Simplex

*UL, ULC, CSFM Listed**

Datasheet

MX Technology Addressable Devices

Addressable Duct Sensor Housing 4098-5214 for the 4098-5252 Photoelectric Sensor

Features

- Compact air duct sensor housing
- Includes an internally mounted base for use with a 4098-5252 Photoelectric Sensor. Order the sensor separately.
- Compatible with Simplex 4100ES or 4010ES fire alarm control panels, equipped with an MX Technology Addressable Loop Module.
- Clear cover for visual inspection, to monitor for the presence of smoke.
- Sampling tubes, ordered separately, are available in multiple lengths to match duct size.
- UL listed to Standard 268A.
- Communicates analog sensor information to the host control panel for accurate analysis.

Remote module options, order separately:

Red alarm LED (2098-9808)

Note: The capacity for smoke detection in air ducts does not replace smoke detection requirements for open areas or other non-duct applications.

Introduction

The 4098-5214 duct smoke sensor housing enables a 4098-5252 MX Technology smoke sensor to monitor for smoke conditions in air conditioning or ventilating ducts. A sampling tube, selected in accordance with 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 by using the exhaust tube.

Sensor description

Rugged sensor construction.

The MX 4098-5252 850 series photoelectric sensor provides a robust and reliable construction which has undergone stringent environmental testing. Electrical contacts are molded into the plastic to eliminate movement. The construction uses durable, fire resistant FR110 plastic.

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

Figure 1: Duct sensor housing, front view, shown with 4098-5252 sensor

Application information reference

Refer to the 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

Use the 850EMT programming tool to address MX technology sensors and addressable devices. Its simple menu driven user interface can automatically increment addresses after each write operation. This simple to use soft addressing technique avoids misaddressing errors that often occur when coded switches are used.

The 850EMT 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 4098-5252 Photoelectric Sensor incorporates a unique optical chamber design with a high signal-to-noise ratio that provides resilience to dust, dirt, small insects, and reduced service cost.

- The sensor communicates analog sensor information to the host control panel and is 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.

Figure 2: 4098-5252 Photoelectric Sensor

MX Fastlogic sensor operation

MX Fastlogic sensor operation is an algorithm that takes into account the pattern of smoke buildup 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, 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 that uses real fire data as a basis for the alarm decision. For any application, the most suitable detection, for response to an actual fire, is used to minimize false alarms. This general requirement is clearly reflected in local and national standards governing fire detection system designs.

* 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.

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 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. The MX Fastlogic algorithm uses this raw data 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 and 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. The decision to alarm is made against this risk measurement.

Maintain sensitivity and minimizing false alarms

MX Fastlogic sensors are designed to maintain sensitivity to fire while minimizing false alarms. The user can select different smoke detector sensitivity settings with the many analog detection systems, for example, 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 compares 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

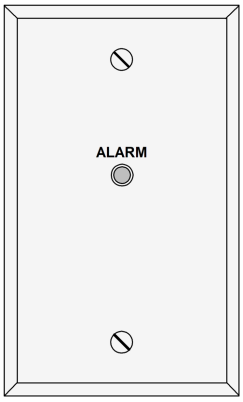

Figure 3: 2098-9808 Remote LED indicator

The red LED indicator provides a remote indication that the sensor is in alarm. See Specifications for dimensions.

Additional information

Table 1: Documents for further reference

Subject	Document
MX Loop Module	S4100-0059
4098-5214 Smoke Detector, Installation Guide	579-962

Product selection

Table 2: Duct smoke sensor housing

SKU	Description
4098-5214	Duct sensor housing with internally mounted sensor base, 7 in. (178 mm) exhaust tube, sampling tube end plug, mounting screws, and mounting template; requires 4098-5252 sensor and selection of a sampling tube. **Note:** The 4098-5214 unit is backwards compatible with the discontinued 4098-5202 sensor.

Table 3: Smoke sensor, one required for each sensor housing, order separately

SKU	Description
4098-5252	850 series MX Technology Addressable Photoelectric Sensor for the 4098-5214

Table 4: Sampling tubes, ordered according to duct width, one required per sensor housing, ordered separately

Model	Tube length	Duct width range
STS-2.5	30 in. (762 mm)	12 in. to 30 in. (305 mm to 762 mm)
STS-5.0	60 in. (1524 mm)	30 in. to 60 in. (762 mm to 1524 mm)
STS-10.0	120 in. (3048 mm)	60 in. to 120 in. (1524 mm to 3048 mm)
Note: The sampling tube model numbers in this table are for a quantity of one. Sampling tubes are packaged in quantities of five. Order in multiples of five in accordance with system requirements.		

Specifications

Table 5: General mechanical and environmental

Parameter	Range
Approximate dimensions	10 in. x 8 1/2 in. x 2 1/4 in. (254 mm x 216 mm x 57 mm) (H x W x D)
Air velocity, linear ft/min	500 ft/min to 4,000 ft/min (2.54 m/sec 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

Table 6: Electrical

Parameter	Range
Communications	MX Loop, one address for each sensor base
Wiring connections	Terminal blocks, 18 AWG to 14 AWG (0.82 mm^2 to 2.5 mm^2, or two, 1.5 mm^2)

Table 7: 2098-9808 Remote LED Indicator

Parameter	Range
Dimensions	Overall: 4 3/4 in. x 2 3/4 in. (120.65 mm x 70 mm) H x W. Mounting holes: 3 9/32 in. (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 reference

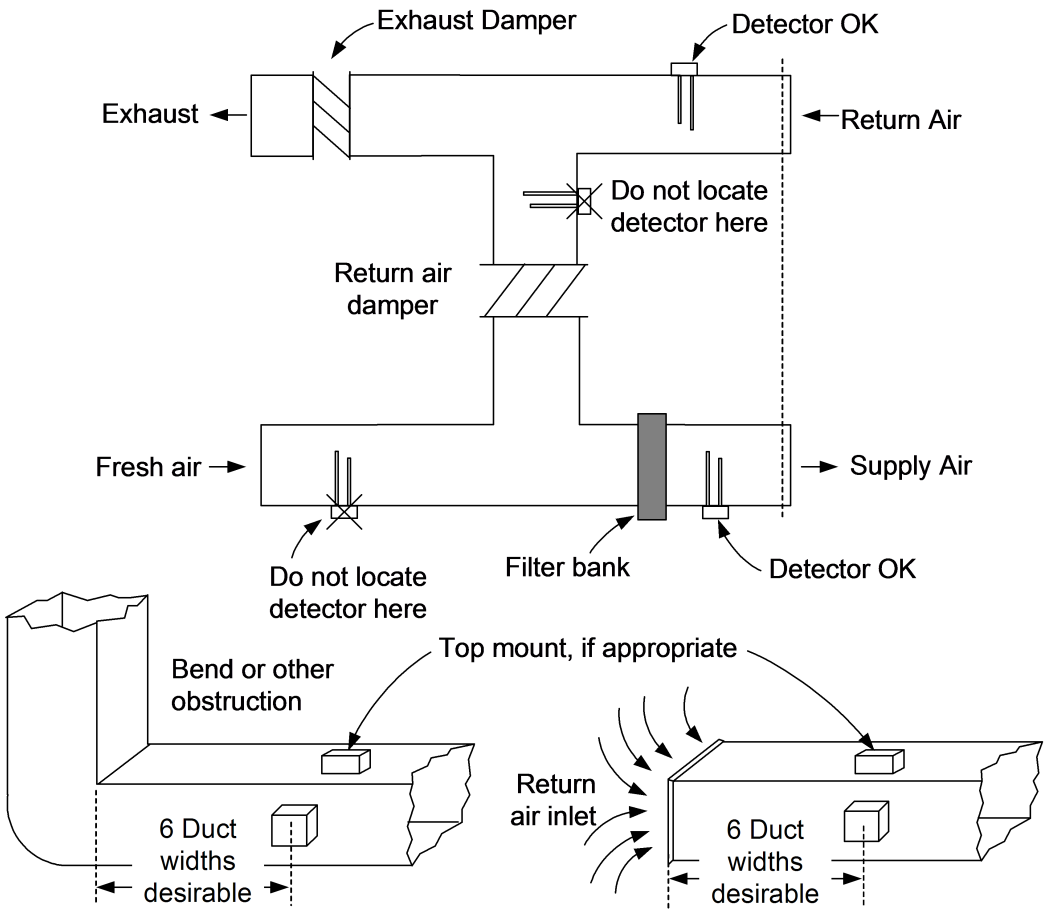

Figure 4: Duct sensor location reference

Duct sensor location considerations:

1. Correct duct smoke detection location must ensure adequate airflow within the duct housing.
2. Duct air velocity rating is 500 ft/min. to 4000 ft/min. (2.54 m/sec. to 20.3 m/sec.). The pressure differential between intake and exhaust tubes must be between 0.016 in. (0.4 mm) and 1.0 in. (25.4 mm) of water.
3. To avoid air turbulence, the best location is six duct widths downstream from bends or inlets. Ensure accessibility for testing and service.
4. Correct locations include the downstream side of filters to detect fires in the filters, in return ducts, ahead of mixing areas, and upstream of the air humidifier and the cooling coil.
5. The sensor may require other locations and orientations for correct duct smoke detection, depending on, duct access, system design, and duct airflow testing.

Locations to avoid:

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