IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx FMG 21.0019X**

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Certificate history:
Issue 2 (2024-04-04)
Issue 1 (2022-08-17)
Issue 0 (2022-07-22)

Status: **Current**

Issue No: 3

Date of Issue: 2024-11-19

Applicant: **General Monitors Inc**
16782 Von Karman Ave.
Unit 14
Irvine, CA 92606
United States of America

Equipment: **S5000 Gas Monitor Gas Detection System**

Optional accessory:

Type of Protection: **Flameproof, Dust Protection by Enclosure, Nonsparking, and Gas Detector Performance**

Marking: Refer to certificate annex for full marking.

Approved for issue on behalf of the IECEx Certification Body: **J. E. Marquedant**

Position: **VP, Manager - Electrical Systems**

Signature:
(for printed version)

Date:
(for printed version)

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Certificate issued by:

FM Approvals LLC
One Technology Way
Norwood MA 02062
United States of America

FM Approvals
Member of the FM Global Group

IECEx Certificate of Conformity

Manufacturer: **General Monitors Inc**
16782 Von Karman Ave.
Unit 14
Irvine, CA 92606
United States of America

Manufacturing locations: **General Monitors (Ireland) Ltd**
Ballybrit Business Park
Galway
Ireland

MSA - THE SAFETY COMPANY
1000 Cranberry Woods Dr
Cranberry Township
Pennsylvania 16066-5296
United States of America

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Edition:7.0	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-1:2014 Edition:7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-15:2010 Edition:4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
IEC 60079-29-1:2016 Edition:2.0	Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases
IEC 60079-31:2013 Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

US/FMG/ExTR21.0023/00 US/FMG/ExTR21.0023/01 US/FMG/ExTR21.0023/02

Quality Assessment Reports:

FR/INE/QAR08.0011/14 GB/CML/QAR22.0009/01 US/UL/QAR10.0004/11

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The S5000 Gas Monitor fixed gas detection system is designed to measure specified percentage volumes of combustible gases or a variety of toxic gases or oxygen. The system comprises of an S5000 transmitter base unit and an optional S5000 Junction Box or JB5000 Junction Box. The S5000 Gas Monitor supports two Digital Sensors, one ULTIMA XIR Plus sensor and one Digital Sensor simultaneously, or one IR400 point IR detector and one Digital Sensor simultaneously. The device only supports one passive sensor, either a combustible catalytic bead sensor for combustible gases or a metal oxide semiconductor (MOS) sensor for H2S.

Refer to the Annex for additional information.

SPECIFIC CONDITIONS OF USE: YES as shown below:
See Annex

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Equipment (continued):

See Annex

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

The equipment was updated to replace microprocessors for the S5000 Gas Monitor, the Toxic Digital Sensor, and the XIR Plus Sensor (for MSA Innovation LLC). In addition, firmware was updated for the equipment. Performance testing was required to verify that the hardware and firmware changes conform to the applicable standards. Testing and assessment for the Nonsparking Hazardous Location standard was performed. The changes do not affect the Flameproof or Protection by Enclosure methods of protection. The description of equipment and the structure of the equipment listing in the ExTR Annex and in the certificate were updated to better detail the equipment approved, the specifications of the equipment, and which sensors are permitted for use in the system. The listing for the Digital Sensors was separated from the S5000 Gas Monitor listing. The humidity range of the combustible digital sensors was increased to 95 %RH.

Annex:

IECEx FMG 21.0019X Issue 3 Annex.pdf

Annex to: **IECEx FMG 21.0019X Issue 3**

Applicant: **General Monitors Inc**

Apparatus: **S5000 Gas Monitor Gas Detection System**

Marking:

1. S5000 Gas Monitor

Ex db IIC T5 Gb (WITH CEMENTED WINDOW JOINT)
Ex db IIB+H2 T5 Gb (WITH NON-CEMENTED, FLANGED WINDOW JOINT)
Ex nA nC IIC T4 Gc
Ex tb IIIC T85°C Db
Ta = -55°C to +75°C
60079-29-1
IP66

WHEN USING PASSIVE SINTERED SENSORS
Ex db IIC T4 Gb (WITH CEMENTED WINDOW JOINT)
Ex db IIB+H2 T4 Gb (WITH NON-CEMENTED, FLANGED WINDOW JOINT)
Ta = -40°C to +70°C

2. S5000 Junction Box

Ex db IIC T6 Gb (WITH CEMENTED WINDOW JOINT)
Ex db IIB+H2 T6 Gb (WITH NON-CEMENTED, FLANGED WINDOW JOINT)
Ex nA IIC T6 Gc
Ex tb IIIC T85°C Db
Ta = -55°C to +75°C
60079-29-1
IP66

WHEN USING PASSIVE SINTERED SENSORS
Ex db IIC T4 Gb (WITH CEMENTED WINDOW JOINT)
Ex db IIB+H2 T4 Gb (WITH NON-CEMENTED, FLANGED WINDOW JOINT)
Ta = -40°C to +70°C

3. Digital Sensor (With Sintered Flame Arrestor)

Ex db IIC T5 Gb
Ex tb IIIC T85°C Db
Ex db nA IIC T5 Gc
Ta = -55°C to +60°C
60079-29-1
IP65

4. Digital Sensor (With Sintered Flame Arrestor)

Ex nA IIC T5 Gc
Ta = -55°C to +60°C
IP65

Annex to: **IECEx FMG 21.0019X Issue 3**

Applicant: **General Monitors Inc**

Apparatus: **S5000 Gas Monitor Gas Detection System**

Description of Equipment:

The S5000 Gas Monitor consists of an S5000 Transmitter and an optional S5000 Junction Box or JB5000 Junction Box. The S5000 Gas Monitor supports two Digital Sensors, one ULTIMA XIR Plus sensor and one Digital Sensor simultaneously, or one IR400 point IR detector and one Digital Sensor simultaneously. The device only supports one passive sintered sensor, either a combustible catalytic bead sensor for combustible gases or a metal oxide semiconductor (MOS) sensor for H2S. The sensors may be connected integral to the transmitter or remote via the S5000 or JB5000 Junction Box.

The S5000 Gas Monitor enclosure consists of a single 316 stainless steel compartment enclosure and is provided with ¾" NPT threaded entries and a certified adapter is supplied for M25 entries which can be fitted with the sensors described below or suitably certified cable entry devices or blanking plugs.
The S5000 Junction Boxes are the remote mounting units of the S5000 Gas Monitor fixed gas detection system. The S5000 enclosures are provided with either ¾" NPT or M25 threaded entries, and a certified adapter can be supplied for M25 entries which can be fitted with sensors approved for use with the S5000 Gas Monitor fixed gas detection system, suitably certified cable entry devices, or blanking plugs. The equipment enclosure has been separately tested against the requirements of EN 60529 and meets IP66.

The S5000 Digital Sensor (with sintered flame arrestor) consists of a sensor body and a combustible gas, toxic gas, or oxygen sensing element. The sintered flame arrestor is located in the lower sensor element housing assembly, which has a fine thread pattern machined in to mate to the thread pattern of the upper sensor body assembly. The Digital Sensors are constructed of stainless steel and include a ¾" NPT thread for connection to the S5000 Transmitter. Remote connection requires the S5000 Junction Box or JB5000 Junction Box.

Model Code Options:

1. <u>S5000 Gas Monitor</u>

S5000-a-b-c-d-e-f-g-h, S5000 Gas Monitor

a is for Enclosure Material:
- 2 = Stainless Steel – IIB+H2 (with flanged, non-cemented window joint)
- 3 = Stainless Steel – IIC (with cemented window joint)

b is for Outputs:
- 0 = Bluetooth/ Modbus/ HART 1.25 mA
- 1 = Bluetooth/ Modbus/ HART 3.5 mA
- 2 = Bluetooth/ Modbus/ HART 1.25 mA/ RELAYS
- 3 = Bluetooth/ Modbus/ HART 3.5 mA/ RELAYS
- 4 = No Bluetooth/ Modbus/ HART 1.25 mA
- 5 = No Bluetooth/ Modbus/ HART 3.5 mA
- 6 = No Bluetooth/ Modbus/ HART 1.25 mA/ RELAYS
- 7 = No Bluetooth/ Modbus/ HART 3.5 mA/ RELAYS

c is for Relay State:
- 0 = No Relays
- 1 = Latch Alarm / Non-Latch Warn De-Energized
- 2 = Latch Alarm / Non-Latch Warn Energized
- 3 = Latch Alarm / Latch Warn De-Energized
- 4 = Latch Alarm / Latch Warn Energized
- 5 = Non-Latch Alarm / Non-Latch Warn De-Energized
- 6 = Non-Latch Alarm / Non-Latch Warn Energized
- 7 = Non-Latch Alarm / Latch Warn De-Energized
- 8 = Non-Latch Alarm / Latch Warn Energized

d is for Agency Approval:
- 1 = ATEX/IECEx/UKEX

e is for Custom Features:

00 = None (standard)
01 = Stainless Steel Tag
02 = HART Off (Factory Setting, customer can enable later)
03 = Stainless Steel Tag / Hart Off (Factory Setting, customer can enable later)
04 = UI Assy –1 with Bluetooth Disabled
05 = Stainless Steel Tag / UI Assy –1 with Bluetooth Disabled
06 = BCM Modbus (Isolated)
07 = SS Tag/BCM Modbus (Isolated)

fff is for Sensor 1 selection: See Approved Sensors table below
Cxx = Passive Sintered Sensor (Combustible)
Dxx = Digital Sensor
Mxx = Passive Sintered Sensor (Toxic)
Rxx = IR Series Combustible Sensor
xx = Ultima XIR Plus Sensor

ggg is for Sensor 2 selection: See Approved Sensors table below
000 = No Sensor or Sensor Body
Dxx = Digital Sensor

h is for Paint Options:
0 = no paint
1 = Gray
2 = Blue
3 = Yellow
4 = White

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 Sensor Table for response time
Supply Parameters:	12-30 Vdc, 13.7W maximum
Operating Temperature:	-55°C to +75°C -40°C to +70°C (when installed with passive sintered sensors as identified in the Sensor Table)
Storage Temperature:	-50°C to +85°C
Relative Humidity:	5 to 95% RH non-condensing
Measurement Signal:	Two 4-20mA, LED Display
Alarms:	LED Display, Relay (5A 30Vdc / 250Vac)
Ingress Protection:	IP66
Firmware:	NXP Microprocessor: 2.00.0065 ST Microprocessor: 4.01.0011

Annex to: **IECEx FMG 21.0019X Issue 3**

Applicant: **General Monitors Inc**

Apparatus: **S5000 Gas Monitor Gas Detection System**

Sensor Table - Sensors permitted for use with the S5000 Gas Monitor:

Product / Listing Title	Model Code	Gas / Description	Range	Certificate Number
Ultima XIR Plus Combustible Gas Sensors	See Sensor Table	See Sensor Table	See Sensor Table	IECEx FMG 21.0021X
Digital Sensors	See Sensor Table	See Sensor Table	See Sensor Table	IECEx FMG 21.0019X
IR400	R00	No Sensor	N/A	N/A
IR400-1065	R43	Methane - CH_4	0-100% LFL	N/A
IR400-1067	R44	Propane - C_3H_8	0-100% LFL	N/A
IR400-2593	R45*	Hexane - C_6H_{14}	0-100% LFL	N/A
IR400-2611	R46*	Pentane - C_5H_{12}	0-100% LFL	N/A
IR400-1069	R47*	Butane - C_4H_{10}	0-100% LFL	N/A
IR400-1108	R48*	Ethane - C_2H_6	0-100% LFL	N/A
IR400-1533	R50*	Ethylene - C_2H_4	0-100% LFL	N/A
Passive Sintered Sensors				
Universal Gas HC Sensor (Combustible)	C00	No Sensor	N/A	N/A
11159-1L	C07	General Purpose	0-100% LFL	N/A
11159-2L	C08	General Purpose, High Temperature	0-100% LFL	N/A
11159-8L	C09	General Purpose	0-20% LFL	N/A
11159-8	C10	General Purpose	0-20% LFL	N/A
11159-1	C11	General Purpose	0-100% LFL	N/A
11159-2	C12	General Purpose, High Temperature	0-100% LFL	N/A
Universal Gas H_2S Sensor (Toxic)	M00*	No Sensor	N/A	N/A
51457-1L	M11*	Hydrogen Sulfide - H_2S	0-100 ppm	N/A
51457-5L	M12*	Hydrogen Sulfide - H_2S	0-50 ppm	N/A
51457-9L	M13*	Hydrogen Sulfide - H_2S	0-20 ppm	N/A
51457-1	M14*	Hydrogen Sulfide - H_2S	0-100 ppm	N/A
51457-5	M15*	Hydrogen Sulfide - H_2S	0-50 ppm	N/A
51457-9	M16*	Hydrogen Sulfide - H_2S	0-20 ppm	N/A

*Denotes sensors that do not have performance certification to IEC 60079-29-1.

Accessories - The following accessories are included in the Approval:

CALKIT1	Calibration Kit for Digital Gas Sensors & ULTIMA XIR Plus Sensors
1400270	Calibration Kit for IR400 Point IR Detector

2. S5000 Junction Boxes

Model Reference	Description
324240-1, 324240-5, 324240-9, 324240-13, 324240-17	S5000 Junction Box; Stainless Steel, (with non-cemented, flanged window joint)
324240-2, 324240-6, 324240-10, 324240-14, 324240-18	S5000 Junction Box; Aluminum, (with non-cemented, flanged window joint)
324240-3, 324240-7, 324240-11, 324240-15, 324240-19	S5000 Junction Box; Stainless Steel, (with cemented window joint)
324240-4, 324240-8, 324240-12, 324240-16, 324240-20	S5000 Junction Box; Aluminum, (with cemented window joint)

3. Digital Sensors (With Sintered Flame Arrestor)

A-5K-SENS-aa-b-c-d-e, Digital Sensor (With Sintered Flame Arrestor)

a is for Gas Type:
See Sensor Table below

b is for material type:
0 = Stainless Steel
1 = Aluminum

c is for listed Approval:
A = IECEx/ATEX/UKEX

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	Approved Gas	Range
00	No Sensor or Sensor Body (transmitter only)	N/A
01	No Sensor (Sensor Body with blank element and sintered flame arrestor)	N/A
60	Methane - CH_4	0-100% LFL – 5.0% vol

Model Code	Approved Gas	Range
61	Propane - C_3H_8	0-100% LFL – 2.1% vol
62	Heptane - C_7H_{16}	0-100% LFL – 1.05% vol
63	Nonane - C_9H_{20}	0-100% LFL – 0.8% vol
64	Hydrogen - H_2	0-100% LFL – 4.0% vol
65	Methane - CH_4	0-100% LFL – 4.4% vol
66	Propane - C_3H_8	0-100% LFL – 1.7% vol
67	Heptane - C_7H_{16}	0-100% LFL – 0.85% vol
68	Nonane - C_9H_{20}	0-100% LFL – 0.7% vol
XX	Any two digit letter representing: - Combustible Type gas sensor with sintered flame arrestor, not verified by FM Approvals for the specific flammable gas for performance to IEC 60079-29-1, or - Oxygen or Toxic sensor with sintered flame arrestor, not verified by FM Approvals for performance.	N/A

Specifications:

Sensor Type:	Catalytic Bead
Sampling Type:	Diffusion
Accuracy:	±5% F.S.
Response Time:	t(90) ≤ 60 s
Operating Temperature:	-50°C to +60°C
Storage Temperature:	-40°C to +60°C
Relative Humidity:	10 to 95% RH, non-condensing
Firmware:	1.0.1

4. Digital Sensors (Without Sintered Flame Arrestor)

A-5K-SENS-aa-b-c-d-e, Digital Sensor (Without Sintered Flame Arrestor)

a is for Gas Type:
See Sensor Table below

b is for material type:
0 = Stainless Steel
1 = Aluminum

c is for listed Approval:
A = IECEx/ATEX/UKEX

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	Approved Gas	Range
00	No Sensor or Sensor Body (transmitter only)	N/A
02	No Sensor (Sensor Body with blank element, without a sintered flame arrestor)	N/A
XX	Any two digit letter representing a gas sensor without a sintered flame arrestor, not verified for performance.	N/A

Specifications:

Sensor Type:	Electrochemical
Sampling Type:	Diffusion
Accuracy:	N/A
Response Time:	N/A
Operating Temperature:	-50°C to +60°C
Storage Temperature:	-40°C to +60°C
Relative Humidity:	5 to 95% RH, non-condensing
Firmware:	1.0.1

Annex to: **IECEx FMG 21.0019X Issue 3**

Applicant: **General Monitors Inc**

Apparatus: **S5000 Gas Monitor Gas Detection System**

Specific Conditions of Use:

1. S5000 Gas Monitor

1. For any sensors not specifically identified as having performance testing, the sensors shall require additional evaluation if used within a safety related system.
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 with a damp cloth.
3. This fixed equipment apparatus is exclusively designed for field mounting in the vertical orientation with restrictions placed around the conduit entry locations permitted for connection of the Digital Sensors, ULTIMA XIR Plus sensors, and passive 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. It is recommended to end users to seek guidance provided in EN 60079-29-2 for installation, use and maintenance of gas detectors for flammable gases and other applicable gases.
6. Guidance for functional safety of fixed gas detection systems are set out in EN 60079-29-3 which has not been covered in the scope of this assessment.
7. The user shall comply with the requirements given in the manufacturer's user documentation in regard to all relevant functional safety aspects such as application of use, installation out of hazardous areas, operation, maintenance, proof tests, maximum ratings, environmental conditions, and repair.
8. Selection of this equipment for use in safety functions, configuration, overall validation, maintenance and repair shall only be carried out by competent personnel, observing all the manufacturer's conditions and recommendations in the user documentation.
9. The safety related device must be functioning and powered independently of any control devices required for operation.
10. Further assessment shall be required when the safety device is combined with specific Equipment under Control and before the safety device is used to control risks of explosion.

2. S5000 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. The flameproof joints shall not be repaired.

3. Digital Sensors

1. For any sensors not specifically identified as having performance testing, the sensors shall require additional evaluation if used within a safety related system.
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 with a damp cloth.
3. The Digital Sensor shall be connected directly to a suitably certified junction box or instrument for the hazardous area of installation and thereby provide Ex protection for the flying lead connections.
4. For combustible gas detection performance applications, the appropriate Digital Sensor model number shall only be used to construct the S5000 Gas Monitor fixed gas detection system; mounted onto either the S5000 transmitter, S5000 Junction Box enclosure, or JB5000 Junction Box enclosure and receive power and control from the transmitter.
5. The Ingress Protection rating is exclusively based upon the installation instruction for orientation specified in the operating manual.
6. The Digital Sensor shall only be fitted to enclosures having a maximum reference pressure of 34.4 bars or lower. It is recommended to end users to seek guidance provided in EN 60079-29-2 for installation, use and maintenance of gas detectors for flammable gases and other applicable gases.

7. Guidance for functional safety of fixed gas detection systems are set out in EN 60079-29-3 which has not been covered in the scope of this assessment
8. The user shall comply with the requirements given in the manufacturer's user documentation in regard to all relevant functional safety aspects such as application of use, installation out of hazardous areas, operation, maintenance, proof tests, maximum ratings, environmental conditions, and repair.
9. Selection of this equipment for use in safety functions, configuration, overall validation, maintenance and repair shall only be carried out by competent personnel, observing all the manufacturer's conditions and recommendations in the user documentation.
10. The safety related device must be functioning and powered independently of any control devices required for operation.
11. Further assessment shall be required when the safety device is combined with specific Equipment under Control and before the safety device is used to control risks of explosion.

Full Certificate change history

Issue 0

Issue 1 – This issue introduced the following changes:

1. Deleted theCoding/System Limitations column, as this information is redundant from the markings.
2. Updated specific conditions of use to align with US/CA/ATEX/UKEX text.

Issue 2 – Updated General Monitors Ireland QAR.

Issue 3 – The equipment was updated to replace microprocessors for the S5000 Gas Monitor, the Toxic Digital Sensor, and the XIR Plus Sensor (for MSA Innovation LLC). In addition, firmware was updated to the equipment. The description of equipment and the structure of the equipment listing were updated to better detail the equipment approved, the specifications of the equipment, and which sensors are permitted for use in the system. The listing for the Digital Sensors was separated from the S5000 Gas Monitor listing. The humidity range for the Combustible Digital Sensors was increased to 95 %RH.