Medium Duty Absolute Encoders (Metric Dimension Encoders)

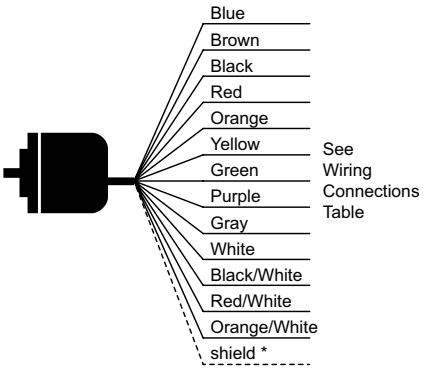
TRD-NA series

Features

Why use an absolute encoder? Absolute encoders provide their exact position at all times, allowing monitoring equipment to read the correct position, even when power cycles. Features include:

- Small body with 50mm diameter and 35mm depth
- Splash proof (IP65 rating)
- 8mm solid shaft
- Absolute resolution available from 32 pulses per revolution to 2048 pulses per revolution
- Open collector output
- Up to 20kHz response frequency

Standard shaft (TRD-NA) model



* Cable shield is not connected to the encoder body;

Absolute Medium Duty Solid Shaft Encoders

Part Number	Price	Resolution	Input Voltage	Output	Body Dia.
TRD-NA32NWD	$287.00	5 bit gray code, 32 pulses per revolution	10–26 VDC	NPN open collector	50 mm
TRD-NA64NWD	$287.00	6 bit gray code, 64 pulses per revolution			
TRD-NA128NWD	$287.00	7 bit gray code, 128 pulses per revolution			
TRD-NA180NWD	$287.00	8 bit gray code, 180 pulses per revolution			
TRD-NA256NWD	$287.00	8 bit gray code, 256 pulses per revolution			
TRD-NA360NWD	$287.00	9 bit gray code, 360 pulses per revolution			
TRD-NA512NWD	$287.00	9 bit gray code, 512 pulses per revolution			
TRD-NA720NWD	$287.00	10 bit gray code, 720 pulses per revolution			
TRD-NA1024NWD	$287.00	10 bit gray code, 1024 pulses per revolution			
TRD-NA2048NWD	$287.00	11 bit gray code, 2048 pulses per revolution			

Wiring Connections

Wire color	Connector Pin No.	Resolution						
		2048	1024 / 720	512 / 360	256 / 180	128	64	32
Blue	1	0V						
Brown	2	12/24V						
Black	3	bit 0 (2^0) *	bit 0 (2^0) *	no connection				
Red	4	bit 1 (2^1) *	bit 1 (2^1) *	bit 0 (2^0) *	no connection			
Orange	5	bit 2 (2^2) *	bit 2 (2^2) *	bit 1 (2^1) *	bit 0 (2^0) *	no connection		
Yellow	6	bit 3 (2^3) *	bit 3 (2^3) *	bit 2 (2^2) *	bit 1 (2^1) *	bit 0 (2^0) *	no connection	
Green	7	bit 4 (2^4) *	bit 4 (2^4) *	bit 3 (2^3) *	bit 2 (2^2) *	bit 1 (2^1) *	bit 0 (2^0) *	no connection
Purple	8	bit 5 (2^5) *	bit 5 (2^5) *	bit 4 (2^4) *	bit 3 (2^3) *	bit 2 (2^2) *	bit 1 (2^1) *	bit 0 (2^0) *
Gray	9	bit 6 (2^6) *	bit 6 (2^6) *	bit 5 (2^5) *	bit 4 (2^4) *	bit 3 (2^3) *	bit 2 (2^2) *	bit 1 (2^1) *
White	10	bit 7 (2^7) *	bit 7 (2^7) *	bit 6 (2^6) *	bit 5 (2^5) *	bit 4 (2^4) *	bit 3 (2^3) *	bit 2 (2^2) *
Black / White	11	bit 8 (2^8) *	bit 8 (2^8) *	bit 7 (2^7) *	bit 6 (2^6) *	bit 5 (2^5) *	bit 4 (2^4) *	bit 3 (2^3) *
Red / White	12	bit 9 (2^9) *	bit 9 (2^9) * (MSB)	bit 8 (2^8) * (MSB)	bit 7 (2^7) * (MSB)	bit 6 (2^6) * (MSB)	bit 5 (2^5) * (MSB)	bit 4 (2^4) * (MSB)
Orange / White	13	bit 10 (2^{10}) * (MSB)	no connection					
Shield	–	GND **						

**** Numbers in parentheses ( ) are the bits corresponding to binary code.***

***** GND (cable shield) is not connected to encoder body; the enclosure is grounded through the 0VDC line.***

Note: Numbers in parentheses ( ) are the bits corresponding to binary code.

Medium Duty Absolute Encoders (Metric Dimension Encoders)

Specifications – TRD-NA series

Electrical Specifications		
Model		***TRD-NAxxxx-NWD***
Power Supply	***Operating Voltage ****	12–24 VDC (nominal) * Range: 10.8–26.4 VDC
	Allowable Ripple	3% rms max.
	Current Consumption	70mA max.
Output Code		Gray binary (38 gray codes at 180 resolution, 76 at 360 resolution, and 152 at 720 resolution)
Max. Response Frequency		20kHz (Maximum revolution speed = (max. response frequency / resolution) x 60). (The encoder does not respond to revolution faster than the maximum speed.)
Accuracy		360 / Resolution x 2 = degree of accuracy
Direction of Rotation		Normal (CW) or reversed (CCW) (When viewed from the shaft, CW is clockwise direction, and CCW is counterclockwise direction)
Rise/Fall Time		2µs max. (at 1kW load resistance and when cable length is 2m or less)
Output	***Output Type***	NPN open collector
	Output Logic	Negative logic (active low)
	Sinking Current	32mA max.
	Residual Voltage	16mA or less: 0.4 V max. 16mA → 32mA: 1.5 V max.
	Load Power Voltage	35VDC max.
**** To be supplied by Class II source***		

Mechanical Specifications	
Starting Torque	0.03 N·m [0.02 lb·ft]
Max. Allowable Shaft Load	Radial: 50N [11.24 lbs] ; Axial: 30N [6.74 lbs]
Max. Allowable Speed	Continuous: 3000 rpm, instantaneous: 5000 rpm; (highest speed that can support the mechanical integrity of encoder)
Wire Size	26 AWG
Weight	Approx. 300g (10.58 oz) with 2m cable

Environmental Specifications	
Ambient Temperature	-10 to 60 °C [14 to 140 °F]
Storage Temperature	-25 to 85 °C [-13 to 185 °F]
Operating Humidity	25–85% RH (with no condensation)
Insulation Resistance	10MΩ min.
Vibration Resistance	Durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitude
Shock Resistance	11ms with 980m/s^2 applied three times along three axes
Mounting Orientation	Can be mounted in any orientation
Protection	IP65
Agency Approvals	$_cUL_{US}$ (E189395)

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 Bracket & Clamps

Mounting Accessories		
Part #	***Price***	***Description***
JT-035D	$11.00	Mounting Bracket: Metal; for use with all TRD-N/NH/NA encoders
NM-9D*	$6.50	Mounting Clamp: Metal; for use with all TRD-N/NA encoders *
NF-55D*	$16.00	Mounting Flange Kit: includes aluminum flange & NM-9D clamp; for use with all TRD-N/NA encoders *
**** Order NF-55D (flange & clamp) for new installations. Order NM-9D (clamp) for replacement parts only.***		

JT-035D

NM-9D

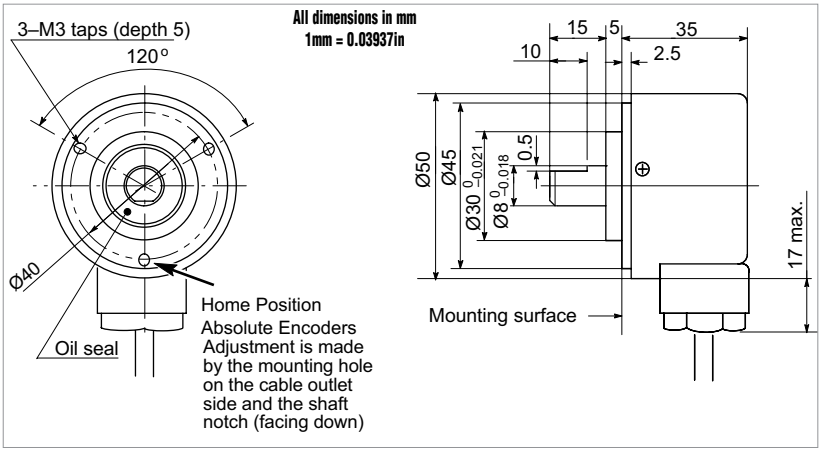
NF-55D

Medium Duty Absolute and Incremental Encoders (Metric Dimension Encoders)

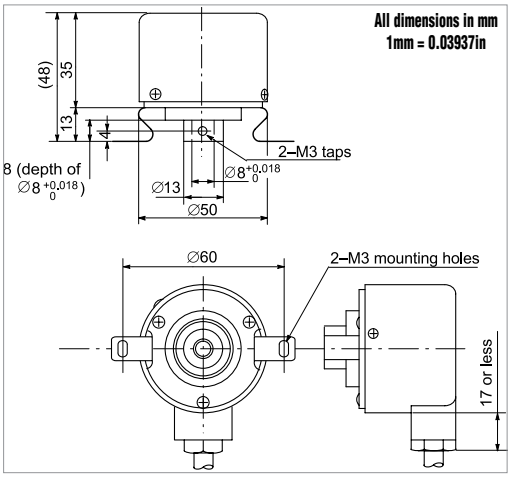
Dimensions – TRD-N(H) & TRD-NA series

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)



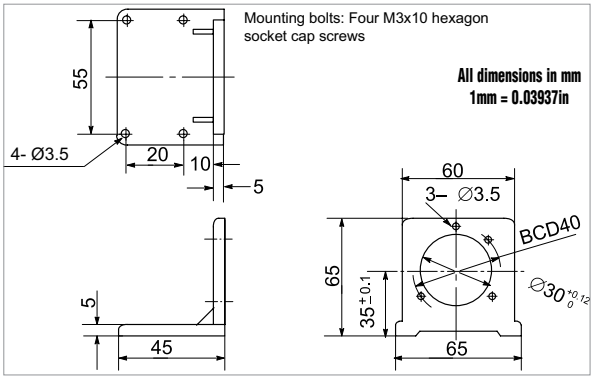
Hollow Shaft Incremental Encoders only (TRD-NH)



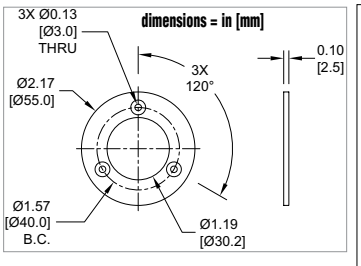
Optional Mounting Flange and Brackets for Medium Duty Encoders

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.

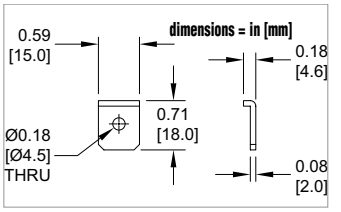
JT-035D (bracket)



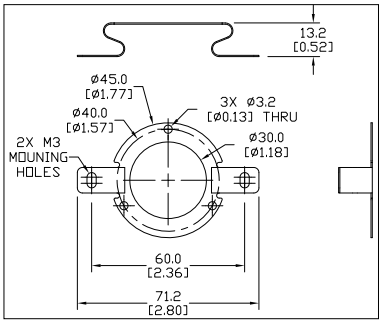
NF-55D (flange)



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



TRD-NH-BKT (bracket)

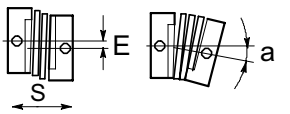


Encoder Accessories – Couplings

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

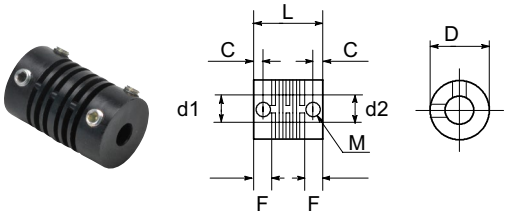
Type	Part Number	Price	Applicable Encoders (shaft size)	Shaft Diameter		D	L	F	C	M	a	E	S	Working Torque	Torsional Rigidity	Material
												max				
				d1	d2	(mm [in])						(mm [in])		(N·m)		
Fiberglass (metric)	GJ-4D	$9.50	TRD-MX (4mm)	4mm	4mm	13 [0.51]	21 [0.83]	5.3 [0.21]	3 [0.12]	M3 set screw	5°	0.4 [0.02]	0.4 [0.02]	0.6 N·m	6 N·m/rad	Glass-fiber reinforced resin
	GJ-6D	$7.50	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	$7.50	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	$9.75	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	$10.50	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	
	GJK-953D	$16.00	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	$20.00	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	$20.00	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	$29.50	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	$46.00	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	$42.00	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	$45.00	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	$29.50	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	$29.50	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	$20.00	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	$29.00	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	$29.00	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	$33.00	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	$33.00	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	$27.50	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	$29.50	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*

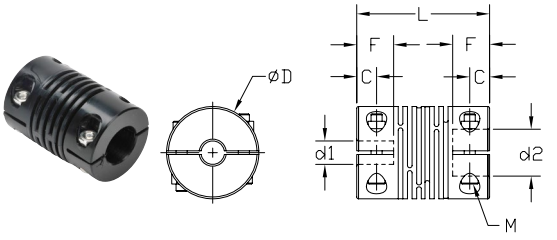
Encoder Accessories – Couplings

Encoder Couplings – Dimensions

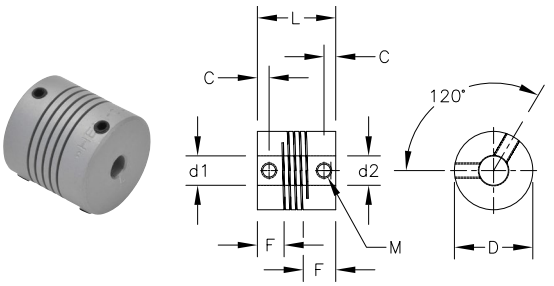
GJ-xxD Fiberglass Couplings (metric) &
GJx-xxxD Fiberglass Couplings (SAE)



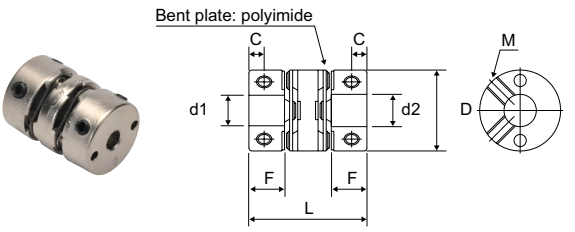
STP-MTRA-SC-xxxx Polymer Couplings



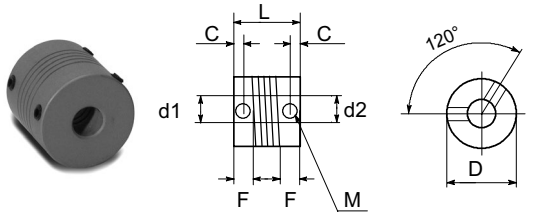
ARM-xxxxxxD Aluminum Couplings (metric & SAE)



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
		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
	Heavy Duty	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.

Mounting brackets

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

Flanges

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

Cables

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