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-M8162G-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 or improper 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 (vibration,impact,temperature,humidity,etc.) ,which specified in the specifications. Otherwise fire or product damage may be caused.
❗	Understand the product first before use it.

[**Installation and wiring**]

⚠ Warning

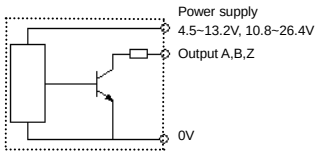
❗	Use only with the power supply voltage listed in the specifications. Otherwise fire,electric shock,or accidents may be caused.
❗	Use only with the wiring and layout specified in the specifications. Otherwise fire, electric shock,or accidents may be caused.
❗	Do not apply any kind of stress to the wires.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

■ Output circuit

Open collector output

TRD－2T□A /B

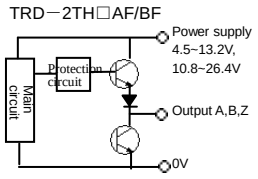
TRD－2TH□A/B



Totem-pole output

TRD－2T□AF/BF

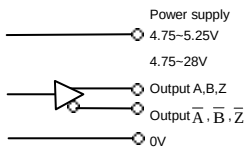
TRD－2TH□AF/BF



Line driver output

TRD－2T□V/V1/VH

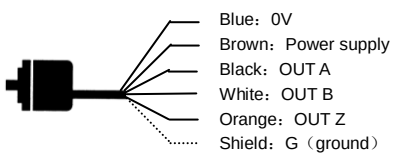
TRD－2TH□V/V1/VH



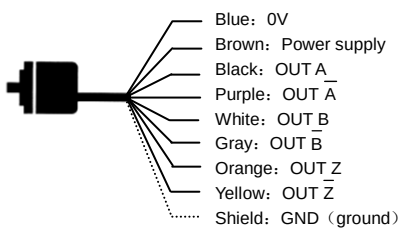
■ Connection

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

- TRD－2T□A/B/AF/BF
- TRD－2 TH□A/B/AF/BF



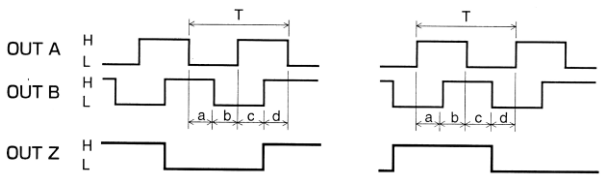
- TRD－2T□V/V1/VH
- TRD－2TH□V/V1/VH



■ Output signal timing chart

（CW means clockwise rotation viewed from the shaft ）

- TRD－2T□A/B/AF/BF
- TRD－2 TH□A/B/AF/BF

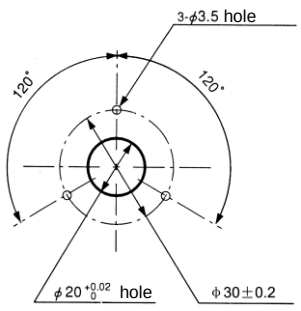


- TRD－2T□V/V1/VH
- TRD－2TH□V/V1/VH

a,b,c,d=(25±12.5%) T

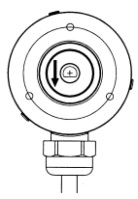
■ Mounting

- TRD－2T□A/B/AF/BF
- TRD－2T□V/V1/VH



■ Setting index position

- TRD－2T□A/B/AF/BF
- TRD－2T□V/V1/VH



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

■ Electrical specifications

Type No.			TRD－2T□A/B TRD－2TH□A/B	TRD－2T□AF/BF TRD－2TH□AF/BF	TRD－2T□V TRD－2TH□V	TRD－2T□V 1 TRD－2TH□V1	TRD－2T□V H TRD－2TH□VH
Power supply	Operating voltage		A/AF: DC4.5V～13.2V B/BF: DC10.8V～26.4V		DC4.75V～5.25V		DC4.75V～28V
	Allowable ripple		≤3%rms				
	Current consumption (no load)		≤50mA			≤90mA	
Output waveform	Signal format		Two-phase + home position output				
	Max. response frequency		200kHz				
	Operating speed		(Maximum response frequency/Pulse)×60				
	Duty Ratio		50±25%				
	Quadrature phasing		25±12.5%				
	Home position signal width		100±50%				
Output	Rising/falling time		≤1μs *1	≤3μs *1	–		
	Output configuration		NPN open collector	Totem-pole output	Line driver 26C31 equivalent	Line driver 26LS31 equivalent	Line driver OL7272 equivalent
	Output logic		Negative logic (active low)	–	Positive logic(active high)		
	Output current	Inflow	≤30mA	≤30mA	–		
		Outflow	–	≤10mA	–		
	Output voltage	"H"	–	≥[(LPV)－3V] *2	≥2.5V		≥[(LPV)－4V] *2
		"L"	≤0.4V	≤0.4V	≤0.5V		≤2V
	Load power supply voltage		≤DC30V	≤DC30V	–		
	Short-circuit protection		Between output and power supply		–		

*1 with a cable of 1m ； *2：LPV：Load power voltage

■ Mechanical specifications

Starting torque		Max. 0.01N・m（＋20℃）
Shaft moment of inertia		0.3×10^{-6} kg・m^2
Max. allowable shaft load	Radial	30N
	Thrust	20N
Max. allowable speed		5000rpm
Cable	Material	Oil-resistant PVC *3
	Nominal core cross section	$0.14mm^2$
	External diameter	Φ5mm
Weight		Approx. 160g (with 1m cable)

*3 2T□A/B/ AF/BF、2TH□A/B/AF/BF ： 5-core shielded cable（AWG26）

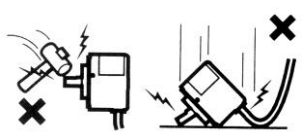
2T□V/V1/VH、 2TH□V/V1/VH ： 8-core shielded cable（AWG26）

■ 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*4
Shock resistance		11ms with 490m/s^2 *5
Protection construction		IP50:Dust proofed

*4: Durable for 1h along 3 axes

*5: Applied 3 times 3 axes

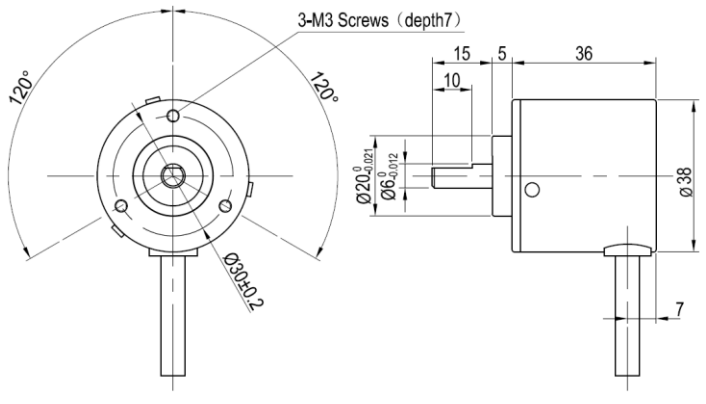


■ Cautions for use

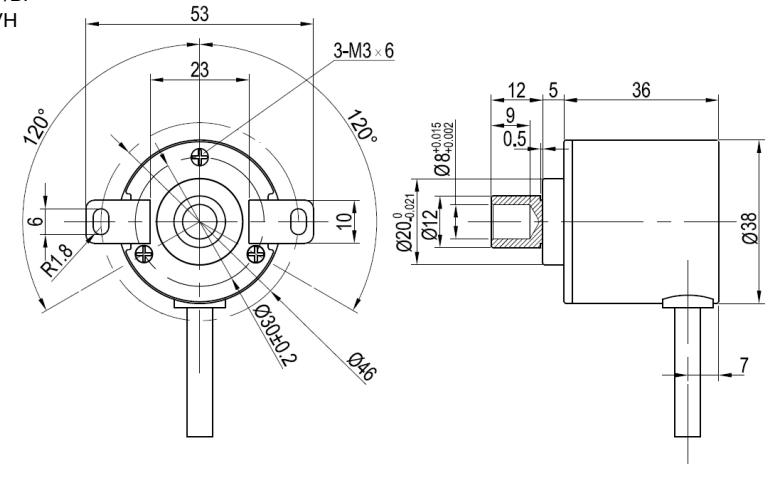
- Do not wire the cable in parallel with other power lines and do not share a duct with other cables.
- Use capacitors or surge absorption elements to remove the sparks caused by relays and switches in the control panel as far as possible.
- Be sure to connect all wires properly, as wrong wiring can 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.

■ External dimensions

- TRD－2T□A/B/AF/BF
- TRD－2T□V/V1/VH



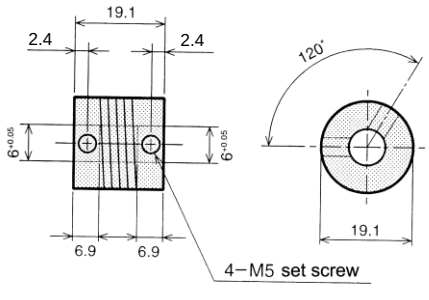
- TRD－2TH□A/B/AF/BF
- TRD－2TH□V/V1/VH



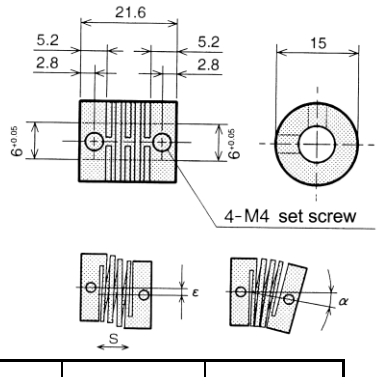
■ Options

- 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