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

With operating speeds up to 3000 feet per minute and a wide variety of configuration options, the TR1 Tru-Trac® is the 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 unit, the TR1 is both easy-to-use and compact. Plus, the TR1 housing is a durable, conductive composite material that will eliminate static build up. Its spring-loaded torsion arm offers adjustable torsion load, allowing the TR1 to be mounted in almost any orientation – even upside-down. And the threaded shaft on the pivot axis is easily reversible in the field, providing mounting access from either side. The TR1 is your solution for a compact, linear encoder.

COMMON APPLICATIONS

MODEL TR1 ORDERING GUIDE
Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.

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MECHANICAL
- MODEL TR1 Tru-Trac™
- WHEEL TYPE & CIRCUMFERENCE
  - U1 Urethane 6.0" cir
  - U2 Urethane 200 mm cir
  - K1 Knurled 6.0" cir
  - K2 Knurled 200 mm cir
  - A1 Anodized Knurled 6.0" cir
  - A2 Anodized Knurled 200 mm cir
  - 19 No wheel - 1/4" shaft
  - 20 No wheel - 6 mm shaft
- CYCLES PER REVOLUTION
  - See CPR Options below
- PIVOT SHAFT MOUNTING
  - R4 Right side 1/4-20 thread
  - L4 Left side 1/4-20 thread
  - R6 Right side M6 thread
  - L6 Left side M6 thread
- NUMBER OF CHANNELS
  - A Channel A
  - B Channel B
  - C Quadrature A & B
  - D Quadrature A & B with Index
  - E Channel B Leads A
- OUTPUT TYPE
  - OC Open Collector
  - PP Push-Pull
  - HV Line Driver
  - PU Pull-Up Resistor
  - OD Open Collector with Differential Outputs
- MAXIMUM FREQUENCY
  - Standard
  - Extended

ELECTRICAL
- INPUT VOLTAGE
  - V1 5 to 28 VDC
- CONNECTOR TYPE
  - F00 18" Cable (Std)
  - F01 12" Cable
  - F02 24" Cable
  - F03 36" Cable
  - M00 2M Cable
  - J00 18" Cable with 5-pin M12
  - K00 18" Cable with 8-pin M12
- SEALING
  - IP50 (Std)
  - S2 IP65
  - S3 IP66

OPTIONAL FEATURES
- LEAVE BLANK FOR STANDARD OPTIONS

NOTES:
1. See mechanical drawing. Shaft is reversible in the field.
2. Contact Customer Service for non-standard index gating or phase relationship options.
3. Reverse Quadrature not available with Pull-Up Resistor Output Type.
5. With Input Voltage above 16 VDC, operating temperature is limited to 85° C.
6. For mating connectors, cables, and cordsets, see Accessories at encoder.com. For Connector Pin Configuration Diagrams, see Connector Pin Configuration Diagrams at encoder.com.
7. 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.
8. For non-standard metric cable lengths enter ‘M’ plus cable length expressed in meters. Example: M06 = 6 meters of cable.

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.
**MODEL TR1 SPECIFICATIONS**

**Electrical**
- **Input Voltage**: 4.75 to 28 VDC max for temperatures up to 85°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 shaft side. See Waveform Diagrams.
- **Output Types**: Open Collector = 20 mA max per channel
- **Index**: Once per revolution. 1 to 400 CPR: Ungated
- **Max. Frequency**:
  - Standard Frequency Response is 1 MHz for CPR 5001 to 10,000
  - Extended Frequency Response (optional) is achievable: 300 kHz for CPR 2000, 2048, 2500, and 2540
- **Accuracy**: Within 0.017° mechanical or 1 arc-minute (See Waveform Diagrams)

**Mechanical**
- **Max Shaft Speed**: 6000 RPM. Higher speeds may result in permanent damage.
- **Shaft Tolerance**: ±0.0005” or ±0.01 mm
- **Radial Shaft Load**: 5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2 x 10^10 revolutions
- **Axial Shaft Load**: 5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2 x 10^10 revolutions

**Environmental**
- **Storage Temperature**: -25°C to 85°C
- **Humidity**: 98% RH non-condensing
- **Vibration**: 10 g at 50 to 500 Hz
- **Shock**: 80 g at 11 ms duration
- **Sealing**: IP50 standard; IP65 or IP66 available

**Wiring Table**

<table>
<thead>
<tr>
<th>Function</th>
<th>Gland Cable Wire Color</th>
<th>5-pin M12**</th>
<th>8-pin M12**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Com</td>
<td>Black</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>+VDC</td>
<td>White</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>A</td>
<td>Brown</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>A'</td>
<td>Yellow</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>Red</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>B'</td>
<td>Green</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td>Z</td>
<td>Orange</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Z'</td>
<td>Blue</td>
<td>--</td>
<td>8</td>
</tr>
<tr>
<td>Shield</td>
<td>Bare*</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*CE Option: Cable shield (bare wire) is connected to internal case.
**CE Option: Use cable cordset with shield connected to M12 connector coupling nut.

**TRU-TRAC® MOUNTING BRACKET**

Allows for a variety of mounting positions and makes installation of the Model TR1 even easier.

**WAVEFORM DIAGRAM**

Incremental signals

[Diagram showing incremental signals and connections]

**NOTE:** All degree references are electrical degrees. Waveform shown with optional complementary signals A, B, Z for HV output only.