

# TRD-S/SH Series

## Features

### φ38 Incremental Type

- Thin design with an outside diameter of φ38 mm / depth of 30 mm
- Small diameter lineup with resolutions up to 2,500 P/R
- Low price contributes to cost reduction of the system.
- IP40 protective structure



## Model Number List

| Type              | Appearance                                                                        | Model Number | Supply Voltage    | Output                                               | Output Form           | Pulse Number / Rotation                                                                                     |
|-------------------|-----------------------------------------------------------------------------------|--------------|-------------------|------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------|
| Shaft Type        |  | TRD-S□A      | 4.5 to 13.2 V DC  | Output with 2-phase origin (Origin reverse action □) | Open collector output | 10, 20, 30, 40, 50, 60, 100, 200, 250, 300, 360, 400, 500, 512, 600, 800, 1,000, 1,024, 1,200, 2,000, 2,500 |
|                   |                                                                                   | TRD-S□B      | 10.8 to 26.4 V DC |                                                      | Open collector output |                                                                                                             |
|                   |                                                                                   | TRD-S□V      | 4.75 to 5.25 V DC | Output with 2-phase origin (Origin direct action □)  | Line driver output    |                                                                                                             |
| Hollow Shaft Type |  | TRD-SH□A     | 4.5 to 13.2 V DC  | Output with 2-phase origin (Origin reverse action □) | Open collector output |                                                                                                             |
|                   |                                                                                   | TRD-SH□B     | 10.8 to 26.4 V DC |                                                      | Open collector output |                                                                                                             |
|                   |                                                                                   | TRD-SH□V     | 4.75 to 5.25 V DC | Output with 2-phase origin (Origin direct action □)  | Line driver output    |                                                                                                             |

TRD-S□A

- Series classification
- S** : Shaft type
- SH** : Hollow shaft type

- Pulse number

- Form

- A**: Supply voltage 4.5 to 13.2 V DC Open collector output
- B**: Supply voltage 10.8 to 26.4 V DC Open collector output
- V**: Supply voltage 4.75 to 5.25 V DC Line driver output

## Pulse and Frequencies

| Pulse Number per Rotation         | 10               | 20 | 30 | 40 | 50 | 60 | 100 | 200 | 250 | 300 | 360 | 400 | 500 | 512 | 600 | 800 | 1,000 | 1,024 | 1,200 | 2,000 | 2,500 |
|-----------------------------------|------------------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|-------|-------|
| Maximum Response Frequency (kHz)* | 1                | 2  | 3  | 4  | 5  | 6  | 10  | 20  | 25  | 30  | 36  | 40  | 50  | 50  | 60  | 80  | 100   | 100   | 120   | 200   | 200   |
| Applicable Models                 | TRD-S□A/TRD-SH□A | ●  | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●     | ●     | ●     | ●     | ●     |
|                                   | TRD-S□B/TRD-SH□B | ●  | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●     | ●     | ●     | ●     | ●     |
|                                   | TRD-S□V/TRD-SH□V | ●  | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●     | ●     | ●     | ●     | ●     |

\* The electric maximum response frequency is specified by resolution (pulse number) and the maximum number of revolutions.

Electrical maximum number of revolutions = ((Maximum response frequency/Resolution) x 60)

Therefore, if the encoder rotates at a speed greater than the electrical maximum number of revolutions, the signals do not electrically follow.

## Electrical Specifications

| Model Number    |                               |     | TRD-S□A/TRD-SH□A                                      | TRD-S□B/TRD-SH□B  | TRD-S□V/TRD-SH□V             |
|-----------------|-------------------------------|-----|-------------------------------------------------------|-------------------|------------------------------|
| Power Supply    | Supply Voltage                |     | 4.5 to 13.2 V DC                                      | 10.8 to 26.4 V DC | 4.75 to 5.25 V DC            |
|                 | Allowable Ripple              |     | 3% rms or less                                        |                   |                              |
|                 | Consumption Current (No Load) |     | 50 mA or lower                                        |                   |                              |
| Output Waveform | Signal Format                 |     | 2-phase output + home position                        |                   |                              |
|                 | Maximum Response Frequency    |     | 200 kHz                                               |                   |                              |
|                 | Duty Ratio                    |     | 50±25%                                                |                   |                              |
|                 | Phase Difference Width        |     | 25±12.5%                                              |                   |                              |
|                 | Signal Width at Home Position |     | 100±50%                                               |                   |                              |
| Output          | Rise / Fall Time              |     | Not larger than 1 μs (Cable length 1 m, maximum load) |                   |                              |
|                 | Output Form                   |     | NPN open collector output                             |                   | Line driver output*          |
|                 | Output Logic                  |     | Negative logic (Active low)                           |                   | Positive logic (Active high) |
|                 | Output Voltage                | "H" | —                                                     |                   | 2.5 V or higher              |
|                 |                               | "L" | 0.4 V or lower                                        |                   | 0.5 V or lower               |
|                 | Output Current                |     | Up to 30 mA (Sink current)                            |                   | Up to 20 mA                  |
|                 | Load Supply Voltage           |     | 30 V DC or lower                                      |                   | —                            |

\* Equivalent to 26C31. The receiver is equivalent to 26C32.

# TRD-S/SH Series

## Specifications/Dimensions

PLC HMI SENSOR ENCODER COUNTER INFORMATION Rotary Encoder  
Lineup

Selection Guide

Incremental  
Type

Absolute Type

TRD-MX

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

### Mechanical Specifications

|                                                  |                                                                                                                                                                            |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Starting Torque                                  | 0.001 N·m or less (+20°C)                                                                                                                                                  |
| Moment of Inertia                                | $0.3 \times 10^{-6} \text{ kg} \cdot \text{m}^2$                                                                                                                           |
| Shaft Allowable Load                             | Radial: 20 N                                                                                                                                                               |
|                                                  | Thrust: 10 N                                                                                                                                                               |
| Maximum Allowable Number of Revolutions (Note 1) | 6,000 rpm                                                                                                                                                                  |
| Cable                                            | Outside diameter $\phi 5 \text{ mm}$                                                                                                                                       |
|                                                  | 5-core shielded oil-resistant vinyl chloride cable<br>Core wire nominal cross-sectional area: $0.14 \text{ mm}^2$<br>(Line driver output is 8 cores, $0.14 \text{ mm}^2$ ) |
| Weight                                           | Approx. 100 g (With 1 m cable)                                                                                                                                             |

Note 1: Maximum number of revolutions that can be mechanically endured

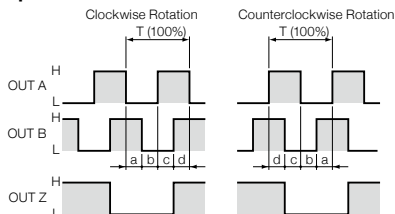
### Environmental Requirements

|                                  |                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------|
| Use Ambient Temperature          | -10 to +70°C                                                                             |
| Storage Ambient Temperature      | -25 to +85°C                                                                             |
| Use Ambient Humidity             | 35 to 85%RH (No condensation)                                                            |
| Withstand Voltage                | Excluded due to capacitor grounding<br>60 pulses or lower: 500 V AC (50/60 Hz) 1 minute* |
| Insulation Resistance            | 50 MΩ or higher*                                                                         |
| Vibration Resistance (Endurance) | Displacement half amplitude:<br>0.75 mm, 10 to 55 Hz, 3 axial directions, each 1 h       |
| Impact Resistance (Endurance)    | 490 m/s <sup>2</sup><br>11 ms, each 3 times in 3 axial directions                        |
| Protective Structure             | Simple Dustproof type: IP40                                                              |

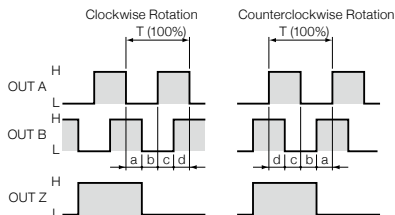
\* The power supply, signal lines, and shield between the cases are excluded.

### Output Waveform

#### Open Collector



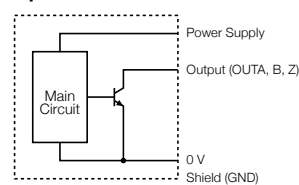
#### Line Driver

a, b, c, d =  $1/4T \pm 1/8T$ 

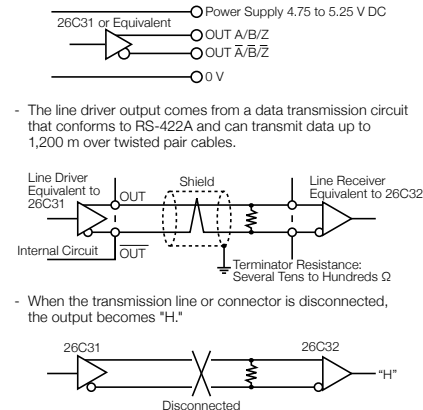
Note: Clockwise rotation when the main body is seen from the axle side is the normal rotation.

### Output Circuit

#### Open Collector



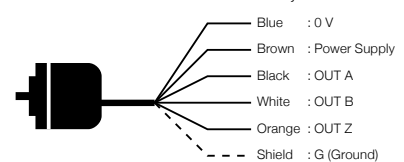
#### Line Driver



### Connection Diagram

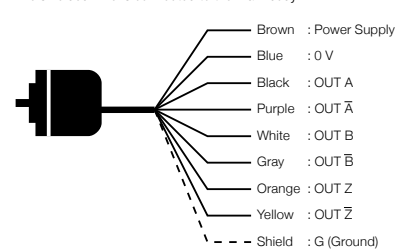
#### Open Collector

The shielded wire is connected to the main body.



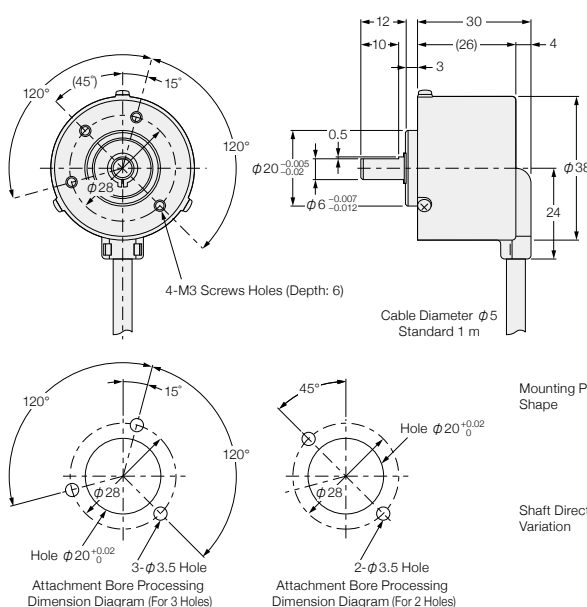
#### Line Driver

The shielded wire is connected to the main body.

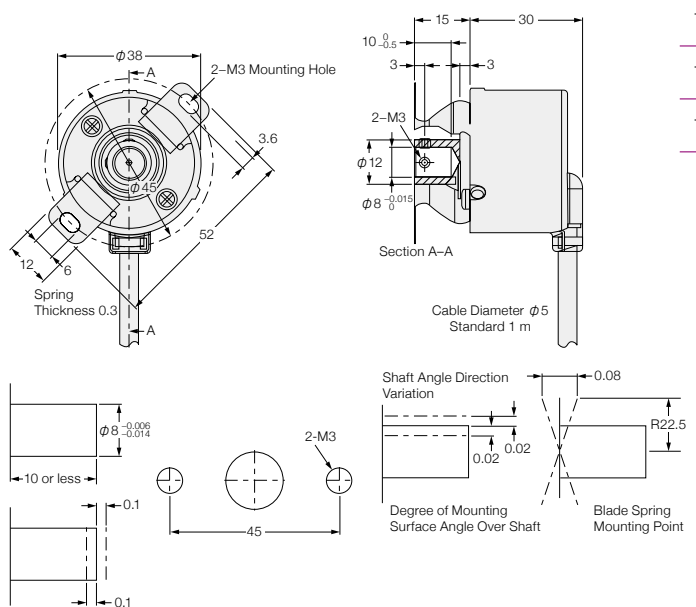


### Dimensions (Unit: mm)

#### TRD-S□A/TRD-S□B/TRD-S□V



#### TRD-SH□A/TRD-SH□B/TRD-SH□V



The specifications and prices described in this catalog were valid when the catalog was issued.  
For the latest information, contact our sales persons or see our website.