TRD-J Series Incremental Encoders

■ Features

- ø8 mm thick shaft and ø50 mm body
- Vibration and shock resistant metal slit plate durable at 1,000 P/R
- Operating voltage ranging from 4.75 to 30 VDC
- Totem-pole output facilitating cable extension

■ List of model numbers

Type	Appearance	Model number	Output	Pulse / revolution
With rear cable		TRD-J□-S	One-phase	
		TRD-J□-RZ	Two-phase with home position in normal operation ⎍	
		TRD-J□-RZL	Two-phase with home position in reverse operation ⎎	
		TRD-J□-RZV	Two-phase with home position and line driver	10*
Dust and splash proofed		TRD-J□-SW	One-phase	30
		TRD-J□-RZW	Two-phase with home position in normal operation ⎍	40
		TRD-J□-RZWL	Two-phase with home position in reverse operation ⎎	50
		TRD-J□-RZVW	Two-phase with home position and line driver	60
With connector		TRD-J□-SC	One-phase	100
		TRD-J□-RZC	Two-phase with home position in normal operation ⎍	120
		TRD-J□-RZCL	Two-phase with home position in reverse operation ⎎	200
		TRD-J□-RZVC	Two-phase with home position and line driver	240
Dust and splash proofed with connector		TRD-J□-SCW	One-phase	300
		TRD-J□-RZCW	Two-phase with home position in normal operation ⎍	360
		TRD-J□-RZCWL	Two-phase with home position in reverse operation ⎎	400
		TRD-J□-RZVCW	Two-phase with home position and line driver	500
With side cable		TRD-J□-SS Note 1	One-phase	600
		TRD-J□-RZS Note 1	Two-phase with home position in normal operation ⎍	750
		TRD-J□-RZSL Note 1	Two-phase with home position in reverse operation ⎎	1000
		TRD-J□-RZVS Note 1	Two-phase with home position and line driver	* One-phase only for 10 pulse
Dust and splash proofed with side cable		TRD-J□-SWS Note 1	One-phase	
		TRD-J□-RZWS Note 1	Two-phase with home position in normal operation ⎍	
		TRD-J□-RZWSL Note 1	Two-phase with home position in reverse operation ⎎	
		TRD-J□-RZVWS Note 1	Two-phase with home position and line driver	

Note: Consult your Koyo dealer for delivery period.

■ Model numbering system

TRD-J □□-RZ V W L-□

- Series
- Pulse/revolution
- Output signal
  S: One-phase/**RZ:** Two-phase with home position in normal operation
- Output type
  Blank: Totem-pole/**V:** Line driver
- Connection
  Blank: Rear cable
  W: Dust and splash proofed/**C:** Connector/**CW:** Dust and splash proofed with connector
  S : Side cable/**WS:** Dust and splash proofed with side cable
- Home position reverse operation symbol
  If output signal is RZ, model numbers with "L" are home position reverse operation type.
- (Available options)

■ Pulse and frequencies

Pulse/revolution		10	30	40	50	60	100	120	200	240	300	360	400	500	600	750	1000
Max. response frequency (kHz)*		0.5	1.5	2	2.5	3	5	6	10	12	15	18	20	25	30	37.5	50
Applicable models	TRD-J□-S□	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	TRD-J□-RZ□		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	TRD-J□-RZV□		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

* Maximum response frequency is defined by the following formula:
Maximum revolution speed = (Maximum response frequency/Pulse) × 60
The encoder dows not respond to revolution faster than the maximum speed.

■ Electrical Specifications

Model			TRD-J□-S□	TRD-J□-RZ□	TRD-J□-RZV□
Power source	Power source voltage		4.75 to 30 VDC	4.75 to 30 VDC	4.75 to 5.25 VDC
	Allowable ripple		3% rms max.	3% rms max.	3% rms max.
	Current consumption (no load)		40 mA (See "Electrical Characteristics" below.) max.	60 mA (See "Electrical Characteristics" below.) max.	130 mA max.
Output wave form	Output signal type		One-phase	Two-phase + home position	Two-phase + home position
	Duty ratio		50 ± 25% (square wave)	50 ± 25% (square wave)	50 ± 25% (square wave)
	Signal width at home position		—	50 to 150%	50 to 150%
	Rise/Fall time		3 μs (Max. Cable 50 cm) max.	3 μs (Max. Cable 50 cm) max.	2 μs (Max. Cable 50 cm) max.
Output	Output Type		Totem-pole	Totem-pole	Line-driver*
	Output current	Outflow "H"	10 mA max.	10 mA max.	—
		Inflow "L"	30 mA max.	30 mA max.	—
	Output voltage	"H"	[(Load power voltage) – 2.5 V] min.	[(Load power voltage) – 2.5 V] min.	2.5 V max.
		"L"	0.4 V max.	0.4 V max.	0.5 V max.
	Output standard	TTL 5V	10TTL	10TTL	—
	Load power voltage		30 VDC max.	30 VDC max.	—

* Equivalent to 26LS31
(Output signal is compatible to TTL)

■ Mechanical specifications

Initial torque	0.003 N•m (+20°C) max. (Dust and splash proofed: Min. 0.02 N•m)
Moment of inertia	2×10^{-6} kg•m^2
Allowable load	Radial: 50 N
	Thrust: 30 N
Maximum allowable speed (Note 1)	5000 rpm (Dust and splash proofed: 3000 rpm)
Service life of bearing	5×10^9 revolution (calculated value at the maximum load)
Cable	External diameter ø5 mm (W type: ø6 mm) 5-wire oil-proof shielded vinyl chloride cable Nominal section area of core: 0.3 mm^2 (Line driver output: 8 cores, 0.14 mm^2)
Weight	220 g (with 0.5 m cable) max.

Note 1: Highest speed that can support mechanical integrity of the encoder

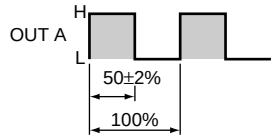
■ Environmental requirements

Ambient temperature	–10 to +50°C
Storage temperature	–25 to +85°C
Operating humidity	35 to 85% RH (with no condensation)
Withstand voltage	500 VAC for one minute (between terminals and case)
Insulation resistance	50 MΩ min.
Vibration resistance	Durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitude
Shock resistance	11 ms with 490 m/s^2 applied three times along three axes
Protection	IP50: Dust proofed IP65: Dust and splash proofed

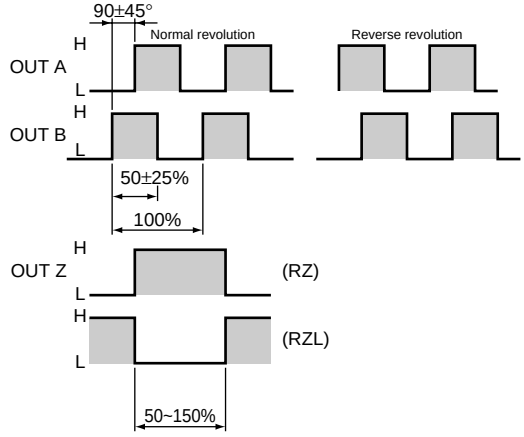
Totem-pole output **TRD-J□ -S□ /TRD-J□ -RZ□**

■ Output signal timing chart

One-phase: **TRD-J□ -S□**



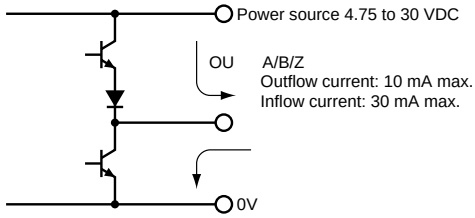
Two-phase with home position: **TRD-J□ -RZ□**



"Normal" means clockwise revolution viewed from the shaft.

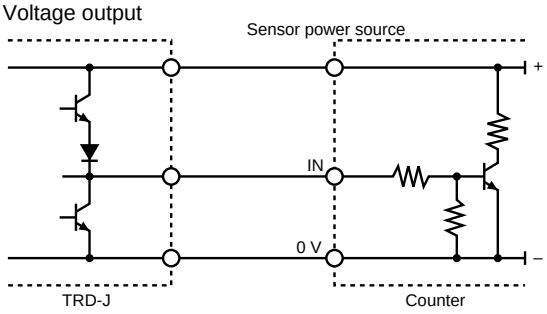
■ Output circuit

Totem-pole output:

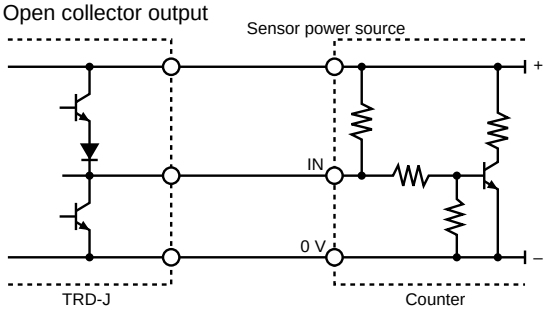


The above circuit can be applied to voltage output or open collector output as follows:

● Voltage output

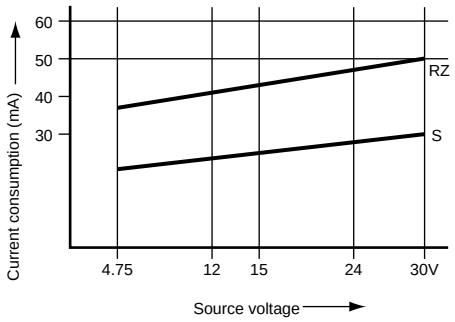


● Open collector output



■ Electrical characteristics

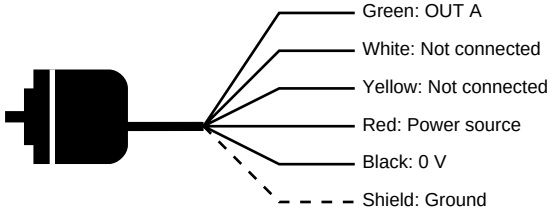
Current consumption characteristics



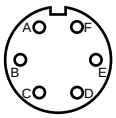
■ Terminal assignment

Shielded cable is not connected to the encoder body.

One-phase: **TRD-J□ -S□**



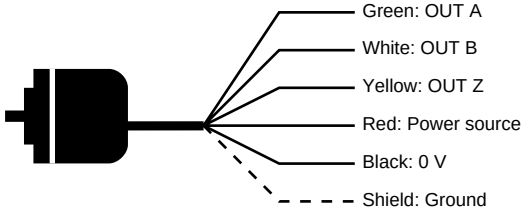
Pin out of connector



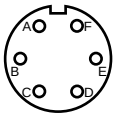
Rear view

Pin code
- A: OUT A
- B: Not connected
- C: Not connected
- D: Power source
- E: 0V
- F: Not connected

Two-phase with home position: **TRD-J□ -RZ□**



Pin out of connector



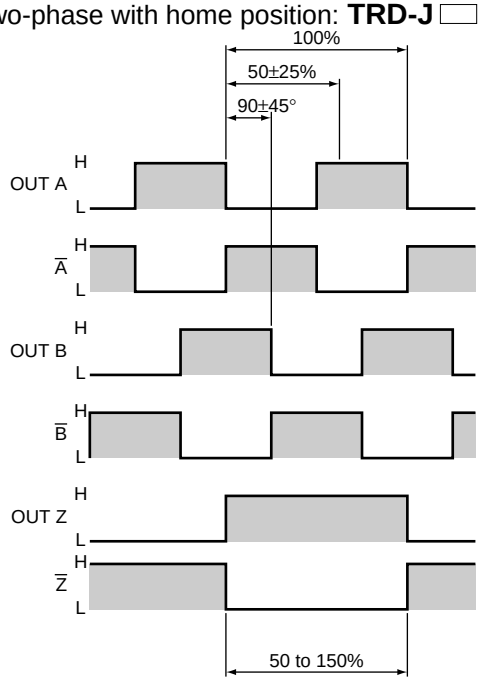
Rear view

Pin code
- A: OUT A
- B: OUT B
- C: OUT Z
- D: Power source
- E: 0 V
- F: Not connected

Line driver **TRD-J ☐ -RZV**

■ Output signal timing chart

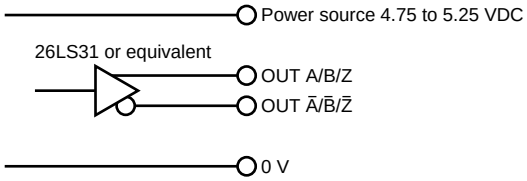
Two-phase with home position: **TRD-J ☐ -RZV ☐**



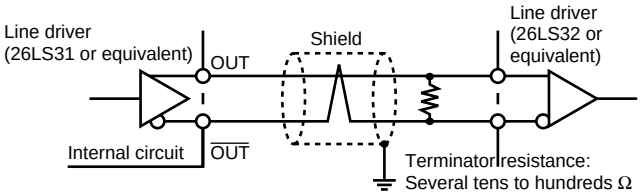
"Normal" means clockwise revolution viewed from the shaft.

■ Output circuit

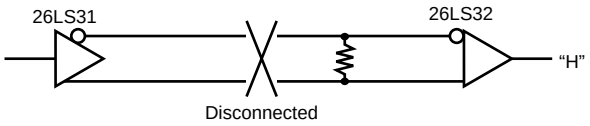
Line driver Output



- The line driver can use a RS-422A compliant twisted pair cable of up to 1,200 m.

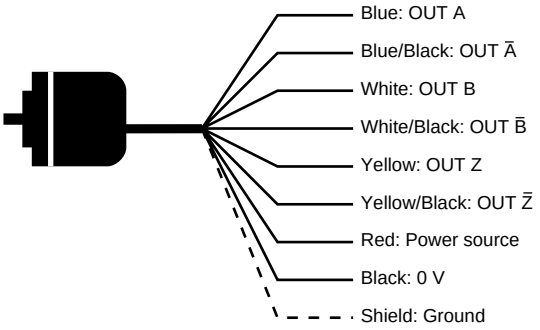


- Output signal turns to "H" level when the cable or connector is disconnected.

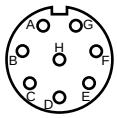


■ Terminal assignment

Shielded cable is not connected to



Pin out of connector



Rear view

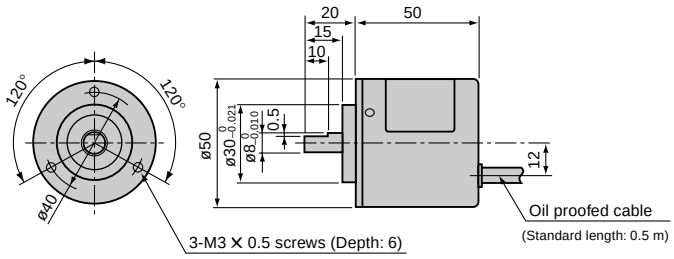
Pin code

A: OUT A
B: OUT Ā
C: OUT B
D: OUT B̄
E: OUT Z
F: OUT Z̄
G: Power source
H: 0 V

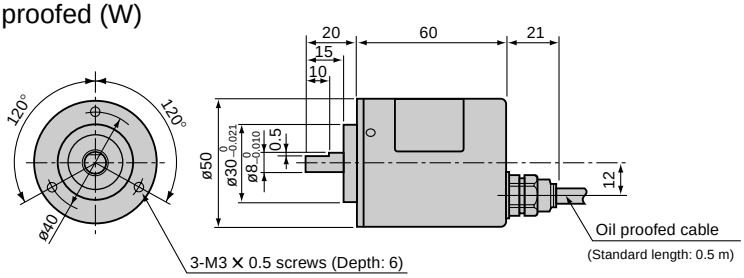
External Dimensions

(in mm)

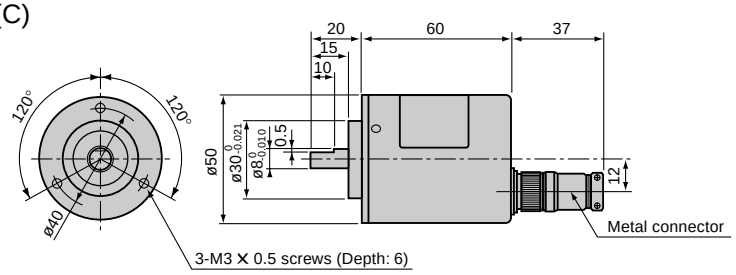
● With side cable



● Dust and splash proofed (W)



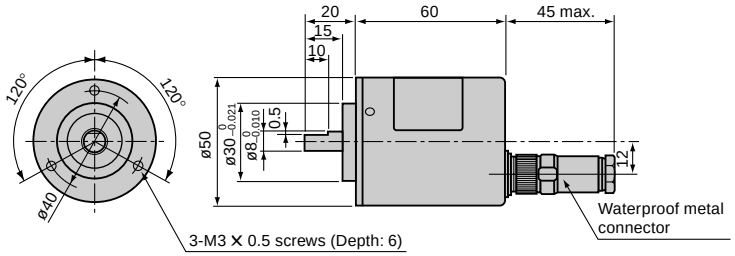
● With connector (C)



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)
  (of Tajimi Musen)

* Section area: Max. 0.3 mm²
Diameter of cable duct : ø6.2

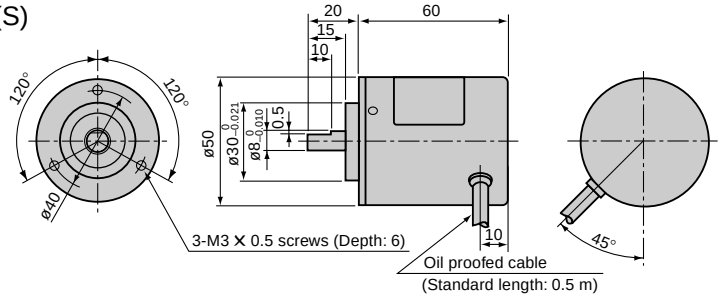
● Dust and splash proofed with connector (CW)



Model numbers of connectors
- Totem-pole (S□□/RZ□□)
  Body: R04-R6F
  Cable: R04-P6M (Attached)
- Line driver (RZV□□)
  Body: R04-R8F
  Cable: R04-P8M (Attached)
  (of Tajimi Musen)

* Section area: Max. 0.3 mm²
Diameter of cable duct : ø6.2

● With side cable (S)



● Dust and splash proofed with side cable (WS)