Product Data Sheet
00813-0100-3003, Rev AA
August 2021

GDU-Incus

Ultrasonic Gas Leak Detector

Wide area coverage for pressurized gas leaks

The GDU-Incus is an advanced gas leak detector that uses four sensitive acoustic sensors to monitor wide areas for the ultrasound generated from pressurized gas releases.

Ideally suited for monitoring ventilated outdoor applications, the GDU-Incus has been engineered to withstand extreme conditions. Detection response is rapid and unaffected by inclement weather, wind, leak direction, or gas dilution.

- Instantaneous response to all gas leaks (toxic, combustible, or inert).
- Operates in extreme temperatures.
- Automated electronic self-test offers failsafe operation.
- Widest area of coverage through four independent sensors.
- 4-20 mA analog or stepped and HART® communication protocol.
- Certified worldwide for hazardous locations.
- Programmable alarm settings screen intermittent unwanted alarm sources.

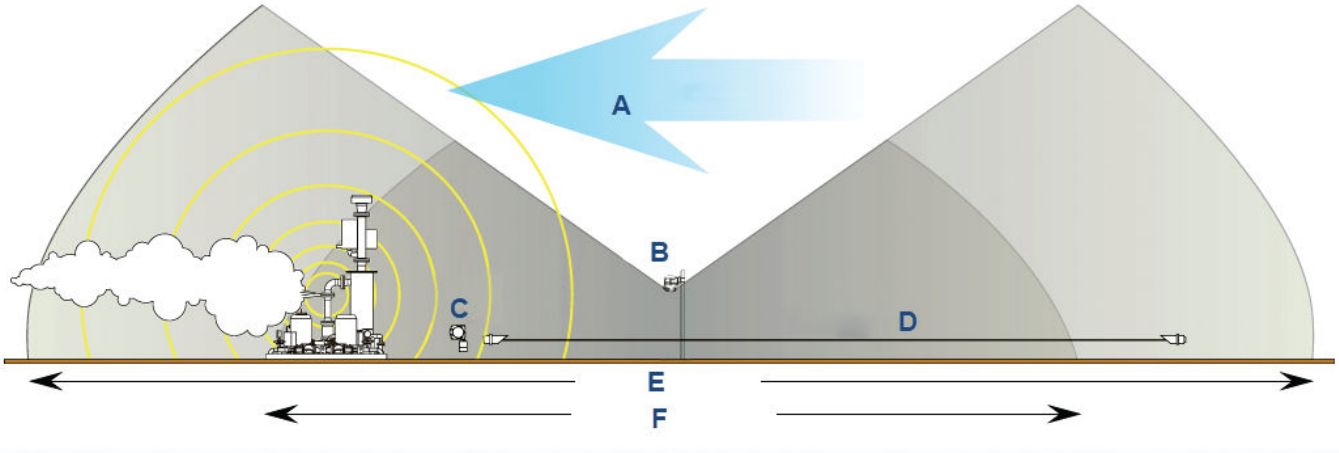
EMERSON

Ultrasonic detection overview

Ultrasonic (acoustic) gas leak detection technology functions through the constant monitoring of wide areas by advanced acoustic sensors specially tuned to process ultrasound emitted from pressurized gas leaks.

Ultrasonic gas leak detectors do not have to wait until a hazardous gas concentration has accumulated or the gas cloud has made physical contact with a sensor. In addition, the response is instantaneous for all gas types.

Figure 1: Ultrasonic Leak Detection



A. *Wind direction*
B. *Ultrasonic gas leak detector*
C. *Point gas detector*
D. *Open path (line of sight) gas detection*
E. *40 M - Low ultrasonic background noise*
F. *20 M - High ultrasonic background noise*

Simply put, the ultrasonic gas leak detector only triggers an alarm when inaudible ultrasound is detected (between 25 khz and 100 khz), which is only produced with the release of highly pressurized gas.

This makes for reliable and efficient detection; since ultrasonic gas leak detectors are immune to poisoning, they never require field calibration, and all intermittent sources of background ultrasound noises may be ignored by time delay settings.

The GDU-Incus detects gas leaks at the speed of sound while providing wide area coverage. It is unaffected by inclement weather, wind, leak detection, and gas dilution or stratification. When used with Emerson's point gas and optical flame detectors, a complete and comprehensive safety system is ensured.

Contents

Features

Four multi-directional sensor heads

Quad sensing heads provide the widest overall detection range available on the market. The sensing heads are independent, and the detector output is based on the highest ultrasound measured by any one head. If one or more sensing heads fail, complete coverage is not lost.

Field-proven ultrasonic sensor principle

GDU-Incus responds to the ultrasound produced by pressurized gas releases, a technology proven with hundreds of detectors installed worldwide.

Sealed sensor housing

Piezoceramic sensor heads have no moving parts and can therefore be completely sealed against moisture, corrosive atmosphere, and industrial contaminants.

Sensor design: they just keep working

Each sensor is completely free from moving parts and will not age, drift, or ever need to be replaced under normal operating conditions. The sensors provide maintenance-free protection with proven reliability.

Continuous self-test ensures instrument health

Electronic self-test checks the detector every 320 ms by sending an amplitude signal through sensing circuitry. The sensor suffers no loss of detection while in test mode in contrast to those based on diaphragm microphones.

Built for extreme conditions

The GDU-Incus is designed to operate at -40 °F (-40 °C) to 185 °F (85 °C) and may be supplied for monitoring areas of regard at -67 °F (-55 °C).

Corrosion resistant stainless steel housing is standard; detectors are ingress rated to IP66/67 or Type 4X.

Spare parts and accessories

Part number	Description
GDU-01-TT	GDU test transmitter, battery-operated, and charger **⚠ WARNING** This device will need a hot work permit.
GDU-01-TT-CHARGER	18 V 0.83 A standard charger for the GDU test transmitter

Part number	Description
GDU-02-360-KIT	GDU Incus 2 in (51 mm) pipe U-bolt kit
GDU-02-370-KIT	4 in (102 mm) pipe mount bracket kit. Material: stainless steel
GDU-02-TCFK	Terminal fastener kit
GDU-02-TCL	Terminal cover O-ring lower for Incus
GDU-02-TCU	Terminal cover O-ring upper for Incus
GDU-INCUS-MTBR-S	GDU Incus wrap-around mounting bracket, 316 stainless steel

Specifications

Table 1: General

Self-test	Continuous electronic check of sensor integrity

Table 2: Output signal

Analog	■ 4-20 mA: Normal operation range ■ 0-2 mA: Fault outputs
Two form C relay contacts	■ Configurable fault relay ■ Configurable alarm relay
HART® protocol	Supplied as standard

Table 3: Performance

Detection frequency range	25 khz to 100 khz
Operation modes	■ Stepped analog signal (bi-state: 4 mA = no alarm, 12 mA = alarm) ■ 4-20 mA = 40-200 dB ■ 4-20 mA = 40-120 dB (standard)
Response time	Instantaneous (less than 1 second with HART outputs; alarm delay via 1 second variable increments - customer programmable)
Detection coverage	7 ft (2 m) to 65 ft (20 m)radius (leak pressure, size, and background level dependent). Greater distances may be achieved subject to application consultation.

Table 4: Electrical

Operating range voltage	24 Vac (15 to 30 Vdc)
Power consumption	Standard unit: 6 W during normal operation Heated unit: 1.5 A at maximum display brightness with heaters drawing maximum current (at 131 °F (55 °C))
Cable entry	■ Signal entry: 1 in (25 mm) x 0.75 in (19 mm) NPT ■ Double entry: 2 x M20 (not available for FM certified units)

Table 5: Environmental

Storage temperature	-40 °F (-40 °C) to 185 °F (85 °C)
Operating temperature	■ Standard unit: -40 °F (-40 °C) to 185 °F (85 °C) ■ Heated unit: -67 °F (-55 °C) to 185 °F (85 °C) Available for ATEX low temperature and EAC certification options only.
Relative humidity	0 to 95% RH non-condensing
Enclosure material	AISI 316 stainless steel
Mounting bracket (included)	AISI 316 stainless steel
Ingress protection	Rated IP66/IP67 and Type 4X to withstand harsh environments
Weight (with bracket)	Approximately 40 lb (18 kg)

Warranty

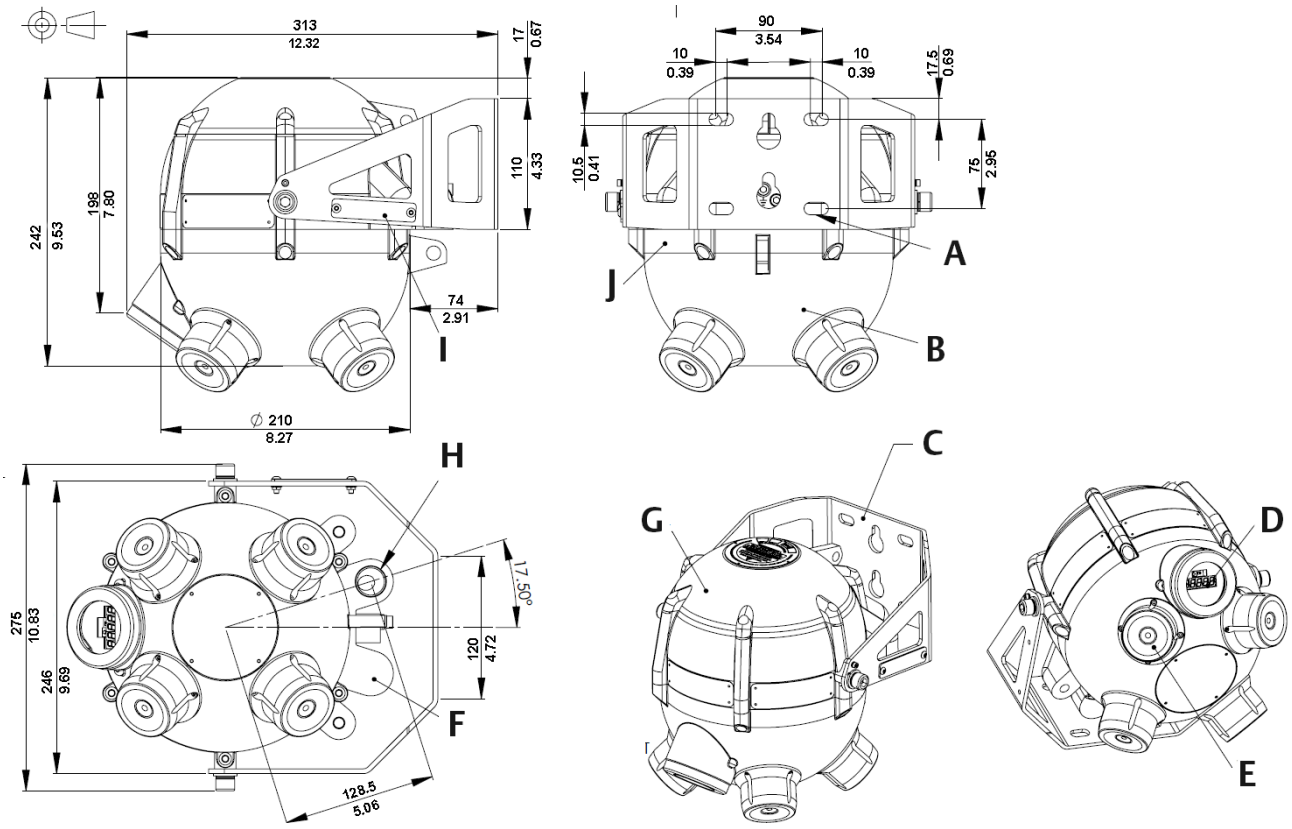
18 months after shipment or 12 months after installation, whichever comes first.

Dimensions

Refer to Figure 2 for the dimensions of the GDU-Incus.

Note
Dimensions are in millimeters (top number) and inches (bottom number).

Figure 2: Dimensions



A. Suitable for M10 or equivalent
B. Main body enclosure (housing)
C. Standard mounting bracket shown. U-bolt kits (for pole mounting) and a "DNV" certified bracket are available.
D. Display
E. Sensor head (four positions)
F. Customer cable entry position available for dual entry/relay output (ATEX/IECEx units only)
G. Terminal compartment housing
H. Customer cable entry M20 standard. M250.5 in (13 mm) NPT or 0.75 in (19.0 mm) NPT alternative
I. Identification tag (sold separately) can be mounted on either side of bracket using holes provided.
J. Top body enclosure (housing)

Product certifications

Rev 0.1

Ordinary location certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by FM Approvals, a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

Installing equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

FM

Explosionproof with Intrinsically Safe sensors

Flameproof with Intrinsically Safe sensors

Certificate	3043275
Standards	FM Class 3600: 2011, FM Class 3610: 2010, FM Class 3615: 2006, FM Class 3810: 2005, ANSI/NEMA 250: 1991, ANSI/ISA 60079-0: 2009, ANSI/ISA 60079-1: 2009, ANSI/ISA 60079-11: 2011
Markings	Class 1, Div 1, Groups B,C, and D, T4 AEx d ib Class 1, Zone 1, Group IIB+H2, T4 Type 4X -40 °F (-40 °C) to 185 °F (85 °C)

Canada

FM

Explosionproof with Intrinsically Safe sensors

Flameproof with Intrinsically Safe sensors

Certificate	3043275C
Standards	FM Class 3600: 2011, FM Class 3610: 2010, FM Class 3615: 2006, FM Class 3810: 2005, ANSI/NEMA 250: 1991, ANSI/ISA 60079-0: 2009, ANSI/ISA 60079-1: 2009, ANSI/ISA 60079-11: 2011
Markings	Class 1, Div 1, Groups B,C, and D, T4 Ex d ib Class 1, Zone 1, Group IIB+H2, T4 Type 4X -40 °F (-40 °C) to 185 °F (85 °C)

Europe

Intertek

Intrinsically Safe and Explosionproof/Flameproof

Certificate	ITS09ATEX1683X
Standards	EN IEC 60079-0: 2018, EN 60079-1: 2014, EN 60079-11: 2012
Markings	Ex II 2 G Ex db ib IIB+H_2 T4 Gb Model Option: -A -40 °F (-40 °C) ≤ Ta ≤185 °F (85 °C) Model Option: -B -67 °F (-55 °C) ≤ Ta ≤ 185 °F (85 °C)

Special Conditions for Safe Use (X)

1. As flameproof joint lengths exceed the relevant minimum dimensions given in IEC 60079-1: 2014 Clauses 5.2 to 5.5, information on the dimensions of the flameproof joints shall be obtained from the listed certified schedule drawings; contact the manufacturer.
2. When temperature at the cable entry could exceed 158 °F (70 °C) or 176 °F (80 °C) at the branching point, suitably rated cable must be selected based on the T-Class/T max.
3. Minimum fastener yield stress required ≥ 450 Moa (property class A4-70).

International

IECEx

Certificate	IECEXITS10.0004X
Standards	IEC 60079-0: 2017, IEC 60079-1: 2014-06, IEC 60079-11: 2011
Markings	T amb XX °C to 185 °F (85 °C) XX is -67 °F (-55 °C) when fitted with heating device XX is -40 °F (-40 °C) when no heating device is fitted IECEx ITS 10.0004X

Special Conditions for Safe Use (X)

1. As flameproof joint lengths exceed the relevant minimum dimensions given in IEC 60079-1: 2014 Clauses 5.2 to 5.5, information on the dimensions of the flameproof joints shall be obtained from the listed certified schedule drawings; contact the manufacturer.
2. When temperature at the cable entry could exceed 158 °F (70 °C) or 176 °F (80 °C) at the branching point, suitably rated cable must be selected based on the T-Class/T max.
3. Minimum fastener yield stress required ≥ 450 Moa (property class A4-70).

Brazil

Inmetro

Intrinsically Safe and Explosionproof/Flameproof

Certificate	UL-BR 15.0063X

Standards	ABNT NBR IEC 60079-0: 2008 + Errata 1: 2011 ABNT NBR IEC 60079-1: 2009 + Errata 1: 2011 ABNT NBR IEC 60079-11: 2009
Markings	Ex db ib IIB+H2 T4 Gb [(1)] ≤ Ta ≤ 185 °F (85 °C)

Special Conditions for Safe Use (X)

1. No modifications must be made to the flamepaths of the unit without consultation of the drawings listed in ExTR cover sheets.
2. When temperature at the cable entry could exceed 158 °F (70 °C) or 176 °F (80 °C) at the branching point, suitably rated cable must be selected based on the T-Class/T max.
3. Minimum fastener yield stress required ≥ 450 Moa (property class A4-70).
4. Suitably approved cable glands only to be used.
5. Any unused entries must be blanked using suitably approved blanking plugs.
6. As flameproof joint lengths exceed the relevant minimum dimensions given in ABNT NBR IEC 60079-1: 2009, information on the dimensions of the flameproof joints shall be obtained from the listed certified schedule drawings; contact the manufacturer.

Republic of Korea

Explosionproof/Flameproof with Intrinsically Safe output

Certificate	21-KA4BO-0134X
Markings	Ex db ib IIB+H_2 T4 Gb

Special Conditions for Safe Use (X)

1. As flameproof joint lengths exceed the relevant minimum dimensions given in IEC 60079-1: 2014 Clauses 5.2 to 5.5, information on the dimensions of the flameproof joints shall be obtained from the listed certified schedule drawings; contact the manufacturer.
2. When temperature at the cable entry could exceed 158 °F (70 °C) or 176 °F (80 °C) at the branching point, suitably rated cable must be selected based on the T-Class/T max.
3. Minimum fastener yield stress required ≥ 450 Moa (property class A4-70).

Additional certifications

SBS

American Bureau of Shipping (ABS) Type Approval

Certificate	18-1744209-1-PDA
Intended use	Marine and offshore applications.

(1) -67 °F (-55 °C) when fitted with heating device. -40 °F (-40 °C) when no heating device is fitted.

00813-0100-3003
Rev. AA
August 2021

For more information: **www.emerson.com**