

# IMPORTANT INSTRUCTIONS

## M Series Photoelectric Sensors

Made in  
U.S.A.

### DESCRIPTION

The M Series sensors are compact, self contained photoelectric sensors housed in an encapsulated cylindrical 18 mm threaded housing. These sensors can be powered by either AC or DC and are available with either a Relay or Solid State (FET) output. The output is SPDT, which allows the M Series to operate as both a "Light On" and "Dark On" sensor without the need of a selector switch or additional models.

#### MD-P18 (F or R) & MDL-P18 (F or R)

The MD-P18 and MDL-P18 are diffused photoelectric sensors, utilizing an infrared modulated light source. It detects an object in its path by detecting the diffusion of transmitted light from the surface of an object. The MD-P18 has a maximum range of 4 inches (100 mm), and the MDL-P18 a maximum range of 18 inches (450 mm).

#### MR-P18 (F or R) & MRP-P18 (F or R)

The MR-P18 is a retroreflective photoelectric sensor which has an infrared, modulated LED light source. The MRP-P18 is a polarized retroreflective sensor which has a visible red, modulated LED light source. It senses an object by detecting the presence or absence of the transmitted beam of light after it reflects from the reflector provided with each unit. The MDP-P18 polarized unit incorporates filters so the sensor will not detect shiny surfaces other than the reflector supplied with the unit. Both the MR-P18 and the MRP-P18 have a maximum range of 12 feet (3.5 M).

### MOUNTING

Two (2) flat plastic nuts are supplied with each unit. After mounting in an appropriate bracket, these nuts are used to lock the sensor in place once the range adjustment is made. Lock washers are not necessary unless the sensor is installed where vibration is severe.

#### MD-P18 (F or R) & MDL-P18 (F or R)

If the background is shiny, such as a metal surface, position the unit so that the light beam strikes the surface at an angle to improve reliability.

#### MR-P18 (F or R) & MRP-P18 (F or R)

Mount the reflector across the path of the object opposite the sensor. If the object to be sensed has a shiny surface, position the unit so that the light beam strikes the object at an angle to improve reliability.

### ALIGNMENT

#### MD-P18 (F or R) & MDL-P18 (F or R)

Select a mounting position giving a clear view of the object and avoiding reflections from the background surfaces, as much as possible. If some background reflection is still present, attempt to darken it. Align the sensor so that the object is within the sensing range and the LED is on. Shift the sensor away from the object until the LED turns off. Then, move the sensor toward the object until the LED just turns on. Measure the distance between the sensor and object surface and decrease this distance by 20% to give a safety factor for reliable operation through varying environmental conditions. Tighten the sensor in place using the two mounting nuts.

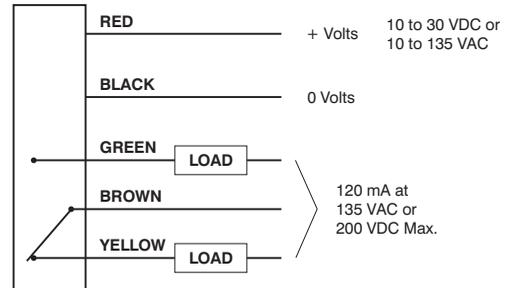
#### MR-P18 (F or R) & MRP-P18 (F or R)

With power applied to the unit and no object in the beam, shift the sensor from side to side and up and down until the beam is reflected from the reflector and the LED is off. Shift the sensor in one plane to find the two extreme positions where the LED is on. Position the unit midway between the two positions. Then repeat shifting and positioning the sensor in the other plane. Pass the object between the unit and its reflector to insure operation. Tighten the sensor in place using the two mounting nuts.

### WIRING DIAGRAMS

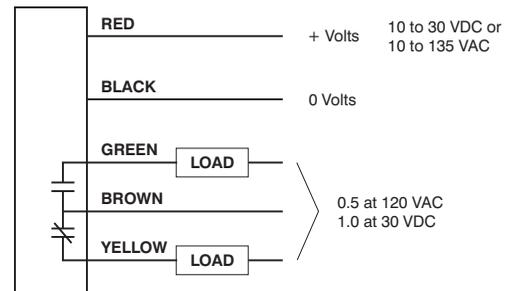
#### SOLID STATE DUAL FET (SPDT) OUTPUT

Models: MD-P18F, MDL-P18F, MR-P18F & MRP-P18F

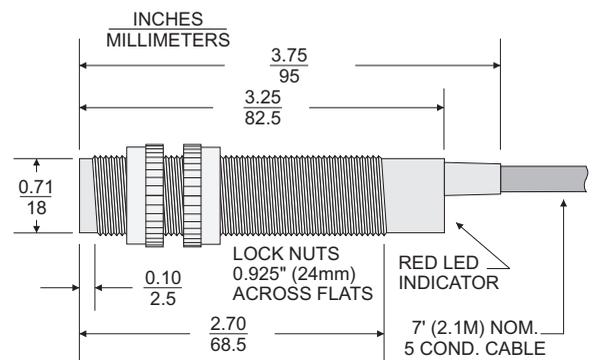


#### RELAY (SPDT) OUTPUT

Models: MD-P18R, MDL-P18R, MR-P18R & MRP-P18R



### DIMENSIONS



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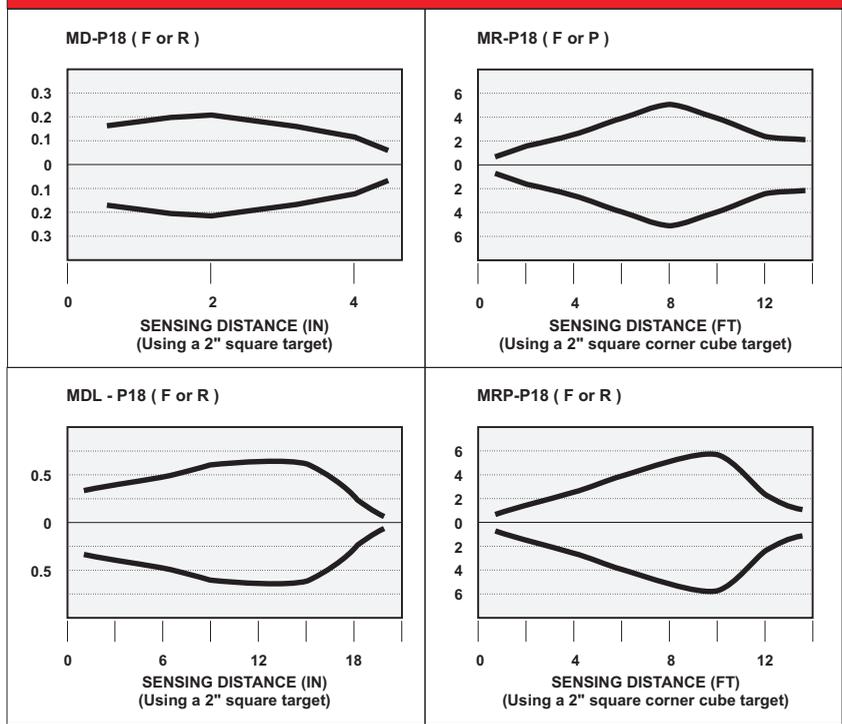
www.fsinet.com

## SPECIFICATIONS

MODEL	MD-P18	MDL-P18	MR-P18	MRP-P18
<b>SENSING</b>				
Max. Distance	4" (10cm)	18" (0.5m)	12" (3.5M)	12" (3.5M)
Min. Target Size	0.2" (5mm)	0.5" (1.25cm)	2.0" * (5.1cm)	2.0" * (5.1cm)
<b>INPUT</b>				
Voltage	10 to 30 VDC / 10 to 135 VAC			
Current (nominal)	45 mA Max.			
<b>OUTPUT</b>				
Type "F"	SPDT FET Short Circuit Protected Using 10 to 30 VDC			
Capacity	120 mA @ 135 VAC or 200 VDC Max.			
Response Time	< 3 ms			
Max. Rate	325 Hz			
Type "R"	SPDT Relay			
Capacity	1.0A @ 30 VDC - 0.5A @ 120 VAC			
Response Time	<5 ms			
Max. Rate	200 Hz			
<b>FEATURES</b>				
Operating Mode	Light-On / Dark-On			
Status Indicator	Red LED			
<b>ENVIRONMENT</b>				
Ambient Temp.	-13° to 122° F (-25° to 50° C)			
Humidity	Max. Relative Humidity 85%			
<b>PHYSICAL</b>				
Housing	Non-metallic, NEMA 4, Potted			
Light Emitting Element	Infrared			Visible LED
Weight (shipping)	8.3 oz	8.3 oz	8.3 oz	8.3 oz
Weight (unit)	3.5 oz	3.5 oz	3.5 oz	3.5 oz

\* Depends on reflector - 2" with included reflector

## OPERATING CHARACTERISTICS

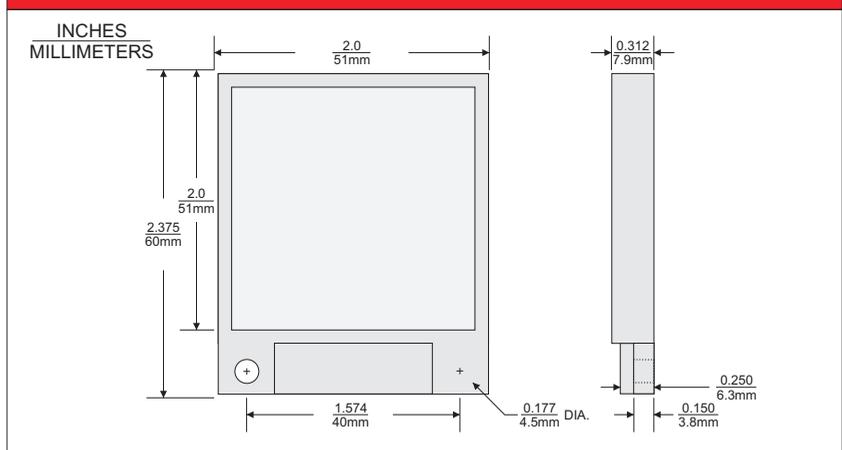


## ORDERING INFORMATION

Part Number: **MXX-P18-X**

- D** Diffused (Short Range)      ↑
  - DL** Diffused (Long Range)    ↑
  - R** Retroreflective (IR) \*      ↑
  - RP** Retro polarized (red) \*    ↑
  
  - F** SPDT FET Solid State Output    ↑
  - R** SPDT Relay Output            ↑
- \* Includes Reflector

## REFLECTOR DIMENSIONS



### A WORD ABOUT SAFETY

Most of FSI's products are designed for general and not for specific applications. Because of this, we usually are not aware of how they eventually will be used. However, they are frequently employed in controlling automatic machinery or processes.

Although FSI makes products of high reliability, every product given enough time, can be expected to fail. Statistically, devices can fail after a short period of time or a long period or time or anything in between. In essentially all cases, failure means (1) failure to provide a logic signal or power to an electrical load when it should or (2) the providing of such a signal or power when it should be absent. Less often, failure means failure to meet some other specification. But, in all cases, it means to do something unwanted or unexpected.

**No FSI product is fail-safe in and of itself.**

The photoelectric controls we manufacture and/or market are for general industrial application and are not designed as a primary optical safety device and are not fail-safe in and of themselves.

Since the failure of automatic machinery or processes can create hazardous conditions for personnel or property, whatever the definition of failure might be, it is necessary to consider the consequences of failure and the design of the application in which the FSI product is used so that failure will not create a hazard to personnel or property. The design must insure that any failure will result in a fail-safe condition and there will be no danger to personnel and/or property involved in the use of the product.

**Designs incorporating controls of any kind should be carefully considered to provide for their eventual failure.**

### IMPORTANT NOTICE

Our recommendations, if any, for the use of this product

are based on tests believed to be reliable. The greatest care is exercised in the selection of our raw materials and in our manufacturing operations. However, since the use of this product is beyond the control of the manufacturer, no guarantee or warranty, expressed or implied, is made as to such use or effects incidental to such use, handling or possession or the results to be obtained, whether in accordance with the directions or claimed so to be. The manufacturer expressly disclaims responsibility therefore. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing laws and/or patents covering any material or use.

Warranties of Sale, disclaimer thereof and limitations of liability are covered exclusively by the FSI / Fork Standards, Inc. printed warranty statement for the controls. These instructions do not expand, reduce, modify or alter FSI / Fork Standards, Inc. warranty statement and no warranty or remedy in favor of a customer or any other person arises out of these instructions.

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