

Medium Duty Incremental Encoders (SAE Dimension Encoders)

TRDA-20 series

Features

A medium duty encoder that is cost-effective for small applications; has the following features:

- Small body with 2.0 in. diameter and 1.7 in. depth
- 0.375 in. diameter solid shaft
- Resolution available from 100 pulses per revolution to 2500 pulses per revolution
- Totem pole or line driver output
- Up to 100 kHz response frequency (totem pole)
- Up to 200 kHz response frequency (line driver)
- Two-meter cable with tinned ends
- IP50 environmental rating



TRDA-20R1N models

TRDA-20 Medium Duty Solid-shaft Incremental Encoders (Totem-pole and Line-driver Output Models)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRDA-20R1N100RZD		100	5-30 VDC	Totem-pole sink/source	2.0 in.
TRDA-20R1N360RZD		360			
TRDA-20R1N500RZD		500			
TRDA-20R1N1000RZD		1000			
TRDA-20R1N1024RZD		1024			
TRDA-20R1N2500RZD		2500			
TRDA-20R1N100VD		100	5VDC	Line-driver (differential)	
TRDA-20R1N360VD		360			
TRDA-20R1N500VD		500			
TRDA-20R1N1000VD		1000			
TRDA-20R1N1024VD		1024			
TRDA-20R1N2500VD		2500			

Accessories

Accessories for TRDA-20 Series Encoders *		
Part Number *	Price	Description
TRDA-20R1D		Mounting flange, round, 1.5 inch bolt-hole circle
TRDA-20R2D		Mounting flange, round, 1.625 inch bolt-hole circle
TRDA-20SND		Mounting flange, square
LM-001D**		Mounting bracket for TRDA-20 & TRDA-25 encoders

* The accessories in this table work only with TRDA-20R1Nxxxxxx series encoders, unless marked otherwise.
 ** Use of LM-001D also requires a TRDA-20SND replacement mounting flange, plus four customer-supplied 6-32 x 0.50 in long fasteners.

Couplings

For encoders with a solid shaft, please select a coupling that fits your encoder. All couplings are in stock, ready to ship.

See the "Encoder Couplings" section for more information.



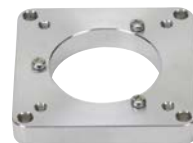
LM-001D



TRDA-20R1D



TRDA-20R2D



TRDA-20SND

Medium Duty Incremental Encoders (SAE Dimension Encoders)

Specifications – TRDA-20 series

Electrical Specifications (SAE Dimension Medium Duty)				
Model		TRDA-20R1NxxxxRZD (Totem-pole)	TRDA-20R1NxxxxVD (Line Driver)	
Power Supply	Operating Voltage *	5–30 VDC (nominal) * Range: 4.75–30.0 VDC	5VDC (nominal) * Range: 4.75–5.25 VDC	
	Allowable Ripple	3% rms max		
	Current Consumption	60 mA max		
Output Waveform	Signal Waveform	Quadrature + home position		
	Max. Response Frequency	100 kHz	200 kHz	
	Operating Speed	(max response frequency / resolution) x 60		
	Duty Ratio (Symmetry)	50% ±25%		
	Index Signal Width (at home position)	100% ±50%		
Output	Rise/Fall Time **	3µs max **	100 ns max **	
	Output Type	Totem-pole	Line driver (26C31 or equivalent)	
	Output Current	Inflow	30 mA max	20 mA max
		Outflow	10 mA max	
	Output Voltage	H	[(power voltage voltage) - (2.5V)] min	2.5V min
		L	0.4V max	0.5V max
	Load Power Supply Voltage	35 VDC max	–	
Short-Circuit Protection	between each output and 0V terminal	–		
* To be supplied by Class II source.				
** With a cable of 2m or less; Max load.				
Mechanical Specifications				
Starting Torque	0.003 N-m (0.002 lb-ft) max @ 20 °C [68 °F]			
Max Allowable Shaft Load	Radial: 50N (11.2 lb); Axial: 30N (6.7 lb)			
Max Allowable Speed	5000 rpm (max speed that the mechanical integrity of encoder can support)			
Wire Size	0.2 mm ² [24 AWG] shielded, oil-resistant PVC			
Mounting Orientation	can be mounted in any orientation			
Weight	approx 270g (9.52 oz) [with 2m cable]			
Environmental Specifications				
Ambient Temperature	-10 to 70 °C [14 to 158 °F]			
Storage Temperature	-25 to 85 °C [-13 to 185 °F]			
Operating Humidity	35 to 85 %RH			
Voltage Withstand	500 VAC @ 50/60Hz for one minute	grounded through capacitor		
Insulation Resistance	50 MΩ min (excluding shield)			
Vibration Resistance	10 to 55 Hz with 0.75 mm half amplitude; durable for one hour along three axes			
Shock Resistance	11 ms ~ 500 P/R metal slit 981 m/s ² applied three times along three axes 11 ms ~ 600 P/R glass slit 490 m/s ² applied three times along three axes			
Protection	IP50			
Agency Approvals	cUL _{US} (E189395)			

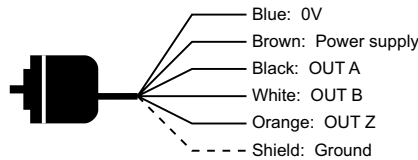
Medium Duty Incremental Encoders (SAE Dimension Encoders)

Specifications – TRDA-20 series

Wiring Diagrams

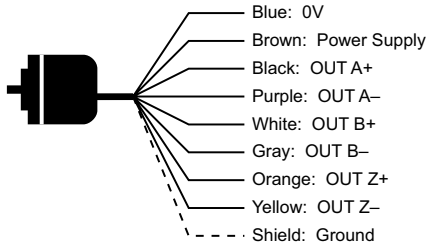
Totem Pole Connections

Cable shield is connected to the encoder body (frame ground)



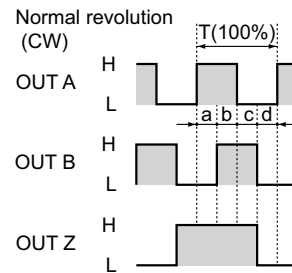
Line Driver Connections

Cable shield is connected to the encoder body (frame ground)



Channel Timing Charts

Totem Pole Models (TRDA-20R1NxxxRZD)



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

"Normal" means clockwise revolution viewed from the shaft

How to read the timing charts

Totem Pole Models

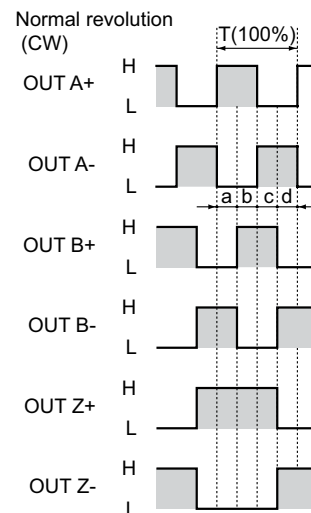
Out A and Out B are 90 degrees out of phase. Like any quadrature encoder, four unique logic states are created internally to the encoder. This is based on the rising edge to rising edge (one cycle) on channel A or B that indicates one set of bars on the internal encoder disk has passed by the optical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

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 shaft.

Line Driver Models (TRDA-20R1NxxxVD)



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

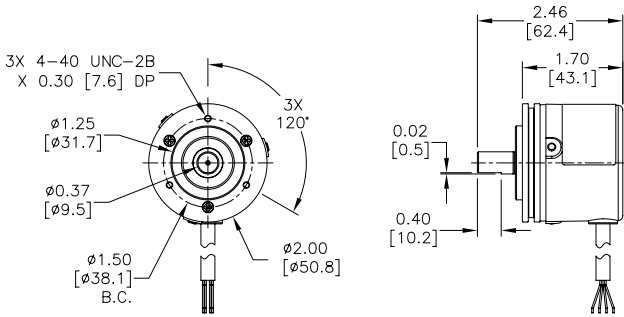
"Normal" means clockwise revolution viewed from the shaft

Medium Duty Incremental Encoders (SAE Dimension Encoders)

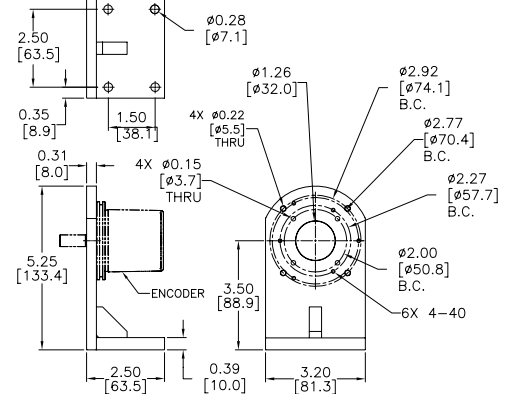
Dimensions – TRDA-20 series

Dimensions = in [mm]

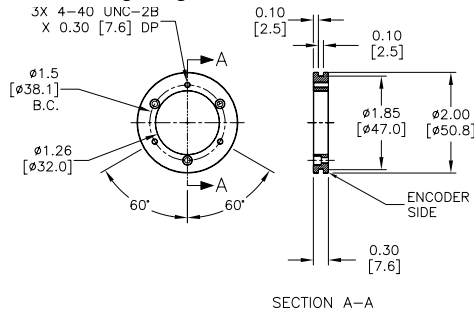
TRDA-20R1NxxxxxD



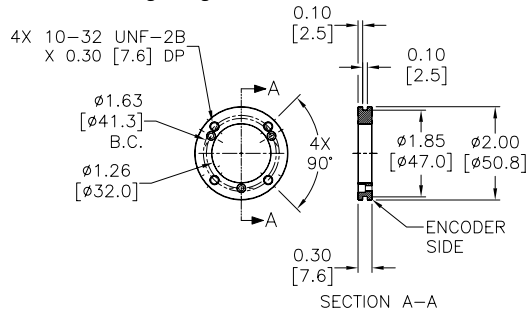
LM-001D Mounting Bracket



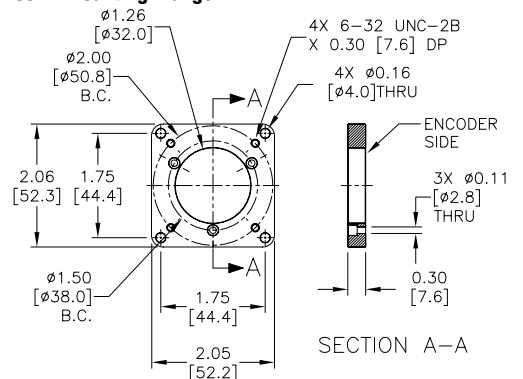
TRDA-20R1D Mounting Flange



TRDA-20R2D Mounting Flange



TRDA-20SND Mounting Flange



Medium Duty Incremental Encoders (SAE Dimension Encoders)

TRDA-25 series

Features

A medium duty encoder that is cost-effective for small applications; has the following features:

- Small body with 2.0 in. diameter and 2.15 in. depth
- 0.375 in diameter solid shaft
- Removable 2.5 in. round flange
- Resolution available from 100 pulses per revolution to 2500 pulses per revolution
- Totem pole or line driver output
- Up to 100 kHz response frequency (totem pole)
- Up to 200 kHz response frequency (line driver)
- Military-style connector (cable sold separately)
- IP65 environmental rating



TRDA-25 models

Accessories

Couplings

For encoders with a solid shaft, please select a coupling that fits your encoder. All couplings are in stock, ready to ship. See the "Encoder Couplings" section for more information on.

TRDA-25 Medium Duty Solid-shaft Incremental Encoders – (Totem-pole and Line-driver Output Models) – MS Connector *					
Part Number *	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRDA25RN100RZWDMS		100	5–30 VDC	Totem-pole sink/source	2.0 in. (2.5 in. round flange)
TRDA25RN360RZWDMS		360			
TRDA25RN500RZWDMS		500			
TRDA25RN1000RZWDMS		1000			
TRDA25RN1024RZWDMS		1024			
TRDA25RN2500RZWDMS		2500	5VDC	Line-driver (differential)	
TRDA25RN100VWDMS		100			
TRDA25RN360VWDMS		360			
TRDA25RN500VWDMS		500			
TRDA25RN1000VWDMS		1000			
TRDA25RN1024VWDMS		1024			
TRDA25RN2500VWDMS		2500			

* TRDA25RNxxxxWDMS encoders do NOT include cables or connectors, which are sold separately in the "Accessories" section.

Accessories for TRDA-25 Series Encoders *		
Part Number *	Price	Description
TRDA-25RND		Mounting flange, round (2.5 in. dia. w/ 1.88 in B.C.)
TRDA-25SND		Mounting flange, square (2.5 in. dia.)
TRDA-25CON-RZWD		Connector for TRDA-25RNxxxRZWD-MS, Totem Pole output, 7-pin MS connector
TRDA-25CBL-RZWD-10**		Cable for TRDA-25RNxxxRZWD-MS, Totem Pole output, 7-pin MS connector, 10 ft
TRDA-25CBL-RZWD-20**		Cable for TRDA-25RNxxxRZWD-MS, Totem Pole output, 7-pin MS connector, 20 ft
TRDA-25CBL-RZWD-30**		Cable for TRDA-25RNxxxRZWD-MS, Totem Pole output, 7-pin MS connector, 30 ft
TRDA-25CON-VWD		Connector for TRDA-25RNxxxVWD-MS, Line Driver output, 10-pin MS connector
TRDA-25CBL-VWD-10**		Cable for TRDA-25RNxxxVWD-MS, Line Driver output, 10-pin MS connector, 10 ft
TRDA-25CBL-VWD-20**		Cable for TRDA-25RNxxxVWD-MS, Line Driver output, 10-pin MS connector, 20 ft
TRDA-25CBL-VWD-30**		Cable for TRDA-25RNxxxVWD-MS, Line Driver output, 10-pin MS connector, 30 ft
LM-001D***		Mounting bracket for TRDA-20 & TRDA-25 encoders

* The accessories in this table work only with TRDA-25RNxxxxWD-MS series encoders, unless marked otherwise.
 ** Cables have IP65 environmental rating.
 *** Use of LM-001D also requires a TRDA-25SND replacement mounting flange, plus four customer-supplied 6-32 x 0.50 in long fasteners.



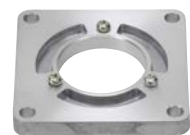
TRDA-25-CON-RZWD



LM-001D



TRDA-25RND



TRDA-25SND



TRDA-25-CON-VWD



TRDA-25CBL-RZWD



TRDA-25CBL-VWD

Medium Duty Incremental Encoders (SAE Dimension Encoders)

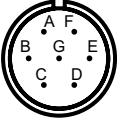
Specifications – TRDA-25 series

Electrical Specifications – TRDA-25 (SAE Dimension Medium Duty)				
Model		TRDA25RNxxxxRZWDMS (Totem-pole)	TRDA25RNxxxxVWDMS (Line Driver)	
Power Supply	Operating Voltage *	5–30 VDC (nominal) * Range: 4.75–30.0 VDC	5VDC (nominal) * Range: 4.75–5.25 VDC	
	Allowable Ripple	3% rms max		
	Current Consumption	60 mA max		
Output Waveform	Signal Waveform	Quadrature + home position		
	Max. Response Frequency	100 kHz	200 kHz	
	Operating Speed	(max response frequency / resolution) x 60		
	Duty Ratio (Symmetry)	50% ±25%		
	Index Signal Width (at home position)	100% ±50%		
Output	Rise/Fall Time **	3µs max **	100 ns max **	
	Output Type	Totem-pole	Line driver (26C31 or equivalent)	
	Output Current	Inflow	30 mA max	20 mA max
		Outflow	10 mA max	
	Output Voltage	H	[(power voltage voltage) - (2.5V)] min	2.5V min
		L	0.4V max	0.5V max
	Load Power Supply Voltage	35 VDC max		–
Short-Circuit Protection	between each output and 0V terminal		–	
* To be supplied by Class II source.				
** With a cable of 2m or less; Max load.				
Mechanical Specifications				
Starting Torque	0.05 N·m [0.04 lb·ft] @ 20 °C [68 °F]			
Max Allowable Shaft Load	Radial: 50N [11.2 lb]; Axial: 30N [6.7 lb]			
Max Allowable Speed	3000 rpm (max speed that the mechanical integrity of encoder can support)			
Wire Size	–			
Mounting Orientation	can be mounted in any orientation			
Weight	approx 280g [9.88 oz]			
Environmental Specifications				
Ambient Temperature	-10 to 70 °C [14 to 158 °F]			
Storage Temperature	-25 to 85 °C [-13 to 185 °F]			
Operating Humidity	35 to 85 %RH			
Voltage Withstand	500 VAC @ 50/60Hz for one minute	grounded through capacitor		
Insulation Resistance	50 MΩ min (excluding shield)			
Vibration Resistance	10 to 55 Hz with 0.75 mm half amplitude; durable for one hour along three axes			
Shock Resistance	11 ms ~ 500 P/R metal slit 981 m/s ² applied three times along three axes 11 ms ~ 600 P/R glass slit 490 m/s ² applied three times along three axes			
Protection	IP65			
Agency Approvals	cUL _{US} (E189395)			

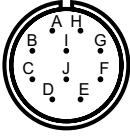
Medium Duty Incremental Encoders (SAE Dimension Encoders)

Specifications – TRDA-25 series

Connector Pin-out

TRDA25RNxxxRZWDMS (Totem Pole)		
Connector	Pin	Signal
 <p>Viewed from wiring side (rear)</p>	A	Out A
	B	Out B
	C	Out Z
	D	Power Supply
	E	n.c.
	F	0V
	G	ground

A shielding wire is connected to frame ground.

TRDA25RNxxxVWDMS (Line Driver)		
Connector	Pin	Signal
 <p>Viewed from wiring side (rear)</p>	A	Out A+
	B	Out B+
	C	Out Z+
	D	Power Supply
	E	n.c.
	F	0V
	G	ground
	H	Out A-
	I	Out B-
	J	Out Z-

A shielding wire is connected to frame ground.

How to read the timing charts

Totem Pole Models

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

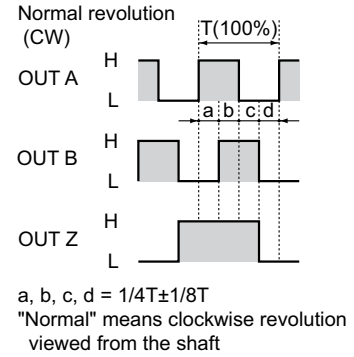
OUT Z is the absolute reference added to an incremental encoder and is also known as home position. It signifies a full rotation of the encoder shaft.

Line Driver Models

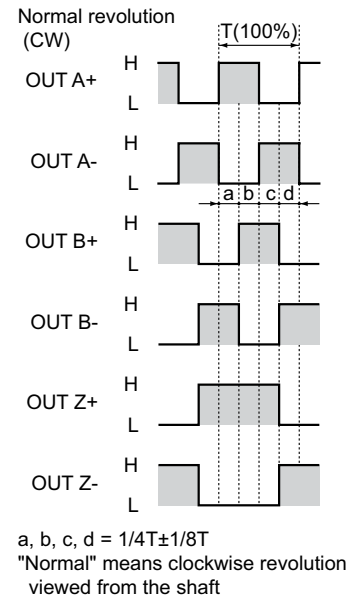
Channel A (OUT A and A-not) and Channel B (OUT B and B-not) are also 90 degrees out of phase on line driver encoders. OUT Z is the same as on open collector models, and is the absolute reference (home position). It signifies one full rotation of the encoder shaft.

Channel Timing Charts

Totem Pole Models (TRDA25RNxxxRZWDxx)



Line Driver Models (TRDA25RNxxxVWDxx)

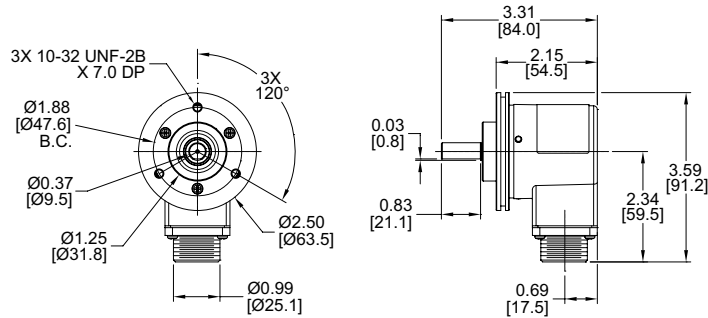


Medium Duty Incremental Encoders (SAE Dimension Encoders)

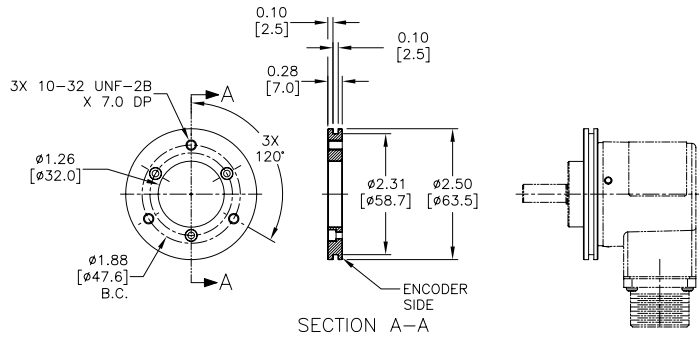
Dimensions – TRDA-25 series

Dimensions = in [mm]

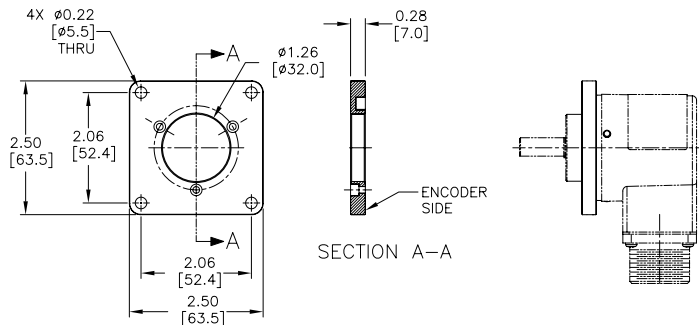
TRDA25RN Encoder



TRDA-25RND Mounting Flange



TRDA-25SND Mounting Flange



Medium Duty Incremental Encoders (Metric Dimension Encoders)

TRD-N(H) series

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 solid shaft or 8 mm hollow shaft
- Incremental resolution available from 3 pulses per revolution to 5,000 pulses per revolution
- Line driver or Totem-pole (push-pull) output
- Up to 200 kHz response frequency



Solid-shaft (TRD-N) model



Hollow-shaft (TRD-NH) model

Incremental Medium Duty Solid Shaft Encoders (Totem-pole Output, TRD-Nxxx-RZWD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-N3-RZWD		3	5-30 VDC	Totem-pole (push-pull) sink/source	50 mm
TRD-N4-RZWD		4			
TRD-N5-RZWD		5			
TRD-N10-RZWD		10			
TRD-N30-RZWD		30			
TRD-N40-RZWD		40			
TRD-N50-RZWD		50			
TRD-N60-RZWD		60			
TRD-N100-RZWD		100			
TRD-N120-RZWD		120			
TRD-N200-RZWD		200			
TRD-N240-RZWD		240			
TRD-N250-RZWD		250			
TRD-N300-RZWD		300			
TRD-N360-RZWD		360			
TRD-N400-RZWD		400			
TRD-N480-RZWD		480			
TRD-N500-RZWD		500			
TRD-N600-RZWD		600			
TRD-N750-RZWD		750			
TRD-N1000-RZWD		1000			
TRD-N1024-RZWD		1024			
TRD-N1200-RZWD		1200			
TRD-N2000-RZWD		2000			
TRD-N2500-RZWD		2500			
TRD-N3000-RZWD		3000			
TRD-N3600-RZWD		3600			
TRD-N5000-RZWD		5000			

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 (push-pull) sink/source	50 mm
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-NH1024-RZWD		1024			
TRD-NH1200-RZWD		1200			
TRD-NH2000-RZWD		2000			
TRD-NH2500-RZWD		2500			
TRD-NH3000-RZWD		3000			
TRD-NH3600-RZWD		3600			
TRD-NH5000-RZWD		5000			

Medium Duty Incremental Encoders (Metric Dimension Encoders)

TRD-N(H) series

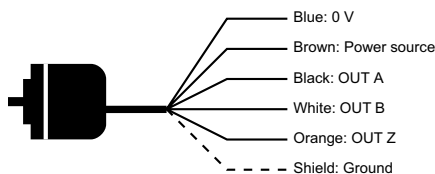
Incremental Medium Duty Solid Shaft Encoders (Line Driver Output, TRD-Nxxx-RZVWD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-N3-RZVWD		3	5VDC	Line driver (differential)	50 mm
TRD-N4-RZVWD		4			
TRD-N5-RZVWD		5			
TRD-N10-RZVWD		10			
TRD-N30-RZVWD		30			
TRD-N40-RZVWD		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			
TRD-N3000-RZVWD		3000			
TRD-N3600-RZVWD		3600			
TRD-N5000-RZVWD		5000			

Incremental Medium Duty Hollow Shaft Encoders (Line Driver Output, TRD-NHxxx-RZVWD)					
Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-NH3-RZVWD		3	5VDC	Line driver (differential)	50 mm
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			
TRD-NH3000-RZVWD		3000			
TRD-NH3600-RZVWD		3600			
TRD-NH5000-RZVWD		5000			

Wiring diagrams

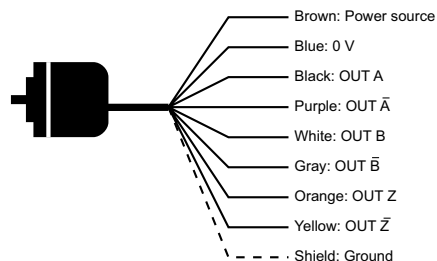
Totem-pole (push-pull) connections

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

(Metric Dimension Encoders)

Specifications – TRD-N(H) series

Accessories

Couplings

For encoders with a **solid shaft**, please select a coupling that fits your encoder. All couplings are typically in stock, ready to ship.

See the “Encoder Couplings” section for more information.

Mounting Flange & Brackets

Mounting Accessories		
Part #	Price	Description
JT-035D		Mounting Bracket: Metal; for use with all TRD-N/NH/NA encoders
NM-9D*		Mounting Clamp: Metal; for use with all TRD-N/NA encoders *
NF-55D*		Mounting Flange Kit: includes aluminum flange & NM-9D clamp; for use with all TRD-N/NA encoders *
TRD-NH-BKT		Flexible mounting bracket, replacement. For use with Koyo TRD-NH series hollow shaft encoders

* Order NF-55D (flange & clamp) for new installations. Order NM-9D (clamp) for replacement parts only.

TRD-NH-BKT



NM-9D



JT-035D



NF-55D



How to read the timing charts

Totem Pole Models

Out A and Out B are 90 degrees out of phase. Like any quadrature encoder, four unique logic states are created internally to the encoder. This is based on the rising edge to rising edge (one cycle) on channel A or B that indicates 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 shaft.

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 shaft.

Electrical Specifications				
Model		TRD-N(H)xxxx-RZWD (Totem-pole)	TRD-N(H)xxxx-RZVWD (Line Driver)	
Power Supply	Operating Voltage *	5–30 VDC (nominal) * Range: 4.75–30.0 VDC	5VDC (nominal) * Range: 4.75–5.25 VDC	
	Allowable Ripple	3% rms max.		
	Current Consumption	60 mA max.		
Signal Waveform		Quadrature + home position		
Max. Response Frequency		100 kHz	100kHz for ≤ 3000 ppr 200kHz for > 3000 ppr	
Operating Speed		(max response frequency / resolution) x 60		
Duty Ratio		50% ±25% (square wave)		
Signal Width at Home Position		100% ±50%		
Output	Rise/Fall Time **	3µs max **	100 ns max **	
	Output Type	Totem Pole (Push Pull)	Line Driver (26C31 or equivalent)	
	Output Current	Negative logic (active low)	Positive logic (active high)	
	Output Current	“H” (inflow)	30 mA max.	20 mA max
		“L” (outflow)	10 mA max.	
	Output Voltage	“H”	[(Load power volt) - 2.5V]	2.5V min
		“L”	0.4V max	0.5V max
Load Power Voltage	35 VDC max		–	

* To be supplied by Class II source

** Cable length ≤ 2m or less. Maximum load.

Mechanical Specifications

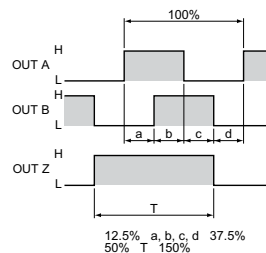
Starting Torque	N (solid shaft): 0.02 N-m [0.18 lb-ft]; NH (hollow shaft): 0.05 N-m [0.44 lb-ft]
Max. Allowable Shaft Load	Radial: 50N [11.24 lb]; Axial: 30N [6.74 lb]
Max. Allowable Speed	Continuous: 3,000 rpm; Instantaneous: 5,000 rpm
Wire Size	24 AWG
Weight	Approx. 270g [9.52 oz] with 2m cable

Environmental Specifications

Ambient Temperature	-10 to 70 °C [14 to 158 °F]
Storage Temperature	-25 to 85 °C [-13 to 185 °F]
Operating Humidity	35–85% RH
Withstand Voltage *	500 VAC (50/60Hz) for one minute * Grounded through a capacitor
Insulation Resistance	50 MΩ min. (excluding shield between power supply, signal cable and case)
Vibration Resistance	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)
Shock Resistance	≤500 ppr (metal slit) = 11 ms with 981 m/s ² applied three times along three axes ≥600 ppr (glass slit) = 11 ms with 490 m/s ² applied three times along three axes
Mounting Orientation	can be mounted in any orientation
Protection	IP65
Agency Approvals	cUL _{US} (E189395)

* Voltage withstand is good for power supply, signal, and case; not good for shield wire.

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 RZW models.

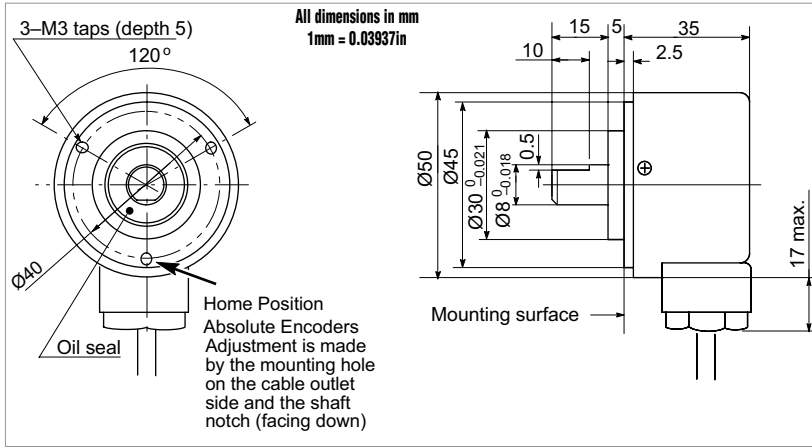
Channel timing chart

Medium Duty Absolute and Incremental Encoders (Metric Dimension Encoders)

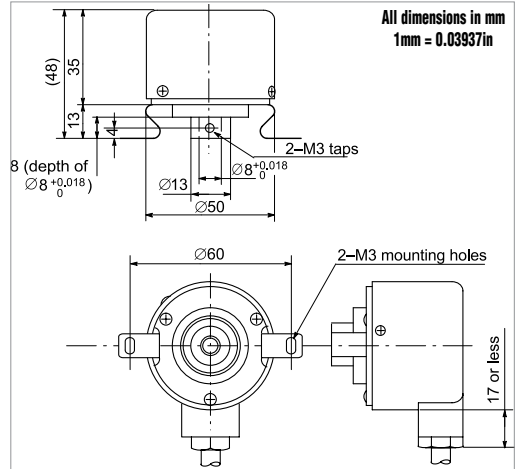
Dimensions – TRD-N(H) & TRD-NA series

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

Solid Shaft Incremental and Absolute Encoders (TRD-N, TRD-NA)



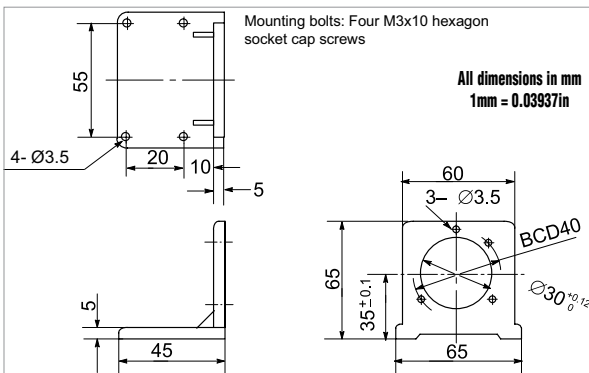
Hollow Shaft Incremental Encoders only (TRD-NH)



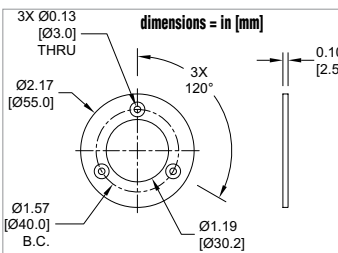
Optional Mounting Flange and Brackets for Medium Duty Encoders

NOTE: NF-55D flange & included NM-9D bracket: Requires (3) M4 x 0.7 tapped holes equally spaced on a 64mm bolt circle in the mounting surface.

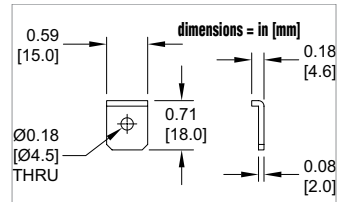
JT-035D (bracket)



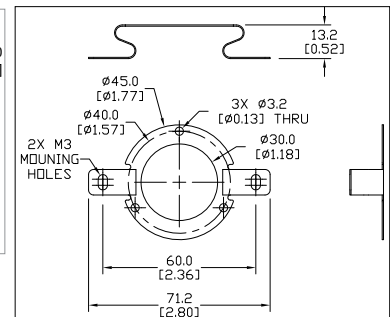
NF-55D (flange)



NM-9D (clamp) (included with NF-55D)



TRD-NH-BKT (bracket)

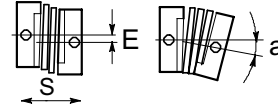


Encoder Accessories – Couplings

Encoder Couplings

Couplings provide a connection between solid-shaft encoders and solid shafts. We offer aluminum, fiberglass, and polymer couplings for metric, S.A.E. and metric-to-S.A.E. applications.

Misalignment compensation



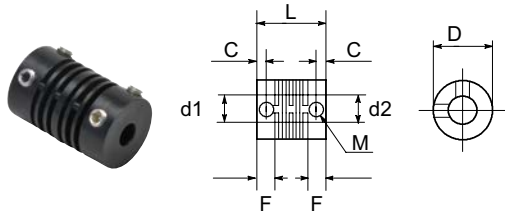
Couplings Selection Guide and Dimensions																
Type	Part Number	Price	Applicable Encoders (shaft size)	Shaft Diameter		D	L	F	C	M	a	E	S	Working Torque	Torsional Rigidity	Material
				d1	d2											
				max			(mm [in])				(N-m)					
Fiberglass (metric)	GJ-4D		TRD-MX (4mm)	4mm	4mm	13 [0.51]	21 [0.83]	5.3 [0.21]	3 [0.12]	M3 set screw	5°	0.4 [0.02]	0.4 [0.02]	0.6 N-m	6 N-m/rad	Glass-fiber reinforced resin
	GJ-6D		TRD-S (6mm)	6mm	6mm	15 [0.59]	22 [0.87]	5.2 [0.20]	3 [0.12]	M3 set screw	6°	0.5 [0.02]	0.12 [0.005]	0.8 N-m	10 N-m/rad	
	GJ-8D		TRD-N/NA (8mm)	8mm	8mm	19 [0.75]	24 [0.94]	6.8 [0.27]	3.5 [0.14]	M4 set screw	5°	0.5 [0.02]	0.4 [0.016]	1.5 N-m	20 N-m/rad	
	GJ-10D		TRD-GK (10 mm)	10 mm	10 mm	22 [0.87]	26 [1.02]	7.1 [0.28]	4 [0.16]	M4 set screw	5°	0.5 [0.02]	0.12 [0.005]	2.0 N-m	32 N-m/rad	
Fiberglass (SAE)	GJ-635D		TRDA-2E (0.25 in)	0.25 in	0.25 in	15 [0.59]	22 [0.87]	5.2 [0.20]	3 [0.12]	M3 set screw	5°	0.5 [0.02]	0.12 [0.005]	0.8 N-m	10 N-m/rad	Glass-fiber reinforced resin
	GJK-953D		TRDA-20/25 (0.375 in)	0.375 in	0.375 in	25 [0.98]	32 [1.26]	7.3 [0.29]	3.5 [0.14]	M4 set screw	5°	0.5 [0.02]	0.12 [0.005]	2.0 N-m	32 N-m/rad	
Polymer (SAE)	STP-MTRA-SC-1412		TRDA-2E (0.25 in)	0.25 in	0.50 in	25 [0.98]	38 [1.50]	9.9 [0.39]	5.4 [0.21]	M3 cap screw	5°	0.3 [0.01]	0.12 [0.005]	3.7 N-m	0.36 °/lb-in	Engineered polymer
	STP-MTRA-SC-3812		TRDA-20/25 (0.375 in)	0.375 in	0.50 in	25 [0.98]	38 [1.50]	9.9 [0.39]	5.4 [0.21]	M3 cap screw	5°	0.3 [0.01]	0.12 [0.005]	3.7 N-m	0.36 °/lb-in	
Aluminum (metric)	ARM-075-5-4D		TRD-MX (4mm)	4mm	5mm	19.1 [0.75]	19.1 [0.75]	4.6 [0.18]	2.4 [0.09]	M3 set screw	5°	0.25 [0.01]	0.25 [0.01]	2.3 N-m	8.2 N-m/rad	Aluminum alloy
	RU-075D		TRD-S (6mm)	6mm	6mm	19.1 [0.75]	19.1 [0.75]	4.6 [0.18]	2.4 [0.09]	M3 set screw	5°	0.25 [0.01]	0.12 [0.005]	1.0 N-m	8.2 N-m/rad	
	JU-100D		TRD-N/NA (8mm)	8mm	8mm	25.4 [1.00]	25.4 [1.00]	6.6 [0.26]	3.8 [0.15]	M5 set screw	5°	0.25 [0.01]	0.25 [0.01]	1.6 N-m	14.3 N-m/rad	
	RU-100D		TRD-GK (10 mm)	10 mm	10 mm	25.4 [1.00]	25.4 [1.00]	6.6 [0.26]	3.8 [0.15]	M5 set screw	5°	0.25 [0.01]	0.12 [0.005]	1.6 N-m	14.3 N-m/rad	
Aluminum (metric-to-SAE)	ML13P-4-476D		TRD-MX (4mm)	4mm	0.1875 in	13 [0.51]	19 [0.75]	5.5 [0.22]	2.5 [0.10]	M2 set screw	5°	0.4 [0.02]	0.2 [0.01]	0.25 N-m	44 N-m/rad	Aluminum alloy (Bent plate: Polyimide)
	ML16P-4-635D		TRD-MX (4mm) TRDA-2E (0.25 in)	4mm	0.25 in	16 [0.63]	23 [0.91]	7 [0.28]	3 [0.12]	M3 set screw	5°	0.6 [0.02]	0.3 [0.01]	0.4 N-m	70 N-m/rad	
	MCGL16-6-635		TRD-S (6mm) TRDA-2E (0.25 in)	6mm	0.25 in	16 [0.63]	23.2 [0.91]	7 [0.28]	3 [0.12]	M3 set screw	3.5°	0.3 [0.01]	0.3 [0.01]	0.4 N-m	70 N-m/rad	
	MCGL20-8-635		TRD-N/NA (8mm) TRDA-2E (0.25 in)	8mm	0.25 in	20 [0.79]	26 [1.02]	7.5 [0.30]	3.7 [0.15]	M3 set screw	3.5°	0.3 [0.01]	0.4 [0.02]	0.6 N-m	130 N-m/rad	
	MCGL20-8-952		TRD-N/NA (8mm) TRDA-20/25 (0.375 in)	8mm	0.375 in	20 [0.79]	26 [1.02]	7.5 [0.30]	3.7 [0.15]	M3 set screw	3.5°	0.3 [0.01]	0.4 [0.02]	0.6 N-m	130 N-m/rad	
	MCGL25-10-635		TRD-GK (10 mm) TRDA-2E (0.25 in)	10 mm	0.25 in	25 [0.98]	30.2 [1.19]	9 [0.35]	4 [0.16]	M4 set screw	3.5°	0.3 [0.01]	0.5 [0.02]	1.4 N-m	240 N-m/rad	
	MCGL25-10-952		TRD-GK (10 mm) TRDA-20/25 (0.375 in)	10 mm	0.375 in	25 [0.98]	30.2 [1.19]	9 [0.35]	4 [0.16]	M4 set screw	3.5°	0.3 [0.01]	0.5 [0.02]	1.4 N-m	240 N-m/rad	
Aluminum (SAE)	ARM-075-635-635D		TRDA-2E (0.25 in)	0.25 in	0.25 in	19.1 [0.75]	19.1 [0.75]	4.6 [0.18]	2.4 [0.09]	M3 set screw	5°	0.25 [0.01]	0.25 [0.01]	1.0 N-m	8.2 N-m/rad	Aluminum alloy
	ARM-100-9525-9525D		TRDA-20/25 (0.375 in)	0.375 in	0.375 in	25.4 [1.00]	25.4 [1.00]	6.6 [0.26]	3.8 [0.15]	M5 set screw	5°	0.25 [0.01]	0.25 [0.01]	1.6 N-m	14.3 N-m/rad	

* mm ÷ 25.4 = inches

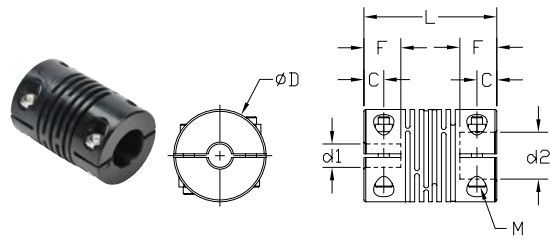
Encoder Accessories – Couplings

Encoder Couplings – Dimensions

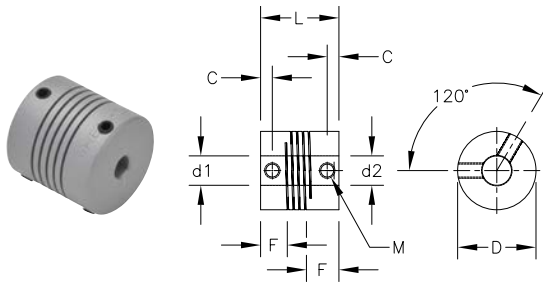
GJ-xxD Fiberglass Couplings (metric) & GJx-xxxD Fiberglass Couplings (SAE)



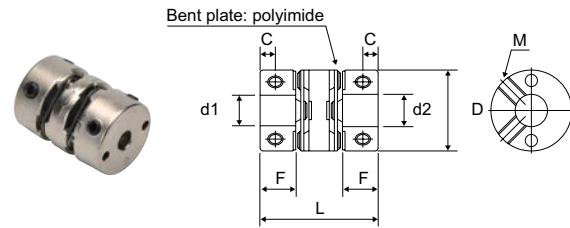
STP-MTRA-SC-xxxx Polymer Couplings



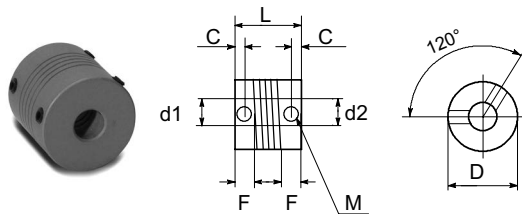
ARM-xxxxxD Aluminum Couplings (metric & SAE)



MCGLxx Aluminum Couplings & ML1xP-4-xxxD Aluminum Couplings



RU-075D, RU-100D, and JU-100D Aluminum Couplings



Great Encoder Selection at Great Prices

Koyo



Heavy-duty TRD-GK

Medium Duty TRD-NH

Medium Duty TRD-N

Medium Duty TRDA-25 (w/MS connector)

Light-duty TRD-MX

Duty	Family	Size	Encoder diameter	Shaft diameter	Solid or Hollow Shaft	Operating Voltage (VDC) and Electrical Output*	IP Rating	Max Radial Load (N)	Max Axial Load (N)	Available resolutions	
Incremental	Light Duty	TRD-MX	10	25mm	4mm	solid	5V Line Driver or 5-12V OC or 12-24V OC	IP50	10	5	100, 360, 500, 1000, 1024
		TRDA-2E	15	1.5"	1/4"	solid	5V Line Driver or 12-24V OC	IP50	30	20	100, 360, 500, 1000, 1024, 2500
		TRD-S	15	38mm	6mm	solid	5V Line Driver or 5-12V OC or 12-24V OC	IP40	20	10	100, 200, 250, 300, 360, 400, 500, 600, 800, 1000, 1024, 1200, 2000, 2500
		TRD-SH	15	38mm	8mm	hollow	5V Line Driver or 5-12V OC or 12-24V OC	IP40	20	10	100, 200, 250, 300, 360, 400, 500, 600, 800, 1000, 1024, 1200, 2000, 2500
	Medium Duty	TRDA-20	20	2"	3/8"	solid	5V Line Driver or 5-30V P/P	IP50	50	30	100, 360, 500, 1000, 1024, 2500
		TRDA-25	25 (w/size 20 body)	2.5" flange (w/ 2.0" body)	3/8"	solid	5V Line Driver or 5-30V P/P	IP65	50	30	100, 360, 500, 1000, 1024, 2500
		TRD-N	20	50mm	8mm	solid	5V Line Driver or 5-30V P/P	IP65	50	30	3, 4, 5, 10, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1000, 1024, 1200, 2000, 2500, 3000, 3600, 5000
	Heavy Duty	TRD-NH	20	50mm	8mm	hollow	5V Line Driver or 5-30V P/P	IP65	50	30	3, 4, 5, 10, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1000, 1024, 1200, 2000, 2500, 3000, 3600, 5000
		TRD-GK	30	78mm	10mm	solid	10-30V P/P	IP65	100	50	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1000, 1200, 1500, 1800, 2000, 2500, 3600, 5000
	Medium Duty Absolute	TRD-NA	20	50mm	8mm	solid	10-30V OC	IP65	50	30	32, 64, 128, 180, 256, 360, 512, 720, 1024, 2048 (Gray code)

All our encoders feature an integral 2m cable except for the TRDA-25 series which has an MS connector

*Operating Voltage and Electrical Output:

- LD = Line Driver (all Line Drivers require 5VDC supply)
- OC = NPN Open Collector (at Operating Voltage)
- P/P = Push Pull or Totem Pole (at Operating Voltage)

Accessories

Couplings

A variety of couplings - metric-to-metric, inch-to-inch (SAE - SAE), and metric-to-inch are in stock, ready to ship.



Flanges

A collection of flanges that ease encoder mounting. Several models are available with round flanges, square flanges and miscellaneous mounting options.

Mounting brackets

Simplify your installation with a ready-to-use right-angle mounting bracket for light, medium and heavy-duty encoders



Cables

For encoders that require a connector cable, we have cables in stock, priced right and ready to ship.