

# MR314

ZapFree™ Hollow Shaft FIBER OPTIC ROTARY ENCODER

**MICRONOR**  
automation components

## Products

The MR314 ZapFree™ High Resolution (1024ppr) Hollow Shaft Rotary Encoder is an entirely passive, intrinsically safe, fiber optic incremental rotary encoder – ideal for a wide range of harsh and hazardous environmental applications. There are no integral electronics within the encoder housing and the all-optical design requires just a single 62.5/125 MM optical fiber connection – the utmost in simplicity, reliability and ease of installation.

Downstream, an MR310 Remote Encoder Interface (REI) module converts the optical signals to an array of standard electrical outputs (both quadrature and analog) for interfacing to conventional counters, PLCs or computer interface boards. An RS232/RS422/RS485 serial interface is also provided for ease of interface to computers and PCs.



**Intrinsically Safe**  
**Simple Apparatus**  
CE Ex op is I/II ... Ga

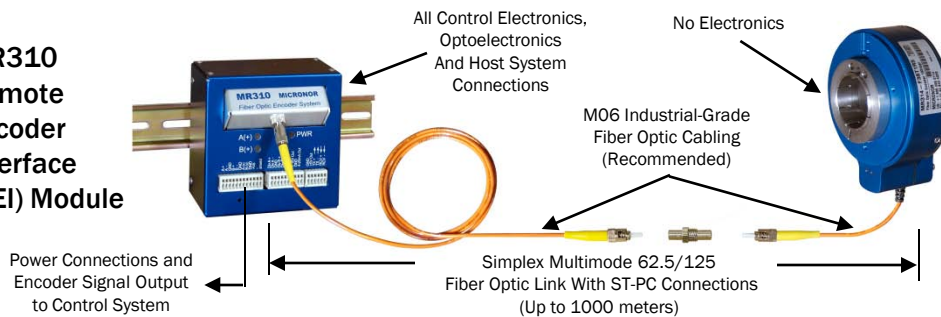
## Features

- 100% passive sensing design
- ATEX Classification “Simple Apparatus” and Intrinsically Safe. For use in all IEC Group I/II, U.S. Class I/II/III and Zones 0/1/2/20/21/22 hazardous locations and atmospheres
- Insensitive to EMI and RFI for use in and around medical equipment and “noisy” industrial environments
- Immune to lightning and atmospheric static that “zaps” conventional encoders
- Outdistances copper, link lengths to 1000m
- Standard model operates -40 °C to +80 °C; Extended option covers -60 °C to +150 °C
- Special versions can be engineered for radiation and thermal-vac environments



## Installation

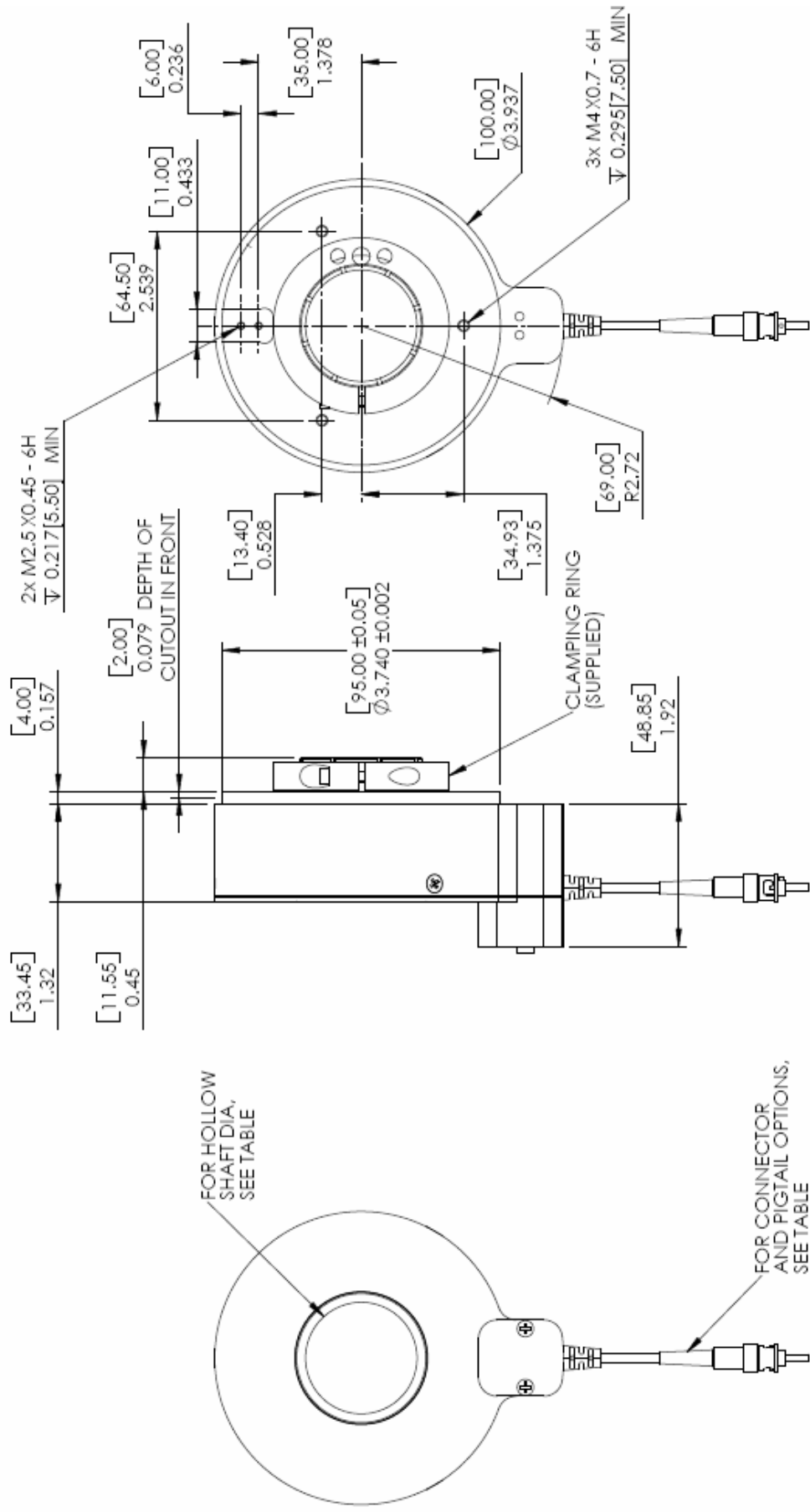
**MR310 Remote Encoder Interface (REI) Module**



**MR314 ZapFREE™ Fiber Optic Rotary Encoder**

1. Mount MR314 rotary encoder to the external equipment shaft using the optional Tether Arm. Consult the ZapFREE™ Encoder System User Guide for additional information.
2. Make MR310 electrical connections (power, ground, quadrature signals, serial interface, etc.) to the control system via WAGO Quick-Connect plugs (supplied with the MR310).
3. Connect ZapFREE™ Encoder to MR310 Module via MR320 series ST-PC to ST-PC FO cable assembly (or equivalent).
4. The ZapFREE™ Fiber Optic Encoder System is now ready to operate!






# Reference Drawing



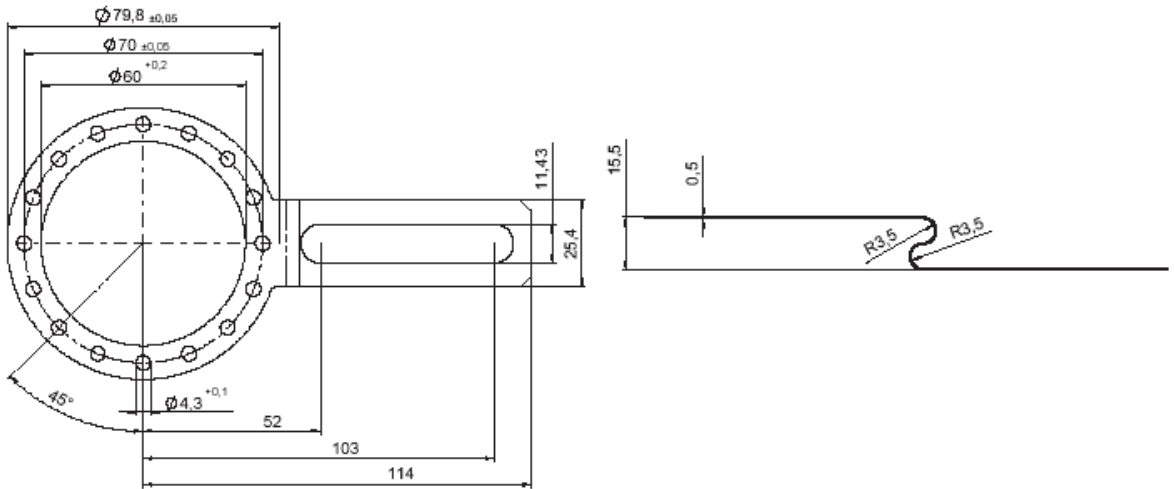
# Mounting Options

The MR314A Tether Arm Kit and MR314B Bracket Kit represent two methods of mounting these Size 100 (100mm OD) hollow shaft encoders by Micronor:

- MR314 series Fiber Optic Rotary Encoder
- ENI100 series Incremental Optical Rotary Encoder
- ENA100 series Absolute Single-Turn Optical Rotary Encoder
- ENAM100 series Absolute Multi-Turn Optical Rotary Encoder

Pictures	Example of Use	Use	Pitch Circle Diameter	Order Code
		For applications with fastening points located on variable pitch circle	104-206 mm	MR314A
		For applications with high axial play	110 mm	MR314B (Use Long Spring and Pin)
		For applications with reduced mounting space	76 mm	MR314B (Use Short Spring and Pin)
		For applications with axial and radial play with low dynamics for constant rotary movement	65 mm	MR314B (Use Small Tether Bracket and Screw)

- Prevents radial play of the encoder
- Necessary axial play remains intact
- Material:
  - Mounting bracket: stainless steel
  - Screws: galvanized steel
- Kit includes:
  - Flexing spring device
  - 3 screws



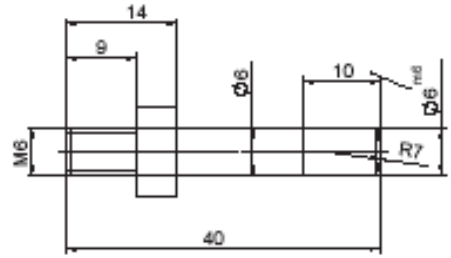
### Mounting Instructions:

1. Check that there are no burrs on the mating shaft and that the shaft length is correct for the encoder
2. Attach the Tether Arm to the encoder body using the supplied hardware. Slide the assembly onto the mating shaft.
3. Rotate the Tether Arm until it is at the correct orientation and align with the mounting feature on the shaft housing. Using the appropriate hardware to secure the tether arm in that position.
4. Check to make sure that the tether is still in its “unstressed” condition and then tighten the shaft clamp on the encoder. Check for excessive runout as you rotate the shaft by hand. (Excessive runout will cause premature bearing failure.) If the runout is excessive, then reinstall the encoder. Otherwise, installation is complete.

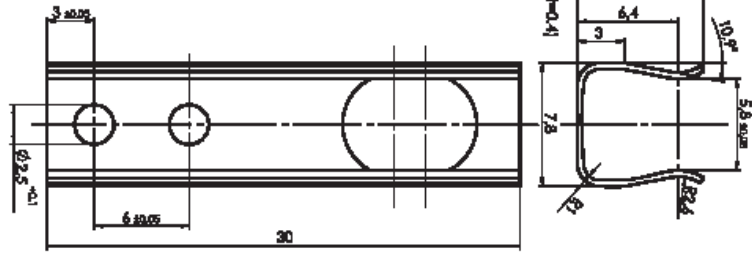
# MR314B

- These attachments allow a wide range of mounting variants
- Material:
  - Cylindrical pin, spring & bracket: stainless steel
  - Screws: galvanized steel
- Kit includes:
  - 1x Cylindrical pin with thread
  - 1x Long spring
  - 1x Short spring
  - 1x Small tether bracket
  - 1x Washer
  - 2x Screws M2.5
  - 1x Screw M4 x 10

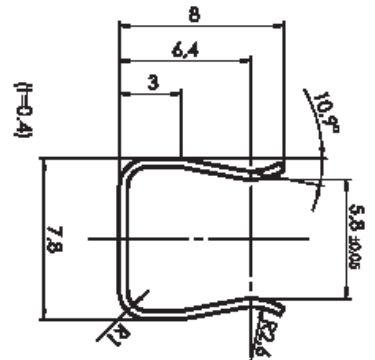
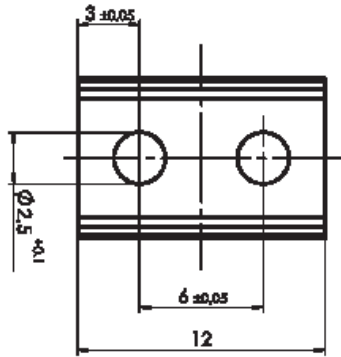
Cylindric Pin With Fastening Thread



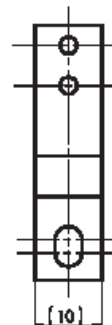
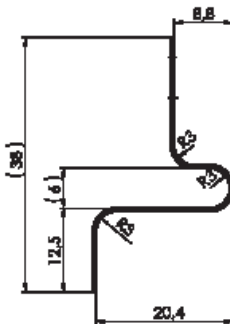
Long Spring



Short Spring



Small Tether Bracket



# Specifications

## Specifications Subject To Change Without Notice

<b>Resolution</b>	1024ppr
<b>Speed</b>	
<b>Mechanical Maximum Speed</b>	3,000 rpm continuous 3,300 rpm short term (<1 minute)
<b>Electrical Maximum Speed</b> (See Notes 1 and 2 below)	3,300 rpm max - For Quadrature Outputs only 3,000 rpm max - For I and V Analog Outputs activated but Divider de-activated 2,5000 rpm max – For I and V Analog Outputs and Divider activated
<b>Optical Interface</b>	ST-PC (for connection to MR310 REI Module)
<b>Fiber Type</b>	MM 62.5/125µm, Graded Index, 0.275NA
<b>Fiber Length (between MR310 and MR314)</b>	Up to 1000m (3280 ft)
<b>Temperature/Humidity Range</b>	<b>ATEX Classification “Intrinsically/Inherently Safe Simple Apparatus”</b>
<b>STANDARD Option</b>	<b>-40°C to +80°C</b> / 0% to 95% RH (non-condensing) ☑ Ex op is I/II 80°C/T6 Ga U.S.: Class I/II/II, AEx op is Group I/II/III 80°C/T6 , Zone 0/1/2/20/21/22, Division 1/2
<b>EXTENDED Option</b>	<b>-60°C to +150°C</b> / 0% to 95% RH (non-condensing) ☑ Ex op is I/II 150°C/T3 Ga U.S.: Class I/II/II, AEx op is Group I/II/III 150°C/T3 , Zone 0/1/2/20/21/22, Division ½
<b>Moment of Inertia</b>	209 x 10 <sup>-6</sup> kg*m <sup>2</sup>
<b>Seal Rating</b>	IP65 (low-pressure water jets)
<b>Hollow Shaft Hole</b>	Ø 38mm ID (Other options available upon request)
<b>Housing/Weight</b>	Ø 100mm x 49mm L; 655 g (23 oz)
<b>System MTBF</b>	Bearing life calculated at 2000 rpm: 1.76 x 10 <sup>9</sup> hours (201,061 years)

Note: 1. Electrical Speed specifications apply to MR310 modules with firmware 1.2 and up.  
 2. At 3,000 rpm, the MR314 housing temperatures rises by 25°C about ambient due to bearing friction. Environmental temperature rating must be reduced accordingly.

# Ordering Info

## MR314 - F 3 8 T 1 R 5

**Hollow Shaft Hole Size**

**38** 38mm ID  
(Others hole sizes upon request)

**Termination Option**

**T1R5** ST Pigtail, 1.5m  
(Other lengths upon request)

**Temperature Range**

**Blank** Standard  
**E** Extended

### Optional Mounting Accessories:

- MR314A** Long Tether Arm Kit
- MR314B** Multi-Purpose Mounting Kit

#### Related Items:

- MR310 ZapFREE™ Remote Encoder Interface (REI) Module
- MR320-MO6Lxx Industrial-Grade Fiber Optic Cable Assembly
- MR320A ST-to-ST Mating/Bulkhead Receptacle

For additional technical information, contact Micronor and request:

- MR312 ZapFREE™ Fiber Optic Shaft Encoder Data Sheet
- MR316 ZapFREE™ Heavy Duty Fiber Optic Shaft Encoder Data Sheet
- MR3XX ZapFREE™ Encoder System User Guide
- MR3XX ATEX Declaration of Conformity Report
- MR320-MO6Lxx Ruggedized Fiber Optic Cable Assembly Data Sheet

#### MICRONOR INC.

900 Calle Plano Ste K  
 Camarillo, CA 93012  
 USA  
 T +1-805-389-6600  
 F +1-805-389-6605  
 sales@micronor.com  
 www.micronor.com

#### MICRONOR AG

Pumpwerkstrasse 32  
 CH-8105 Regensdorf  
 Switzerland  
 T +41-44-843-4020  
 F +41-44-843-4039  
 sales@micronor.ch  
 www.micronor.com