

The MR430 series ZapFREE® 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.



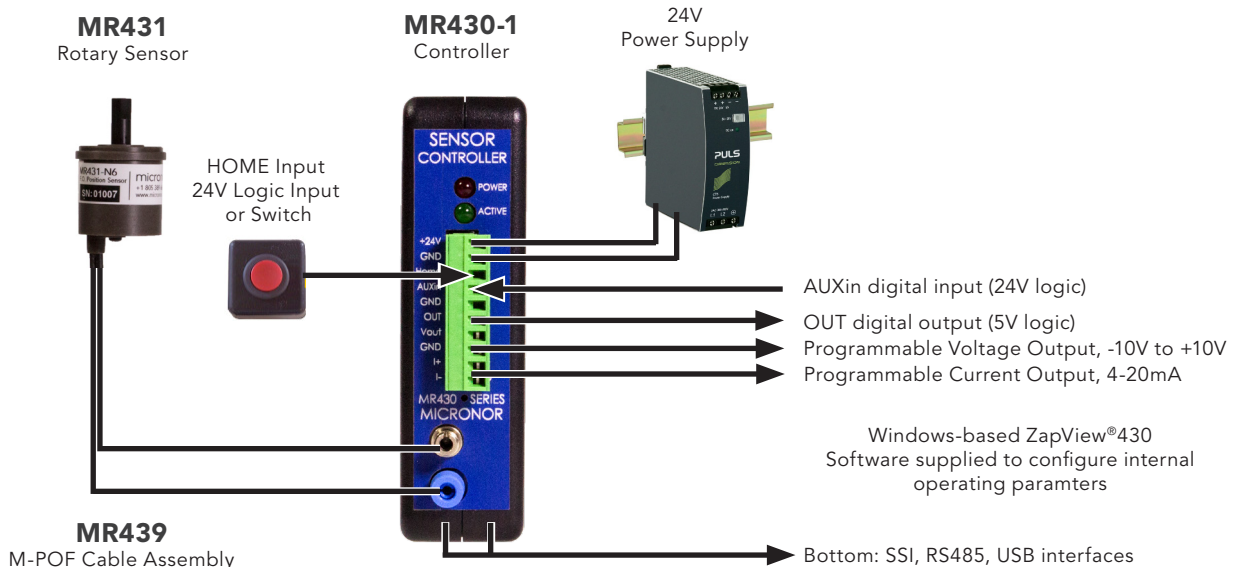
MR430 Fiber Optic Position Sensor System
Small Form Factor, Size 11
MRI Safe, All-Dielectric Construction
Inherently Safe, Simple Mechanical Device

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
- Immune and invisible to magnetic fields
- Non-metallic, all-dielectric MRI Safe sensor
- M-POF fiber optic link can extend up to 30 meters
- DIN rail mount controller

Applications

- Medical and MRI
- Transformer tap changer
- Switchgear
- Oil & Gas
- Transportation
- Semiconductor equipment
- Welding
- Robotic



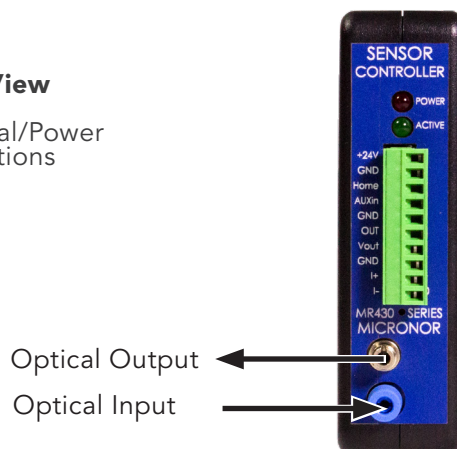
MR430 Controller

Specifications

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 baudrate 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 (Vout)	+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
Maximum Optical Link Length	Up to 30 m (~100 ft) with MR431 Sensor
Explosive Atmospheres	
Inherently Safe, Optical Radiation	
EX Classification	Controller shall be installed in non-hazardous location only
IEC Ex	EPL Mb/Gb/Gc/Db/Dc
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
Unit Weight	230g (8.1 oz)

Specifications subject to change without notice

Front View
J1 - Electrical/Power Connections



Bottom View
J2 - USB
J3 - SSI/RS485



MR430 Controller

J1 - Discrete Power/Electrical Connections

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)
7	Vout	User Scalable, Analog Output, -10V to +10V
8	GND	GND (all GND connected together)
9	I+	User Programmable Analog Output, 4-20mA, +
10	I-	User Programmable Analog Output, 4-20mA, -

J3 - SSI/RS485 Interface Connections

J3 Electrical Interface via Plug Hirose 3240-10P-C(50) Pigtail Assembly available as Micronor MR430-99-01			
Pin	RS485	SSI	MR430-99-01 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
7		SSI CLK-	Purple
8		SSI CLK+	Grey
9		SSI DAT+	White
10		SSI DAT-	Black

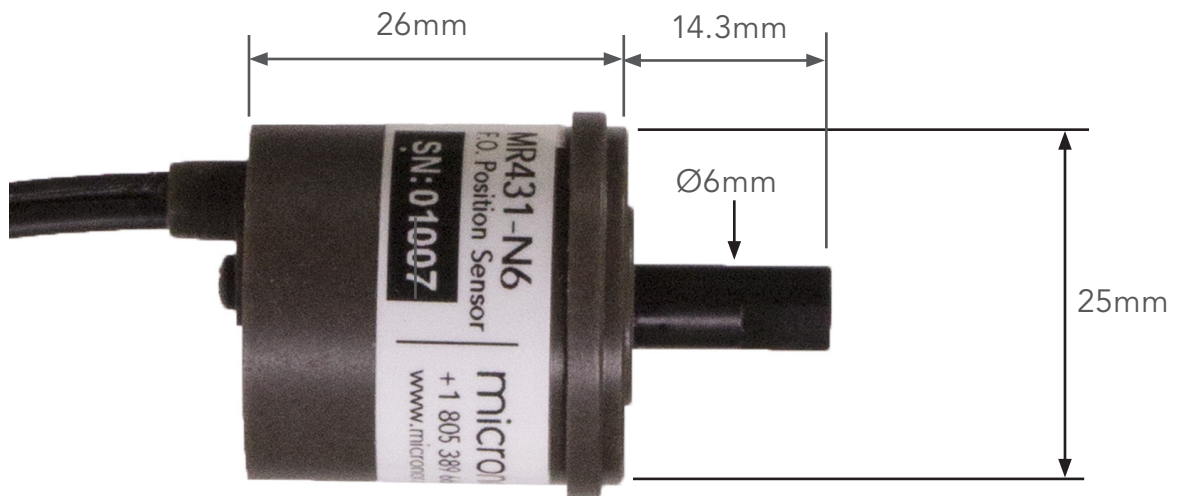
NOTE: +5V can be used to power a RS485-to-RS232 converter module., Max Load 15mA

MR431 Sensor and MR439 Pigtail

Specifications

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
Explosive Atmosphere	
Inherently Safe, Simple Mechanical Device	
EX Classification	Inherently safe, simple mechanical device when used with MR430-1 Controller
IEC Ex	EPL Mb/Gb/Gc/Db/Dc
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

Specifications subject to change without notice



Ordering Info

A complete MR430 sensor system consists of Controller, Sensor and M-POF Cable Assembly.

MR430 - 1

Controller

MR431 - A06

Sensor

MR439 - P03

Cable Assembly

Pigtail Length

P03 Length=3m

P05 Length=5m

P10 Length=10m

P20 Length=20m

NOTES: (1) Contact Micronor sales for OEM custom lengths.

Quick Ship Configurations

MR430-1	DIN rail mount controller
MR430-99-01	J2 Interface Pigtail Assembly, Length=1m, For facilitating SSI and RS485 connections
MR431-A06	Sensor
MR439-P03	3m Sensor Cable Assembly
MR439-P05	5m Sensor Cable Assembly
MR439-P10	10m Sensor Cable Assembly

Accessories

MR430-99-01	J2 Interface Pigtail Assembly, Length=1m, For facilitating SSI and RS485 connections
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MICRONOR INC, 900 Calle Plano, Suite 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