Simplex

*UL Listed**

Datasheet

MX Technology Addressable Devices

Addressable Smoke and Heat Sensors; Multi-Sensors (Smoke and Heat), Isolator Bases, Sounder Bases, and Accessories

Features

MX Technology addressable smoke sensor, heat sensor and multi-sensor features:

- Smoke sensors provide accurate photoelectric sensing
- Heat sensors provide electronic heat sensing with multiple alarm options
- Multi-sensors combine photoelectric sensing with heat sensing
- Isolator Bases monitor line condition and separate input from output to isolate short circuits
- Sounder Bases provide multiple tone and volume selections and are available as MX Loop powered, or powered from a separate 24 VDC
- Sounder-Beacon Bases are loop powered and provide the sounder base functions and a light that flashes
- Accessories include remote LED indicators, address flags and labels, and base adapters
- Smoke sensors and accessories are listed to UL 268, heat sensors to UL 521

Compatibility:

- For use with Simplex 4100ES, 4010ES and 4100U series fire alarm control panels equipped with an MX Loop Module
- Analog sensor information is communicated to the host control panel and analyzed using the MX Fastlogic algorithm
- The MX Fastlogic algorithm is an expert algorithm that uses real fire data as a basis for the alarm decision

Installation and service features:

- Each sensor is supplied with an integral dust cover for protection during storage and installation. You can remove it when you commission the system
- Unique ‘park' position for commissioning and service
- The address flag is attached to the base to minimize errors during service
- You can program the detector’s address with the MX Service tool
- Bases with multiple mounting options simplify installation

Description

Rugged construction.

MX compatible 4098- series sensors feature robust and reliable construction which has undergone stringent environmental tests. Electrical contacts are molded into the plastic to eliminate movement. Construction uses durable, fire resistant FR110 plastic.

Detection modes.

MX sensors communicate with the MX Loop Module through MX Technology communications. Each detector operates in one or two of several detection modes. This enables it to be easily risk-optimized.

Figure 1: 4098-5202 Photoelectric Sensor and 4098-5203 Photoelectric Sensor with Heat Sensing



Figure 2: 4098-5201 Heat Sensor



Figure 3: Photo Sensor on 4098-5215 Sounder Base



Figure 4: Photo Sensor on 4098-5212 Sounder-Beacon Base



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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 more than 200 years of fire test data from research at the University of Duisburg in Germany. The algorithm determines the likelihood that there is a real fire and it is designed for faster detection of real fires and slower (preferably no) detection of false alarm sources.

MX Fastlogic sensor basics. The MX Fastlogic algorithm is an Expert algorithm that 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, false alarm reduction has involved degrading the level of fire protection provided, by raising the alarm threshold of smoke detectors, introducing delays, or generally employing less responsive detection. MX Fastlogic sensors provide 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 while 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 enable the user to select different smoke detector sensitivity settings. 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.

MX Fastlogic availability. MX Fastlogic operation is available for MX photoelectric sensors and photoelectric/heat sensors. These devices are used in both life protection and property protection applications providing reliable, and early detection of real fires.

Soft addressing

You can set the address of MX technology sensors and addressable devices with the 801AP programming tool which features a simple menu driven user interface that 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 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

Figure 5: 4098-5201 Heat Sensor



4098-5201 Heat Sensor. The 4098-5201 Heat Sensor returns analog temperature readings to the fire alarm control panel for evaluation. Construction includes a high-quality thermistor with very low thermal mass. This enables the sensor to provide fast and accurate temperature readings for heat detection determination.

At the fire alarm control panel, you can select heat detection settings for 135° F (57.2°C) or 200°F (93°C) with or without rate-of-rise detection.

Note: For applications, when Heat Sensor 4098-5201 is used for 200°F (93°C) setting applications, use only the following bases:

- Standard Base 4098-5207
- Isolator Base 4098-5208
- Sounder Base 4098-5210

Figure 6: 4098-5202 Photoelectric Sensor



4098-5202 Photoelectric Sensor incorporates a unique optical chamber design with a signal-to-noise ratio that provides high resilience to dust, dirt, and small insects for reduced service cost. The unique chamber cover draws slow moving smoke into the chamber to provide more responsive detection.

Figure 7: 4098-5203 Photoelectric Sensor with Heat Sensing



4098-5203 Photoelectric Sensor with Heat Sensing multi-sensor provides the features of the 4098-5202 Photoelectric Sensor with the addition of the heat sensor from the 4098-5201. This enables the 4098-5203 to satisfy detection applications with multiple risks.

Additional MX Loop Module information

For additional information about the MX Loop Module, refer to data sheet *ESMX Loop Interface Modules for 4100ES and 4010ES Fire Alarm Control Units (S4100-0059)*.

Base and LED indicator details

Figure 8: 4098-5207 5 in. Addressable Sensor Base



4098-5207 5 in. Addressable Sensor Bases are compatible with a variety of standard ceiling and wall mount backboxes. Features include: remote LED connections, anti-tamper facility, park position and address flag holder, and integral breakout locking key.

Figure 9: 4098-5208 Addressable Isolator Base



4098-5208 Addressable Isolator Bases provide the features of the 4098-5207 Standard Base and incorporate bi-directional short circuit isolation. Isolators can be used for each sensor on the MX Loop, or can be used to isolate specific areas, and to isolate sensors from call points, manual stations, and other MX addressable devices. An integral yellow LED indicates isolation mode is activated.

Figure 10: 2098-9808 Remote LED Indicator



2098-9808, Remote LED Alarm Indicator. Red LED indicator provides a remote indication that the sensor is in Alarm. See Specifications for dimensions.

Sounder and Sounder-Beacon Base details

Figure 11: 4098-5215 Loop Powered Sounder Base



Figure 12: 4098-5212 Loop Powered Sounder-Beacon Base



General features:

- Low power sounder and sounder-beacon bases are loop-powered from the MX Loop Module
- Provides one point of installation for detector, isolator, and sounder or sounder-beacon
- Listed to UL 464 for general signaling operation

Sounder Base details:

- You can select one of four sounder output levels when you program it from a host fire alarm control panel with an MX Loop Module:
  - Low, 60 dB
  - Mid low, 70 dB
  - Mid high, 80 dB
  - High, 90 dB

  Note: Sound output levels are measured at 3 ft (1 m)
- Output is set at the sounder or sounder-beacon base for continuous and then one of five output patterns is selected from the host fire alarm control panel with MX Loop Module:
  - Continuous Tone, 970 Hz
  - Temporal pattern 3, fire evacuation
  - Temporal pattern 4, CO warning
  - March Time, 60 beats per second
  - Slow March Time, 20 beats per second
- Sounder bases require a separate address. Two addresses are required for each sounder base with a sensor.

Sounder-Beacon Base details:

- Provides the sounder operation detailed in **Sounder Base details** and includes a multiple LED 1.5 cd beacon for local visible notification
- Beacon flash rate is selectable at the host fire alarm control panel with MX Loop Module as either Slow Flash at 0.5 Hz, or Fast Flash at 1 Hz
- Sounder-beacon bases require two addresses. Tree addresses are required for each sounder-beacon base with a sensor.

Sounder Base details

Figure 13: 4098-5209, 4098-5210, and 4098-5211 Sounder Bases, appearance reference, shown with supplied mounting flange



Sounder bases are for use with the following sensors:
4098-5201, Heat Sensor. See the note for applications in Sensor details

4098-5202, Photoelectric Sensor

4098-5203, Photoelectric Sensor with Heat Sensor

Multiple output tones are available:

- Tones are activated for each individual address as controlled from the MX Loop Module
- Eight tone selections are available. See the following **Local tone selection options**
- Tone is DIP switch selected at the base to satisfy local requirements

Tone volume is adjustable at each base:

For applications requiring reduced sound level, you can adjust output volume at the sounder base with a Volume Trimmer Tool 517.050.015

MX Loop Module provides the following tone control selections:

- Temporal 3
- Slow March Time, 20 bpm
- March Time, 60 bpm
- Steady-on, continuous

Local tone selection options:

Continuous –

Note: Select this for use with temporal 3, slow march time, or march time control from the MX Loop Module

The following local tone selections are available for use with the Steady-on (continuous) command from the MX Loop Module:

- Temporal 4
- Slow sweep
- March time beep
- Fast sweep
- Temporal 3
- Two tone
- German DIN
- Dutch Slow Sweep

4098-5209 Non-addressable Loop Powered (LP) Sounder Base, Low Output:

- MX Loop powered, no separate power connection is required
- Maximum sound level output is 85 dBA at 3 ft (1 m)
- Maximum alarm current is 6.8 mA, from the MX Loop

Note: 4098-5209 is for supplemental use only and not instead of notification appliances

4098-5210 Non-addressable Loop Powered (LP) Sounder Base, standard output:

- MX Loop powered, no separate power connection is required
- Maximum sound output is 85 dBA at 10 ft (3 m)
- Maximum alarm current is 24 mA, from the MX Loop

4098-5211 Addressable 4-Wire Sounder Base:

- Sounder is activated from the MX Loop
- Power is supplied from a separate 24 VDC fire alarm power supply through a separate wiring loop
- Maximum sound output is 90 dBA at 10 ft (3 m)
- Maximum alarm current is 20 mA, from the separate fire alarm power supply

Product selection

Table 1: Sensors and bases

Model	Description	Installation instructions
4098-5201	Heat Sensor	579-933
4098-5202	Photoelectric Smoke Sensor	579-934
4098-5203	Photoelectric Smoke Sensor with Heat Sensor (Multi-Sensor)	579-932
4098-5215	Addressable Loop Powered Sounder Base, selectable volume	579-1085
4098-5212	Addressable Loop Powered Sounder-Beacon Base, selectable volume and selectable flash rate	
4098-5209	Non-addressable Loop Powered Low Power Sounder Base, 85 dB maximum at 3 ft (1 m)	579-939
4098-5210	Non-addressable Loop Powered Standard Power Sounder Base, 85 dB maximum at 10 ft (3 m)	579-925
4098-5211	Addressable 4-Wire Sounder Base, 90 dB maximum at 10 ft (3 m)	579-926
4098-5207	5 in. Addressable Sensor Base with Remote LED Output	579-936
4098-5208	5 in. Addressable Isolator Base with Remote LED Output	579-937
2098-9808	Remote LED Alarm Indicator for use with the previously listed bases	––

Table 2: Sensor accessories

Model	Description	Installation instructions
4098-5276	Address Flags (pack of 100)	Refer to base instructions
4098-5277	Address Flag Labels	
516.850.900	850EMT Programming Tool (infrared com link to head)	120.515.058
516.800.922	Spare ancillary programming lead for 850EMT	—
516.800.924	Package of 10 spare pins for ancillary programming lead	—
516.800.923	Accessory Kit. Carrying case, shoulder strap, and 12 V automobile adapter	—
517.050.060	Ceiling Tile Adapter (CTA), use to mount sensors to suspended ceilings. This enables commissioning and testing before the ceiling is installed	Refer to base instructions
517.050.058	Ceiling Tile Adapter Plate, use to mount beacon or sounder bases to the Ceiling Tile Adaptor	
516.800.959	DAB3-4 Mounting Flange-type B for conduit. Use it to mount four 0980-9515 Sounder Bases and 4098-9512 Sounder-Beacon Bases	

Specifications

Table 3: Current requirements and sound output, current supplied by MX Loop (except as noted)

Product	Supervisory	In Alarm/Activated **Note:** Does not include Remote LED current
4098-5208 Isolator Base	80 µA	10 mA in isolation
4098-5201 Heat Sensor	245 µA	3.33 mA maximum in alarm
4098-5202 Photoelectric Sensor	275 µA	
4098-5203 Multi-Sensor	275 µA	

Table 4: Supervisory and activated current

Product	Supervisory	Activated current **Note:** Does not include remote LED current		
		Flash rate	Activated current for each audio output	
			Low or Mid Low	Mid High or High
4098-5215 Sounder Base	440 µA	—	3.1 mA	5.2 mA
4098-5212 Sounder-Beacon Base	440 µA	0.5 Hz	6.5 mA	8.5 mA
		1 Hz	7.7 mA	9.7 mA

Table 5: Audio output for each sound level selected at 3 ft (1 m)

Product	Low	Mid Low	Mid High	High
4098-5215 Sounder Base	60 dB	70 dB	80 dB	90 dB
4098-5212 Sounder-Beacon Base				

Table 6: Supervisory and activated current

Product	Supervisory	Activated **Note:** Does not include remote indicator LED current
4098-5209 LP Sounder Base	200 µA	6.8 mA at full volume of 85 dB at 3 ft (1 m)
		1.2 mA at low volume
4098-5210 LP Sounder Base	10 µA	24 mA at full volume of 85 dB at 10 ft (3 m)
4098-5211 4-Wire Sounder Base	5 µA	20 µA from MX Loop
		20 mA from external 24 VDC power, full volume of 90 dB at 10 ft (3 m)

Table 7: General specifications

Parameter	Details
Communications	MX Loop, one address for each sensor base
Sounder Base Voltage	18 to 32 VDC from fire alarm power supply. 24 VDC is nominal
Sensor Base Wire Connections	Terminal blocks, for wire size 20 to 14 AWG (0.5 to 2.5 mm^2, or two, 1.5 mm^2)

Table 8: Operating temperature range. For indoor use only.

Product		Operating temperature	
4098-5203 Multi-Sensor 2098-9808 Remote LED Annunciator		32° to 100° F (0° to 38° C)	
4098-5202 Photoelectric Sensor		-13° to 158° F (-25° to 70° C) continuous. Up to 194° F (90° C) short term	
4098-5207 Standard Base			
4098-5208 Isolator Base			
4098-5201 Heat Sensor	135° F (57.2 °C) setting	100° F (38° C) maximum ceiling ambient temperature	
	200° F (93° C) setting	150° F (65.6° C) maximum ceiling ambient temperature	
4098-5215 Sounder Base		0° to 38° C (32° to 100° F)	-25° C to 70° C (-13° F to 158° F)
4098-5212 Sounder-Beacon Base			
4098-5209, 4098-5210, and 4098-5211 Sounder Base		0° to 38° C (32° to 100° F)	-25° C to 70° C (-13° F to 158° F)
2098-9808 Remote LED Annunciator			

Table 9: Additional specifications:

Parameter			Details
Humidity range, for indoor use only			Up to 93% RH at 32° C (90° F)
Sensor dimensions			109 mm x 43 mm (4 1/4 in. x 1 11/16 in.)
Sensors mounted on	**4098-5215 Sounder Base**		112 mm x 68 mm (4 3/8 in. x 2 11/16 in.)
	4098-5212 Sounder-Beacon Base		
Sensors mounted on	**4098-5209, 4098-5210, or**		110 mm x 68.5 mm (4 11/32 in. x 2 11/16 in.)
	4098-5211 Sounder Base		
2098-9808 Remote LED Indicator		**Dimensions**	Overall: 114 mm H x 70 mm W (4 1/2 in. x 2 3/4 in.) Mounting holes: 83 mm (3 9/32 in.) apart (standard US single-gang box mounting)
		Current	1 mA
		Connections	Color coded wire leads, 18 AWG (0.82 mm^2)

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