ULTIMA® X Series

State-of-the-Art Gas Monitoring

MSA
The Safety Company

ULTIMA XE

ULTIMA XIR

*Because every life has a **purpose…***

Providing a unique Range of Capabilities

The ULTIMA X series of gas monitors is available with catalytic sensors for combustible gas and electrochemical sensors for toxic and oxygen (ULTIMA XE) or infrared for combustible gas (ULTIMA XIR).

The state-of-the-art design provides ease of use and maintenance and notably the XIR technology's outstanding long term accuracy extends the calibration interval.

All ULTIMA X series monitors are protected by a rugged, explosion proof stainless steel enclosure and are suitable for indoor and outdoor applications in virtually any industry including offshore operations.

The monitors can be deployed as stand-alone units, but also provide a 4 to 20 mA output for connection to controllers. In addition, the ULTIMA X³ range now supports ModBUS RTU communication with PLC, DCS or other control systems.

Durable stainless steel enclosure for even the toughest requirements

Infrared remote control interface

Optional field-configurable relay outputs

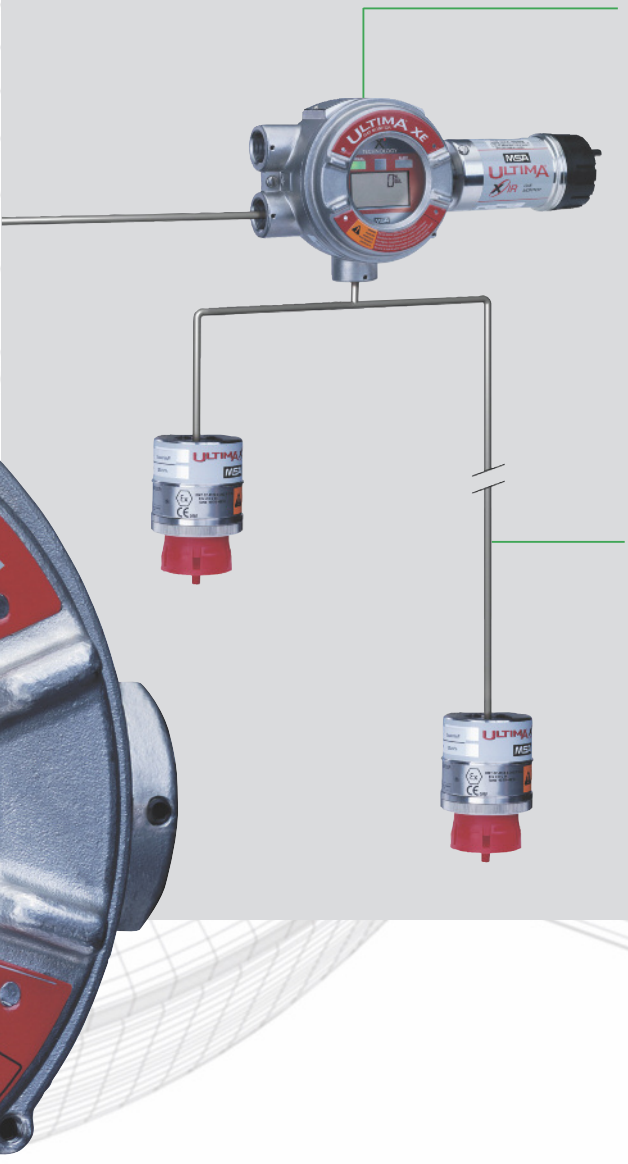
Optional super bright "quick check" LEDs for enhanced visibility

Large LCD shows gas concentration and clear text status messages

4 –20 mA or relay output

Easy to use, totally flexible cable entries

Unified single board electronics for all monitoring technologies



Highlights

Sensor Change under Power
MSA's patented sensor design allows for quick and easy sensor changes in the field, even in hazardous areas (catalytic and electrochemical sensors).

Interchangeable Smart Sensors
Pre-calibrated sensor modules are ready for installation out of the box. No tools are needed to mount them in the field. Sensor changes are recognised, signalled on the display and indicated by the LEDs (catalytic and electrochemical sensors).

Versatile Display
The liquid crystal display alternates between gas concentration and gas type, and features scrolling text diagnostic indications.

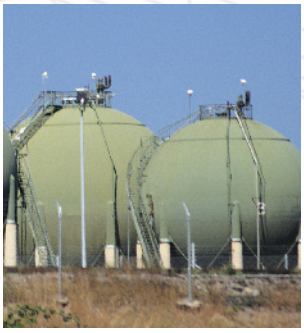
Unified Hardware Design
A single device with three sensing options: catalytic, electrochemical and infrared absorption. The ULTIMA X series with unified single board electronics marks the state-of-the-art in monitoring combustible and toxic gases and oxygen.

Onboard LEDs and Relays
Optional "quick check" LEDs at the display unit provide system condition indications at a glance, even from a distance. Four optional field-programmable relays provide three levels of alarm and fault output.

Three Sensing Options in one single Device

Features and Benefits

- Stainless steel explosion-proof, multiple-entry enclosure
- Large LCD for numerical data as well as clear text messages
- Unified sensor electronics for multiple detection and monitoring technologies
- Single-board design greatly simplifies servicing
- "Quick-check" LEDs indicate system conditions, with good visibility even from a distance
- Optional field-programmable relays
- Remote sensor option
- Automatic compensation for changes in temperature and humidity
- All calibrations and adjustments made using non-invasive calibra tor or controller (IR interface)
- Sensors can be changed under power in the field, even in hazardous areas (catalytic and electrochemical sensors)
- 4–20 mA output signal (ULTIMA XE)
- Digital ModBUS RTU communication (ULTIMA X^3)
- Up to three sensors per monitor (ULTIMA X^3)



Applications

ULTIMA X series gas monitors are suitable for indoor and outdoor applications in virtually any industrial environment including:

- Offshore installations
- Refineries
- Chemical and petrochemical facilities
- Steel mills
- Water and wastewater plants
- Automotive factories

Hazards

ULTIMA X series gas monitors protect against the following hazards:

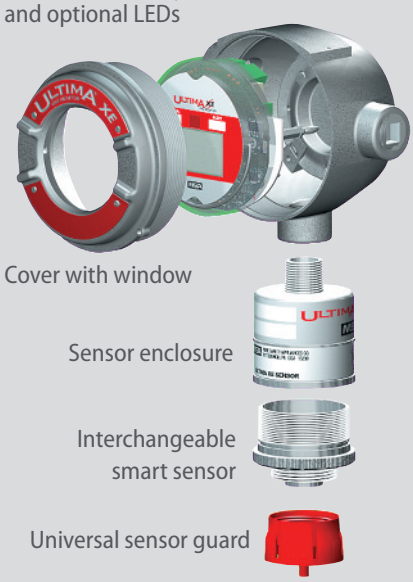
- Combustible atmosphere
- Oxygen deficiency
- Toxic atmosphere
- Gas leaks

Installation and Operation

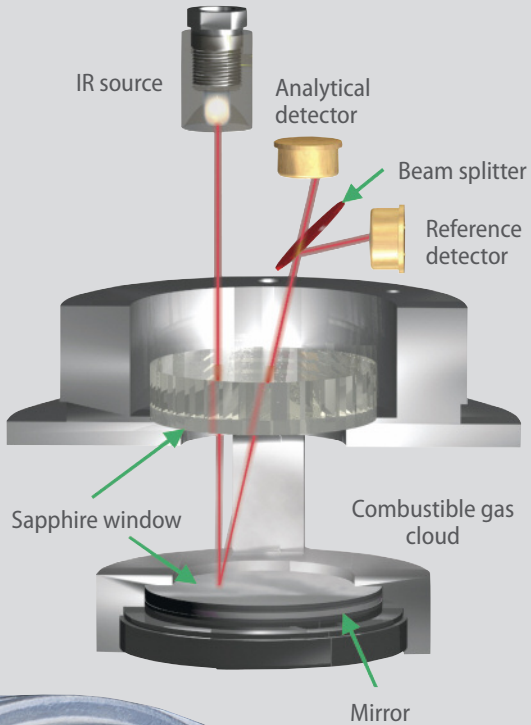
Allowing for variable sensor placement, ULTIMA X series gas monitors have multiple enclosure entries for left, right or bottom wiring. The monitors are also suitable for remote sensing applications, with up to 15 m between sensor and electronics.

The modular design allows for pre-installation and wiring of the main enclosure at early stages of site construction. Main electronics and calibrated sensors can be easily added at commissioning to reduce risk of loss or damage and maximise sensor life.

ULTIMA X catalytic and toxic "Smart Sensor" modules store all calibration data internally, allowing convenient sensor presetting and calibration in the workshop. Calibration in the field is also possible, e.g. if required by regulations. No tools are needed for connecting or disconnecting sensor modules, and power to the monitor can remain on.



Electrochemical/Catalytic Sensor

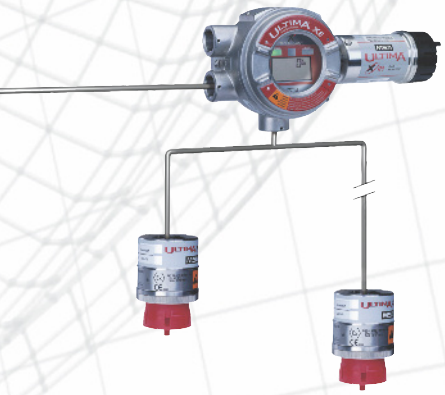


ULTIMA X IR Technology

An electronically modulated source of infrared energy and two detectors convert the infrared energy into electrical signals. Each detector is sensitive to a different range of wavelengths in the infrared spectrum. The source emission is directed through a window in the main enclosure into an open vol ume. A mirror, protected by a sec ond window, directs the energy back into the main enclosure and onto the detectors. The presence of a combustible gas in the open volume will reduce the intensity of the source emission reaching the detector, but not the intensity of the source emission reaching the reference detector. The microprocessor monitors the ratio of these two signals and correlates this to a % LEL combustible reading.

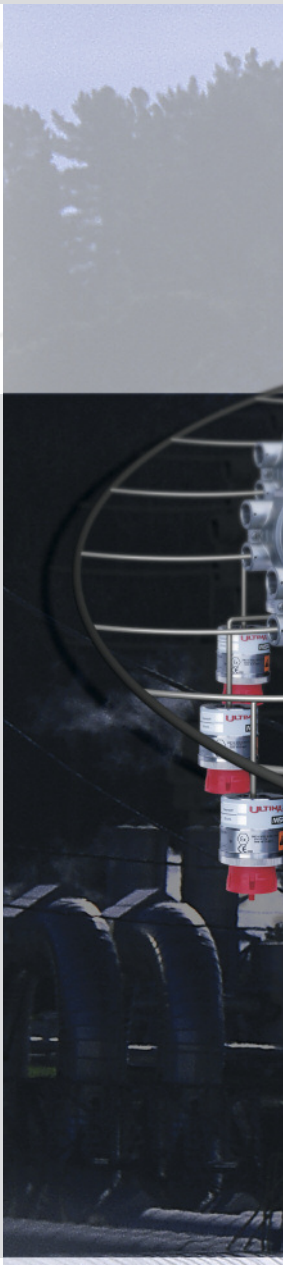
Digital Data Transfer and up to 3 Sensors per Monitor

The ULTIMA X³ has all the benefits of the ULTIMA X series and is also capable of digital communication. A maximum of 31 ULTIMA X³ transmitters can be connected to the same line via ModBUS RTU. Since ULTIMA X³ units can be equipped with up to 3 sensors each, 93 sensors in all can share a single signal line. The wiring effort is minimal.

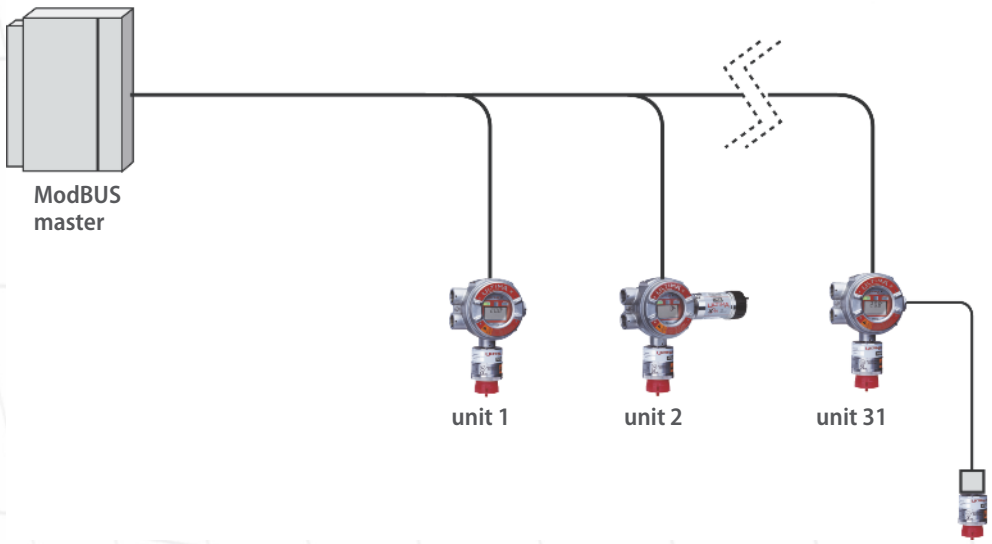


Multi-Sensing System

- Various combinations of electrochemical, catalytic and infrared sensors available
- Remote diagnostics feasible thanks to sensor condition transmissions
- Gas monitor's "scrolling display" shows all its sensor types
- ULTIMA X³ monitor operates as slave device on the network
- Optional remote sensor installation allows for a maximum distance of 15 m for each sensor
- Internal relays can be config ured for 3 different common alarms or one individual alarm for each sensor



ModBUS Network Example



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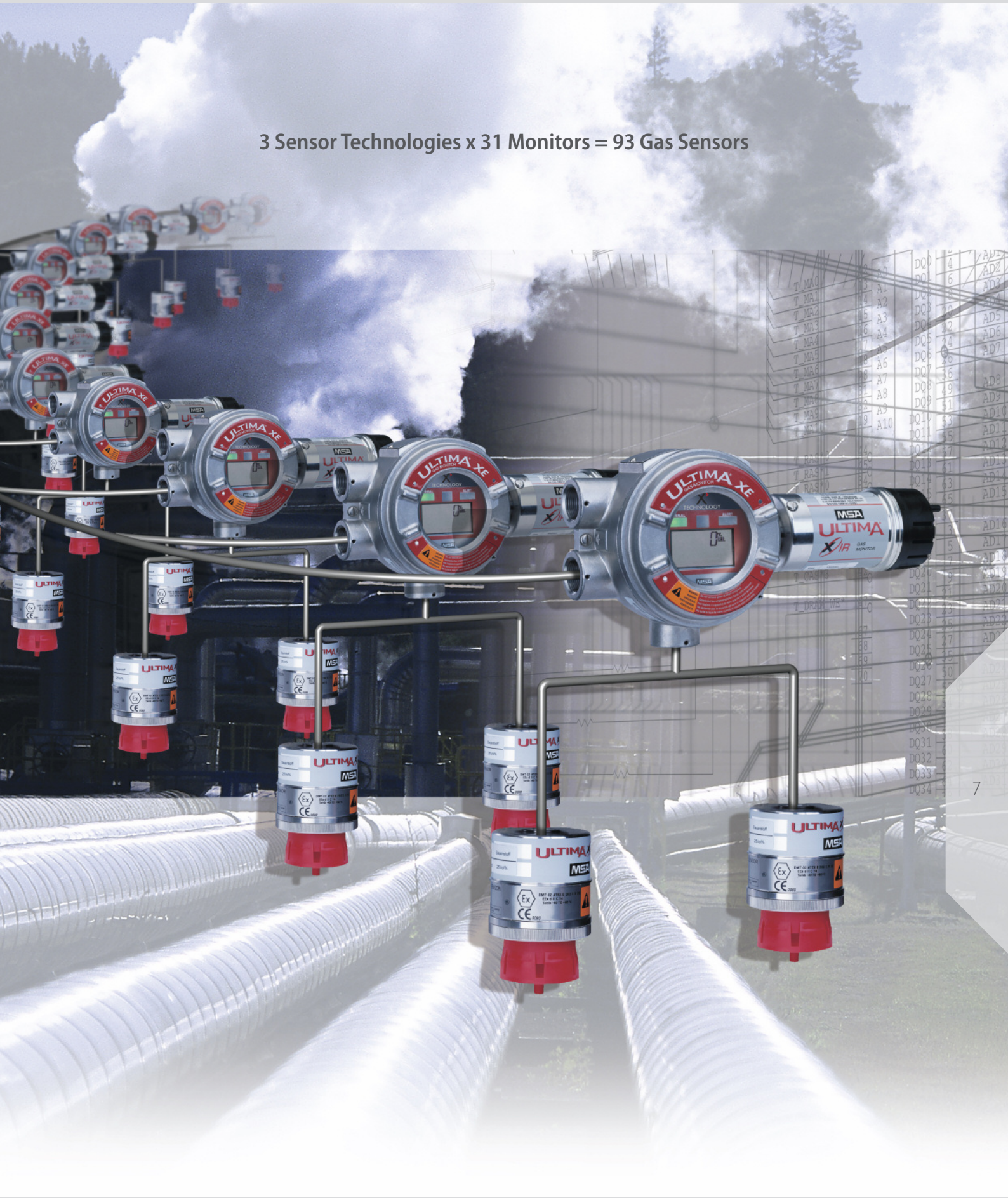


Accessories

Calibrator

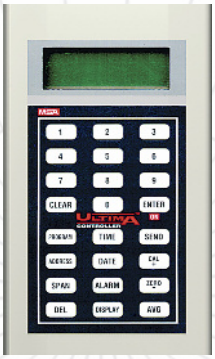
The easy to use 3 button ULTIMA Calibrator, with IR interface, offers the industry's simplest method of calibration. The intrinsically safe Calibrator can also be used to change the address of an ULTIMA X^3 gas monitor.

Controller

The ULTIMA Controller has an IR interface and provides complete access to all features through its full function keypad.

Features include:

- Intrinsically safe
- Set/display alarm levels
- Set/display SPAN gas value
- Display minimum, maximum and average gas readings
- Calibration menu



Push Button (external)

The push button allows for quick browsing through key functions without the calibrator:

- Acknowledge Alarms
- Zero Calibration
- SPAN Calibration
- Initial Calibration (iCAL)
- Abort Calibration

Flow through Adaptor

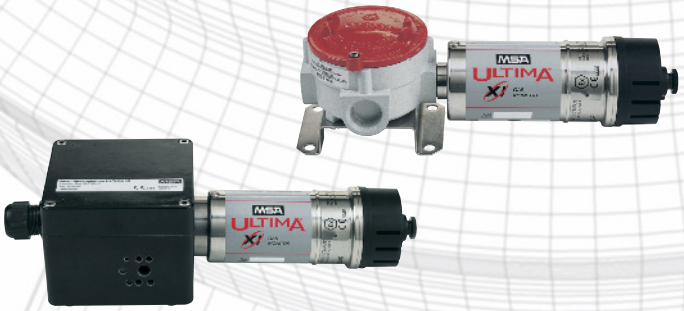
For toxic and catalytic sensors with connection for option to apply calibration gas remotely (for ULTIMA XE).

Flow Cap

Used when there is a requirement to pump a sample through the sensing module (for ULTIMA XI and XIR).

Remote Sensor Options

The optional explosion-proof (NPT) or increased safety (metric) enclosure includes a terminal strip for easy wiring of power and signal.



Gas Types	Combustibles, toxics and oxygen
Temperature Range	–40°C to +60°C (–40°F to +140°F) (typical, range for some gases may differ)
Drift Zero Drift Span Drift	 < 5 % per year, typical <10 % per year, typical
Accuracy Repeatability	 ± 1% Full Scale or 2 ppm, typical
Linearity	± 2 %Full Scale or 2 ppm (O_2, CO), typical ± 3 % Full Scale (<50 % LEL combustibles) ± 5 % Full Scale (>50 % LEL combustibles) ±10 % Full Scale or 2 ppm (non-CO toxics), typical
Response Times τ_{20} oxygen and toxics τ_{50} oxygen and toxics τ_{50} combustibles τ_{90} combustibles τ_{90} XIR	 <12 seconds (typically 6 seconds) <30 seconds (typically 12 seconds) < 8 seconds <20 seconds < 5 seconds (without sensor guard)
Humidity	15 %– 95 % RH, non-condensing
Sensor Life Oxygen and toxics Combustibles	 2 years typical 3 years typical
Power Input	24 VDC (oxygen) 24 VDC @ 450 mA maximum (combustibles) 24 VDC @750 mA maximum (XIR)
Wiring Requirements Combustibles (incl. XIR) Oxygen and toxics Oxygen and toxics	 3-wire 2-wire; no LEDs or relays 3-wire; LEDs and/or relays

Signal Output ULTIMA XE	 4–20 mA 2-wire current sink 4–20 mA 3-wire current source
Relay Contacts Rating Alarm Fault	 5 A @ 220 VAC; 5 A @ 30 VDC normally energised/de-energised, SPDT, upscale/downscale, latching/nonlatching normally energised, SPDT, non-latching
Cable Entries	Four, 3/4 inch NPT or 25 mm
Physical Weight Dimensions Material	 4.7 kg 261 x 160 x 99 mm (H x W x D) 316 Stainless Steel
Approvals ULTIMA XE/XIR/X[3] ULTIMA XE/XIR/X[3] and Remote Sensor ULTIMA XE/XIR/X[3]	 CE Low Voltage Directive: 2014/35/EU CE ATEX Directive: 2014/34/EU CE EMC Directive: 2014/30/EU Ⓔx II 2G Ex d IIC T5Gb (main enclosure) Ⓔx II 2G Ex d IIC T4Gb (sensor excluding IR) Ⓔx II 2G Ex d IIC T5Gb (IR sensor) Ⓔx II 2G Ex ia IIC T4Gb (sensor with safety barrier) –40°C Ta +60°C
EC-Type Examination Certificate ULTIMA XE/XIR ULTIMA Calibrator ULTIMA Controller	DMT 02 ATEX E 202 X Performance approval EN 60079-29-1:2007 EN 50104:2010 (PFG-No. 41301103P) EN 50271:2010 Ⓔx II 2G Ex ia IIC T4Gb Ⓔx II 2G Ex ib IIC T3Gb
Warranty	24 months on all components including IR sensor (does not include catalytic or electrochemical sensor modules)

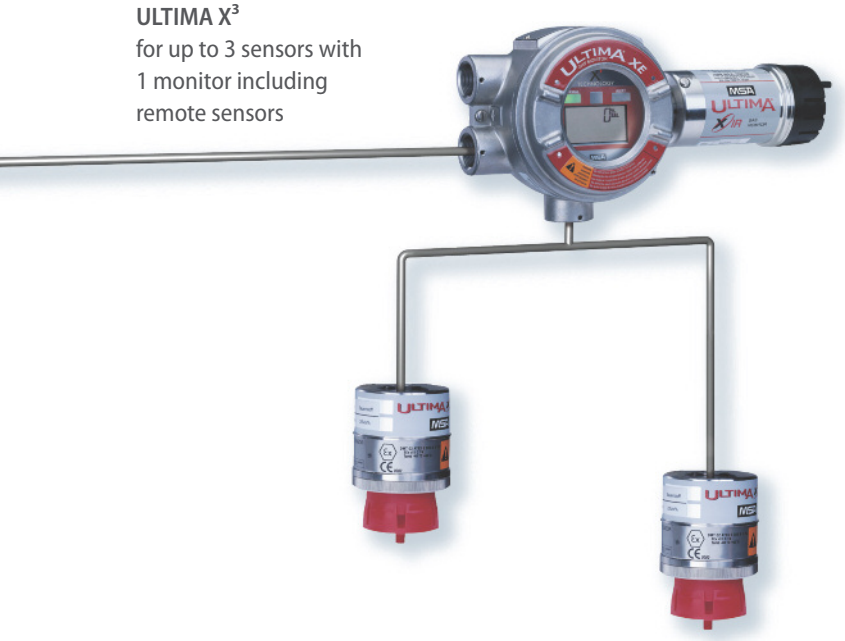
Sensor & System Options

Infrared Sensors
for monitoring group
3 or 4 combustibles

Electrochemical Sensors
for monitoring various
toxics and oxygen

Catalytic Sensor
for monitoring group
1 and 2 combustibles

ULTIMA X^3
for up to 3 sensors with
1 monitor including
remote sensors



List of Combustible Gases, Catalytic Sensor

Compound	Group	Compound	Group
Acetaldehyde	2	Gasoline	2
Acetic Acid	2	Heptane	2
Acetone	2	Hexane	2
Acetylene	2	Hexene	2
Acrylnitrile	2	Hydrogen	1
Amyl Alcohol	2	Isoprene	2
Benzene	2	JP-4	2
Butadiene-1,3	1	Methane	1
Butane-iso	2	Methanol	2
Butanol	2	Methyl Acetate	2
Butene-1	1	Methyl Ethyl Ketone	2
Butene-2	1	Methyl Isobutyl Ketone	2
Butyl Acetate	2	Methyl Methacrylate	2
Butyl Acrylate	2	Methyl Propane-2	1
Butene	1	Methyl t-Butyl Ether	2
Butyraldehyde	2	Pentane-iso	1
Cyclohexane	2	Pentane-n	1
Diethyl Ether	2	Pentene	1
Dimethoxyethane	2	Propane	1
Dimethyl Ether	2	Propanol-iso	2
Dioxane-1,4	2	Propanol-n	2
Ethane	1	Propyl Acetate	2
Ethanol	2	Propylene	1
Ethyl Acetate	2	Propylene Oxide	2
Ethyl Acrylate	2	Styrene	2
Ethyl Benzene	2	Tetrahydrofuran	2
Ethylene	1	Toluene	2
Ethylene Oxide	1	Xylenes	2

List of Combustible Gases, IR Sensor

Compound	Group	Compound	Group
Acetone	3	Isopropyl Acetate	4
Allyl Alcohol	4	MEK	4
Benzene	4	Methane	3
Butadiene-1,3	3	Methanol	4
Butane	3	Methyl Chloride	4
Butanol	4	Methylene Chloride	4
Cyclohexane	4	MIBK	4
Cyclopentane	4	MTBE	4
Diethyl Ether	4	Propanol-n	4
Difluoroethane-1,1		Pentane	4
(R 152a)	4	Propane	3
Dimethylamine	4	Propionaldehyde	4
Dimethyl Ether	4	Propyl Acetate	4
Epichlorohydrin	4	Propylene	3
Ethane	3	Propylene Oxide	4
Ethanol	4	Styrene	4
Ethyl Acetate	4	Tetrahydrofuran	4
Ethylene	3	Toluene	4
Ethylene Oxide	3	Trichloroethane-1,1,1	4
Heptane	4	Triethylamine	4
Hexane	4	Trimethylamine	4
Isobutane	3	Vinyl Acetate	4
Isobutylene	4	Xylenes (O-Xylene)	4
Isopropanol	4		

		Cable Gland Thread Type	
Enclosure Type		**3/4" NPT**	**25 mm metric**
Enclosure without terminal strips		10044380	10044382
Enclosure with terminal strips		10044381	10044383
Gas Type		**3/4" NPT**	**25 mm metric**
Infrared Sensors			
IR Sensor for Combustible Gases, Group 3*: 0–100% LEL		10044425	10044449
IR Sensor for Combustible Gases, Group 4*: 0–100% LEL		10044426	10044450
Catalytic Sensors			
Catalytic Sensor for Combustible Gases, Group 1*: 0–100% LEL		10044423	10044447
Catalytic Sensor for Combustible Gases, Group 2*: 0–100% LEL		10044424	10044448
Electrochemical Sensors			
Ammonia	0–50 ppm	10044520	10044528
Ammonia	0–100 ppm	10062612	10056992
Arsine	0–2 ppm	10044428	10044452
Bromine	0–5 ppm	10044518	10044526
Carbon Monoxide	0–100 ppm	10044364	10044433
Carbon Monoxide	0–500 ppm	10044365	10044434
Chlorine	0–5 ppm	10044514	10044522
Chlorine Dioxide	0–3 ppm	10044517	10044525
Diborane	0–50 ppm	10044431	10044455
Ethylene Oxide	0–10 ppm	10044521	10044529
Fluorine	0–10 ppm	10044519	10044527
Germane	0–3 ppm	10044430	10044454
Hydrogen	0–1000 ppm	10044432	10044456
Hydrogen Chloride	0–50 ppm	10044516	10044524
Hydrogen Cyanide	0–50 ppm	10044422	10044446
Hydrogen Sulphide	0–10 ppm	10044368	10044440
Hydrogen Sulphide	0–50 ppm	10044369	10044442
Hydrogen Sulphide	0–100 ppm	10044420	10044444
Nitric Oxide	0–100 ppm	10044421	10044445
Nitrogen Dioxide	0–10 ppm	10044515	10044523
Oxygen	0–10%	10044366	10044436
Oxygen	0–25%	10044367	10044438
Phosphine	0–2 ppm	10044427	10044451
Silane	0–25 ppm	10044429	10044453
LED/Relay/Output Options			
ULTIMA XE/XIR	no LEDs and no relays, 2-wire output (only for toxics, not for comb.)		10044388
ULTIMA XE/XIR	no LEDs and no relays, 3-wire output		10044386
ULTIMA XE/XIR	LEDs and no relays, 3-wire output		10044385
ULTIMA XE/XIR	Relays and no LEDs, 3-wire output		10044387
ULTIMA XE/XIR	LEDs and relays, 3-wire output		10044384
ULTIMA X^3 ModBUS-PCB	no LEDs and no relays		10062613
ULTIMA X^3 ModBUS-PCB	LEDs and no relays		10062614
ULTIMA X^3 ModBUS-PCB	Relays and no LEDs		10062615
ULTIMA X^3 ModBUS-PCB	LEDs and relays		10062616
Installation Options			
Instrument mounting bracket			10047561
Housing for remote sensor installation, 3/4" NPT			10044457
Housing for remote sensor installation, 25 mm metric			10044458
Reducer M25/M20 EEx de			10045881
Cable Gland M20 EEx d			10045880
Accessories			
ULTIMA Controller			10044459
ULTIMA Calibrator			10044470
Reset push button (external)			10074014
ULTIMA XE Calibration cap			10020030
ULTIMA XE Flow adapter			10041866
ULTIMA XE SensorGard			10028904
ULTIMA XIR Calibration cap			10041533
ULTIMA XIR Flow cap			10042600
ULTIMA XIR SensorGard			10041265

Please choose from the options to create your ULTIMA X

**Please see specifications. More gas types, options and accessories available on request.*

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About MSA

Over 100 years of experience and capability in comprehensive safety solutions have made MSA a modern and forward-looking company for the protection of people, facilities, and the environment. MSA 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, the MSA FGFD product portfolio expanded even further. As two unmatched experts in gas and flame detection joined forces, we are proving that the right mix of durable products and innovative technology can increase safety while driving operational efficiency.

Together MSA and General Monitors have the widest range of sensing technologies for gas and flame detection. We can create solutions that will not only provide worker safety and protect facilities, but will also decrease overall cost of ownership. While our customers still have access to the great products and service that they have come to rely on in the past, they now have access to so much more: superior service, improved support, a wider range of technology, and unique solutions enhanced by the combined strength of MSA and General Monitors.

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