

# Koyo

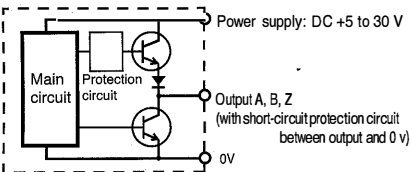
## Incremental Encoder Series TRD-N

### Operation Manual

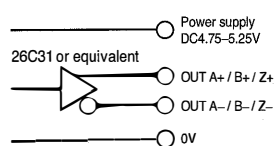
Thank you for purchasing Series TRD-N Incremental Encoder. Please read this Operation Manual carefully before applying this product.  
KEEP THIS MANUAL IN A SAFE PLACE

#### Output circuit

● Totem pole output

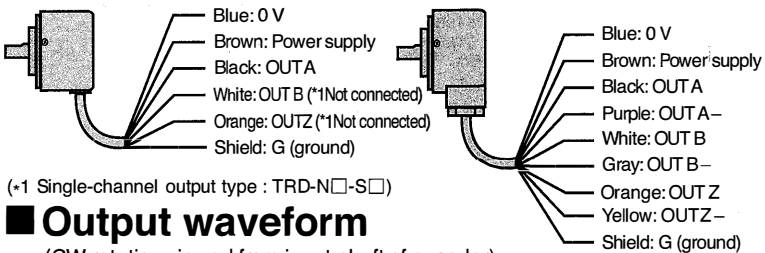


● Line driver output



#### Connection

To 2500P/R, a shield wire (GND) does not connect with an encoder body  
As for more than 2501P/R, a shield wire (GND) is connected to an encoder body

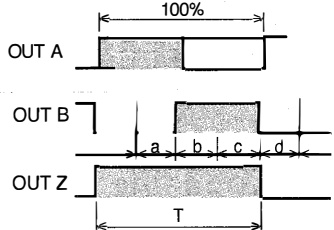


(+1 Single-channel output type : TRD-N□-S□)

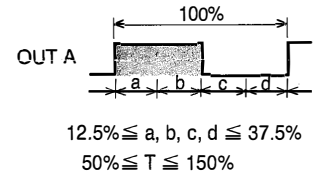
#### Output waveform

(CW rotation viewed from input-shaft of encoder)

● Quadrature output type with origin : TRD-N□-RZ□/RZV□



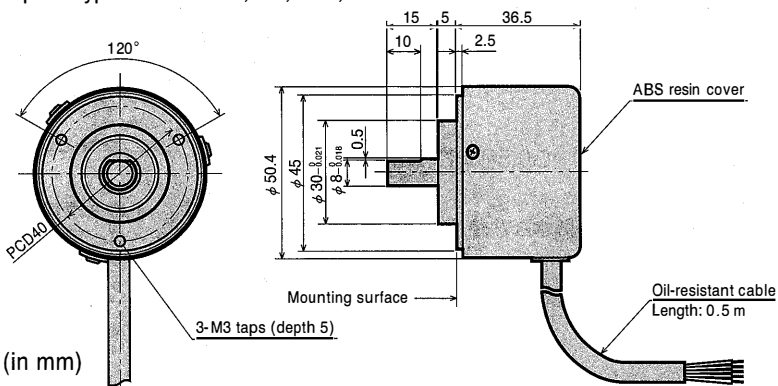
● Single-channel output type : TRD-N□-S□



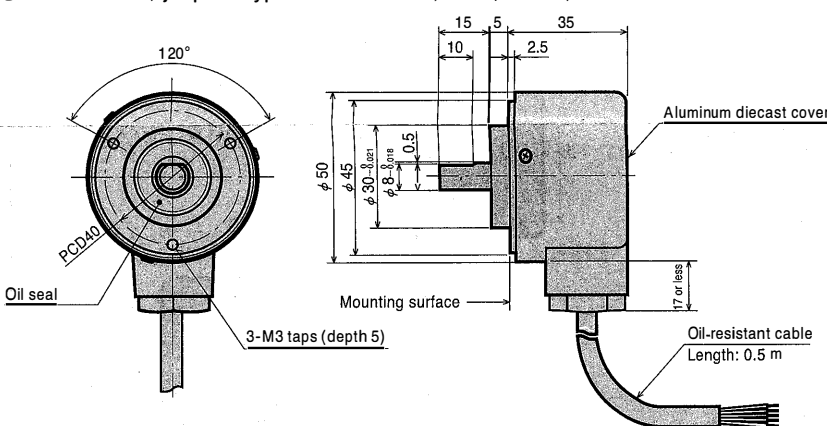
OUT Z is the opposite for RZL and RZVL type.

#### External dimensions

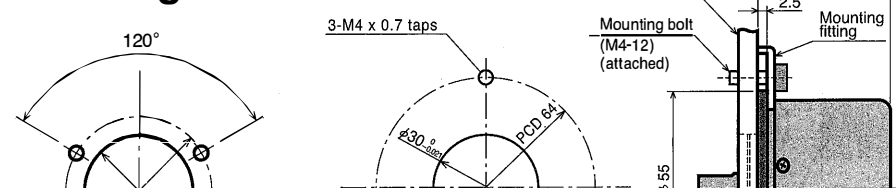
● Dust-proof type : TRD-N□-S, RZ, RZL, RZV



● Dust-resistant, jet-proof type : TRD-N□-SW, RZW, RZWL, RZVW



#### Mounting



#### 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.

#### [Use environment and conditions]



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.

#### [Use environment and conditions]



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.

#### [Ventilation and wiring]



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.

#### Electrical specifications

Type No.	TRD-N□-S□	TRD-N□-RZ□/RZVL	TRD-N□-RZV□	
Power supply	Operating voltage*2	DC 4.75-30V	DC 4.75-5.25V	
	Allowable ripple	3% rms Max.	←	
	Current consumption (no load)	40mA Max.	60mA Max.	
Output waveform	Signal format	Single-Channel output	Quadrature output with origin	
	Max. response frequency	100kHz	←	
	Max. response rotating speed*3 (Max. response frequency/Pulse)X60	←	100kHz(200kHz: above 2501P/R)	
	Duty rate	50 ± 25%	←	
	Origin signal width	←	100 ± 50%	
	Rising/falling time	3μs Max.*4	←	
Output	Output configuration	Totem pole output	Line driver output (26C31 or equivalent)	
	Output logic	Positive logic (active high)	←	
	Output current	Inflow: 30mA Max. Outflow: 10mA Max.	←	20mA Max.
	Output voltage	"H": [(Power supply voltage)-2.5V] Min. "L": 0.4V Max.	←	2.5V Min. 0.5V Max.
	Load power supply voltage	DC35V Max.	←	←

\*2 To be supplied by class II source.

\*3 When the operating speed is exceeded, the signal will not follow up electrically.

\*4 With a cable of 0.5m or less. Maximum load.

#### Environmental requirements

Ambient temperature	operation	-10 to 70°C	A power supply, signal line and a case interval. Shield line does not include it.
	store	-25 to 85°C	
Ambient humidity		35 to 85%RH (non-condensing)	
Withstand voltage		AC500V (50/60Hz) for 1min*7	
Insulation resistance		50MΩ Min.	
Vibration resistance		10 to 55Hz with 0.75mm amplitude*8	
Shock resistance		~500P/R (metal slit) 981m/s <sup>2</sup> 11ms*9	
		600P/R~ (glass slit) 490m/s <sup>2</sup> 11ms*9	
Protection construction		IP50 (Dust-proof type)	
		IP65 (Dust resistant, jet-proof type)	

\*7-RZV□ type is excluded for the capacitor earth.

\*7-RZ□ type with resolution above 2501P/R is excluded for the capacitor earth.

\*8 Durable for 1h along 3 axes

\*9 Applied 3 times 3 axes

It is an examination condition, and it is not a thing to guarantee for consecutive use.

#### 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 wire the lines 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.
- 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.

#### Mechanical specifications

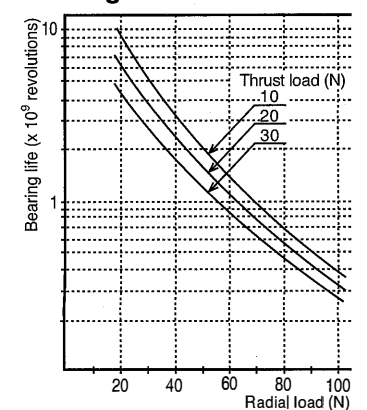
Starting torque	0.003N·m MAX.(+20°C) (0.02N·m for the dust-resistant, jet-proof type.)	
Shaft moment of inertia	2x10 <sup>-6</sup> kg·m <sup>2</sup>	
max. allowable shaft load	Radial: 50N Thrust: 30N	
max. allowable speed	5000rpm (for the dust-resistant, jet-proof type: 3000rpm continuously and 5000rpm momentarily.)	
Cable	External diameter	6.0mm
	Material	Oil-resistant shielded cable*5
	Nominal core cross section	0.3mm <sup>2</sup> (Line driver: 0.14mm <sup>2</sup> )
weight*6	Approx. 150g (Approx.200g for the dust-resistant, jet-proof type.)	

\*5 TRD-N□-S□/RZ□: 5 core oil-resistant shielded cable

\*5 TRD-N□-RZV□: 8 core oil-resistant shielded cable

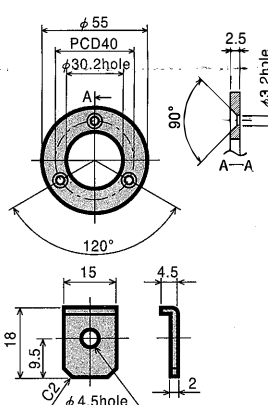
\*6 With 0.5m cable.

#### Bearing life

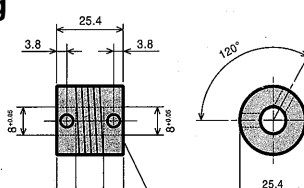


#### Options

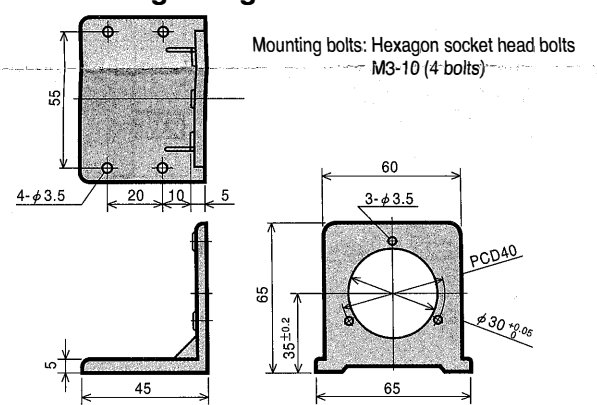
##### Flange for servo mounting



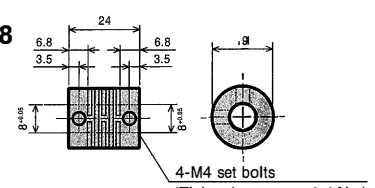
##### Coupling JU-100



##### Mounting fitting JT-035



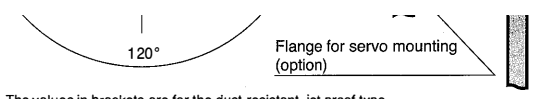
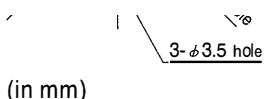
##### GJ-8



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The values in brackets are for the dust-resistant, jet-proof type.

JU-100	Aluminum alloy (A705)	5° MAX	0.25mm MAX	0.12mm MAX
GJ-8	Glass-fiber reinforced polyacetal resin	5° MAX	0.5mm MAX	0.12mm MAX

ES-M7035 00MC