Koyo®

Incremental Encoder

Series TRD-GN

Operation Manual

Thank you for purchasing this series TRD-GN Incremental Encoders. Please read this Operation Manual carefully before applying this product.

PLEASE KEEP THIS MANUAL IN A SAFE PLACE!

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KEW-M8175B-E

■ Safety Consideration

⚠Warning	This indicates contents which can cause large accidents leading to loss of life or severe injury when the indication is disregarded and wrong handling is executed.
⚠Caution	This indicates contents which can cause injury or material damage when the indication is disregarded and wrong handling is executed.

Explanation of the pictograms

⃠ This symbol indicates a general prohibition.

! This symbol indicates a compulsory item or an instruction.

[Operating environment and conditions]

⚠Warning

⃠ Do not use in a combustible or explosive atmosphere.
Otherwise personal injury or fire may be caused.

⃠ Do not use this product for applications related to human safety.
Use is assumed in an application where an accident or incorrect use will not immediately cause danger to humans.

[Operating environment and conditions]

⚠Caution

! Use and store the equipment within the scope of the environment (vibrations, impact, temperature, humidity, etc.) specified in the specifications.
Otherwise fire or product damage may be caused.

! Understand the product first before use it.

[Installation and wiring]

⚠Warning

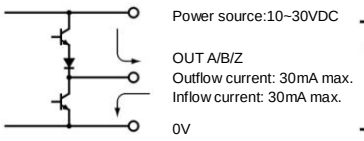
! Use only with the power supply voltage listed in the specifications.
Otherwise fire, electric shock, or accidents may be caused.

! Use only with the wiring and layout specified in the specifications.
Otherwise fire, electric shock, or accidents may be caused.

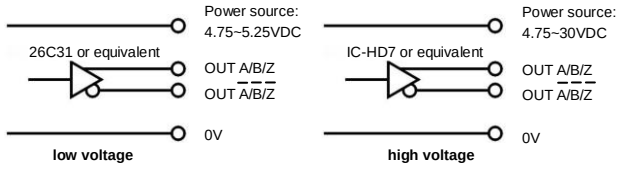
! Do not apply any kind of stress to the wires.
Otherwise electric shock or fire may be caused.

■ Output circuit

● **Totem-pole Output**

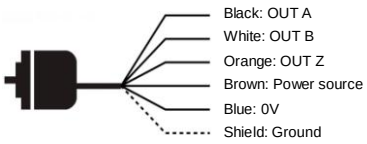


● **Line driver Output**



■ Connection

● **Totem-pole Output**



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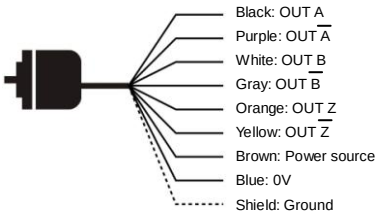


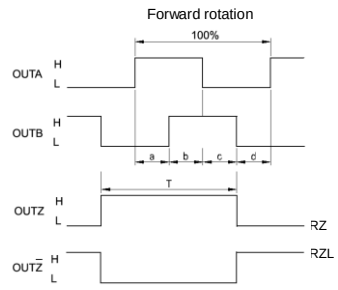
■ Composition of model number

TRD – GN 1000 – RZ V H W L

- Series
- Resolution (Pulse)
  1000, 1024, 2000, 2048, 4096, 5000, 8192, 10000,
- Signal type
  RZ: Two-phase with home position
- Output type
  Blank: Totem-pole
  V: Line driver
- Line driver power supply voltage
  Blank: 5±0.25VDC
  H: 4.75~30VDC
- Connection
  Blank: General
  W: Dust and splash proofed
- Home position reverse operation symbol
  Blank: home position normal operation type
  L: home position reverse operation type

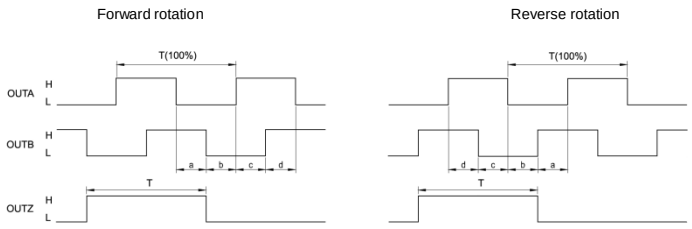
■ Output signal timing chart

● **Totem-pole Output**



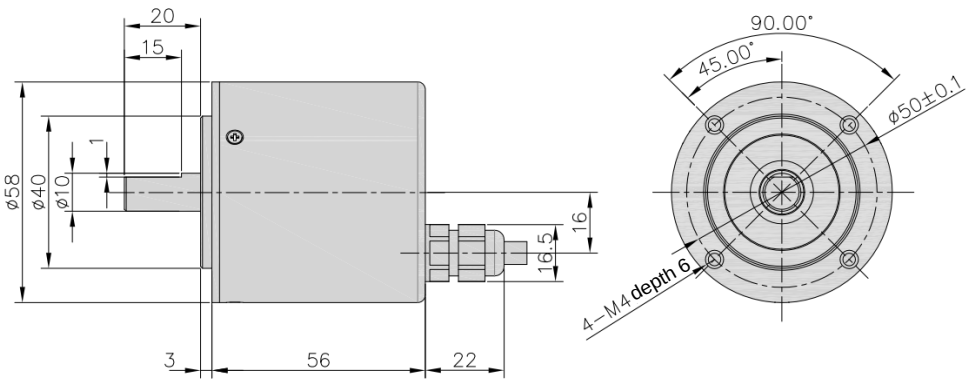
Forward rotation means clockwise revolution viewed from the shaft.
12.5%≤a,b,c,d≤37.5%, 50%≤T≤150%

● **Line Drive Output**



Forward rotation means clockwise revolution viewed from the shaft.
12.5%≤a,b,c,d≤37.5%, 50%≤T≤150%

■ External dimensions



■ Mechanical specifications

Starting torque（＋20℃）		General：≤0.01N・m
		Dust and splash proofed：≤0.04N・m
Shaft moment of inertia		5.7×10⁻⁶ kg・m²
Allowable shaft load	Radial	100N
	Axial	50N
Max. allowable rotation speed		5000rpm
Service life of bearing		1.2×10⁹ revolutions (calculated value at the maximum load)
Cable	Material	Oil-proofed PVC (with shielded cable)
	External diameter	Approx.6.0mm
	Length	2m
	Nominal cross-sectional area	Totem-pole output(5-core)：0.3mm²
		Line driver output(8-core twisted pair)：0.2mm²
Weight (without cable)		General：approx.313g
		Dust and splash proofed：approx.320g

■ Environmental requirements

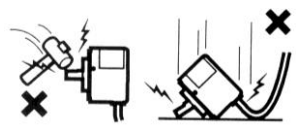
Ambient temperature	Operation temperature: -10 ～ +70℃
	Storage temperature: -25 ～ +85℃
Ambient humidity	35～85%RH (without condensation)
Withstand voltage	AC500V 1minute *Note 1
Insulation resistance	≥50MΩ (Excluding shield between power supply, signal wire and case.)
Vibration resistance	Durable for 1h along 3 axes at 10 to 55Hz with 0.75mm amplitude
Shock resistance	11ms with 490m/s² applied 3 times 3 axes, total 18 times
Protection construction	General：IP50 dust and splash proofed：IP65

Note1: Shield wire is connected to the encoder body. The enclosure is connected with 0V wire through a 630V 0.01μF capacitance.

■ Electrical specifications

Output type		Totem-pole output	Line driver output	
Power supply	Power supply voltage	RZ：10~30VDC	RZV：4.75~5.25VDC	RZVH：4.75~30VDC
	Allowable ripple	≤3%rms		
	Current consumption	≤100mA (without load)		
Signal format		Two-phase A and B＋Phase Z		
Max. response frequency		100kHz	200kHz	
Electric Max. allowable speed		(Maximum response frequency/Pulse)×60 (The encoder can not respond to revolution faster than the electric maximum allowable speed.)		
Duty ratio		50%±25%		
Phase Shift		25%±12.5%		
Index signal width		100%±50%		
Output	Rise and Fall time	2μs Max. (Cable length: 2m, output current: 20mA (Resistance load))		
	Output type	Totem-pole output	Line driver output (26C31 or equivalent)	Line driver output (IC-HD7 or equivalent)
	Output voltage H-level voltage	≥(Power source voltage－4V)	≥2.5V (output current: 20mA (resistance load))	
	Output voltage L-level voltage	≤2VDC	≤0.5VDC (output current: 20mA (resistance load))	
	Output current	≤30mA		

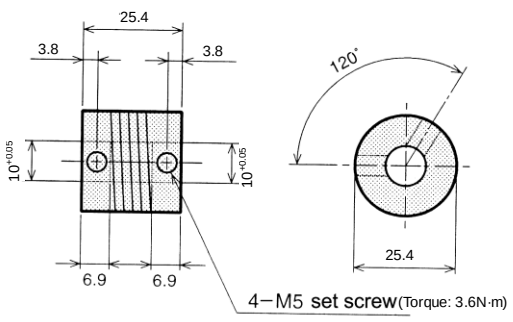
■ Cautions for use



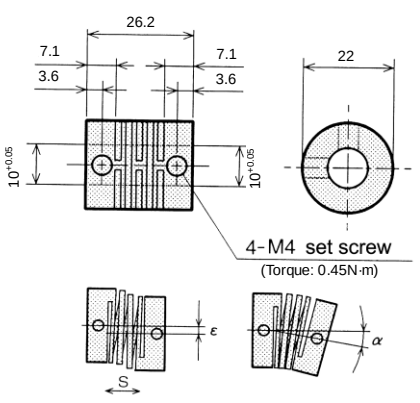
- **Do not wire the cable in parallel with other power lines and do not share a duct with other cables.**
- **Use capacitors or surge absorption elements to remove the sparks caused by relays and switches in the control panel as far as possible.**
- **Be sure to connect all wires properly, as wrong wiring can damage the internal circuitry.**
- **Erroneous pulses may be caused at the time of power ON and power OFF. After power ON, wait for at least 0.5 sec before use.**
- **Use a specified coupling for connecting the encoder shaft and the shaft of a machine to be controlled. Do not squeeze the shaft into the coupling.**
- **The service life of the bearing is largely affected by the amount of load to the shaft. Try to reduce the load as much as possible.**
- **Do not disassemble the product. Do not expose the product for a long time to water, even if it is a dust-resistant, jet-proof type. Wipe off any water getting onto the product.**
- **As the rotary encoder is composed of precision parts, its function will be impaired when it is subjected to shocks. Use sufficient care for handling and mounting.**

■ Options

RU－100



GJ－10



Type No.	Material	α	ε	s
RU－100	Aluminum alloy（7075）	5° MAX	0.25mmMAX	0.25mmMAX
GJ－10	Glass-fiber reinforced polyacetal resin	5° MAX	0.5mmMAX	0.12mmMAX