

MAS SENSORS

INSTALLATION AND MAINTENANCE MANUAL (IMM)



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GENERAL

1. *Please read these instructions carefully to prevent any possible injury or equipment damage.*
2. *Installer must be a qualified and experienced service technician.*
3. *Verify the product ratings to confirm that this product will satisfy your requirements and application.*

INTRODUCTION

MAS sensors monitor ambient light levels and provide an analog DC signal to various microprocessors and energy management systems for the purposes of lighting control. MAS sensors are available in 4 different styles.

Styles Include: *Indoor, Outdoor, Atrium and Skylight*
Range: *4 - 20mA*

The MAS sensors require 18-30VDC input power to operate properly. The four different styles of MAS sensors have different mounting and installation requirements. (See Fig. 1A-1E) for mounting hints and recommendations.

INSTALLATION

1. Indoor Sensor (Ceiling)

Mount the Indoor sensor in a 1/2" hole in the false ceiling tile using the adhesive backing. For most general applications the sensor should be mounted between 6-8 feet of the window area, central to the area illuminated by the electrical lighting that will be controlled. In all cases the sensor must be mounted so that it looks at reflected light only and not at any direct light. (See Fig. 1A).

2. Indoor Sensor (Reflecting Wall)

Mount the Indoor/Low sensor at reflecting wall. When sconces are in place in the light well, make sure not to mount sensor in direct level as the sconces. Place sensor 18" from the bottom corner of the ceiling. Remember, the Fresnel lens will see light with a field of view that is 1.15 times the distance to the wall. No direct lighting should be within the field of view. (See Fig. 1C).

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3. Outdoor Sensor

Mount the Outdoor sensor in a standard threaded 1/2" conduit or 1/2" knockout. Locate the sensor on the roof or somewhere that is exposed to full daylight and is not shadowed or directly exposed to any nighttime illumination. Sensor must be mounted horizontally, facing North, with the hooded portion on top. **(See Fig. 1E)**

4. Atrium Sensor

Mount the Atrium Sensor in a standard threaded 1/2" conduit or 1/2" knockout. Locate the sensor at the opposite side of the window mounting the sensor against the wall or ideally in the middle of the atrium glass facing towards the Atrium glass. **(See Fig. 1B)**

5. Skylight Sensor

Mount the Skylight sensor in a standard threaded 1/2" conduit or 1/2" knockout. Locate the assembly near the center of the skylight well (at least 12" from the side) that is exposed to full daylight and is not shadowed. For the best results, use unistrut with a 1/4" angle support, making sure the top of the light sensor is level with top of skylight curb. Sensor must be mounted vertically with the domed portion facing up. **(See Fig. 1D)**

CONNECTIONS

MAS sensors are a two-wire device that can provide an analog DC current input to a variety of controllers and microprocessors. In general, the red wire should be connected to a +24 VDC source and the black wire is connected to the analog input terminal of the controller. The sensor will draw less than 4mA of current. **See Fig. 2** for connection schematics.

Wiring the sensor to the controller should be done with 18-22 AWG stranded wire. Do not route the low voltage wire with or near power wiring. For long wire runs or where there is excessive electrical noise, shielded cable or cable in conduit is required. Cable lengths should not exceed 5000 Ft. Butt splices are recommended but wire nuts are acceptable. Wiring should be performed with all relevant power switched off.

RED:	Input Voltage (18 - 30VDC)
BLACK:	Signal Current (20mA)

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CALIBRATION

MAS sensors are calibrated at the factory. The Footcandle Range can be double or halved in the field using a FIELD CALIBRATION UNIT (See Fig. 3). Any desired calibration values that are different from the factory standards should be requested when the order is placed. The factory standards are as follows:

Sensor	Style	Fixed Corresponding Fc. Min.	Factory Set Max		
			1/2X	1X	2X
MAS/I	Indoor	0 Fc	50 Fc	100 Fc	200 Fc
MAS/O	Outdoor	0 Fc	125 Fc	250 Fc	500 Fc
MAS/A	Atrium	50 Fc	500 Fc	1,000 Fc	2,000 Fc
MAS/S	Skylight	100 Fc	2,500 Fc	5,000 Fc	10,000 Fc

The Maximum range of a MAS sensor should be at least 50% higher than the highest setpoint of interest in the lighting control zone that is controlled by the sensor. The signal response of a MAS sensor is very linear.

The Full-Scale Response Time of the MAS sensor is factory set for 10 minutes. This means that if the sensor sees an abrupt light level change (i.e. from 100 to 5,000 Fc in the case of an MAS/S) the sensor signal will take 10 minutes to reach the full-scale level (See Fig. 4).

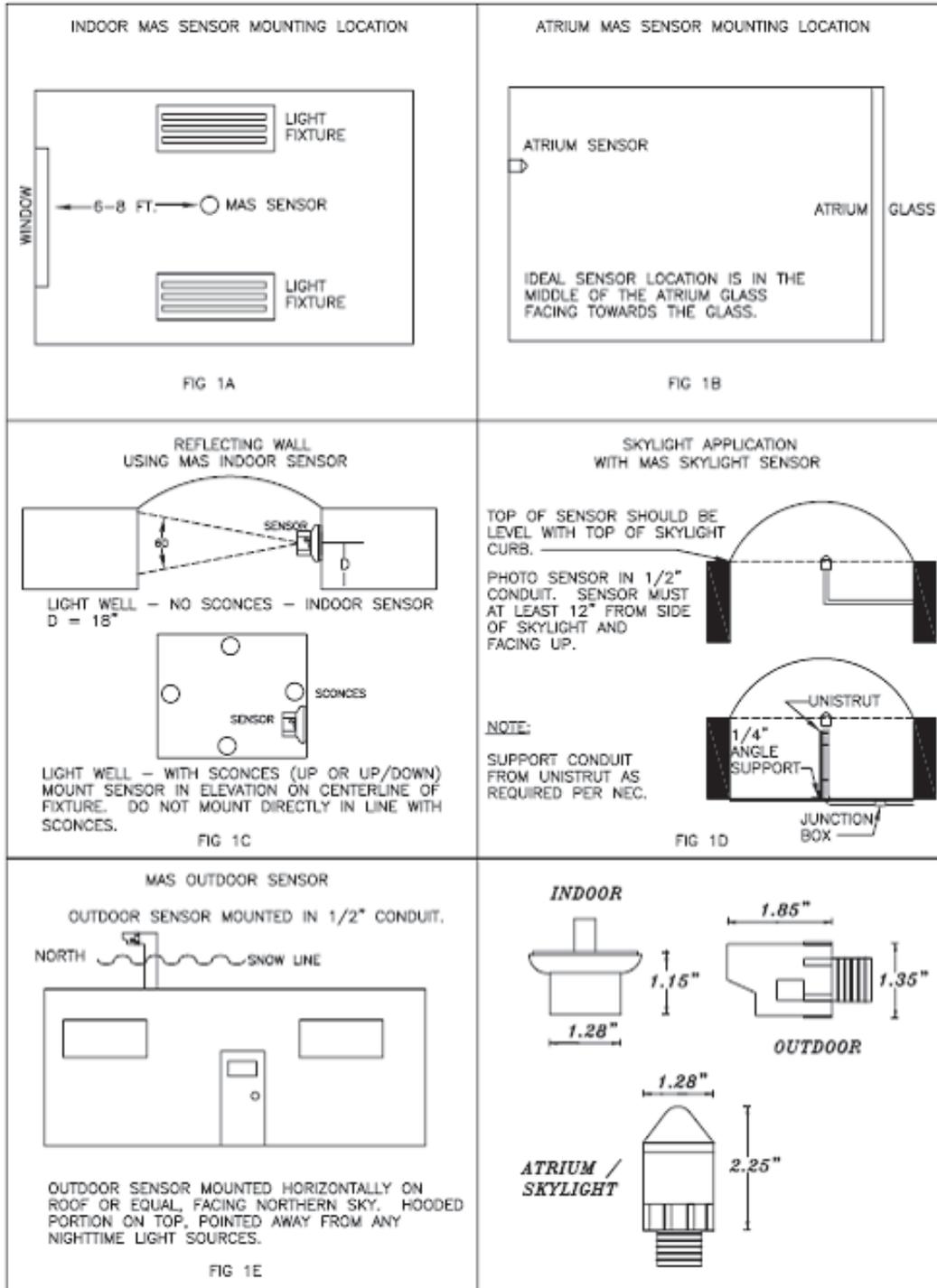
The FIELD CALIBRATION UNIT (MAS-CAL), is used to change the Full-Scale Response Time. The selectable times are: 1 second response (0T), 10 minute response (1T), and 20 minute response (2T). When 0T is selected, response time will be immediate and is mostly used for calibration and testing. 1T is the factory standard, and 2T doubles to response time for applications that require more signal stability.

The MAS-CAL can also be used to change the range of the sensor. The factory default range is set at 1X for any particular sensor type. Selecting 1/2X changes the full-scale range to half of the factory default setting. Selecting 2X will change the full-scale range to twice the factory default setting.

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OPERATION

The MAS sensor is functioning when the controller is activated. Once calibrated, the sensor will need no further attention. There are no switches or other user controls on the sensor.

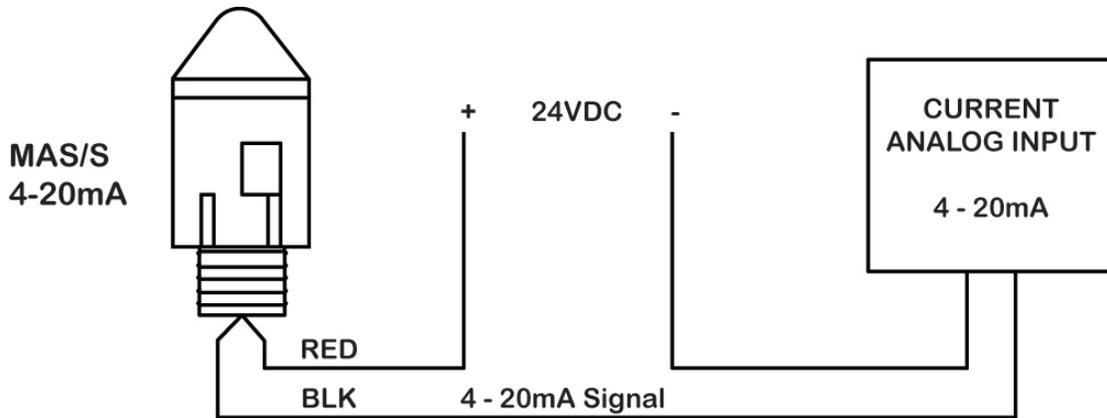


FIGURES: 1A - 1E MAS SENSOR LOCATION

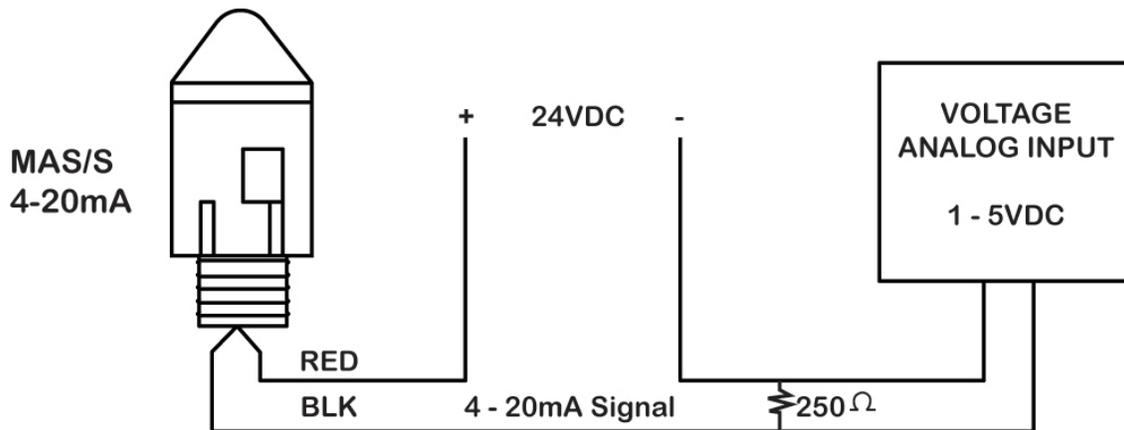
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MAINTENANCE

Every 2 months wipe the lens clean with a non-scratching clean cloth and ensure that no foreign debris remains. Check the housing for damage such as cracks, burns or other deformations. Check that no moisture has penetrated the sensor, as this will likely render it inoperable.



CURRENT CONNECTION



VOLTAGE CONNECTION

FIGURE 2: CONNECTION DRAWING

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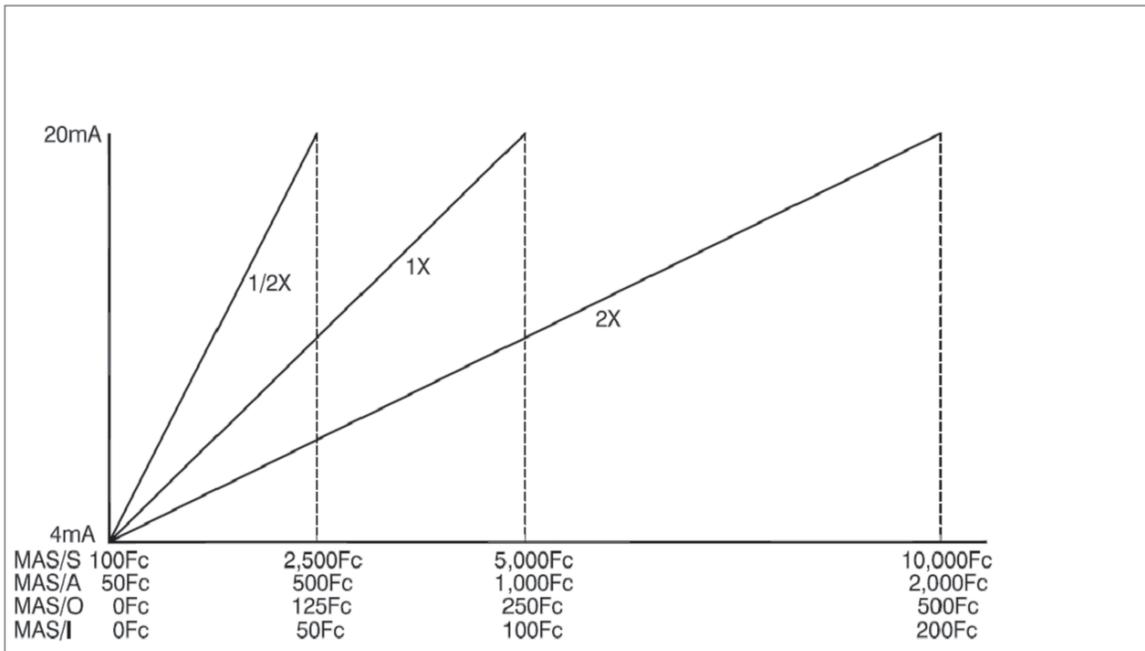


FIGURE 3: FOOTCANDLE RANGE SCALING

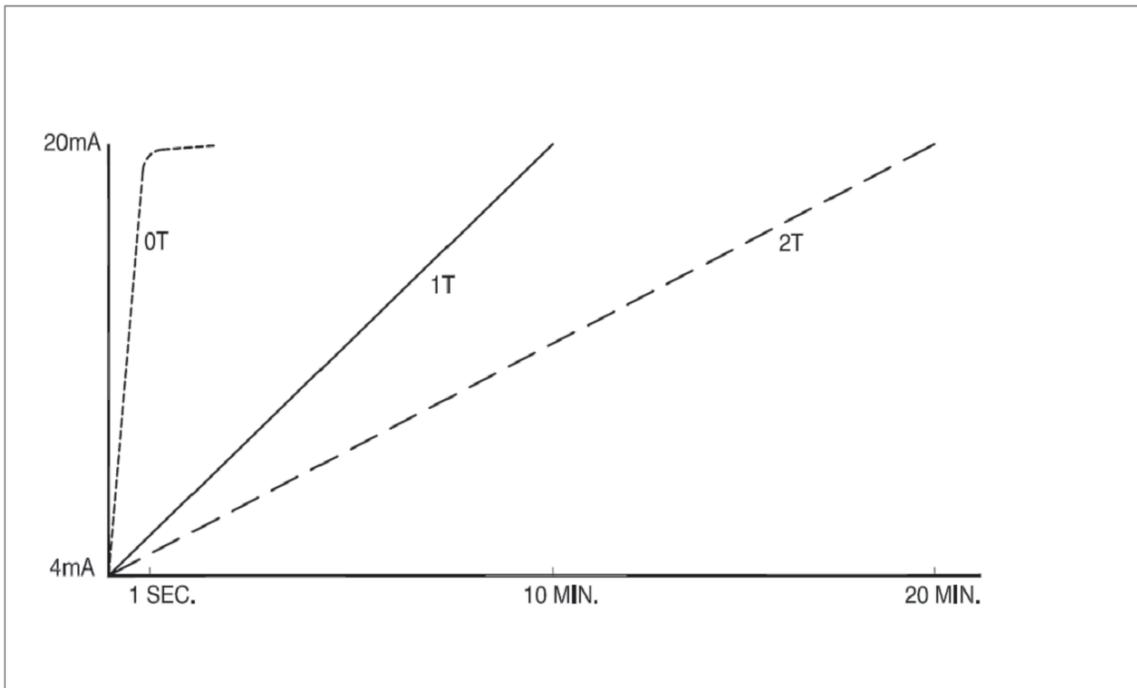


FIGURE 4: FULL-SCALE RESPONSE TIME

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