

Koyo®

Servomotor Dedicated Encoder Series TRD-RV Operation Manual

Thank you for purchasing this series TRD-RV Servomotor Dedicated Encoders. Please read this Operation Manual carefully before applying this product.

PLEASE KEEP MANUAL IN A SAFE PLACE!

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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.

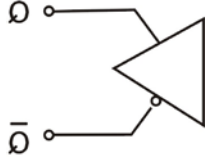
[Installation and wiring]

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

Line driver Output

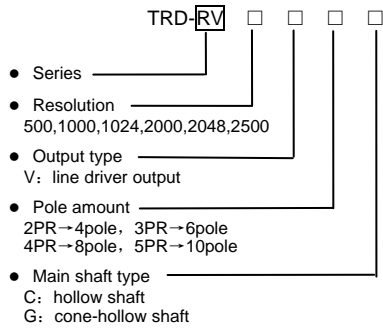


26C31 or equivalent

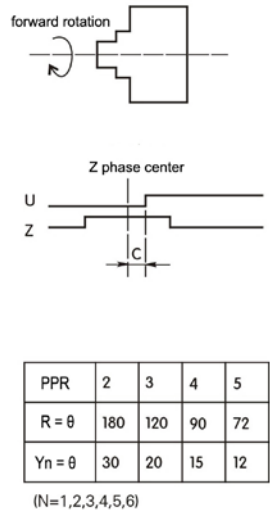
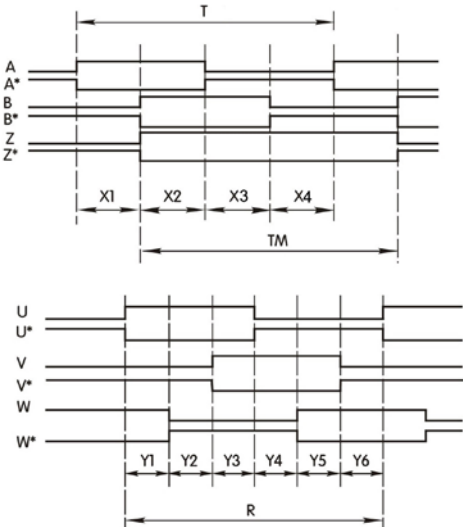
Connection

Pin number	Signal	Color of cable
1	0V	Blue/Red
2	5V	Red/Blue
3	A*	Green
4	A	Brown
5	B*	Blue
6	B	Orange
7	Z	Black
8	Z*	Yellow
9	U*	White/Brown
10	U	Brown/White
11	W*	White/Gray
12	W	Gray/White
13	V*	Red/Orange
14	V	Orange/Red
15	N.C	

Composition of model number



Output signal timing chart



Division Accuracy

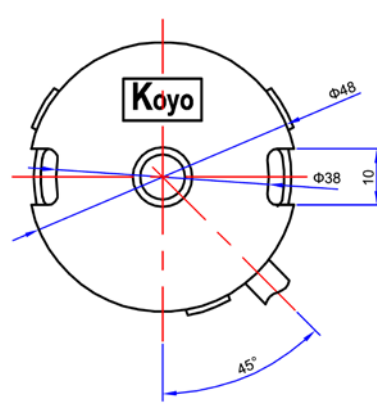
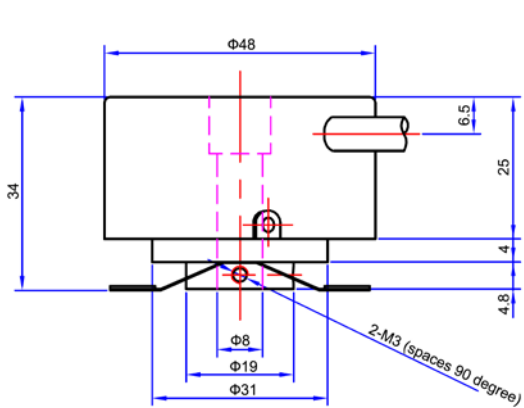
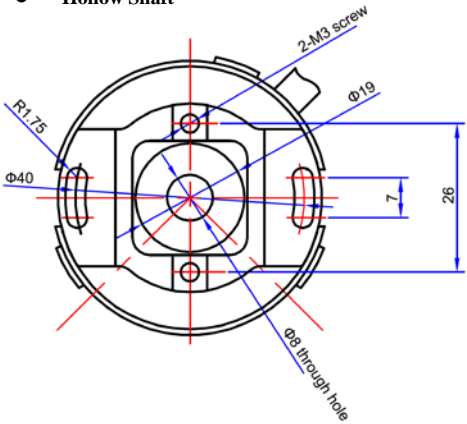
Symmetry(A, B)
 $X1+X2=0.5T \pm 0.1T$
 $X3+X4=0.5T \pm 0.1T$
 Phase shift(A, B)
 $Xn=0.25T \pm 0.1T$
 (n=1,2,3,4)
 Signal width of ch Z
 $TM=1.0T \pm 0.5T$
 Symmetry(U, V, W)
 $R = \theta \pm 1.0^\circ$ mechanical angle
 $Yn = \theta \pm 1.0^\circ$ mechanical angle
 $C = \pm 1.0^\circ$ mechanical angle
 $Y1+Y2+Y3=0.5R \pm 0.03R$
 $Y4+Y5+Y6=0.5R \pm 0.03R$
 $Yn=0.1666R \pm 0.03R$
 (n=1,2,3,4,5,6)

PPR	2	3	4	5
R = θ	180	120	90	72
Yn = θ	30	20	15	12

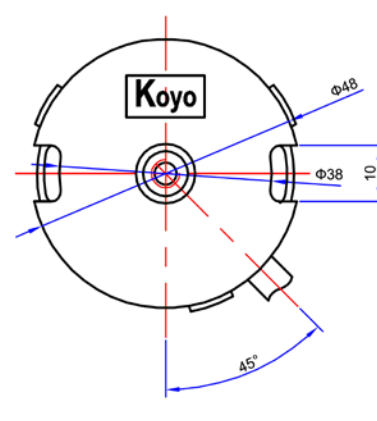
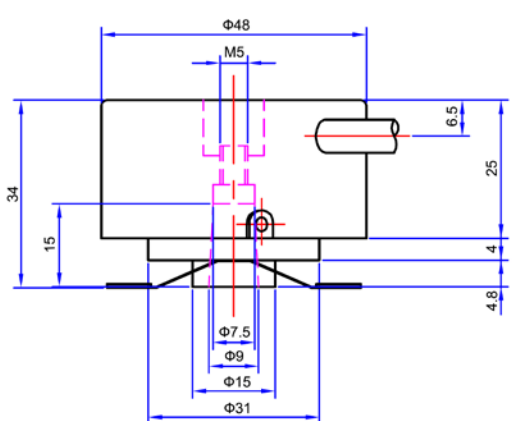
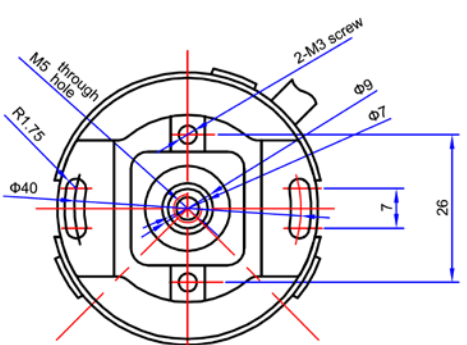
T=360°/N
 N= pulse / revolution

External dimensions (cable length:30cm)

Hollow Shaft



Cone-hollow Shaft



Mechanical specifications

Starting torque		Max. 0.01N·m (+20°C)
Shaft moment of inertia		30g·cm ²
Max. allowable shaft load	Radial	10N
	Thrust	10N
Max. allowable speed		7500rpm
Cable	Material	Oil-resistant PVC(with shielded cable)
	Nominal core cross section	0.089 mm ² AWG#28
	External diameter	Approx. 7.0 mm
Weight		Approx.82g(cable length 0.3m)

Environmental requirements

Ambient temperature	Operation temperature: -20~+100°C Storage temperature: -25~+120°C
Ambient humidity	35~90%RH (non-condensing)
Withstand voltage	AC500V 1minute
Insulation resistance	50MΩ min.
Vibration resistance	Durable for 1h along 3 axes at 10 to 2000Hz with 98m/s ² amplitudes
Shock resistance	10~15ms with 1960m/s ² applied 3 times 3 axes
Protection construction	IP40 (Prevent the solids larger than 1.0mm)

Electrical specifications

Type No.		TRD-RV
Power supply	Operating voltage	5±0.5V DC
	Allowable ripple	≤1%rms
	Current consumption	180mA Max. (without load)
Signal format		ABZ phase+UVW phase
Output signal		A, A*, B, B*, Z, Z*, U, U*, V, V*, W, W*
Max. response frequency		200kHz
Electric Max. allowable speed		(Maximum response frequency/Pulse)×60 (The encoder can not respond to revolution faster than the electric maximum allowable speed.)
Pulse rising/falling time		0.5μs Max.
Output	Output waveform	
	Output voltage	Rectangle wave
Output voltage	High-level voltage	≥2.3VDC
	Low-level voltage	≤0.5VDC
Output type		Line driver output (26C31 or equivalent)
ABZ output characteristic	Output code	Incremental
	Period wobble	≤0.1T
	Duty ratio	50%±10%
	Phase shift	25%±10%
	Signal width at home position	100%±50%
UVW output characteristic	magnetic pole amount	2P, 3P, 4P, 5P
	Flutter	≤0.03R
	Period (4P)	90° ± 1.0°
	Phase Shift (4P)	15° ± 1.0°
	Output position "C"(The rising edge of channel U is aligned to the center of index channel Z)	± 1.0° (mechanical angle)

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.
- 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.

