CERTIFICATE OF CONFORMITY

FM Approvals

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** **FM20US0060X**

3. **Equipment:**
   (Type Reference and Name) **ULTIMA X5000 Gas Monitor Fixed Gas Detection System and ULTIMA XIR Plus Sensors**

4. **Name of Listing Company:** **MSA Innovation LLC dba MSA - The Safety Company**

5. **Address of Listing Company:** **1000 Cranberry Woods Drive, Cranberry Township, Pennsylvania 16066, United States of America**

6. The examination and test results are recorded in confidential report number:

   PR449063 dated 10th August 2020

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM 3600:2022, FM 3611:2021, FM 3615:2022, FM 3616:2022, FM 3810:2021, FM 6320:2018, FM 6340:2022, ANSI/FM/UL 60079-29-1:2019, ANSI/UL 50E:2015, NEMA 250:2014, ANSI/UL 60079-0:2020, ANSI/UL 60079-1:2015, ANSI/UL 60079-15:2017, ANSI/UL 60079-31:2015, ANSI/IEC 60529:2004, ANSI/UL 61010-1:2023, ANSI/UL 121201:2021, ANSI/UL 920001:2010, ANSI/UL 920401:2007

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

10. Equipment Ratings:

    See Annex

11. The marking of the equipment shall include:

    See Annex

Certificate issued by:

J.E. Marquedant

J.E. Marquedant
VP, Manager - Electrical Systems

15 July 2024

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCC Accredited CB-P/S OCPS Accredité CCN

12. **Description of Equipment:**

    See Annex

13. **Specific Conditions of Use:**

    See Annex

14. **Test and Assessment Procedure and Conditions:**

    This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

    A copy of the technical documentation has been kept by FM Approvals.

16. **Certificate History**

    Details of the supplements to this certificate are described below:

Date	Description
10 August 2020	Original Issue.
4 January 2021	Supplement 1: Report Reference: PR457661 dated 4th January 2021. Description of the Change: Documentation, hardware and software updates and an additional junction box option.
10 March 2021	Supplement 2: Report Reference: PR457661 Reissue 1 dated 10th March 2021. Corrected model code listing and typos.
9 August 2022	Supplement 3: Report Reference: PR460997 dated 9th August 2022. Description of the Change: Add Zones and update FM3600, FM3615, FM3616 and FM6340 to version 2022 as the revisions had no technical changes. Added UL50E:2015 based on similarity with ANSI/NEMA 250:2014.Minor circuit changes and software updates assessed within test report PR462888
6 February 2023	Supplement 4: Report Reference: RR234893 dated 6th February 2023. Description of the Change: Update to certificate format, to include Annex. Minor changes to replace an obsolete component. Various drawing updates to correlate with previously approved changes. No change to firmware.

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US Certificate of Conformity No: FM20US0060X

Date	Description
15 July 2024	Supplement 5: Report Reference: PR467005 dated 15 July 2024. Description of the Change(s): Hardware and firmware updates required additional performance testing and Nonincendive testing. Major corrections to the listing format to provide clarity, remove separate listing of General Monitor's digital sensors, and create a table listing all approved sensors. Updated format to reduce paragraphs and provide information in a table. The company name has been updated from "MSA - The Safety Company" to "MSA Innovation LLC dba MSA - The Safety Company".

ANNEX

ULTIMA X5000 Gas Monitor

Equipment Ratings:

The ULTIMA X5000 Gas Monitor is Explosionproof for use in Class I, Division 1, Groups A, B, C, D, T6; Class II, Division 1, 2, Groups E, F, G, Class III, T6; Nonincendive (without optional relays) for Class I, Division 2, Groups A, B, C, D, T4; Flameproof for use in Class I, Zone 1, AEx db IIC T6 Gb; Protection by Enclosure as Zone 21 AEx tb IIIC T85°C Db; Non-Sparking (without optional relays) as Class I, Zone 2, AEx nA IIC T4 Gc Ta = -40°C to +60°C Hazardous (Classified) Locations, indoor and outdoor (Type 4X/IP66).

The ULTIMA X5000 Junction Box is Explosionproof for use in Class I, Division 1, Groups A, B, C, D, T6; Class II, Division 1, 2, Groups E, F, G, Class III, T6; Nonincendive for Class I, Division 2, Groups A, B, C, D, T6; Flameproof for use in Class I, Zone 1, AEx db IIC T6 Gb; Protection by Enclosure as Zone 21 AEx tb IIIC T85°C Db; Non-Sparking as Class I, Zone 2, AEx nA IIC T6 Ta = -40°C to +60°C Hazardous (Classified) Locations, indoor and outdoor (Type 4X/IP66).

The JB5000 Junction Box is Explosionproof for use in Class I, Division 1, Groups A, B, C, D T6; Class II, Division 1, 2 Groups E, F, G, Class III T6; Nonincendive for Class I, Division 2, Groups A, B, C, D T6; Flameproof for use in Class I, Zone 1, AEx db IIC T6 Gb; Protection by Enclosure as Zone 21 AEx tb IIIC T85°C Db; Non-Sparking as Class I, Zone 2, AEx nA IIC T6 Ta = -50°C to +60°C Hazardous (Classified) Locations, indoor and outdoor (Type 4X/IP66).

Markings:

ULTIMA X5000 Gas Monitor
CL I, Div 1 Group A, B, C, D; T6
CL I, Div 2 Group A, B, C, D; T4 (without optional relays)
CL II, Div 1,2 Group E, F, G; CL III; T6
CL I, Zone 1 AEx db IIC T6 Gb
CL I, Zone 2 AEx nA IIC T4 Gc (without optional relays)
Zone 21, AEx tb IIIC T85°C Db
Ta = -40°C to +60°C; Type 4X, IP66
FM 6340
ANSI/ISA 92.00.01
ANSI/ISA 92.04.01
60079-29-1

ULTIMA X5000 Junction Box
CL I, Div 1 Group A, B, C, D; T6
CL I, Div 2 Group A, B, C, D; T6
CL II, Div 1,2 Group E, F, G; CL III; T6
CL I, Zone 1 AEx db IIC T6 Gb
CL I, Zone 2 AEx nA IIC T6 Gc

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

Zone 21, AEx tb IIIC T85°C Db
Ta = -40°C to +60°C; Type 4X, IP66
FM 6340
ANSI/ISA 92.00.01
ANSI/ISA 92.04.01
60079-29-1

JB5000 Junction Box
CL I, Div 1 Group A, B, C, D; T6
CL I, Div 2 Group A, B, C, D; T6
CL II, Div 1,2 Group E, F, G; CL III; T6
CL I, Zone 1 AEx db IIC T6 Gb
CL I, Zone 2 AEx nA IIC T6 Gc
Zone 21, AEx tb IIIC T85°C Db
Ta = -50°C to +60°C; Type 4X, IP66
FM 6340
ANSI/ISA 92.00.01
ANSI/ISA 92.04.01
60079-29-1

Description of Equipment:

The ULTIMA X5000 Gas Monitor consists of an ULTIMA X5000 Transmitter and an optional ULTIMA X5000 or JB5000 Junction Box. The ULTIMA X5000 Gas Monitor supports up to two ULTIMA XIR Plus point IR Detectors, up to two General Monitors Inc. Digital Sensors (Combustible, Toxic, or Oxygen), or one ULTIMA XIR Plus point IR detector and one Digital Sensor simultaneously.

The ULTIMA X5000 Gas Monitor and ULTIMA X5000 Junction Box consist of a single 316 stainless steel compartment enclosure measuring approximately 5.9 inches in width, 5.7 inches in height with depths of 3.8 and 4.8 inches (depending on the windowed cover installed). The JB5000 Junction Box consists of a single 316 stainless steel compartment enclosure approximately 3.5 inches in diameter by 3 inches high. The enclosures are explosionproof/dust-ignitionproof rated and contain field connections, power, display and control circuitry if used as the transmitter or if used as a junction box as a means of connecting remote sensors. The transmitter and junction box enclosures provide (4) ¾ inch NPT threaded conduit entries, or optionally M25 straight threaded entries. Unused entries are fitted with suitably certified blanking plugs. M25 to ¾ inch NPT adapters are provided for connecting of sensors. The ULTIMA X5000 Gas Monitor and ULTIMA X5000 Junction Box include a 4-1/8-12UN threaded window cover (short or tall version) that comes with a 0.375 inch thick soda lime tempered glass lens held in place with retaining ring. The JB5000 junction box enclosure provides (3) ¾ inch NPT or optionally M25 straight threaded entries and a 3-1/4-12UN threaded cover. Unused entries are fitted with suitably certified blanking plugs. M25 to ¾ inch NPT adapters are provided for connecting of sensors. The housings are available in 316 stainless steel material only.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

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US Certificate of Conformity No: FM20US0060X

Model Code Options:

A-X5000-abcdeffggh, Gas Monitor Model ULTIMA X5000

a is for Enclosure Material:
- 0 = Stainless Steel – ¾" NPT
- 2 = Stainless Steel – M25

b is for listed Approval:
- M = FM

c is for Bluetooth:
- 0 = Yes
- 1 = No

d is for Output Communication:
- 0 = Analog/HART
- 1 = Analog/HART/Relays
- 3 = Analog/HART/Relays/Isolate Modbus

e is for Advanced Option
- 0 = Default place holder, not relevant to certification

ff is for Sensor 1 selection:
- See Model Code column of the Sensor Table

gg is for Sensor 2 selection:
- See Model Code column of the Sensor Table

h is for Tag:
- 0 = None
- T# = (# = 1, 2, or 3) Stainless Steel affixed tags

Specifications:

Sensor Type:	See Sensor Table for sensor type
Gases:	See Sensor Table for approved gases
Range:	See Sensor Table for ranges
Installation:	Fixed
Sampling Type:	See Sensor Table for sampling type
Accuracy:	See Sensor Table for sensor accuracy
Response Time:	See the Sensors Table for response time
Supply Parameters:	11-30Vdc, 15W max
Operating Temperature:	-40°C to +60°C
Storage Temperature:	-40°C to +60°C
Relative Humidity:	5 to 95% RH non-condensing

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Measurement Signal:	Two 4-20mA, LED Display
Alarms:	LED Display, Relay (5A 30Vdc / 250Vac)
Firmware:	NXP Microprocessor: 2.00.0065 ST Microprocessor: 4.01.0016

Approved Sensors - The following sensors have been performance tested for use with the ULTIMA X5000 Gas Monitor, X5000 Junction Box, and JB5000 Junction Box:

Product / Listing Title	Company	Certificate Number
ULTIMA XIR Plus Combustible Gas Sensors	MSA Innovation LLC dba MSA - The Safety Company	FM20US0060X
Digital Sensor (Combustible)	General Monitors Inc an MSA Company	FM20US0039X
Digital Sensor (Toxic)	General Monitors Inc an MSA Company	FM20US0039X
Digital Sensor (Oxygen)	General Monitors Inc an MSA Company	FM20US0039X

Accessories - The following accessories are included in the Approval:

CALKIT1	Calibration Kit

Junction Boxes Approved with the ULTIMA X5000:

10179509	ULTIMA X5000 Junction Box; Stainless Steel, ¾" NPT
10179511	ULTIMA X5000 Junction Box; Stainless Steel, M25
10179513	ULTIMA X5000 Junction Box; Aluminum, ¾" NPT
10213892	JB5000 Junction Box; Stainless Steel, ¾" NPT
10213896	JB5000 Junction Box; Stainless Steel, M25

Specific Conditions of Use:

X5000 Gas Monitor:

1. Seal installed within 18 in (450 mm) of the enclosure.
2. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned

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with a damp cloth.

3. This fixed equipment is exclusively designed for field mounting in the vertical orientation with restrictions placed around the conduit entry locations permitted for connection of both the Digital Sensor and ULTIMA XIR Plus IR sensors. The equipment is subject to the installation and orientation requirements defined in the product manual.
4. The flameproof joints shall not be repaired.
5. The Ultima X5000Gas Monitor complies with FM 6320, ANSI/FM 60079-29-1, FM 6340, ANSI/ISA-92.00.01, and ANSI/ISA-92.04.01 only when connected to a gas sensor that also has been evaluated to the appropriate standard listed on the certificate.
6. Certification does not cover Isolated Modbus, Wireless HART, HART or Bluetooth used for toxic, oxygen or combustible gas performance. The Isolated Modbus, Wireless HART, HART or Bluetooth may only be used for data collection or record keeping with regard to toxic, oxygen and combustible gas detection.
7. To minimize the risk of electrostatic charge, provisions shall be made for adequate grounding and equipment shall be installed in such a manner so that accidental discharge shall not occur.
8. The High Alarm relay can be programmed for a latching or non-latching operation with a deliberate manual action to reset. When the High Alarm relay is set to non-latching the output must be connected to an integrated or auxiliary system with the means of latching and resetting incorporated into these systems.
9. The ULTIMA XIR Plus Ingress Protection rating is exclusively based upon the installation instruction for orientation specified in the operating manual.

Junction Box:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned with a damp cloth.
2. This fixed equipment is exclusively designed for field mounting in the vertical orientation with restrictions placed around the conduit entry locations permitted for connection of the Digital Sensor and the ULTIMA XIR Plus infrared (IR) sensor. The equipment is subject to the installation and orientation requirements defined in the product manual.
3. The flameproof joints shall not be repaired.

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ULTIMA XIR Plus Combustible Gas Sensors

Equipment Ratings:

Suitable for installation in Class I, Division 1, Groups A, B, C, D, T6; Class II, Division 1, 2, Groups E, F, G, Class III, T6; Nonincendive for Class I, Division 2, Groups A, B, C, D, T6; Flameproof for use in Class I, Zone 1, AEx db IIC T6 Gb; Non-Sparking as Class I, Zone 2, AEx nA IIC T6 Gc Ta = -40°C to +60°C Hazardous (Classified) Locations, indoor and outdoor (Type 4X/IP66).

Markings:

CL I, Div 1 Group A, B, C, D; T6
CL I, Div 2 Group A, B, C, D; T6
CL II, Div 1,2 Group E, F, G; CL III; T6
CL I, Zone 1 AEx db IIC T6 Gb
CL I, Zone 2 AEx nA IIC T6 Gc
Ta = -40°C to +60°C; Type 4X, IP66
60079-29-1

Description of Equipment:

The ULTIMA XIR Plus Combustible Gas Sensor consists of a two-piece stainless steel enclosure with lens assembly and includes a ¾" NPT thread for connection to the X5000 Transmitter. Remote connection requires the X5000 Junction Box or JB5000 Junction Box.

Model Code Options:

A-5K-SENS-a-b-c-d-e ULTIMA XIR Plus Infrared Combustible Sensor
a is for Gas Type:
See Model Code column of Sensor Table
b is for material type:
0 = Stainless Steel
c is for listed Approval:
M = FM
d is for Sensor Body Thread Type:
0 = No Sensor Body
1 = ¾ NPT
2 = M25
e is for Advanced Option:
0 = none

Sensor Table:

Model Code	Gas	Range
AA	Methane - CH_4	0-100% LFL – 5% vol

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Model Code	Gas	Range
AB	Propane - C_3H_8	0-100% LFL – 2.1% vol
AC	Methane - CH_4	0-100% LFL –4.4% vol
AD	Propane - C_3H_8	0-100% LFL – 1.7% vol
AK	Acetone - C_3H_6O	0-100% LFL – 2.5% vol
AS	Benzene - C_6H_6	0-100% LFL – 1.2% vol
BY	Ethanol - C_2H_6O	0-100% LFL – 3.3% vol
CD	Ethylene - C_2H_4	0-100% LFL – 2.7% vol
CF	Ethylene Oxide - C_2H_4O	0-100% LFL – 3.0% vol
CJ	Hexane - C_6H_{14}	0-100% LFL – 1.1% vol
CP	Isopropanol - C_3H_8O	0-100% LFL – 2.0% vol
DJ	Methyl Methacrylate - $C_5H_8O_2$	0-100% LFL – 1.7% vol
FJ	Ethanol - C_2H_6O	0-100% LFL – 3.1% vol
FL	Ethylene - C_2H_4	0-100% LFL – 2.3% vol
FM	Ethylene Oxide - C_2H_4O	0-100% LFL – 2.6% vol
FP	Hexane - C_6H_{14}	0-100% LFL – 1.0% vol

Specifications:

Sensor Type:	IR
Sampling Type:	Diffusion
Accuracy:	±5% F.S.
Response Time:	t(90) ≤ 60 s
Operating Temperature:	-40°C to +60°C
Storage Temperature:	-40°C to +60°C
Relative Humidity:	5 to 90% RH, non-condensing

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Firmware:	NXP Microprocessor: 3.52 ST Microprocessor: 4.0.8

Specific Conditions of Use:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned with a damp cloth.
2. The flameproof joints shall not be repaired.
3. The ULTIMA XIR Plus infrared (IR) sensor is provided with a ¾“ NPT thread and shall only be connected to a suitably certified junction box or instrument for the hazardous area of installation and thereby provide Ex protection for the flying lead connections. The installation to the certified enclosure shall be with five fully engaged threads, tightened wrench-tight.
4. The ULTIMA XIR Plus shall only be installed for external connection to suitably certified equipment (transmitters) providing transient protection set at a maximum transient overvoltage of 119 V (140% of 85 Vpeak). The operating manual shall reinforce this installation requirement
5. The ULTIMA XIR Plus infrared (IR) sensor shall only be fitted to enclosures having a maximum reference pressure of 13.5 bars.
6. In combustible gas detection performance applications, the appropriate ULTIMA® XIR Plus model number shall only be used to construct the ULTIMA X5000 Gas Monitor fixed gas detection system; mounted onto either the ULTIMA X5000 transmitter or ULTIMA X5000 Junction Box enclosures and receive power and control from the transmitter.
7. The Ingress Protection rating is exclusively based upon the installation instruction for orientation specified in the operating manual.
8. Guidance for Installation of fixed gas detection systems are set out in ANSI/UL 60079-29-2 which has not been covered in the scope of this assessment.
9. Guidance for functional safety of fixed gas detection systems are set out in ANSI/UL 60079-29-3 which has not been covered in the scope of this assessment.
10. The XIR Plus Sensor enclosure with Sensor Guard (opaque cover) or enclosure must fully contain the optical radiation and comply with a suitable type of protection as required by the involved EPL, complying with one of the following conditions:

    - An enclosure for which protection regarding ingress of an explosive dust atmosphere is provided, such as dust protection "t" enclosures" (ANSI/UL 60079-31), or
    - An enclosure that provides a minimum ingress protection of IP 6X and where no internal absorbers are to be expected and complying with “Tests of enclosures” in ANSI/UL 60079-0.

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com