

Koyo®

Incremental Encoder Series TRD-J Operation Manual

Thank you for purchasing this series TRD-MX Incremental Encoder. Please read this Operation Manual carefully before applying this product.
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

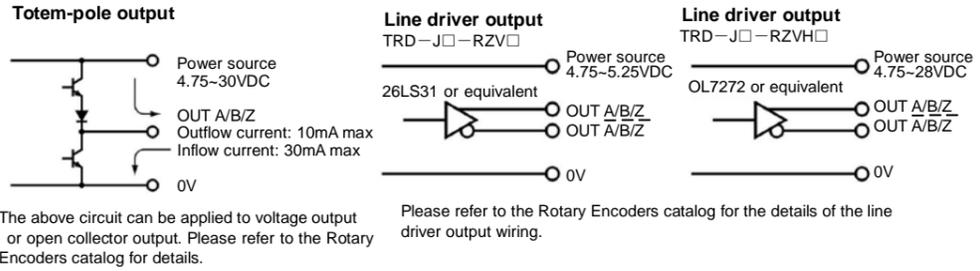
- Use only with the power supply voltage listed in the specifications. Otherwise fire, electric shock, or accidents may be caused.
- Use only with the wiring and layout specified in the specifications. Otherwise fire, electric shock, or accidents may be caused.
- Do not apply any kind of stress to the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

Electrical specifications

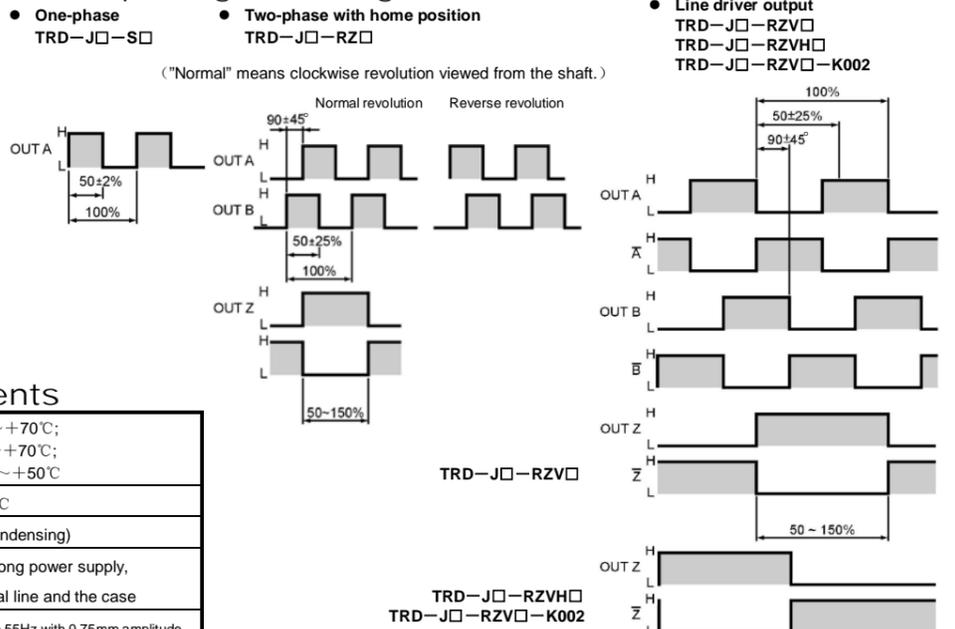
Model ^{*1}	TRD-J□-S□	TRD-J□-RZ□	TRD-J□-RZV□	TRD-J□-RZVH□		
Power supply	Operating voltage	DC 4.75V~30V	DC 4.75V~30V	DC 4.75V~5.25V	DC 10V~28V	
	Allowable ripple	3%rms Max.	3%rms Max.	3%rms Max.	3%rms Max.	
	Current consumption(no load)	40mA Max.	60mA Max.	130mA Max.	50mA Max.	
Output waveform	Output signal type	One-phase	Two-phase+ home position	Two-phase+ home position	Two-phase+ home position	
	Max. response frequency ^{*2}	50kHz	100kHz	50kHz	100kHz	
	Operating speed	(Maximum response frequency/Pulse)×60		(Maximum response frequency/Pulse)×60		
	Duty cycle	50±25%(square wave)		50±25%(square wave)		
Output	Signal width at home position	—	50~150%	50~150%	50~150%	
	Rising/falling time	3μs (Max. Cable 50 cm) max.		2μs (Max. Cable 50 cm) max.		
	Output Type	Totem-pole	Totem-pole	5V Line driver output ^{*3}	Wide Voltage Line driver output ^{*4}	
	Output current	Outflow "H"	10mA Max.	10mA Max.	20mA Max.	20mA Max.
		Inflow "L"	30mA Max.	30mA Max.	20mA Max.	20mA Max.
	Output voltage	"H"	[(Load power voltage)-2.5V] min.		2.5V Min.	2.5V Min.
		"L"	0.4V Max.	0.4V Max.	0.5V Max.	0.5V Max.
TTL 5V		10TTL	10TTL	—	—	
Load power supply voltage	30VDC Max.	30VDC Max.	—	28VDC Max.		

*1 TRD-J□-RZV□-K002 is not described in this specification table. The specifications of TRD-J□-RZV□-K002 is the same as TRD-J□-RZV□ except: 1) operating voltage is DC10V~30V. 2) Line driver output is equivalent to 26C31. 3) Max response frequency is 100KHz.
*2 The maximum response frequency depends on the resolution of the encoder, please refer to the Rotary Encoders catalog for details.
*3 Equivalent to 26LS31 (Output signal is compatible to TTL). *4 Equivalent to OL7272.

Output circuit



Output signal timing chart



Mechanical specifications

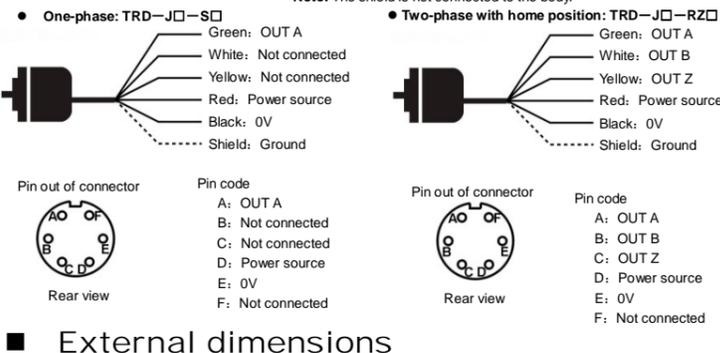
Starting torque	Max. 0.003N·m (+20°C) (Dust and splash proofed: Min. 0.02N·m)
Shaft moment of inertia	$2 \times 10^{-6} \text{ kg} \cdot \text{m}^2$
Max. allowable shaft load	Radial : 50N Thrust : 30N
Max. allowable speed ^{*1}	5000rpm(Dust and splash proofed: 3000rpm)
Service life of bearing	5×10^9 revolution (calculated value at the maximum load)
Cable	External diameter $\Phi 5\text{mm}$ (W type: $\Phi 6\text{mm}$) 5-wire oil-proof shielded vinyl chloride cable Nominal section area of core: 0.3mm^2 (Line driver output: 8 cores, 0.14mm^2)
Weight	220 g (with 0.5m cable) max.

*1 The highest speed that can support mechanical integrity of the encoder.

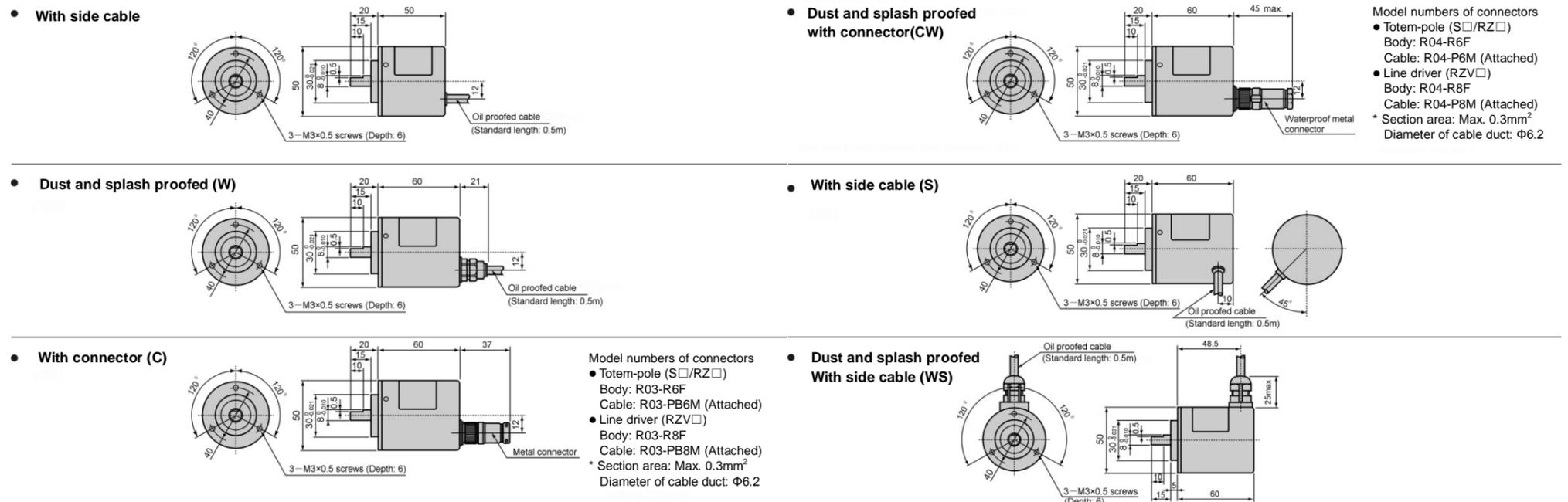
Environmental requirements

Ambient temperature	RD-J□-RZV□-K002: -10~+70°C; RD-J□-RZVH□: -10~+70°C; others: -10~+50°C
Storage temperature	-25~+85°C
Ambient humidity	35~85%RH (non-condensing)
Withstand voltage	500VAC for one minute
Insulation resistance	50MΩ min.
Vibration resistance	Durable for one hour along three axes at 10 to 55Hz with 0.75mm amplitude
Shock resistance	11ms with 490m/s^2 applied three times along three axes
Protection construction	Dust proofed: IP50; Dust and splash proofed: IP65

Connection



External dimensions



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.