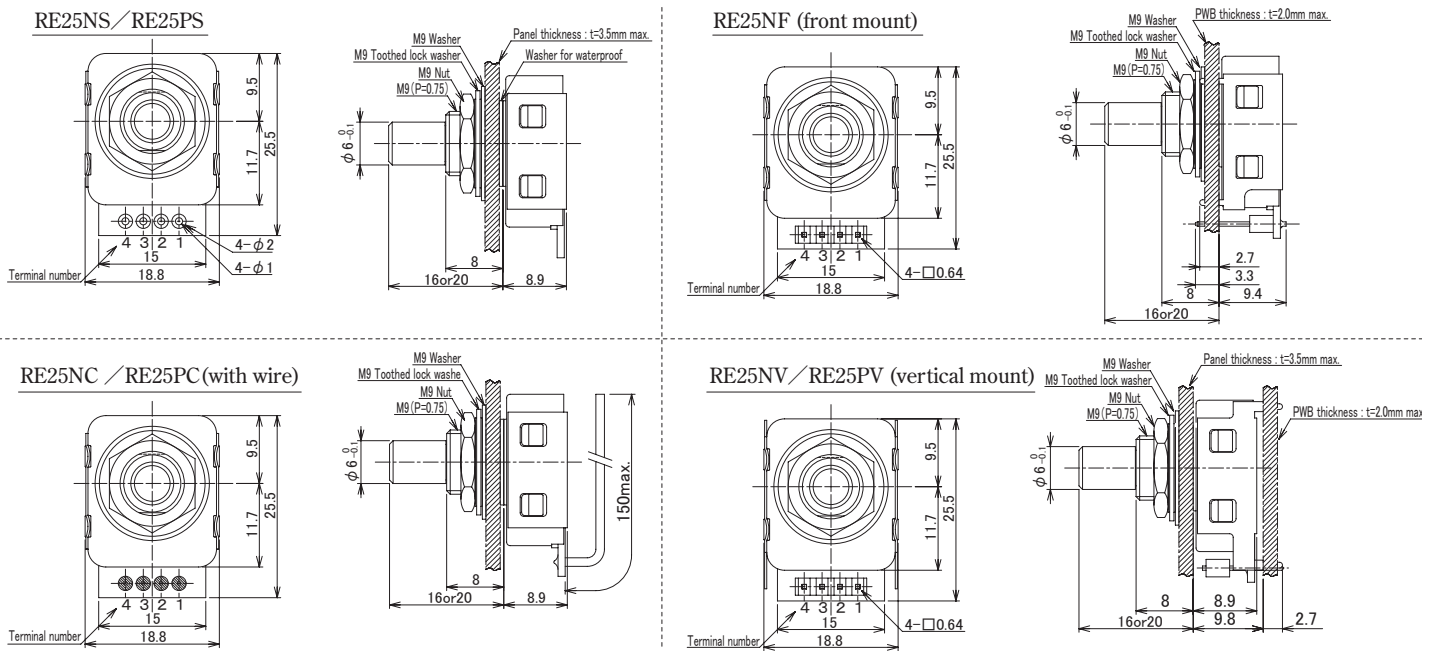
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage (1);
- 3) Detent positions are where both signal A and B are low (0).



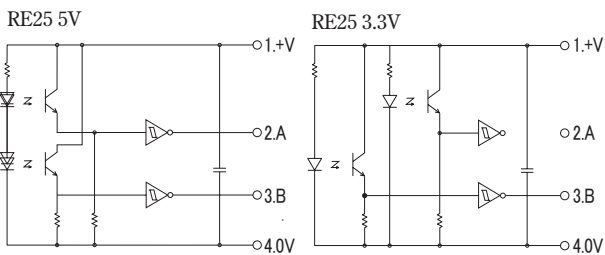
Part Number Designation

| | | | | | | | | | |
|--------|----------------|---|---|-------|-------|--------------------|---|---------------|--------------|
| Series | RE25 | N | S | 25 | C | 20 | R | A | |
| | Waterproof | | | Pulse | | | | Power Voltage | |
| N | No | | | 16 | 16PPR | | | A | 5V |
| P | Yes | | | 25 | 25PPR | | | B | 3.3V |
| | Wiring | | | | Ckick | Rotation Torque | | | Shaft Shape |
| S | Standard | | | S | | 4mN · m | | R | Round |
| C | With wire | | | C | With | 6mN · m | | | Shaft length |
| F | Front Mount | | | M | | 10.5mN · m | | 16 | 16mm |
| V | Vortical Mount | | | H | | 16mN · m | | 20 | 20mm |
| | | | | Non | W/O | $\leq 4mN \cdot m$ | | | |

Dimensions (mm)



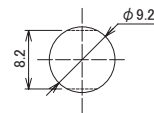
Circuitry



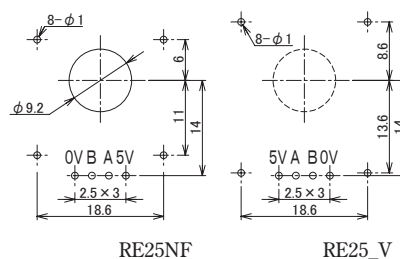
Terminal number

| | | |
|---|---------|----------|
| 1 | 3.3V/5V | Supply |
| 2 | A | Signal A |
| 3 | B | Signal B |
| 4 | 0V | Ground |

Mounting hole dimensions (mm)



PWB mounting hole dimensions (mm)



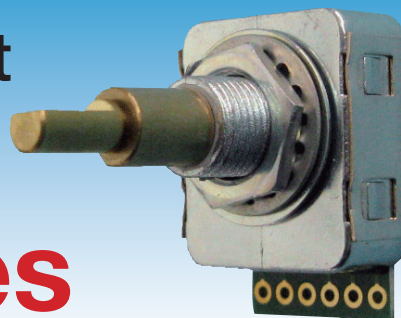
Precautions

| | |
|---------------|--------------------------------------------------------------------------------|
| Wiring | Use buffering amplifier when extending lead wire over 30cm. |
| Soldering | Do not put a load on the terminal area during and immediately after soldering. |
| Operation | Do not use flow/reflow soldering machines. |
| Power | Use under specified power voltage and connect properly. |
| Waterproofing | Do not fasten tighter with the torque of more than 1.5N·m. |

Warranty

- 1 year from the date of shipment.

Rotary Encoder with Dual Functional Shaft



RE24 Series

Outline

RE24 rotary encoder series contain unique mechanism for its shaft; its rotational outer axis for rotary encoder and the inner axis for push switch. RE24 is designed for use in various industrial areas: measurement component, medical equipment, industrial machinery, telecommunication device and machine tool.

Features

- Dual inner/outer axes mechanism to help prevent misoperation
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Thin-line (18.8x25.5x8.9mm) and lightweight (18g)
- Long-lasting without “contact chatter” due to its optical switching function
- Specially designed knob (GG60) available

Specifications

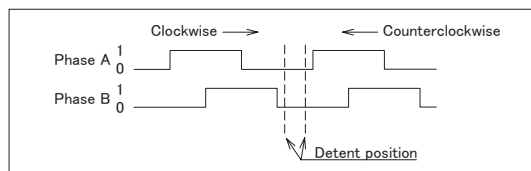
| 1. Electrical and Mechanical specifications | | |
|---------------------------------------------|-------------------------|-----------------------------------------|
| Items | | Rated Value |
| Number of pulses | | 16PPR, 25PPR |
| Supply voltage | 3.3V±10% | 5V±10% |
| | 20mA | 10mA |
| Output signals | | two square wave output (A/B), CMOS chip |
| Output voltage | High | (Supply Voltage - 0.5V) ≤ |
| | Low | ≤ 0.5V |
| Response frequency | | 200Hz |
| Rotational torque | Light: S | 4±1mN · m |
| | Standard: C | 6±2mN · m |
| | Medium: M | 10.5±3.5mN · m |
| | High: H | 16±5mN · m |
| Push switch | Rating of contact | |
| | ≤ DC12V 0.1 ~ 10mA | |
| | Travel of switch | |
| | 0.2±0.1mm | |
| Operational Force | S | 3.2±1N |
| | M | 4.0±1N |
| | H | 5.0±1N |
| Weight | | 18g |

Note : In case Rotational Torque M or H, Operational Torque should be either M or H.

| 2. Reliability and Environmental specifications | | |
|-------------------------------------------------|-----------------------------|------------------------------------|
| Items | | Rated Value |
| Durability of operating area | Thrust direction | Push: 100N |
| | | Pull: 50N |
| | Radial | 1N · m |
| Rotational durability | Light: S | 1 million strokes (No load) |
| | Standard: C | |
| | Medium: M | |
| | High: H | 100 thousand strokes (No load) |
| Screw Torque | | Not more than 1N · m |
| Heat resistance of solder | Solder bit temp.: MAX 350°C | Within 3 seconds for each terminal |
| Operating temperature | | 0°C ~ +55°C 32F ~ 131F |
| Storage temperature | | - 40°C ~ +85°C - 40F ~ 185F |

Output Waveform

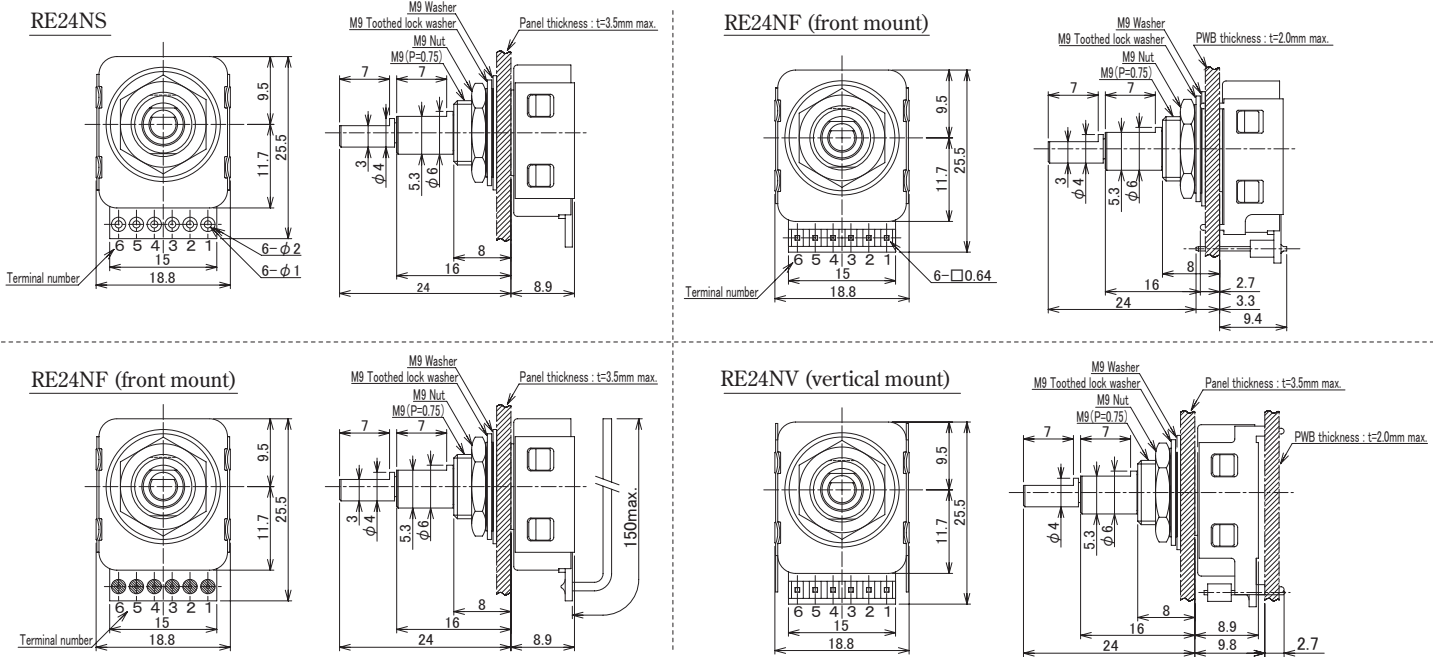
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage (1);
- 3) Detent positions are where both signal A and B are low (0).



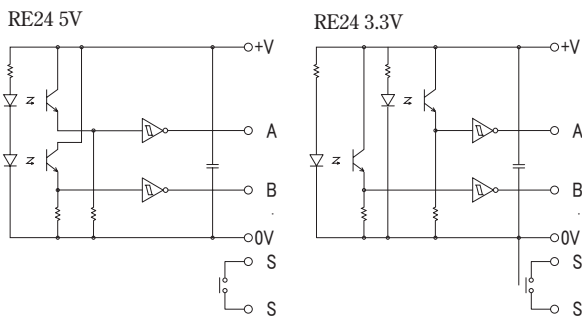
Part Number Designation

| | | | | | | | | | |
|--------|----------------|---|----------|-----------------|--------------------|-------------------|-------|-----------------|-----------------|
| Series | RE24 | N | S | 25 | C | S | 16/24 | R | A |
| | Waterproof | | Pulse | | | Push Switch Force | | | Power Voltage |
| N | No | | 16 16PPR | | | S 3.2N | | | A 5V |
| | | | 25 25PPR | | | H 5N | | | B 3.3V |
| | Wiring | | Ckick | Rotation Torque | | | | | Shaft Shape |
| S | Standard | | S | 4mN · m | | | | | F Flat |
| C | With Code | | C | 6mN · m | | | | | |
| F | Front Mount | | M | 10.5mN · m | | | | | |
| V | Vortical Mount | | H | 16mN · m | | | | | Shaft length |
| | | | Non | W/O | $\leq 4mN \cdot m$ | | | 16 16mm (inner) | 20 24mm (outer) |

Dimensions (mm)



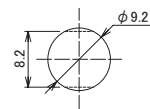
Circuitry



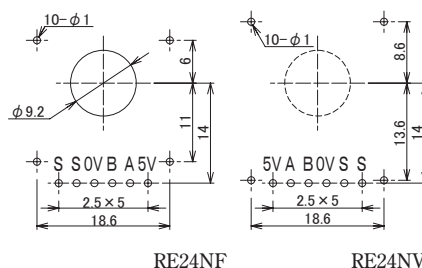
Terminal number

| | | |
|---|---------|-------------|
| 1 | 3.3V/5V | Supply |
| 2 | A | Signal A |
| 3 | B | Signal B |
| 4 | 0V | Ground |
| 5 | S | Push Switch |
| 6 | S | Push Switch |

Mounting hole dimensions (mm)



PWB mounting hole dimensions (mm)



Precautions

| | |
|---------------|--------------------------------------------------------------------------------|
| Wiring | Use buffering amplifier when extending lead wire over 30cm. |
| Soldering | Do not put a load on the terminal area during and immediately after soldering. |
| Operation | Do not use flow/reflow soldering machines. |
| Power | Use under specified power voltage and connect properly. |
| Waterproofing | Do not fasten tighter with the torque of more than 1.5N·m. |

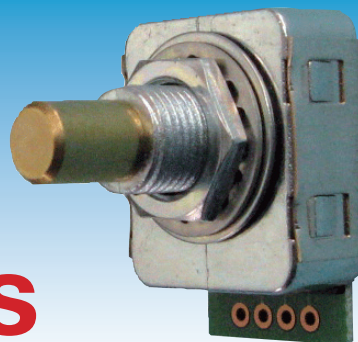
Warranty

- 1 year from the date of shipment.

Optical Rotary Encoder with Push Switch



RE23 Series



Outline

RE23 series are optical rotary encoders with dual functions of pushing and rotating on its shaft. Its size, mounting procedures and inner-structures have been designed for a wide-array of uses; measurement devices, medical equipments, industrial machineries, telecommunication devices and machine tools.

Features

- Multi-functional with 2 way acting – pushing and rotating – shaft
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Thin-line (18.8x25.5x8.9mm) and lightweight (18g)
- Various types of models with options: lead wire with or without connector, clamp for horizontal/vertical mounting
- Long-lasting without “contact chatter” due to its optical switching function

Specifications

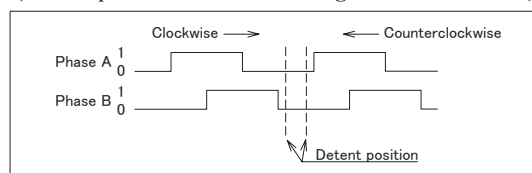
| 1. Electrical and Mechanical specifications | | | | |
|---------------------------------------------|-------------------|------------------------------------|------------|--|
| Items | | Rated Value | | |
| Number of pulses | | 16PPR, 25PPR | | |
| Supply voltage | | 3.3V±10% | 5V±10% | |
| | | 20mA | 10mA | |
| Output signals | | Channel A/B: Square Wave CMOS chip | | |
| Output voltage | High | (Supply Voltage - 0.5V) ≤ | | |
| | Low | ≤ 0.5V | | |
| Response frequency | | 200Hz | | |
| Rotational torque | Light: S | 4±1mN · m | | |
| | Standard: C | 6±2mN · m | | |
| | Medium: M | 10.5±3.5mN · m | | |
| | High: H | 16±5mN · m | | |
| Push switch | Rating of contact | ≤ DC12V | 0.1 ~ 10mA | |
| | Travel of switch | 0.2±0.1mm | | |
| | Operational Force | S | 3.2±1N | |
| | | M | 4.0±1N | |
| H | | 5.0±1N | | |
| Weight | | 18g | | |

Note : In case Rotational Torque M or H, Operational Torque should be either M or H.

| 2. Reliability and Environmental specifications | | | |
|-------------------------------------------------|-----------------------------|------------------------------------|--------------|
| Items | | Rated Value | |
| Durability of operating area | Thrust direction | Push | 100N |
| | | Pull | 50N |
| | Radial | | 1N · m |
| Rotational durability | Light: S | 1 million strokes (No load) | |
| | Standard: C | | |
| | Medium: M | | |
| | High: H | 100 thousand strokes (No load) | |
| Screw Torque | | Not more than 1N · m | |
| Heat resistance of solder | Solder bit temp.: MAX 350°C | Within 3 seconds for each terminal | |
| Operating temperature | | 0°C ~ +55°C | 32F ~ 131F |
| Storage temperature | | - 40°C ~ +85°C | - 40F ~ 185F |

Output Waveform

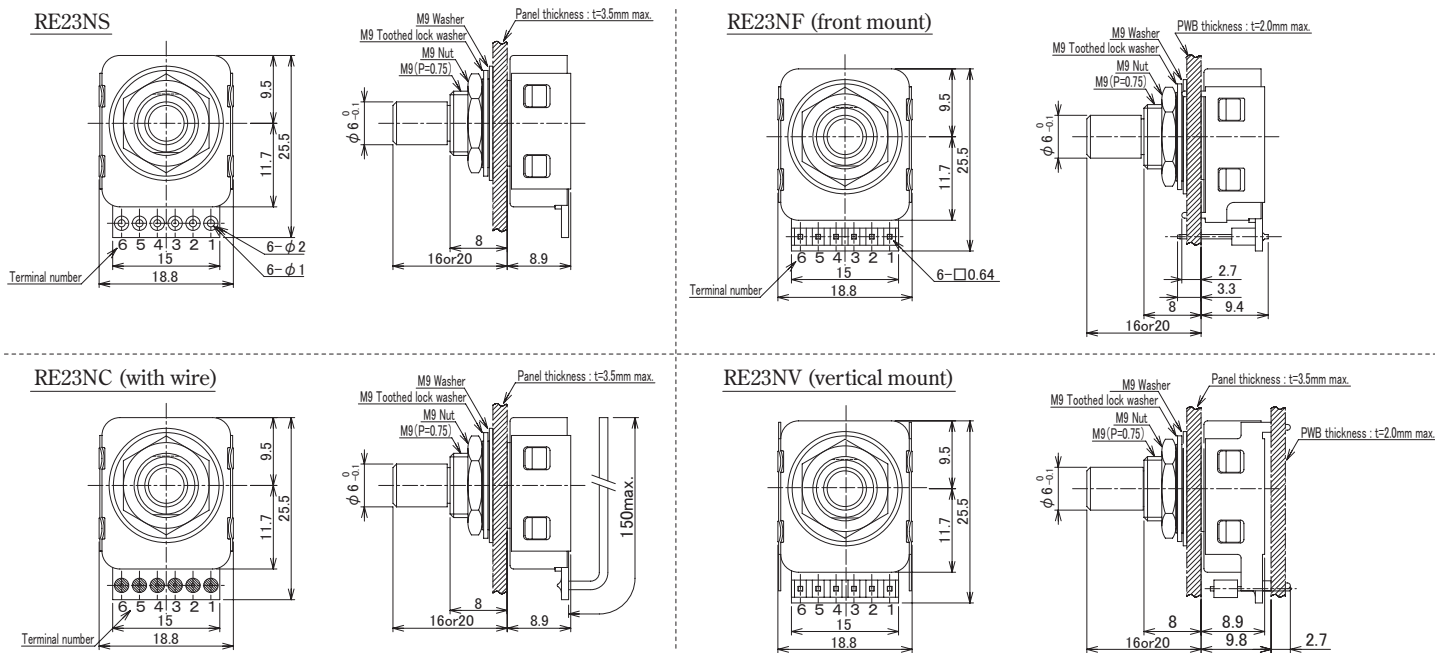
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage (1);
- 3) Detent positions are where both signal A and B are low (0).



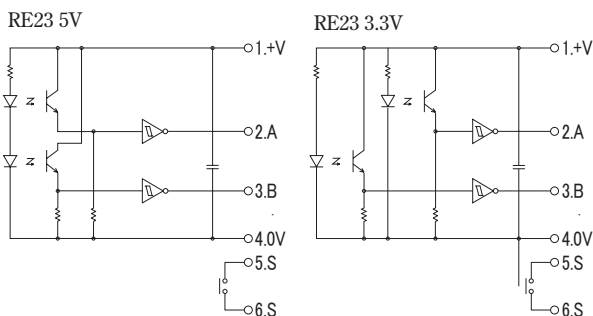
Part Number Designation

| | | | | | | | | | |
|--------|------------------|---|---|----------|--------------------|-------------------|----|---|---------------|
| Series | RE23 | N | S | 25 | C | S | 20 | R | A |
| | Waterproof | | | Pulse | | Push Switch Force | | | Power Voltage |
| | N No | | | 16 16PPR | | S 3.2N | | | A 5V |
| | | | | 25 25PPR | | H 5N | | | B 3.3V |
| | Wiring | | | Ckick | Rotation Torque | | | | Shaft Shape |
| | S Standard | | | S | 4mN · m | | | | R Round |
| | C With wire | | | C With | 6mN · m | | | | Shaft length |
| | F Front Mount | | | M | 10.5mN · m | | | | 16 16mm |
| | V Vortical Mount | | | H | 16mN · m | | | | 20 20mm |
| | | | | Non W/O | $\leq 4mN \cdot m$ | | | | |

Dimensions (mm)



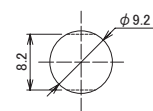
Circuitry



Terminal number

| | | |
|---|---------|-------------|
| 1 | 3.3V/5V | Supply |
| 2 | A | Signal A |
| 3 | B | Signal B |
| 4 | 0V | Ground |
| 5 | S | Push Switch |
| 6 | S | Push Switch |

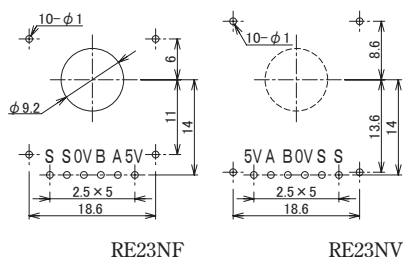
Mounting hole dimensions (mm)



Precautions

| | |
|---------------|--------------------------------------------------------------------------------|
| Wiring | Use buffering amplifier when extending lead wire over 30cm. |
| Soldering | Do not put a load on the terminal area during and immediately after soldering. |
| Operation | Do not use flow/reflow soldering machines. |
| Power | Use under specified power voltage and connect properly. |
| Waterproofing | Do not fasten tighter with the torque of more than 1.5N·m. |

PWB mounting hole dimensions (mm)



Warranty

- 1 year from the date of shipment.

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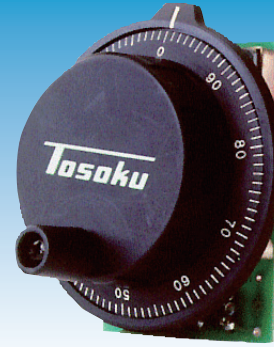
Manual Pulse Generator Catalogue

| | | |
|-----------------------------------|-------|--------|
| RE 4 5 T | _____ | P . 29 |
| thin (8.5mm), hermetically sealed | | |
| RE 4 5 B | _____ | P . 31 |
| long life, various options | | |
| RE 4 6 | _____ | P . 33 |
| large wheel, yet thin | | |
| RE 4 7 | _____ | P . 35 |
| most compact and thin | | |

Manual Pulse Generator



RE45T series



Outline

RE45T/V series are compact optical manual pulse generators that allow accurate and smooth manual motion for NC machine tools, industrial machines etc.

Features

- Eco friendly: RoHS compliant
- Various Options
 - terminal block mounted type/direct moulding type
 - output circuit: CMOS, open collector, line driver
- Enclosed structure design
- Protection from flux
- 100PPR, 25PPR available
- Long life use

Specifications

| Model | RE645T***5 RE45V***5 | RE45T***1 | RE45T***D | RE45***T2 |
|------------------------------------|--------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------|------------------------------------------|
| Application | 5V input | 12V input | Differential line | Photo coupler |
| Power Voltage | DC5V±10% | DC12V±10% | DC5V±10% | DC10.8Vto 26.4V |
| Current Power | ≤ 80mA | ≤ 60mA | ≤ 150mA (90mA typ) | ≤ 60mA |
| Current Power (Open collector) | ≤ 30mA | ≤ 40mA | | |
| Out put | CMOS (45T) 330Ωpull-up or open collector | 2.2KΩpull-up or open collector | RS-422A (Line driver) Receiver's terminator : 100Ω for each signal | Open collector (Current out put type) |
| Out put voltage | level 1: (Power voltage -0.5V) ≤ | | | level 1: TR is ON |
| Out put voltage (Pull up) | level 0: ≤ 0.4V (No-load) | | | level 0: TR is OFF |
| Collector voltage (Open collector) | not more than DC30V or 50mA | | | not more than DC30V or 50mA |
| Pulse per revolution | 100pulse/100Click or 25Pulse/100Click | | | |
| Click torque | S: (Soft torque) 8 ~ 16mN.m C: (Standard) 32 ~ 64mN.m | | | |
| Rotational Durability | Over a million times | | | |
| Protection against water | 2m water resistant (2h) (Do not push or rotate under the water) | | | |
| Operating Temperature | -10℃ 14F | | ~ | 60℃ 140F |

Part number designation

RE45T 1 C M 1 B 1
① ② ③ ④ ⑤ ⑥

- ① Number of pulses
1: 100PPR
2: 25PPR
- ② Click
C: Standard
S: Soft
Blank: without click
- ③ Output
M: CMOS
O: Open Collector
D: Line Driver
R: Pull up
- ④ Supply Voltage
1: 12V
2: 24V
5: 5V
- ⑤ Dial Knob
B: 15mm, with Tosoku logo
C: 15mm, without logo
D: 15mm, with customer logo
H: 25mm with Tosoku logo
J: 25mm without logo
K: 25mm, with customer logo
- ⑥ Dial base / Shaft length
Blank: W/O dial base, 16mm
0: W/O dial base, 18mm
1: With dial base, 18mm

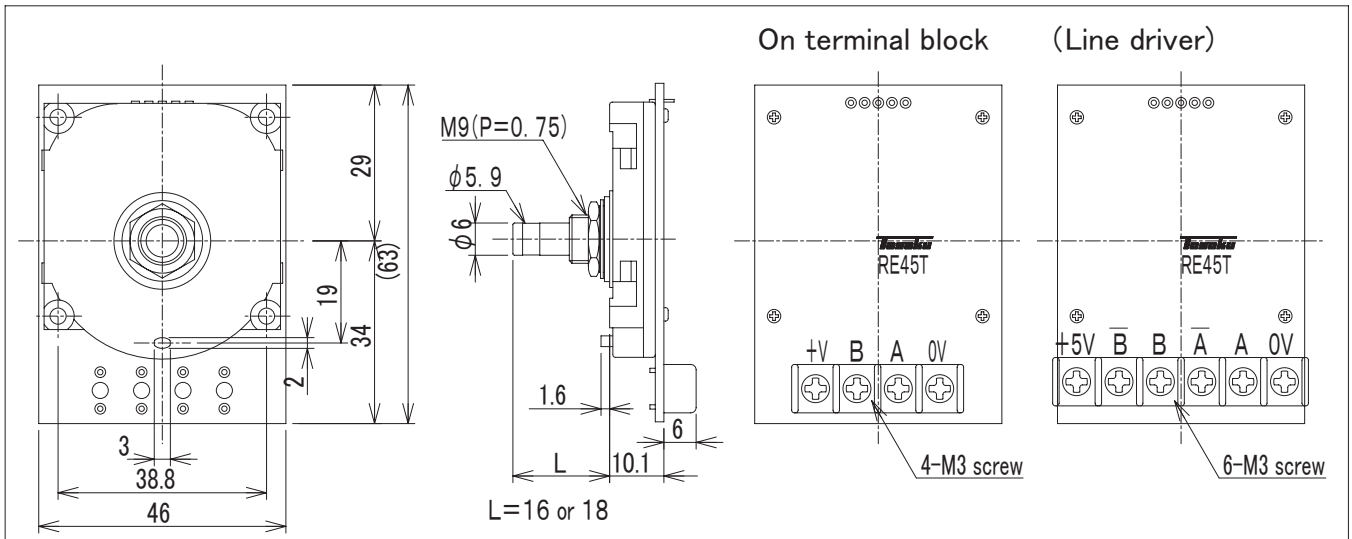
| Models | Supply | Out-put | Pulse Per Revolution | |
|-----------|--------|--------------------|----------------------|-------------------------------------|
| RE45T1_M5 | 5V | 5V | 100PPR | Standard Model for 5V |
| RE45T1_R1 | 12V | 12V | 100PPR | Standard Model for 12V |
| RE45T1_O5 | 5V | OC | 100PPR | |
| RE45T1_O1 | 12V | OC | 100PPR | |
| RE45T1_O2 | 24V | OC* | 100PPR | 12V ~ 24V input, photo coupler only |
| RE45T1_D5 | 5V | Differential Line* | 100PPR | Special model for noise resistance |
| RE45T2_M5 | 5V | 5V | 25PPR | |
| RE45T2_M1 | 12V | 5V* | 25PPR | 12V input, 5Voutput |
| RE45T2_O1 | 12V | OC | 25PPR | |
| RE45T2_O2 | 24V | OC* | 25PPR | 12V ~ 24V input, photo coupler only |
| RE45T2_D5 | 5V | Differential Line* | 25PPR | Special model for noise resistance |

*Differential Line: Connect with terminating resistance 100Ω (Based on RS-422 line receiver).

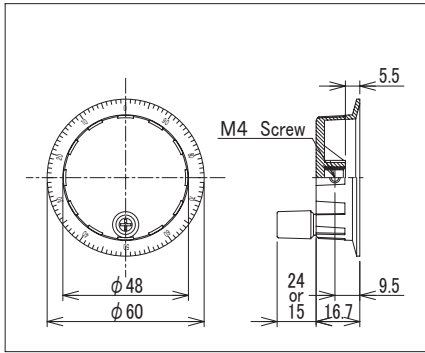
*5V: power voltage = 12V. Output voltage = 5V

*OC (For photo coupler): Out put voltage/0level=transistor /OFF=Current/0

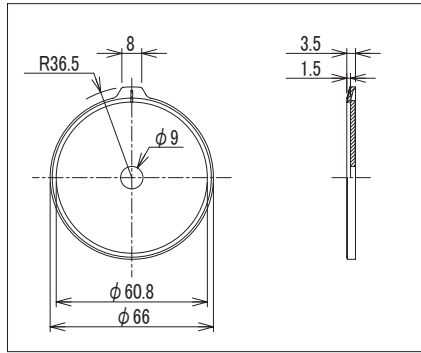
Dimensions (mm)



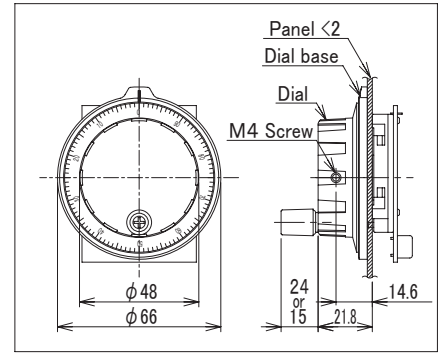
■ Dial



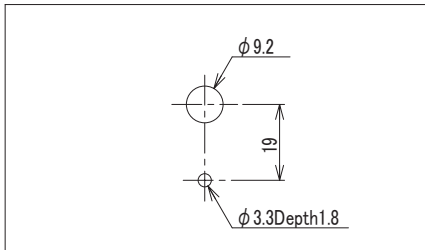
■ Dial base



■ Dial attached on the dial base



■ Mounting hole dimensions (mm)



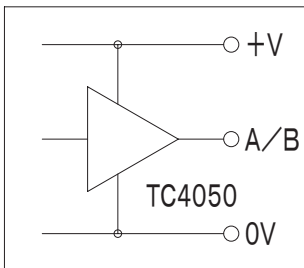
Precautions

| Soldering | Temperature | Time |
|------------------|-------------|------------------------------------|
| Manual Soldering | Up to 350° | Within 3 seconds for each terminal |
| Flow soldering | Up to 260° | Within 5 seconds for each terminal |

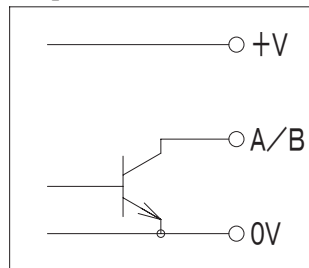
NOTE: Do not put pressure on terminal during heating or soon after.

■ Circuitry

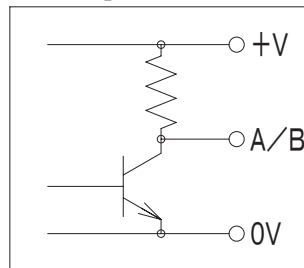
● CMOS (M)



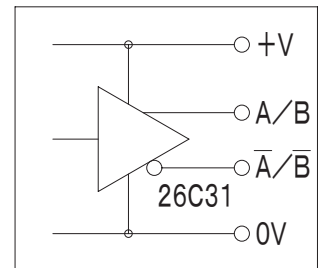
● Open Collector (O)



● Pull up (R)

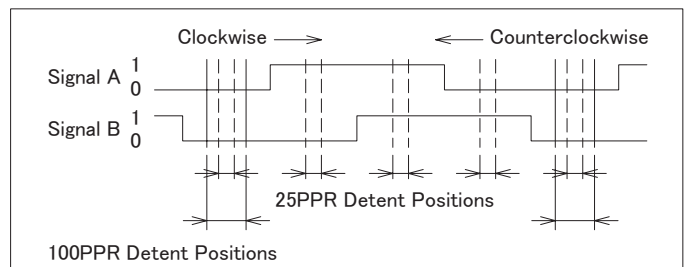


● Line driver (D)



■ Output Waveform

- Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



Manual Pulse Generator



RE45B series



Outline

RE45B series are optical manual pulse generator developed for NC machine tools

Features

- Eco friendly: RoHS compliant
- Comfortable wide knob
- Various Options
- Printing Logo type on the wheel cover upon request
- Long life use

Specifications

| Application | 5V input | 2V input | Differential line | Photo coupler |
|------------------------------------|---------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------------------|-----------------------------------------|
| Power Voltage | DC5V±10% | DC12V±10% | DC5V±10% | DC10.8V to 26.4V |
| Current power (pull up) | ≤ 80mA | ≤ 60mA | ≤ 150mA (90mA typ) | ≤ 60mA |
| Current power (Open collector) | ≤ 30mA | ≤ 40mA | | |
| Output | 330Ω Pull-up or Open collector | 2.2KΩ Pull-up or Open collector | RS-422A (Line driver) Terminating register at receiver :100Ω/phrase | Open collector (Current output type) |
| Output voltage | 1 level: (Power voltage -0.5V) ≤ | | | 1 level: Transistor/ON |
| Output voltage (pull up) | 0 level: ≤ 0.4V (No-load) | | | 0 level: Transistor/OFF |
| Collector voltage | ≤ DC30V | | | ≤ 30V |
| Collector voltage (Open collector) | ≤ 40mA | | | ≤ 50mA |
| Pulse per revolution | 100pulse/100Click or 25pulse/100Click | | | |
| Click torque | A,B,C : 8 ~ 16mN.m D: 32 ~ 64mN.m | | | |
| Rotational Durability | Over a million rotations | | | |
| Water resistance | D type only: 2m water resistant (2h) (Do not push or rotate under the water) | | | |
| Operating Temperature | -10°C | | ~ | 60°C |
| | 14F | | | 140F |

Part number designation

RE45B A 1 R 5 B
 ① ② ③ ④ ⑤

① Type

A: With φ 80 dial / mounted by 3 nuts
C: With φ 66 dial / mounted by 1 nut
D: Without Dial

② Number of pulses

1: 100PPR
2: 25PPR

③ Output

R: Voltage Output
O: Open Collector
D: Line Driver

④ Supply Voltage

5: 5V
1: 12V
2: 24V

⑤ Dial Knob (color:black)

B: 15mm, with Tosoku logo
C: 15mm, without logo
D: 15mm, with customer logo
H: 24mm with Tosoku logo
J: 24mm without logo
K: 24mm, with customer logo

| Models | Supply | | Pulse Per Revolution |
|-----------|--------|--------------------|----------------------|
| RE45B_1R5 | 5V | 5V | 100PPR |
| RE45B_1R1 | 12V | 12V | 100PPR |
| RE45B_1O5 | 5V | OC | 100PPR |
| RE45B_1O1 | 12V | OC | 100PPR |
| RE45B_1O2 | 24V | OC* | 100PPR |
| RE45B_1D5 | 5V | Differential Line* | 100PPR |
| RE45B_2R5 | 5V | 5V | 25PPR |
| RE45B_2R1 | 12V | 5V* | 25PPR |
| RE45B_2O5 | 12V | OC | 25PPR |
| RE45B_2O1 | 12V | OC | 25PPR |
| RE45B_2O2 | 24V | OC* | 25PPR |
| RE45B_2D5 | 5V | Differential Line* | 100PPR |

*Differential Line: Connect with terminating resistance 100Ω (Based on RS-422 line receiver).

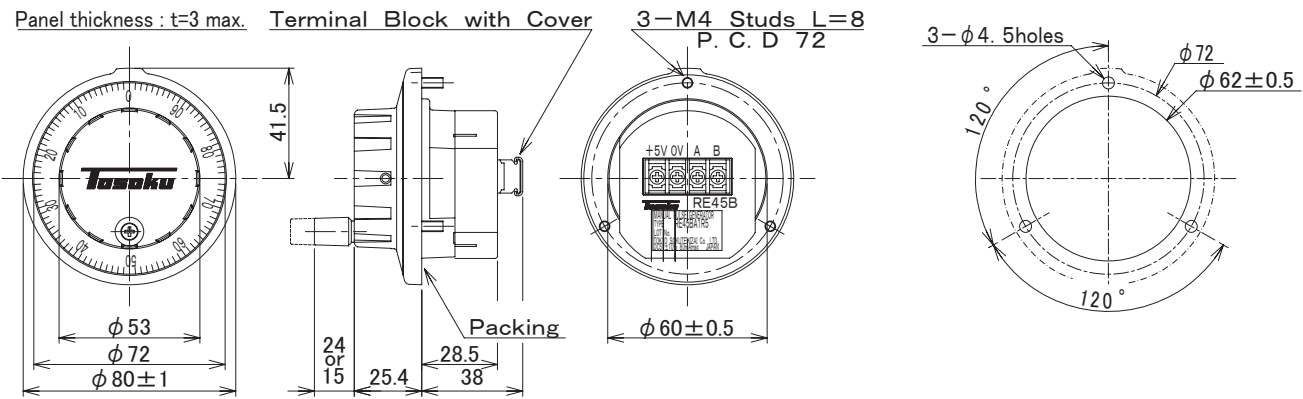
*5V: Supply voltage=12V, Output voltage=5V

*OC: For photo coupler only, Supply voltage 12 ~ 24V

Dimensions (mm)

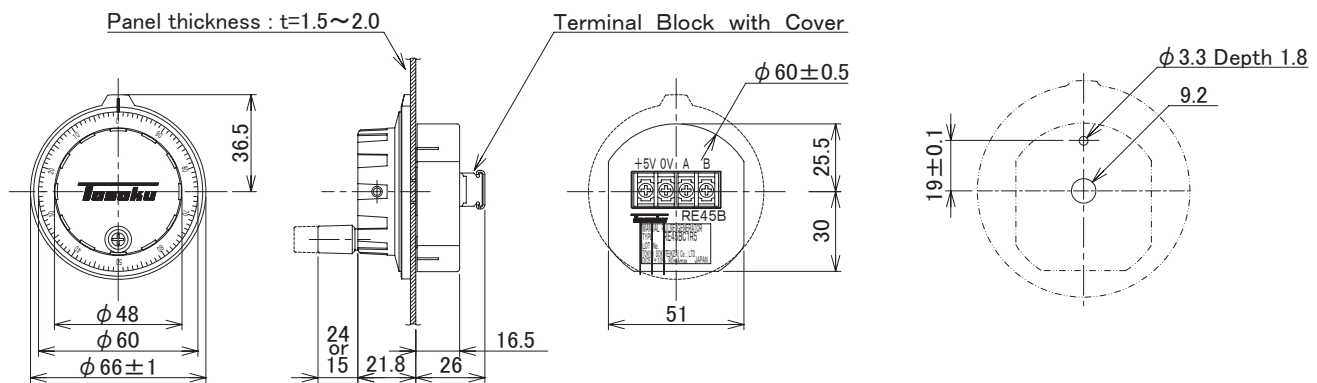
● Type A (with 80 ϕ dial / mounted by 3 nuts)

■ Type A, Mounting hole dimensions (mm)

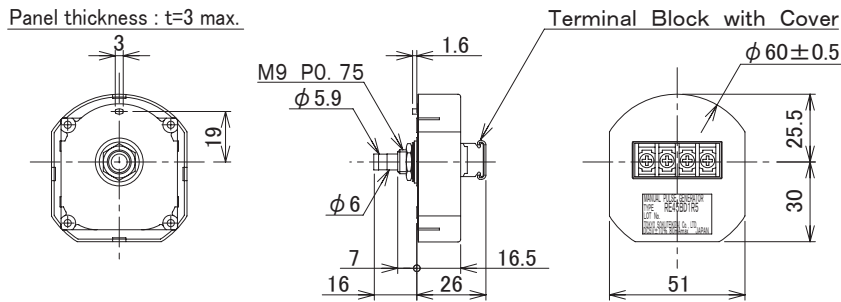


● Type C (with 66 ϕ dial / mounted by 1 nut)

■ Type C,D, Mounting Hole Dimension (mm)

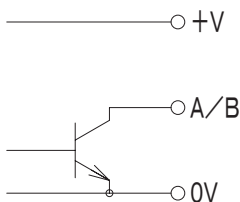


● Type D (without dial)

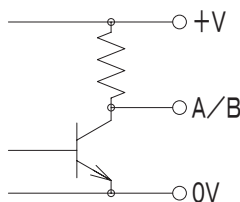


■ Circuitry

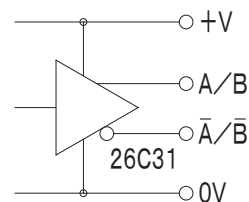
● Open collector (code:O)



● Voltage Output (code:R)

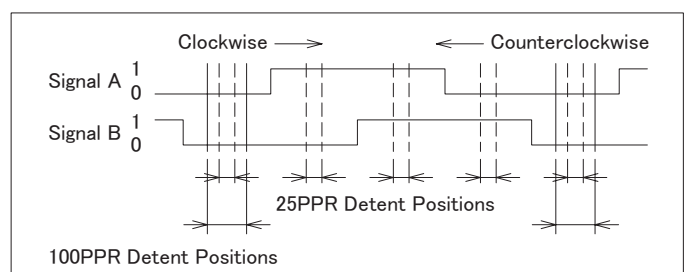


● Line Driver (code:D)



■ Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



Manual Pulse Generator



RE46 series



Outline

RE46 series are incremental optical manual pulse generators developed for NC machine tools. The depth of the surface-bottom is mere 8mm which allows you to save space behind the panel.

Features

- Eco friendly: RoHS compliant
- Fine operability with a large wheel and a weight inside
- Various Options of the input/output circuit: CMOS, open collector, line driver
- Chattering-free and long-life use with optical unit
- Original logos available on the wheel cover

Specifications

| Application | 5V input | 12V input | Differential line | Photo coupler(12 ~ 24V) |
|------------------------------------|--------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Power Voltage | DC5V±10% | DC12V±10% | DC5V±10% | DC10.8V to 26.4V |
| Current power (pull up) | ≤ 80mA | ≤ 60mA | ≤ 150mA (90mAtyp) | ≤ 60mA |
| Current power(Open collector) | ≤ 30mA | ≤ 40mA | | |
| Output | 330ΩPull-up or Open collector | 2.2KΩPull-up or Open collector | RS-422A (Line driver) Terminating register at receiver :100Ω/phrase | Open collector (Current output type) 1level:Transistor/ON 0level:Transistor/OFF |
| Output voltage (pull up) | 1 level:(Power voltage -0.5V) ≤ 0 level: ≤ 0.4V (No-load) | | | ≤ 30V ≤ 50mA |
| Collector voltage (Open corrector) | ≤ DC30V ≤ 50mA | | | |
| Pulse per revolution | 100pulse/100Click or 25pulse/100Click | | | |
| Click torque | 32 ~ 64mN.m (320 ~ 640gf.cm) | | | |
| Rotational Durability | Over a million rotations | | | |
| Operating Temperature | -10℃ ~ 60℃ (14F ~ 140F) | | | |
| Weight | 220g | | | |

Part number designation

| | | | | | | |
|--------------------|----------|----------|----------|---------------------------|----------|----------|
| RE46 | A | 1 | C | R | 5 | B |
| | ① | ② | ③ | ④ | ⑤ | ⑥ |
| ① Type | | | | ⑤ Supply Voltage | | |
| ② Number of Pulses | | | | 5: 5V | | |
| 1: 100PPR | | | | 1: 12V | | |
| 2: 25PPR | | | | 2: 12 ~ 24V | | |
| ③ Click | | | | ⑥ Dial Knob (color black) | | |
| C: Standard | | | | B: 15mm with Tosoku logo | | |
| | | | | C: 15mm without logo | | |
| | | | | D: 15mm customer logo | | |
| ④ Output | | | | H: 24mm with Tosoku logo | | |
| R: Voltage Output | | | | J: 24mm without logo | | |
| O: Open Collector | | | | K: with customer logo | | |
| D: Line Driver | | | | | | |

| Models | Supply | | Pulse Per Revolution |
|------------|--------|--------------------|----------------------|
| RE46A1CR5_ | 5V | 5V | 100PPR |
| RE46A1CR1_ | 12V | 12V | 100PPR |
| RE46A1CO5_ | 5V | OC | 100PPR |
| RE46A1CO1_ | 12V | OC | 100PPR |
| RE46A1CO2_ | 24V | OC* | 100PPR |
| RE46A1CD5_ | 5V | Differential Line* | 100PPR |
| RE46A2CR5_ | 5V | 5V | 25PPR |
| RE46A2CR1_ | 12V | 5V* | 25PPR |
| RE46A2CO5_ | 5V | OC | 25PPR |
| RE46A2CO1_ | 12V | OC | 25PPR |
| RE46A2CO2_ | 24V | OC* | 25PPR |
| RE46A2CD5_ | 5V | Differential Line* | 25PPR |

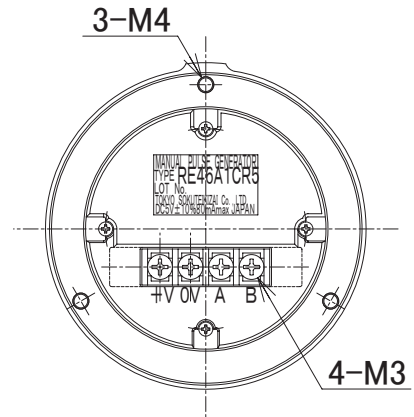
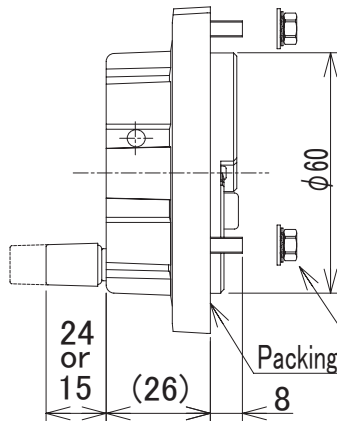
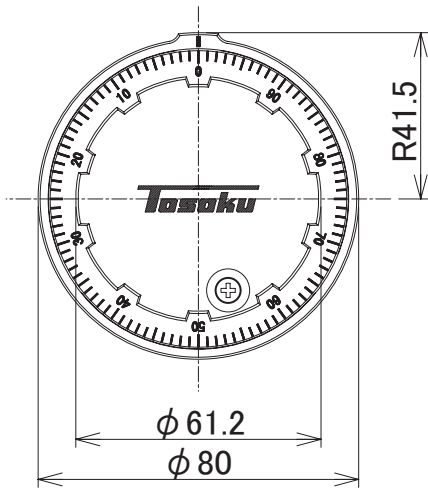
*Differential Line: Connect with terminating resistance 100Ω(Based on RS-422 line receiver).

*5V:Supply voltage=12V, Output voltage=5V

*OC:For photo coupler only, Supply voltage 12 ~ 24V

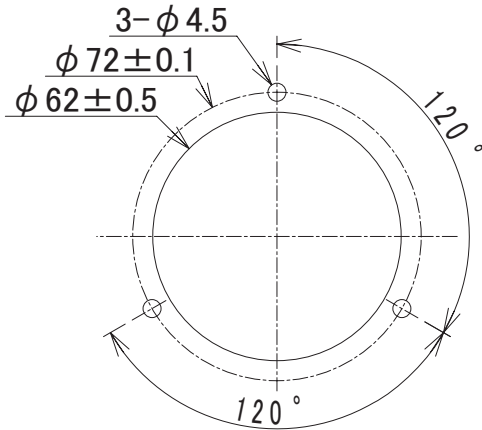
Dimensions (mm)

* Line Driver is in the drawing below

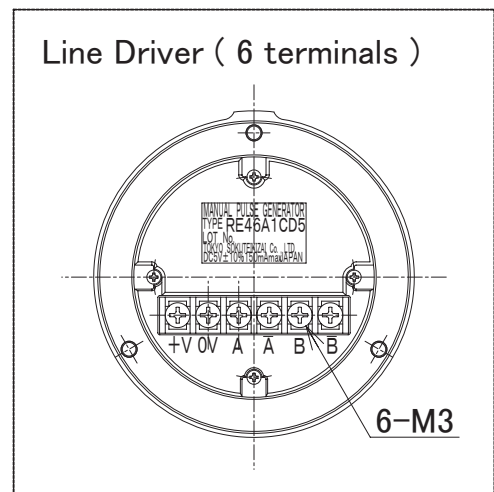


Accessories
 M4 Nut : t=3.2mm
 M4 Teeth Washer : t=0.9mm
 M4 Washer : t=0.8mm

Panel Mounting Hole

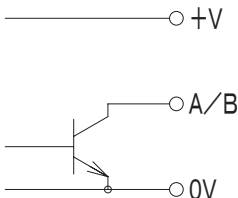


Thickness of the Panel : ≤ 3 mm
 Recommended Torque for fastening the nut
 : 0.4 ~ 0.5 N·m (4~5 Kgf·cm)

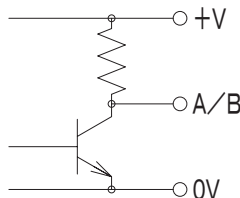


■ Circuitry

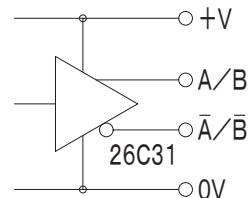
● Open collector (code:O)



● Voltage Output (code:R)

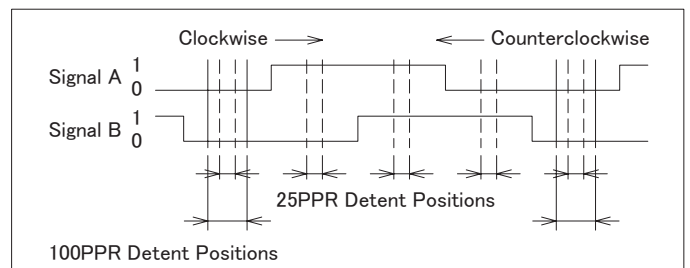


● Line Driver (code:D)



■ Output Waveform

- Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- Rotating the shaft counterclockwise would generate the signal A when the signal B outputs a high voltage (1);



Manual Pulse Generator



RE47 series



Outline

RE47 is an incremental optical manual pulse generator developed mainly for NC machine tools. The series are most compact of all MPGs on our line-up and universally compatible with various sorts of compact MPGs.

Features

- Eco friendly: RoHS compliant
- ϕ 60mm diameter
- Less than 10mm in depth (from surface-to-bottom) allows you to save space behind the panel
- Fine operability with a weight inside of the dial.
- Various Options of the input/output circuit: CMOS, open collector, line driver
- Chattering-free and long-life use with optical unit
- Original logos available on the dial

Specifications

| Application | 5V input | 12V input | Differential line | Photo coupler(12 ~ 24V) |
|---------------------------------------|------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------|
| Power Voltage | DC5V \pm 10% | DC12V \pm 10% | DC5V \pm 10% | DC10.8V to 26.4V |
| Current power (pull up) | \leq 80mA | \leq 60mA | \leq 150mA (90mAtyp) | \leq 60mA |
| Current power(Open collector) | \leq 30mA | \leq 40mA | | |
| Output | 330 Ω Pull-up or Open collector | 2.2K Ω Pull-up or Open collector | RS-422A (Line driver) Terminating register at receiver :100 Ω /phrase | Open collector (Current output type) |
| Output voltage (pull up) | 1 level:(Power voltage -0.5V) \leq 0 level: \leq 0.4V (No-load) | | | 1level:Transistor/ON 0level:Transistor/OFF |
| Collector voltage (Open corrector) | \leq DC30V \leq 50mA | | | \leq 30V \leq 50mA |
| Pulse per revolution | 100pulse/100Click or 25pulse/100Click | | | |
| Panel water resistance | IP54 | | | |
| Click torque | 8 ~ 16mN.m (80 ~ 160gf.cm) | | | |
| Rotational Durability | Over a million rotations | | | |
| Operating Temperature | -10 $^{\circ}$ C ~ 60 $^{\circ}$ C (14F ~ 140F) | | | |
| Weight | 85g | | | |

Part number designation

| | | | | | | |
|--------------------|----------|----------|----------|---------------------------|----------|----------|
| <u>RE47</u> | <u>A</u> | <u>1</u> | <u>S</u> | <u>R</u> | <u>5</u> | <u>B</u> |
| | ① | ② | ③ | ④ | ⑤ | ⑥ |
| ① Type | | | | ⑤ Supply Voltage | | |
| | | | | 5: 5V | | |
| ② Number of Pulses | | | | 1: 12V | | |
| 1: 100PPR | | | | 2: 12 ~ 24V | | |
| 2: 25PPR | | | | | | |
| ③ Click | | | | ⑥ Dial Knob (color black) | | |
| S: Soft | | | | B: 15mm with Tosoku logo | | |
| | | | | C: 15mm without logo | | |
| | | | | D: 15mm customer logo | | |
| ④ Output | | | | | | |
| R: Voltage Output | | | | | | |
| O: Open Collector | | | | | | |
| D: Line Driver | | | | | | |

| Models | Supply | | Pulse Per Revolution |
|------------|--------|--------------------|----------------------|
| RE47A1SR5_ | 5V | 5V | 100PPR |
| RE47A1SR1_ | 12V | 12V | 100PPR |
| RE47A1SO5_ | 5V | OC | 100PPR |
| RE47A1SO1_ | 12V | OC | 100PPR |
| RE47A1SO2_ | 24V | OC* | 100PPR |
| RE47A1SD5_ | 5V | Differential Line* | 100PPR |
| RE47A1SR5_ | 5V | 5V | 25PPR |
| RE47A1SR1_ | 12V | 5V* | 25PPR |
| RE47A1SO5_ | 5V | OC | 25PPR |
| RE47A1SO1_ | 12V | OC | 25PPR |
| RE47A1SO2_ | 24V | OC* | 25PPR |
| RE47A1SD5_ | 5V | Differential Line* | 25PPR |

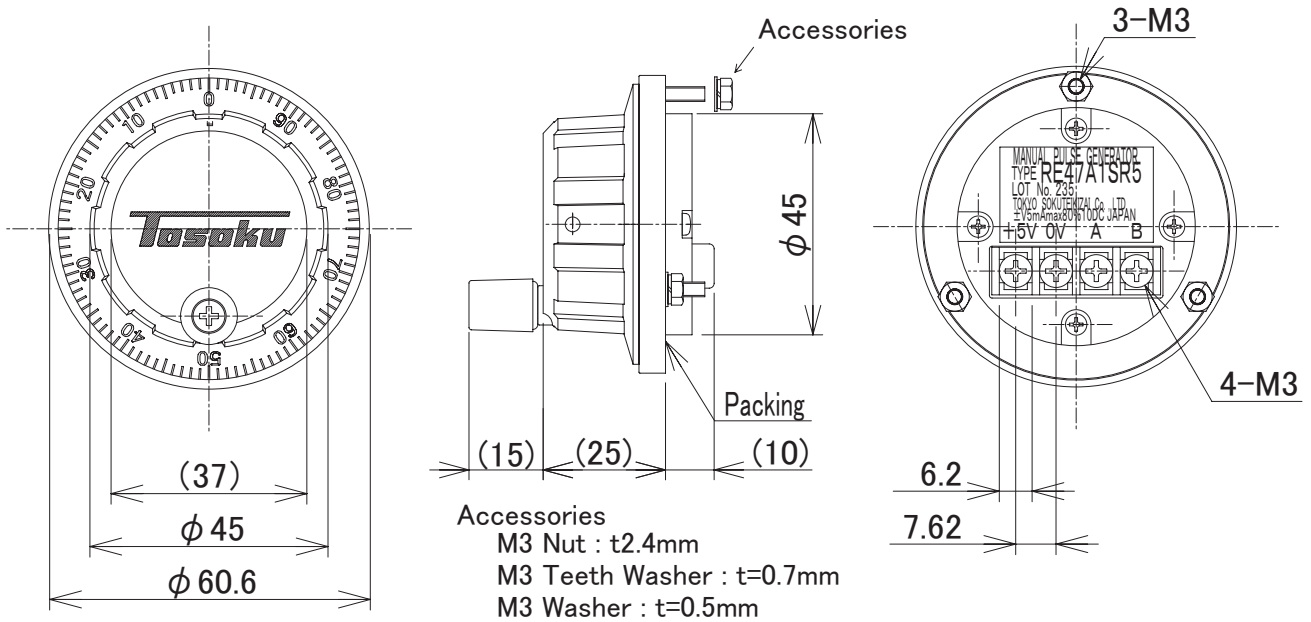
*Differential Line: Connect with terminating resistance 100 Ω (Based on RS-422 line receiver).

*5V:Supply voltage=12V, Output voltage=5V

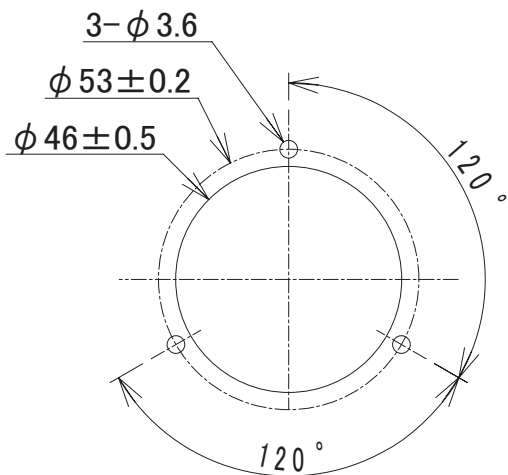
*OC:For photo coupler only, Supply voltage 12 ~ 24V

Dimensions (mm)

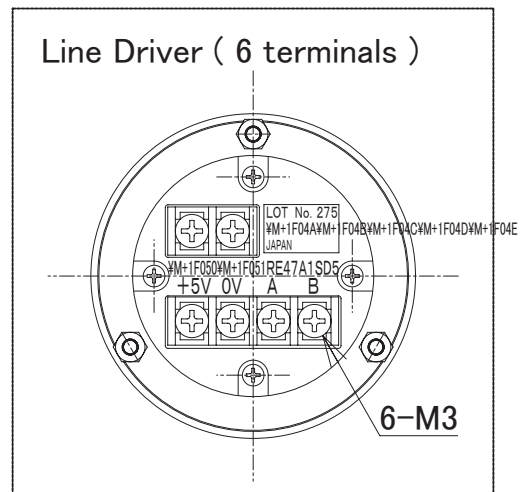
* Line Driver is in the drawing below



Panel Mounting Hole

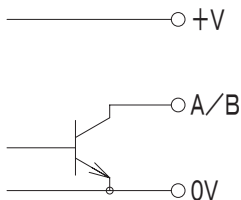


Thickness of the Panel : ≤ 3 mm
 Recommended Torque for fastening the nut : $0.4 \sim 0.5$ N·m (4~5 Kgf·cm)

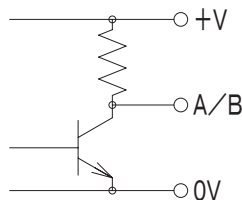


■ Circuitry

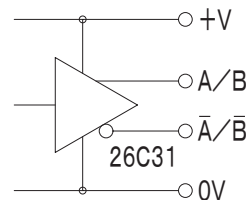
● Open collector (code:O)



● Voltage Output (code:R)

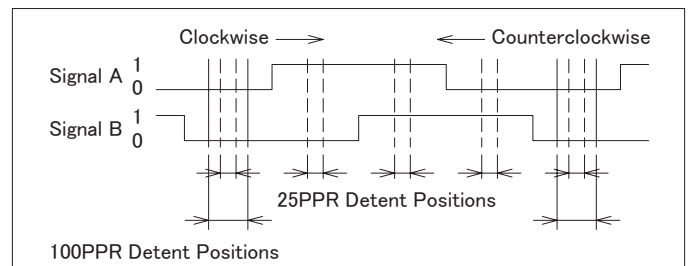


● Line Driver (code:D)



■ Output Waveform

- Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



TOKYO SOKUTEIKIZAI CO., LTD.

Handy Manual Pulse Generator Catalogue

| | | |
|------|----------------------------------------------------------|---------|
| HT | _____ | P . 3 9 |
| | thin-line, 3 position enabling switch available | |
| HC 1 | _____ | P . 4 3 |
| | compact, light | |
| HM | _____ | P . 4 9 |
| | compact, emergency stop button/enabling switch available | |
| HR | _____ | P . 5 3 |
| | 3 position enabling switch available | |
| HS | _____ | P . 5 7 |
| | resin box, free-to-design | |

Metal holders are provided for all Handy MPGs. Magnets are optionally provided.
Original company logos can be printed on the dials.

Handy Manual Pulse Generator



HT Series



Outline

HT series are easy-to-handle and compact Handy MPGs which put a premium on safety with 3-position enabling switches and emergency stop buttons.

Features

- Ergonomically designed and compact to be held with one hand
- 3-position (off-on-off) enabling switch available on either side
- Upper part is free to design and allows various kinds of switches (including emergency stop button) to be set
- RoHS compliant
- On the middle part: either MR8A - the rotary switch series or MR8C - the digital code switch series selectable
- Strong plate magnets available on back side (as option)
- Various types of curl cords provided along with connectors of all sorts at your request

Specifications

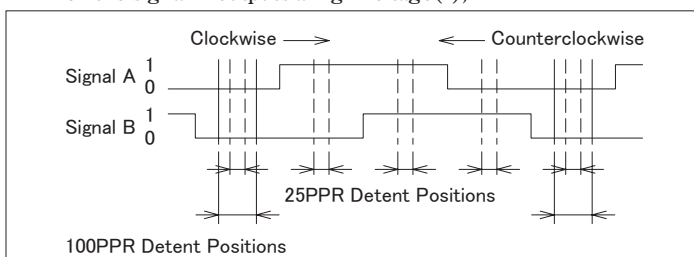
| | |
|-------------------|-----------------------------------|
| 1. Body | |
| Dimension | 170×80×39(mm) |
| LED light | DC24V Green |
| Enabling switches | Available on both sides |
| Logo | Logo available on the wheel cover |

| | |
|------------------------------|--|
| 2. Mechanical specifications | |
| 2.1 Rotary Encoder Unit | |

| | |
|-----------------------|---------------------------------------------------------------|
| Output Voltage | DC5V±10%, DC12V±10% or 12~24V |
| Wheel | 100 clicks / rotation 100 pulses or 25 pulses per rotation |
| Rotational Durability | Over 1,000,000 times |

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



* See RE45B catalog for more details

| |
|-----------------------|
| 2.2 Selector Switches |
|-----------------------|

MR8A (rotary switch) 25V15mA (AC/DC)
MR8C (code switch) 15V10mA (AC/DC)
* See MR8A/MR8C catalog for more details

| |
|------------------------|
| 3. Curl/Straight Cords |
|------------------------|

| | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Curl Cord | 19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords |
| Straight Cord | Also available |

| |
|-------------------|
| 5. Connector Unit |
|-------------------|

| | |
|-----------|-------------------------------------------------------------------------------------------------------------------|
| Connector | Dripproofed connector to be attached on the end of the cord optionally provided (EBSP2119-D/EBSP2119FGS-D by DDK) |
|-----------|-------------------------------------------------------------------------------------------------------------------|

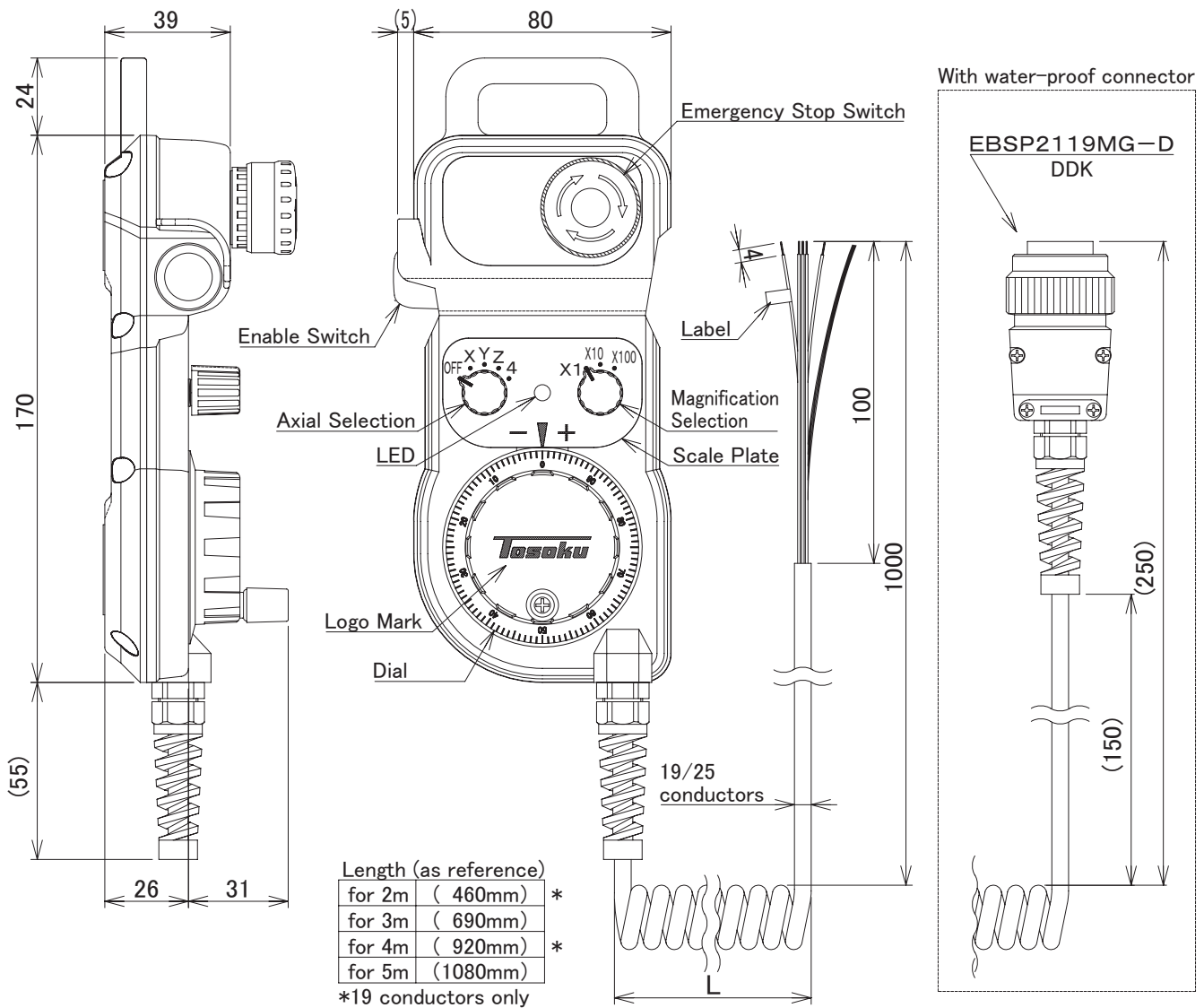
Warranty

- 1 year from the date of shipment.

Dimensions (mm)

HT Unit with curl cord

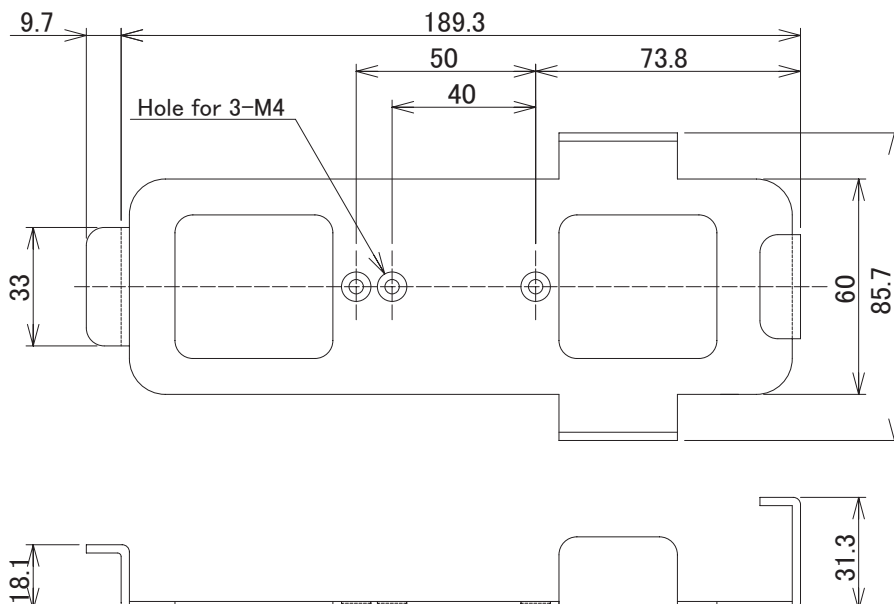
※ This drawing is an example, it may differ according to number of swithes etc.



Original Holder

Material : SPCC

Cathodic Electrodeposition Coating



H T series Order Sheet (Print out this page for sending orders.)

We'll hand in to you a drawing in accordance with your order. The drawing shall be approved before starting in on production.

1) Select one from each spec table and fill blank spaces with " ".

| Pulses/Rev. | |
|--------------------------|--------|
| <input type="checkbox"/> | 100PPR |
| <input type="checkbox"/> | 25PPR |

* 25PPR and yet 100 Clicks/Revolution

| Power Supply | Output |
|--------------------------|-------------------------|
| <input type="checkbox"/> | 5V 5V (330Ω Pull Up) |
| <input type="checkbox"/> | 5V Open Collector |
| <input type="checkbox"/> | 5V (for Line Driver) |
| <input type="checkbox"/> | 12V 5V (2.2kΩ Pull Up) |
| <input type="checkbox"/> | 12V 12V (2.2kΩ Pull Up) |
| <input type="checkbox"/> | 12V Open Collector |
| <input type="checkbox"/> | 12V- for Photocoupler |
| <input type="checkbox"/> | 24V (Open Collector) |

* Transistor will be "OFF" at every clicked positions.
(For other open collector output models, transistors will be "ON" at every clicked positions.)

| Logo on the dial | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | with "TOSOKU" logo |
| <input type="checkbox"/> | with an original logo() |

| 3-Positions Enabling Switch (contacts) | |
|----------------------------------------|--------------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | One on the left() |
| <input type="checkbox"/> | On both sides() |

* Assigned contacts should be 2 or less for normally open (NO) and 2 or less for normally closed (NC).
(2A2B maximum.)

| Emergency Switch (contacts) | |
|-----------------------------|-------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | Mounted () |

* 1 for (NO), 4 for (NC) maximum (1A/4B). Maximum of 4 contacts in total (1A3B or 4B).

| Magnet on the backside | |
|--------------------------|---------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | Mounted |

| Axis Selector/Multiplication Selector Switches | |
|------------------------------------------------|------------------------------|
| <input type="checkbox"/> | MR8C type (Gray code switch) |
| <input type="checkbox"/> | MR8A type (Selection switch) |

Indications for Axis Selector (left)

| | |
|--------------------------|--------------------|
| e.g. | OFF, X, Y, Z, 4, 5 |
| <input type="checkbox"/> | |

Indications for Multiplication Selector (right)

| | |
|--------------------------|---------------|
| e.g. | x1, x10, x100 |
| <input type="checkbox"/> | |

| Curl Cord Length | |
|--------------------------|-------------------------------------------|
| <input type="checkbox"/> | 2m Curl Cord (for only 19-conductor cord) |
| <input type="checkbox"/> | 3m Curl Cord |
| <input type="checkbox"/> | 4m Curl Cord (for only 19-conductor cord) |
| <input type="checkbox"/> | 5m Curl Cord |

* We will select either 19-conductor cord or 25-conductor cord to cover your requested specs

| Waterproofed Connector (for curl cord) | |
|----------------------------------------|---------------------------------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | Male connector (EBSP2119MG-D, DDK) |
| <input type="checkbox"/> | Female connector (EBSP2119FGS-D, DDK) |

* Fill in both spaces to order both connectors.

2) Other options

| Other options to request |
|-------------------------------------------------------------------------------|
| (e.g.) Switches with LED illumination x 2 2 contact selector switch x 1 |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |



Rotary Encoders
Pulse Generators
Rotary Switches

Code Switches
Lever Switches
Trackballs

Handy Manual Pulse Generator



HC1 Series



Outline

HC1 is the most compact model of all our MPG series, developed for usage in numerous industrial areas.

Features

- Compact, thin-line and lightweight (26mm)
- Axis/Multiplication selection can be set according to customers' requirement
- Sealed structured box
- RoHS compliant (box/cord)
- Exclusive easy-to-attach holder as a standard accessory
- Rubber magnet for option
- Logo can be printed on the wheel cover

Specifications

| | |
|-----------------------|-----------------------------------|
| 1. Body | |
| Dimension | 124×73×26(mm)* |
| LED Visible Indicator | DC24V Green |
| Noise Immunity | EN50082-2 compliant |
| Other Features | Logo available on the wheel cover |

* excluding hook, switch and knob

| | |
|------------------------------|--|
| 2. Mechanical specifications | |
| 2.1 Rotary Encoder Unit | |

* See RE45B page for details

| | |
|-----------------------|--|
| 2.2 Selector Switches | |
|-----------------------|--|

* See MR8A/MR8C page for details

| | |
|---------------------------------|---------------------------|
| 3. Environmental specifications | |
| Operating temperature | -10℃ ~ +60℃ 14F ~ 140F |
| Storage temperature | -40℃ ~ +70℃ 40F ~ 158F |

| | |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. Curl/Straight Cords | |
| Curl Cord | 19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords |
| | Straight Cord |

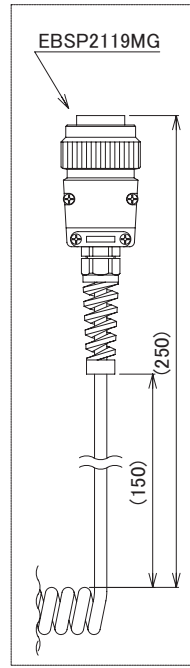
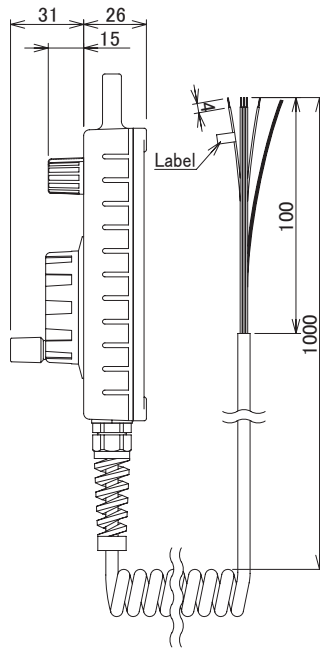
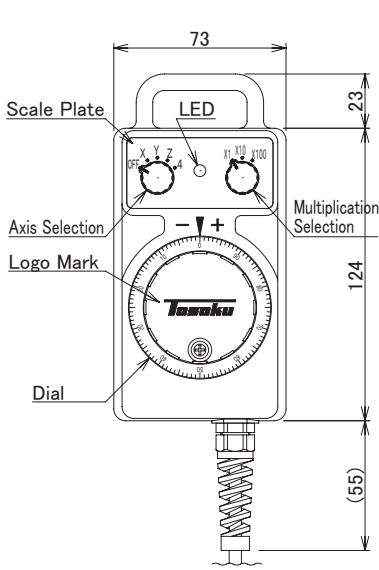
| | |
|-------------------|----------------------------------------------------------------------------------|
| 5. Connector Unit | |
| Connector | Waterproofed connector to be attached on the end of the cord optionally provided |

Warranty

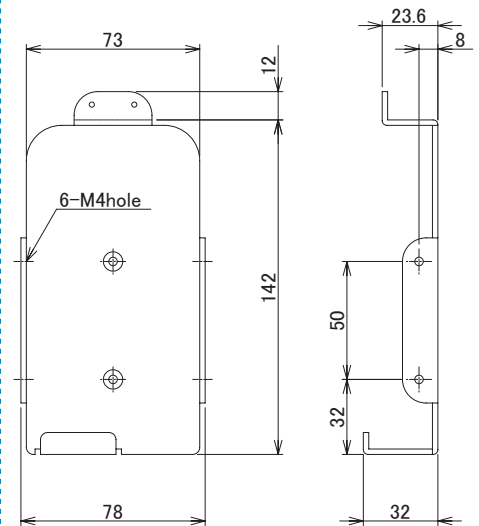
- 1 year from the date of shipment.

Dimensions (mm)

HC1 main unit with curl cord



Original Holder (THA)



Material: SPCC(t2.3)
(Black chromate filming)

Part Number Designation

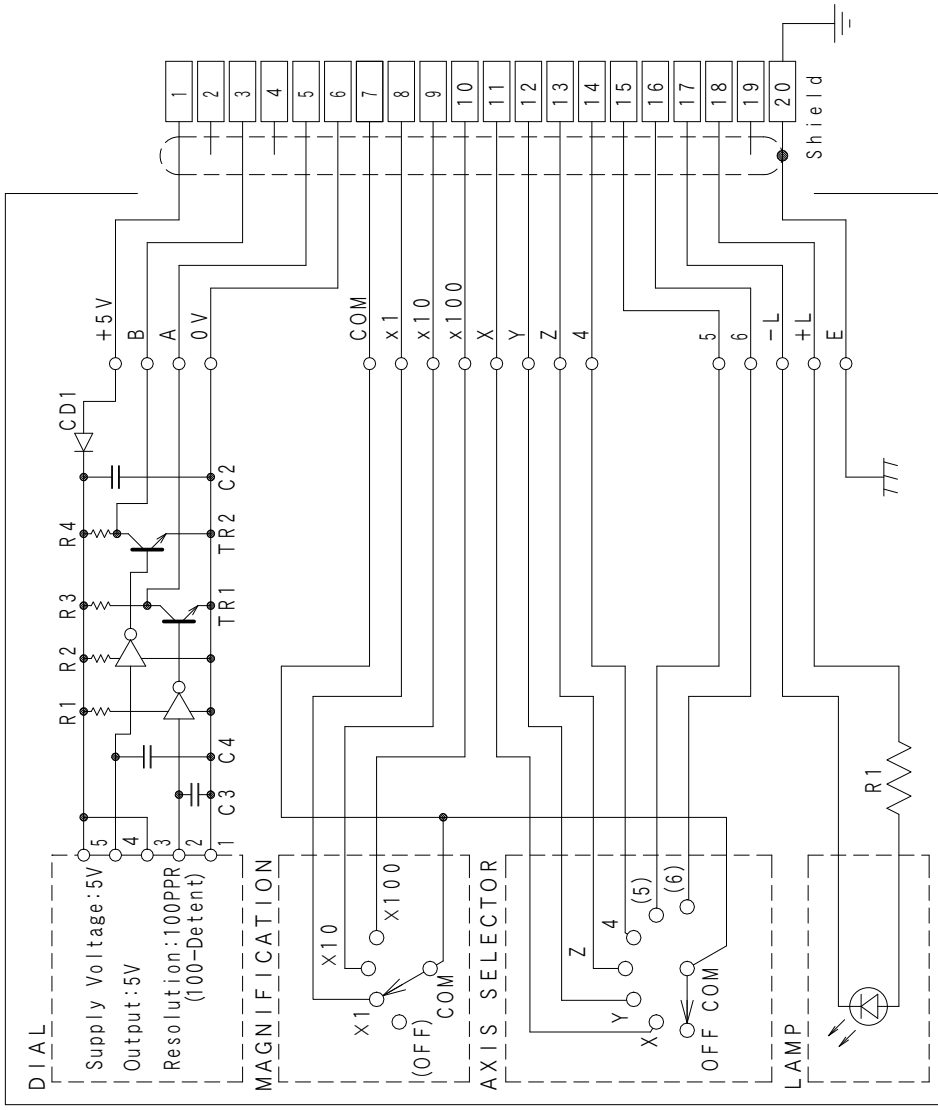
| | | | | | | | | | |
|----|----------------|--------------------------|--------------------------------|----------------------------------|-------------|---|---|----|---------------------------------------------------------------------------|
| | HC1 | 2 | 1 | A | B | 2 | 1 | 03 | |
| | Name of series | | | | | | | | |
| | | number of pulse | | | | | | | Optional selector switch |
| | | 1 | 100 PPR | | | | | | selection switch |
| ※1 | | 2 | 25 PPR | | | | | ※6 | Digital code switch (Gray code 30° type) |
| | | | | | | | | | ※6 The starting position of a cordswitch is 0, and the step angle is 30°. |
| | | power supply voltage | | | | | | | Options of connectors |
| | | 1 | 12V | | | | | | 0 |
| | | 5 | 5V | | | | | | without connector |
| | | D | 5V (a differential output) | | | | | | 1 |
| ※2 | | 2 | 24V (for photocoupler only) | | | | | | With a male side connector |
| | | | | | | | | | 2 |
| | | | | | | | | | With a male & a female side connector |
| | | | | | | | | | 9 |
| | | | | | | | | | With a specification connector |
| | | | | | | | | | ※5 In case nothing specified, there will be no connector attached. |
| | | | | | | | | | Curl Cord |
| | | | | | | | | | 1 |
| | | | | | | | | | With 2m curl cord* |
| | | | | | | | | | 2 |
| | | | | | | | | | With 3m curl cord |
| | | | | | | | | | 3 |
| | | | | | | | | | With 5m curl cord |
| | | | | | | | | | 4 |
| | | | | | | | | | With 4m curl cord* |
| | | | | | | | | | ※4 Tosoku choose the number of cables by the function. |
| | | | | | | | | | ※19 conductors only |
| | | | | | | | | | Logo Mark on Dial |
| | | | | | | | | | B |
| | | | | | | | | | With TOSOKU Logo Mark |
| | | | | | | | | | C |
| | | | | | | | | | With No Logo Mark |
| | | | | | | | | | D |
| | | | | | | | | | With a specified Logo Mark |
| ※3 | | Axial Select Description | | Magnification Select Description | | | | | |
| | | A | OFF X Y Z 4 | | ×1 ×10 ×100 | | | | |
| | | B | OFF X Y Z 4 5 | | ×1 ×10 ×100 | | | | |
| | | C | OFF X Y Z 4 5 6 | | ×1 ×10 ×100 | | | | |
| | | D | OFF X Y Z 4 5 6 7 | | ×1 ×10 ×100 | | | | |
| | | E | OFF X Y Z 4 5 6 7 8 | | ×1 ×10 ×100 | | | | |
| | | F | OFF X Y | | ×1 ×10 ×100 | | | | |
| | | G | OFF X Y Z | | ×1 ×10 ×100 | | | | |
| | | H | X Y | | ×1 ×10 ×100 | | | | |
| | | J | X Y Z | | ×1 ×10 ×100 | | | | |
| | | K | X Y Z 4 | | ×1 ×10 ×100 | | | | |
| | | L | X Y Z 4 5 | | ×1 ×10 ×100 | | | | |
| | | M | X Y Z 4 5 6 | | ×1 ×10 ×100 | | | | |
| | | N | X Y Z 4 5 6 7 | | ×1 ×10 ×100 | | | | |
| | | P | X Y Z 4 5 6 7 8 | | ×1 ×10 ×100 | | | | |

★HC115 is for FANAC NC equipment.
★HC121 is for MITSUBISHI NC equipment.
(MELDAS)

※3 Description other than above is available upon request.

Circuitry

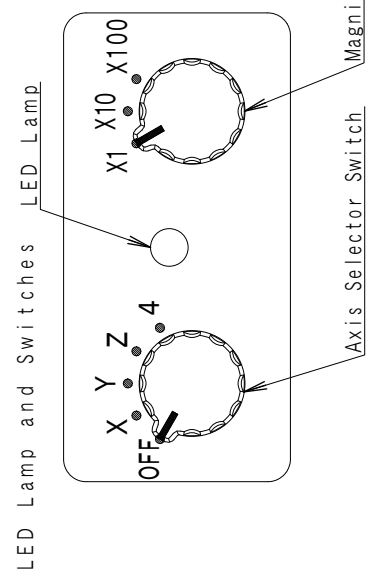
HC115A**



Cur l Code Wiring

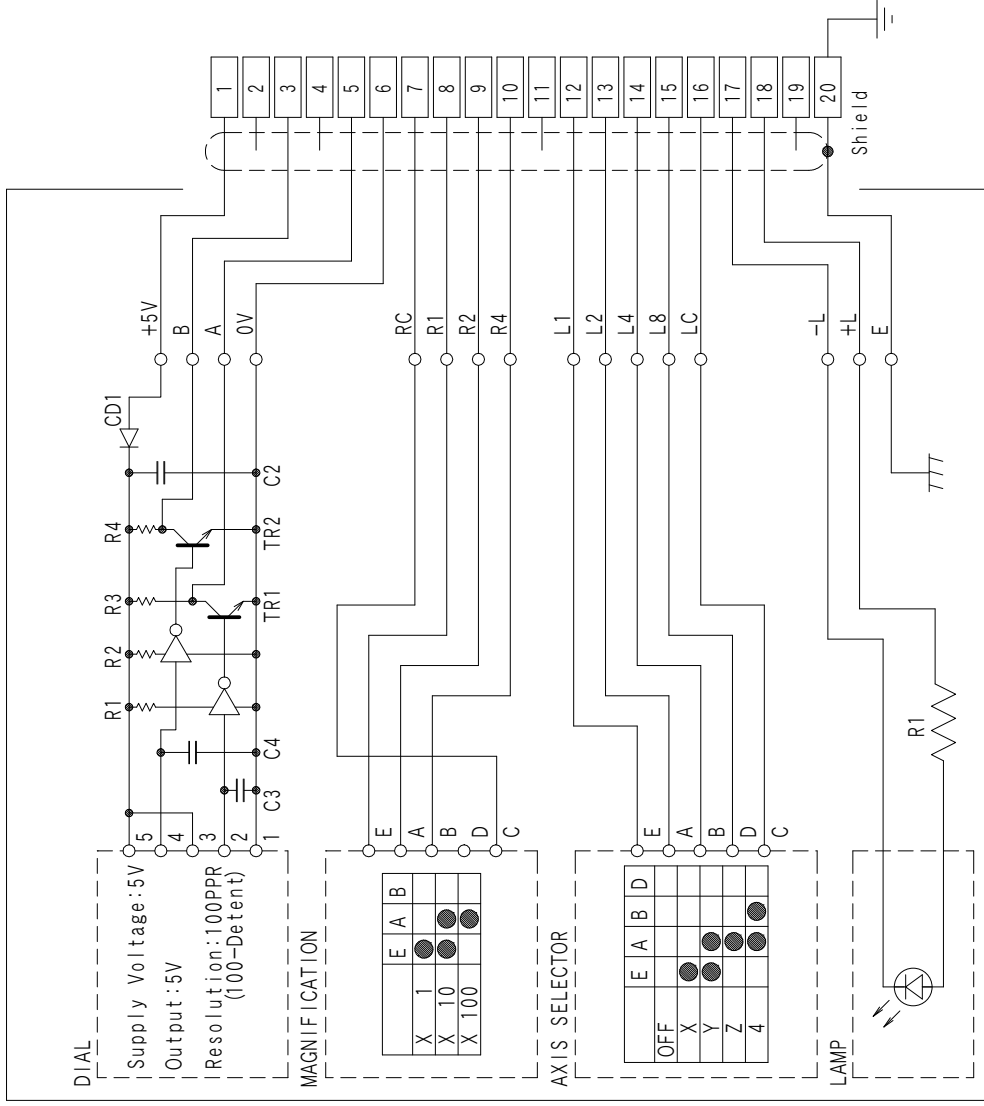
| Terminal No. | Terminal symbol | Color of wire | Function |
|--------------|-----------------|-----------------|------------------------------------------|
| 1 | +5V | Brown | Dial +5VDC |
| 2 | - | Red | |
| 3 | B | Orange | Dial Channel B Output (0/5V) |
| 4 | - | Yellow | |
| 5 | A | Green | Dial Channel A Output (0/5V) |
| 6 | 0V | Blue | Dial 0VDC |
| 7 | COM | Purple | Common Terminal of Multiplication Switch |
| 8 | X1 | Gray | X1 |
| 9 | X10 | White | X10 |
| 10 | X100 | Black | X100 |
| 11 | X | Pink | Axis X |
| 12 | Y | Light blue | Axis Y |
| 13 | Z | Yellow-green | Axis Z |
| 14 | 4 | Light purple | Axis 4 |
| 15 | 5 | Color-less | (Axis 5) |
| 16 | 6 | Color-less/BK | (Axis 6) |
| 17 | -L | Light blue/BK | LED Lamp (-) |
| 18 | +L | Yellow-green/BK | LED Lamp +24VDC |
| 19 | - | Light brown | |
| 20 | E | | Shielding Wire (connect to GND) |

* /BK:with Black line



Circuitry

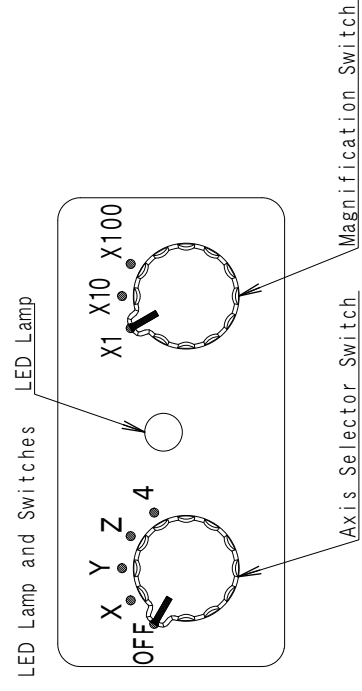
HC115A**03



Curl Code Wiring

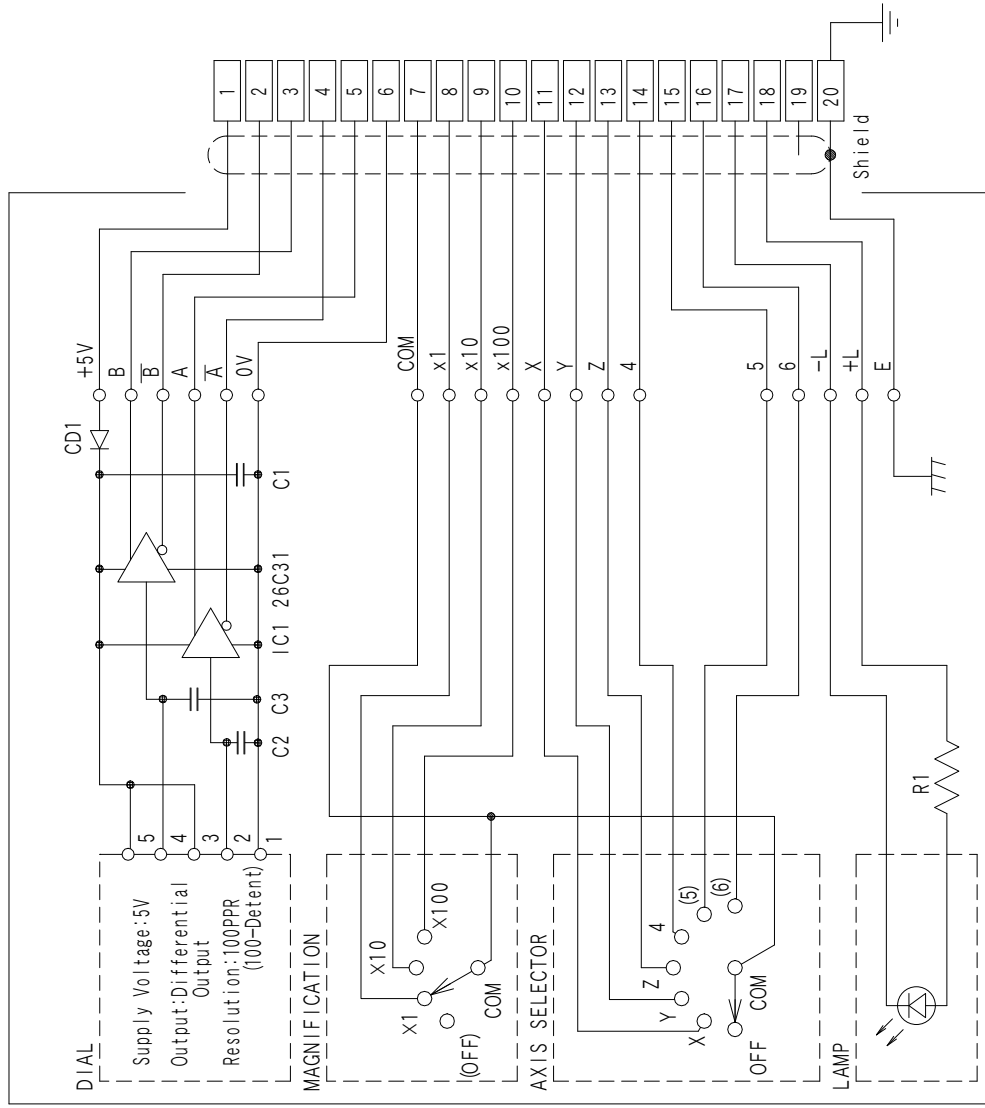
| Terminal No | Terminal symbol | Color of wire | Function |
|-------------|-----------------|-----------------|------------------------------------------|
| 1 | +5V | Brown | Dial +5VDC |
| 2 | - | Red | |
| 3 | B | Orange | Dial Channel B Output (0/5V) |
| 4 | - | Yellow | |
| 5 | A | Green | Dial Channel A Output (0/5V) |
| 6 | 0V | Blue | Dial 0VDC |
| 7 | RC | Purple | Common Terminal of Multiplication Switch |
| 8 | R1 | Gray | Terminal E |
| 9 | R2 | White | Terminal A |
| 10 | R4 | Black | Terminal B |
| 11 | - | Pink | |
| 12 | L1 | Light blue | Terminal E |
| 13 | L2 | Yellow-green | Terminal A |
| 14 | L4 | Light purple | Terminal B |
| 15 | L8 | Color-less | Terminal D |
| 16 | LC | Color-less/BK | Common Terminal of Axis Selector Switch |
| 17 | -L | Light blue/BK | LED Lamp (-) |
| 18 | +L | Yellow-green/BK | LED Lamp +24VDC |
| 19 | - | Light brown | |
| 20 | E | | Shielding Wire (connect to GND) |

* /BK:with Black line



Circuitry

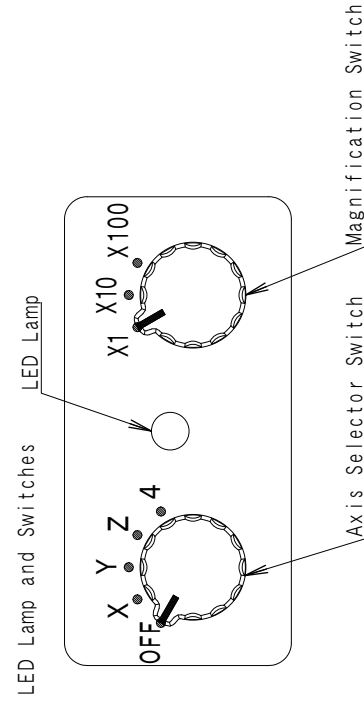
HC11DA**



Curl Code Wiring

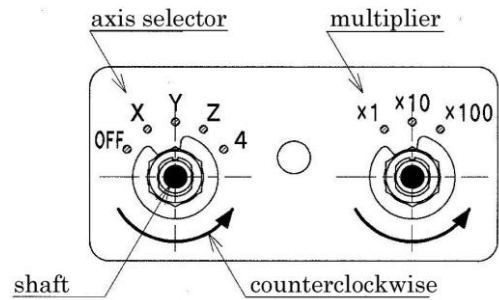
| Terminal No | Terminal symbol | Color of wire | Function |
|-------------|-----------------|-----------------|------------------------------------------|
| 1 | +5V | Brown | Dial +5VDC |
| 2 | B | Red | Dial Channel B Inverting Output |
| 3 | B-bar | Orange | Dial Channel B Output |
| 4 | A | Yellow | Dial Channel A Inverting Output |
| 5 | A-bar | Green | Dial Channel A Output |
| 6 | 0V | Blue | Dial 0VDC |
| 7 | COM | Purple | Common Terminal of Multiplication Switch |
| 8 | X1 | Gray | X1 |
| 9 | X10 | White | X10 |
| 10 | X100 | Black | X100 |
| 11 | X | Pink | Axis X |
| 12 | Y | Light blue | Axis Y |
| 13 | Z | Yellow-green | Axis Z |
| 14 | 4 | Light purple | Axis 4 |
| 15 | 5 | Color-less | (Axis 5) |
| 16 | 6 | Color-less/BK | (Axis 6) |
| 17 | -L | Light blue/BK | LED Lamp (-) |
| 18 | +L | Yellow-green/BK | LED Lamp +12~+24VDC |
| 19 | - | Light brown | |
| 20 | E | | Shielding wire (connect to GND) |

* /BK:with Black line

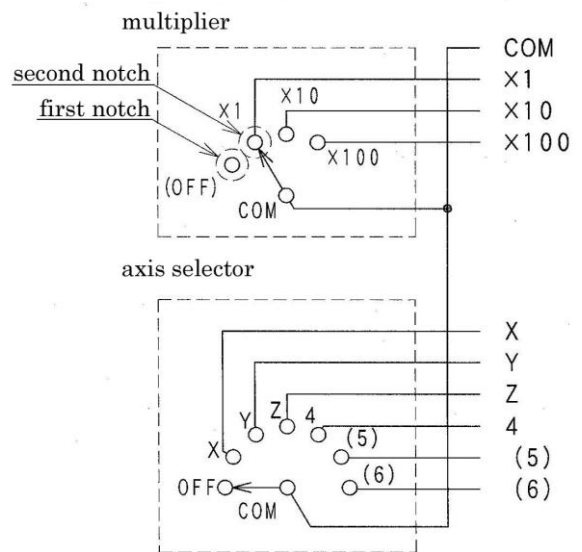


How to mount knobs for selector switches (HC1/HM/HT series)

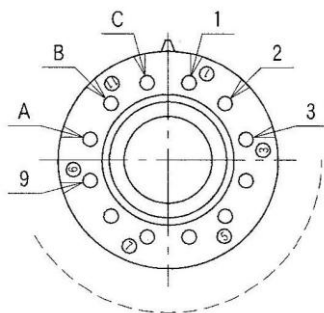
1. All switches select OFF circuits (position no.1) when fully turned counterclockwise. 1 click/2 clicks clockwise will make a connection of position no.2/no.3 with COM which feeds a signal for each.
2. If the indications on the plate begin with "OFF", "0" or any other indication to render disconnection, confirm that the shaft is turned fully counterclockwise to the end, then screw the knob on to it within 5kgf.cm of torque.
If the indications begin with "X", "x1" or any other indication to render connection, 1) turn 1 click clockwise from the very left end, 2) adjust the white line on the knob with the indication, then 3) tighten the screw of the knob (cf. picture 2. multiplier switch).
3. The standard wiring diagrams indicated do not necessarily be consistent with the actual delivered products. Confirm the diagrams on the specifications when mounting the knobs.
4. When the knob is turned, it will stop where stopper-pin is inserted. To alter the position to stop, refer to picture 3 and 4, then re-insert the pin into the designated position.



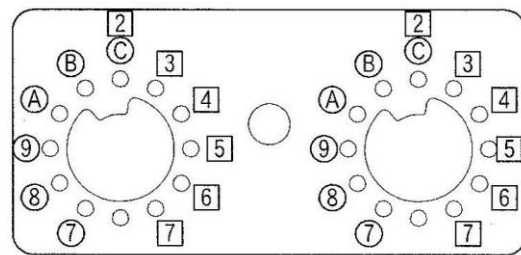
Picture 1. plate



Picture 2. Indications and wiring



Picture 3. The back of the knob
(holes for stopper-pins)



Numbers and alphabets with ○ show positions to start, and those with □ show positions to stop. Select the appropriate position from the picture 4 and insert the pins into the correspondent positions.

e.g. The plate shown in the picture 1 will be set as follows.

Axis Selector: A, 4/ Multiple Selector: B, 3.

Picture 4. Correspondent Positions of the Pins

Handy Manual Pulse Generator



HM Series



Outline

HM series have a variety of switches which can be customized according to your requests. The model is compact and lightweight, which is perfect for accurate and smooth manual operation.

Features

- Various switches available : Emergency switch (2 positions), side mounted (right/left) enabling switches, 2 rotary switches (as axis and multiplication selector etc.)
- Compact, thin-line and lightweight.
- Strong plate magnets available on back side. (optional)
- RoHS compliant (box/cord)
- Various types of curl cords provided along with connectors of all sorts at your request.

Specifications

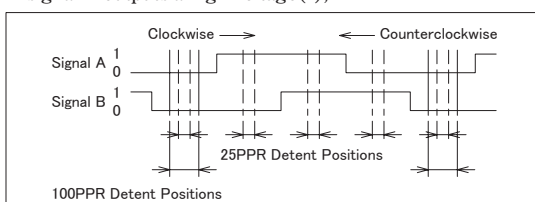
| | |
|-----------------|-----------------------------------|
| 1. Body | |
| Dimension | 145×73×35(mm) |
| LED light | DC24V Green |
| Enabling Switch | Available on both sides |
| Logo | Logo available on the wheel cover |

| | |
|------------------------------|--|
| 2. Mechanical specifications | |
| 2.1 Rotary Encoder Unit | |

| | |
|-----------------------|---------------------------------------------------------------|
| Output Voltage | DC5V±10%, DC12V±10% |
| Wheel | 100 clicks / rotation 100 pulses or 25 pulses per rotation |
| Rotational Durability | Over 1,000,000 times |

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



* See RE45B page for details

2.2 Selector Switches

MR8A (Rotary switch) 25V15mA (AC/DC)
MR8C (Code switch) 15V10mA (AC/DC)
* See MR8A/MR8C pages for details

3. Curl/Straight Cords

| | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Curl Cord | 19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords |
| Straight Cord | Also available |

4. Connector Unit

| | |
|-----------|---------------------------------------------------------------------------------|
| Connector | Dripproofed connector to be attached on the end of the cord optionally provided |
|-----------|---------------------------------------------------------------------------------|

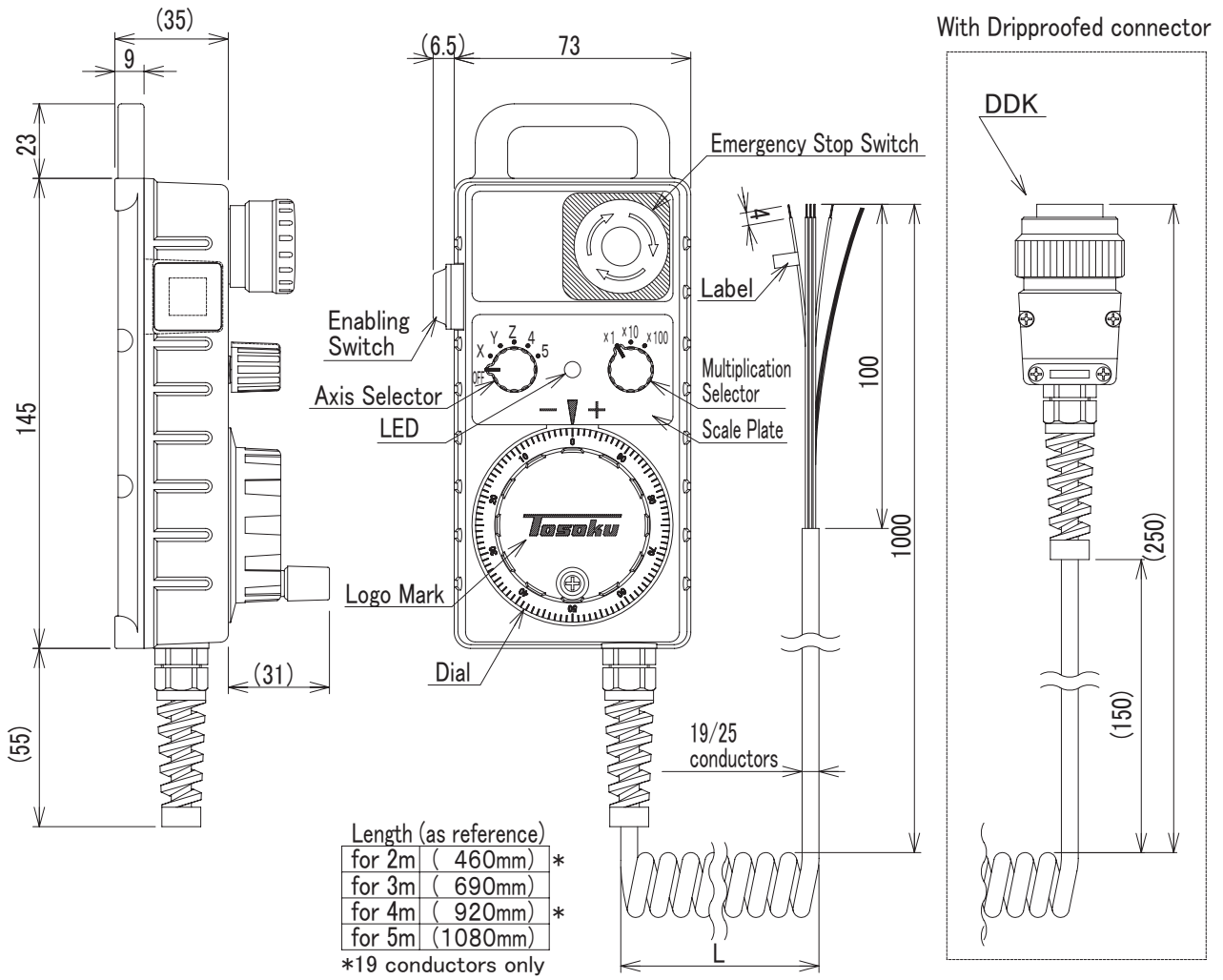
Warranty

- 1 year from the date of shipment.

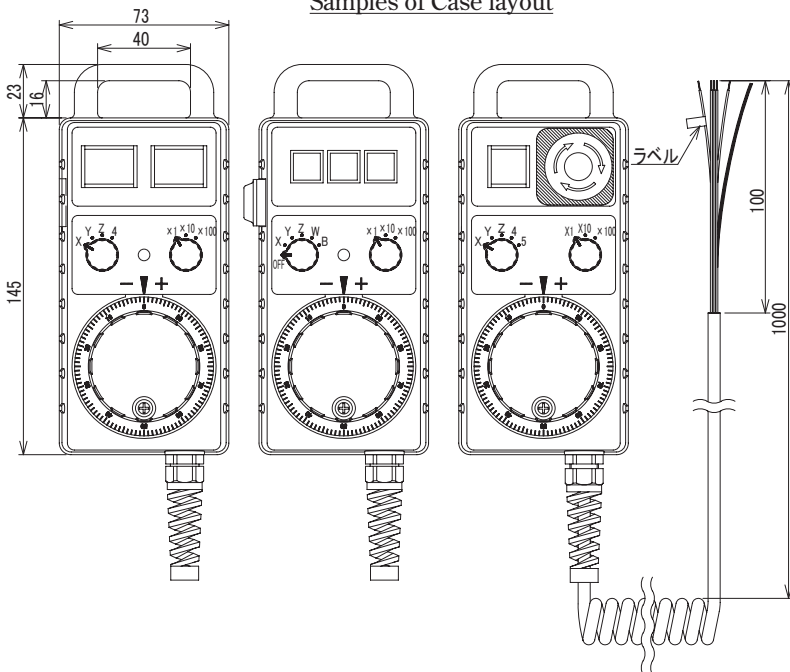
Dimensions (mm)

HM Unit with curl cord

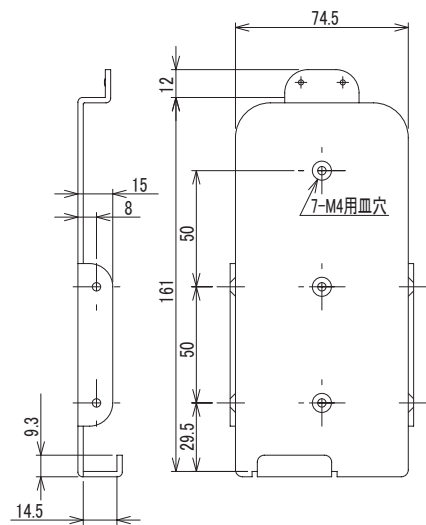
※ This drawing is an example, it may differ according to number of swithes etc.



Samples of Case layout



Original Holder



H M series Order Sheet (Print out this page for sending orders.)

We'll hand in to you a drawing in accordance with your order. The drawing shall be approved before starting in on production.

1) Select one from each spec table and fill blank spaces with " ".

| Pulses/Rev. | |
|----------------------------|--------|
| <input type="checkbox"/> | 100PPR |
| * <input type="checkbox"/> | 25PPR |

*25PPR and yet 100 Clicks/Revolution

| Power Supply | Output |
|----------------------------|-----------------------------------------------|
| <input type="checkbox"/> | 5V 5V (330Ω Pull Up) |
| <input type="checkbox"/> | 5V Open Collector |
| <input type="checkbox"/> | 5V (for Line Driver) |
| <input type="checkbox"/> | 12V 5V (2.2kΩ Pull Up) |
| <input type="checkbox"/> | 12V 12V (2.2kΩ Pull Up) |
| <input type="checkbox"/> | 12V Open Collector |
| * <input type="checkbox"/> | 12V- for Photocoupler 24V (Open Collector) |

* Transistor will be "OFF" at every clicked positions.

(For other open collector output models, transistors will be "ON" at every clicked positions.)

| Logo on the dial | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | with "TOSOKU" logo |
| <input type="checkbox"/> | with an original logo() |

| 2-Position Enabling Switch | |
|----------------------------|-----------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | One on the left |
| <input type="checkbox"/> | On both sides |

| Emergency Switch (contacts) | |
|-----------------------------|-------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | Mounted () |

* 1 for (NO), 4 for (NC) maximum (1A/4B). Maximum of 4 contacts in total (1A3B or 4B).

| Magnet on the backside | |
|--------------------------|---------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | Mounted |

| Axis Selector/Multiplication Selector Switches | |
|------------------------------------------------|------------------------------|
| <input type="checkbox"/> | MR8C type (Gray code switch) |
| <input type="checkbox"/> | MR8A type (Selection switch) |

Indications for Axis Selector (left)

| | |
|--------------------------|--------------------|
| e.g. | OFF, X, Y, Z, 4, 5 |
| <input type="checkbox"/> | |

Indications for Multiplication Selector (right)

| | |
|--------------------------|---------------|
| e.g. | x1, x10, x100 |
| <input type="checkbox"/> | |

| Curl Cord Length | |
|--------------------------|-------------------------------------------|
| <input type="checkbox"/> | 2m Curl Cord (for only 19-conductor cord) |
| <input type="checkbox"/> | 3m Curl Cord |
| <input type="checkbox"/> | 4m Curl Cord (for only 19-conductor cord) |
| <input type="checkbox"/> | 5m Curl Cord |

* We will select either 19-conductor cord or 25-conductor cord to cover your requested specs

| Waterproofed Connector (for curl cord) | |
|----------------------------------------|---------------------------------------|
| <input type="checkbox"/> | None |
| <input type="checkbox"/> | Male connector (EBSP2119MG-D, DDK) |
| <input type="checkbox"/> | Female connector (EBSP2119FGS-D, DDK) |

* Fill in both spaces to order both connectors.

2) Other options

| Other options to request |
|-------------------------------------------------------------------------------|
| (e.g.) Switches with LED illumination x 2 2 contact selector switch x 1 |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |
| ----- |



Rotary Encoders
Pulse Generators
Rotary Switches

Code Switches
Lever Switches
Trackballs

Handy Manual Pulse Generator



HR Series

Outline

HR series provide you comfort in long time use and safety with various options of switches.

Features

- Ergonomically designed to be held with one hand
- 3-position (off-on-off) switch available on both sides
- RoHS compliant (box/cord)
- Upper part is free to design and allows various kinds of switches (including emergency stop button) to be set
- HR series also provide you various line-up of switches to be set on the middle part:
DP - the digital code switch series, RS400 - the rotary switch series etc.
- Strong plate magnets available on back side. (optional)
- Various types of curl cords provided along with connectors by all sorts of your request

Specifications

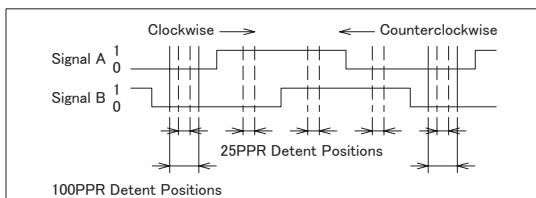
| | |
|-----------------|-----------------------------------|
| 1. Body | |
| Dimension | 190×100×50.5(mm) |
| Enabling Switch | Available on both sides |
| Other Features | Logo available on the wheel cover |

| | |
|------------------------------|--|
| 2. Mechanical specifications | |
| 2.1 Rotary Encoder Unit | |

| | |
|-----------------------|--------------------------------------------------------------|
| Output Voltage | DC5V±10%, DC12V±10% |
| Wheel | 100 clicks / rotation 100 pulse or 25 pulses per rotation |
| Rotational Durability | Over 1,000,000 times |

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage(1);



* See RE45B page for details

| |
|-----------------------|
| 2.2 Selector Switches |
|-----------------------|

* See RS400/DP pages for details

| | |
|------------------------|--|
| 3. Curl/Straight Cords | |
|------------------------|--|

| | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Curl Cord | 19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords |
| Straight Cord | Also available |

| | |
|-------------------|--|
| 4. Connector Unit | |
|-------------------|--|

| | |
|-----------|---------------------------------------------------------------------------------|
| Connector | Dripproofed connector to be attached on the end of the cord optionally provided |
|-----------|---------------------------------------------------------------------------------|

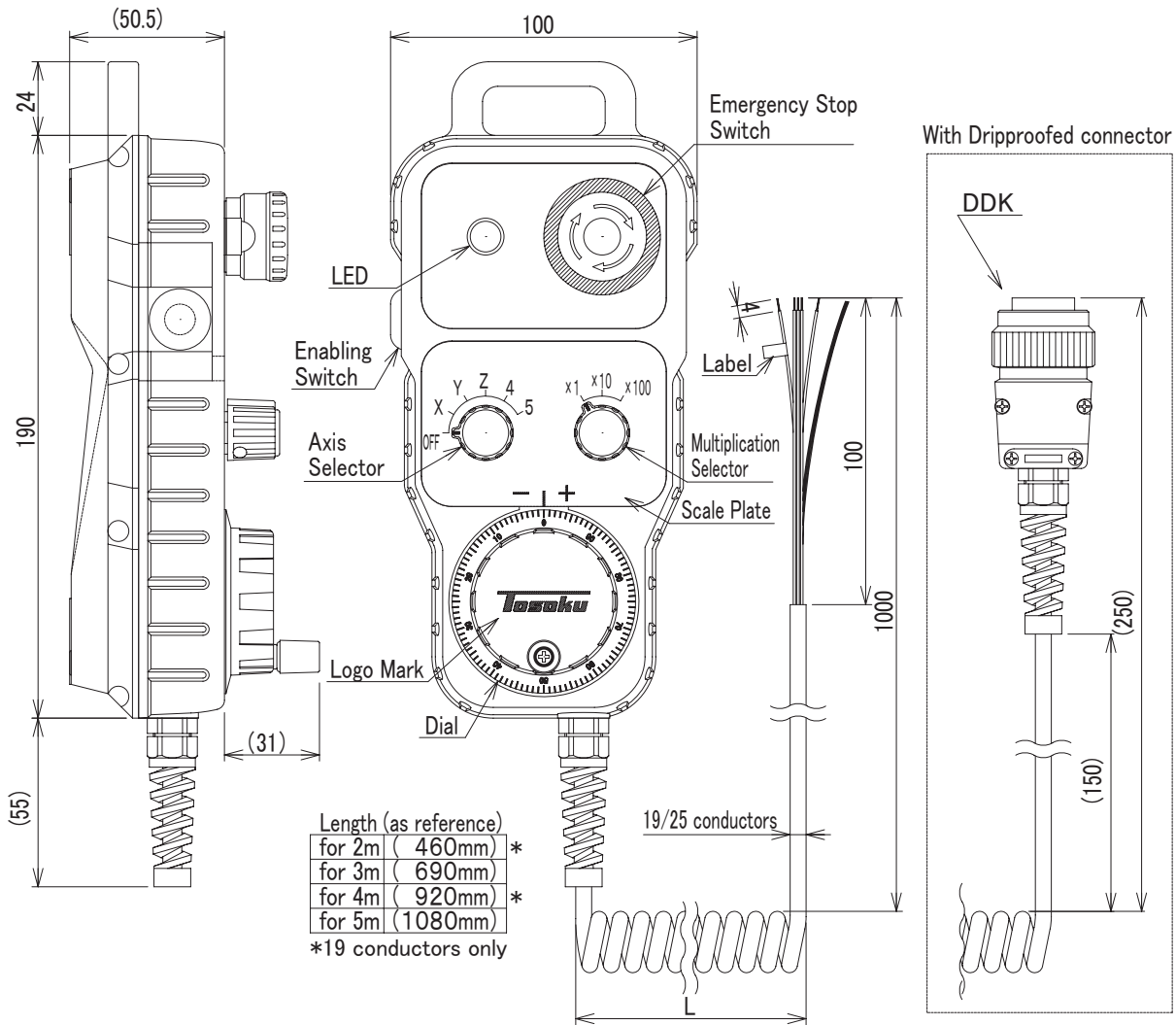
Warranty

- 1 year from the date of shipment.

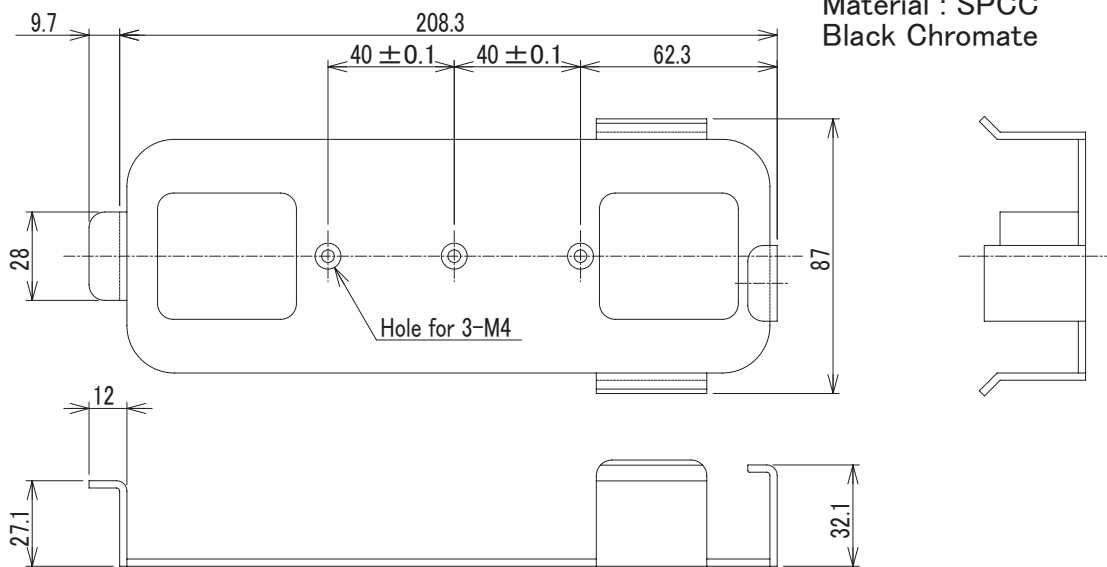
Dimensions (mm)

HR Unit with curl cord

※ This drawing is an example, it may differ according to number of swithes etc.



Original Holder



H R series Order Sheet (Print out this page for sending orders.)

We'll hand in to you a drawing in accordance with your order. The drawing shall be approved before starting in on production.

1) Select one from each spec table and fill blank spaces with " ".

| Pulses/Rev. | |
|-------------|--------|
| | 100PPR |
| * | 25PPR |

*25PPR and yet 100 Clicks/Revolution

| Power Supply | Output |
|--------------|-------------------------|
| | 5V 5V (330Ω Pull Up) |
| | 5V Open Collector |
| | 5V (for Line Driver) |
| | 12V 5V (2.2kΩ Pull Up) |
| | 12V 12V (2.2kΩ Pull Up) |
| | 12V Open Collector |
| * | 12V- for Photocoupler |
| | 24V (Open Collector) |

* Transistor will be "OFF" at every clicked positions.

(For other open collector output models, transistors will be "ON" at every clicked positions.)

| Logo on the dial | |
|------------------|--------------------------|
| | None |
| | with "TOSOKU" logo |
| | with an original logo() |

| 3-Positions Enabling Switch (contacts) | |
|----------------------------------------|--------------------|
| | None |
| | One on the left() |
| | On both sides() |

* Assigned contacts should be 2 or less for normally open (NO) and 2 or less for normally closed (NC). (2A2B maximum.)

| Emergency Switch (contacts) | |
|-----------------------------|-------------|
| | None |
| | Mounted () |

* 1 for (NO), 4 for (NC) maximum (1A/4B). Maximum of 4 contacts in total (1A3B or 4B).

| Magnet on the backside | |
|------------------------|---------|
| | None |
| | Mounted |

| Axis Selector/Multiplication Selector Switches | |
|------------------------------------------------|--------------------|
| | Gray code switch |
| | Binary code switch |
| | Selection switch |

Indications for Axis Selector (left)

| | |
|------|--------------------|
| e.g. | OFF, X, Y, Z, 4, 5 |
| | |

Indications for Multiplication Selector (right)

| | |
|------|---------------|
| e.g. | ×1, ×10, ×100 |
| | |

| Curl Cord Length | |
|------------------|-------------------------------------------|
| | 2m Curl Cord (for only 19-conductor cord) |
| | 3m Curl Cord |
| | 4m Curl Cord (for only 19-conductor cord) |
| | 5m Curl Cord |

* We will select either 19-conductor cord or 25-conductor cord to cover your requested specs

| Waterproofed Connector (for curl cord) | |
|----------------------------------------|---------------------------------------|
| | None |
| | Male connector (EBSP2119MG-D, DDK) |
| | Female connector (EBSP2119FGS-D, DDK) |

* Fill in both spaces to order both connectors.

2) Other options

| Other options to request | |
|--------------------------|------------------------------------|
| (e.g.) | Switches with LED illumination x 2 |
| | 2 contact selector switch x 1 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
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| | |
| | |
| | |



Rotary Encoders
Pulse Generators
Rotary Switches
Code Switches
Lever Switches
Trackballs

Handy Manual Pulse Generator



HS Series



Outline

HS is a free-to-design handheld manual pulse generator which allows wide variety of switches laid out at your service.

Features

- Optional layout of switches
- 3-position (off-on-off) switch available on both sides
- RoHS compliant (box/cord)
- Emergency stop button also available
- Holder provided
- Strong plate magnet as an additional accessory. (optional)
- Various types of curl cords provided along with connectors by all sorts of your request

Specifications

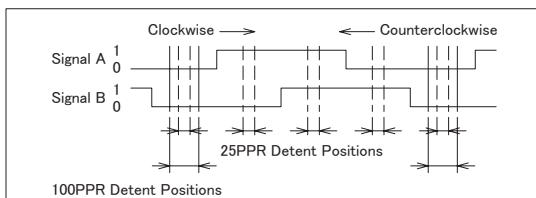
| 1. Body | |
|-----------------|-----------------------------------|
| Dimension | 180×96×50(mm) |
| Enabling Switch | Available on both sides |
| Other Features | Logo available on the wheel cover |

| 2. Mechanical specifications | |
|------------------------------|--|
| 2.1 Rotary Encoder Unit | |

| | |
|-----------------------|---------------------------------------------------------------|
| Output Voltage | DC5V±10%, DC12V±10% |
| Wheel | 100 clicks / rotation 100 puluse or 25 pulses per rotation |
| Rotational Durability | Over 1,000,000 times |

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage(1);



* See RE45B page for details

| 2.2 Selector Switches | |
|-----------------------|--|
|-----------------------|--|

RS400 (Rotary switch)
AC 30V1.0A / 200V0.2A
DC 20V1.0A / 200V0.1A (Resistance Load)
DP (Code switch)
AC 5V0.5V/50V0.05A
DC 5V0.25A / 25V0.05A (Resistance Load)

* See RS400/DP pages for details

| 3. Curl/Straight Cords | |
|------------------------|--|
|------------------------|--|

| | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Curl Cord | 19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords |
| Straight Cord | Also available |

| 4. Connector Unit | |
|-------------------|--|
|-------------------|--|

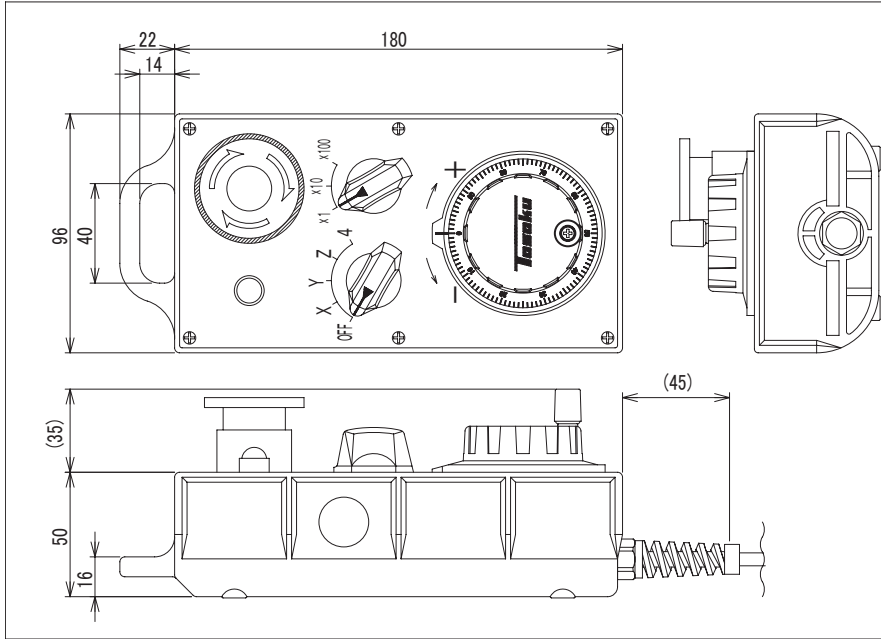
| | |
|-----------|---------------------------------------------------------------------------------|
| Connector | Dripproofed connector to be attached on the end of the cord optionally provided |
|-----------|---------------------------------------------------------------------------------|

Warranty

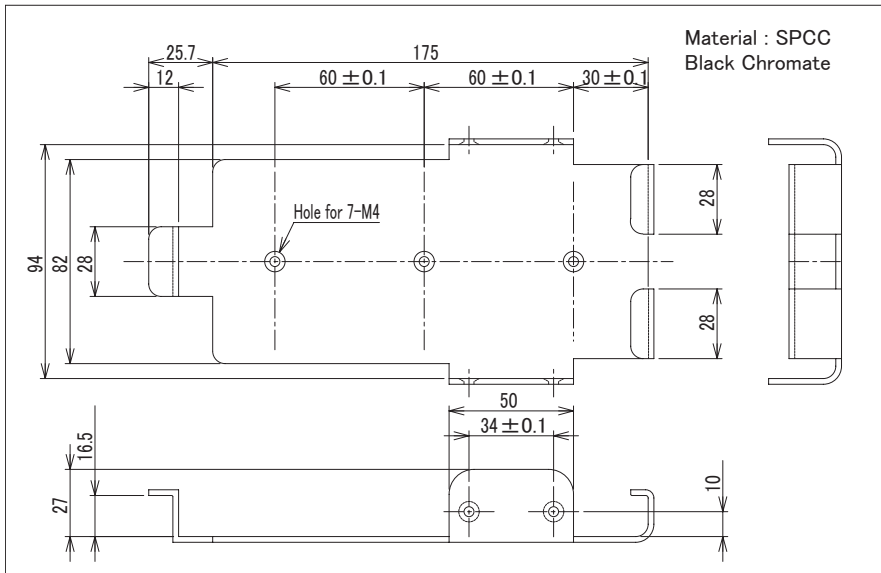
- 1 year from the date of shipment.

Dimensions (mm)

HS Main unit ※ This drawing is an example, it may differ according to number of swithes etc.



HS Original holder



HS Layout examples



TOKYO SOKUTEIKIZAI CO., LTD.

Trackball
Catalogue

Trackball TB3 6 ————— P . 61
designed for usage in numerous kinds of devices and equipments

Track ball



TB36 Series



Outline

TB36 series are high-spec trackballs for various sorts of professional use: for medical devices (e.g. ultrasonic reflectoscope, specular microscope), mixing units of audio devices, factory automation systems etc.

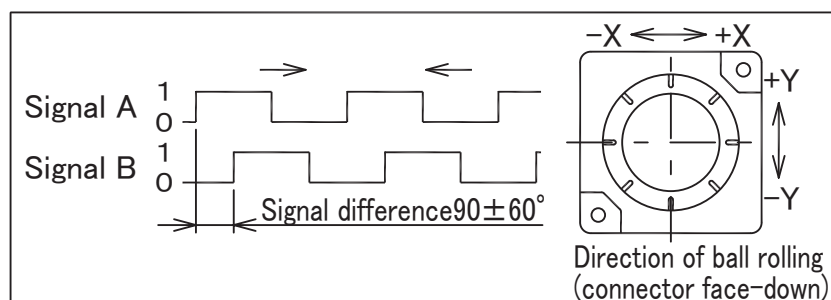
Features

- Low Cost
- RoHS compliant
- Translucent ball with LED option
- Easy Maintenance
- Long life use
 - Over 3million ball revolutions.

Specifications

| | |
|-----------------------|---------------------------------------|
| Operating temperature | 0°C to +45°C 32F to 113F |
| Supply voltage | DC5V±5% no more than 30mA |
| Ball | S φ 36mm/1.4inch |
| Output axes | 2way axes (X, Y) |
| Pulse | 216 pulses per ball generation (±10%) |
| Out put signals | Two square wave signals: CMOS (TTL) |
| Ball driving force | 15±10mN |
| Life time | Over 3million ball revolutions |
| Ball load | 200N maximum downward pressure |
| Mounting position | Horizontal to 30° |

Output Wave form

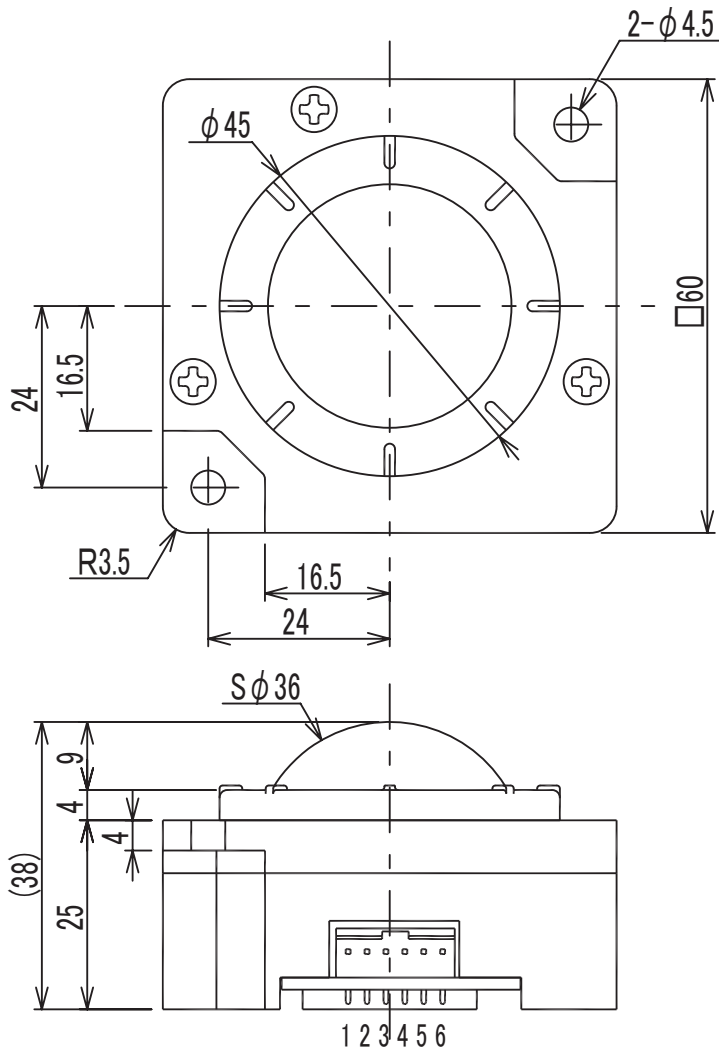


Part Number Designation

TB36 L S W
 ① ② ③ ④

- ① 38mm Track
- ② Operational torque : Light
- ③ Output signal: Two square wave output (A/B)
- ④ Color :
 W: Ivory white
 T: Transparent

Dimensions (mm)



Connection

| Pin No. | Function |
|---------|------------------|
| 1 | +5V Input |
| 2 | 0V Common return |
| 3 | XA Signal output |
| 4 | XB Signal output |
| 5 | YA Signal output |
| 6 | YB Signal output |

Connector :
 IL-6PS3FP2-1 (JAE)

Precautions

● Maintenance

Pick up ball:

-Turn the ring counterclockwise by approx. 40°.

-Set the idler on the arrow position.

Bring back ball:

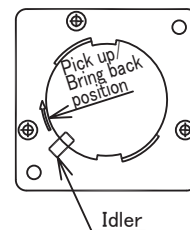
-Set the idler on the arrow position, and turn the ring clockwise.

● Cleaning:

-XY axis sensor, Idler: Wipe with cotton buds.

-Ball: Wipe with dry cloth.

: If balls are still unclean, use ethyl alcohol or neutral detergent (grit, alkaline are not included)



NOTE: 1) Any shock or vibration may cause malfunctions.

2) TB36 series are not waterproof.