

TRD-S/SH Series Incremental Encoders

Rotary Encoders

■ Features

- Shaft and Hollow Shaft type are available.
- Small body with 38mm diameter and 30mm depth.
- Compact design but the lineup reaches 2,500P/R.
- Protection degree IP40. (simple dust proof)



Incremental Type

■ List of model numbers

Type	Appearance	Model number	Source voltage	Output	Output type	Pulse/revolution
Shaft		TRD-S□A	4.5 to 13.2 VDC	2-phase with home position in reverse operation	Open collector output	* 10, 20, 30, 40, 50, 60, 100, 200, 250, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2500
		TRD-S□B	10.8 to 26.4 VDC			
		TRD-S□V	4.75 to 5.25 VDC	2-phase with home position in forward operation	Line driver output	
Hollow shaft		TRD-SH□A	4.5 to 13.2 VDC	2-phase with home position in reverse operation	Open collector output	
		TRD-SH□B	10.8 to 26.4 VDC			
		TRD-SH□V	4.75 to 5.25 VDC	2-phase with home position in forward operation	Line driver output	

TRD-S/SH

TRD-2E

■ Model numbering system



- Series
 - S**: Shaft
 - SH**: Hollow shaft
- Pulse/revolution
- Model
 - A**: Source voltage 4.5 to 13.2 VDC, open collector output
 - B**: Source voltage 10.8 to 26.4 VDC, open collector output
 - V**: Source voltage 4.75 to 5.25 VDC, line driver output

TRD-N/NH

TRD-J

■ Pulse and frequencies

Pulse/revolution		10	20	30	40	50	60	100	200	250	300	360	400	500	512	600	800	1000	1024	1200	2000	2500
Max. response frequency (kHz)*		1	2	3	4	5	6	10	20	25	30	36	40	50	50	60	80	100	100	120	200	200
Applicable models	TRD-S□A/TRD-SH□A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	TRD-S□B/TRD-SH□B	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	TRD-S□V/TRD-SH□V	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

TRD-GK

Absolute Type

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

■ Electrical specifications

Model		TRD-S□A / TRD-SH□A	TRD-S□B / TRD-SH□B	TRD-S□V / TRD-SH□V	
Power source	Power source voltage	4.5 to 13.2 VDC	10.8 to 26.4 VDC	4.75 to 5.25 VDC	
	Allowable ripple	3% rms max.		—	
	Current consumption	50 mA max.		50 mA max.	
Signal waveform		Two-phase + home position		Two-phase + home position	
Maximum response frequency		200 kHz		200 kHz	
Duty ratio		50 ± 25%		50 ± 25%	
Phase difference width		25 ± 12.5%		25 ± 12.5%	
Signal width at home position		100 ± 50%		100 ± 50%	
Output	Rise / Fall time	1 μs max. (when cable length is 1 m)		—	
	Output type	NPN open collector output		Line-driver*	
	Output logic	Negative logic (active low)		Positive logic (active high)	
	Output voltage	“H”	—		2.5 V min.
		“L”	0.4 V max.		0.5 V max.
	Influx current	30 mA max.		—	
Load power voltage	30 VDC max.		—		

TRD-NA

TRD-K

TRD-KL

* Equivalent to 26C31, lever is equivalent to 26C32.

Mechanical specifications

Initial torque	0.001 N•m (+20°C) max.
Moment of inertia	$0.3 \times 10^{-6} \text{kg} \cdot \text{m}^2$
Allowable load	Radial: 20 N
	Thrust: 10 N
Maximum allowable speed (Note 1)	6000 rpm
Cable	External diameter $\phi 5 \text{ mm}$ 5-wire oil resistant PVC cable Nominal section area of core: 0.14 mm^2 (Line driver output: 8 cores, 0.14 mm^2)
Weight	Approx. 100 g

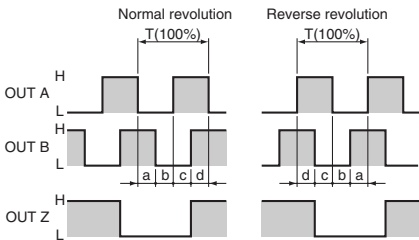
Note 1: Highest speed that can support mechanical integrity of the encoder

Environmental requirements

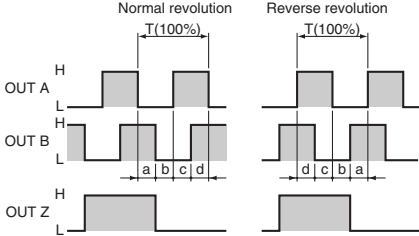
Ambient temperature	-10 to +70°C
Storage temperature	-25 to +85°C
Operating humidity	35 to 85% RH (with no condensation)
Voltage withstand	500 VAC (50 Hz/60 Hz) for one minute
Insulation resistance	50 M Ω min.
Vibration resistance	Durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitude
Shock resistance	11 ms with 490 m/s^2 applied three times along three axes
Protection	Simple dust protection: IP40

Channel timing chart

TRD-S□A/TRD-SH□A
TRD-S□B/TRD-SH□B



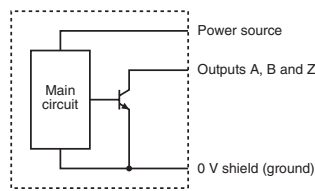
TRD-S□V/TRD-SH□V



$$a, b, c, d = 1/4T \pm 1/8T$$

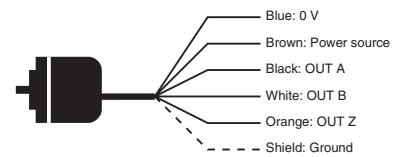
"Normal" means clockwise revolution viewed from the shaft.

Open collector output circuit

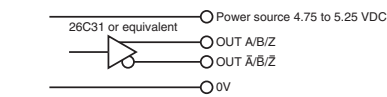


Open collector connections

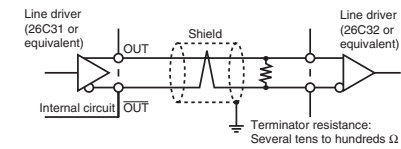
Shielded cable is not connected to the encoder body.



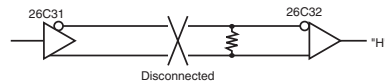
Line driver output circuit



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

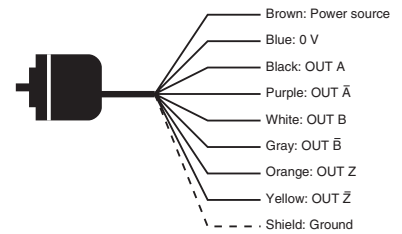


- Output signal turns to "H" level when the cable or connector is disconnected.



Line driver connections

Shielded cable is not connected to the encoder body.



External Dimensions

TRD-S□A/TRD-S□B/TRD-S□V

TRD-SH□A/TRD-SH□B/TRD-SH□V

