ULTRASONIC GAS LEAK DETECTOR

GASSONIC OBSERVER

ULTRASONIC GAS LEAK DETECTOR

APPLICATIONS (EXAMPLES)

- Offshore and Onshore Oil and Gas Installations
- Petrochemical Processing Plants
- Gas Pipeline Compressor Stations
- Gas Storage Facilities
- Hydrogen gas leak detection

FEATURES

- Explosion proof, EEXd design
- Instant detection of pressurized gas leaks (from Ø 2 mm)
- Not sensitive to changing wind directions and gas dilution
- Senssonic™ self test technology ensuring failsafe operation
- Advanced microphone technology ensuring well-defined and wide detection coverage (up to 20 meter radius at a leak rate of 0.1 kg/s)
- Versatile interface outputs such as 4-20 mA analogue, alarm/fault relay, and RS485
- Full AISI 316L stainless steel enclosure ensuring corrosion resistance in harsh environmental conditions
- ATEX, UL/ULC, IEC Ex, and GGTN K (Kasakhstan) certified

SENSSONIC™ – INTEGRATED ACOUSTIC INTEGRITY TEST

SENSSONIC™

To eliminate the risk of un-revealed failures, Gassonic A/S has developed the patented acoustic integrity test Senssonic™. In intervals, an external piezo transducer transmits an acoustic test signal to verify that the microphone is within the correct tolerances.

INTRODUCTION

The Gassonic Observer is the most advanced fixed ultrasonic gas leak detector in the market. It is based on robust and proven microphone technology and designed for long and failsafe operation in extreme environmental conditions. The detector detects gas leaks by sensing the airborne ultrasound emitted from leaking gas at high pressure.

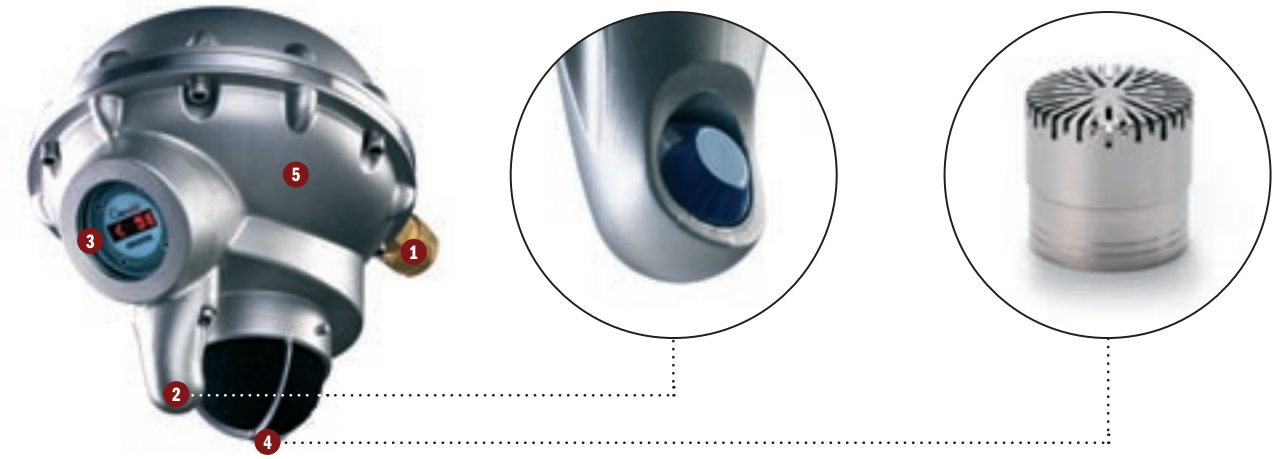
Traditional gas detection systems (infrared and catalytic point and open path gas detection) rely on a concentration build up of the leaking gas to enable detection. These systems work fairly well in closed or indoor installations, but in outdoor, ventilated areas such as offshore platforms, many gas leaks can go undetected for long periods of time. The problem is, that due to the nature of these systems, the gas needs to be in physical contact with the sensor or within the path of an infrared light beam before it can be detected. In outdoor installations, this is very difficult to ensure as the leaking gases are rapidly diluted or blown away by the wind.

Instead of ”sniffing” the gas and relying on an LEL concentration level, the Gassonic Observer instantly detects the distinct ultrasonic noise emitted by the leaking gas. Ultrasound emitted from a gas leak is not affected by the wind direction or diluted as is a gas cloud. This makes the Gassonic Observer the optimal choice for instant and reliable fixed gas leak detection in outdoor applications.

GASSONIC

THE GASSONIC OBSERVER

The Gassonic Observer will ensure gas leak detection at the speed of sound. The detector does not need gas to accumulate or come into physical contact with the detector. As a consequence, it may reduce risk and prevent hazards from escalating into catastrophic scenarios. The Gassonic Observer is a failsafe ultrasonic gas leak detector with integrated Senssonic™ self-test technology to avoid un-revealed failures from occurring. This advanced ultrasonic gas leak detector is designed for long and reliable installation in extreme environmental conditions.



1 ELECTRICAL INTERFACES

- Analogue 4–20 mA for real-time readout of ultrasonic sound level and error/fault conditions
- Digital RS485 interface with full two-way addressable communication
- Separate alarm relay and fault/error relay output

2 SENSSONIC™ ACOUSTIC INTEGRITY TEST

Senssonic™ integrated acoustic integrity test for continuous self-test of the detector. In intervals the test sound source emits an acoustic test signal, which is picked up by the microphone and verified by the detector. If the test signal fails, an error will be raised in the detector's electrical interfaces. Senssonic™ is the only technology to ensure regular self-test within well-defined tolerances.

3 INTEGRATED INTERACTIVE DISPLAY

- Real-time readout of ultrasonic sound level
- Readout of alarm and error conditions
- Externally operated with magnet stick for detector set-up in EEX hazardous areas

4 ROBUST MICROPHONE TECHNOLOGY

The microphone is protected by a wind screen. The Gassonic Observer is based on customized stainless steel microphones designed to withstand rough handling and corrosive environments. They are manufactured with the highest precision to ensure tolerances of less than one micron. The microphone technology has demonstrated extraordinary long term stability in all weather conditions. This conclusion is based on more than 10 years of field experiences with installation of Gassonic detectors in environmentally challenging surroundings, including installations in remote desert areas (Oman) and Arctic locations (Russia). The microphone is protected by a wind screen.

5 INTEGRATED CABLE TERMINATION

Integrated cable termination. No extra junction box needed.

DETECTION COVERAGE

The Gassonic Observer will instantly raise an alarm when it picks up the noise generated by leaking pressurized gas. The Gassonic Observer will not wait for the gas to accumulate into a potentially dangerous cloud, but reacts immediately upon a gas release.

Unlike other gas detection technologies the Gassonic Observer offers the ability to calculate the detection coverage. When calculating the coverage of the Gassonic Observer, three factors must be considered:
1) Leak size
2) Gas pressure
3) Ultrasonic background noise level

GAS LEAK RATE

The gas leak rate is an indicator of the amount of gas that will escape through a leak. This is very important as it is a measure of how rapidly a potentially dangerous gas cloud will accumulate from the leak. The gas leak rate is influenced by the leak size and the gas pressure. For a hydrocarbon gas leak, 0.1 kg/s is typically used as the performance standard for leak detection. This is considered a small leak.

ULTRASONIC BACKGROUND NOISE LEVEL

The Gassonic Observer filters out low-frequency background noise below 25 kHz. However, a few noise sources may generate ultrasonic noise above 25 kHz. To prevent this from triggering the detector, a background noise survey of the plant should be performed using an ultrasonic mapping meter.

A background noise survey makes it possible to adjust the sensitivity of the individual detector ensuring that it is not affected by the ultrasonic background noise in the area it is covering.

COMMISSIONING AND VERIFICATION

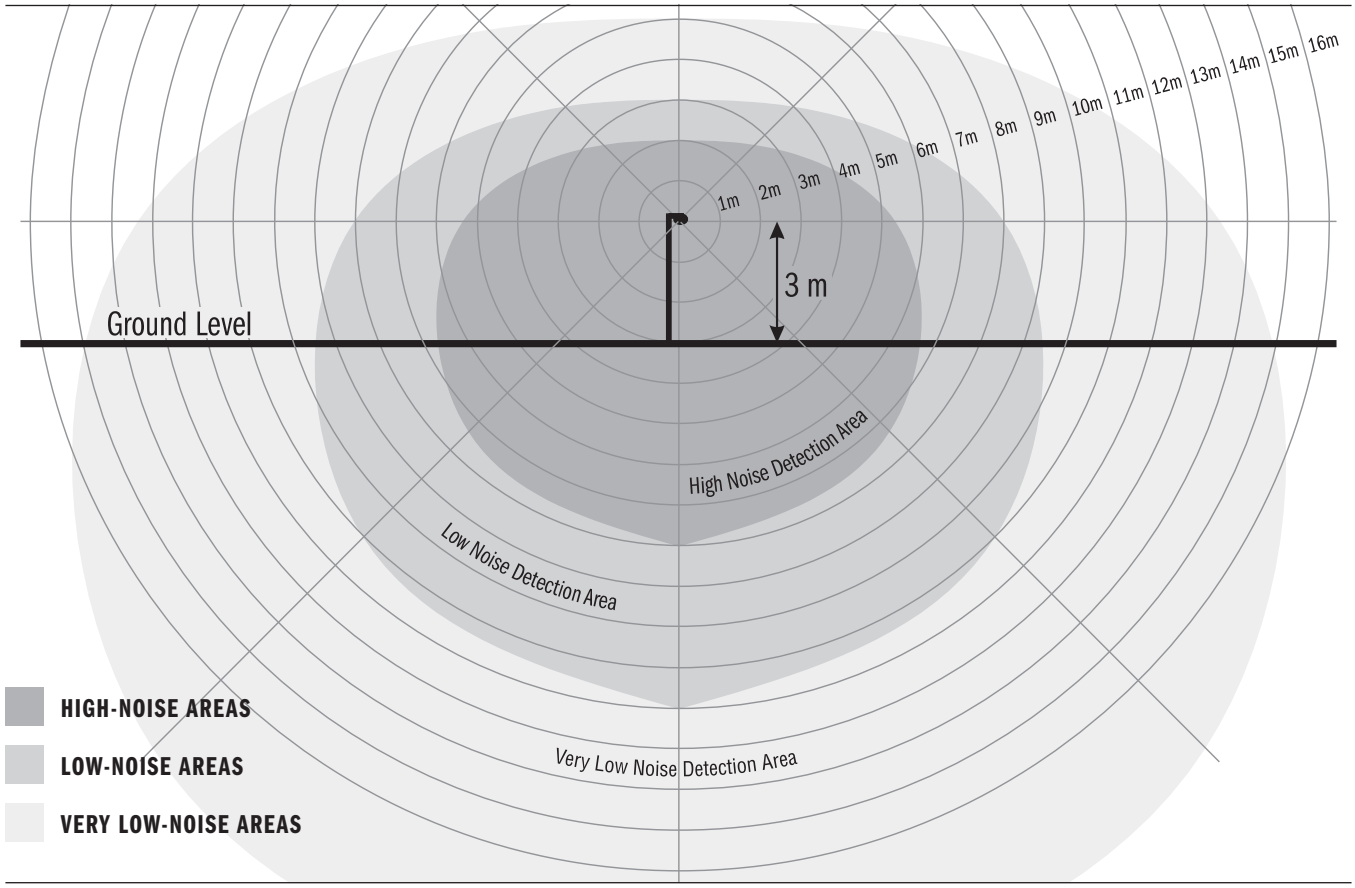
During commissioning real gas leak simulation can be performed to verify the actual detection coverage area. This is done by means of nitrogen gas.

COVERAGE CHARACTERISTICS

The detection coverage of the Gassonic Observer is determined by the ultrasonic noise levels in the area of installation. Experience has shown that most process environments can be divided into three overall noise levels. This is illustrated in the image on the next page.

The detection coverage characteristics are based on live tests and show the minimum coverage of the Gassonic Observer detector in areas without solid physical obstructions between the detector and the leak. Gassonic A/S can be consulted on further instructions related to installation.

DETECTION COVERAGE CHARACTERISTICS



HIGH-NOISE AREAS

In "high-noise areas" (background noise < 78dB), the trigger level must be set at 84 dB. This corresponds to a detection radius of 5-8 metres.

Typical areas:

- Turbo compressor areas
- Completely open offshore weather deck
- Next to very noisy machinery

LOW-NOISE AREAS

In "low-noise areas" (background noise < 68dB), the trigger level must be set at 74 dB. This corresponds to a detection radius of 9-12 metres.

Typical areas:

- Areas with no machinery
- Areas with low frequency machine made noise

VERY LOW-NOISE AREAS

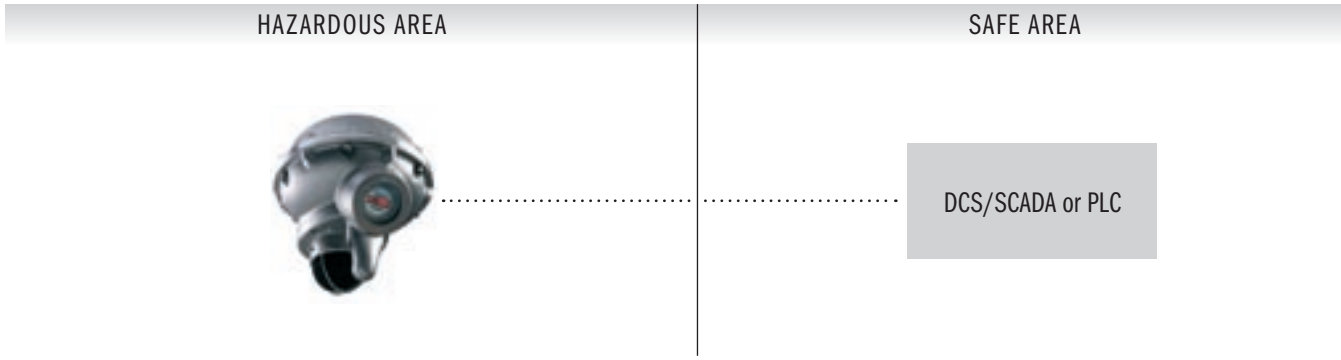
In "very low-noise areas" (background noise < 58dB), the trigger level must be set at 64 dB. This corresponds to a detection radius of 13-20 metres.

Typical areas:

- Onshore wellhead areas in calm environment
- Salt dome gas storage facilities in calm environment

INSTALLATION PRACTICE

The Gassonic Observer can be installed on its own or in conjunction with other detection equipment. The detector can be connected directly to the plant control system (DCS, PL/PLC, Fire&Gas, SCADA). This is illustrated below. The Gassonic Observer is explosion proof by design and does therefore not require current limiting safety barriers. It can be installed in a 3-wire configuration as a minimum.



MAINTENANCE

The Gassonic Observer is practically maintenance free and does not require regular calibration. However, most plant regulations require regular tests of the equipment. The Gassonic 1701 is a customized portable test and calibration unit, which can be used for onsite testing and calibration of the Gassonic detectors. Besides, the integrated Senssonic™ self-test technology will indicate if the microphone sensor status is incorrect.

GASSONIC PRODUCT RANGE – COMPARISON OF ULTRASONIC GAS LEAK DETECTOR MODELS

FEATURE	Gassonic MM0100	Gassonic Surveyor	Gassonic Observer
Design philosophy	EEXi	EEXi	EEXd
Hazardous area certification	ATEX, UL/ULC	ATEX, IECEx	ATEX, UL/ULC, IECEx, GGTN
Acoustic self-test (Senssonic™)			✓
Digital communication RS485			✓
Interface 4 – 20 mA		✓	✓
Interface: Fault relay		✓	✓
Interface: Alarm relay	✓	✓	✓
Alarm trigger level steps	10 dB	5 dB	5 dB
Internal alarm delay setting	15, 30, 60, 120, 240, 480 sec.	0 to 150 sec. in 10 sec . steps	0 to 600 sec. in 10 sec. steps
User interface		LED indications	Full interactive display
Cable connection	Fixed 6 metres flying lead cable	Integrated cable connection compartment	Integrated cable connection compartment
Detector set up	Internal	Internal	External
Coverage @ 0.1 kg/sec	5-20 metres	5-20 metres	5-20 metres
Field testing (w/ Gassonic 1701)	✓	✓	✓
Field calibration (w/ Gassonic 1701)		✓	✓
Dynamic range	44-104 dB	44-104 dB	58-104 dB
Material	Fiberglas reinforced duroplastic	Stainless steel	Stainless steel
Temperature range	-40 to +55	-40 to +75	-40 to +60

BASIC SPECIFICATIONS FOR THE GASSONIC OBSERVER

GENERAL DESCRIPTION

Detector type . . . . . Ultrasonic Gas Leak Detector for fixed installations
Sensor technology . . . . . SS Microphone technology
Acoustic self-test . . . . . Integrated Senssonic™ technology
Detector frequency range . . . . . 25 kHz – 70 kHz
Dynamic range . . . . . 58 dB – 104 dB SPL
Response time . . . . . Instant
Detection coverage (leak rate 0.1 kg/s) . . . 5-20 meter radius

Test sound source

Test frequency . . . . . 40 kHz ± 3 kHz
Sound pressure . . . . . 100 dB ± 7 dB, 60 mm from the sound source

CERTIFICATIONS

ATEX . . . . . Ex II 2G EEx d e ib IIB + H_2 T6
UL/ULC . . . Flame proof enclosure. CLASS 1 DIV 1 Groups BCD
IEC . . . . . IECEx ULD 06.0010X Ex d e ib IIB+H2 T6
GGTN K (Kasakhstan) . . . . . Permit to use
GOST R (Russia). . . . . Pending

ENVIRONMENTAL DATA

Ingress protection IP66
Operational temperature range . . . . . -40°C to 60°C
Humidity . . . . . 0 to 100% relative humidity

POWER REQUIREMENTS

Input voltage . . . . . 15–30 V DC
Maximum current consumption . . . . . 250 mA

OUTPUT SIGNALS

Analogue interface

0 mA . . . . . No power / Low supply voltage
1 mA . . . . . Acoustic error
3 mA . . . . . Unit inhibit
4 – 20 mA . . . . . 58 dB – 104 dB SPL

Relay 1 . . . . . Error/fault indication
Relay 2 . . . . . Indication of alarm trigger level
Digital interface . . . . . RS 485 half duplex addressable.

RF EMISSION AND IMMUNITY

Tested according to

General electrical safety. EN61010-1
RF emission EN61000-6-4
RF immunity. EN61000-6-2

MTBF

GB (Ground Benign) . . . . . 477167 hours or 54 years
GF (Ground Fixed) . . . . . 148019 hours or 17 years
NS (Naval Sheltered) . . . . . 92301 hours or 11 years

DIMENSIONS

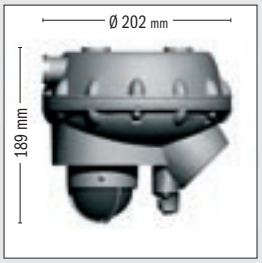
Ø 202 x 189 mm (7.95 x 7.44 in)
Two gland/conduit entries: M20 x 1.5

CONSTRUCTION

Stainless steel AISI 316L
Weight: 7.5 Kg

PATENT

Patented in Europe
Patent pending in the U.S.



ORDERING INFORMATION

ACCESSORIES

Portable test and calibration unit: Gassonic 1701
Magnet stick: UC5352
Mounting bracket: UA1352A
Wind screen: DS0592A
Torque wrench: EZ1000

FIELD REPLACEABLE SPAREPARTS

Spare microphone: MM4190
Spare transducer tower: UD0131

CONSULTING SERVICES

Onsite sound mapping survey and detector allocation
Onsite commissioning and personnel training

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