

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 □ -RZWL □

- 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

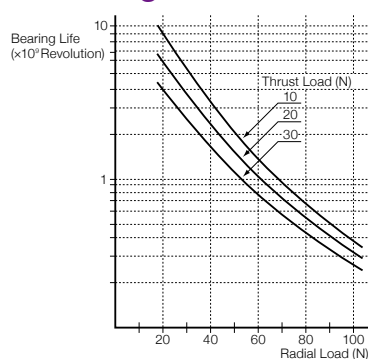
* Cable 0.5 m or shorter, maximum load

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

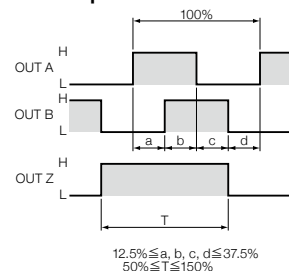
Use Ambient Temperature	-10 to +70°C
Storage Ambient Temperature	-25 to +85°C
Use Ambient Humidity	35 to 85% RH (No condensation)
Withstand Voltage	500 V AC (50/60 Hz) 1 minute Excluded due to capacitor grounding (The signal lines, and shield between the cases are excluded)
Insulation Resistance	50 MΩ 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

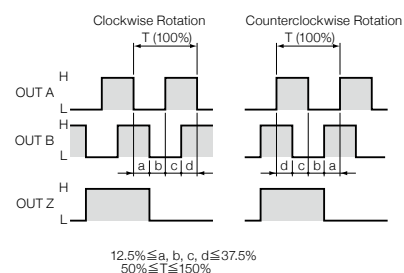
Output Waveform

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.

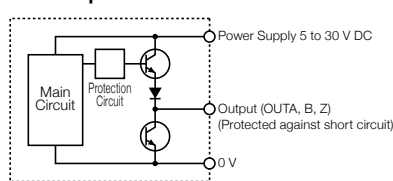
Line Driver



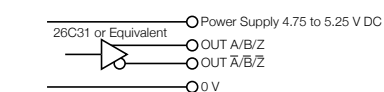
Note: Clockwise rotation when the main body is seen from the axle side is the normal rotation.

Output Circuit

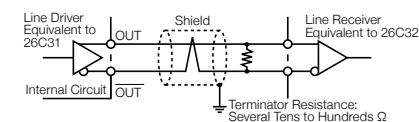
Totem-pole



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."

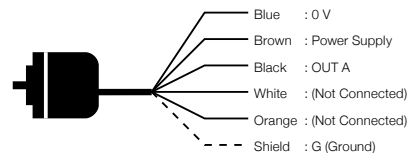


Connection Diagram

Totem-pole

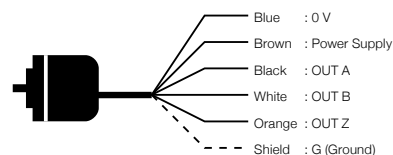
《1-phase output》

The shielded wire is connected to the main body.



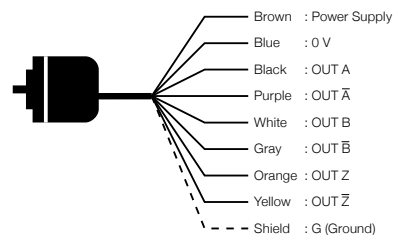
《Output with 2-phase origin》

The shielded wire is connected to the main body.

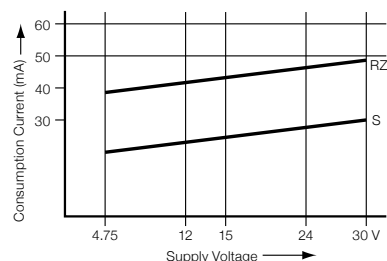


Line Driver

The shielded wire is connected to the main body.



Electrical Characteristics (Typical)



PLC

HMI

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

TRD-N/NH Series

Dimensions

P L C



H M I



SENSOR



ENCODER



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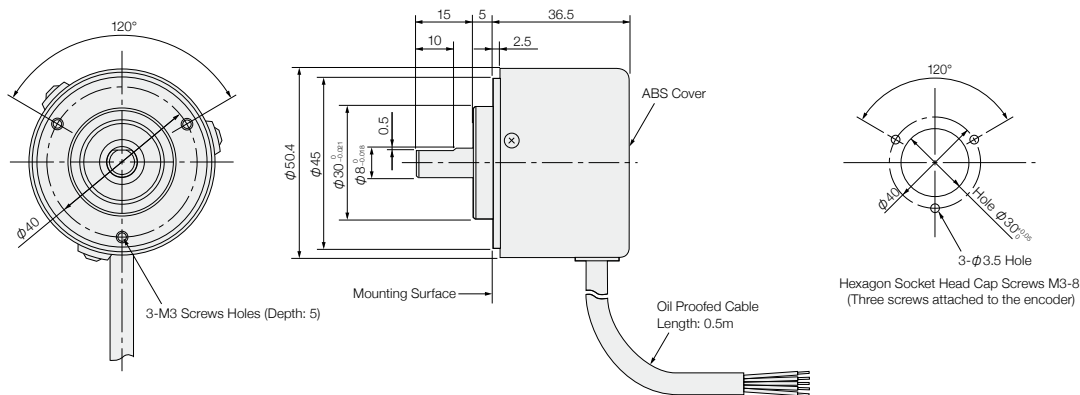
TRD-N/NH

TRD-J

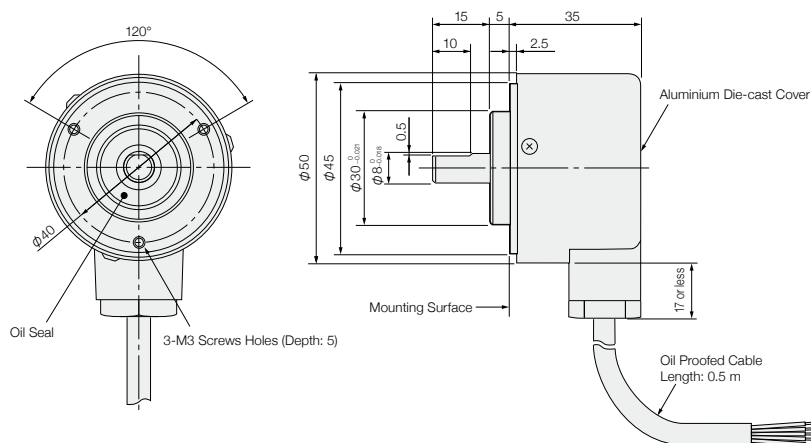
TRD-GK

Dimensions (Unit: mm)

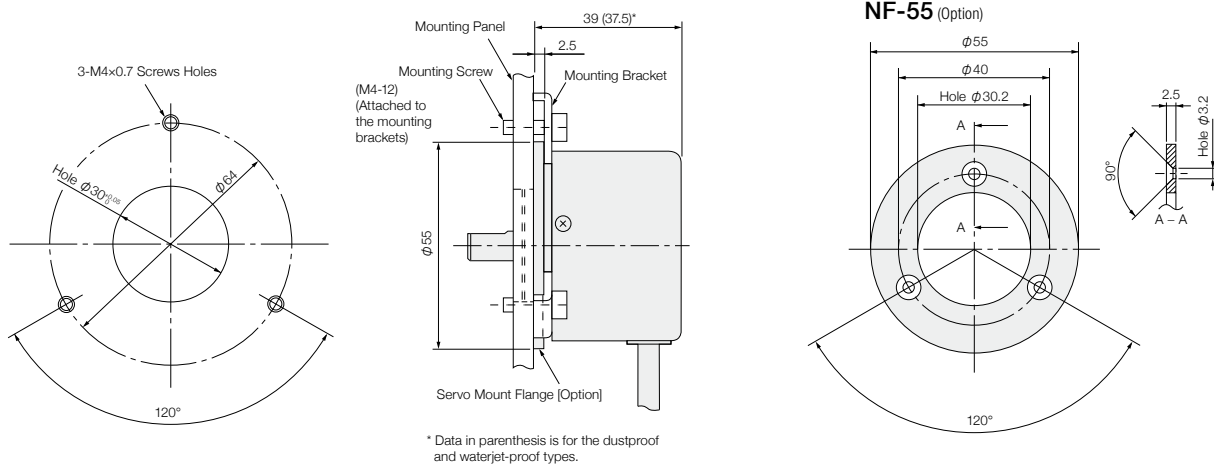
TRD-N Series [Dustproof Type: S/RZ/RZL/RZV]



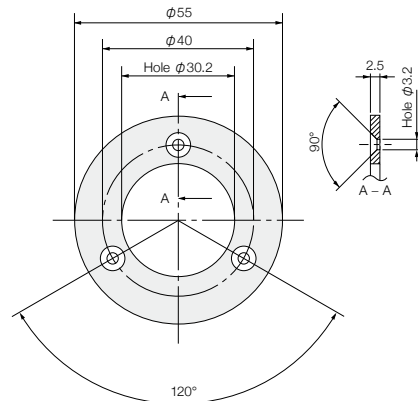
TRD-N Series [Dustproof and Waterjet-proof Type : SW/RZW/RZWL/RZVW]



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

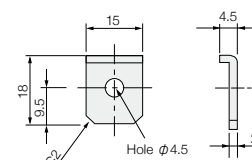


Servo Mount Flange NF-55 (Option)



Servo Mount Metal Fixture

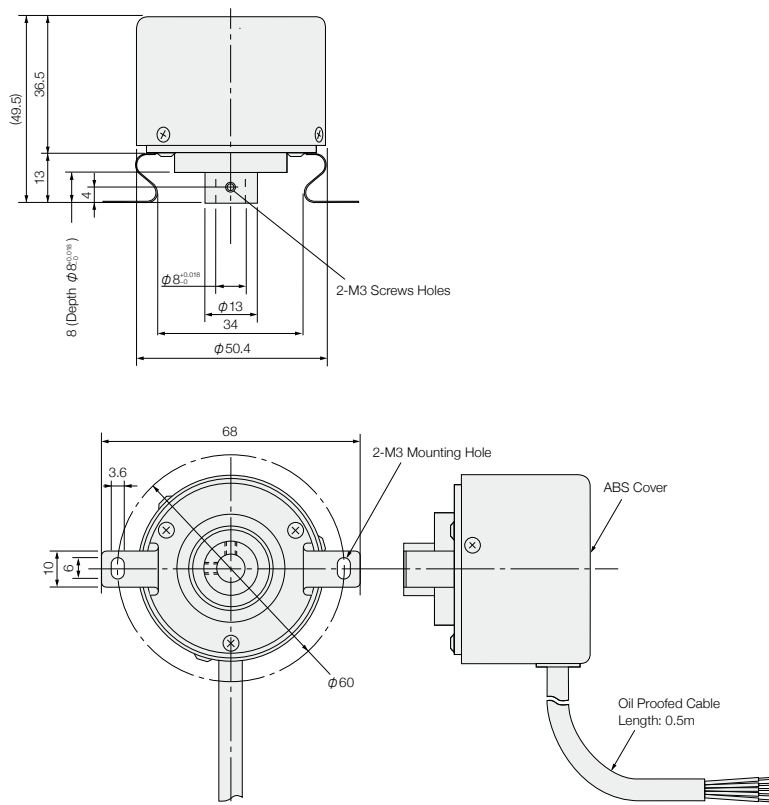
NM-9 (Attached to the optional flange)



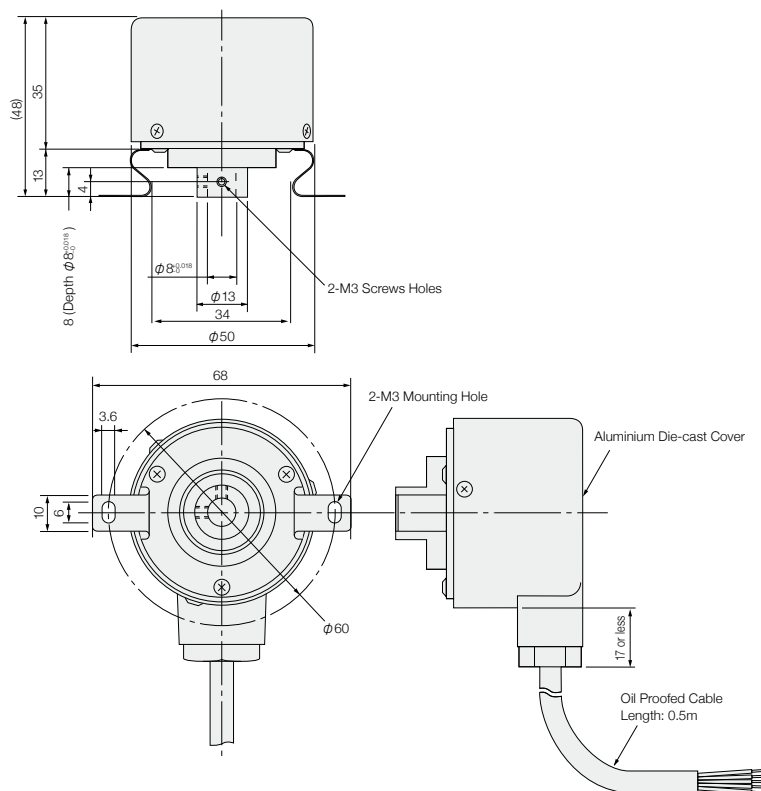
TRD-N/NH Series

Dimensions

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



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

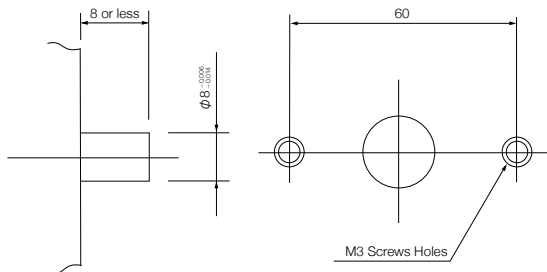


TRD-N/NH Series

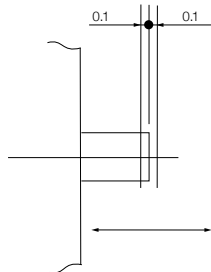
Dimensions

P L C H M I SENSOR ENCODER COUNTER INFORMATION 

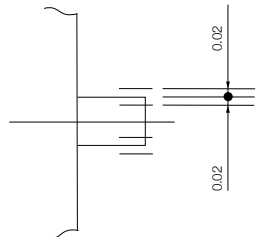
Mounting Point Shape



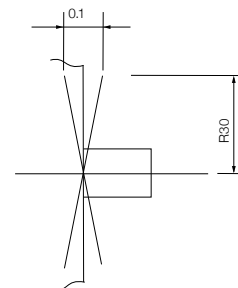
Shaft Direction Variation



Shaft Angle Direction Variation



Degree of Mounting Surface Angle Over Shaft.

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