MR380-1-3
Universal
DIN Rail Mount Controller

Instruction Manual

Document No. 98-0380-01
Revision F

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Revision History

Revision	Date	Notes
A	12/11/2013	• Initial release
B	7/13/2015	• Added 50/125 fiber pigtail option • Controller design upgraded to Universal and will work with both 50/125 and 62.5/125 multimode fiber
C	10/15/2015	• Update with new Camarillo address and tel/fax numbers
C1	03/09/2016	• Style Update
D	10/17/2016	• E-Stop part number change, MR380 to MR387 • Added Single Mode option • Added reference to IECEx Test Report • Added MR380-2-2 Switch Contoller • Added Declaration of Conformity
D1	12/1/2016	• Corrected SIL typo, is SIL1/PLc
D2	3/2/2017	• Added Single Mode Declaration of Conformity to Appendix
D3	5/18/2017	• Remove 850nm Multimode Option
D4	9/27/2019	• Single Mode MR387/MR381 maximum loss specification increased to 5dB • Combined SM/MM Declaration of Conformity added
E	5/7/2021	• Updated text and logos to reflect change to Micronor LLC., a division of Photon Control • Updated MR380-1-3 and MR387 E-Stop System Functional Safety and Declaration of Conformity • Added MR380-1-3 Controller minimum system loss budget of 23dB, maintained typical system loss budget of 25dB • Removed MR380-1-2 and MR380-2 Controllers • Removed MR381 E-Actuator and MR385 Foot Pedal • Updated figures
F	1/18/2023	• Updated for Micronor Sensors

Table of Contents

Table of Figures

1. Product Description

1.1 MR387 Fiber Optic Emergency Stop

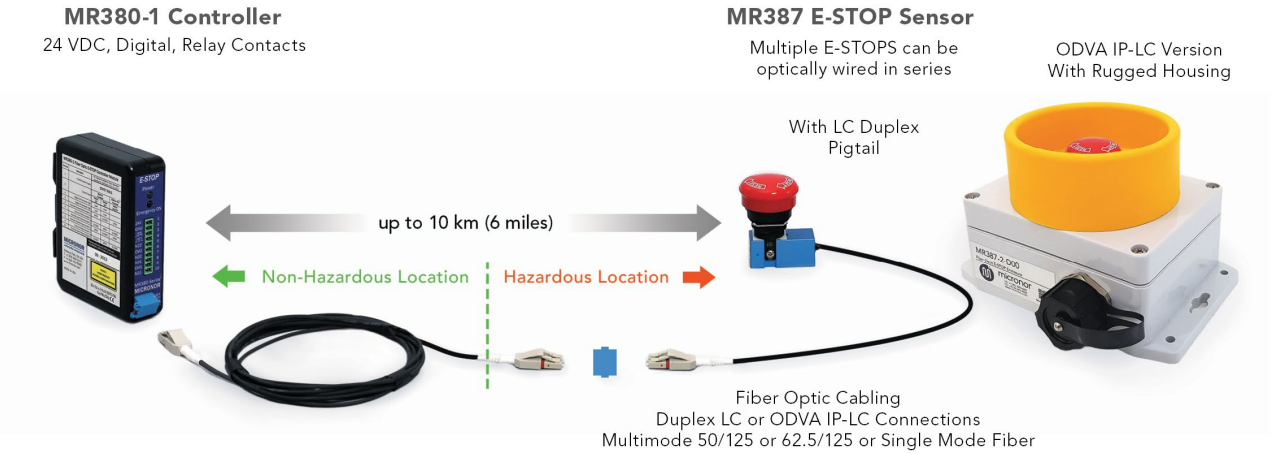

Figure 1. MR387 Emergency Stop Switch with MR380-1-3 Controller

The MR387 Fiber Optic Emergency Stop Switch paired with MR380-1-3 Controller provides a new, innovative emergency signaling detection that can be deployed in hazardous environments and over very long distances. The E-Stop Switch employs a photo interrupt scheme operating over a duplex multimode or single mode optical link that allows for reliable signal detection and implements a known default failure state.

The optical signal levels are rated inherently safe, allowing the sensor to be safely deployed in any type of explosive atmosphere or hazardous location. The entire fiber optic sensor system has a generous system loss budget, enabling long distance systems, complex routing and daisy chaining of multiple switches.

Depressing the switch interrupts the optical signal and the controller provides both Double Pole Double Throw (DPDT) relay contacts and digital outputs for signal and control. The controller will indicate if there is a broken fiber connection or depressed switch in the system which provides increased safety margin over electrical emergency switches. The controller will always default to the emergency state when the switch is depressed, in case of a broken or disconnected fiber, or due to loss of power to the controller unit.

Multiple E-Stops may be wired in series to one controller as long as all optical losses fall within the optical loss budget of the controller used.

Figure 2 provides a complete functional overview of the emergency switch system.

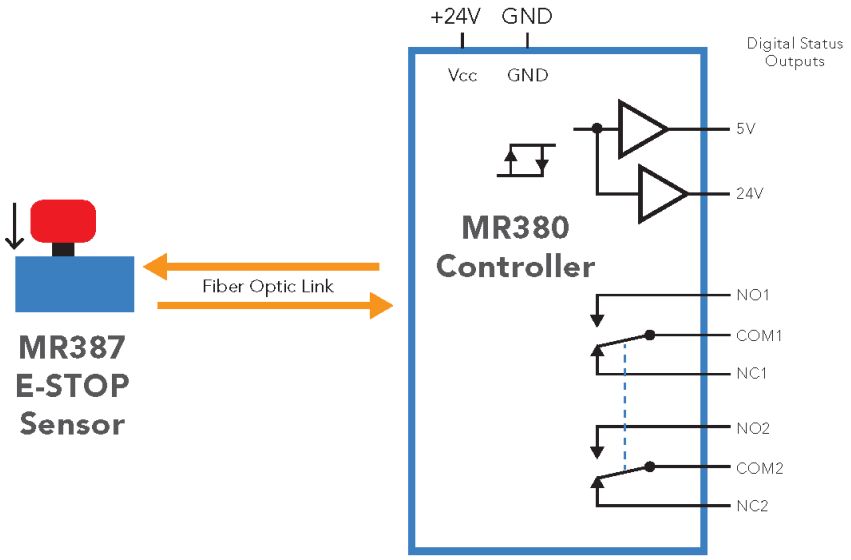

Figure 2. Complete E-Stop Functional System Overview

1.2 *MR386 Fiber Optic Microswitch*

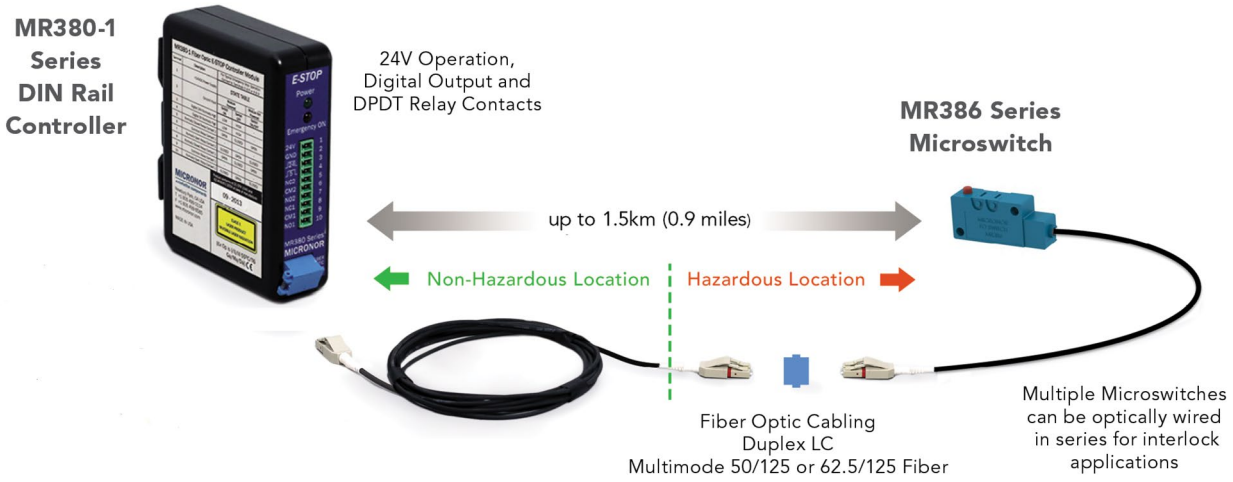

Figure 3. MR386 Microswitch with MR380-1-3 Controller

The MR386 Fiber Optic Microswitch paired with the MR380-1-3 Controller provides a new, innovative signaling detection that can be deployed in difficult, hazardous environments and over very long distances. The Microswitch employs a photo interrupt scheme operating over a duplex 62.5/125µm fiber optic link that allows for reliable signal detection. This provides the same mechanical attributes typically associated with ubiquitous electrical microswitches. It has mechanical tactile feedback when the switch toggles – essential when precise switching points need to be set.

There are two switch materials. The completely non–metallic version is designed to operate within an MRI environment where high magnetic fields would interfere with any electronic switch. The switch

may be safely used within the MRI bore because it is immune to the magnetic field as well as invisible to the imaging process. It is also an ideal switch for deployment in highly corrosive atmospheres. Meanwhile, the industrial version employs a metallic non-magnetic spring and can work over a wider temperature range. The optical signal levels are rated inherently safe, allowing the system to be safely deployed in various explosive atmospheres or hazardous locations.

In addition, there are two optical circuit configurations. The Normally Open (NO) layout corresponds to an optical circuit that is open until the microswitch is depressed; the Normally Closed (NC) layout corresponds to an optical circuit that is closed until the microswitch is depressed.

1.3 Fields of Application

- Hazardous Environments: Oil & gas mining/extracting, refining
- Medical: MRI environment
- Energy Distribution: Switches may be deployed next to high voltage lines

1.4 Features

- EMI/RFI Immune
- Immune to High Voltage Lines and Lightening
- ATEX classified Inherently Safe for EPL Mb/Gb/Gc/Db/Dc applications
- Wide System Loss Budget
- Complex Routing Capability
- Long Distance Signaling without Interference
- Double Pole Double Throw (DPDT) Relay Output
- Digital Signal Out
- Universal DIN Rail Controller, compatible with 50/125 µm, 62.5/125 µm and 9/125 µm links
- E-Stop Switch available with 50/125µm, 62.5/125µm and 9/125µm fibers
- Multiple E-Stop Switches can be Wired in Series

1.5 How the MR380-1-3 Controller Works

A functional block diagram is shown in ***Error! Reference source not found.***, showing the switch sensor, optical link and controller module. The switch is connected to the controller by a duplex fiber optic cable of readily available 50/125µm or 62.5/125µm multimode fiber or 9/125µm single mode fiber. The controller's 9/125µm single mode transmit fiber guides steady optical power from a near-IR light source to the optical switch. Then, a 62.5/125µm multimode receive fiber returns the light relaying if the switch is open or closed.

Controller

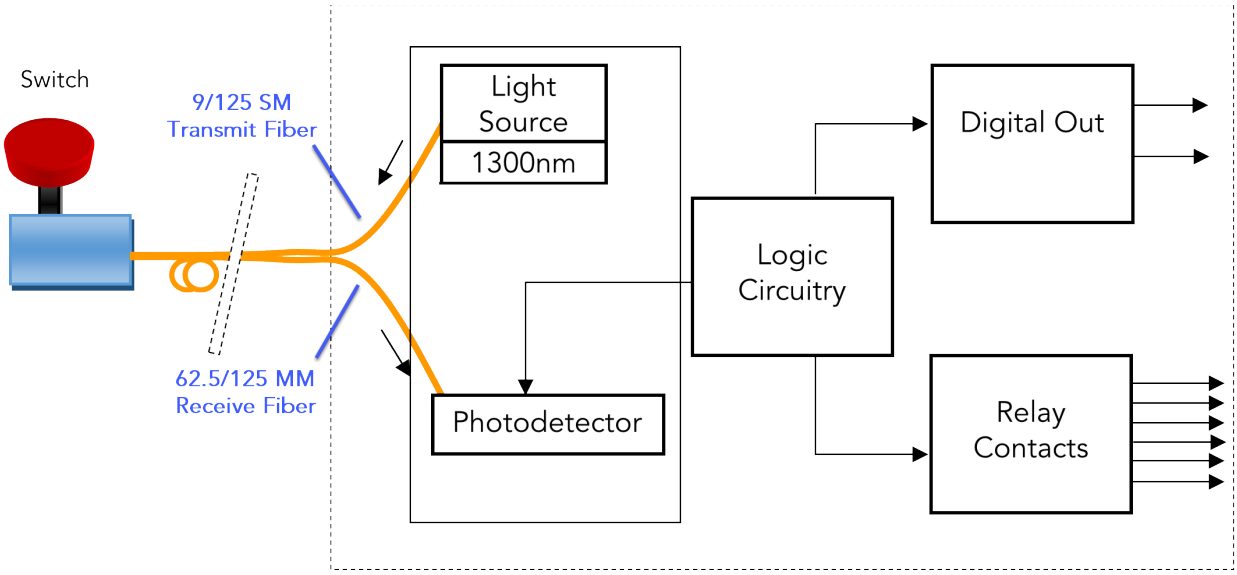

Figure 4. Block Diagram for a MR380-1-3 Controller System

The light source power is held constant under normal operating conditions allowing for a known system loss budget when designing a system. Additionally, the optics within the switch are designed to couple maximum light back into the receive fiber enabling the ability to create long distance systems and chain multiple switches.

Next, the optical power is identified by the photodetector and translated into a logic signal depending on the power level. The photodetector operates with an active low signal scheme which provides a known failure state. The controller then interprets events such as broken fiber, poor connection, high loss or a depressed switch as a failure or 'EMERGENCY ON'.

The photodetector outputs a logic signal to the remaining logic circuitry which then interprets high or low levels for the +24V and +5V digital outputs.

1.6 What Makes the MR380-1-3 Controller "Universal"

The MR380-1-3 Controller is designed to be universally compatible with any standard fiber optic cabling. This is accomplished through the design of its transmit and receive fibers.

In fiber optics, coupling two fibers of different core diameters is only permitted when the core of the receiving fiber is the same size or larger than that of the transmitting fiber. For example, transmitting from OS1 9/125µm single mode fiber to OM1 62.5/125µm or OM2 50/125 multimode fiber does not produce any losses since the core diameter expands from 9µm to 62.5µm or 50µm. Conversely, transmitting from OM1 or OM2 fiber to OS1 fiber causes significant losses and is unacceptable as the core of the receiving fiber is smaller than that of the transmitting fiber. However, if the receiving fiber is only slightly smaller than the transmitting fiber, there is a smaller loss that can be built into the system loss budget. For example, transmitting from OM1 fiber (62.5µm core) to OM2 fiber (50µm core) produces a loss of approximately 1.2dB, which is not a problem in most situations.

In the MR380-1-3 controller, the transmit fiber is OS1 9/125µm single mode fiber. Since the core of the fiber is smaller than any other standard fiber, no losses are produced at this connection, no matter which standard fiber the rest of the system uses. And, at the other end, the controller's receive fiber is OM1 62.5/125µm multimode fiber. Similarly, no losses are produced at the receive connection because the OM1 fiber is larger than any standard fiber the rest of the system might use.

As a result, the MR380-1-3 controller is compatible with any standard fiber, hence its designation as a universal controller. Despite this designation, users should use the same fiber throughout their system to avoid complications and simplify future alterations.

2. Initial Preparation

2.1 Unpacking and Inspection

The unit was carefully inspected mechanically and electrically before shipment. When received, the shipping carton should contain the following items listed below. Account for and inspect each item before the carton is discarded. In the event of a damaged instrument, write or call your nearest MICRONOR representative office or MICRONOR AG headquarters in Switzerland. Please retain the shipping container in case reshipment is required for any reason.

2.2 Damage in Shipment

All instruments are insured when shipped by MICRONOR. If you receive a damaged instrument, you should:

1) Report the damage to your shipper immediately.
2) Inform MICRONOR
3) Save all shipping cartons.

Failure to follow this procedure may affect your claim for compensation.

2.3 Standard Contents

MR380-1-3 Controller

- MR380-1-3 Module
- Phoenix 10C Terminal Block (1879599) inserted as part of unit
- DIN Rail Adapter attached

MR386 series FO Microswitch Sensor:

- MR386 sensor with Duplex LC pigtail in length as ordered

MR387 series FO Emergency Stop Sensor:

- MR387 sensor with either Duplex LC pigtail (length as ordered) or mounted in IP-LC housing

2.4 Warranty Information

Warranty

MICRONOR AG warrants this product to be free from defects in material and workmanship for a period of twelve (12) months from date of shipment. During the warranty period we will, at our option, either repair or replace any product that proves to be defective.

To exercise this warranty, write or call your local MICRONOR respresentativce, or directly contact MICRONOR AG in Switzerland. You will be given prompt assistance and return instructions. Send the

instrument, transportation prepaid, to the indicated service facility. Repairs will be made and the instrument returned transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

Limitations of Warranty

This warranty does not apply to defects resulting from unauthorized modification or misuse of any product or part. This warranty also does not apply to optical interfaces, cable assemblies, fuses or AC line cords. This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability of fitness for a particular use. MICRONOR or MICRONOR SENSORS shall not be liable for any indirect, special or consequent damages.

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3. MR380-1-3 Controller Installation and Operation

3.1 Mounting the MR380-1-3 Controller Module

The controller unit mounts on DIN rails as well as a single mounting clip. Both mounting schemes are shown below in *Figure 5*.

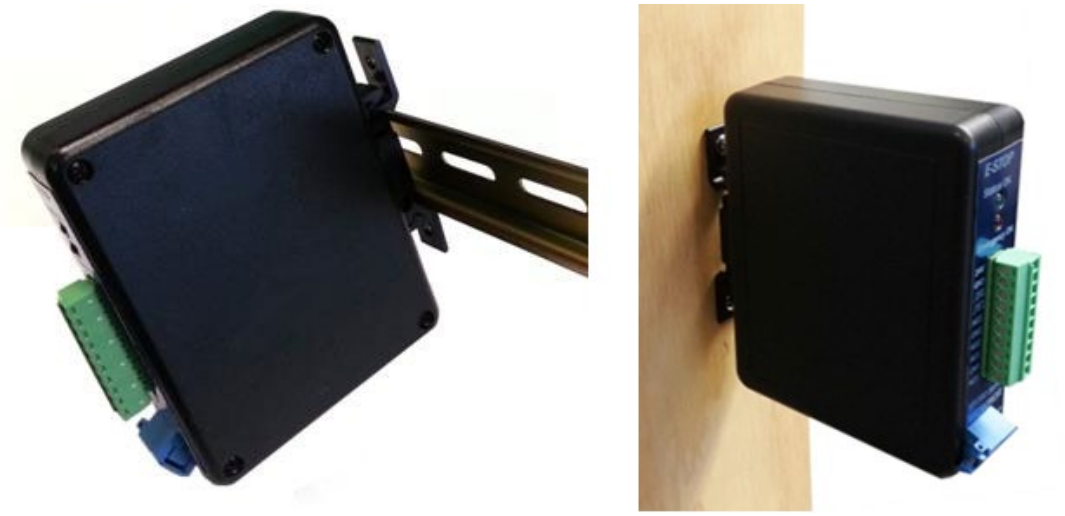


Figure 5. MR380-1-3 Mounting Options: DIN Rail Mount versus Chassis Mount

3.2 Connecting the MR380-1-3 Controller Module

An LC Duplex optical cable is used to interconnect the sensor and controller. The sensor incorporates a 3m optical pigtail (or alternate length as specified by customer). If a longer connection to the controller is required, then an extension cable having an LC Duplex connector may be used.

Remove the LC Duplex connector's dust cap(s) and open the external shutter of the controller. When inserting the LC Duplex connector, there should be a positive click when the connector is engaged properly. Avoid repeated fiber optic disconnects to reduce likelihood of surface contamination.

3.3 Mounting the MR387 E-Stop Switch

When mounting the E-Stop switch into a panel, provide a cut-out as dimensionally shown below in *Figure 6* and the Mechanical Reference Drawing in *Section 9.2*.

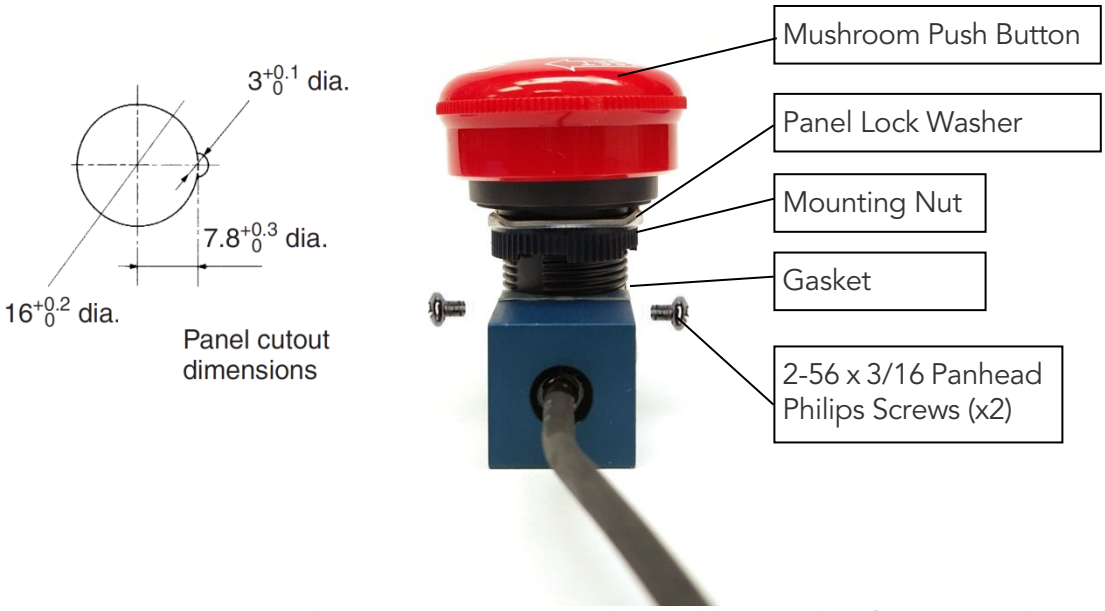


Figure 6. Panel Cut Out Dimensions and Assembly Hierarchy of E-Stop Switch

Refer to Figure 7 below for switch orientation. Secure panel-mount switch with all appropriate designations and requirements.

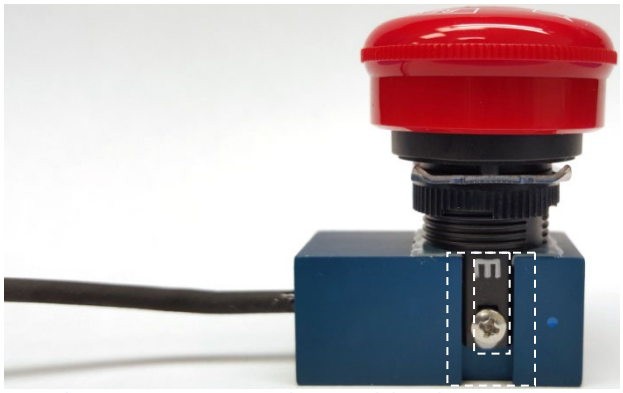


Figure 7. E-Stop Switch Orientation Interchangeable when Mounting into Optical Block

3.4 MR380 Electrical Connections

Figure 8. Front Panel Outputs of MR380-1-3 Controller

MR380-1-3 Fiber Optic Controller State Table				
Terminal	Description			
1	+24 VDC Power Supply	Module Powered		Module Not Powered
2	Ground Input	Switch ON	Switch OFF	Switch ON/OFF
3	Digital 24V Normally High	LOW	HIGH	-
4	Digital 5V Normally High	LOW	HIGH	-
5	Normally Closed Relay Contact 2	OPEN	CLOSED	OPEN
6	Common Relay Contact 2	-	-	-
7	Normally Open Relay Contact 2	CLOSED	OPEN	CLOSED
8	Normally Closed Relay Contact 1	OPEN	CLOSED	OPEN
9	Common Relay Contact 1	-	-	-
10	Normally Open Relay Contact 1	CLOSED	OPEN	CLOSED

The table above depicts the pinouts for the MR380-1-3 controller, and the state of each terminal when an E-stop switch is on or off. For powering the controller, +24 VDC is supplied to terminal 1 and grounded using terminal 2. For typical E-stop operation, connect to terminals 5 and 6 or terminals 8 and 9.

The contact on the controller module uses a Phoenix Contact screw terminal. For more information, consult Controller specifications given in *Section 5*. If connectors are lost or damaged, contact Micronor Sales for replacement details.

3.5 MR380 Optical Connections

A duplex fiber optic cable is used to interconnect the sensor and controller. The sensor incorporates a 1.5m optical pigtail (or as specified by customer). If a longer connection to the controller is required, then an extension fiber cable having duplex LC connector may be used.

Remove the dust cap form the connector on the cable and open the spring-loaded cover of the receptacle on the controller. Insert the LC connector as shown. There should be a positive click when the connector is engaged properly.

Do not force the Fiber Optic Connector!

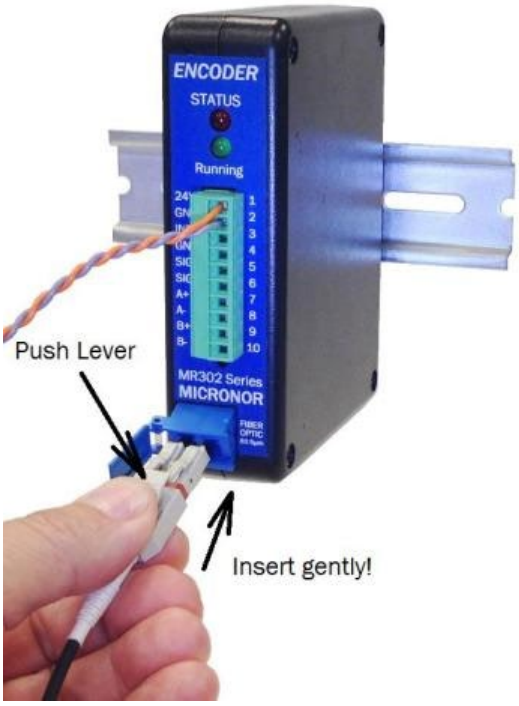
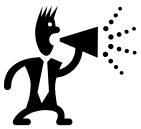


Figure 9. Connecting Sensor to Controller Optical Interface

This is the same fiber used in local area networks (LANs). The cable ends must be terminated with high quality Duplex LC connectors and meet these optical performance requirements:

- Multimode Fiber 62.5/125µm, 0.275NA
- Insertion loss <0.5dB,
- Return loss >20dB
- End-face geometry per TELCORDIA GR-326-CORE or equivalent

3.5.1 How To Clean Fiber Optic Connectors and Interfaces



- Fiber Optic connectors must be kept clean from dust and other contaminants.
- Always keep unmated connectors covered with an appropriate dust cap.
- Do not touch the connector ends.
- For recommended FO cleaning and troubleshooting products, consult Application Note AN120, *Fiber Optic Connector and Cable Care*

Before mating - clean BOTH connector ends as shown below in Figure 8 and Figure 9.

Figure 10. How to Clean Optical Interface With Cleaning Stick

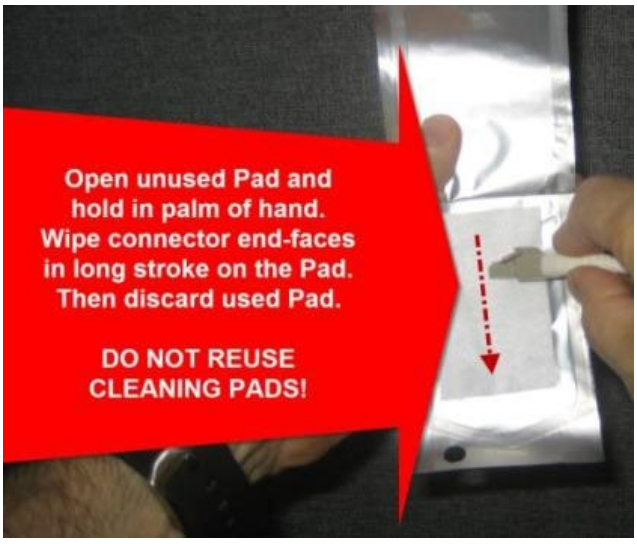


Figure 11. How to Clean Optical Plug with Cleaning Wipe

3.6 MR380-1-3 and MR387 E-Stop System Start-Up & Performance Check

Connect +24VDC supply and ground to the designated terminals on the controller module. Verify that the 'POWER' LED (green) is illuminated. If the E-Stop Switch is not connected, do so at this time and verify that the 'EMERGENCY ON' LED (red) is as shown below:

E-Stop Switch	'Power' LED	'Emergency ON' LED	24V Digital Out	5V Digital Out	Relay Contacts
Not Depressed	ON	OFF	Hi > +20V	Hi > + 4V	NO=Open NC=Closed
Depressed	ON	ON	Low < +1V	Low < +0.5V	Polarization Change NO=Closed NC=Open

If the Emergency Switch and Controller LEDs are not illuminated as shown below, see *Section 3.5* Troubleshooting for help.

Figure 12. Controller with E-Stop: Power On (Left) and E-Stop Depressed (Right)

3.7 Troubleshooting

The following are potential issues and recommended solutions when troubleshooting the MR380-1-3 fiber optic system. For issues not listed, please contact Micronor Sales.

If the Instructions do not rectify the problem, then contact Micronor Sales for further assistance.

Function	Symptom	Instructions
'Power' Green LED	Not illuminated when controller powered	Verify solid electrical connection between wires and screw terminal for both +24VDC and GND. Verify controller module power supply is +24VDC with a current output of at least 80mA.
'Emergency ON' Red LED (Using MR387 Only)	Illuminated when E-Stop not depressed	• Check if emergency switch is 'On' when depressed. If so, reset switch and verify 'Emergency ON' is now off. • Verify optical link cabling is properly connected and undamaged. • Verify that the fiber optic system does not exceed system loss margin specifications. Measure the output power using a power meter set at 1300nm. It should read between -8.5dBm to -6.5dBm when using 62.5/125µm or 50/125µm MM fiber, or between -9.5dBm to -6.5dBm when using 9/125µm SM fiber. • Clean all fiber optic connector surfaces using appropriate cleaning materials.
+5V and +24V Digital Outputs	No high voltage output	Verify solid electrical connection between wires and screw terminal for Digital Out and GND. • Verify that the controller module is properly powered with +24VDC and grounded. • Verify emergency switch is connected and 'Emergency ON' is off.
Relay	Switching failure	Verify solid electrical connection between wires and screw terminal for NO2, NC2, CM2, NO1, NC1, CM1 • Verify that the controller module is properly powered with +24VDC and grounded. • Verify E-Stop Switch is connected and "Emergency ON' is off. • Verify when switch is depressed the controller will electro-mechanically switch the state of the relay resulting in a faint 'click' sound.

Damaged Sensor	E-Stop	• Verify controller module outputs optical power by connecting LC loopback directly from one LC connector to the other, shown in *Figure 10*. 'Power' should be illuminated and 'Emergency ON' should be OFF. • Verify undamaged fiber with visual fault finder. • Verify that the switch loss is less than the Optical Insertion Loss specification of the switch sensor using an optical power meter. • Clean fiber optic surfaces on the switch using the appropriate cleaning materials.

Figure 13. LC Loopback MR380-1-3 Controller Check

4 Specifications

For additional clarification of parameters related to Functional Safety, Laser Safety, Explosive Atmospheres and CE Marking, consult Micronor document 93-0380-01, Declaration of Conformity.

4.1 MR380-1-3 Controller Module

Functional States	As Applies to MR387 E-Stop Sensor
Normal RESET (Up Position)	Red LED is OFF Digital 5V and 24V Outputs=HI Relay NC contacts=Closed, NO contacts=Open
ACTIVATED (Down Position) Broken Fiber, Loss of Optical Signal, or Controller Failure	Red LED is ON Digital 5V and 24V Outputs=LOW Relay NC contacts=Open, NO contacts=Closed
Digital Outputs	
5V Logic	5 VDC/2k Ω Load Max
24V Logic	24 VDC/2k Ω Load Max
Relay Contacts	2x Form C (COM-NO-NC)
Switching Power Rating	60 W / 62.5 VA
Contact Material	AgNi, Gold Covered
DC Rating	75 V @ 0.75A; 24 V @ 2A
AC Rating	50 V @ 1A; 24 V @ 2A
Optical	Class I Eye Safe
Compatible Fibers	Multimode OM1 62.5/125 or OM2 50/125 Single Mode OS1 9/125 or SMF-28
System Loss Budget	Minimum 23dB, Typical 25dB
Maximum Optical Link Length	Distance is a function of user's system loss budget which is the total round-trip loss of all optical link components - sensor(s), connectors, splices and cable segments. Consult Application Note AN118 for more information. Contact Micronor for longer distance applications.
Interface	NOTE: Electrical connections shall not exceed 3 meters.
Electrical	10-pin Screw Terminal, 30-14 AWG (Phoenix Mating Plug 1803659)
Optical	LC-Duplex, 9/125 SM transmit fiber, 62.5/125 MM receive fiber
Power Supply	+24 VDC, <80 mA input
Functional Safety	For MR387 E-Stop Sensor + MR380-1-3 Universal Controller
ISO 13849	Category 2
MTTFd	4.14 E+06 hours (473.1 years)
Performance Level (PL)	PL=c
Safety Integrity Level (SIL)	SIL=1
Explosive Atmospheres	Inherently Safe Optical Radiation
Ex Classification	Controller shall be installed in non-hazardous location only Power supply to Controller shall be current limited to 200mA or less IECEx Test Report (ExTR) GB/CML/ExTR 16.0105/00 (Multimode Controllers)
ATEX	+ EPL Mb/Gb/Gc/Db/Dc
IEC Ex	EPL Mb/Gb/Gc/Db/Dc
NEC	Exempt

Environmental Performance	
Temperature/Humidity	-5°C to +55°C (23°F to +131°F), 0-95% RH, Non-Condensing
Ingress Protection	IP50
Physical Attributes	
Mounting	35mm DIN Rail
Housing	11.4 x 8.9 x 3.2 cm (4.5 x 3.5 x 1.25 inches)
Weight	230 g (8.1 oz)

Specifications subject to change without notice

4.2 MR387 Emergency Stop Sensor Switch

Functionality	
ISO 13850	ISO 13850 defines the characteristics and requirements for a traditional electromechanical E-STOP switch. The MR380 Sensor/Controller integrates the definition of purpose and functionality only.
Functional States	**MR380-1-3 Universal Controller Output States**
Normal RESET (Up Position)	Red LED is OFF Digital 5V and 24V Outputs=HI Relay NC contacts=Closed, Relay NO contacts=Open
ACTIVATED (Down Position) Broken Fiber, Loss of Optical Signal, or Controller Failure	Red LED is ON Digital 5V and 24V Outputs=LOW Relay NC contacts=Open, Relay NO contacts=Closed
Functional Safety	**For MR387 E-Stop Sensor + MR380-1-3 Universal Controller**
ISO 13849	Category 2
$MTTF_d$	4.14 E+06 hours (473.1 years)
Performance Level	PL=c
Safety Integrity Level	SIL=1
Optical Interface	
Interface	Duplex LC for pigtailed sensors, MR387-XX-YY where YY is pigtail length in meters ODVA IP-LC connector receptacle, MR387-XX-D00 sensors in housing
Insertion Loss	For calculating System Loss Budget: MR387-2X-XX, IL=2.5dB max (2dB typical), 62.5/125 OM1 MM Fiber MR387-3X-XX, IL=5.0dB max (3dB typical), 9/125 OS1 SM Fiber Consult Application Note AN118 for guidance on determining system loss budget and maximum distance
Explosive Atmospheres	**Inherently Safe, Simple Mechanical Device**
EX Classification	Inherently safe, simple mechanical device when used with MR380 Controller

	IECEx Test Report GB/CML/ExTR 16.0105.00/00
ATEX	+ EPL Mb/Gb/Gc/Db/Dc
EAEU/GOST	EPL Mb/Gb/Gc/Db/Dc
IEC Ex	EPL Mb/Gb/Gc/Db/Dc
North America	Exempt, non-electrical
Environmental	
Temperature/Humidity	-40°C to +65°C (-40°F to +150°F), 0-95% RH, Non-Condensing
Ingress Protection	Pigtail Version=IP61, Panel Mount Housing=IP65
Mechanical	
Housing	Aluminum body, anodized finish
Durability	100,000 operations min.
Physical	
Housing Dimension	Consult Mechanical Reference Drawing
Mounting	Consult Mechanical Reference Drawing
Unit Weight	Sensor with 5 meter pigtail, 240 g (8.5 oz)

Specifications subject to change without notice

5 Application Notes

5.1 Determining System Loss Budget when Chaining Multiple Switches

The MR380-1-3 controllers have the capacity to chain multiple switches in series, permitted that the additional losses fall within the optical system loss budget. *Figure 14* illustrates a system using three MR387 switches in series. For more information on System Loss Budget, please refer to Application Note AN118.

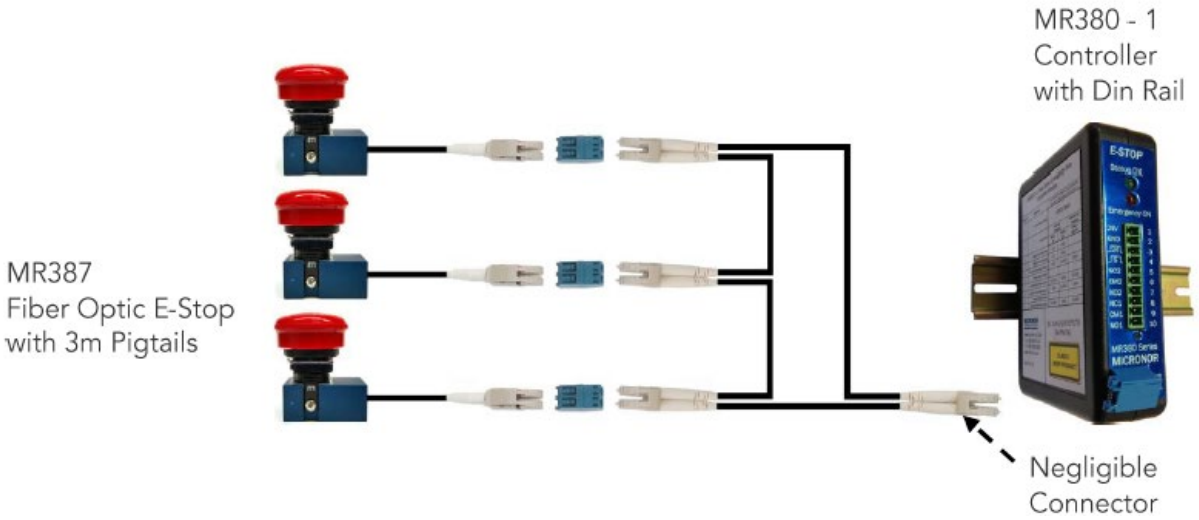


Figure 14. Example E-Stop System with multiple MR387 E-Stop Switches

5.2 Triggering Multiple Controllers with a Single E-Stop

A single MR387 E-Stop can be used to manage the response of two individually remote MR380-1-3 controllers using an optical splitter, permitted that all additional losses fall within the optical system loss budget. This allows a single E-stop to control multiple systems or switch off multiple sources of energy, even if large distances separate the system locations. *Figure 15* shows a system with one E-stop and two controllers with an arbitrary distance between them.

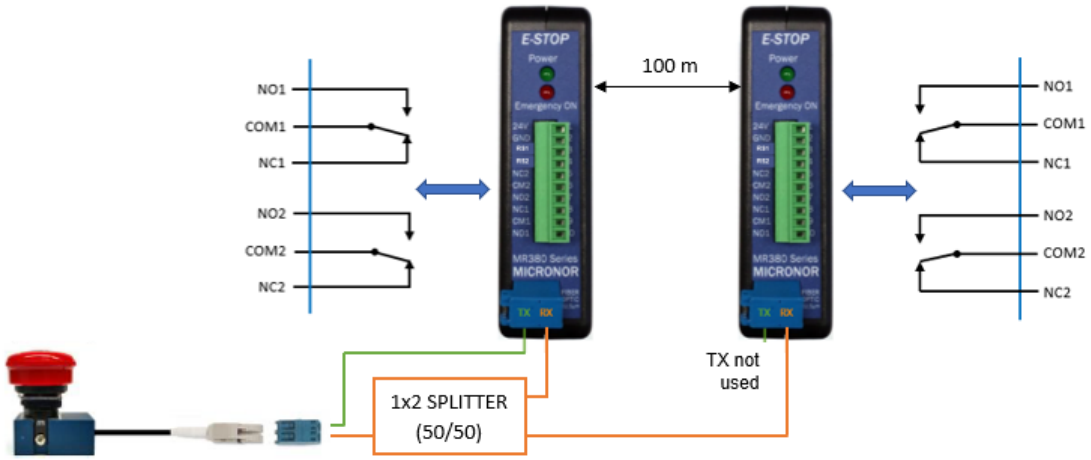


Figure 15. Example E-Stop System with Two Remote MR380-1-3 Controllers

6 Reference Documents

See following pages for these reference drawings and documents.

6.1 MR380-1 Controller Reference Drawing

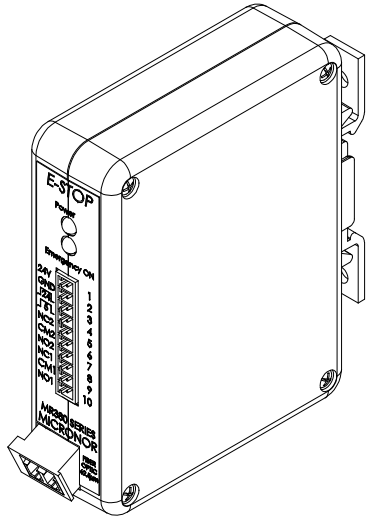
6.2 MR387 E-Stop Reference Drawing

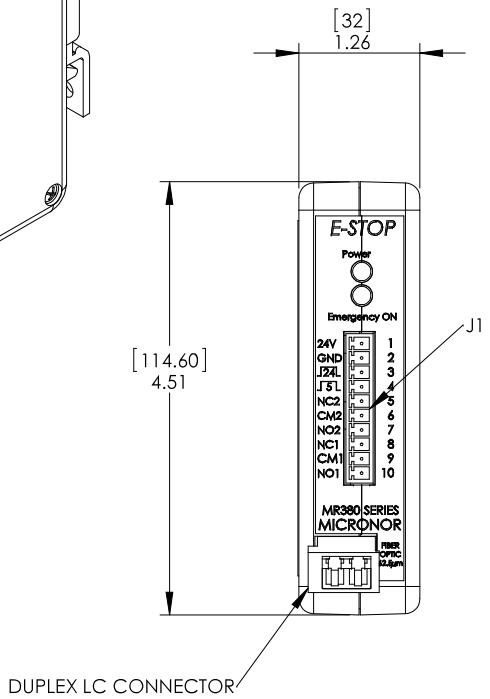
(2 pages)

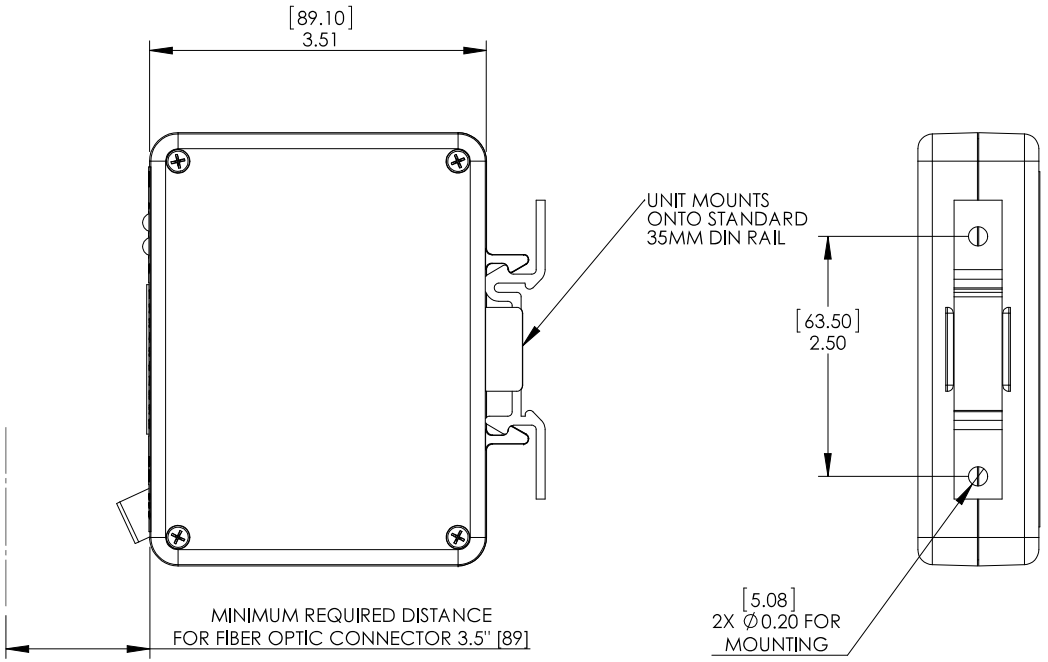
6.3 MR380 Series Declaration of Conformity

(3 pages)

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	NEW RELEASE	9-24-13	RGB
B1	Added Long Haul Option, MR380-1-3	4-06-16	DM
B2	Removed Short Haul Option, MR380-1-1	5-18-17	JF







J1 PHOENIX CONTACT P/N: 1803358
(10 PIN TERMINAL), MATING PLUG P/N: 1803659

TERMINAL	DESCRIPTION
1	+24VDC Power Supply Input
2	Ground Input
3	Digital 24V Normally High
4	Digital 5V Normally High
5	Normally Closed Relay Contact 2
6	Common Relay Contact 2
7	Normally Open Relay Contact 2
8	Normally Closed Relay Contact 1
9	Common Relay Contact 1
10	Normally Open Relay Contact 1

PART NUMBER ORDERING CODE

MR380 - 1 - 2

2 = 1300NM MULTIMODE, MEDIUM HAUL
3 = 1310NM SINGE MODE, LONG HAUL

1 = DIN RAIL MOUNT MODULE

1 WARNING: KEEP CONNECTOR COVERS IN PLACE DURING STORAGE, TO PROTECT FIBER OPTIC INTERFACES.

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: ANGULAR: ±.5° TWO PLACE DECIMAL ±.02 THREE PLACE DECIMAL ±.005 FOUR PLACE DECIMAL ±.0010	DRAWN	R BOYER	9-24-13
	CHECKED		
	ENG APPR.		
	MFG APPR.		
INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
MATERIAL	COMMENTS:		
FINISH			
DO NOT SCALE DRAWING			

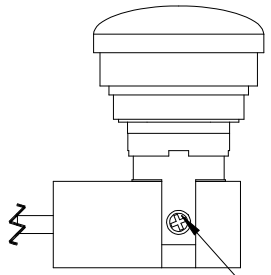
MICRONOR INC.
CAMARILLO, CA (805) 389-6600

TITLE:
MR380-1
CONTROLLER MODULE

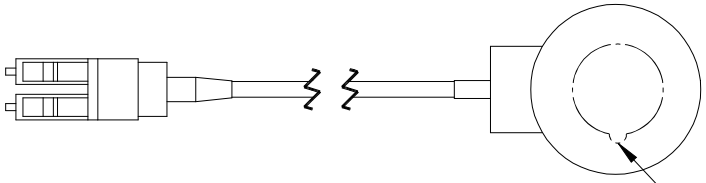
SIZE	DWG. NO.	REV
C	MR380-1	B2

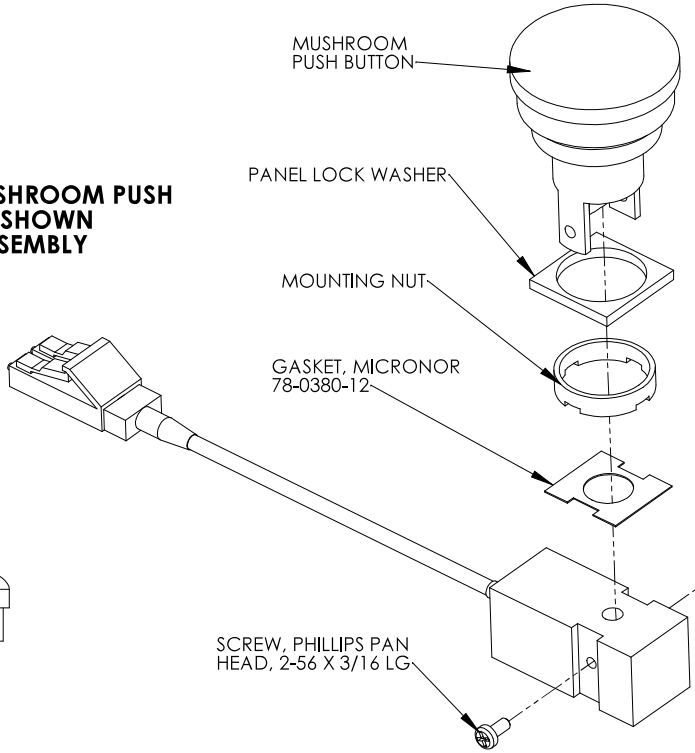
SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1

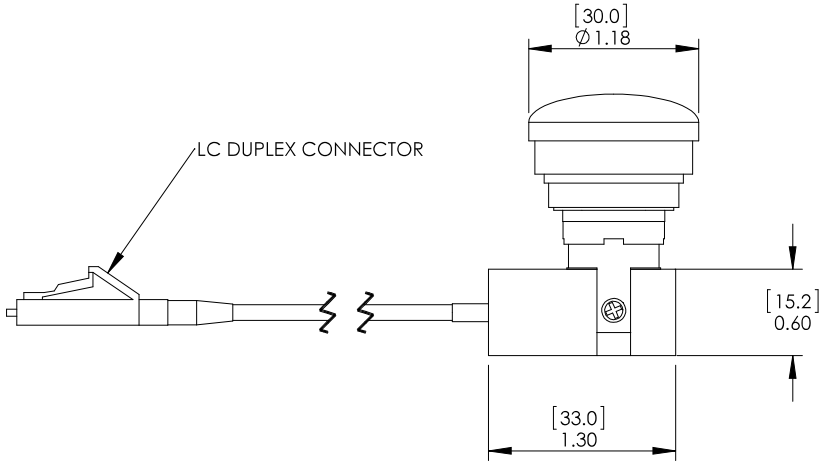
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
B2	UPDATE TO PN TO MR387	4-06-16	DM
B3			DNH

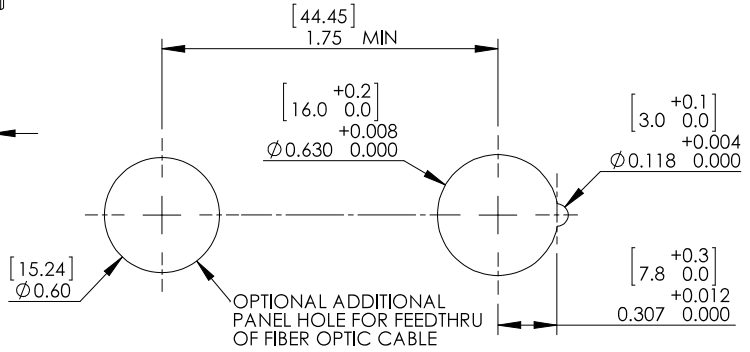


ORIENT MUSHROOM PUSH BUTTON AS SHOWN DURING ASSEMBLY









PANEL CUTOUT DIMENSIONS

PART NUMBER ORDERING CODE

MR387 - 2 S - 03

- 03 — CABLE LENGTH IN METERS
  1R5 = 1.5 METERS
  03 = 3 METERS (STANDARD)
  05 = 5 METERS
  CONSULT FACTORY FOR OTHER LENGTHS
- S — S = Ø30mm BUTTON
  M= Ø40mm BUTTON
- 2 — 2 = WITH 62.5/125 OM-1 FIBER
  3 = WITH SINGLE MODE OS1 FIBER
  5 = WITH 50/125 OM-2 FIBER

2 WARNING: KEEP CONNECTOR COVERS IN PLACE DURING STORAGE, TO PROTECT FIBER OPTIC INTERFACES.

1 WARNING: AVOID SHARP BENDS AND CABLE PINCHING. KEEP BEND RADIUS GREATER THAN 0.5 INCH [13MM].

NOTES: UNLESS OTHERWISE SPECIFIED

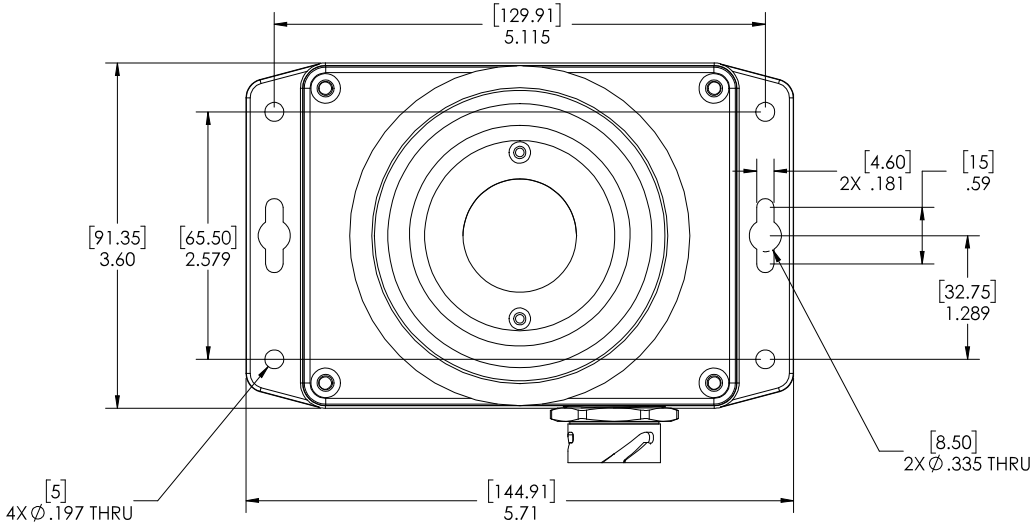
UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: ANGULAR: ±.5° TWO PLACE DECIMAL ±.02 THREE PLACE DECIMAL ±.005 FOUR PLACE DECIMAL ±.0010	DRAWN	R BOYER	8-15-13
	CHECKED		
	ENG APPR.		
	MFG APPR.		
INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
MATERIAL	COMMENTS:		
FINISH			
DO NOT SCALE DRAWING			

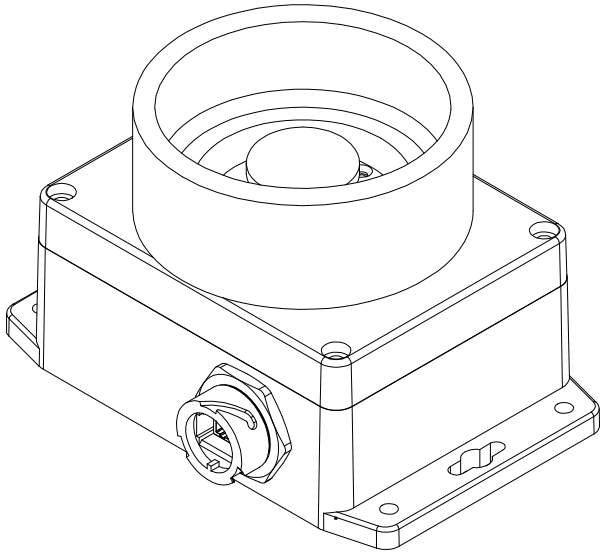
MICRONOR INC.
NEWBURY PARK, CA (805) 499-0114

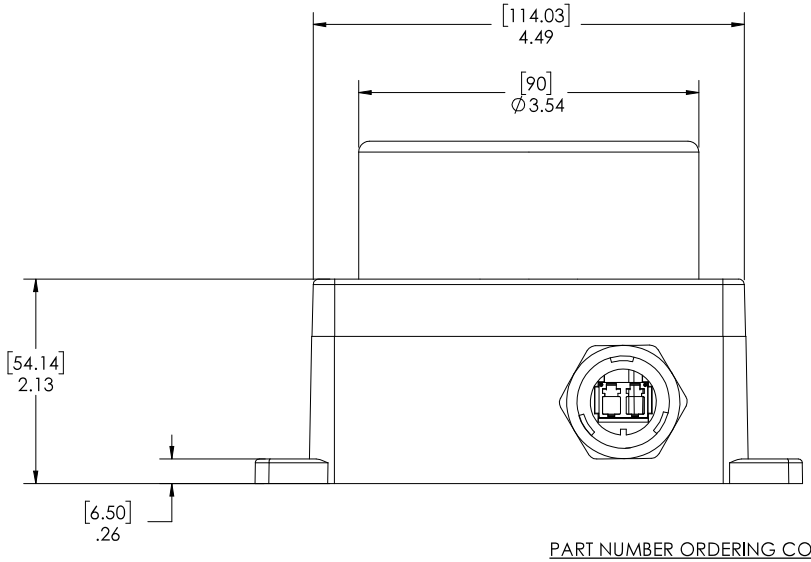
TITLE:
FIBER OPTIC
E-STOP SWITCH

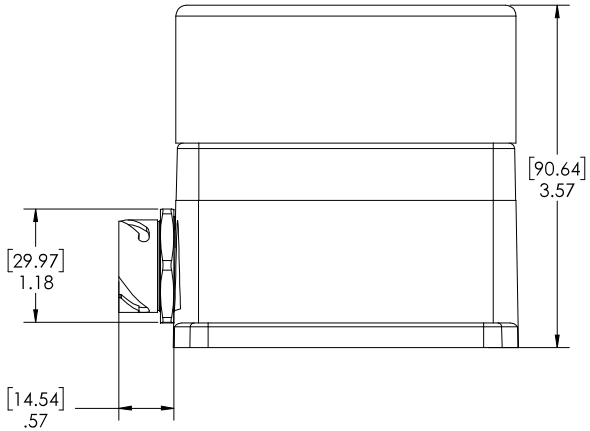
SIZE	DWG. NO.	REV
C	MR387	B3

SCALE: 1.5:1 WEIGHT: SHEET 1 OF 1









PART NUMBER ORDERING CODE

MR387- 2 S - D00

S=Ø30mm BUTTON
M=Ø40mm BUTTON

2=WITH 62.5/125 OM1-FIBER
3=WITH SINGLE MODE OS1 FIBER
5=WITH 50/125 OM-2 FIBER

1 WARNING: KEEP CONNECTOR COVERS IN PLACE DURING STORAGE TO PROTECT FIBER OPTIC INTERFACES

NOTES: UNLESS OTHERWISE SPECIFIED

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.004	DRAWN	A DU	6/10/16
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL SEE NOTES	COMMENTS:		
NEXT ASSY	USED ON	FINISH SEE NOTES			
APPLICATION		DO NOT SCALE DRAWING			

MICRONOR INC.
CAMARILLO, CA (805) 389-9600

TITLE:
E STOP, ENCLOSURE

SIZE	DWG. NO.	REV
C	MR387	B3

SCALE: 1:1 WEIGHT: SHEET 2 OF 2

micronor
a division of PHOTON CONTROL

Declaration of Conformity (EU)

We, the manufacturer,

Micronor LLC
900 Calle Plano, Suite K, Camarillo, CA 93012, USA
Telephone +1-805-389-6600, Email sales@micronor.com

declare that this DoC is issued under our sole responsibility and belongs to the following products:

- Fiber optic switch and signaling system, consisting of:
- MR380 series Controller, MR380-0-1E or MR380-1-3
- MR380 series Sensor, MR382/MR383/MR384/MR385/MR386/MR387

That the equipment is in conformity with the following relevant European Union harmonization legislation:

- Equipment for Potentially Explosive Atmospheres Directive (ATEX), 2014/34/EU
- Electromagnetic Compatibility Directive (EMC), 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU

to which this declaration relates in conformity with the following standards or other normative documents (latest version of EN or corresponding IEC document used per Appendix C):

- EN 60079-0:2018
- EN 60079-14:2014
- EN 60079-28:2015
- EN 60825-1:2014
- EN 61010-1:2010
- EN 61000-6-2:2005+AC:2005
- EN 61000-6-4:2007+A1:2011

Certification Agency

- Certification Management Ltd, EU Notifying Body 2503, IEC Ex Certification Body
- CML Evaluation Report R1198C, GB/CML/ExTR 16.0130/00

Signed for and on behalf of:

Camarillo, CA 2021-05-07 Ben Rosenberg, Application Engineer

micronor
a division of PHOTON CONTROL

Declaration of Conformity (IECEx and North America)

We, the manufacturer,

Micronor LLC
900 Calle Plano, Suite K, Camarillo, CA 93012, USA
Telephone +1-805-389-6600, Email sales@micronor.com

declare that this DoC is issued under our sole responsibility and belongs to the following products:

- Fiber optic switch and signaling system, consisting of:
- MR380 series Controller, MR380-0-1E or MR380-1-3
- MR380 series Sensor, MR382/MR383/MR384/MR385/MR386/MR387

That the equipment is in conformity with the following International (IEC) and North American requirements:

- Explosive Atmospheres/Hazardous Locations, IEC Ex
- Electromagnetic Compatibility for Industrial Environments, IEC and FCC
- Electrical Safety, IEC and FDA/NEC

to which this declaration relates in conformity with the following standards or other normative documents:

- IEC 60079-0:2017, Edition 7.0
- IEC 60079-14:2013, Edition 5.0
- IEC 60079-28:2015: Edition 2.0
- IEC 60825-1: 2014, Edition 3.0
- IEC 61010-1:2010. Edition 3.0
- IEC 61000-6-2:2005, Edition 2.0
- IEC 61000-6-4:2006, Edition 2.0 +AMD1:2010 +ISH1:2011
- US CFR, FDA, Title 21, Chapter 1, Subchapter J, Parts 1000-1050
- US CFR, FCC, Title 47, Chapter 1, Subchapter A, Part 15
- US NFPA 70, NEC, 2014

Certification Agency

- Certification Management Ltd, EU Notifying Body 2503, IEC Ex Certification Body
- CML Evaluation Report R1198C, GB/CML/ExTR 16.0130/00

Signed for and on behalf of:

Camarillo, CA 2021-05-07 Ben Rosenberg, Application Engineer

micronor
a division of PHOTON CONTROL

Declaration of Conformity (EAEU)

We, the manufacturer,

Micronor LLC
900 Calle Plano, Suite K, Camarillo, CA 93012, USA
Telephone +1-805-389-6600, Email sales@micronor.com

declare that this DoC is issued under our sole responsibility and belongs to the following products:

- Fiber optic switch and signaling system, consisting of:
- MR380 series Controller, MR380-0-1E or MR380-1-3
- MR380 series Sensor, MR382/MR383/MR384/MR385/MR386/MR387

That the equipment is in conformity with the following relevant EAEU harmonization legislation:

- On safety of low-voltage equipment, TR-CU-004/2011
- On safety of equipment intended for use in explosive atmospheres, TP-TC-012/2011
- Electromagnetic Compatibility of Technical Products, CU-TR-020/2011

to which this declaration relates in conformity with the following standards or other normative documents (latest version of corresponding IEC document used per Appendix D):

- GOST 30804.6.2-2013
- GOST 30804.6.4-2013
- GOST 31610.28-2017
- GOST R IEC 60079-0-2011
- GOST IEC 60079-14-2013
- GOST IEC 60825-1-2013
- GOST IEC 61010-1-2014

Certification Agency

- Certification Management Ltd, EU Notifying Body 2503, IEC Ex Certification Body
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Signed for and on behalf of:

Camarillo, CA 2021-05-07 Ben Rosenberg, Application Engineer