

# Medium Duty Incremental Encoders

## Features

The medium duty encoder offers the greatest flexibility of choice in a very high-quality encoder, all for a very low price.

Features:

- Small body with 50 mm diameter and 35 mm depth
- Splash proof (IP65 rating)
- 8 mm standard shaft or 8 mm hollow shaft
- Incremental resolution available from 3 pulses per revolution to 2500 pulses per revolution
- Line driver or Totem-pole output
- Up to 100 kHz response frequency



**Standard shaft (TRD-N) model**



**Hollow shaft (TRD-NH) model**

Note: Yellow shaded part numbers are non-stock. Availability may range from four to six

Incremental Medium Duty Standard Shaft Encoders (Totem-pole Output, TRD-Nxxx-RZVD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-N3-RZVD	<-->	3	5-30 VDC	Totem-pole sink/source	50mm
TRD-N4-RZVD	<-->	4			
TRD-N5-RZVD	<-->	5			
TRD-N10-RZVD	<-->	10			
TRD-N30-RZVD	<-->	30			
TRD-N40-RZVD	<-->	40			
TRD-N50-RZVD	<-->	50			
TRD-N60-RZVD	<-->	60			
TRD-N100-RZVD	<-->	100			
TRD-N120-RZVD	<-->	120			
TRD-N200-RZVD	<-->	200			
TRD-N240-RZVD	<-->	240			
TRD-N250-RZVD	<-->	250			
TRD-N300-RZVD	<-->	300			
TRD-N360-RZVD	<-->	360			
TRD-N400-RZVD	<-->	400			
TRD-N480-RZVD	<-->	480			
TRD-N500-RZVD	<-->	500			
TRD-N600-RZVD	<-->	600			
TRD-N750-RZVD	<-->	750			
TRD-N1000-RZVD	<-->	1000			
TRD-N1024-RZVD	<-->	1024			
TRD-N1200-RZVD	<-->	1200			
TRD-N2000-RZVD	<-->	2000			
TRD-N2500-RZVD	<-->	2500			

Incremental Medium Duty Hollow Shaft Encoders (Totem-pole Output, TRD-NHxxx-RZWD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-NH3-RZWD	<-->	3	5-30 VDC	Totem-pole sink/source	50mm
TRD-NH4-RZWD	<-->	4			
TRD-NH5-RZWD	<-->	5			
TRD-NH10-RZWD	<-->	10			
TRD-NH30-RZWD	<-->	30			
TRD-NH40-RZWD	<-->	40			
TRD-NH50-RZWD	<-->	50			
TRD-NH60-RZWD	<-->	60			
TRD-NH100-RZWD	<-->	100			
TRD-NH120-RZWD	<-->	120			
TRD-NH200-RZWD	<-->	200			
TRD-NH240-RZWD	<-->	240			
TRD-NH250-RZWD	<-->	250			
TRD-NH300-RZWD	<-->	300			
TRD-NH360-RZWD	<-->	360			
TRD-NH400-RZWD	<-->	400			
TRD-NH480-RZWD	<-->	480			
TRD-NH500-RZWD	<-->	500			
TRD-NH600-RZWD	<-->	600			
TRD-NH750-RZWD	<-->	750			
TRD-NH1000-RZWD	<-->	1000			
TRD-NH1200-RZWD	<-->	1200			
TRD-NH2000-RZWD	<-->	2000			
TRD-NH2500-RZWD	<-->	2500			

# Medium Duty Incremental Encoders

Note: Yellow shaded part numbers are non-stock. Availability may range from four to six

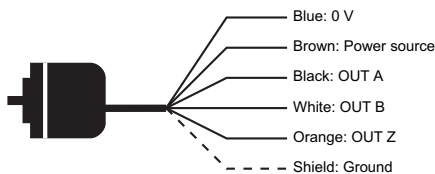
Incremental Medium Duty Standard Shaft Encoders (Line Driver Output, TRD-Nxxx-RZVWD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-N3-RZVWD	<-->	3	5VDC	Line driver (differential)	50mm
TRD-N4-RZVWD	<-->	4			
TRD-N5-RZVWD	<-->	5			
TRD-N10-RZVWD	<-->	10			
TRD-N30-RZVWD	<-->	30			
TRD-N40-RZVWD	<-->	40			
TRD-N50-RZVWD	<-->	50			
TRD-N60-RZVWD	<-->	60			
TRD-N100-RZVWD	<-->	100			
TRD-N120-RZVWD	<-->	120			
TRD-N200-RZVWD	<-->	200			
TRD-N240-RZVWD	<-->	240			
TRD-N250-RZVWD	<-->	250			
TRD-N300-RZVWD	<-->	300			
TRD-N360-RZVWD	<-->	360			
TRD-N400-RZVWD	<-->	400			
TRD-N480-RZVWD	<-->	480			
TRD-N500-RZVWD	<-->	500			
TRD-N600-RZVWD	<-->	600			
TRD-N750-RZVWD	<-->	750			
TRD-N1000-RZVWD	<-->	1000			
TRD-N1024-RZVWD	<-->	1024			
TRD-N1200-RZVWD	<-->	1200			
TRD-N2000-RZVWD	<-->	2000			
TRD-N2500-RZVWD	<-->	2500			

Incremental Medium Duty Hollow Shaft Encoders (Line Driver Output, TRDH-Nxxx-RZVWD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-NH3-RZVWD	<-->	3	5VDC	Line driver (differential)	50mm
TRD-NH4-RZVWD	<-->	4			
TRD-NH5-RZVWD	<-->	5			
TRD-NH10-RZVWD	<-->	10			
TRD-NH30-RZVWD	<-->	30			
TRD-NH40-RZVWD	<-->	40			
TRD-NH50-RZVWD	<-->	50			
TRD-NH60-RZVWD	<-->	60			
TRD-NH100-RZVWD	<-->	100			
TRD-NH120-RZVWD	<-->	120			
TRD-NH200-RZVWD	<-->	200			
TRD-NH240-RZVWD	<-->	240			
TRD-NH250-RZVWD	<-->	250			
TRD-NH300-RZVWD	<-->	300			
TRD-NH360-RZVWD	<-->	360			
TRD-NH400-RZVWD	<-->	400			
TRD-NH480-RZVWD	<-->	480			
TRD-NH500-RZVWD	<-->	500			
TRD-NH600-RZVWD	<-->	600			
TRD-NH750-RZVWD	<-->	750			
TRD-NH1000-RZVWD	<-->	1000			
TRD-NH1024-RZVWD	<-->	1024			
TRD-NH1200-RZVWD	<-->	1200			
TRD-NH2000-RZVWD	<-->	2000			
TRD-NH2500-RZVWD	<-->	2500			

## Wiring diagrams

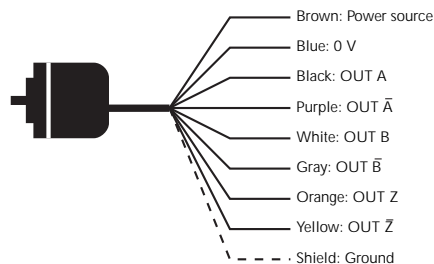
### Totem-pole connections

Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire



### Line driver connections

Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire

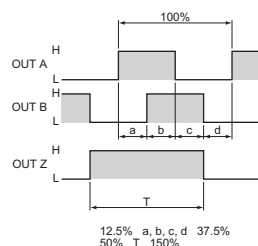


# Medium Duty Incremental Encoders

Electrical Specifications				
<b>Model</b>		<b>TRD-N/NHxxxx-RZWD (Totem-pole)</b>	<b>TRD-N/NHxxxx-RZVWD (Line Driver)</b>	
<b>Power Supply</b>	<b>Operating Voltage</b>	4.75 - 30VDC*	+4.75 - 5.25VDC*	
	<b>Allowable Ripple</b>	3% rms max.	-	
	<b>Current Consumption</b>	60 mA max.		
<b>Signal Waveform</b>		Two-phase + home position		
<b>Max. Response Frequency</b>		100kHz max.		
<b>Duty Ratio</b>		50 ± 25% (square wave)		
<b>Signal Width at Home Position</b>		100 ± 50%		
<b>Output</b>	<b>Rise/Fall Time</b>	3µs max. (when cable length is 1m)	-	
	<b>Output Type</b>	Totem-pole	Line driver output (26C31 or equivalent)	
	<b>Output Logic</b>	Negative logic (active low)	Negative logic (active high)	
	<b>Output Current</b>	<b>"H"</b>	10mA max.	-
		<b>"L"</b>	30mA max.	-
	<b>Output Voltage</b>	<b>"H"</b>	[(Load power volt) - 2.5V]	-
<b>"L"</b>		0.4V max.	-	
<b>Load Power Voltage</b>		35 VDC max.		
* To be supplied by Class II source				
Mechanical Specifications				
<b>Starting Torque</b>	Max. 0.03 Nm (.0022 ft lbs)			
<b>Max. Allowable Shaft Load</b>	Radial: 50N (11.24 lbs) Axial: 30N (6.74 lbs)			
<b>Max. Allowable Speed</b>	5000 rpm (dust and splash proofed: continuous: 3,000 rpm, instantaneous: 5,000 rpm) (highest speed that can support the mechanical integrity of encoder)			
<b>Wire Size</b>	AWG24			
<b>Weight</b>	Approx. 250g (8.82 oz) with 2m cable			
Environmental Specifications				
<b>Ambient Temperature</b>	10 to 70°C; 14 to 158°F			
<b>Storage Temperature</b>	-25 to 85°C; -13 to 185°F			
<b>Operating Humidity</b>	35-85% RH			
<b>Voltage Withstand</b>	500VAC (50/60Hz) for one minute			
<b>Insulation Resistance</b>	50MΩ min. (excluding shield between power supply, signal cable and case)			
<b>Vibration Resistance</b>	Durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitude (excluding shield between power supply, signal cable and case)			
<b>Shock Resistance</b>	11 ms with 490 m/s <sup>2</sup> applied three times along three axes			
<b>Protection</b>	IP50: dust proof; IP65: dust and splash proof			

## Channel timing chart

Output Signal Timing Chart - Totem Pole Models



The above waveforms apply to normal (clockwise) revolution viewed from the shaft. OUT Z phase is reversed on the RZL and RZWL models.

## Accessories

### Couplings

If you selected an encoder with a solid shaft, please select a coupling that fits your encoder. All couplings are in stock, ready to ship.

See page 20-16 for more information.

### Mounting bracket

JT-035D metal mounting bracket can be used for all TRD-N/NH/NA encoders.

JT-035D

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## How to read the timing charts

### Open Collector Models

Out A and Out B are 90 degrees out of phase. Like any quadrature encoder, four unique logic states are created internal to the encoder. This is based on the rising edge to rising edge (one cycle) on channel A or B that indicates that one set of bars on the internal encoder disk has passed by the optical sensor.

OUT Z is the absolute reference added to an incremental encoder and is also known as home position. It signifies a full rotation of the encoder disk.

### Line Driver Models

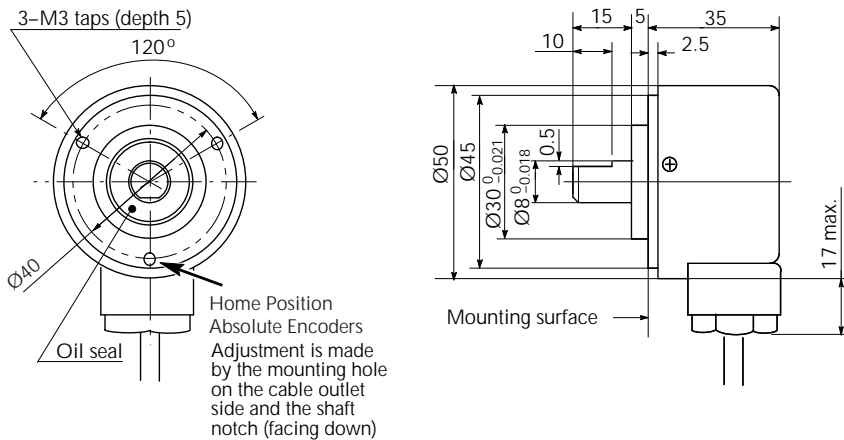
Channel A (OUT A and A-not) and Channel B (OUT B and B-not) are also 90 degrees out of phase on line driver encoders. OUT Z is the same as on open collector models, and is the absolute reference (home position). It signifies one full rotation of the encoder.

# Medium Duty Absolute and Incremental

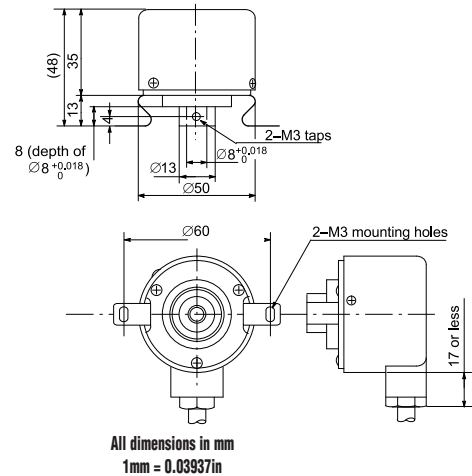
## Dimensions

The following are the external dimensions of both incremental and absolute medium duty encoders and the optional mounting bracket.

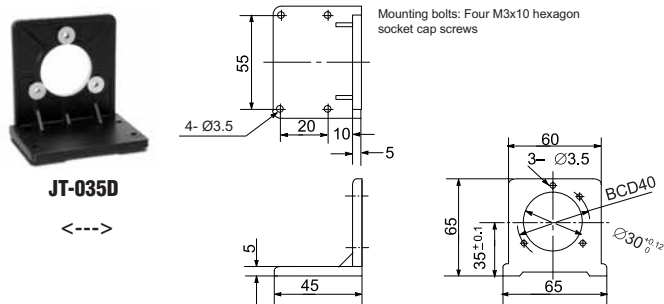
### Standard shaft incremental and absolute encoders (TRD-N, TRD-NA)



### Hollow shaft incremental encoders only (TRD-NH)



### Optional mounting bracket for all medium duty encoders



PLC Overview

DL05/06 PLC

DL105 PLC

DL205 PLC

DL305 PLC

DL405 PLC

Field I/O

Software

C-more HMIs

Other HMI

AC Drives

Motors

Steppers/Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pushbuttons/Lights

Process

Relays/Timers

Comm.

TB's & Wiring

Power

Circuit Protection

Enclosures

Appendix

Part Index