Light Duty Incremental Encoders (Metric Dimension Encoders)

TRD-MX series Features

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

- Small body with 25 mm diameter and 29 mm depth
- 4 mm diameter solid shaft
- Resolution available from 100 pulses per revolution to 1024 pulses per revolution
- Open collector output (4.5–13.2 or 10.8–26.4 VDC), or line driver output (4.75–5.25 VDC)
- Up to 100 kHz response frequency
- Two-meter cable with tinned ends
- IP50 environmental rating
- Mounting bracket and couplings are available

TRD-MXxxxx-AD/BD models

TRD-MXxxxx-VD models

Light Duty Solid-shaft Incremental Encoders (NPN Open-collector Output, TRD-MXxxxAD/BD)

Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-MX100AD	<--->	100	4.5–13.2 VDC	NPN Open Collector	25 mm
TRD-MX360AD	<--->	360			
TRD-MX500BD	<--->	500	10.8–26.4 VDC		

Light Duty Solid-shaft Incremental Encoders (Line Driver Output, TRD-MXxxxVD)

Part Number	Price	Pulses per Revolution	Input Voltage	Output	Body Dia.
TRD-MX100VD	<--->	100	4.75–5.25 VDC	Line Driver	25 mm
TRD-MX360VD	<--->	360			
TRD-MX500VD	<--->	500			

Accessories

Accessories for TRD-MX Series Encoders

Part Number	Price	Description
MM-4D	<--->	Servo mounting clamp for TRD-MX series encoders
MT-030D	<--->	Right-angle mounting bracket for TRD-MX series encoders

Couplings

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

See the "Encoder Couplings" section for more information.

MM-4D

MT-030D

Couplings

Light Duty Incremental Encoders (Metric Dimension Encoders)

Specifications – TRD-MX series

Electrical Specifications (Metric Dimension Light Duty TRD-MX)					
Model			**TRD-MXxxxAD (open collector)**	**TRD-MXxxxBD (open collector)**	**TRD-MXxxxVD (line driver)**
Power Supply	**Operating Voltage ***		5–12 VDC (nominal) * 4.5–13.2 VDC	12–24 VDC (nominal) * 10.8–26.4 VDC	5VDC (nominal) * 4.75–5.25 VDC
	Allowable Ripple		3% rms max		
	Current Consumption		50 mA max (no load)		
	Circuit Protection Required		Limit current to 100 mA or less		–
Output Waveform	**Signal Waveform**		Quadrature + home position		
	Max. Response Frequency		100 kHz		
	Operating Speed		(max response frequency / resolution) x 60 Hz		
	Duty Ratio (Symmetry)		50% ±25%		
	Index Signal Width (at Home Position)		100% ±50%		
Output	**Rise/Fall Time ******		2µs ** (sink current < 30 mA)		0.1 µs max ** (source current < 20 mA)
	Output Type		Open collector (NPN sinking)		Line driver (26C31 or equivalent)
	Output Logic		Negative logic (active low)		Positive logic (active high)
	Output Current	**Inflow**	30 mA max		20 mA max
		Outflow	–		
	Output Voltage	**H**	–		2.5V min (source current < 20 mA)
		L	0.4V max (sink current < 30 mA)		0.5V max (source current < 20 mA)
	Load Power Voltage		30 VDC max		–
	Short-circuit Protection		–		–

** To be supplied by Class II source.*
*** Cable length ≤2m or less. Maximum load.*

Mechanical Specifications (Metric Dimension Light Duty TRD-MX)	
Starting Torque	0.001 N·m [0.009 lb·in] max @ 20 °C [68 °F]
Max. Allowable Shaft Load	Axial: 5N [1.1 lb]; Radial: 10N [2.2 lb]
Max. Allowable Speed	6000 rpm (highest speed that can support the mechanical integrity of encoder)
Wire Size	26 AWG, shielded, oil-resistant PVC
Weight	approx 120g [0.3 lb]

Environmental Specifications (Metric Dimension Light Duty TRD-MX)	
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 (non-condensing)
Withstand Voltage *	630V grounded through capacitor (a 630V cap is connected between 0V & FG lines)
Insulation Resistance	20 MΩ min
Vibration Resistance	durable for one hour along three axes @ 10 to 55 Hz with 0.75 mm half-amplitude
Shock Resistance	490 m/s^2 (11 ms applied 3-times, each X, Y, Z)
Mounting Orientation	can be mounted in any orientation
Protection	IP50
Agency Approvals	CE, RoHS, $_{C}UL_{US}$ (E189395)

** Withstand voltage is good for power supply, signal, and case; not good for shield wire.*

Light Duty Incremental Encoders (Metric Dimension Encoders)

Specifications – TRD-MX series

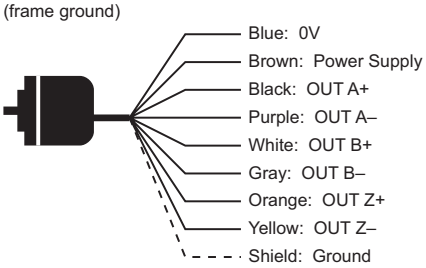
Wiring Diagrams

Open Collector Connections

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

Line Driver Connections

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



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.

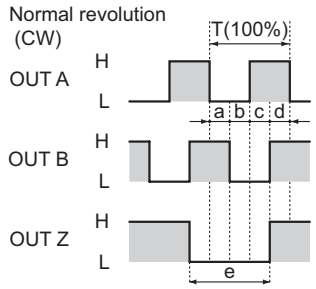
OUT Z is the absolute reference added to an incremental encoder and is also known as home position. It signifies a full rotation of the encoder shaft. It pulses once per revolution.

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. It pulses once per revolution.

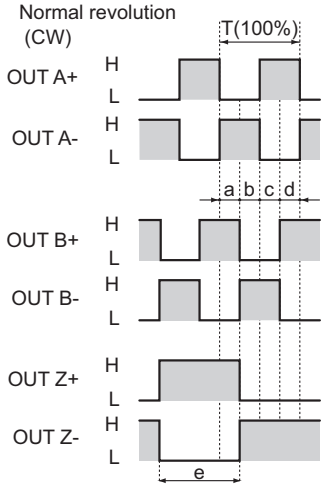
Channel Timing Charts

Open Collector Models (TRD-MXxxxAD/BD)



a, b, c, d = 0.25T ±0.125T; e = 1T ±0.125T
"Normal" means clockwise revolution viewed from the shaft

Line Driver Models (TRD-MXxxxVD)

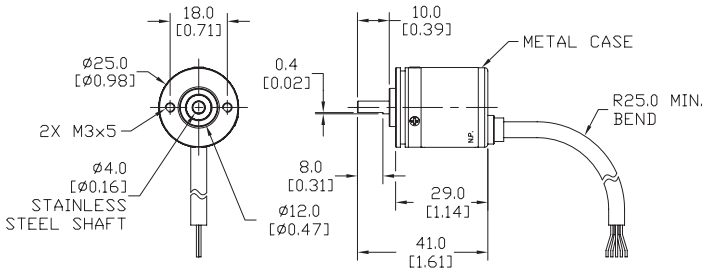


a, b, c, d = 0.25T ±0.125T; e = 1T ±0.125T
"Normal" means clockwise revolution viewed from the shaft

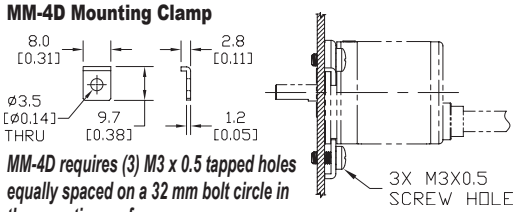
Dimensions – TRD-MX series

Dimensions = mm [in]

TRD-MXxxxxD



MM-4D Mounting Clamp



MM-4D requires (3) M3 x 0.5 tapped holes equally spaced on a 32 mm bolt circle in the mounting surface.

MT-030D Mounting Bracket