UL Listed*

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
· **Triple sensors** combine photoelectric, heat and CO sensing
· **Built-in isolation features** are contained in some sensors, removing the need for individual isolator devices
· **Sounder bases** provide multiple tone and volume selections and are available as MX Loop powered
· **Sounder-beacon bases** are loop powered and provide the sounder base functions plus a visible flashing light
· **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 units equipped with an MX Loop Module
· Analog sensor information is communicated to the host control unit and analyzed using the MX Fastlogic algorithm
· The MX Fastlogic algorithm uses real fire data as a basis for the alarm decision

Installation and service Features:

· Each sensor comes with an integral dust cover for protection during storage and installation and you easily remove it when commissioning the system
· Unique 'park' position for commissioning and service
· The address flag is attached to the base to minimize errors during service
· You can conveniently program detector addressing using the MX 850 EMT Programming Tool
· Bases with multiple mounting options simplify installation

Description

Rugged construction. MX compatible sensors provide 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.

Detection modes. MX Sensors communicate to the MX Loop Module using MX Technology communications. Each detector can operate in one of several detection modes, thus it is easily optimized to the risk.

Figure 1: Heat detector

Figure 2: Photo, Photo-Heat, or Photo-Heat-CO

Figure 3: Photo Sensor with Loop power Sounder Base

Figure 4: Photo Sensor with Loop power Sounder Beacon Base

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, Germany to determine the likelihood that there is a real fire and achieves 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 because 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 involve 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 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 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. Using this risk measurement, 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. You can select different smoke detector sensitivity settings in many analog detection systems e.g. High, Normal, or Low sensitivity. Lowering the sensitivity setting is a typical reaction to unwanted alarms but it usually means that the detector requires a greater density of smoke 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, early detection of real fires.

Soft addressing

MX technology sensors and addressable devices are addressed using the 850 EMT 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.

Using the 850 EMT Programming Tool you can also change addresses stored in a sensor or other addressable device's non-volatile memory, which makes addressing errors easy to rectify.

Figure 5: MX 850 EMT Programming Tool

Sensor Details

Figure 6: 4098-5267, 4098-5257 Heat Sensors

4098-5267 4098-5257 Heat Sensors return analog temperature readings to the fire alarm control unit for evaluation. Construction includes a high quality thermistor with very low thermal mass so the sensor can provide fast and accurate temperature readings for heat detection determination.

Heat detection settings are selectable at the fire alarm control unit for 135 °F (57 °C) or 200 °F (93 °C) either with or without rate-of-rise detection. 15 °F (8.4 °C) per minute.

Note: The 4098-5267 additionally includes a built in isolator.

Figure 7: 4098-5266,4098-5256 Photoelectric Sensors

4098-5266 4098-5256 Photoelectric Sensors incorporate 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 actually draws slow moving smoke into the chamber to provide more responsive detection.

Note: The 4098-5266 additionally includes a built in isolator.

**Figure 8: 4098-5265, 4098-5255
Photoelectric Sensors with Heat Sensing**

4098-5255, **4098-5265 Multi-Sensor** provides the feature of the photoelectric sensor with the addition of heat sensor so the multi-sensor can satisfy the detection application with multiple risks.

Note: The 4098-5265 additionally includes a built in isolator.

Figure 9: 4098-5268 Triple Sensor

4098-5268 Triple Sensor with Isolator incorporates optical and heat sensors, combined with a CO sensor. The Triple Sensor uses powerful algorithms for use in life safety applications, and those where environmental conditions present challenges to standard sensors. It is a multi-sensor device which monitors smoke, heat and CO levels simultaneously to accurately determine the presence of fire. This sensor includes a built-in isolator.

Figure 10: 4098-5260 4 in. Continuity Base

4098-5260 4 in. Continuity Base provides the features of a Standard Mounting Base and allows for internal short circuit isolation in the sensors to protect them from electrical shorts on the SLC.

Figure 11: 4B Base

4098-5261 4 in. Base use as an Standard Mounting Base where inbuilt isolator is not required in the sensors on the SLC.
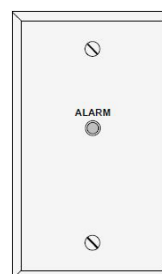

Figure 12: 2098-9808 Remote LED Indicator

2098-9808, Remote LED Alarm Indicator. Red LED indicator provides a remote indication that the sensor is in alarm. Refer to specifications for dimensions.

Additional MX loop module information

For additional information about the MX Loop Module, refer to data sheet *S4100-0059*.

Loop Power Sounder and Sounder-Beacon Base Details

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

4098-5217 Addressable Loop Powered Sounder Base:

Figure 13: 4098-5217 Loop Powered Sounder Base

Select one of four sounder output levels by programming from the host fire alarm control panel with MX Loop Module:

- Low, 60 dB
- Mid Low, 70 dB
- Mid High, 80 dB
- High, 90 dB
- Sound output levels are 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:

· 4098-5217 Loop Powered Sounder Base

· 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; with sensor, 2 addresses are required for each sounder base with sensor

Figure 14: 4098-5220 Loop Powered Sounder Beacon Base

4098-5220 Addressable Loop powered Sounder-Beacon Base:

· Provides the sounder operation detailed above and includes a multiple LED 1.5 cd beacon for local visible notification
· You can select beacon flash rate at the host fire alarm control panel with MX Loop Module as either Slow Flash at ½ Hz, or Fast Flash at 1 Hz
· Sounder-beacon bases requires a separate address; with sensor, 2 addresses are required for each sounder-beacon base with sensor.
· 4098-5220 Loop Powered Sounder-Beacon Base

4098-5209 Loop Power Sounder base detail

Addressable Sounder Base provides an additional sounder function on the addressable loop circuit. Sounder Base requires an associated detector in order to operate, as it uses the address of the detector that is fitted to it. Removal of the detector or loss of power to the loop will cause the sounder to cease operating. It provides eight tone and two volume settings.

Multiple output tones are available:

· Tones are activated for each individual address as controlled from the MX Loop Module
· Eight tone selections are available and tone can be selected by DIP switch at the base to satisfy local requirement

You can adjust the tone and volume at each base:

For applications requiring reduced sound level, you can adjust output volume at the sounder base using 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**
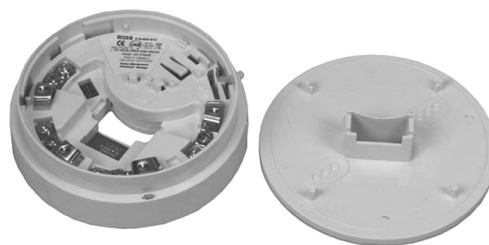· **Dutch Slow Sweep**

Figure 15: 4098-5209, Sounder Bases, Appearance Reference (shown with supplied mounting flange)

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

· MX Loop powered, so no seperate power connection is required
· Maximum sound level output is 85 dBA @ 3 ft (1 m)
· Maximum alarm current is 6.8 mA, from the MX Loop

Note: Only use 4098-5209 is for supplemental use and not in lieu of notification appliances

Product Selection

Table 1: Product Selection

Model	Description	Installation Instructions
4098-5255	MX PHOTO/HEAT SENSOR	579-1387
4098-5256	MX PHOTO SENSOR	
4098-5257	MX HEAT SENSOR	
4098-5265	MX PHOTO/HEAT SENSOR-ISOLATOR	
4098-5266	MX PHOTO SENSOR-ISOLATOR	
4098-5267	MX HEAT SENSOR-ISOLATOR	
4098-5268	MX PHOTO/HEAT/CO SENSOR-ISOLATOR	
4098-5209	Addressable Loop Powered Low Power Sounder Base, 85 dB maximum @ 3 ft. (1 m)	579-939
4098-5217	Addressable Base Sounder	579-1085
4098-5220	Addressable Base Sounder Beacon VID	
4098-5260	4 in. Continuity Base 4B-C UL	579-1089
4098-5261	4 in. Detector Base (for use when isolation is not required)	
2098-9808	Remote LED Alarm Indicator (for use with the bases listed above)	-

Table 2: Sensor Accessories

Model	Description	Installation Accessories
4098-5276	Address Flags (pack of 100)	Refer to base instructions
4098-5277	Address Flag Labels	Refer to base instructions
516.850.900	850 EMT Programming Tool (infrared com link to head)	120.515.058
516.800.922	Spare ancillary programming lead for 850 EMT	-
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 adaptor	-

Specifications

Current Requirements and Sound Output, Current Supplied by MX Loop (except as noted).

Table 3: Sensor Current requirements

Product	Supervisory	In alarm/Activated (Note: Does not include Remote LED current)
4098-5265 Photo/heat sensor with isolator 4098-5255 Photoelectric/heat - sensor	350 µA	4.0 mA maximum in alarm
4098-5266 Photo sensor with isolator 4098-5256 Photoelectric sensor	350 µA	4.0 mA maximum in alarm
4098-5267 Heat sensor with isolator 4098-5257 Heat sensor	350 µA	4.0 mA maximum in alarm
4098-5268 Triple sensor with isolator	350 µA	4.0 mA maximum in alarm

Table 4: Sounder Current Requirements

Product	Supervisory	Activated Current (Note: Does not include Remote LED current)		
		Flash Rate	Activated Current per Audio Output	
			Low or Mid Low	Mid High or High
4098-5217 Sounder Base	440 µA	-	3.0 mA	4.8 mA
4098-5220 Sounder-Beacon Base	440 µA	½ Hz	8.0 mA	8.0 mA
		1 Hz	9.6 mA	9.6 mA
4098-5209 Sounder Base	200 µA	-	1.2 mA	6.8 mA

Table 5: Audio Output per Sound Level Selected @ 3 ft (1 m)

Product	Low	Mid Low	Mid High	High
4098-5217 Sounder Base	60 db	70 dB	80 dB	90 db
4098-5220 Sounder-Beacon Base	60 db	70 dB	80 dB	90 db
4098-5209 Sounder Base	Full Volume at 85 dB			

Table 6: General Specifications

Specification	Rating
Communications	MX Loop, one address for each sensor base
Sounder Base Voltage	MX Loop powered (20 VDC to 40 VDC maximum) no separate power connection is required
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 7: Operating Temperature Range (for Indoor Use Only)

Product		Operating Temperature	Storage Temperature
4098-5265 Photo/heat sensor with isolator 4098-5255 Photo/heat sensor		-13 °F to 158 °F (-25 °C to 70 °C)	-22 °F to 158 °F (-30 °C to 70 °C)
4098-5266 Photoelectric sensor with isolator 4098-5256 Photoelectric sensor		33.8 °F to 120.2 °F (1 °C to 49 °C)	-22 °F to 158 °F (-30 °C to 70 °C)
4098-5267 Heat sensor with isolator 4098-5257 Heat sensor	135 °F (57.2 °C) setting	100 °F (38 °C) maximum ceiling ambient temperature	-22 °F to 158 °F (-30 °C to 70 °C)
	200 °F (93 °C) setting	150 °F (65.6 °C) maximum ceiling ambient temperature	
4098-5268 Triple Sensor with Isolator		33.8 °F to 111.2 °F (1 °C to 44 °C)	-4 °F to 131 °F (-20 °C to 55 °C)
4098-5261 4 in. Base UL		-13 °F to 158 °F (-25 °C to 70 °C) continuous; up to 194 °F (90 °C) short term	
4098-5260 4 in. Continuity Base 4B-C UL		-13 °F to 158 °F (-25 °C to 70 °C) continuous; up to 194 °F (90 °C) short term	
4098-5209 Sounder Base		32 °F to 104 °F (0 °C to 40 °C)	- 25 °C to 70 °C (-13 °F to 158 °F)
4098-5217 Sounder Base		32 °F to 158 °F (0 °C to 70 °C)	-25 °C to 70 °C (-13 °F to 158 °F)
4098-5220 Sounder-Beacon Base		32 °F to 158 °F (0 °C to 70 °C)	-25 °C to 70 °C (-13 °F to 158 °F)
2098-9808 Remote LED Annunciator		32 °F to 100 °F (0 °C to 38 °C)	-25 °C to 70 °C (-13 °F to 158 °F)

Table 8: Additional Specifications

Specification		Rating
Humidity Range (for indoor use only)		up to 93% RH non-condensing
Sensor Dimensions		108 mm x 42 mm (4.252in . x 1.653 in.)
4098-5209 Sounder Base		110 mm x 37.5 mm (4.33 in x 1.48 in.)
4098-5217 Sounder Base		114 mm x 45 mm (4.48 in x 1.77 in)
4098-5220 Sounder-Beacon Base		114 mm x 45 mm (4.48 in x 1.77 in)
2098-9808 Remote LED Indicator	Dimensions	Overall: 114 mm H x 70 mm W (4 ½ in. x 2 ¾ 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)