

# MR316

ZapFree™ HEAVY DUTY FIBER OPTIC ROTARY ENCODER

**MICRONOR**  
automation components

## Products

The MR316 series ZapFree™ Fiber Optic Rotary Encoder is an entirely passive, intrinsically safe, fiber optic incremental rotary encoder – ideal for a wide range of harsh and hazardous environmental applications. The all-optical sensor requires a single 62.5/125 MM optical fiber link for utmost ease of installation.



Downstream, the MR310 Remote Encoder Interface (REI) module provides an array of interfaces and features:

- Direct A/B Pull-Up and A/A'/B/B' Line Driver quadrature outputs
- Multiplier/Divider function with separate A/A'/B/B' LD Outputs
- Fully programmable 4-20mA output (Speed or Position)
- Fully programmable ±10V analog output (Speed or Position)
- RS422/RS485 serial interface (RS232 adapter available)

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

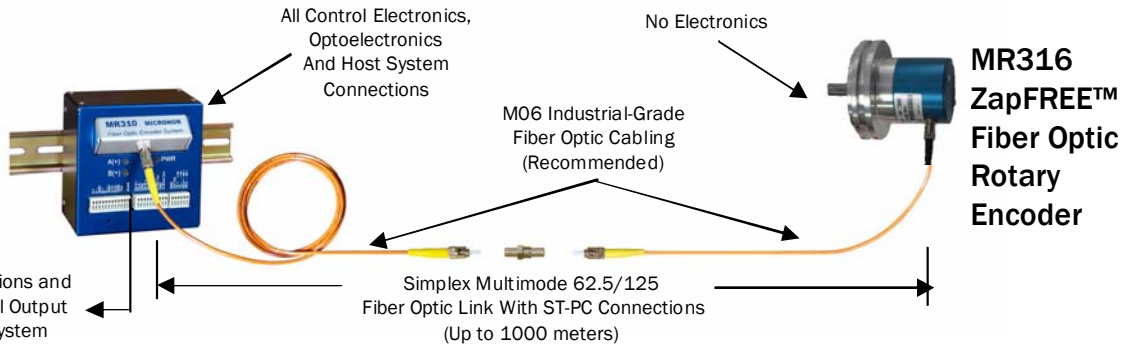
## Features

- 100% passive sensing design in industry standard 90mm Ø encoder housing
- 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 and explosive 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 temperature range: -40/+80 °C; **Extended** option range: -60/+150 °C
- Special versions can be engineered for radiation and thermal-vac environments



## Installation

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



1. Connect the MR316 to the external equipment via a flexible shaft coupling and follow flange/panel mounting guidelines provided in MR3XX ZapFREE™ Encoder System User Guide.
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!



# Specifications

## Specifications Subject To Change Without Notice

<b>Resolutions</b>	100, 128, 256 and 360ppr (Other options available upon request)
<b>Max Speed</b>	<b>Continuous Operating Speed For 256ppr (Contact Micronor if higher speed requirements.)</b>
<b>For MR310 Direct Quadrature Outputs</b>	<b>8000 rpm</b> (Using standard MR310 and no Auxiliary Functions)
<b>For MR310 Auxiliary Functions</b>	<b>5000 rpm</b> (Speed limitation if all processor-controlled auxiliary functions are being used at same time; e.g. Programmable Divider, Programmable Analog Outputs, etc. Contact Micronor for more information about operational trade-offs versus speed.)
<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 MR316)</b>	Up to 1000m (3280 ft)
<b>Temperature/Humidity Range and ATEX Ratings</b>	<b>ATEX Classification "Intrinsically/Inherently Safe Simple Apparatus"</b>
<b>STANDARD Option</b>	<b>-40° C to +80° C / 0% to 95% RH (non-condensing)</b> ☐☐ Ex op is I/II 80°C/T6 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 / 0% to 95% RH (non-condensing)</b> ☐☐ Ex op is I/II 150°C/T3 U.S.: Class I/II/II, AEx op is Group I/II/III 150°C/T3 , Zone 0/1/2/20/21/22, Division 1/2
<b>Max Shaft Loads</b>	Radial = 140N (31 lbf), Axial = 70N (15 lbf)
<b>Seal Rating</b>	IP66 (strong jet water and temporary submersion)
<b>Shaft OD</b>	Ø 12mm with 4mm keyway and M4 thread
<b>Housing/Weight</b>	Ø 90mm x 82.5mm L; 615 g (21.5oz)
<b>System MTBF</b>	Bearing life calculated at 50% of max radial and axial load at 2500 RPM: 3.11 x 10 <sup>5</sup> hours (35.6 years)

# Ordering Info

## MR316 - C12T00

### Resolution Options

- A 100ppr
- B 128ppr
- C 256ppr
- D 360ppr

### Termination Option

- T1R5 ST Pigtail, 1.5m
- T00 ST Receptacle

### Shaft Size

- 12 12mm OD
- Others on request

### Temperature Range

- Blank Standard
- E Extended

## Optional Mounting Accessory:

**MR316A** Set of 3x BMF Hold-Down Clamps and 3x Screws

### Related Items:

- MR310 Remote Encoder Interface (REI) Module
- MR320-M06Lxx Fiber Optic Cable Assembly
- MR320A ST-to-ST Mating/Bulkhead Adapter

For additional technical information, contact Micronor and request:

- EC-TD5107 MRI-Compatible (Non-Metallic) Rotary Encoder Data Sheet
- MR310 Remote Encoder Interface (REI) Module Data Sheet
- MR312 ZapFREE Solid Shaft Rotary Encoder Data Sheet
- MR314 ZapFREE Hollow Shaft Rotary Encoder Data Sheet
- MR320-M06Lxx Ruggedized Fiber Optic Cable Assembly Data Sheet
- MR3XX ZapFREE™ Encoder System User Guide
- MR3XX ATEX Declaration of Conformity Report
- MR310/MR312/MR314/MR316/MR320 Mechanical Reference Drawings

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