

# Precautions

## Precautions in Use / Noise Measures

HMI

SENSOR

ENCODER

COUNTER

INFORMATION

### Precautions in Use

Since the rotary encoder consists of precision parts, impacting it may damage its functioning. Handle the rotary encoder with care.

#### Megger Tests

Although the encoder has a withstand voltage of 500 V between the case and electric circuit, since incorrect application of voltage may destroy the internal electronic circuit, do not perform megger tests.

\* Although the shielded wire of the TRD-GK series is connected to the case, it is isolated from the electronic circuit.

The shielded wire of the TRD-S/SH/2E/N/NH/J/NA/K/KL series is not connected to the case.

#### Installation

- When installing the encoder, neither pry it open nor impact it by pounding the axle.
- For connection between the encoder axle and the axle of devices, use a coupling. When mounting a coupling to the axle, do not push it forcibly. Even if a coupling is used, since a load greater than the allowance may be applied to the axle depending on installation, perform centering carefully.
- Bearing life changes according to conditions of use and, in particular, it is largely affected by axial load. Even if it is within the specified load, bearing life can be largely extended by reducing the bearing load.
- Do not disassemble the rotary encoder. Doing so may damage oil- and drip-proofness. Moreover, even if it is of the dustproof and waterjet-proof type, do not expose the main body to water and oil for long periods of time. If it is exposed to water and oil, wipe it off.
- Anchor the hollow shaft type with the provided hexagon socket set screws. Prevent looseness by using a screw lock agent.

#### Vibrations

Since vibrations applied to the rotary encoder may cause false pulses, pay careful attention to the installation site.

If the more pulses per rotation there are, the shorter the slit interval of the rotary slit board becomes. Therefore, such an encoder is easily affected by vibrations and the vibrations applied during low-speed rotation and shutdown are transmitted to the shaft and the main body. As a result, the rotary slit board is virtually turned, generating false pulses.

#### Wiring / Connections

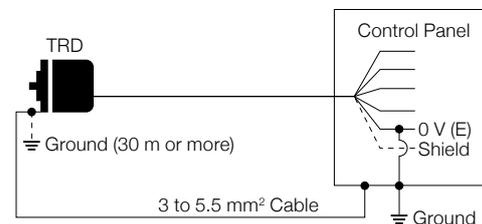
Note that miswiring may damage the internal circuit.

Regarding the totem-pole output type, protection against short-circuits is provided between the output terminal and the power source 0V side, but not between the output terminal and the power source positive side.

### Noise Measures

- Do not wire cables in parallel to other power lines or in the same duct.
- Eliminate electric sparks from relays and switches in the control panel as much as possible using capacitors and elements for absorbing surge.
- Do not use the rotary encoder near electric discharge welding machines or electric furnaces. Otherwise, use electromagnetic shields.
- Be sure to use a shielded cable as an extension cable.
- Connect the shielded wires of the TRD-S/SH/2E/N/NH/J/NA/K/KL series to 0V or ground them. Since the shield of the TRD-GK series is internally connected to the case main body, it is not necessary to connect the shield at the cable end.
- Since false pulses may be generated when the power is turned on and off, use the rotary encoder 0.1 seconds after the power is turned on and 0.5 seconds after the power is turned off.
- If the potential difference occurs between the encoder chassis and control panel chassis and the noise causes a malfunction, connect the encoder chassis and the control panel chassis using a cable of 3 to 5.5 mm<sup>2</sup>.
- Grounding procedure: The effects of noise differ depending on the relations between the encoder and peripheral devices. Example connections when there are the effects of noise are shown in the table below.

Distance to the Control Panel	How to Connect the Rotary Encoder
30 m or less	Connect the rotary encoder chassis to the control panel chassis using a cable of 3 to 5.5 mm <sup>2</sup> . Connect the 0 V (E) terminal to the control panel chassis using a similar cable and ground the terminal.
30 m or more	In addition to the measures mentioned above, also ground the rotary encoder.



# Precautions

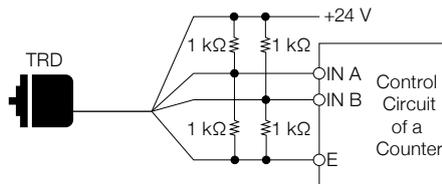
## Cable Extension

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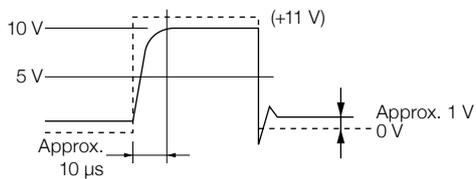
### ■ Cable Extension

The cable extensions are likely to cause waveform distortion due to the resistance of the cable conductor and line capacity. Therefore, use cables that have low conductor resistance and capacity, and pose little interference between signals (such as coaxial cable), and lower the maximum usable frequency.

As shown in the figure below, if the power source of the rotary encoder is fed by 24 V DC, it produces favorable results against noise over long distance signal transmission, phase shifts due to line capacity, and waveform distortion.



\* The figure below shows an example of waveform distortion (continuous line) when the shielded cable is extended by 100 m. The dotted line shows a cable length of 2 m.



For long distance transmission and high pulse transmission, use line driver output. (Use a twisted-pair shielded cable as an extension cable and an RS-422A compatible line receiver for the receiving circuit.)