### Rotary Position Technology

**Absolute Encoders, Multiturn**

#### Absolute, Multiturn Type RM-105 (Shaft) / RM-106 (Blind Hollow Shaft)  

**EtherNet/IP**

- **Bearing-Lock**
- **High rotational speed**
- **Temperature**
- **High IP**
- **High shaft load capacity**
- **Shock/vibration resistant**
- **Magnetic field proof**
- **Reverse polarity protection**
- **Optical sensor**

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#### Reliable
- Increased ability to withstand vibration and installation errors. Sturdy Bearing-Lock design structure eliminates machine downtime and repairs.
- Wide temperature range of -40 to +176°F (-40 to +80°C).
- Fewer components and connection points increase the operational reliability: TURCK OptoASIC technology with highest integration density (Chip-on-board).

#### Fast
- 5x faster position value transfer that the usual market encoder – RPI time of 1 ms
- Fast and easy commissioning, configuration possible through cyclic services
- M12 connector ensures fast, simple, error-free connection

#### Versatile
- Thanks to the implementation of DLR (Device Level Ring) a single cable break does not lead to a “machine down” state.
- 32 bits total resolution, shafts up to 10 mm, blind hollow shafts up to 15 mm and certified EtherNet/IP functionality.
- The optical absolute multiturn EtherNet/IP encoders were designed for time sensitive applications. Their distinctive features help not only with the machine’s performance as well as uptime, but also contribute to time and cost savings.

#### Mechanical Characteristics:

- **Max. speed shaft version (IP65) up to 158 °F (70 °C):** 8,000 RPM, continuous 6000 RPM
- **Max. speed shaft version (IP65) up to Tmax:** 6,000 RPM, continuous 4000 RPM
- **Max. speed blind hollow shaft version (IP65) up to 158 °F (70 °C):** 6,000 RPM, continuous 4000 RPM
- **Max. speed blind hollow shaft version (IP65) up to Tmax:** 4,000 RPM, continuous 3,000 RPM
- **Starting torque at 68 °F (20 °C):** 1.4 oz-in (< 0.01 Nm)
- **Moment of inertia:**
  - Shaft version: 0.16 oz-in² (3.0 x 10⁻⁶ kgm²)
  - Hollow shaft version: 0.32 oz-in² (6.0 x 10⁻⁶ kgm²)
- **Radial load capacity of shaft:** 18 lbs (80 N)
- **Axial load capacity of shaft:** 9 lbs (40 N)
- **Weight:** approx. 1 lbs (0.45 kg)
- **Protection acc. to EN 60 529:** IP65
- **Working temperature:** -40 to +176 °F (-40 to +80 °C)
- **Materials:** Shaft: stainless steel, Flange: aluminum, Housing: aluminum
- **Shock resistance acc. to EN 60068-2-27:** > 250 g (> 2,500 m/s²), 6 ms
- **Vibration resistance acc. to EN 60068-2-26:** > 10 g (> 100 m/s²), 55-2000 Hz

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#### General Information about EtherNet/IP

EtherNet/IP conformance tested acc. to version CT-12 of Dec. 11, 2014

### Applications

Industrial Ethernet is increasingly imposing itself as the new communication standard in automation technology. The goal is to create a vertical integration – that is to say: only one core computer, from the control level up to the industrial production plants – that will be able to control any devices.

The Turck EtherNet/IP encoders demonstrate their abilities in the following application examples: automotive production, logistics, metal-working, textile, printing and packaging machines.
**General Electrical Characteristics:**

- **Supply voltage:** 10-30 VDC
- **Current consumption (without output load):** Max. 250 mA
- **Reverse polarity protection at power supply (+V):** Yes
- **CE compliant acc. to:** EMC guideline 2014/30/EU, RoHS guideline 2011/65/EU

**Device Characteristics:**

- **Singleturn resolution**
  - Default value: 1-65536 (16 bit), (scalable: 1-65536)
  - 65536 (16 bit)

- **Multiturn resolution:**
  - Max. 65536 (16 bit)
  - Scalable only via the total resolution

- **Total resolution:**
  - Scalable from 1 to 4,294,967,296 (32 bit)

- **Code:** Binary

- **Interface:** EtherNet/IP

**The following functionalities are integrated:**

- **Adjustable parameters**
  - Preset
  - Count direction
  - Resolution
  - Unity of speed
  - IP address
  - Number of revolutions
  - Position
  - Diagnosis
  - Position limit
  - Warning messages

- **Objects (CIP Objects)**
  - Identity Object
  - Message Router
  - Assembly Object
  - Connection Manager
  - Parameter Object
  - Position Sensor Object
  - Qos Object
  - Port Object
  - TCP / IP Interface Object
  - EtherNet Link Object

- **EtherNet/IP features**
  - DLR (Device Level Ring) possible
  - Qos (Quality of Service) possible
  - ACD (Address Conflict Detection)
  - Multicast and unicast capability

**Universal Scaling Function (USF)**

This Encoder has the Turck Universal Scaling Function (USF) always activated. There is no position error at the end of the total measuring range, when using a decimal divider for position scaling.

Without the USF function, you can only use a binary scaling divider. Otherwise you get an position error at the end of the total measuring range (TMR).

**Standard Wiring (Bus):**

* (M12 eurofast® Connector, D-Coded)

### Table: Standard Wiring (Bus)

<table>
<thead>
<tr>
<th>Direction</th>
<th>Port 1</th>
<th>Port 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal:</td>
<td>Transmit data+</td>
<td>Receive data+</td>
</tr>
<tr>
<td>Abbrv:</td>
<td>TxD+</td>
<td>RxD+</td>
</tr>
<tr>
<td>M12 eurofast®</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**Standard Wiring (Power Supply):**

* (M12 eurofast® Connector)

### Table: Standard Wiring (Power Supply)

<table>
<thead>
<tr>
<th>Signal:</th>
<th>Power Supply</th>
<th>N/C</th>
<th>Common</th>
<th>N/C</th>
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<tbody>
<tr>
<td>Abbrv:</td>
<td>+V</td>
<td>-</td>
<td>0 V</td>
<td>-</td>
</tr>
<tr>
<td>M12 eurofast®</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Wiring Diagrams:**

<table>
<thead>
<tr>
<th>Bus</th>
<th>Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Encoder View</td>
<td>Male Encoder View</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M12 eurofast® Pinout</th>
<th>M12 eurofast® Pinout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mating Cordset: RS5D 420-*</td>
<td>Mating Cordset: RK 4.4T-*</td>
</tr>
</tbody>
</table>
### Absolute, Multiturn Type RM-105 (Shaft) / RM-106 (Blind Hollow Shaft)

#### Part Number Key: RM-105 Shaft Version

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>RM-105T</td>
<td>6</td>
<td>C</td>
<td>9N32B</td>
</tr>
</tbody>
</table>

**A** Type
- RM-105T 58 mm, Shaft, IP65 Shaft Seal

**B** Shaft (Ø x L)
- 6: Ø 6 mm x 10 mm
- 10: Ø 10 mm x 20 mm
- A0: Ø 1/4" x 7/8"
- A1: Ø 3/8" x 7/8"

**C** Flange
- C: Ø 58 mm Clamping Flange
- S: Ø 58 mm Servo Flange
- R: 2.5” Square Flange

#### Part Number Key: RM-106 Blind Hollow Shaft Version

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<tbody>
<tr>
<td></td>
<td>RM-106C</td>
<td>10</td>
<td>T</td>
<td>9N32B</td>
</tr>
</tbody>
</table>

**A** Type
- RM-106C 58 mm, Blind Hollow Shaft, IP65 Shaft Seal

**B** Bore (30 mm Insertion Depth)
- 10: Ø 10 mm
- 12: Ø 12 mm
- 14: Ø 14 mm
- 15: Ø 15 mm
- A1: Ø 3/8"
- A3: Ø 1/2"

**C** Flange
- T: Ø 50 mm Flange w/ Torque Stop
- E: Ø 63 mm Flange w/ Slotted Flex Mount
- E1: Ø 65 mm Flange w/ Flex Mount

**D** Voltage Supply and Output Type
- 9N32B: 10-30 VDC, EtherNet/IP w/DLR

**E** Type of Connection
- B3M12: Axial 3 x M12 eurofast® Connectors

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**Accessories:**
- See page H1, Connectivity, for cables and connectors
- See page G1, Accessories, for mounting attachments and couplings
Absolute, Multiturn Type RM-105 (Shaft) / RM-106 (Blind Hollow Shaft)  
EtherNet/IP

Dimensions: RM-105 Shaft Version

RM-105 Flange C  
Connection B3M12

RM-105 Flange S  
Connection B3M12

RM-105 Flange R  
Connection B3M12
# Rotary Position Technology

**Absolute Encoders, Multiturn**

## Absolute, Multiturn Type RM-105 (Shaft) / RM-106 (Blind Hollow Shaft)

**EtherNet/IP**

### Dimensions: RM-106 Blind Hollow Shaft Version

#### RM-106 Flange T

**Connection B3M12**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value 1 (Unit)</th>
<th>Value 2 (Unit)</th>
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<tbody>
<tr>
<td>ØD H7</td>
<td>1.653 [42.0]</td>
<td>2.559 [65.0]</td>
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<tr>
<td>Ø2.323</td>
<td>0.393 [10.0]</td>
<td>0.727 [18.5]</td>
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<tr>
<td>Ø2.283</td>
<td>1.444 [36.7]</td>
<td>1.609 [40.0]</td>
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<tr>
<td>Ø0.94</td>
<td>1.181 [30.0]</td>
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<tr>
<td>Ø1.219</td>
<td>1.609 [40.0]</td>
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</table>

#### RM-106 Flange E

**Connection B3M12**

<table>
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<th>Dimension</th>
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<td>Ø1.220</td>
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</table>

#### RM-106 Flange E1

**Connection B3M12**

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<th>Value 1 (Unit)</th>
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www.turck.com  •  1-800-544-7769  •  Fax: (763) 553-0708  •  TURCK  •  Minneapolis, MN 55441

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