

# micronor sensors

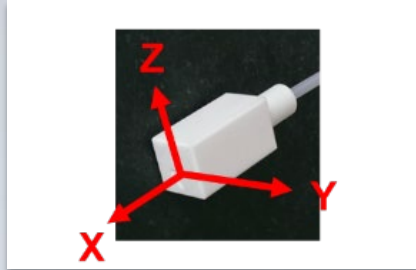
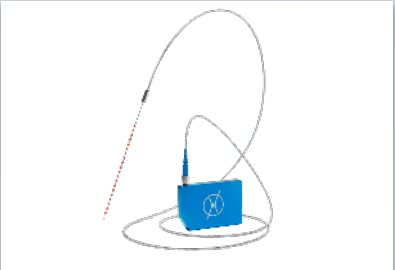
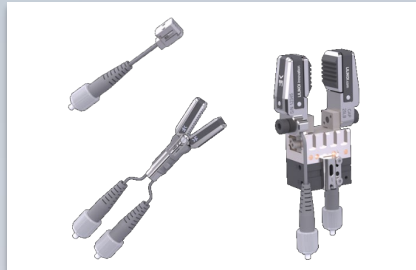
Micronor Sensors, Inc.  
2085 Sperry Ave, Suite A-1  
Ventura CA 93003, USA  
+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)  
[www.micronor.com](http://www.micronor.com)

**Fiber Optic Sensors**  
**Product QUICK GUIDES**

Revision C  
7/25/2024

# Micronor Sensors

## Fiber Optic and Electromechanical Kinetic Sensors



### Fiber Optic

- ☐ Absolute and Incremental Encoders (Micronor AG)
- ☐ Emergency Stop (Micronor AG)
- ☐ Microswitch/Limit Switch (Micronor AG)
- ☐ Multi-axis Acceleration/Vibration Sensors (Micronor AG)
- ☐ High Precision GaAs Temperature Sensors (COMEM Optocon)
- ☐ Multipoint FBG Temperature and Strain Sensors (FiSens GmbH)
- ☐ Gripper, Grasper and Inline Force Sensors (Lilikoi Innovation)

### Electromechanical

- ☐ Smart Bracket Strain Gauge Force Sensors (Lilikoi Innovation)
- ☐ Position Transducers/Feedback Units (Micronor AG)
- ☐ Rotary Limit Switches (Micronor AG)
- ☐ Optical/Magnetic Absolute and Incremental Encoders (Micronor AG)
- ☐ Resolvers (Micronor AG)
- ☐ Cam Timers/Motorized Potentiometers (Micronor AG)
- ☐ HMI – Handheld Pendants and MPGs (Micronor AG)

# Micronor Sensors

We are a world-class supplier of **fiber optic sensors**, and achieve business success through a shared commitment to meet or exceed our customer's expectations through teamwork, continuous improvement, and innovation.

To achieve our mission, it is essential that we focus on quality and pragmatic thinking in everything we do throughout our organization.

Offering both **Fiber Optic** and **Electromechanical** Sensor solutions, we want our customers to consider us a one-stop shop for their sensor needs.

# Micronor Technical Achievements

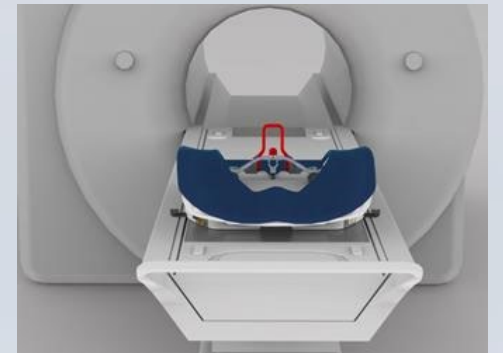
Micronor employees have in depth and proven Fiber Optics Experience. Since the company's founding in 2003, numerous inventions have led to new products. Some technologies are patented.

- 2004** – World's First Commercial FO Incremental Encoder (MR310)
- 2007** – US Patent 7,196,320 awarded for FO Incremental Encoder
- 2010** – World's First Commercial MRI-compatible FO Encoder (MR318)
- 2011** – World's First 13-bit FO Position Sensor (MR330)
- 2012** – World's First Commercial MRI Safe FO Position Sensor (MR338)
- 2013** – US Patent 8,461,514 awarded for FO Absolute Position Sensor
- 2016** – World's First Single Mode Fiber Optic E-Stop (MR387)
- 2016** – World's First Fiber Optic Microswitch (MR386)
- 2017** – POF Based Fiber Optic Absolute Encoder (MR430)
- 2019** – FO Incremental Encoder for ITER (Fusion for Energy) with 62'400 ppr resolution
- 2020** – FO Incremental Encoder for ITER (Fusion for Energy) with 157,050 ppr resolution

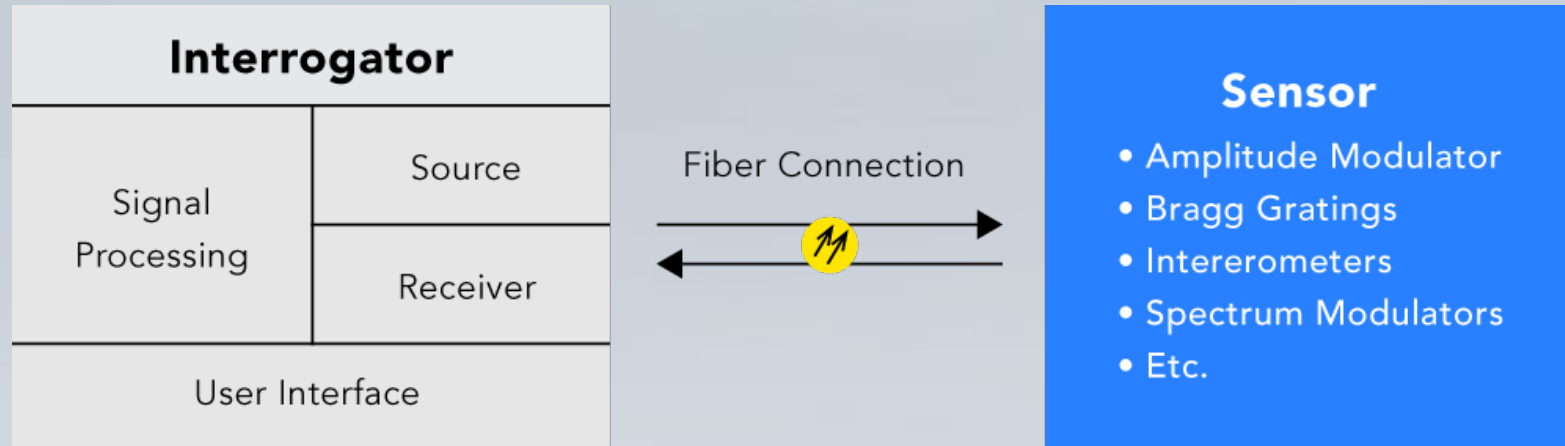
# Micronor Sensors

Our products are used everywhere that you can think of:

- industrial automation and robotic systems
- process automation and control
- medical equipment and MRI imaging
- railway, aerial cable cars and other transportation
- food processing and manufacturing
- petrochemical plants, refineries and oil rigs
- utilities, dams, hydroelectric and nuclear power plants
- advanced research laboratories including CERN, PSI, LLNL
- mines and ore processing
- steel mills and rolling plants
- cranes, hoists and conveyors
- moveable bridges
- military and aerospace



# Principle of Fiber Optic Sensors



1. A fiber optic sensor is, by definition, entirely controlled by light and does not include any electrical components whatsoever.
2. Typically, a fiber optic sensor is “interrogated” using a quantity of light, and the sensor alters the properties of this light signal in proportion to the physical quantity to be measured.
3. The interrogator translates the received optical signals back into electronic quantities in either analog or digital form and serves as the interface to the attached control equipment.

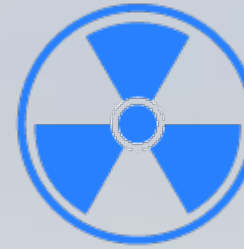
# Why Fiber Optics?



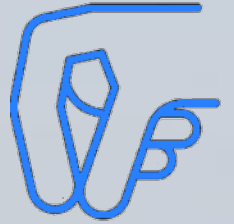
Immune to  
Electrical and RF Fields



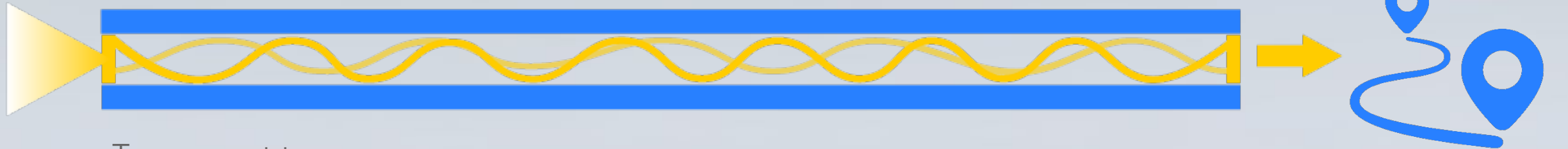
Immune to Lightning  
and High Voltage



Radiation Resistant



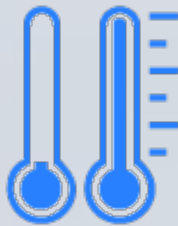
Extremely  
Small Size



Transparent to  
Magnetic Fields



Wide Temperature Range



Inherently Safe





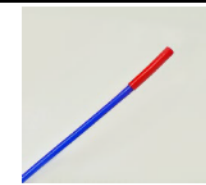



Interference-Free  
Over  
Long  
Distances



## FOTEMP® FO TEMPERATURE PROBES



MODEL	 <b>TS2p</b> Smallest	 <b>TS3</b> General Purpose	 <b>TS4</b> Harsh Chemicals	 <b>TS5</b> Medical & SFF	 <b>TST</b> Transformers	 <b>SmartSpacer®</b> SmartDisc, & Busbar
Key Features	Smallest size, Bare GaAs crystal (300µm x 300µm) for Very Small Surface Areas, Semi devices, and Micro-Vials, Non-Conductive.	Semi Rigid Probe, Immune to EMI/RFI and Microwave Emissions, Non-Conductive.	High Accuracy, Corrosion Resistant, PTFE Coated, Non-Conductive.	Flexible Probe, Small Form Factor, and Compact Size, Non-Conductive.	Specifically Designed for Use in Oil-Filled & Dry Transformers, Non-Conductive	Non-conductive accessories used to embed TST and TS3 probes in transformer, busbar and switchgear.
Applications	General Use: RF, Voltage, Semiconductor Device, and Medical Testing	General Use: Food, Microwave Oven, and RF Environments	Harsh Chemical and Liquid Immersion	Medical Environments, Catheter Instrumentation, Semiconductor, Small FF	Oil-Filled Transformers	General Use: Transformer Windings, Bus Bars, & other Switchgear.
Temperature Range	-200 °C to +300 °C	-200 °C to +300 °C	-200 °C to +300 °C	-200 °C to +300 °C	-40 °C to +200 °C	+180 °C Max
Accuracy	± 0.2 °C	± 0.2 °C	± 0.2 °C	± 0.2 °C	± 0.2 °C	---
Thermal Response	20 °C/s	12 °C/s	7 °C/s	19 °C/s	19 °C/s	---
Probe Dimensions	D1: 0.25 mm D2: 1.7 mm D3: 1.3 mm	D1: 1.0 mm D2: 1.7 mm D3: 1.3 mm	D1: 1.0 mm D2: 1.7 mm D3: 1.3 mm	D1: 0.6 mm D2: 2.0 mm D3: 1.3 mm	D1: 1.75 mm D2: 1.2 mm D3: 3.1 mm	SmartSpacer & SmartDisc for use with TST probe. SmartBusbar used with TS3 probe.
Dimensions Other lengths on request	L1: 4 mm L2: 10 mm L3: 1 – 20 m	L1: 10 – 130 mm L2: 30 mm L3: 1 – 20 m	L1: 15 - 550 mm L2: 10 mm L3: 1 – 20 m	L1: 10 – 600 mm L2: 15 mm L3: 1 – 20 m	L1: 10 mm L2: 70 mm L3: 1 – 20 m	Consult drawings
Cable Coating	Polyimide / Teflon	Polyimide / Teflon	Polyimide / Teflon	Polyimide / Teflon	Polyimide / Teflon	PEEK or NOMEX
Connector Type	ST	ST	ST	ST	ST	---
STOCK PRODUCTS (L1 and L3 Lengths)	TS2p-02	TS3-15MM-02 TS3-15MM-06	TS4-15MM-02	TS5-20MM-02, -06 TS5-50MM-02, -06	Special Order based on required lengths	EOF0200 SmartSpacer EOF0203 SmartDisc ZM0060 SmartBusbar

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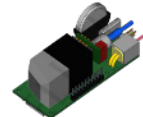


2085 SPERRY AVE, STE A-1  
VENTURA, CA 93003 USA

+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)





## FOTEMP® FIBER OPTIC SIGNAL CONDITIONERS

						
MODEL	FOTEMP-PLUS Most Popular	FOTEMP-H2 Handheld	FOTEMP-OEM	FOTEMP-MINI 3	FOTEMP-T2	FOTEMP-MODULAR
Description	Compact Bench Top	Handheld, Portable	OEM Module, Bench Top, Chassis or DIN Rail Mount	Small Form Factor OEM PCB Module	DIN Rail, Chassis Mount or Bench Top	Multichannel Modular System
No. of Channels	1, 2 or 4	1 or 2	1, 2 or 4	1	4, 8, 12, or 16	1-255
Measurement Range	-200 °C to +300 °C	-200 °C to +300 °C	-200 °C to +300 °C	-200 °C to +300 °C	-200 °C to +300 °C	-200 °C to +300 °C
Accuracy	± 0.3 °C	± 0.2 °C	± 0.2 °C	± 0.2 °C	± 1 °C	± 0.2 °C
Applications	Laboratory, Industrial Process Monitoring	Laboratory, Industrial Process Monitoring	Industrial Process, Switchgear, Generator, Transformer	Embedded OEM Application	Industrial Process, Switchgear, Generator, Transformer	Laboratory, Process Monitoring
Sample Rate/channel	250ms	250ms	250ms	250ms	250ms	250ms
Internal Data Logging?	No	Yes	No	Yes	Yes Requires programming via Modbus	No
Data Logging Storage	---	MicroSD Card	---	MicroSD Card	MicroSD Card	---
Analog output	Std=0-10V Option=4-20mA	---	Std=0-10V Option=4-20mA	---	Std=4-20mA (First 8 Channels Only)	Option: 0-10V or 4-20mA
Relay output	Option=4	---	Option=4	---	Std=4	Option=1-255
Interface	Std=USB+RS232 Option=USB+RS485	USB-C	Std=USB+RS232 Opt=USB+RS485/Modbus	USB-C, UART, RS232, RS485/ModbusRTU	Std=USB+ModbusRTU Option=USB+ModbusTCP	RS485 or RS232
Power Supply	12VDC (includes AC power supply)	12VDC or USB-C, (Internal Li-Ion battery)	12 VDC (includes AC power supply)	USB-C (5V 3A)	24VDC (includes DIN AC-DC Power Supply)	100-240VAC
STOCK PRODUCTS A1-CAL= -20C to +150C A2-CAL= -40°C to +200C B-CAL= -40°C to +300°C C-CAL= -200°C to +300°C	FOTEMP4-PLUS-P0-V-B FOTEMP4-PLUS-P0-V-C	FOTEMP-H2-1-P0-A2 FOTEMP-H2-2-P0-A2	Special Order	FOTEMP-MIN3-P0-A2 Special Order	FOTEMP-T2-8-P1-B	Special Order

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# FISENS® FBG INTERROGATOR & SENSOR CHAIN QUICK GUIDE



MODEL	FBGX100 Interrogator	FBGX400 Interrogator	FI Sensor Chain Bare Fiber Capillary	PE Sensor Chain PEEK Capillary	SI/AC Sensor Chain SI=Silica, AC=Al Ceramic	SSC Sensor Chain Stainless Steel Capillary
Description	Compact Interrogator	Compact Interrogator	Bare Fiber, SM800 P=Polyimide-coated A=Acrylate-coated	Bare Fiber mounted in PEEK tubing	Bare Fiber mounted in Silica or Alumina Ceramic Capillary Tube	Bare Fiber mounted in Stainless Steel Capillary Tube
No. of Channels	1, Wideband (W)	4, Wideband (W)	1	1	1	1
Measurement	Temperature, °C Strain, $\mu\epsilon$	Temperature, °C Strain, $\mu\epsilon$	Temperature and Strain	Temperature and Strain	Temperature	Temperature
Precision	0.1-1°C or 1-10 $\mu\epsilon$ depending on sample rate	0.1-1°C or 1-10 $\mu\epsilon$ depending on sample rate	Sensor Configurations: A-n-W-GL-FI P-n-W-GL-FI UHS-n-W-GL-FI	Sensor Configurations: A-n-W-GL-PK P-n-W-GL-PK	Sensor Configurations: P-n-W-GL-SI UHT-n-W-GL-SI UHT-n-W-GL-AC	Sensor Configurations: P-n-W-SST-SSC UHT-n-W-SST-SSC
# of FBGs per Sensor (n)	1-30	1-30	1-30	1-30	1-30	1-30
Sample Rate/channel	1-100Hz	1-100Hz	Min FBG spacing=2mm Max length=500m	Min FBG spacing=2mm Max cap length=10m	Min FBG spacing=2mm Max cap length, SI=2m, AC=1m	Min FBG spacing=2mm Max cap length=3m
Operating Temperature	0°C to +60°C	0°C to +60°C	Capillary Section: For A: -40°C to +80°C For P: -40°C to +300°C For UHS: -250°C to +300°C	Capillary Section: For A: -40°C to +80°C For P: -40°C to +300°C	Capillary Section: For P: -40°C to +300°C For UHT: -250°C to +800°C	Capillary Section: For P: -40°C to +300°C For UHT: -250°C to +800°C
Applications	Laboratory or Embedded OEM	Laboratory or Embedded OEM	General purpose. Supports temperature and strain measurements. FBGs must be strain-relieved for temp.	Flexible tubing provides protection of internal FBGs, as required by specific applications.	Provides strain-relieved, semi-rigid temperature probe for measurements to +800°C.	Provides strain-relieved, rigid temperature probe, well-suited for high temp measurements to +800°C.
Electrical Interface	UART and microUSB	UART and microUSB	---	---	---	---
Optical Interface	FC-APC	FC-APC	FC-APC	FC-APC	FC-APC	FC-APC
Power Supply	+5VDC or USB	+5VDC or USB	---	---	---	---
STOCK PRODUCTS	FBGX100	FBGX400	Available for initial engineering evaluation: FBG-MR0050, 1-FBG FBG-MR0010, 10-FBG  Or ordered per customer-specified configuration	Ordered per customer-specified configuration	Ordered per customer-specified configuration	Ordered per customer-specified configuration
© 2023, MICRONOR SENSORS INC.			P=Polyimide-Coated Fiber, A=Acrylate-Coated Fiber (rated -40C to +80C) UHS=Ultra High Strength, Pure Silica Core Fiber with No Coating UHT= Ultra High Strength, Pure Silica Core Fiber with Polyimide Coating			98-FISN-06-A
All specifications are subject to change without notice						<a href="#">QR Code to FBGs</a>



# LILIKOI® FEMTO OPTICAL AND SMART BRACKET FORCE SENSORS QUICK GUIDE

MODEL	 FBGX100 Interrogator	 FBGX400 Interrogator	 FG25 Inline Optical Force Sensor	 GR25 Gripper Optical Force Sensor	 GS05 Grasper Optical Force Sensor	 SB20, SB30 Smart Bracket Load Cells
Description	Wideband (W) Interrogator	Wideband (W) Interrogator	Inline Force Sensor, Capacity=25lb (11.3kg)	Gripper Force Sensor. Optional dual Gripper assembly with parallel actuator.	Grasping Finger Sensor. Optional grasper assembly with push rod actuation.	Mounts directly into standard Aluminum T-Slot Extrusions using standard T-Nuts
No. of Channels	1, up to 30 FBGs	4, up to 120 FBGs	Sensor requires 1 channel,	Dual Gripper Sensor requires 2 channels	Dual Grasper Sensor requires 2 channels	Requires Strain Gauge amplifier, not optical
Measurement (or Force Capacity)	Temperature, °C Strain, $\mu\epsilon$	Temperature, °C Strain, $\mu\epsilon$	Force Capacity= 25lb (11.3kg)	Force Capacity= 25lb (11.3kg)	Force Capacity= 5 lb (2.2kg)	SB20 = 25 lbs SB30-1 = 25 lbs SB30-2 = 50 lbs, 2.5mV/V
Precision (Interrogator Output)	0.1-1°C or 1-10 $\mu\epsilon$ depending on sample rate	0.1-1°C or 1-10 $\mu\epsilon$ depending on sample rate	Interrogator Output= 3500 $\mu\epsilon$ at F.S nom	Interrogator Output= 3500 $\mu\epsilon$ at F.S nom	Interrogator Output= 3500 $\mu\epsilon$ at F.S nom	SB20 = 2mV/V SB30-1 = 1.25mV/V SB30-2 = 2.5mV/V
Total # of FBGs	1-30	1-120	Internal FBGs=3 Tension, Compression & Temperature	Internal FBGs=3 Tension, Compression & Temperature	Internal FBGs=3 Tension, Compression & Temperature	-
Sample Rate/channel	1-200Hz	1-200Hz	Determined by FBG Interrogator used			Determined by User Amplifier
Operating Temperature	0°C to +60°C	0°C to +60°C	-55°C to +200°C (-67°F to +392°F)	-55°C to +200°C (-67°F to +392°F)	-55°C to +200°C (-67°F to +392°F)	-51°C to +71°C (-60°F to +150°F)
Applications	Laboratory or Embedded OEM	Laboratory or Embedded OEM	Applied force	Gripping force per finger	Grasping force per finger	Two SBs mounted on opposite corners can monitor load balance on T-Frame
Electrical Interface	UART, microUSB	UART, microUSB	---	---	---	---
Optical Interface	FC-APC	FC-APC	FC-APC	FC-APC	FC-APC	4-Wire
Power Supply	+5VDC or USB	+5VDC or USB	---	---	---	-
STOCK PRODUCTS	FBGX100	FBGX400	FG25	GR25	GS05	SB20 SB30-1, SB30-2

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Contact Micronor Sensors sales for special configurations.

98-LLKI-01-A  
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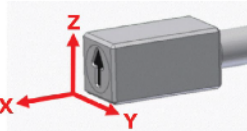
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[www.micronor.com](http://www.micronor.com)

2085 SPERRY AVE, STE A-1  
VENTURA, CA 93003 USA

+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)<https://www.micronor.com>



# Multi-Axis FO Acceleration/Vibration Sensors



MODEL	MR661 1-Axis, Round	MR662 1-Axis, Rectangular	MR663 2-Axis	MR664 3-Axis	MR660 Signal Conditioners	ISOLATOR For >5kV
Key Features	General Purpose 100% passive design, immune to magnetic and electric fields				AC output per axis	High isolation for HV Rail Systems
Applications	Electric Train Pantograph, Transformers, Generators, Heavy Equipment, Medical, MRI (in ceramic housing)				Vibration Analysis	For pantograph applications where addition cabin/pantograph isolation is required
Measurement Range	0-50 g, Minimum Frequency= 0.5 Hz, Max Frequency= 1100 Hz (-3dB BW) Linearity= 3% max, Max Shock 1500 g				Output= 100mv/g pk-pk Non-Linearity= 5% max	+180 °C Max
Operating Temperature	Operating= -40 °C to +85 °C, Storage= -40 °C to +155 °C				-40 °C to +85 °C	---
Housing	Aluminum	Standard Aluminum or Optional Ceramic			Aluminum	---
Length	6m	6m	6m	6m	---	---
Cable Jacket	Polyimide / Teflon	Polyimide / Teflon	Polyimide / Teflon	Polyimide / Teflon	---	---
Connector Type	FO4	FO4	FO4	3x Duplex-E2000	BNC Output(s)	Dual FO4, supports two 1-axis or 2-axis sensors only
STANDARD PRODUCTS	MR661 6099.26.180 (Mtg Adapter)	MR662	MR663	MR664	MR660-1 (for MR661/MR662) MR660-2 (for MR663) MR660-3 (for MR664)	9800.03.007 (25kV) 9800.03.002 (50kV)

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[www.micronor.com](http://www.micronor.com)

2085 SPERRY AVE, STE A-1  
VENTURA, CA 93003 USA

+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)



## FIBER OPTIC ABSOLUTE ENCODER & FO EXTENDER QUICK GUIDE

PRODUCT MODEL	 <b>MR330-1</b> DIN Controller	 <b>MR332</b> Industrial Grade Position Sensor	 <b>MR338</b> MRI Safe Position Sensor	 <b>MR430-1</b> DIN POF Controller	 <b>MR431-A06</b> MRI Safe POF Position Sensor	 <b>MR361-2</b> FO Extender for non-FO SSI Encoders
Description	Controller	Industrial Grade Size 58mm	MRI Safe Size 58mm	Size 100mm, Ø38mm Bore C Thru Bore: IP54 PC Pocket Hole: IP66	MRI Safe, Non-Metallic, Size 11 Synchro or Flange Mount	FO Transmitter/Receiver, provides interference-free extension of non-FO incremental encoders
Resolution	Multiturn 12-bit + Single Turn 13-bit or 14-bit (13,950)			Multiturn 12-bit + Single Turn 13-bit		4-Channels, typically for A/B or A/B/Z encoder interfaces
Compatible Fiber	OM1 (62.5/125) multimode fiber interface only			1mm POF + 1mm POIF		OM1/OM2/OM3
Optical System Margin	12dB	---	---	23dB	---	6dB
Maximum Distance	---	Up to 200m	Up to 200m	---	Pigtail Lengths: 3/5/10/15/20m	Up to 2000m
Encoder Interface	SSI	---	---	SSI	---	SSI Clock+Data (RS422)
Communications Interfaces	Analog Output, SSI, USB, ModbusRTU	---	---	Analog Output, SSI, USB, ModbusRTU	---	Input Error Status (Logic)
Optical Interface	Duplex LC	Duplex LC pigtail or IP-LC	Duplex LC pigtail	MPOF	MPOF	Simplex ST
Power Supply	24 VDC	---	---	24VDC	---	5V or 10-30VDC
Accessories	FO Cabling Junction Boxes	---	---	---	Non-metallic synchro clamps	FO Cabling Junction Boxes
RECOMMENDED PRODUCTS	MR330-1	MR332-Y06D00 MR332-Y10D00	MR338-N10C05 MR338-N10C10	MR430-1	MR431-A06 sensor MR439-Pxx pigtails	For use with 10-30V Encoders: MR361-2-0-1-0 (XMTR) MR361-2-1-1-0 (RCVR)

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[www.micronor.com](http://www.micronor.com)

2085 SPERRY AVE, STE A-1  
VENTURA, CA 93003 USA

+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)



## FIBER OPTIC INCREMENTAL ENCODER & FO EXTENDER QUICK GUIDE

PRODUCT MODEL						
	<b>MR340-1</b> Controller	<b>TD5482</b> Controller in IP Housing	<b>MR342/MR346</b> Shaft Encoder	<b>MR344</b> Hollow Shaft Encoder	<b>MR348</b> MRI Safe Shaft Encoder	<b>MR361-1</b> FO Extender for non-FO Encoders
Description	Controller	MR340-1 Controller in IP Housing, with extended 30C wiring block for additional signal routing	Synchro or Flange Mount MR342: Size Ø58mm, IP64 MR346: Size Ø90mm, IP66	Size 100mm, Ø38mm Bore C Thru Bore: IP54 PC Pocket Hole: IP66	MRI Safe, Non-Metallic, Size Ø58mm, Synchro or Flange Mount	FO Transmitter/Receiver, provides interference-free extension of non-FO incremental encoders
No. of Channels or Resolution	One MR340-1 Controller interfaces to one MR34X series FO Incremental Encoder		256 or 360ppr	1024ppr	360ppr	4-Channels, typically for A/B or A/B/Z encoder interfaces
Compatible Fiber	Fiber Used OM1(62.5/125), Compatible with OM2/OM3 (50/125)					
Optical System Margin	12dB	11dB	One MR340-1 Controller controls one MR34X series FO Incremental Encoder			6dB
Maximum Distance	---	---	Up to 2000m	Up to 2000m	Up to 2000m	Up to 2000m
Encoder Output	Programmable 5V/12V/24V Level		---	---	---	RS422 or HTL option
Communications Interfaces	Analog Output, SSI, USB, ModbusRTU		---	---	---	Unused channel(s) can transmit other signals – including overspeed limit, emergency stop, etc.
Optical Interface	Duplex LC	IP-LC	Duplex LC pigtail or IP-LC	Duplex LC pigtail	Duplex LC pigtail	Simplex ST
Power Supply	24 VDC	24 VDC	---	---	---	5V or 10-30VDC
Accessories	FO Cabling Junction Boxes	FO Cabling Junction Boxes	---	MR344-99-XX Shaft Adapters: 8-32mm, ½" to 1¼"	---	FO Cabling Junction Boxes
RECOMMENDED PRODUCTS	MR340-1	TD5482	MR342-D06D00 MR346-D12D00	MR344-F38C1R5 MR344-F38C1R5E MR344-F38PC1R5	MR348-D06C05 MR348-D06C10	For use with HTL Encoders: MR361-1-0-3-0 (XMTR) MR361-1-1-3-0 (RCVR)

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98-0340-17-A  
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MICRONOR SENSORS, INC.  
[www.micronor.com](http://www.micronor.com)







2085 SPERRY AVE, STE A-1  
VENTURA, CA 93003 USA

+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)





## FIBER OPTIC SIGNALING SENSORS – EMERGENCY STOP & MICROSWITCH

PRODUCT MODEL						
	<b>MR380-0-UNI</b> OEM Controller	<b>MR380-1-3</b> DIN Controller	<b>MR386</b> FO Microswitch	<b>MR387</b> MM/SM FO E-Stop	<b>MR388</b> Outdoor FO E-Stop	<b>TD5412</b> POF E-Stop
Description	Universal SM/MM OEM Controller (PCB)	Universal SM/MM DIN Rail Controller	V-series compatible Microswitch	Emergency Stop, Pigtail or IP66 housing	MR387 E-Stop in IP67 Weatherproof Enclosure	POF E-Stop
No. of Channels	1 (Duplex)	1 (Duplex)	Multiple sensors can be wired in series up to the limits of the Controller's optical loss margin. Consult application note AN118 for link examples and calculations.			1 (Duplex)
Compatible Fiber	OM1 (MM 62.5/125) OM2/OM3 (MM 50/125) OS1 (SM 9/125)		Available with OM1 pigtail only. Compatible with OM2/OM3 fiber links.	Available with OM1 or OS1 fiber interfaces only. OM1 interfaces compatible with OM2/OM3 fiber links.	Available with OM1 or OS1 fiber interfaces only. OM1 interfaces compatible with OM2/OM3 fiber links.	1mm POF
Optical System Margin	OM1=21dB, OS1=18dB	23dB	Use with MR380	Use with MR380	Use with MR380	User provides 650nm (red) optical interface
Maximum Distance	Depends on # of sensors wired in series, # of interconnections, and cable segment lengths		Up to 12km	MM, up to 13km SM, up to 18km	MM, up to 13km SM, up to 18km	Up to 20m
Function Safety Rating	Not rated	SIL=1, PL=c	Not rated	SIL1/PLC when used with MR380-1-3 Controller	SIL1/PLC when used with MR380-1-3 Controller	Not rated
Digital Status Outputs	5V Logic, OC	5V & 24V Logic	---	---	---	---
Internal Relay	---	DPDT contacts	---	---	---	---
Optical Interface	Duplex LC	Duplex LC	Duplex LC pigtail	Duplex LC pigtail, or IP-LC receptacle	Internal: Duplex LC External: IP-LC receptacle	Duplex 1mm POF
Power Supply	5-24 VDC	24 VDC	---	---	---	---
Accessories	---	---	Compatible with Omron and Honeywell V-series lever arm accessories	---	---	---
RECOMMENDED PRODUCTS	MR380-0-UNI	MR380-1-3	MR386-21-1R5 (NO) MR386-25-1R5 (NC)	MR387-2S-1R5 (MM) MR387-2S-D00 (MM) MR387-3S-1R5 (SM) MR387-3S-D00 (SM)	Special Order	TD5412

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98-0380-22-A  
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MICRONOR SENSORS, INC.  
[www.micronor.com](http://www.micronor.com)

2085 SPERRY AVE, STE A-1  
VENTURA, CA 93003 USA

+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)





# Any Questions?



Dennis Horwitz  
President/Technical Sales Manager  
+1-805-242-4296  
[dennis@micronor.com](mailto:dennis@micronor.com)

Micronor Sensors, Inc.  
2085 Sperry Ave, Suite A-1  
Ventura, CA 93003 USA  
+1-805-389-6600  
[sales@micronor.com](mailto:sales@micronor.com)  
[www.Micronor.com](http://www.Micronor.com)