Incremental Encoder Series

TRD-MX **OPERATION** MANUAL

Thank you for purchasing this Series TRD-MX Incremental Encoder. Please read this Operation Manual carefully before applying this product. KEEP THIS MANUAL IN A SAFE PLACE.



TRD-MX_DS - 1st Ed, Rev B - 11/2013 - sheet 1 of 1

Electrical Specifications

Electrical	Specifications		TRD-MXxxxAD/BD	TRDA-MXxxxVD	
	Operating voltage *		AD: 4.5–13.2 VDC BD: 10.8–26.4 VDC	4.75–5.25 VDC	
Power Supply	Allowable ripple		3% rms max		
	Current consumption		50mA max (no load)		
	Circuit protection required		Limit current to 100 mA or less	-	
Output Waveform	Signal waveform		Quadrature + home position		
	Max response frequency		100kHz		
	Operating speed		(maximum response frequency / resolution) x 60 Hz		
	Duty ratio (Symmetry)		50% ±25%		
	Index signal width		100% ±50%		
	Rising/falling time **		2µs max	0.1µs max	
	Output configuration		NPN open collector	Line driver (26C31 or equivalent)	
	Output logic		Negative logic (active low)	Positive logic (active high	
	Output current	Inflow	30mA max	- 20mA max	
Output		Outflow	-		
	Output voltage	"H"	-	2.5V min	
		"L"	0.4V max	0.5V max	
	Load power supply voltage		30 VDC max	-	
	Short-circuit protection		-	-	

Safety Considerations



information could prevent injury, loss of property, or even death (in extreme cases) When you see the "notepad" icon in the left-hand margin, the para-

When you see the "exclamation mark" icon in the left-hand margin, the paragraph to its immediate right will be a WARNING. This

GRAPH TO ITS IMMEDIATE RIGHT WILL BE A SPECIAL NOTE WHICH PRESENTS INFORMATION THAT MAY MAKE YOUR WORK QUICKER OR MORE EFFICIENT.

WARNINGS: Operating environment and conditions



Do not use in a combustible or explosive atmosphere. Otherwise personal injury or fire may be caused.

Do not use this product for applications related to human safety. Use is assumed in an application where an accident or incorrect use will not immediately cause danger to humans.

Mechanical Specifications

Mechanical Specifications						
Starting tor	que	Max 0.001 N•m (20°C)				
Shaft Mom	ent of Inertia	1x10 ⁻⁷ kg•m ²				
Max allowable shaft load	Radial	10N				
	Axial	5N				
Max allowa	able speed *	6000 rpm				
Cable	Material	Oil-resistant PVC **				
	Nominal conductor cross section	0.14 mm ²				
	External diameter	5.0 mm				
Weight		approx 120g [0.3 lb] ***				
 * Highest speed that can support mechanical integrity of the encoder. ** AD/BD: 5-conductor shielded cable (26 AWG). VD: 8-conductor shielded cable (26 AWG). *** With 2m cable. 						

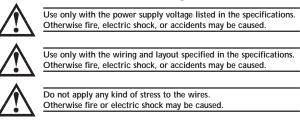
CAUTIONS: Operating environment and conditions



Use and store the equipment within the scope of the environment (VIBRATIONS, IMPACT, TEMPERATURE, HUMIDITY, ETC.) SPECIFIED IN THE SPECIFI-CATIONS. OTHERWISE FIRE OR PRODUCT DAMAGE MAY BE CAUSED.

Read this Operation Manual, and understand this product before USING IT.

WARNINGS: Installation and Wiring



Environmental Specifications

Environmental Conditions							
Ambient Temperature	Operation	-10 to 70 °C [14 to 158 °F]					
	Store	-25 to 85 °C [-13 to 185 °F]					
Ambient Humidity		35 to 85 %RH (non-condensing)					
Withstand Voltage		grounded through capacitor *	withstand voltage is good for power supply, signals, and case;				
Insulation Resistance		20 MΩ min	not good for shield wire				
Vibration Resistance		10 to 55 Hz with 0.75 mm half amplitude **					
Shock Resistance		11 ms with 490 m/s ² ***					
Mounting Orientation		can be mounted in any orientation					
Protective Construction		IP50 (IEC529)					
Agency Approvals		CE, RoHS, _C UL _{US} (E189395)					
* A capacitor of 630V is connected between 0V and FG lines. ** Durable for one (1) hour along 3 axes. (Not guaranteed for continuous use.) *** Applied 3 times 3 axes. (Not guaranteed for continuous use.)							

WARNINGS for Use

• Do not wire the cable in parallel with other power lines, and do not share a wiring duct with other cables. · Use capacitors or surge absorption elements to remove the sparks caused by relays and switches in the control panel

· Connect all wires properly. (Incorrect wiring can damage the internal circuitry.)

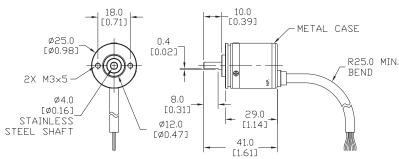
Erroneous pulses may be caused at the time of power ON and power OFF. After power ON, wait at least a 0.5 second before use. • Do not dissasemble the product.

• Use care when handling and mounting the rotary encoder. (It is made of precision components that can be damaged by physical shocks.)

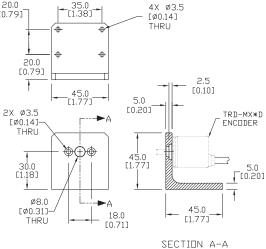
Dimensions – (dimensions = mm [in])

VISIT WWW.AUTOMATIONDIRECT.COM FOR DRAWINGS OF EACH PART NUMBER.

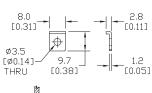
Dimensions – TRD-MX Encoder



Dimensions – MT-030D Bracket 20.0 _ 35.0 [[1.38] [0,79]



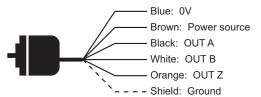




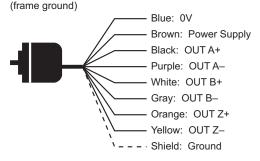
Connections

Open Collector Connections

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

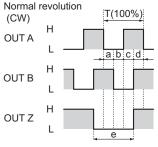


Line Driver Connections Cable shield is connected to the encoder body



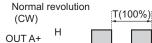
Channel Timing Charts

Open Collector Models (TRD-MXxxxAD/BD)

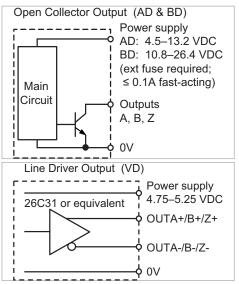


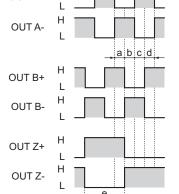
a, b, c, d = 0.25T ±0.125T; e = 1T ±0.125T "Normal" means clockwise revolution viewed from the shaft

Line Driver Models (TRD-MXxxxVD)

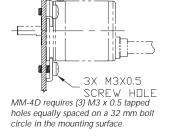


Output Circuits



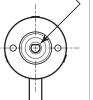


a, b, c, d = 0.25T ±0.125T; e = 1T ±0.125T "Normal" means clockwise revolution viewed from the shaft end



Index Position

Adjustment is made with the shaft notch facing up



Mounting Screw Information							
Part #	Quantity	Fastener Type Size		Tightening Torque			
TRD-MX (all)	2	socket head screw	M3 x 0.5 x 6mm	0.45 N·m [4.0 lb∙in]			
MT-030D	2	countersink machine screw	M3 x 0.5 x 8mm				
	4	socket head screw	M3 x 0.5 x 10mm	*			
MM-4D	MM-4D 3 socket head screw		M3 x 0.5 x 8mm	*			
* These screws are for mounting the bracket to the customer-provided mounting surface; tightening torque depends upon the mounting surface material.							