Koyo®

Incremental Encoder

TRD-2T/2TH

Operation Manual

Thank you for purchasing series TRD-2T and TRD-2TH Incremental Encoder.Please read this Operation Manual carefully before applying this product.

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KEW-M8162C-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 mat erial 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**]

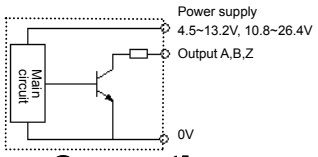
⚠ **Caution**
❗ Use and store the equipment within the scope of the environment(vibrations,impact,temperature,humidity,etc.) specified in the specifications. Otherwise fire or product damage may be caused.
❗ Understand the product first before use it.

[**Installation and wiring**]

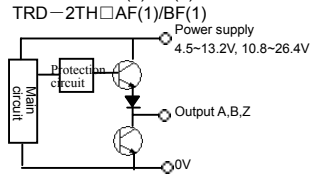
⚠ **Warning**
❗ Use only with the power supply voltage listed in the specifications. Otherwise fire,electric shock,or accidents may be caused.
❗ Use only with the wiring and layout specified in the specifications. Otherwise fire,electric shock,or accidents may be caused.
❗ Do not apply any kind of stress to the wires. Otherwise electric shock or fire may be caused.

■ Output circuit

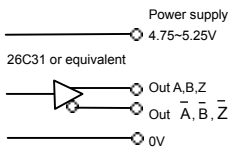
Open Collector Output
TRD－2T□A(1) /B(1)
TRD－2TH□A(1)/B(1)



Totem-pole output
TRD－2T□AF(1)/BF(1)
TRD－2TH□AF(1)/BF(1)



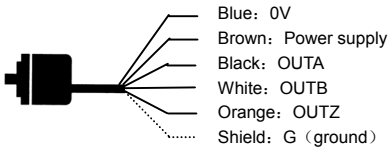
Line driver Output
TRD－2T□V(1)
TRD－2TH□V(1)



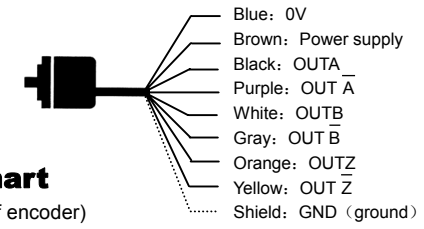
■ Connection

The shield wire（GND）is not connected to the encoder body.

- TRD－2T□A(1)/B(1)/AF(1)/BF(1)
- TRD－2 TH□A(1)/B(1)/AF(1)/BF(1)



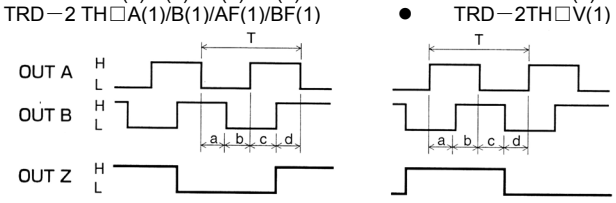
- TRD－2T□V(1)
- TRD－2TH□V(1)



■ Output signal timing chart

（CW rotation viewed from input-shaft of encoder）

- TRD－2T□A(1)/B(1)/AF(1)/BF(1)
- TRD－2 TH□A(1)/B(1)/AF(1)/BF(1)



- TRD－2T□V(1)
- TRD－2TH□V(1)

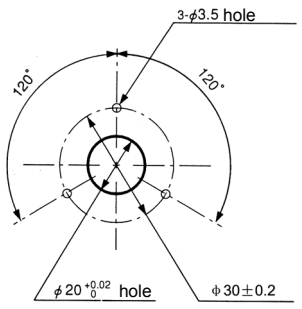
a,b,c,d=（25±12.5%）T

■ Electrial specifications

Type No.			TRD－2T□A/B	TRD－2T□AF/BF	
			TRD－2TH□A/B	TRD－2TH□AF/BF	TRD－2T□V /TRD－2TH□V
Power supply	Operating voltage		A: DC4.75V～13.2V		DC4.75V～5.25V
			B: DC10.8V～26.4V		
	Allowable ripple		≤3%rms		
	Current consumption		≤50mA		
Output waveform	Signal format		Quadrature output		
	Max. response frequency		200kHz		
	Operating speed		(Maximum response frequency/Pulse)×60		
	Symmentry		50±25%		
	Quadrature phasing		25±12.5%		
	Index signal width		100±50%		
Output	Rising/falling time		≤1μs（with a cable of 1m）	≤3μs（cable length≤0．5m）	—
	Output configuration		NPN open collector	Totem-pole output	Line driver(26C31 or equivalent)
	Output logic		Negative logic (active low)	—	Positive logic(active high)
	Output current	Inflow	≤30mA	≤30mA	—
		Outflow	—	≤10mA	—
	Output voltage	“H”	—	≥[(Load power voltage)－3V]	≥2.5V.
		“L”	≤0.4V	≤0.4V	≤0.5V.
	Output standard	TTL5V	—	10TTL	—
	Load power supply voltage		≤DC30V	≤DC30V	—
	Short-circuit protection		Between output and power supply		—

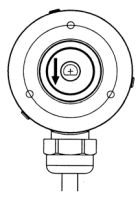
■ Mounting

TRD－2T□A/B/V
TRD－2T□AF/BF



■ Setting index position

TRD－2T□A/B/V
TRD－2T□AF/BF



Adjustment is made by the shaft notch (facing down).

■ Mechanical specifications

Starting torque		Max. 0.01N・m（＋20℃）
Shaft moment of intertia		0.3×10^{-6}kg・m^2
Max. allowable shaft load	Radial	30N
	Thrust	20N
Max.allowable speed		5000rpm
Cable	Material	Oil-resistant PVC *1
	Nominal core cross section	0.14mm^2
	External diameter	Φ5mm
Weight		Approx. 122g (with 0.5m cable)

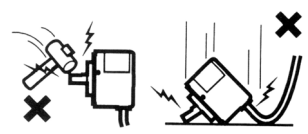
*1 2T□A/B、2TH□A/B，2T□AF/BF、2TH□AF/BF：5-core shielded cable（AWG26）
2T□V、2TH□V ：8-core shidlded cable（AWG26）

■ Environmental requirements

Ambient temperature	Operation	－10～＋70℃
	Store	－25～＋85℃
Ambient humidity		35～85%RH（non-condensing）
Withstand voltage		AC500V（50/60Hz）for 1 min.
Insulation resistance		50MΩ min.
Vibration resistance		10～55Hz with 0.75mm amplitude*2
Shock resistance		11ms with 490m/s^2 *3
Protection construction		IP50:Dust proofed

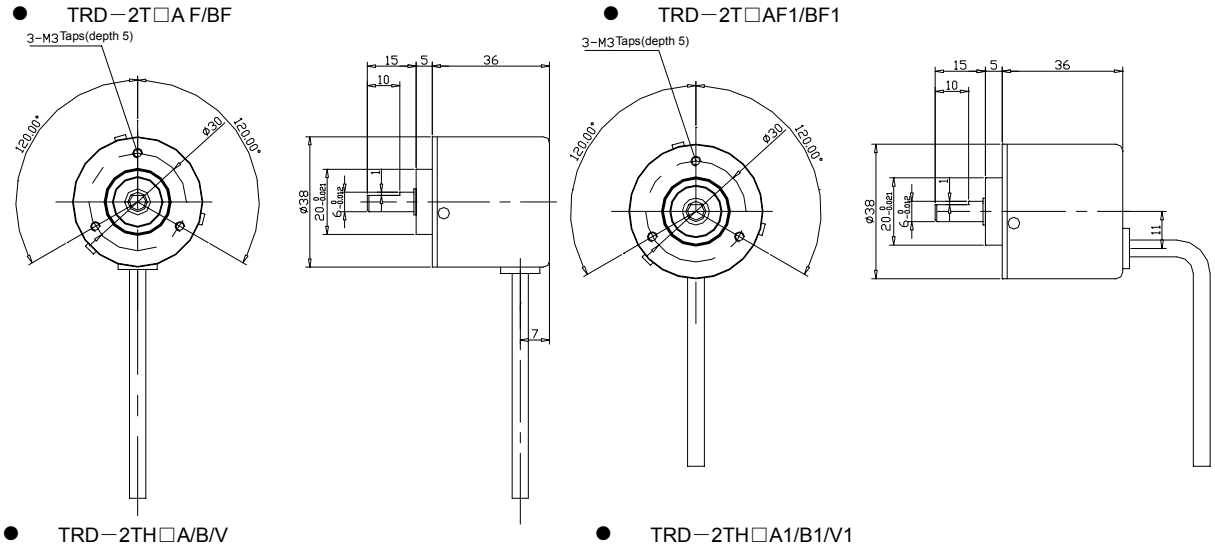
*2: Durable for 1h along 3 axes

*3: Applied 3 times 3 axes



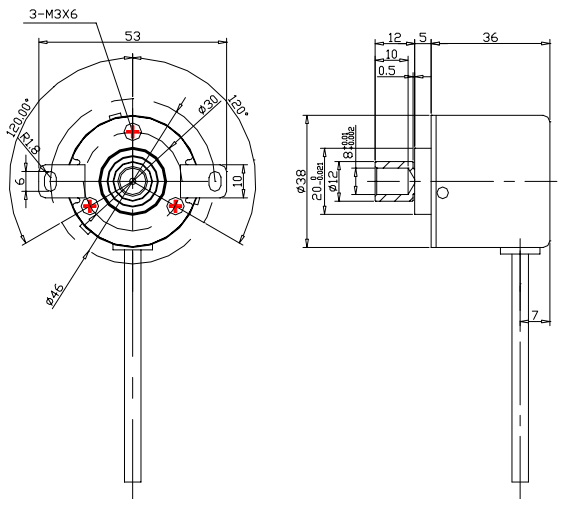
■ External dimensions

- TRD－2T□A /B /V
- TRD－2T□A F/BF

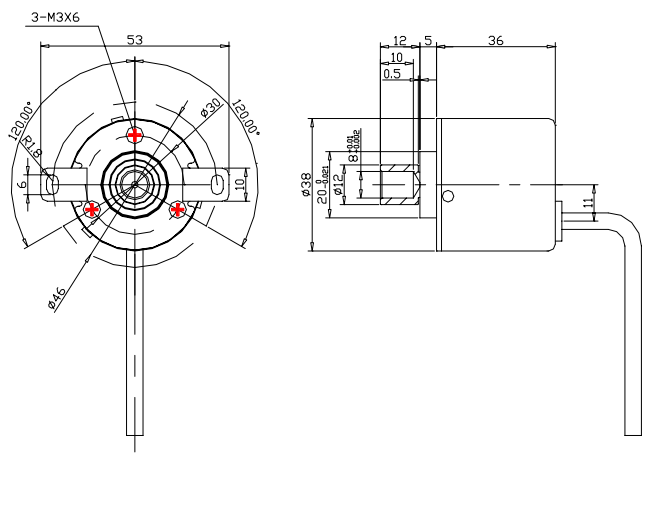


- TRD－2T□A1/B1/V1
- TRD－2T□AF1/BF1

- TRD－2TH□A/B/V
- TRD－2TH□AF/BF



- TRD－2TH□A1/B1/V1
- TRD－2TH□AF1/BF1



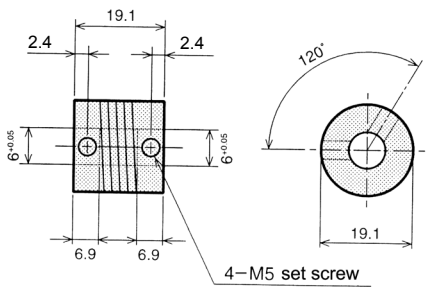
■ Cautions for use

- 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.
- Do not disassemble 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.

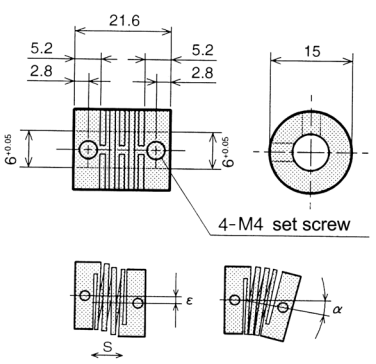
■ Options

- Coupling

RU－075



GJ－6



Type No.	Material	α	ε	s
RU－075	Aluminum alloy（7075）	5° MAX	0.25mmMAX	0.12mmMAX
GJ－6	Glass-fiber reinforced polyacetal resin	5° MAX	0.5mmMAX	0.12mmMAX