

FUNCTIONAL SAFETY MANUAL
Gassonic Observer-H and Observer-i
Ultrasonic Gas Leak Detector

GASSONIC



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Part No. MANOBSAFETY Revision B

This manual describes the functional safety related information for the installation, operation, configuration, and maintenance of the Gassonic Observer-H and Gassonic Observer-i ultrasonic gas leak detectors. This manual does not describe installation requirements in hazardous locations.

For complete information regarding performance, installation, operation, maintenance, and specifications of the Gassonic Observer-H and Gassonic Observer-i, please refer to the product instruction manuals.

Gassonic, along with General Monitors, is part of MSA Safety. It is our mission to benefit society by providing safety solutions through industry-leading products, services, and systems that save lives and protect capital resources from the dangers of hazardous flames, gases, and vapors.

The safety product you have purchased should be handled carefully, and installed and maintained in accordance with the associated product instruction manual. Remember, this product is for your safety.



WARNING: TOXIC, COMBUSTIBLE, AND FLAMMABLE GASES AND VAPORS ARE VERY DANGEROUS. USE EXTREME CAUTION WHEN THESE HAZARDS ARE PRESENT.

INTRODUCTION

General Description

The Gassonic Observer-H and Gassonic Observer-i are microphone based ultrasonic gas leak detectors that detect gas leaks by sensing the airborne ultrasound emitted from leaking gas at high pressure and responds with a 4-20 mA analog output, proportional to the acoustic sound pressure level (SPL) in dB, or optional relay output. Ultrasound emitted from a gas leak is not affected by wind direction or diluted as is a gas cloud. This makes the Gassonic Observer-H and Gassonic Observer-i the optimal choice for instant and reliable fixed gas leak detection in outdoor applications. The Gassonic Observer-H and Gassonic Observer-i are regarded as a Type B field devices per IEC 61508.

The safety function of the Gassonic Observer-H and Gassonic Observer-i do not include:

- RS-485 or Modbus digital communication
- HART communication

RS-485, Modbus, and HART communication are typically used for field device setup, diagnostics, and troubleshooting. Carefully observe requirements for interfacing in hazardous locations. RS-485, Modbus, and HART communication are non-interfering functions and do not interrupt the safety critical function of the detector.

INSTALLATION

NOTE: Power should remain disconnected until all other wiring connections are made.

For complete information on the installation of the Gassonic Observer-H and Gassonic Observer-i acoustic detectors refer to the product instruction manual.

Installation and Maintenance must be carried out by suitably skilled and competent personnel only. Before opening and working on the Gassonic Observer-H and Gassonic Observer-i in hazardous locations, be sure that power is off.

Install and maintain all hazardous area equipment in accordance with the relevant regulations and practices of the country concerned.

Detector Location Considerations

The Gassonic Observer-H and Gassonic Observer-i do not have to be in contact with the leaking gas itself. It will detect the gas leak instantly even if the gas is carried away by wind or diluted in the air. However, factors that should be considered when locating an acoustic detector are:

- Background noise levels
- Correct mounting
- Physical obstructions

Additionally, the unit should be mounted free from shock and vibration and convenient for visual inspection and cleaning. Though the detectors are RFI resistant, they should not be located near radio transmitters, high magnetic or electrical fields, or in areas with similar interference.

No special or additional detector mounting, wiring, power, or tool requirements exist beyond the standard installation practices documented in the product instruction manual for the Gassonic Observer-H and Gassonic Observer-i.



WARNING: The inner six screws for the Gassonic Observer-H and Gassonic Observer-i should not be unscrewed and the bottom compartments should not be opened. The warranty will be void if the bottom part is opened.

OPERATION AND MAINTENANCE

For complete operation, configuration, and maintenance information for the Gassonic Observer-H and Gassonic Observer-i acoustic detectors refer to the product instruction manual.

Before connecting a unit, check to make sure power is turned off. Before power up check all wiring connections.

The Gassonic Observer-H and Gassonic Observer-i perform internal diagnostics on critical faults every two seconds, an acoustic self-test every 15 minutes, and a memory check every 24 hours. Upon detection of a fault the unit will respond with tripping the fault relay and outputting fault level analog output current per Table 2, below.

Upon the detection of an acoustic fault the detector trips the fault relay and outputs an analog output pulse for 5 seconds per Table 2. After the pulse the unit returns to normal detection mode and is able to detect gas however, the detection capability may be reduced due to the acoustic fault. Refer to the product instruction manual for suggestions to clear the fault.

NOTE: During the acoustic self-test the unit is off-line for 8 seconds. In the unlikely event that an acoustic fault occurs immediately after the acoustic test, indication of this fault will occur 16.5 minutes later, at the completion of the next acoustic test.

High readings of ultrasonic sound level may indicate an explosive concentration of gas at the sensor. A subsequent fall in the ultrasonic sound level does not imply that safe working conditions have been restored.

The Gassonic Observer-H and Gassonic Observer-i are tested and calibrated as part of the manufacturing process. However, prior to use, it is good practice to establish and follow a regular maintenance schedule. This can be done using the Gassonic 1701 test and calibration unit. Carefully follow test and calibration procedures described in this section of the product instruction manual.

Refer to the Troubleshooting Section in the product instruction manual in the event of a fault condition. In addition, spare parts should be on-hand to maintain the four hour repair time. Refer to the Replacement Parts section of the instruction manual for more information.

SPECIFICATIONS

Table 1 and Table 2 list specifications for the Gassonic Observer-H and Gassonic Observer-i. For a complete list of specifications refer to the Gassonic Observer-H and Gassonic Observer-i product instruction manuals.

	Gassonic Observer-H	Gassonic Observer-i
Instruction Manual P/N	MANOBSERVER-H	MANOBSERVER i
Operating Temp Range:	-40°C to 60°C	-40°C to 60°C
Humidity Range:	0 to 95% RH	10 to 95% RH
Input Power:	15 VDC – 36 VDC	15 VDC – 36 VDC

Table 1 – Environmental/Electrical Specifications

Analog Output Level	Gassonic Observer-H Mode	Gassonic Observer-i Mode
0 mA	Start Up	Start Up
0, 1.25 mA, or 3.5 mA	Fault	Fault
1 mA, 1.25 mA, or 3.5 mA pulse for 5 seconds	Acoustic Error	Acoustic Error
3.0 mA or 3.5 mA	Set Up	Set Up
4 – 20 mA	58 – 104 dB	Classic Mode: 4 – 20 mA: 40 – 120 dB (u) ANN Mode: 4 – 12 mA: 40 – 120 dB (u), 16 mA: Warning, 20 mA: Alarm
> 20 mA	Over range	Over range

Table 2 – Analog Output Specifications for the Gassonic Observer-H and Gassonic Observer-i (600Ω Max)

CERTIFICATIONS AND FAILURE RATE DATA

The Gassonic Observer-H and Gassonic Observer-i have gone through reliability and functional safety assessments, which have resulted in the acoustic detector being certified to IEC 61508 Parts 1, 2, and 3, by FM Approvals. The reliability assessment is a failure rate prediction that assumes an average temperature of 40°C and an environmental factor equivalent to Ground Fixed. It is assumed that the detectors will be installed in a Safety Instrumented System operating in a Low Demand environment per IEC 61508. Tables 3a and 3b list the SIL parameters for the Gassonic Observer-H and Gassonic Observer-i, respectively.

Parameter	Gassonic Observer-H Analog Output (Source)	Gassonic Observer-H Analog Output (Sink)	Gassonic Observer-H Relay Output
FM Certificate	3041763	3041763	3041763
Mean Time Between Failure (MTBF)	13 years	13 years	13 years
λ_{DD} (Fails per hour)	4.07E-6	4.17E-6	4.3E-6
λ_{DU} (Fails per hour)	6.12E-8	6.16E-8	2.88E-7
SFF	>99%	>99%	97%
SIL*	3	3	2
Diagnostic Test Interval	2 seconds (critical faults) 15 minutes (acoustic self-test) 24 hours (memory check)		
Typical Response Time	<1 second**		
PFDavg1oo1***	2.8E-4	2.9E-4	1.3E-3

Table 3a – SIL Parameters for Gassonic Observer-H

* Hardware Fault Tolerance = 0

** Does not include user-selectable delays

*** PFDavg1oo1 assumes a 4 hour repair time and 1 year proof test interval.

Parameter	Gassonic Observer-i Analog Output (Source)	Gassonic Observer-i Analog Output (Sink)	Gassonic Observer-i Relay Output
FM Certificate	3048799	3048799	3048799
Mean Time Between Failure (MTBF)	8.8 years	8.8 years	8.8 years
λ_{DD} (Fails per hour)	3.77E-6	3.87E-6	4E-6
λ_{DU} (Fails per hour)	7.04E-8	7.08E-8	2.97E-7
SFF	>99%	>99%	97%
SIL*	3	3	2
Diagnostic Test Interval	2 seconds (critical faults) 15 minutes (acoustic self-test) 24 hours (memory check)		
Typical Response Time	<1 second**		
PFDavg1oo1***	3.23E-04	3.25E-4	1.32E-3

Table 3b – SIL Parameters for Gassonic Observer-i

* Hardware Fault Tolerance = 0

** Does not include user-selectable delays

*** PFDavg1oo1 assumes a 4 hour repair time and 1 year proof test interval.

Agency Approvals

The Gassonic Observer-H and Gassonic Observer-i are certified by ATEX, IECEx, FM, CSA and IEC 61508 (per FM Approvals).



ADDENDUM Product Disposal Considerations

This product may contain hazardous and/or toxic substances.

EU Member states shall dispose according to WEEE regulations. For further General Monitors' product WEEE disposal information please visit

<http://www.generalmonitors.com/faqs>

All other countries or states: please dispose of in accordance with existing federal, state and local environmental control regulations.