Simplex

MX Technology Addressable Devices

UL Listed*

Addressable Duct Sensor Housing 4098-5214
for the 4098-5202 Photoelectric Sensor

Features

Compact air duct sensor housing with clear cover to monitor for the presence of smoke**:

- Includes an internally mounted base for use with a 4098-5202 Photoelectric Sensor (sensor is ordered separately)

- Compatible with Simplex® fire alarm control panel model series: 4100ES, 4010ES, or 4100U, equipped with an MX Technology Addressable Loop Module

- Clear cover allows visual inspection

- Sampling tubes (ordered separately) are available in multiple lengths to match duct size

- UL listed to Standard 268A

- Analog sensor information is communicated to the host control panel for accurate analysis

Remote module options (ordered separately):

Red alarm LED (2098-9808)

** Please note that smoke detection in air ducts is intended to provide notification of the presence of smoke *in the duct*. It is not intended to, and will not, replace smoke detection requirements for open areas or other non-duct applications.

Introduction

The 4098-5214 duct smoke sensor housing allows a 4098-5202 MX Technology smoke sensor to monitor for smoke conditions in air conditioning or ventilating ducts. A sampling tube (selected per duct width) is installed into the duct allowing air to be directed to the smoke sensor mounted in the housing and is discharged back into the duct via the exhaust tube.

Sensor Description

Rugged Sensor Construction. The MX 4098-5202 photoelectric sensor provides robust and reliable construction which has undergone stringent environmental testing. Electrical contacts are molded into the plastic to eliminate movement. Construction uses durable, fire resistant FR110 plastic.

MX Sensors communicate to the MX Loop Module using MX Technology communications.

* Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

Duct Sensor Housing, Front View,
Shown with 4098-5202 Sensor

Application Information Reference

Refer to NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*; NFPA 72, the *National Fire Alarm and Signaling Code*; the *NEMA Guide for Proper Use of Smoke Detectors in Duct Applications*, and Installation Instructions 579-962.

Soft Addressing

MX technology sensors and addressable devices are addressed using the 801AP programming tool which presents a simple menu driven user interface that can automatically increment addresses following each write operation. This simple to use "soft addressing" technique avoids misaddressing errors that often occur when coded switches are used.

The 801AP address programmer can also change addresses stored in a sensor or other addressable device's non-volatile memory, which makes addressing errors easy to rectify.

Sensor Details

The 4098-5202 Photoelectric Sensor incorporates a unique optical chamber design with a high signal-to-noise ratio that provides resilience to dust, dirt, and small insects for reduced service cost.

- Analog sensor information is communicated to the host control panel and analyzed using the MX Fastlogic algorithm

- The MX Fastlogic algorithm is considered an Expert algorithm that uses real fire data as a basis for the alarm decision

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4098-5202 Photoelectric Sensor

MX Fastlogic Sensor Operation

MX Fastlogic sensor operation is an algorithm that takes into account the pattern of smoke build up over time and applies fuzzy logic to calculate the level of risk. This algorithm uses over 200 years of fire test data from research at the University of Duisburg (Duisburg, Germany) to determine the likelihood that there is a real fire and is designed to achieve faster detection of real fires and slower (preferably no detection) of false alarm sources.

MX Fastlogic Sensor Basics. The MX Fastlogic algorithm can be described as an Expert algorithm since it uses real fire data as a basis for the alarm decision. For any given application we are obliged to employ the most suitable detection in terms of response to an actual fire while minimizing false alarms. This general requirement is clearly reflected in local and national standards governing fire detection system designs.

Traditionally, attempts at reducing the occurrence of false alarms have involved degrading the level of fire protection afforded, either by raising the alarm threshold of smoke detectors, introducing delays, or generally employing less responsive detection. MX Fastlogic sensors give us the opportunity to offer an improved level of protection while simultaneously increasing immunity to false alarm.

MX Fastlogic Algorithm - Principle Elements.
Several elements of the detector output are monitored and this raw data is used by MX Fastlogic algorithm to execute a series of processes to evaluate the probable presence of fire including:

- Background filtering
- Instantaneous smoke density
- Rate of change of smoke density
- Smoke density weighting
- Smoke density peak suppression
- Real fire 'experience' comparison

Elements synonymous with false alarms are filtered while those elements indicative of fire are weighted. These results are continually compared against data derived from real fires to produce a measure of fire risk. It is against this risk measurement that the decision to alarm is made.

Maintain Sensitivity and Minimizing False Alarms. MX Fastlogic sensors are designed to maintain sensitivity to fire while minimizing false alarms. Many analog detection systems allow the user to select different smoke detector sensitivity settings e.g. High, Normal, or Low sensitivity. Lowering the sensitivity setting is a typical reaction to unwanted alarms but it usually means that a greater density of smoke is required to initiate an alarm. This is not the case for detectors using MX Fastlogic operation which is comparing the real fire experience against recognized fire patterns. Changing sensitivity from 'normal' to 'low' for example, would delay responses to less likely fire patterns while maintaining a normal response to more likely fire patterns. The net result is a reduced sensitivity to possible false alarms without reducing sensitivity to clearly identifiable fires.

LED Indicator Details
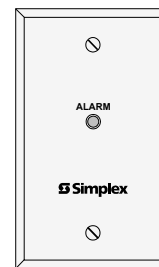
2098-9808 Remote LED Indicator

2098-9808, Remote LED Alarm Indicator. Red LED indicator provides a remote indication that the sensor is in Alarm. (Refer to Specifications on page 3 for dimensions.)

Additional Information

Subject	Document
MX Loop Module	S4100-0059
Installation Instructions	579-962

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Product Selection

Duct Smoke Sensor Housing

Model	Description
4098-5214	Duct Sensor Housing with internally mounted sensor base, 7" (178 mm) exhaust tube, sampling tube end plug, mounting screws, and mounting template; requires 4098-5202 sensor and selection of a sampling tube

Smoke Sensor, One Required Per Sensor Housing, Ordered Separately

Model	Description
4098-5202	MX Technology Addressable Photoelectric Sensor for the 4098-5214

Sampling Tubes, Ordered Per Duct Width, One Required Per Sensor Housing, Ordered Separately

Note: Sampling tube model number below is for a quantity of one (1), sampling tubes are packaged in quantity of five (5), order per system requirements in multiples of five (5)

Model	Tube Length	Duct Width Range
920080	30" (762 mm)	6" to 30" (152 mm to 762 mm)
920081	60" (1524 mm)	30" to 60" (76 mm to 1524 mm)
920082	120" (3048 m)	60" to 120" (1524 mm to 3048 mm)

Specifications

General Mechanical & Environmental

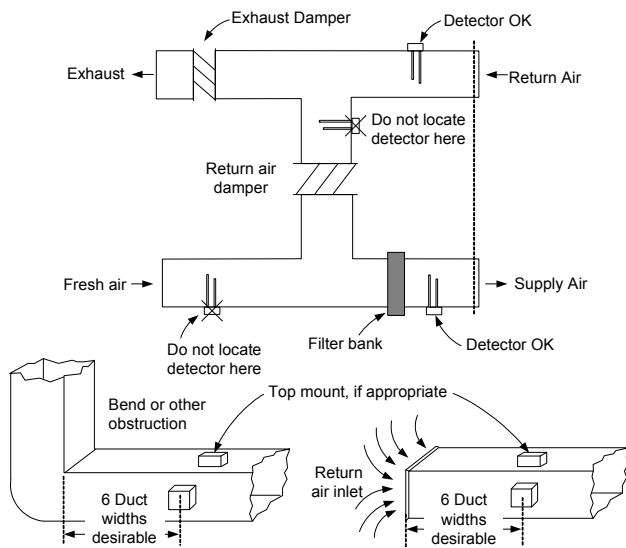|	
Dimensions (approximate)	10" H x 8 ½" W x 2 ¼" D (254 mm x 216 mm x 57 mm)
Air Velocity Range (linear ft/min)	500 to 4000 ft/min (2.54 to 20.3 m/sec)
UL Listed Temperature Range	32° F to 100° F (0° C to 38° C)
Humidity Range	10 to 85% RH (non-condensing)

Electrical

Communications	MX Loop, 1 address per sensor base
Wiring Connections	Terminal blocks, 18 to 14 AWG (0.82 mm^2 to 2.5 mm^2, or two, 1.5 mm^2)

2098-9808 Remote LED Indicator

Dimensions	Overall: 4 ¾" H x 2 ¾" W (114 mm x 70 mm) Mounting holes: 3 $\frac{9}{32}$" (83 mm) apart (standard US single-gang box mounting)
Current	1 mA
Connections	Color coded wire leads, 18 AWG (0.82 mm^2)

Duct Sensor Location Considerations:

1. Proper duct smoke detection location must ensure adequate airflow within the duct housing.
2. Duct air velocity rating is 500 to 4000 ft/min (2.54 to 20.3 m/sec). Pressure differential between intake and exhaust tubes is required to be between 0.016" (4 mm) and 1.0" (25.4 mm) of water.
3. To avoid air turbulence, a location of six duct widths downstream from bends or inlets is desirable. Ensure accessibility for test and service.
4. Proper Locations: downstream side of filters to detect fires in the filters; in return ducts, ahead of mixing areas; upstream of air humidifier and cooling coil.
5. Other locations and orientations may be required for proper duct smoke detection depending on duct access, system design, and duct airflow testing.

Locations to Avoid:

1. Where dampers closed for comfort control would interfere with airflow.
2. Next to outside air inlets (unless the intent is to monitor smoke entry from that area).
3. In return air damper branch ducts and mixing areas where airflow may be restricted.

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