

# MODEL TR1 – LINEAR SOLUTION ENCODER



## FEATURES

**Encoder and Measuring Wheel Solution Integrated Into One Compact Unit**  
**Spring Loaded Torsion Arm Makes Wheel Pressure Adjustments a Snap**  
**Easily Installed in a Vertical, Horizontal or Upside Down Orientation**  
**Operates Over a Variety of Surfaces at Speeds up to 3000 Feet per Minute**  
**Integrated Module Simplifies Your System Design, Reducing Cost**

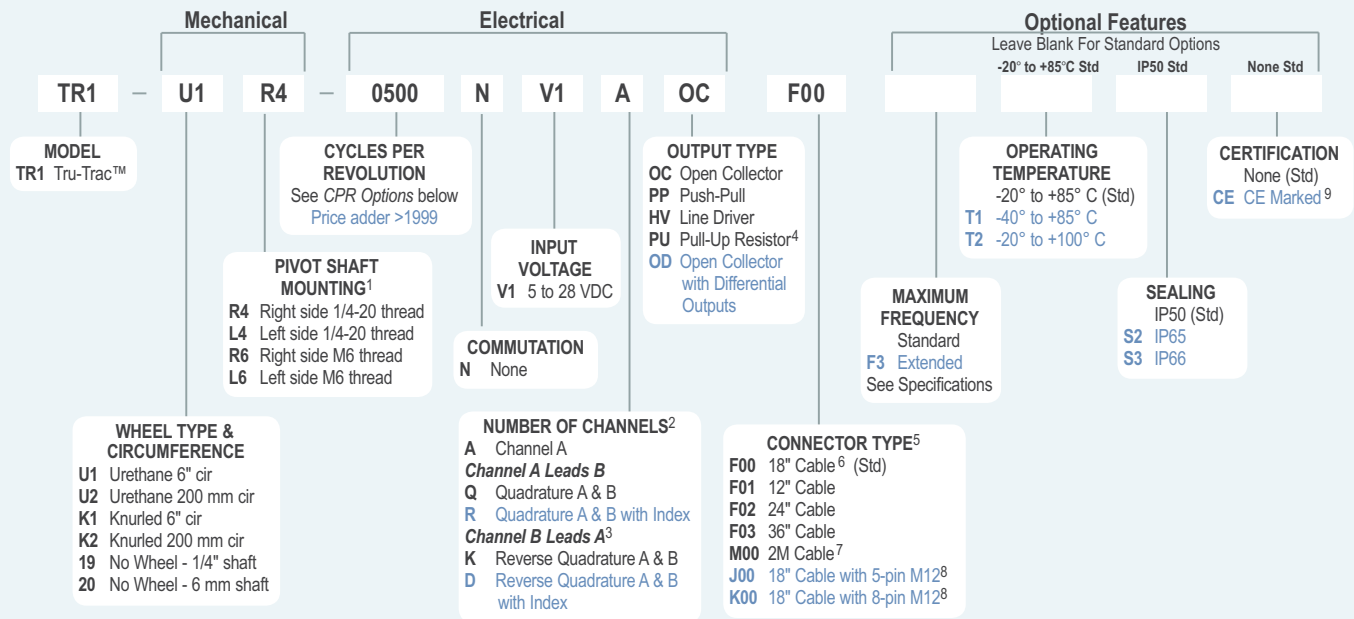
The TR1 Tru-Trac™ is a versatile solution for tracking velocity, position, or distance over a wide variety of surfaces in almost any application. An integrated encoder and spring loaded measuring wheel assembly available in one, the TR1 is both easy-to-use and compact. Its spring-loaded torsion arm offers adjustable torsion load, allowing the TR1 to be mounted in almost any orientation—even upside-down. The threaded shaft on the pivot axis is field reversible providing mounting access from either side. The TR1 housing is a durable, conductive composite material that will eliminate static build up. With operating speeds up to 3000 feet per minute and a wide variety of configuration options, it's easy to see the TR1 Tru-Trac™ is the ideal solution for countless applications.

## COMMON APPLICATIONS

**Web Tension Control, Paper Monitoring, Glue Dispensing, Linear Material Monitoring, Conveyor Systems, Printing, Labeling, Document Handling**

## MODEL TR1 TRU-TRAC™ ORDERING GUIDE

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



### MODEL TR1 TRU-TRAC™ CPR OPTIONS

0001 thru 0189*	0198	0200	0250	0256	0300	0315	0360
0400	0500	0512	0580	0600	0750	0800	1000
1125	1200	1250	1500	1800	2000	2048	2500
3000	3600	4000	4096	5000	6000	7200	8192
							10,000

\*Contact Customer Service For Availability

New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disk resolutions are available upon request and may be subject to a one-time NRE fee.

### NOTES:

- See mechanical drawing. Shaft is reversible in the field.
- Contact Customer Service for non-standard index gating or phase relationship options.
- Reverse Quadrature not available with PU output type.
- With Input Voltage above 16 VDC, operating temperature is limited to 85° C.
- For mating connectors, cables, and cordsets see Encoder Accessories on page 102 or visit [www.encoder.com](http://www.encoder.com). For Pin Configuration Diagrams, see page 107 or visit [www.encoder.com](http://www.encoder.com).
- For non-standard English cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable. Frequency above 300 kHz standard cable lengths only.
- For non-standard metric cable lengths enter 'M' plus cable length expressed in meters. Example: M06 = 6 meters of cable.
- 5-pin not available with Line Driver (HV) output. Additional cable lengths available. Please consult Customer Service.
- Please refer to **Technical Bulletin TB100: When to Choose the CE Option** at [www.encoder.com](http://www.encoder.com).

## MODEL TR1 TRU-TRAC™ SPECIFICATIONS

### Electrical

Input Voltage.....4.75 to 28 VDC max for temperatures up to 85° C  
4.75 to 24 VDC for temperatures between 85° C to 100° C

Input Current .....100 mA max (65 mA typical) with no output load

Output Format .....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the wheel side. See *Waveform Diagram*.

Output Types.....Open Collector- 20 mA max per channel  
Push-Pull- 20 mA max per channel  
Pull-Up- Open collector with 2.2K ohm Pull-Up Resistor- 20mA max per channel  
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)

Index.....Once per revolution.  
0001 to 0189 CPR: Ungated  
0190 to 10,000 CPR: Gated to output A See *Waveform Diagram*.

Max. Frequency .....Standard Frequency Response is  
200 kHz for CPR 1 to 2540  
500 kHz for CPR 2541 to 5000  
1 MHz for CPR 5001 to 10,000  
Extended Frequency Response (optional) is 300 kHz for CPR 2000, 2048, 2500, and 2540

Noise Immunity.....Tested to BS EN61000-6-2;  
BS EN50081-2; BS EN61000-4-2;  
BS EN61000-4-3; BS EN61000-4-6;  
BS EN500811

Quadrature .....67.5° electrical or better is typical,  
Edge Separation 54° electrical minimum at temperatures > 99° C

Waveform Symmetry ...180°(±18°) electrical (single channel encoder)  
Accuracy .....Within 0.017° mechanical or 1 arc-minute from true position (for CPR>189)

### Mechanical

Max Shaft Speed .....6000 RPM. Higher speeds may be achievable, contact Customer Service.

Shaft Material .....Stainless Steel

Shaft Tolerance .....+0.0000/-0.0004" [+0.000/-0.010 mm]

Radial Shaft Load .....5 lb max. Rated load of 2 to 3 lb for bearing life of  $1.2 \times 10^{10}$  revolutions

Axial Shaft Load .....5 lb max. Rated load of 2 to 3 lb for bearing life of  $1.2 \times 10^{10}$  revolutions

Starting Torque .....IP50 0.05 oz-in  
IP65 0.4 oz-in  
IP66 0.8 oz-in

Housing .....Stainless steel fibers in a high temperature nylon composite

Wheel Width.....0.25"

Weight.....5 oz typical

**Environmental**

Storage Temp .....-25° to +85° C

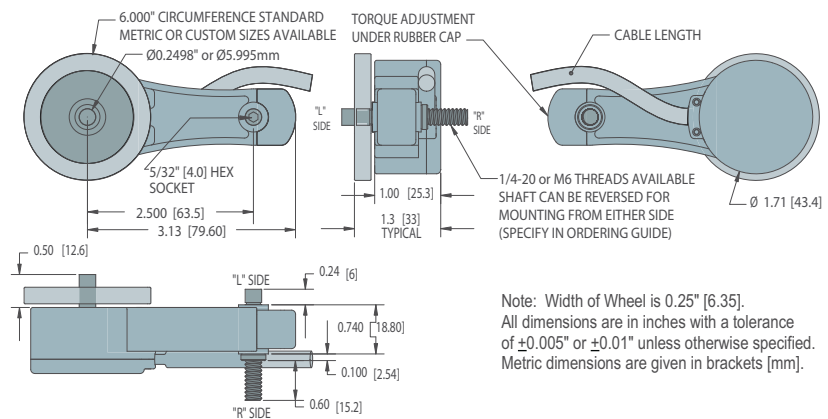
Humidity.....98% RH non-condensing

Vibration.....10 g @ 58 to 500 Hz

Shock.....80 g @ 11 ms duration

Sealing .....IP50 standard; IP65 or IP66 available

## MODEL TR1 TRU-TRAC™



Note: Width of Wheel is 0.25" [6.35]. All dimensions are in inches with a tolerance of  $\pm 0.005$ " or  $\pm 0.01$ " unless otherwise specified. Metric dimensions are given in brackets [mm].

## MODEL TR1 TRU-TRAC™ APPLICATIONS



For linear applications the Tru-Trac™ can be mounted above or below the moving object, and the tension on the wheel can be adjusted for a wide range of applications such as packaging, conveyors, mail sorting, gantries, etc.

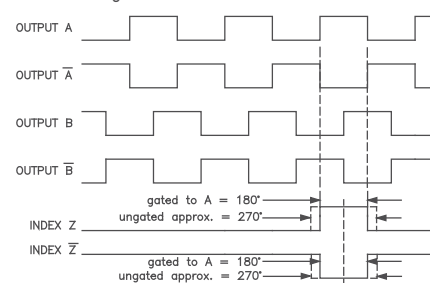


For rotational applications the Tru-Trac™ can be mounted in any orientation to monitor the position or velocity of many types of rotating equipment such as web tension control drums, rotary tables, printing, spooling, etc.



## WAVEFORM DIAGRAM

### Incremental Signals



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES.  
WAVEFORM SHOWN WITH OPTIONAL COMPLEMENTARY SIGNALS  $\bar{A}$ ,  $\bar{B}$ ,  $\bar{Z}$  FOR HV OUTPUT ONLY.

## WIRING TABLE

Function	Cable† Wire Color	5-pin M12**	8-pin M12**
Com	Black	3	7
+VDC	White	1	2
A	Brown	4	1
A'	Yellow	--	3
B	Red	2	4
B'	Green	--	5
Z	Orange	5	6
Z'	Blue	--	8
Shield	Bare*	--	--

\*CE Option: Cable shield (bare wire) is connected to internal case.  
\*\*Non-CE Option: Cable shield is connected to M12 connector body.  
CE Option: Cable shield is connected to M12 connector body and internal case.  
†Standard cable is 24AWG conductors with foil and braid shield.