

Light Duty Incremental Encoders (Metric Dimension Encoders)

TRD-SR series

Features

A light duty incremental (quadrature) encoder that is cost-effective for small applications and has the following features:

- Small body available in 38mm or 40mm diameters
- Separate dust proof (IP50 rating) and water resistant (IP65) ratings
- 6 mm solid shaft
- Resolution available from 100 pulses per revolution to 2500 pulses per revolution
- Open collector or line driver output
- Up to 200 kHz response frequency
- Two-meter cable, pigtail
- Mounting dimensions: 2 and 3 hole patterns on 28mm and 30mm diameters



Solid-shaft (TRD-SR) model

TRD-SR Light Duty Solid Shaft Incremental Encoders (NPN Open Collector and Line Driver models)								
Part Number	Price	Pulses per Revolution	Drawing	Input Voltage	Output	Weight	Protection Rating	Body Diameter
TRD-SR100AD	\$05468:	100	PDF	5–26 VDC	NPN open collector	160g with 2m cable	IP50	38mm
TRD-SR200AD	\$0546a:	200	PDF					
TRD-SR360AD	\$0546c:	360	PDF					
TRD-SR500AD	\$-0546j:	500	PDF					
TRD-SR600AD	\$0546s:	600	PDF					
TRD-SR1000AD	\$0546e:	1000	PDF					
TRD-SR1024AD	\$0546g:	1024	PDF					
TRD-SR2000AD	\$-0546i:	2000	PDF					
TRD-SR2500AD	\$0546n:	2500	PDF	5VDC	Line driver (differential)			
TRD-SR100VD	\$05469:	100	PDF					
TRD-SR200VD	\$0546b:	200	PDF					
TRD-SR360VD	\$0546d:	360	PDF					
TRD-SR500VD	\$0546k:	500	PDF					
TRD-SR600VD	\$0546z:	600	PDF					
TRD-SR1000VD	\$-0546f:	1000	PDF					
TRD-SR1024VD	\$0546h:	1024	PDF					
TRD-SR2000VD	\$-0546l:	2000	PDF	5–26 VDC	NPN open collector			
TRD-SR2500VD	\$0546o:	2500	PDF					
TRD-SR100AWD	\$05474:	100	PDF					
TRD-SR200AWD	\$05476:	200	PDF					
TRD-SR360AWD	\$05478:	360	PDF					
TRD-SR500AWD	\$0547a:	500	PDF					
TRD-SR600AWD	\$0547c:	600	PDF					
TRD-SR1000AWD	\$0547e:	1000	PDF					
TRD-SR1024AWD	\$0547g:	1024	PDF	5VDC	Line driver (differential)	190g with 2m cable	IP65	40mm
TRD-SR2000AWD	\$-0547i:	2000	PDF					
TRD-SR2500AWD	\$0547k:	2500	PDF					
TRD-SR100VWD	\$05475:	100	PDF					
TRD-SR200VWD	\$05477:	200	PDF					
TRD-SR360VWD	\$05479:	360	PDF					
TRD-SR500VWD	\$0547b:	500	PDF					
TRD-SR600VWD	\$0547d:	600	PDF					
TRD-SR1000VWD	\$-0547f:	1000	PDF					
TRD-SR1024VWD	\$0547h:	1024	PDF					
TRD-SR2000VWD	\$-0547j:	2000	PDF					
TRD-SR2500VWD	\$-0547l:	2500	PDF					

Light Duty Incremental Encoders (Metric Dimension Encoders)

TRD-SHR series

Features

A light duty incremental (quadrature) encoder that is cost-effective for small applications and has the following features:

- Small body available in 38mm or 40mm diameters
- Separate dust proof (IP50 rating) and water resistant (IP65) ratings
- 8 mm hollow shaft
- Resolution available from 100 pulses per revolution to 2500 pulses per revolution
- Open collector or line driver output
- Up to 200 kHz response frequency
- Two-meter cable, pigtail
- IP50=45mm Ø mounting pattern (can change to 40mm with SHRS-040D), IP65=40mm Ø mounting pattern



Hollow-shaft (TRD-SHR) model

TRD-SHR Light Duty Hollow Shaft Incremental Encoders (NPN Open Collector and Line Driver models)								
Part Number	Price	Pulses per Revolution	Drawing	Input Voltage	Output	Weight	Protection Rating	Body Diameter
TRD-SHR100A5D	\$0546p:	100	PDF	5-26 VDC	NPN open collector	170g with 2m cable	IP50	38mm
TRD-SHR200A5D	\$,0546t:	200	PDF					
TRD-SHR360A5D	\$0546v:	360	PDF					
TRD-SHR500A5D	\$0546y:	500	PDF					
TRD-SHR600A5D	\$,0546[:	600	PDF					
TRD-SHR1000A5D	\$0546#:	1000	PDF					
TRD-SHR1024A5D	\$0546?:	1024	PDF					
TRD-SHR2000A5D	\$05470:	2000	PDF					
TRD-SHR2500A5D	\$05472:	2500	PDF	5VDC	Line driver (differential)			
TRD-SHR100V5D	\$0546q:	100	PDF					
TRD-SHR200V5D	\$0546u:	200	PDF					
TRD-SHR360V5D	\$0546x:	360	PDF					
TRD-SHR500V5D	\$,0546]:	500	PDF					
TRD-SHR600V5D	\$0546_:	600	PDF					
TRD-SHR1000V5D	\$,0546!:	1000	PDF					
TRD-SHR1024V5D	\$,0546,:	1024	PDF					
TRD-SHR2000V5D	\$05471:	2000	PDF	5-26 VDC	NPN open collector			
TRD-SHR2500V5D	\$05473:	2500	PDF					
TRD-SHR100AW0D	\$0547n:	100	PDF					
TRD-SHR200AW0D	\$0547p:	200	PDF					
TRD-SHR360AW0D	\$0547s:	360	PDF					
TRD-SHR500AW0D	\$0547u:	500	PDF					
TRD-SHR600AW0D	\$0547x:	600	PDF					
TRD-SHR1000AW0D	\$0547z:	1000	PDF					
TRD-SHR1024AW0D	\$,0547[:	1024	PDF	5VDC	Line driver (differential)	200g with 2m cable	IP65	40mm
TRD-SHR2000AW0D	\$0547#:	2000	PDF					
TRD-SHR2500AW0D	\$0547?:	2500	PDF					
TRD-SHR100VW0D	\$0547o:	100	PDF					
TRD-SHR200VW0D	\$0547q:	200	PDF					
TRD-SHR360VW0D	\$,0547t:	360	PDF					
TRD-SHR500VW0D	\$0547v:	500	PDF					
TRD-SHR600VW0D	\$0547y:	600	PDF					
TRD-SHR1000VW0D	\$,0547]:	1000	PDF					
TRD-SHR1024VW0D	\$0547_:	1024	PDF					
TRD-SHR2000VW0D	\$,0547!:	2000	PDF					
TRD-SHR2500VW0D	\$,0547,:	2500	PDF					

Light Duty Incremental Encoders (Metric Dimension Encoders)

Specifications – TRD-SR/SRH series

Electrical Specifications				
Model		TRD-SRxxxxAx TRD-SHRxxxxAxx (open collector)		TRD-SRxxxxVx TRD-SHRxxxxVxx (line driver)
Power Supply	Operating Voltage *		5–26 VDC (nominal) * Range: 4.75–26.4 VDC	
	Allowable Ripple		3% max.	
	Current Consumption		90mA max.	
Signal Waveform		Quadrature + home position		
Resolutions Available		100 to 2500 pulses per revolution		
Max. Response Frequency		200kHz		
Max. Electrical Speed**		(max response frequency / resolution) x 60		
Duty Ratio		50% ±25%		
Phase Difference Width		25% ±12.5%		
Signal Width at Home Position		100 ±50%		
Output	Rise/Fall Time		1µs max. (when cable length is 1m)	
	Output Type		NPN open collector output, sinking	Line driver output (26C31 or equivalent)
	Output Logic		Negative logic (active low)	Positive logic (active high)
	Output Voltage	H	–	2.5 V min.
		L	0.4 V max.	0.5 V max.
	Current		30mA max.	20 mA max.
	Load Power Voltage		30 VDC max.	–
	Short-Circuit Protection		Between output and power supply	–
Mechanical Specifications				
Starting Torque	0.001 Nm (0.00074 ft/lb) max			
Shaft Moment of Inertia	0.6 x 10 ⁴ kg·m ²			
Max. Allowable Shaft Load	Radial: 30N (6.7 lb-f); Axial: 20N (4.5 lb-f)			
Max. Mechanical Speed**	6000rpm (maximum possible without compromising encoder mechanical integrity)			
Wire Size	AWG26			
Mounting Orientation	can be mounted in any orientation			
Environmental Specifications				
Ambient Temperature	-10 to 80 °C (14 to 176 °F)			
Storage Temperature	-25 to 85°C (-13 to 185°F)			
Operating Humidity	35–85% RH (non-condensing)			
Withstand Voltage	Grounded through capacitor			
Insulation Resistance	50MΩ min.			
Vibration Resistance	durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitude			
Shock Resistance	11 ms with 490 m/s ² applied three times along three axes			
Protection	IP50 standard encoders. IP65 for encoders with “W” in the part number.			
Agency Approvals	cUL _{US} (E189395)			
* To be supplied by Class II source.				
** Encoder maximum speed is the lesser value of Max. Electrical Speed and Max. Mechanical Speed.				

Light Duty Incremental Encoders (Metric Dimension Encoders)

TRD-SR/SHR series Mounting Accessories

Mounting Accessories					
Part Number	Price	Description	Weight	Drawing	Compatibility
SHRS-040D*	\$5nnv:	Flexible mounting bracket for IP50 hollow shaft encoders, converts standard 45mm mounting to 40mm mounting.	<2g	PDF	TRD-SHR series, IP50
SHRS-045D*	\$5nnx:	Replacement 45mm flexible mounting bracket for IP50 rated hollow shaft encoders.		PDF	
SHRS-W40D*	\$5nnz:	Replacement 40mm flexible mounting bracket for IP65 rated hollow shaft encoders.		PDF	TRD-SHR series, IP65
SRT-035D	\$5nny:	Right angle mounting bracket for solid shaft TRD-SR encoders.	140g	PDF	TRD-SR series

* Note: The IP50 flexible mounting brackets will not fit on the IP65 encoders. Likewise, the IP65 flexible mounting bracket will not fit on the IP50 encoders.



SHRS-040D



SHRS-045D



SHRS-W40D

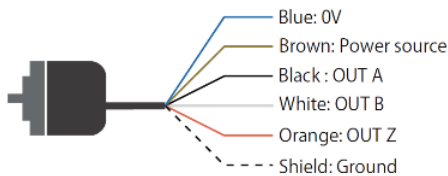


SRT-035D

Wiring diagrams

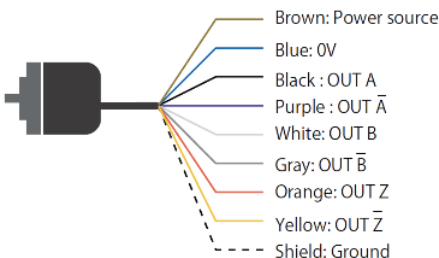
Open Collector Models

Cable shield is NOT connected to the encoder body (frame ground)



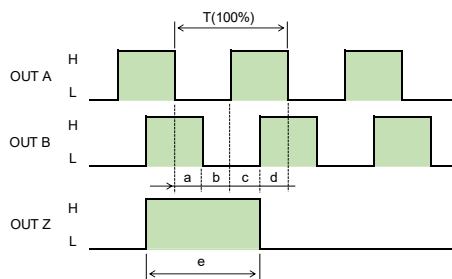
Line Driver Models

Cable shield is NOT connected to the encoder body (frame ground)

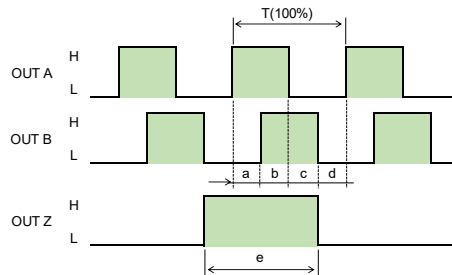


Channel timing charts

TRD-SR/SHR "A" Models



TRD-SR/SHR "V" Models



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

This Output waveform is Normal revolution (CW).
"Normal" means clockwise revolution viewed from the shaft end.

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 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

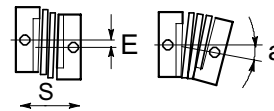
Channel A (OUT A and A-not) and Channel B (OUT B and B-not) are also 90 degrees out of phase on line driver encoders. OUT Z is the same as on open collector models, and is the absolute reference (home position). It signifies one full rotation of the encoder shaft.

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



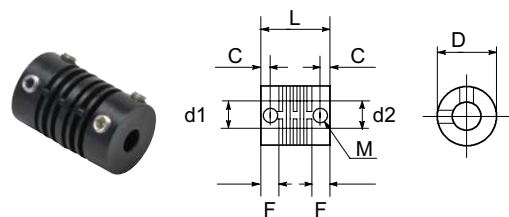
Couplings Selection Guide and Dimensions																
Type	Part Number	Price	Applicable Encoders (shaft size)	Shaft Diameter		D	L	F	C	M	a	E	S	Working Torque	Torsional Rigidity	Material
				d1	d2						max					
						(mm [in])			(mm [in])			(N·m)				
Fiberglass (metric)	GJ-4D	\$0963:	TRD-MX (4mm)	4mm	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	\$965:	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	\$0966:	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	\$0962:	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	\$0964:	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	\$0967:	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	\$-096j:	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	\$096k:	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	\$,095.:	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	\$096g:	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	\$0968:	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	\$096h:	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	\$096e:	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	\$,096f:	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	\$0969:	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	\$096a:	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	\$096b:	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	\$096c:	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	\$096d:	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	\$0960:	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	\$0961:	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																

* mm ÷ 25.4 = inches

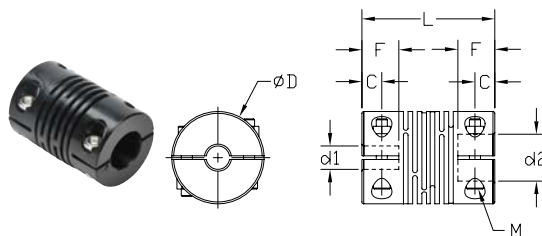
Encoder Accessories – Couplings

Encoder Couplings – Dimensions

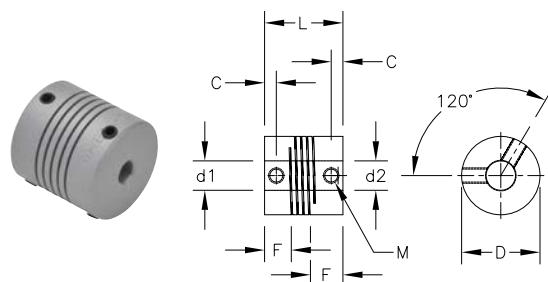
GJ-xxD Fiberglass Couplings (metric) & GJx-xxxD Fiberglass Couplings (SAE)



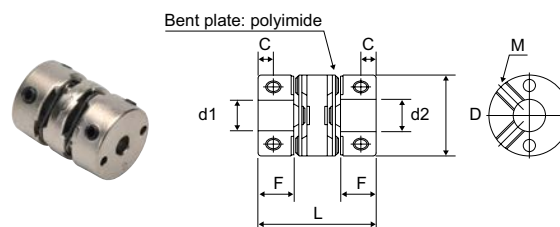
STP-MTRA-SC-xxxx Polymer Couplings



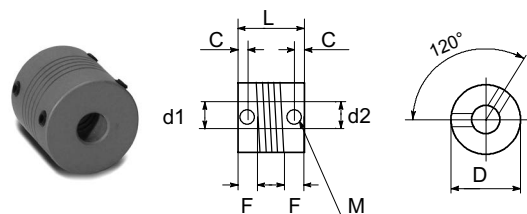
ARM-xxxxxxD Aluminum Couplings (metric & SAE)



MCGLxx Aluminum Couplings & ML1xP-4-xxxD Aluminum Couplings



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



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)	
	Heavy Duty	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	
		TRD-GK	78mm	10mm	Solid		IP65	Integral 2m pigtail cable	100	50	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 1000, 1200, 2000, 2500, 3600, 5000	
		TRD-NA	50mm	8mm	Solid		IP65	Integral 2m pigtail cable	50	30	32, 64, 128, 180, 256, 360, 512, 720, 1024 (gray code)	