

Medium Duty Absolute Encoders (Metric Dimension Encoders)

TRD-NA series

Features

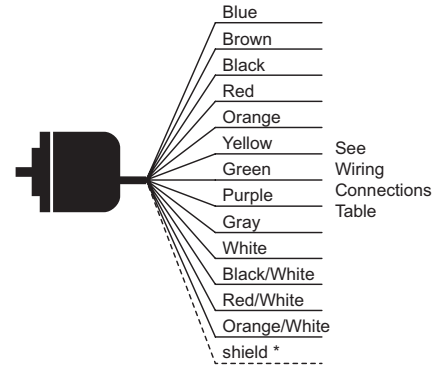
Why use an absolute encoder?

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



Absolute Medium Duty Solid Shaft Encoders					
Part Number	Price	Resolution	Input Voltage	Output	Body Dia.
<u>TRD-NA32NWD</u>	\$384.00	5 bit gray code, 32 pulses per revolution	10-26 VDC	NPN open collector	50 mm
<u>TRD-NA64NWD</u>	\$384.00	6 bit gray code, 64 pulses per revolution			
<u>TRD-NA128NWD</u>	\$384.00	7 bit gray code, 128 pulses per revolution			
<u>TRD-NA180NWD</u>	\$384.00	8 bit gray code, 180 pulses per revolution			
<u>TRD-NA256NWD</u>	\$384.00	8 bit gray code, 256 pulses per revolution			
<u>TRD-NA360NWD</u>	\$384.00	9 bit gray code, 360 pulses per revolution			
<u>TRD-NA512NWD</u>	\$384.00	9 bit gray code, 512 pulses per revolution			
<u>TRD-NA720NWD</u>	\$384.00	10 bit gray code, 720 pulses per revolution			
<u>TRD-NA1024NWD</u>	\$384.00	10 bit gray code, 1024 pulses per revolution			
<u>TRD-NA2048NWD</u>	\$384.00	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 (20) *	bit 0 (20) *	no connection				
Red	4	bit 1 (21) *	bit 1 (21) *	bit 0 (20) *	no connection			
Orange	5	bit 2 (22) *	bit 2 (22) *	bit 1 (21) *	bit 0 (20) *	no connection		
Yellow	6	bit 3 (23) *	bit 3 (23) *	bit 2 (22) *	bit 1 (21) *	bit 0 (20) *	no connection	
Green	7	bit 4 (24) *	bit 4 (24) *	bit 3 (23) *	bit 2 (22) *	bit 1 (21) *	bit 0 (20) *	no connection
Purple	8	bit 5 (25) *	bit 5 (25) *	bit 4 (24) *	bit 3 (23) *	bit 2 (22) *	bit 1 (21) *	bit 0 (20) *
Gray	9	bit 6 (26) *	bit 6 (26) *	bit 5 (25) *	bit 4 (24) *	bit 3 (23) *	bit 2 (22) *	bit 1 (21) *
White	10	bit 7 (27) *	bit 7 (27) *	bit 6 (26) *	bit 5 (25) *	bit 4 (24) *	bit 3 (23) *	bit 2 (22) *
Black / White	11	bit 8 (28) *	bit 8 (28) *	bit 7 (27) *	bit 6 (26) *	bit 5 (25) *	bit 4 (24) *	bit 3 (23) *
Red / White	12	bit 9 (29) *	bit 9 (29) * (MSB)	bit 8 (28) * (MSB)	bit 7 (27) * (MSB)	bit 6 (26) * (MSB)	bit 5 (25) * (MSB)	bit 4 (24) * (MSB)
Orange / White	13	bit 10 (210) * (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.								

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Specifications – TRD-NA series

Electrical Specifications		
Model		TRD-NAxxx-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		$\frac{360}{\text{Resolution}} = \text{degree of accuracy}$
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

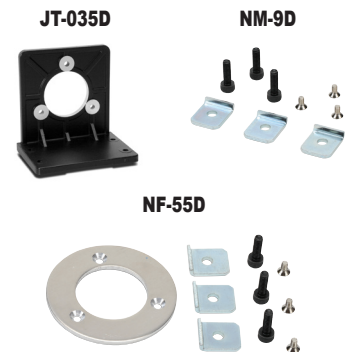
Couplings

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	\$19.00	Mounting Bracket: Metal; for use with all TRD-N/NH/NA encoders
NM-9D*	\$8.50	Mounting Clamp: Metal; for use with all TRD-N/NA encoders *
NF-55D*	\$21.00	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.		

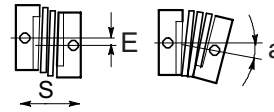


Encoder Accessories – Couplings

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



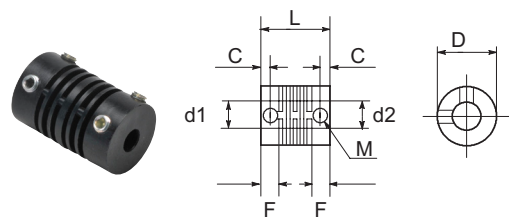
Couplings Selection Guide and Dimensions																
Type	Part Number	Price	Applicable Encoders (shaft size)	Shaft Diameter		D	L	F	C	M	a	E	S	Working Torque	Torsional Rigidity	Material
				d1	d2						max					
						(mm [in])			(mm [in])			(N·m)				
Fiberglass (metric)	GJ-4D	\$12.50	TRD-MX (4mm)	4mm	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	\$9.75	TRD-S/SR (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	\$11.50	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	\$12.50	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	\$23.00	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	\$28.50	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	\$32.50	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	\$32.50	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	\$54.00	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	\$61.00	TRD-S/SR (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	\$54.00	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	\$63.00	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	\$54.00	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	\$54.00	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	\$34.50	TRD-S/SR (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	\$45.00	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	\$46.00	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	\$57.00	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	\$58.00	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	\$55.00	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	\$53.00	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																

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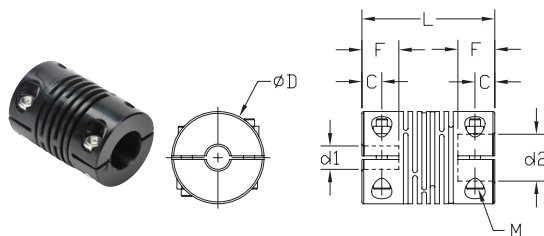
Encoder Accessories – Couplings

Encoder Couplings – Dimensions

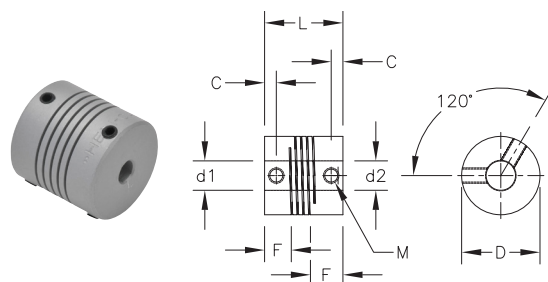
GJ-xxD Fiberglass Couplings (metric) & GJx-xxxD Fiberglass Couplings (SAE)



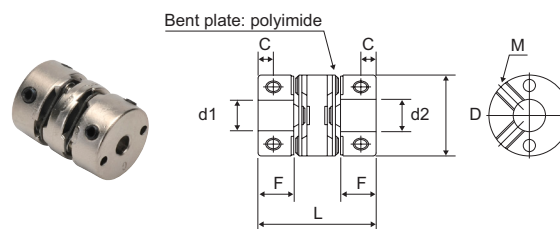
STP-MTRA-SC-xxxx Polymer Couplings



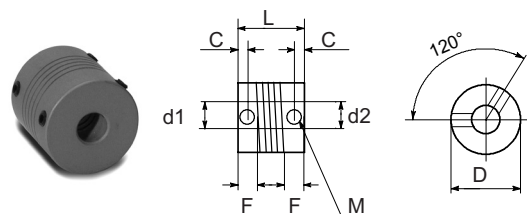
ARM-xxxxxxD Aluminum Couplings (metric & SAE)



MCGLxx Aluminum Couplings & ML1xP-4-xxxD Aluminum Couplings



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



Encoder Selection Guide

SAE Dimension Encoders & Metric Dimension Encoders

Encoder Selection Guide												
Type	Duty	Series	Encoder Diameter	Shaft Diameter	Shaft Type	Operating Voltage (VDC) and Electrical Output	IP Rating	Cable	Max Radial Load (N)	Max Axial Load (N)	Available Resolutions (PPR)	Brand
Incremental	Modular Kit	AMT	28mm, 42mm	2, 3, 4, 5, 6, 8 mm 3/16, 1/4, 3/8, 1/2, 5/8 inch	Hollow	5V Line Driver (TTL) or 5V Push-Pull (Totem Pole)	IP20	Custom cables sold separately	N/A	N/A	Programmable up to 4096	Same Sky
		MTRA	31mm	5mm 1/4", 3/8"	Hollow	5V Line Driver (TTL) or 5V Push-Pull (Totem Pole)	IP20	Custom cables sold separately	N/A	N/A	400, 1000	SureStep
	Light Duty	TRD-S(H)R	38mm, 40mm	8mm	Solid or Hollow	5V Line Driver (TTL) or 5-26V NPN/PNP Open Collector (HTL)	IP50 or IP65	Integral 2m pigtail cable	20	10	100, 200, 360, 500, 600, 1000, 1024, 2000, 2500	JTEKT
		A41	41mm	1/4"	Solid or Hollow	5-30VDC Universal output circuit: Push-Pull (Totem Pole), or NPN/PNP Open Collector (HTL), or Line Driver (TTL)	IP64	Integral 2m pigtail cable	20	20	100, 200, 360, 500, 1000, 1024, 200, 2048, 3600, 4096	Lika
	Medium Duty	A50	50mm	1/4", 3/8"	Hollow		IP65	M12 cables sold separately	20	20	360, 1000, 1024, 2048	
		A80	80mm	30mm (reducer bushings available for 19 & 20mm, 5/8", 7/8", 1, and 1 1/8")	Hollow		IP64	M23 cables sold separately	30	30	1024	
		AQ58/59	58mm, 59mm	3/8" solid, 15mm hollow (reducer bushings available for 6, 8, 10, 11, 12 mm; 1/4, 3/8, 1/2 inch)	Solid or Hollow		IP65	M12 cables sold separately	100	100	Programmable from 1 to 16,384 (default 1024)	
		AR01	58mm	15mm	Solid Dual-shaft		IP65	M12 cables sold separately	50	50	250 (linear res: 0.36 deg/cts) 1250 (linear res: 0.072 deg/cts)	
		TRDA-20	2"	3/8"	Solid	5VDC Line Driver (TTL) or 5-30VDC Push-Pull (Totem Pole)	IP50	Integral 2m pigtail cable	50	30	100, 360, 500, 1000, 1024, 2500	JTEKT
		TRDA-25	2.5" flange (w/2.0" body)	3/8"	Solid		IP65	Military Spec (MS) cables sold separately	50	30	100, 360, 500, 1000, 1014, 2500	
		TRD-N(H)	50mm	8mm	Solid or Hollow		IP65	Integral 2m pigtail cable	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	
	Heavy Duty	TRD-GK	78mm	10mm	Solid	10-30VDC Push-Pull (Totem Pole)	IP65	Integral 2m pigtail cable	100	50	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 1000, 1200, 2000, 2500, 3600, 5000	
Absolute	Medium Duty	TRD-NA	50mm	8mm	Solid	10-30V NPN/PNP Open Collector (HTL)	IP65	Integral 2m pigtail cable	50	30	32, 64, 128, 180, 256, 360, 512, 720, 1024 (Gray code)	Lika
		AM5x ¹	58mm	6–15 mm, 3/8"	Solid or Hollow	5–30 VDC, 10–30 VDC	IP65	M12 cables sold separately	40	40	Programmable up to 8192 ppr (13 bit), up to 16384 turns (14 bit)	

1 - AM5x encoders have different versions supporting 4 different outputs - Ethernet/IP, Modbus TCP, EtherCAT, and Modbus RTU (RS485).