

TRD-N/NH Series

Features

φ50 Incremental Type

- Thin design with an outside diameter of φ50 mm / depth of 35 mm
- Protective structure selectable according to environment of use
Aluminum die-cast case for dustproof and waterjet-proof type (IP65)
- A wide range of resolution (1 to 5,000 P/R).
- Uses robust φ8 mm stainless steel shaft.
- Wide power range of 4.75 to 30 V DC
- Installation using a servo mount convenient for origin adjustment is possible.



Model Number List

Type	Appearance	Model Number	Output	Pulse Number / Rotation
Dustproof type ABS plastic cover		TRD-N□-S	1-phase output	1, 3, 4, 5, 10, 20, 30, 60, 100, 120, 200, 300, 360, 500, 600, 1,000
		TRD-N□-RZ	Output with 2-phase origin (Origin direct action □)	3, 4, 5, 10, 20, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1,000, 1,200, 2,000, 2,500, 3,600, 4,096, 5,000
		TRD-N□-RZL	Output with 2-phase origin (Origin reverse action □)	
		TRD-N□-RZV	Output with 2-phase origin (Origin direct action □)	
Dustproof and Waterjet-proof Type Aluminum die-cast cover		TRD-N□-SW	1-phase output	1, 3, 4, 5, 10, 20, 30, 60, 100, 120, 200, 300, 360, 500, 600, 1,000
		TRD-N□-RZW	Output with 2-phase origin (Origin direct action □)	3, 4, 5, 10, 20, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1,000, 1,200, 2,000, 2,500, 3,600, 4,096, 5,000
		TRD-N□-RZWL	Output with 2-phase origin (Origin reverse action □)	
		TRD-N□-RZVW	Output with 2-phase origin (Origin direct action □)	
Dustproof Hollow Shaft Type ABS plastic cover		TRD-NH□-S	1-phase output	1, 3, 4, 5, 10, 20, 30, 60, 100, 120, 200, 300, 360, 500, 600, 1,000
		TRD-NH□-RZ	Output with 2-phase origin (Origin direct action □)	3, 4, 5, 10, 20, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1,000, 1,200, 2,000, 2,500, 3,600, 4,096, 5,000
		TRD-NH□-RZL	Output with 2-phase origin (Origin reverse action □)	
		TRD-NH□-RZV	Output with 2-phase origin (Origin direct action □)	
Dustproof, Waterjet-proof Hollow Shaft Type Aluminum die-cast cover		TRD-NH□-SW	1-phase output	1, 3, 4, 5, 10, 20, 30, 60, 100, 120, 200, 300, 360, 500, 600, 1,000
		TRD-NH□-RZW	Output with 2-phase origin (Origin direct action □)	3, 4, 5, 10, 20, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1,000, 1,200, 2,000, 2,500, 3,600, 4,096, 5,000
		TRD-NH□-RZWL	Output with 2-phase origin (Origin reverse action □)	
		TRD-NH□-RZVW	Output with 2-phase origin (Origin direct action □)	

TRD-N □ -RZ W L - □

- Series classification
N : Shaft type
NH: Hollow shaft type
- Pulse number
- Signal format
S : 1-phase output
RZ : Output with 2-phase origin (Origin direct action)
RZV: Line driver output
- Protective structure
Blank: Dustproof type (IP50)
W : Dustproof, waterjet-proof type (IP65)
- Origin reverse action symbol
If the signal type is RZ, models with "L" produce the origin reverse action.
- (Special specifications products)

TRD-N/NH Series

Specifications/Dimensions

P L C H M I SENSOR ENCODER COUNTER INFORMATION Rotary Encoder
Lineup

Selection Guide

Incremental
Type

Absolute Type

TRD-MX

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

Pulse and Frequencies

Pulse Number per Rotation		1	3	4	5	10	20	30	40	50	60	100	120	200	240	250	300	360	400	480	500	600	750	1,000	1,200	2,000	2,500	3,600	4,096	5,000	
Maximum Response Frequency (kHz)*1		0.08	0.25	0.33	0.41	0.8	1.6	2.5	3.3	4.1	4.9	8.3	9.9	16	19	20	24	29	33	39	41	49	62	83	100	100	100	100	100	100	100
Applicable Models	TRD-N□-S□	●	●	●	●	●	●				●	●	●	●			●	●			●	●		●				●	●	●	
	TRD-NH□-S□																														
	TRD-N□-RZ□	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	TRD-NH□-RZ□																														
	TRD-N□-RZ□L	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	TRD-NH□-RZ□L																														
	TRD-N□-RZV□	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TRD-NH□-RZV□																															

*1 The electric maximum response frequency is specified by resolution (pulse number) and the maximum number of revolutions.

Electrical maximum number of revolutions = [(Maximum response frequency/Resolution) x 60]

Therefore, if the encoder rotates at a speed greater than the electrical maximum number of revolutions, the signals do not electrically follow.

*2 The totem-pole output is 100 kHz and the line driver output is 200 kHz.

Electrical Specifications

Model Number		TRD-N□-S□ TRD-NH□-S□	TRD-N□-RZV□ TRD-NH□-RZV□	TRD-N□-RZ□/TRD-N□-RZ□L TRD-NH□-RZ□/TRD-NH□-RZ□L
Power Supply	Supply Voltage	4.75 to 30 V DC	4.75 to 5.25 V DC	4.75 to 30 V DC
	Allowable Ripple	3% rms or less	3% rms or less	3% rms or less
	Consumption Current (No Load)	40 mA or lower	60 mA or lower	60 mA or lower
Output Waveform	Signal Format	1-phase output	2-phase output + home position	2-phase output + home position
	Duty Ratio	50±25%	50±25%	50±25%
	Signal Width at Home Position	—	100±50%	100±50%
Output	Rise / Fall Time*	Not larger than 3 μs	Not larger than 2 μs	Not larger than 3 μs
	Output Form	Totem-pole output	Line driver output	Totem-pole output
	Output Current	Source "H"	Up to 10 mA	Up to 10 mA
		Sink "L"	Up to 30 mA	Up to 30 mA
	Output Voltage	"H"	[(Supply Voltage) - 2.5 V] or more	[(Supply Voltage) - 2.5 V] or more
		"L"	0.4 V or lower	0.4 V or lower
	Load Supply Voltage	35 V DC or lower	—	35 V DC or lower

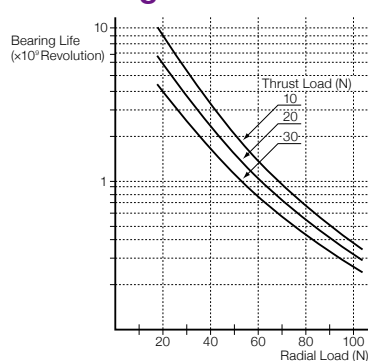
* Cable 0.5 m or shorter, maximum load

Mechanical Specifications

Starting Torque	Dustproof type: 0.003 N·m or less (+20°C)/Dustproof and waterjet-proof type (W type): 0.02 N·m or less (+20°C)/Hollow shaft type: 0.05 N·m or less (+20°C)
Moment of Inertia	2 x 10 ⁻⁶ kg·m ²
Shaft Allowable Load	Radial: 50 N
	Thrust: 30 N
Maximum Allowable Number of Revolutions (Note 1)	5,000 rpm (However, 3,000 rpm (continuously) and 5,000 rpm (instantaneously) for dustproof and waterjet-proof type)
Cable	Outside diameter ϕ 6 mm 5-core shielded oil-resistant cable Core wire nominal cross-sectional area: 0.3 mm ² (Line driver output is 8 cores, 0.14 mm ²)
Weight	Approx. 150 g (Approx. 200 g for dustproof and waterjet-proof type)

Note 1: Maximum number of revolutions that can be mechanically endured

Bearing Life



Environmental Requirements

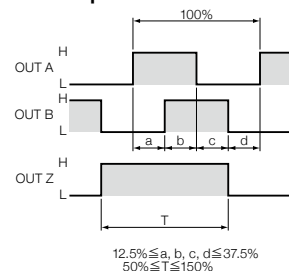
Use Ambient Temperature	-10 to +70°C
Storage Ambient Temperature	-25 to +85°C
Use Ambient Humidity	35 to 85% RH (No condensation)
Withstand Voltage	500 V AC (50/60 Hz) 1 minute Excluded due to capacitor grounding (The signal lines, and shield between the cases are excluded)
Insulation Resistance	50 MΩ or higher
Vibration Resistance (Endurance)	Displacement half amplitude: 0.75 mm, 10 to 55 Hz, 3 axial directions, each 1 h
Impact Resistance (Endurance)	Up to 500P/R (Metal slit) 981 m/s ² 11 ms, each 3 times in 3 axial directions 600 P/R or higher (Glass slit) 490 m/s ² 11 ms, each 3 times in 3 axial directions
Protective Structure	Dustproof type: IP50 Dustproof and Waterjet-proof type: IP65

TRD-N/NH Series

Specifications

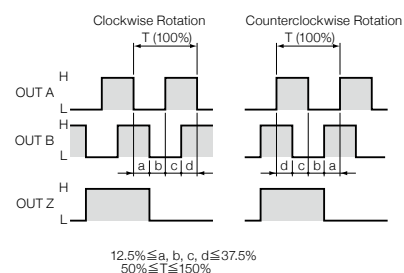
Output Waveform

Totem-pole



Note: Clockwise (normal) rotation when the main body is seen from the axle side
: Z-phase logic is reverse for the RZL and RZWL types.

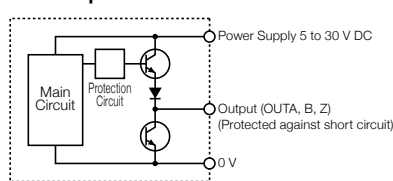
Line Driver



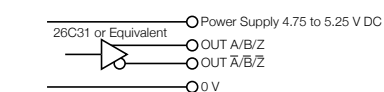
Note: Clockwise rotation when the main body is seen from the axle side is the normal rotation.

Output Circuit

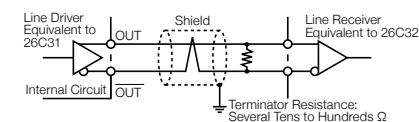
Totem-pole



Line Driver



- The line driver output comes from a data transmission circuit that conforms to RS-422A and can transmit data up to 1,200 m over twisted pair cables.



- When the transmission line or connector is disconnected, the output becomes "H."

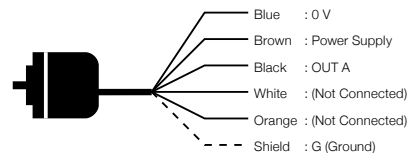


Connection Diagram

Totem-pole

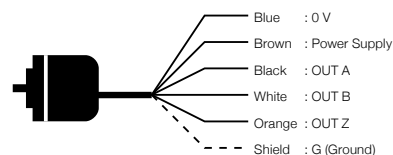
《1-phase output》

The shielded wire is connected to the main body.



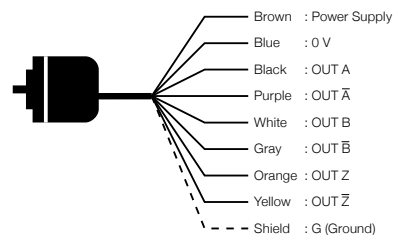
《Output with 2-phase origin》

The shielded wire is connected to the main body.

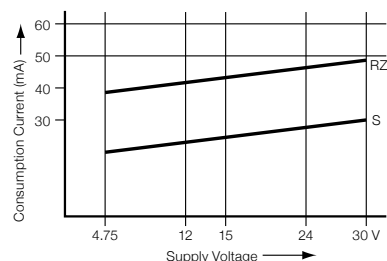


Line Driver

The shielded wire is connected to the main body.



Electrical Characteristics (Typical)



TRD-MX

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

TRD-N/NH Series

Dimensions

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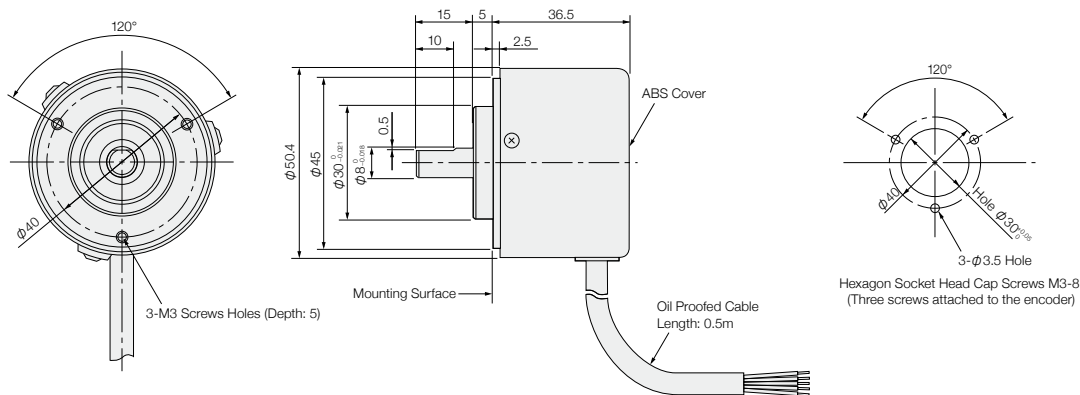
TRD-N/NH

TRD-J

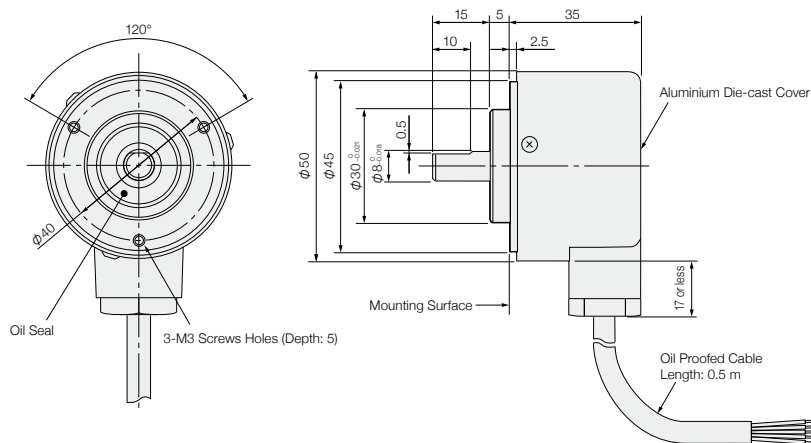
TRD-GK

Dimensions (Unit: mm)

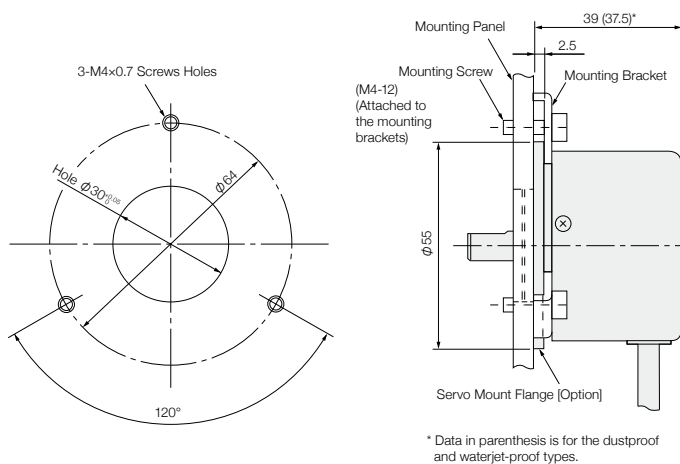
TRD-N Series [Dustproof Type: S/RZ/RZL/RZV]



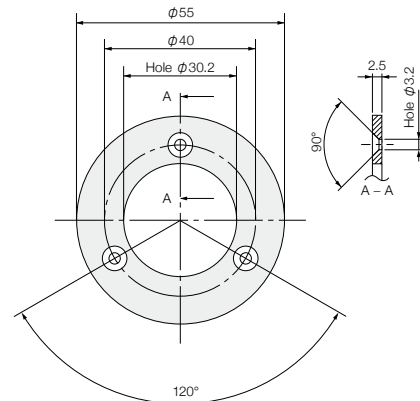
TRD-N Series [Dustproof and Waterjet-proof Type : SW/RZW/RZWL/RZVW]



TRD-N Series [Servo Mount Metal Mounting State Diagram]

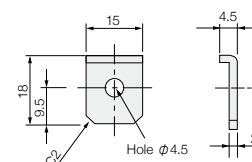


Servo Mount Flange NF-55 (Option)



Servo Mount Metal Fixture

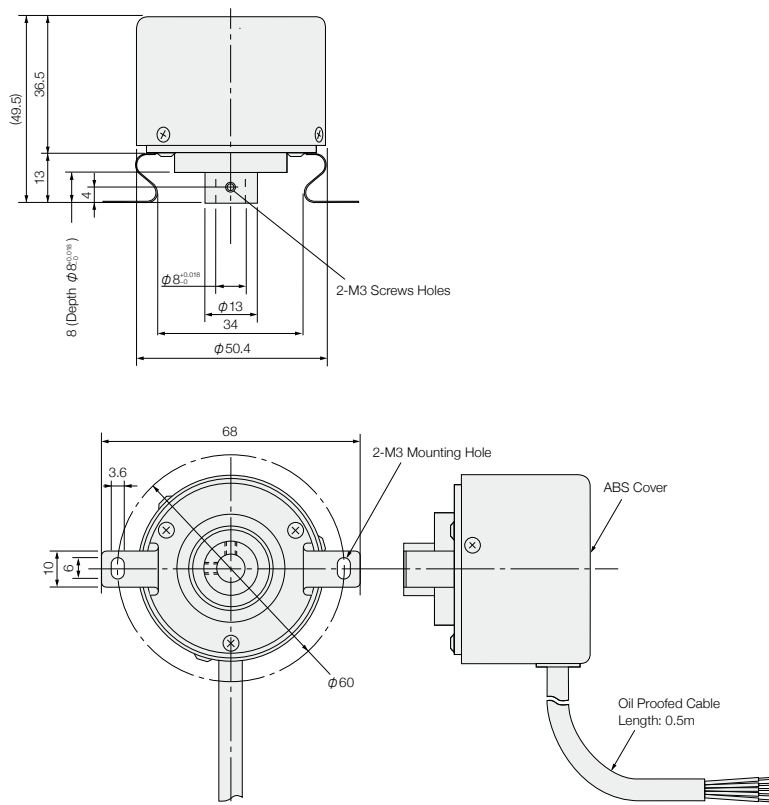
NM-9 (Attached to the optional flange)



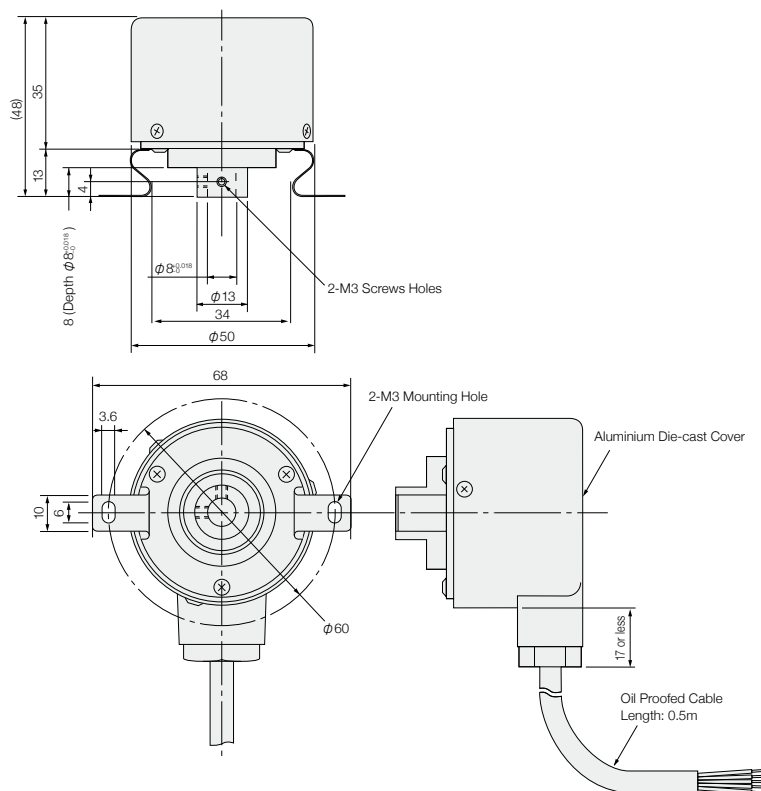
TRD-N/NH Series

Dimensions

TRD-NH Series [Dustproof Type: S/RZ/RZL/RZV]



TRD-NH Series [Dustproof and Waterjet-proof Type: SW/RZW/RZWL/RZVW]

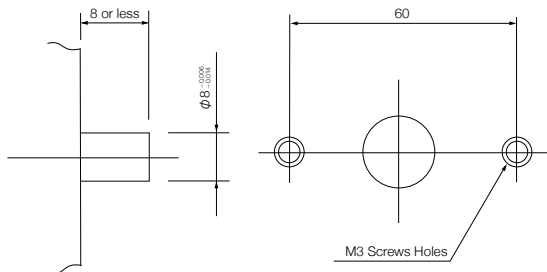


TRD-N/NH Series

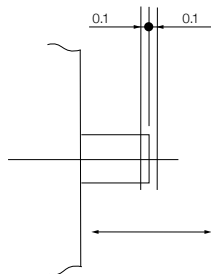
Dimensions

P L C H M I SENSOR ENCODER COUNTER INFORMATION 

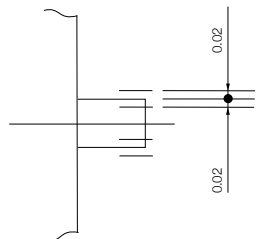
Mounting Point Shape



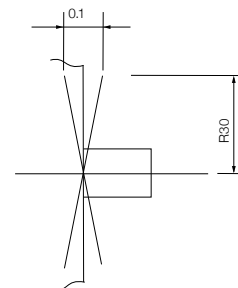
Shaft Direction Variation



Shaft Angle Direction Variation



Degree of Mounting Surface Angle Over Shaft.

Rotary Encoder
Lineup

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