# **JTEKT**

## Incremental Encoder Series TRD-J

# **Operation Manual**

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

KEEP MANUAL IN A SAFE PLACE.

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JELWX-M8164G-E

### Safety Consideration

This indicates contents which can cause large accidents Warning leading to loss of life or severe injury when the indication is disregarded and wrong handling is executed.

This indicates contents which can cause injury or !\Caution 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.

OUTA

100%

#### [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□-RZVH□	TRD-J□-RZV□
Power supply	Operating voltage		DC 4.75V~30V	DC 4.75V~30V	DC 10V~28V	DC 4.75V∼5.25V
	Allowable ripple		3%rms Max.	3%rms Max.	3%rms Max.	3%rms Max.
	Current consumption(no load)		40mA Max.	60mA Max.	50mA Max.	130mA Max.
Output waveform	Output signal type		One-phase	Two-phase+ home position	Two-phase+	Two-phase+ home position
	Max. response frequency*2		50kHz	100kHz	100kHz	50kHz
	Operating speed		(Maximum response frequency/Pulse) × 60		(Maximum response frequency/Pulse)×60	
	Duty cycle		50±25%(square wave)		50±25%(square wave)	
	Signal width at home position		_	50~150%	50~150%	50~150%
Output	Rising/falling time		3µs (Max. Cable 50 cm) max.		2µs (Max. Cable 50 cm) max.	
	Output Type		Totem-pole	Totem-pole	Wide Voltage Line driver output <sup>*3</sup>	5V Line driver output <sup>*4</sup>
	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.			
		"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	<del>-</del> .

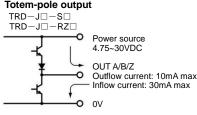
- 1) operating voltage is DC10V~30V. 2) Line driver output is equivalent to 26C31. 3) Max response frequency is 100KHz. The maximum response frequency depends on the resolution of the encoder, please refer to the Rotary Encoders catalog for details

\*3 Equivalent to OL7272. \*4 Equivalent to 26LS31 (Output signal is compatible to TTL).

Mechanical specifications				
Starting torque	Max. 0.003N • m (+20°C) (Dust and splash proofed: Min. 0.02N • m			
Shaft moment of intertia	$2\times10^{-6}\mathrm{kg}\bulletm^2$			
Max. allowable shaft	Radial : 50N			
load	Thrust: 30N			
Max. allowable speed*1	5000rpm(Dust and splash proofed: 3000rpm)			
Service life of bearing	$5 \times 10^9$ revolution (calculated value at the maximum load)			
Cable	External diameter Ф 5mm (W type: Ф 6mm) 5-wire oil-proof shielded vinyl chloride cable Nominal section area of core: 0.3mm <sup>2</sup> (Line driver output:Ф 6mm, 8 cores, 0.14mm <sup>2</sup> )			

220 g (with 0.5m cable) max

## Output circuit Totem-pole output



The above circuit can be applied to voltage output or open collector output. Please refer to the Rotary Encoders catalog for details.

#### Line driver output Line driver output $TRD-J\Box-RZV\Box$ $TRD-J\Box-RZVH\Box$ $TRD-J\Box-RZV\Box-K002$ Power source (Note\*) Power source 4.75~28VDC OL7272 or equivalent (Note\*) OUT A/B/Z OUT <u>A/B/Z</u> OUT A/B/Z OUT A/B/Z **O** 0V

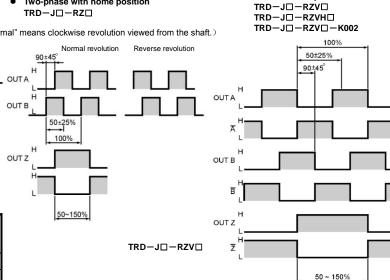
Note\*: For details, please see the electrical specifications table. Please refer to the Rotary Encoders catalog for the details of the line driver output wiring.

Line driver output

## Output signal timing chart

• Two-phase with home position One-phase  $TRD-J\Box-S\Box$ TRD-JU-RZU

("Normal" means clockwise revolution viewed from the shaft.)



OUT Z

#### **Environmental requirements** TRD-J□-RZV□-K002: -10~+70°C; $\mathsf{TRD} \!-\! \mathsf{J} \square \!-\! \mathsf{RZVH} \square \colon -10 \!\!\sim\! +70 \,\!^{\circ}\!\!\mathsf{C};$ Ambient temperature others: $-10{\sim}+50{^\circ}{\rm C}$ -25~+85℃ Storage temperature 35~85%RH (non-condensing) Ambient humidity Withstand voltage 500VAC for one minute Among power supply, Insulation resistance $50M\Omega$ min. signal line and the case Durable for one hour along three axes at 10 to 55Hz with 0.75mm amplitude Vibration resistance 11ms with 490m/s<sup>2</sup> applied three times along three axes Shock resistance Protection construction Dust proofed: IP50; Dust and splash proofed: IP65

● Line driver output: TRD-J□-RZV□

TRD-J - RZV - K002

Blue: OUT A

White: OUT B White/Black: OUT B

Yellow: OUT Z

Black: 0V

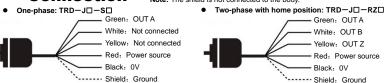
Yellow/Black: OUT Z

Red: Power source

Blue/Black: OUTA

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

#### Connection Note: The shield is not connected to the body



Pin code

- A: OUT A
- C: Not connected D: Power source F: Not connected
- °₽

Pin code A: OUT A B: OUT B C: OUT Z

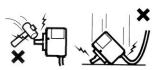
D: Power source

F: Not connected

(Standard length: 0.5m)

---- Shield Ground Pin code
A: OUTA
B: OUTA
C: OUTB
D: OUTB
E: OUTZ
F: OUTZ
G: Power:

## Cautions for use



Do not wire the cable in parallel with other power lines and do not share a duct with other

TRD-J□-RZVH□ TRD-J□-RZV□-K002

- 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.

3-M3 screws (Depth: 6)

-M4 screws(Depth:6)

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.

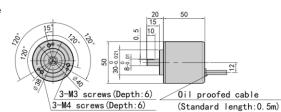
Waterproof

metal connector

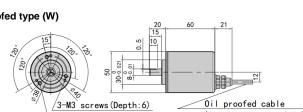
Oil proofed cable (Standard length: 0.5m)

## External dimensions(unit: mm)

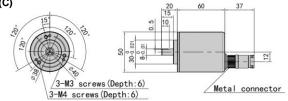
Type with back cable



Dust and splash proofed type (W)



• Type with connector (C)



3-M4 screws(Depth:6)

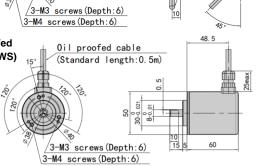
- Model numbers of connectors
- Totem-pole (S□/RZ□) Body: R03-R6F Cable: R03-PB6M (Attached)
- Line driver (RZV□) Body: R03-R8F Cable: R03-PB8M (Attached) Section area: Max. 0.3mm<sup>2</sup> Diameter of cable duct: Φ6.2

# Dust and splash proofed type With side cable (WS)

Dust and splash proofed type

with connector(CW)

• Type with side cable (S)



NOTE: The 3-M4 installing holes are only for the

Model numbers of connectors

Diameter of cable duct: Φ6.2

 Totem-pole (S□/RZ□) Body: R04-R6F Cable: R04-P6M (Attached) Line driver (RZV□) Body: R04-R8F Cable: R04-P8M (Attached) Section area: Max 0.3mm

following types: TRD-J□-□6

TRD-J□-RZV□6-K002