

# Fixed Gas & Flame **Detection**

North America Product Range Overview



Over 100 years of experience and capability in comprehensive safety solutions have made MSA Safety a modern and forward-looking company for the protection of people, facilities, and the environment. MSA Safety is one of the few suppliers of fixed gas and flame detection (FGFD) measurement technology that develops and manufactures a complete range of products and integrates them into safety solutions.

With the acquisition of General Monitors in September 2010 and Senscient in 2016, the MSA FGFD product portfolio expanded even further. As these unmatched experts in gas and flame detection joined forces, we are proving that the right mix of durable products and innovative technology increases safety while driving operational efficiency.

Together we have the widest range of sensing technologies for gas and flame detection. We create solutions that not only provide worker safety and protect facilities, but also decrease overall cost of ownership.

**WE KNOW WHAT'S AT STAKE.**

## Selection Guide: The Right Gas Detector

	Product Type										
	ULTIMA X5000	S5000	ULTIMA XE & ULTIMA XIR	PRIMAX IR	CHEMGARD	TOXGARD	TRIGARD	TRIGAS	SENSICIENT ELDS	OPIR-5 / IR5500	OBSERVER-I
<b>Detection Principle</b>											
Catalytic combustion sensor	■	■	■			■	■	■			
Electrochemical sensor	■	■	■			■	■	■			
Semiconductor sensor		■									
Infrared Point detection	■	■	■	■			■	■			
Open Path detection									■	■	
Photoacoustic Infrared					■						
Ultrasonic											■
<b>Units of Measure</b>											
0–100% LEL	■	■	■	■	■	■	■	■			
% Volume		■	■		■		■	■			
0–5% LEL·m									■	■	
ppm	■	■	■		■	■	■	■			
ppm·m									■	■	
40–120 dB (u)											■
<b>Detectable Gases</b>											
Ammonia (NH <sub>3</sub> )			■		■	■	■		■		
Arsine (AsH <sub>3</sub> )			■				■				
Bromine (Br <sub>2</sub> )		■	■				■				
Carbon Monoxide (CO)	■	■	■		■	■	■	■			
Carbon Dioxide (CO <sub>2</sub> )	■		■		■		■		■		
Chlorine (Cl <sub>2</sub> )			■			■	■				
Chlorine Dioxide (ClO <sub>2</sub> )			■			■	■				
Diborane (B <sub>2</sub> H <sub>6</sub> )			■				■				
Ethylene (C <sub>2</sub> H <sub>4</sub> )	■	■	■	■	■	■	■		■	■	■
Ethylene Oxide (ETOX)			■		■	■	■				
Fluorine (F <sub>2</sub> )		■	■			■	■				
Germane (GeH <sub>4</sub> )		■	■			■	■				
Hydrocarbon Combustible Gases	■	■	■	■	■	■	■	■		■	■
Hydrogen (H <sub>2</sub> )	■	■	■				■				■
Hydrogen Cyanide (HCN)			■				■				
Hydrogen Sulfide (H <sub>2</sub> S)	■	■	■			■	■	■	■		
Hydrogen Chloride (HCl)			■			■	■		■		
Hydrogen Fluoride (HF)			■				■		■		
Methane (CH <sub>4</sub> )	■	■	■	■	■	■	■	■	■	■	■
Nitrogen Oxide (NO)			■			■	■				
Nitrogen Dioxide (NO <sub>2</sub> )			■			■	■				
Oxygen (O <sub>2</sub> )	■	■	■			■	■	■			
Phosphine (PH <sub>3</sub> )			■				■				
Silane (SiH <sub>3</sub> )			■				■				
Sulfur Dioxide (SO <sub>2</sub> )			■			■	■				

See page 3 for Flame Detectors, page 7 for Controllers, and page 8 for Refrigerant Monitors.

## Explosion-Proof Detectors

### ULTIMA® X5000 Gas Monitor

The ULTIMA X5000 Gas Monitor offers advanced technologies detecting oxygen, toxic and combustible gases.

*Key features:*

- TruCal® simulated calibration technology extends manual calibration interval
- High visibility and intuitive display with full-word text available in 9 languages
- Tool-free operation with touch-enabled display
- Dual sensing and universal board design lowers project installation costs
- Bluetooth® application provides easy configuration for faster start-ups



### General Monitors S5000 Gas Monitor

The S5000 Gas Monitor is the ultimate gas detector for extreme environments needing to detect oxygen, toxic and combustible gases.

*Key features:*

- Performs over a wide temperature range (-67°F / -55°C) to (+167°F / +75°C)
- TruCal simulated calibration technology extends manual calibration intervals
- Tool-free design with touch-enabled display
- Dual sensing lowers project installation costs
- Backwards compatible with selected S4000TH and S4000CH sensors
- Bluetooth provides easy configuration with X/S Connect app



## Flame Detectors

### FL500 UV/IR Flame Detector

- Ultraviolet/infrared flame detector detects hydrocarbon fires fast
- Six fuel sources FM performance approved
- Wide field of view for greater fire detection coverage
- HART and Modbus communication options

### FlameGard 5 MSIR/FL4000H Flame Detector

- Advanced multi-spectral infrared optical flame detector for hydrocarbon fires
- Neural Network Technology (NNT) for reliable discrimination between actual flames and false alarm sources
- HART and Modbus communication options

### FlameGard 5/FL3100H UVIR-H2 Flame Detector

- Optical flame detector for hydrogen fires
- HART and Modbus communication options



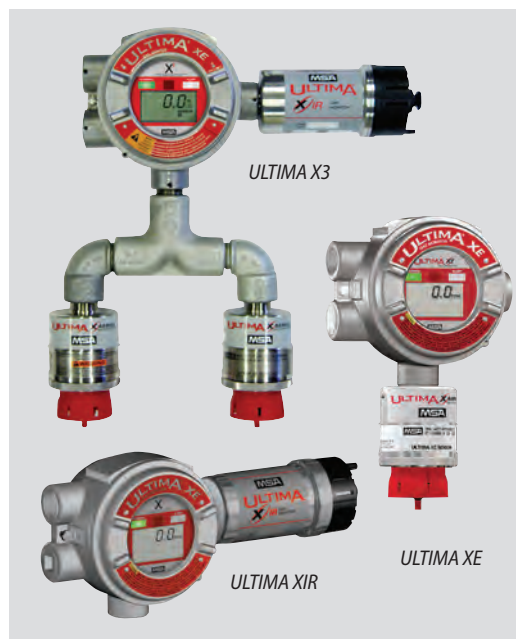
## Detectors

### ULTIMA® X Series

The ULTIMA XE, ULTIMA XIR, and ULTIMA X3 Gas Monitors provide continuous monitoring of combustible and toxic gases and oxygen deficiency using catalytic, electrochemical and infrared sensor technologies.

*Key features:*

- Operate with a large range of gases and toxics
- Easy to read LCD
- Optional on board status LED's and/or output relays
- Optional HART



### PrimaX® IR Gas Transmitter

The PrimaX IR Gas Transmitter is used for methane and propane gas applications.

*Key features:*

- Hydrocarbon detection in LEL
- Infrared dual source technology
- Redundant IR source provides reliability



### Chemgard® Photoacoustic Infrared Gas Monitor

The stable, durable Chemgard Photoacoustic Infrared Gas Monitor is purpose-built and detects minute amounts of a wide variety of gases.

*Key features:*

- Cost-efficient remote monitor detects minute traces of hydrocarbons, solvents, alcohols, CO<sub>2</sub>, CO and toxics
- Three different styles provides mounting options
- Unit can expand to monitor up to 8 locations with 3 levels of alarms
- Easy-to-read display



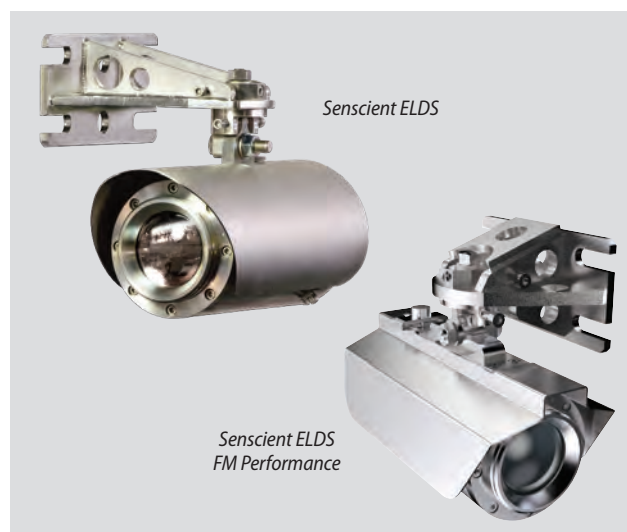
## Open Path and Ultrasonic

### Senscient ELDS™ Open Path Gas Detector

A laser-based open path gas detector for the detection of toxic or flammable gases. Using a separate transmitter, receiver arrangement it is certified for use in hazardous areas. Available for open area detection or ventilation air intakes.

*Key features:*

- Target gas specific—no false alarms
- Gases detected—ammonia, carbon dioxide, hydrogen chloride, hydrogen fluoride, hydrogen sulfide, ethylene, methane, sour gas
- Fast speed of response (<5 seconds)—fast initiation of safety actions
- SimuGas daily automatic self test—no routine manual testing
- Factory lifetime calibration—no routine recalibration required
- No consumable sensing elements—reduced operational cost
- FM performance-approved methane variant



### OPIR-5/IR5500 Open Path Infrared Gas Detector

The OPIR-5/IR5500 Open Path Infrared Gas Detector provides continuous monitoring of flammable gases.

*Key features:*

- Sensitive to small (ppm.m) and large (LEL.m) gas leaks
- Ideal for harsh environments (-67°F / -55 °C)
- Continuous self-check for fail-to-safe operation
- Multiple communication outputs (HART, Modbus, AMS support)



### Observer-i Ultrasonic Gas Leak Detector

The OBSERVER-i responds to the airborne ultrasound generated from pressurized gas releases in open ventilated areas.

*Key features:*

- Artificial Neural Network (ANN) distinguishes real gas leak noise and suppresses false alarm sources
- Patented Senssonic™ self-test ensures full failsafe operation
- Trouble-free maintenance and one-person check and calibration
- AISI 316L stainless steel housing enclosure
- Explosion proof design, Ex-d



## Detectors

### TriGard® Gas Monitor

TriGard Gas Monitor detects chlorine, sulfur dioxide, other toxic gases, remote combustible gases, and oxygen deficiency or enrichment. MSA TriGard Gas Monitor offers affordable monitoring solutions for a variety of needs.

*Key features:*

- Multiple sensor mounting options
- On-board relays
- LCD display with highly visible LED indicators
- Piezo horn with horn silence button
- Available as single-point or 3-point unit
- Battery backup (optional)

Advanced features include sensor disconnect under power, interchangeable smart sensors and onboard LEDs and relays.



TriGard

### TriGas Monitoring System

The TriGas Monitoring System typically monitors for oxygen, hydrogen sulfide and combustible gases (methane or petroleum vapors) and is specifically designed for optimum performance within high-moisture environments. This system can also be supplied with the proper options to meet the NFPA 820 section 1.8 standards followed by the wastewater industry.

*Key features:*

- Ultima X sample pump
- Red strobe
- 95dB buzzer
- 25 watt power supply
- Nema 4X Fiberglass Enclosure



TriGas

### Toxgard® II Gas Monitor

The convenient ToxGard II Gas Monitor detects toxic gases, combustible gases and oxygen deficiency. The indoor/outdoor unit is housed in a rugged NEMA 4X enclosure and features a large LED screen, three levels of alarm and a failsafe fault relay output.

*Key features:*

- Automatic calibration eliminates guesswork and ensures textbook calibration
- Unit features 70 dB sonda-alert, and can be outfitted with 93 dB or 95 dB horns
- Battery backup provides convenient reserve power



Toxgard II

## Controllers

### SUPREMATouch Controller

SUPREMATouch is a gas and fire warning system for large area measuring.

*Key features:*

- Processes up to 256 inputs and 512 outputs
- Multi-lingual touchscreen enabling intuitive operation
- New software enabling remote, one-man and group calibration
- SIL3 compatible due to the option of redundant input cards



SUPREMATouch

### GasGard® XL Controller

GasGard XL Controller monitors up to eight remote gas sensors. Housed in durable, fire-retardant ABS plastic, the controller is suitable for a variety of chemical, industrial and waste water environments.

*Key features:*

- Two levels of alarm per channel and 85 dB audible alarm
- Large multi-language LCD display provides real-time gas readings and full-system diagnosis
- Convenient upload system allows for event log transfer via ethernet or USB



GasGard XL

### 9010/9020 Controller

The 9010/9020 Gas Controller provides maximum flexibility, simple operation, and high reliability.

*Key features:*

- Monitors up to 20 channels independently
- Options in 19-in. rack or wall-mount box (one or two channels)
- Works in combination with a wide range of MSA gas sensors
- Large LCD and LED inform about gas concentration, alarm status and more
- RS 485 Modbus RTU, Ethernet for Modbus TCP



9010/9020

### ModCon™ 75 Touch Controller

Designed for use with the Ultima X Gas Monitor with X3 technology, the pre-programmed ModCon 75 Touch Controller features a 7" touchscreen monitor for ease of use. The controller is self-configuring for monitoring up to 25 monitors for a total of 75 sensors.

- All pertinent data displays on main data screen
- ModBus RTU input and ModBus-over-Ethernet interface capability
- Battery backup holds system information in case of power loss



ModCon 75 Touch

## HVAC Monitors

### Importance of monitoring refrigerant and combustible gases

A building's mechanical room is the hub of its heating, ventilation and air conditioning system. This can include central utility plants, boiler and chiller rooms, mechanical and electrical rooms and fuel rooms. The equipment within these rooms has the potential to leak harmful combustible or toxic gases, including costly and environmentally harmful refrigerant gases.

Refrigerant gas is considered as a toxic gas and although refrigerants have low toxicity, at high concentrations they can displace oxygen. Oxygen deficiency can cause serious injury or death to workers. Many of these refrigerants are categorized as ozone depleting substances and are highly monitored. Gas monitors satisfy the requirements for equipment room emissions. For economic reasons refrigerant leak detection is encouraged due to costs associated with refrigerant leaks.

### Chillgard® 5000 Refrigerant Leak Monitor

The Chillgard 5000 refrigerant leak monitor provides the earliest level of detection of costly refrigerant gas leaks in mechanical equipment rooms.

*Key features:*

- Patented photoacoustic infrared (PAIR) technology detects leaks as low as 1 ppm
- Intuitive, multi-lingual touchscreen user interface makes it easy to operate
- Predictive maintenance and diagnostics keep you operational
- Modular design makes it easy to maintain and expand sample points
- Digital communications—BACnet and Modbus



Chillgard  
5000

### Chillgard VRF Refrigerant Leak Detector

The Chillgard VRF monitors R410a in buildings such as museums, hotels and other air conditioned areas using variable refrigerant flow systems. It monitors at a low detection level of 25 ppm with MSA's PAIR (photoacoustic infrared) technology.

*Key features:*

- Low-level detection at 25 ppm minimum detection
- Versatility—capable of operating within wide temperature and humidity ranges
- Low maintenance—no moving parts and stable PAIR sensor technology
- Easy installation—simply secure back plate to wall
- Digital communications—BACnet and Modbus



Chillgard VRF

### Chillgard LE Photoacoustic Infrared Refrigerant Monitor

The Chillgard LE Photoacoustic Infrared Refrigerant Monitor is specifically designed for reliable detection of five of the most common refrigerants from up to four remote locations—with a minimum detection level of 20 ppm. Specifically designed to operate for months with virtually no zero drift.

*Key features:*

- Very stable and highly selective photoacoustic infrared (PAIR) technology
- Detects R123, R134a, R11, R12, R22—other refrigerant detection available
- Easy-view LCD display
- Three alarm levels
- 85dB buzzer
- Tough water- and corrosion-resistant enclosure
- Easy to install, operate, and maintain



Chillgard LE

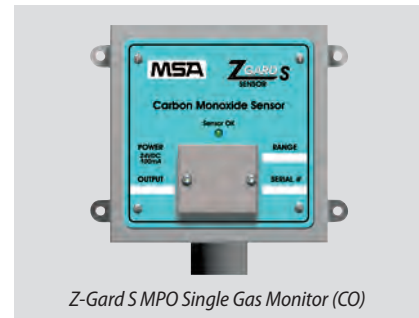


## HVAC Monitors

In enclosed areas such as parking garages, potentially lethal concentrations of carbon monoxide (CO) and nitrogen dioxide (NO<sub>2</sub>) can build up quickly—before exposed individuals have any indication of danger. The issue is not whether these gases reach hazardous concentrations, but rather how to control and ventilate gas buildup when it occurs.

### Z-Gard® S MPO Single Gas Monitor

- Detects the presence of either carbon monoxide, nitrogen dioxide or combustible gases in air
- Connects directly to a building automation system for single gas monitoring solutions
- Communicates with one of several industry standard protocols, providing seamless integration with commercial automation systems



Z-Gard S MPO Single Gas Monitor (CO)

### Z-Gard DS MPO Dual Gas Monitor

- Detects the presence of carbon monoxide and nitrogen dioxide
- Connects directly to a building automation system for dual gas monitoring solutions
- Communicates with one of several industry standard protocols, providing seamless integration with commercial automation systems



Z-Gard DS IMPO Dual Gas Monitor

### Z-Gard COmbo Gas Monitor

- Cost-efficient monitor for underground garages and ventilation control
- Uses a solid-state sensor to detect carbon monoxide
- Local audio/visual alarm status indicators
- Interfaces with air-handling equipment to control air quality within a building
- Remote sensors can be attached to the unit via the RS-485 network port
- 4-20mA output is proportional to the calibrated operating range



Z-Gard COmbo Gas Monitor

### Z-Gard CXII Controller

- Accepts up to 99 sensors
- Large backlit LCD screen displays operating, alarm and fault diagnostic system status
- Modbus RTU or BacNet MS/TP digital protocols are available for integration with building automation systems



Z-Gard CXII Controller

### Z-Gard C 485 Controller

- Microprocessor-based system links up to 24 remote gas sensors
- Set points and readout display are automatically adjusted to match sensor
- Relay outputs indicate warning, alarm or sensor fail for each zone, and units are available with one or two zones
- Large LED readout displays the active channel and the corresponding sensor gas level
- Audible alarm



Z-Gard C 485 Controller

## System Capabilities

### HazardWatch® NFPA 72 Fire and Gas System

The innovative, modular HazardWatch System combines highly reliable programmable logic controller (PLC) technology with our advanced gas and flame field devices. It is highly scalable, making it suitable for small systems to large plant-wide applications. Offering intelligence, flexibility and reliability, the HazardWatch System's controller hardware configuration and software has been tested by Factory Mutual to verify NFPA 72 compliance.

*HazardWatch key features:*

- Both fire and gas functions are certified to NFPA 72 by FM
- FM certified fire network allows for multiple HazardWatch systems to be networked together
- Touchscreen interface (10.4 in.) provides user-friendly graphical interface and supports plot plans
- Field wiring topology is simple, reliable and cost effective
- FM certified ControlNet, Ethernet or Modbus output from the system



*HazardWatch*

### MultiGard™ 5000 Gas Sampling System

The MultiGard 5000 Gas Sampling System uses auto-standardization and flexible sample point order to analyze gas from up to 32 locations.

- Modular construction allows simple installation and maintenance
- Easy setup via front touch-screen panel display
- Common alarm and fault relays
- Gas flow failure indication
- Options include discrete relays and Modbus TCP/BACnet IP output



*MultiGard 5000*

## Custom Products

Individually designed gas detection solutions to fit your application

Special solutions sometimes require greater versatility and unique equipment configurations. MSA's Custom Products group offers individually designed solutions for customer monitoring, control and data acquisition applications.

Each custom system is individually designed to provide the very best solution to unique application requirements. MSA Custom Products provide customers with a distinctive combination of solutions, expertise and timeliness.

Examples include:

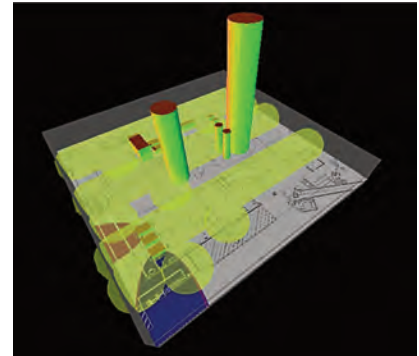
- Flow panels
- Intrinsically safe multi-point gas sampling systems
- Facility management monitoring systems
- Customer-defined packaging solutions
- Shipboard rugged systems
- OEM packaging and labeling



## Improving Gas Detection Coverage with Gas and Flame Mapping

Flame and gas mapping is a solution that assists in the evaluation of flame and gas risks within a process facility and in the reduction of these risks towards an acceptable risk profile.

Flame and gas mapping includes placing of detectors in appropriate locations to achieve the best possible detection coverage, with a systematic and numeric method, which also considers external factors, such as wind direction and obstructions. The output of a mapping study includes graphical maps of residual risks, recommended detector placements and numerical estimates of detection coverage.



## MSA Field Service – Professional, Reliable & Responsive

Alongside the extensive range of top-quality products, MSA Safety also provides a high level of customized service. MSA Safety's comprehensive and versatile range of services ensures that your equipment and systems will always be reliable, economical and ready for use. MSA Safety is always at your service to provide you with the support you need, when you need it.

- Installation & Commissioning. Premium commissioning service program—designed to make it easy for you to have successful start-ups and commissioning of newly installed fixed gas and flame instruments.
- Maintenance—MSA's routine maintenance service program is designed to make it easy for you to budget for the maintenance and calibration needs for your fixed gas and flame instruments. This program offers a flat-fee approach to make it easy for you to determine your costs.
- Project Management
- System Modification
- Repair & Service
- Training



# MSA—The Safety Company

*Our business is safety. We've been the world's leading manufacturer of high-quality safety products since 1914. MSA products may be simple to use and maintain, but they're also highly sophisticated devices and protective gear—the result of countless R&D hours, relentless testing and an unwavering commitment to quality that saves lives and protects millions of hard working men and women each and every day. Many of our most popular products integrate multiple combinations of electronics, mechanical systems and advanced materials to help ensure that users around the world remain protected in even the most hazardous of situations.*

## Our Mission

MSA's mission is to see to it that men and women may work in safety and that they, their families and their communities may live in health throughout the world.

Note: This Bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products. Specifications subject to change without notice.



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