

MR 430 Absolute Encoder System



Features

- ➔ 100% Passive optical sensor - no power supply required
- ➔ Size 11 (Ø1.1") small form factor
- ➔ Single turn resolution 0.044°
- ➔ Up to 25-bit output (13 bits Single Turn + 12 bits multi-Turn)
- ➔ Immune to EMI, RFI, high voltage and lightning

Product Description

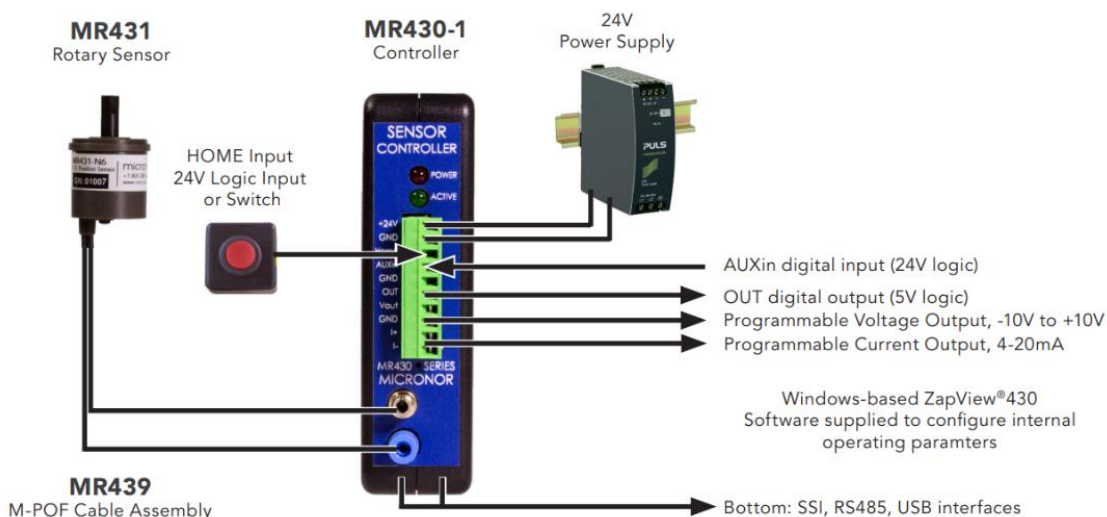
The MR430 series Fiber Optic Position Sensor is a small form factor, rotary position sensor with 13-bit, single-turn resolution. The MR430 features an innovative design which enables new applications and OEM product features not formerly possible with electronics-based sensors.

The sensor is 100% passive and is unaffected by EMI, RFI, microwaves and magnetic fields. The innovative, all-dielectric design also provides 100% electrical isolation and immunity to high voltages & lightning. ZapFREE® Software is used for data acquisition.

Applications

- Medical and MRI
- Transformer tap changer
- Switchgear
- Oil & Gas
- Transportation
- Semiconductor Equipment
- Welding
- Robotics

System Planning



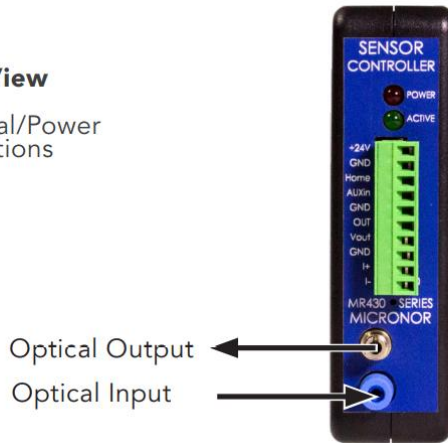
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Electrical and Optical Connections

Front View

J1 - Electrical/Power Connections



Optical Output
Optical Input

Bottom View

J2 - USB
J3 - SSI/RS485



J1 Electrical Interface via Terminal Plug - Phoenix 1803659 (one supplied with Controller)		
Pin	Function	Notes
1	+24V	+24V Power Supply
2	GND	GND (all GND connected together)
3	HOME	HOME input (+24V logic)
4	AUXIn	Auxiliary Input (+24V logic)
5	GND	GND (all GND connected together)
6	OUT	Digital Output (+5V logic)

J3 Electrical Interface via Plug - Hirose 3240-10P-C(50) - Pigtail Assembly available as Micronor MR430-99-01			
Pin	RS485	SSI	MR4330-99-01 Wire Color
1	+5V	+5V	Brown
2	RCV- (RS422 Input)		Red
3	RCV+ (RS422 Input)		Orange
4	TX- (RS422 Input)		Yellow
5	TX+ (RS422 Input)		Green
6	GND	GND	Blue

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Specifications MR430-1 Controller

Position Measurement	
Single Turn Resolution	13 bits, 8192 counts (0.044°)
Turn Counter	Up to 12 bits (4096 turns)
Electrical Interfaces	
Electrical connections shall not exceed 3 meters	
SSI	Up to 25 bits (13 bits ST + 12 bits Multiturn), Programmable building wires 25 kHz -250 kHz
RS485/Modbus RTU	57,600 Baud default, Consult instruction manual for software protocol details
USB	USB, Disables Modbus interface when used, Assigned Virtual Com Port
Current Output (I+/I-)	Isolated 4-20mA (270V isolation maximum), Output scalable by user, Accuracy = ±0.08% Full Scale
Voltage Output (Volt)	+10V to -10V, Output scalable by user, Accuracy = ±0.25% Full Scale
Digital Output (OUT)	0-5V maximum, 5mA load, Programmable Set Point
Digital Inputs (HOME and AUXin)	+24V logic
Power Supply	+18 VDC to +32 VDC, 65 mA max at 24 VDC
Interface Update Rate	
Angular Speed	230 radians/second or 2200 RPM for accurate position reporting
Update Rate	1.17 kHz (850 µs)
Reporting Delay	SSI: Maximum 800 µs (time from actual position to SSI output) Analog Outputs: Maximum 1.0 ms
Optical Interface	
Class 1 Laser Safety	
Interface	Duplex, M-POF Assembly
System Loss Budget	23dB at 645nm
Maximum Optical Link Length	Up to 30 m (~100 ft) with MR431 Sensor, Typical 2-way loss is 0.75dB/m
Environmental Performance	
Temperature/Humidity	Operating: -5°C to +55°C (23°F to +131°F), Storage: -25°C to +65°C (-13°F to +149°F), 25-95% RH (non-condensing)
Ingress Protection	IP40
Physical Attributes	
Housing Dimensions	114 mm W x 89 mm D x 32 mm H, includes 35mm DIN rail mount

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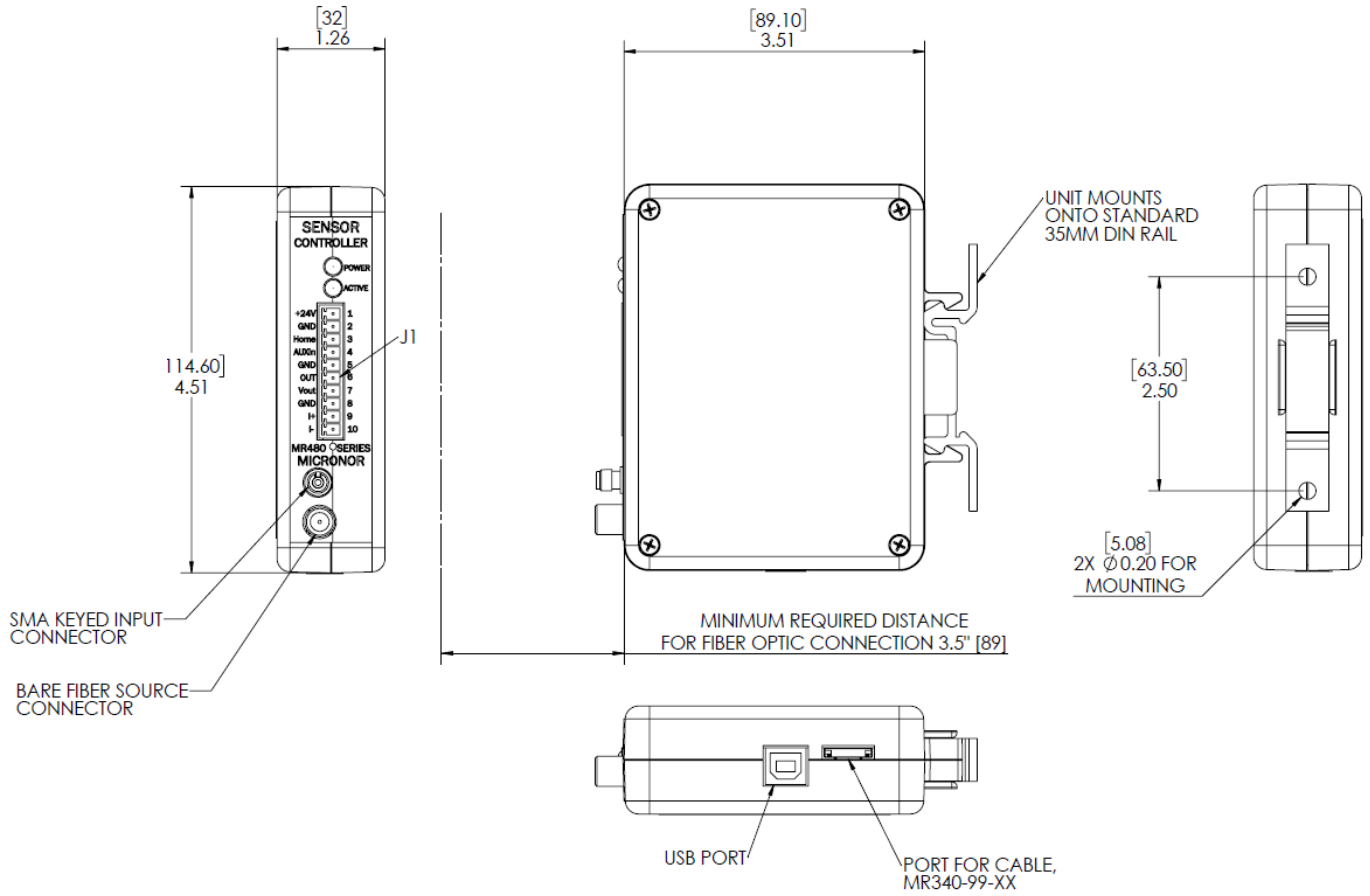
Specifications MR431 Sensor and MR439 Pigtail

Measurement Parameters	
Measurement Range	0° to 360° (continuous)
Resolution	13 bits (8192), 0.044°
Accuracy	0.5° max., 0.3° typical
Repeatability	±0.175°
Maximum RPM	500 RPM continuous, 2200 RPM intermittent Note: 2200 RPM for <2 seconds duration, in stop motion allowed.
Mechanical Performance	
Starting Torque	0.1 N*m
Max Shaft Load	500g at 5mm distance
Optical Interface	
Optical Interface	Duplex, POF and M-POF
Link Length	Up to 30 meters (~100 feet) with MR430 Controller
MR Attributes	
	ACR Guidance Document for Safe MR Practices
MRI Usage Zones	MR431 sensor and MR439 cabling is designed for safe use in Zones I-IV
Materials	MRI Safe, Non-metallic, Body/Shaft: Acetal
Environmental Performance	
Sensor Temperature	Operating: -5°C to +55°C (+23°F to +131°F), Storage: -40°C to +80°C (-40°F to +176°F)
Cable Temperature	Operation: -40°C to +60°C (-40°F to +140°F), Storage: -40°C to +60°C (-40°F to +140°F),
Humidity	0%-95% RH (non-condensing)
Ingress Protection	IP65
Physical Attributes	
Housing Dimension	Ø 25mm x 26mm x Ø 6mm Shaft
Unit Weight	15 g (0.53 oz) without pigtail

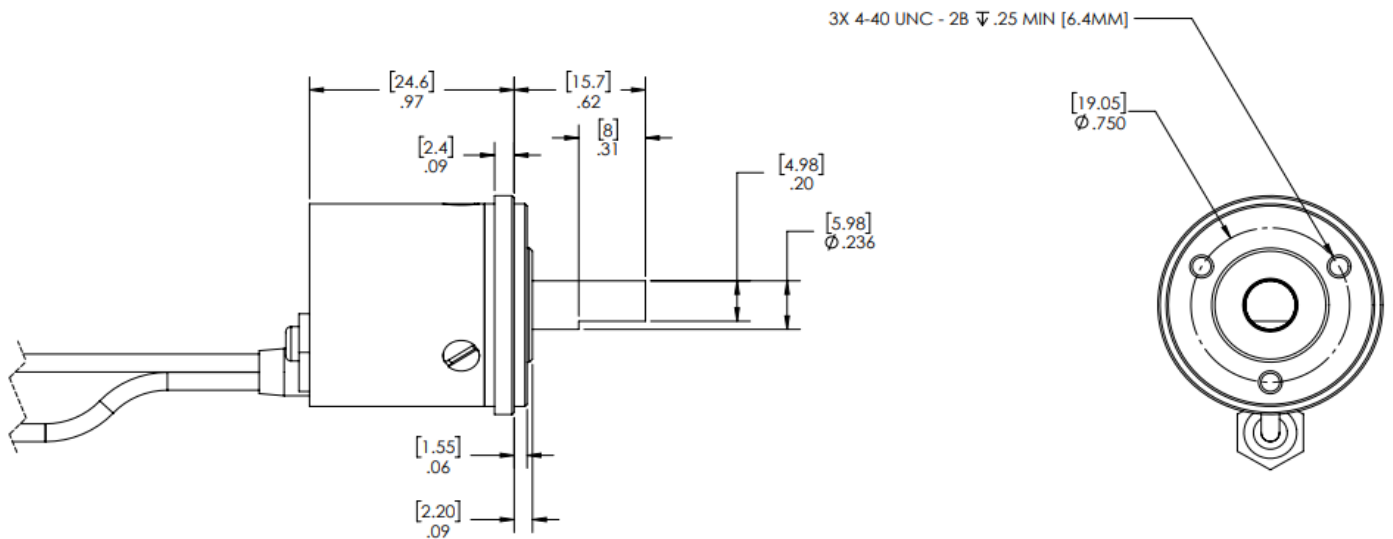
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MR430 Controller Drawing Inch [mm]



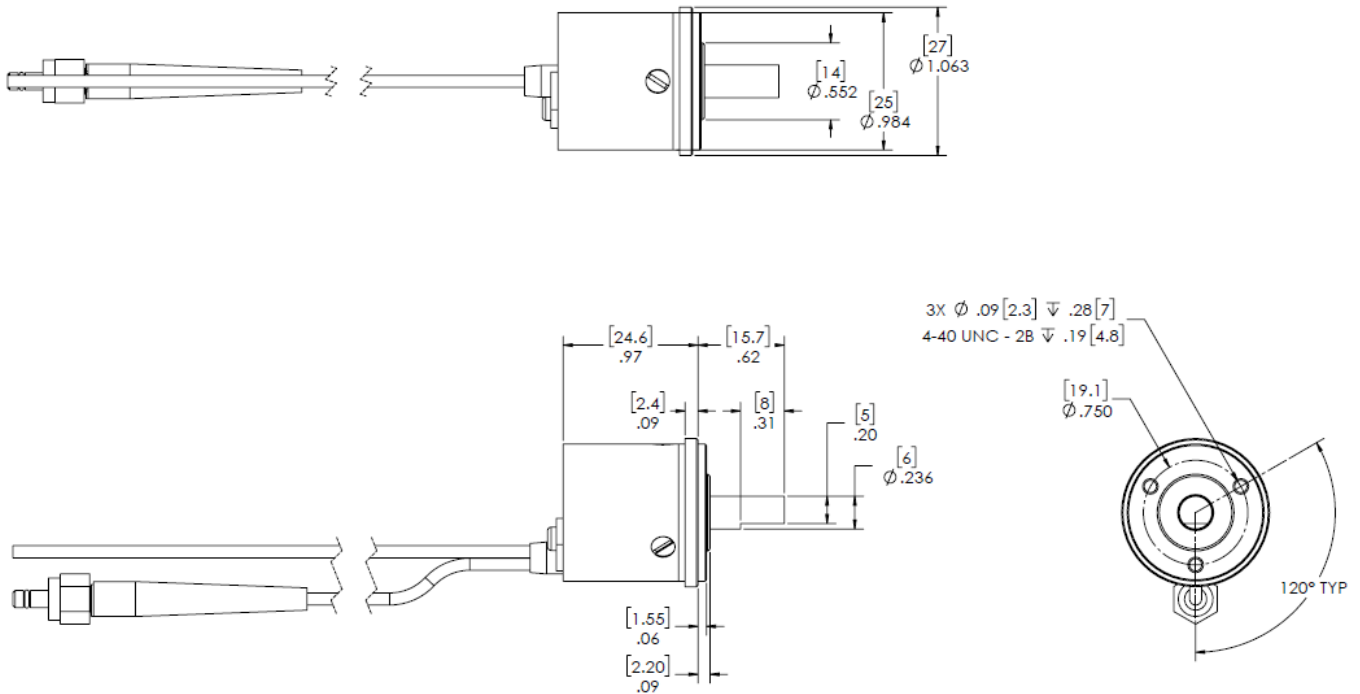
MR431 Sensor Drawing Inch [mm]



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MR431 Sensor and MR439 Pigtail Drawing Inch [mm]



Order Code

- 9700.01.000 MR430-1 POF Absolute Rotary Position Controller
- 9700.01.001 MR431-A06 POF Absolute Rotary Position Sensor
- 9700.01.200 MR430-99-01 SSI/RS485 Interface (J3) pigtail assembly - 1m
- 9700.01.003 MR439-P05 Extension cable Length 5m
- 9700.01.004 MR439-P05 Extension cable Length 10m
- 9700.01.006 MR439-P05 Extension cable Length 20m