

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.

KOYO ELECTRONICS (WUXI) CO.,LTD.

Addr: No.118 Lixi Road Wuxi, Jiangsu, P.R.China

Pc:214072

Tel: (0510)85167888

Fax: (0510)85161393

KEW-M8162E-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 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]

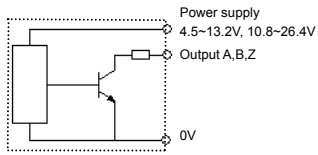
Caution	
	Use and store the equipment within the scope of the environment (vibration, impact, temperature, humidity, etc.), which specified in the specifications. Otherwise fire or product damage may be caused.
	Understand the product first before use it.

[Installation and wiring]

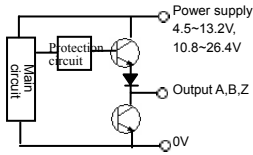
Warning	
	Use only with the power supply voltage listed in the specifications. Otherwise fire, electric shock, or accidents may be caused.
	Use only with the wiring and layout specified in the specifications. Otherwise fire, electric shock, or accidents may be caused.
	Do not apply any kind of stress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

■ Output circuit

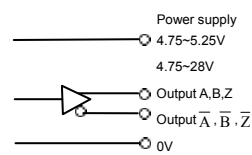
Open collector output
TRD-2T□A/B
TRD-2TH□A/B



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



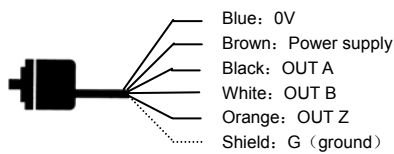
Line driver output
TRD-2T□V1/VH
TRD-2TH□V1/VH



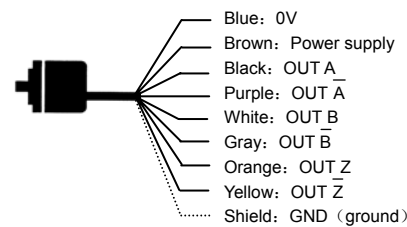
■ Connection

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

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



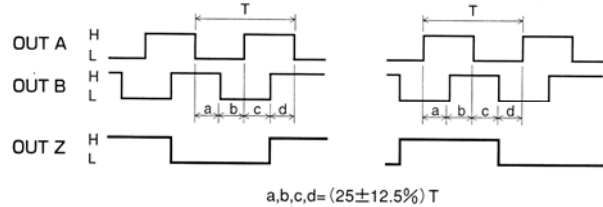
- TRD-2T□V1/VH
- TRD-2TH□V1/VH



■ Output signal timing chart

(CW means clockwise rotation viewed from the shaft)

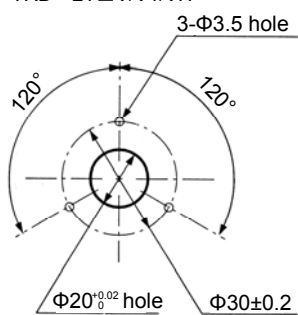
- TRD-2T□A/B/AF/BF
- TRD-2T□V1/VH
- TRD-2TH□A/B/AF/BF
- TRD-2TH□V1/VH



a, b, c, d = (25±12.5%) T

■ Mounting

- TRD-2T□A/B/AF/BF
- TRD-2T□V1/VH



■ Setting index position

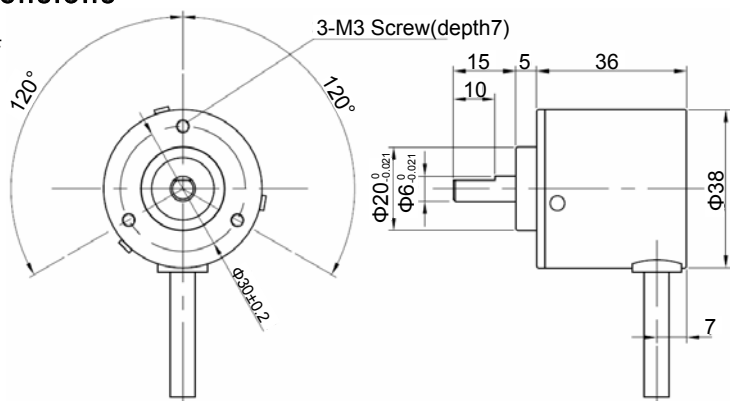
- TRD-2T□A/B/AF/BF
- TRD-2T□V1/VH



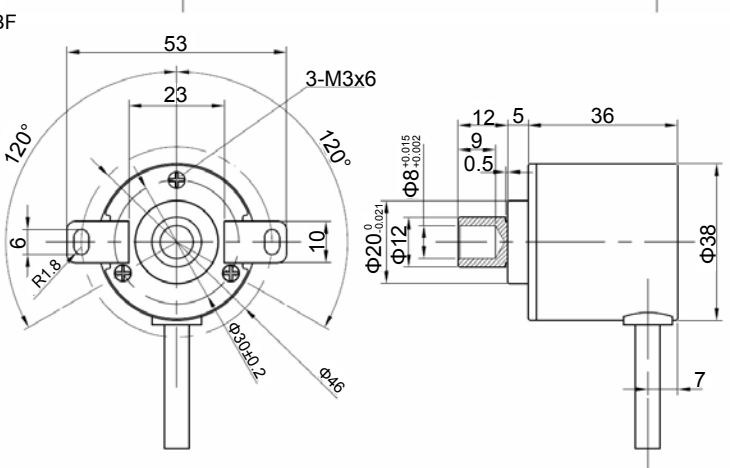
Adjustment is made by the shaft notch (facing down).

■ External dimensions

- TRD-2T□A/B/AF/BF
- TRD-2T□V1/VH



- TRD-2TH□A/B/AF/BF
- TRD-2TH□V1/VH



■ Electrical specifications

Type No.		TRD-2T□A/B	TRD-2T□AF/BF	TRD-2T□V	TRD-2T□V1	TRD-2T□VH	
		TRD-2TH□A/B	TRD-2TH□AF/BF	TRD-2TH□V	TRD-2TH□V1	TRD-2TH□VH	
Power supply	Operating voltage	A/AF: DC4.5V~13.2V		DC4.75V~5.25V		DC4.75V~28V	
	Allowable ripple	B/BF: DC10.8V~26.4V					
	Current consumption			≤3%rms		≤80mA	
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°C)	
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□V1/VH, 2TH□V1/VH : 8-core shielded cable (AWG26)

■ Environmental requirements

Ambient temperature	Operation	-10~+70°C
	Store	-25~+85°C
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

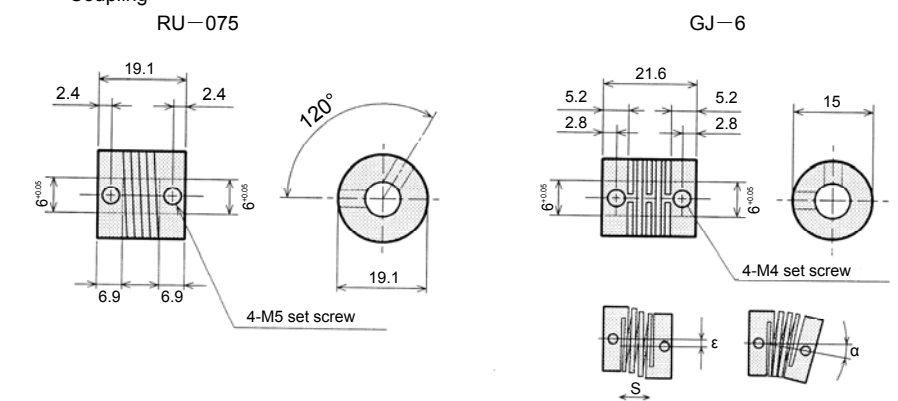
■ Cautions for use

- 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.



■ Options

- Coupling



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