AENOR

USER MANUAL

REMOTE SENSOR

S/3-2

Included

fg fidegas

Manufactured by: C.A.E., S.L. • P. Ubarburu 12 • 20014 San Sebastián - España

Prepared and approved in Revision 26 on 04/2024 by the Quality Department. It consists of 16 pages.

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WARNINGS

Read carefully the user manual before commissioning or operating.

No gas detection system can be replaced by a proper installation and maintenance of gas appliances and boilers and must be installed by a competent person or an authorized installer.

Instructions for using the Test Kit FIDEGAS® is supplied with the equipment for verifying the proper operation and warning of false conclusions that can result from the use of other methods, such as gas lighters, flammable gases or vapours, etc.

- This equipment should not be opened in hazardous area when powered. The certification does not allow the users to change settings, periodic calibration can only be performed by the manufacturer or by an authorized service. In the event of non-compliance certification is invalidated.
- Avoid cleaning near the remote sensor with detergents containing bioalcohols, industrial solvents or brighteners with silicones in suspension. To clean the detector use a cloth dampened with clean water only.
- During the construction, installation or maintenance of the installations, remote sensors must be protected so as to prevent the sensor from damage resulting from work such as welding or paints and should be installed as late as possible, but always before there is a risk of the presence of gas or vapor. If remote sensors are already installed, during the works they must be protected by an airtight packaging and clearly pointed out as not in operation.
- Remote sensors must be protected from vibration, against the risk of mechanical impact and direct exposure to sunlight.

To ensure the tightness of the device it is necessary to seal the threaded connections.
Recommended sealants:

- Thread sealant (e.g. Loctite 577).
- General lubricating lithium grease (e.g. Lubekrafft Ref. 15393)

- Do not submerge the remotr sensor in the water or other liquid under any circunstances
- It is recommended to send the equipment to the manufacturer or authorized service center for calibration at the end of life or when ir does not work with the supplied FIDEGAS® Test Kit.
- Note that the failure to observe these basic precautions can lead to equipment malfunction, the manufacturer is not liable.

LIMITATIONS

- Catalytic sensors are sensitive to gases and vapors in general. Contact us for more information.
- The sensitivity of a catalytic sensor can be altered by exposure to inhibitors or contaminants such as silicone, halogen, sulfur, acetylene, chlorine compounds and heavy metals. When these inhibitors are permanently present, it is recommended to use gas detectors with infrared sensors immunized against such contaminants and inhibitors. Do not use cables containing silicone for installation.
- This equipment is designed to operate in atmospheres with values lower than 100% LEL of the gas which are calibrated and can be affected in industrial processes enriched atmospheres or depleted oxygen (O2).
- The FIDEGAS® gas detection system composed of Central Ref. CA, Remote Sensor Ref. S/3-2, S3 cable and Test Kit is certified to work together.

WARRANTY

- Warranty three (3) years is given by C.A.E., S.L., manufacturer of FIDEGAS®, against any manufacturing defect from the date of purchase and cease to be effective if this equipment is not installed, used and maintained according to the guidelines stated in the User Manual.
- This warranty becomes void in cases where it is found that:
  a) The equipment has been repaired, tampered with or external accessories have been added, with the involvement of people outside our Authorized Service Center.
  b) It has suffered any impact or damage.
  c) The serial number has been altered or modified and does not match with our records.
- C.A.E., S.L., manufacturer of FIDEGAS®, is not liable for damages that may arise as result of misuse of the equipment.
- All the necessary efforts have been made to ensure the accuracy of the information provided in this document. However, C.A.E., S.L., manufacturer of FIDEGAS®, reserves the right to make improvements or modifications to this equipment without prior notice.
- Any failure to follow these instructions automatically voids the warranty and the expenses are responsibility of the user.

QUALITY CONTROL

This product is designed, manufactured and commercialised under the honesty ocurrent regulatory compliance, controlled within a Quality Management System certified according to ISO 9001:2015 and audited annually by AENOR.

The Laboratorio Oficial J.M. Madariaga (LOM) is a notified organism (Nº 0163) that certifies that C.A.E., S.L. manufacturer of FIDEGAS® has a quality control system of the production that complies with specified in Annex VII of Directive 2014/34/EU.

OPTIONAL EQUIPMENT

REFERENCE	OPTIONAL EQUIPAMENT
Consult	Module Display MIR
03645	Gas collector cone for sensor S/3 and S/2
03665	LS3 support for S/3 sensors
03932	Relay module MS3-RE V1.1
04056	Anti-splash tulip
Consult	Test Kit Fidegas®
01314	S/3 mask with activated carbon filter

SUPPORTED PRODUCTS

- Ref. CA Control Units
- Ref. CS4 Control Units
- GPRS Telecontrol
- MIR V3 Remote Indicator

DIRECTIVE 2014/34/UE (ATEX)

Classification of hazardous areas

ZONE	Definition
0	A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapor or mist is present continuously or for long periods or frequently
1	A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapor or mist is likely to occur in normal operation occasionally.
2	A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only

Equipment category

Categoríy	Definition	Zone (s) of use
1	Equipment with a “very high” degree of security	0
2	Equipment with a “high” degree of security	1 and 2
3	Equipment with a “normal” degree of security	2

Group of gases

Group	Reference gas	Definition
I	Methane	Equipment intended for use in mines susceptible to firedamp, above and below ground.
IIA	Propane	Equipment intended for use in surface above ground industries
IIB	Ethylene	
IIC	Hydrogen	

Temperature Classification

The equipment shall be selected so that the ignition temperature of the material is not reached during operation.

Explosive Limit

The relationship between the % LEL (Lower Explosive Limit) and the % v/v (volumen/volumen) varies from gas to another. Examples extracted from EN ISO/IEC 80079-20-1:2019

Gas	Formula	100% LEL
Methane	CH_4	4,4 % v/v
Hydrogen	H_2	4,0 % v/v
Butane	C_4H_{10}	1,4 % v/v
Propane	C_3H_8	1,7 % v/v

1. GENERAL

FIDEGAS® Ref. S/3-2 gas remote sensors (GRS) for flammable gases are intended to be used for Natural Gas/ Methane, Butane/Propane and Hydrogen monitoring in commercial, industrial and non-residential safety applications. Its 4-20 mA output is proportional to the flammable gas concentration present in air. Offers high linearity and accuracy and can be used with equipment with 4-20 mA inputs or with FIDEGAS® Ref. CA-2, CA-4 or CA-8 control units. Serial or parallel connection between remote sensors is not allowed.

Once connected to equipment with 4-20 mA inputs or to a FIDEGAS® control unit, they work as an approximately linear gas detection transmitter according to the specifications of only alarm equipment, providing a 4-20 mA output proportional to the concentration of present gas in the range 0-100% LEL (lower explosive limit) of the gas for which the sensor is adjusted: Natural Gas (calibration gas Methane), Butane/ propane (calibration gas Propane) and Hydrogen (calibration gas Hydrogen). This signal can be converted into voltage for its reading. At switching on the power, a 5 minute warming up time is needed for the sensor to stabilize. During this time, the signal can pass from the maximum to the minimum before it stabilizes in the value of gas concentration that could be present.

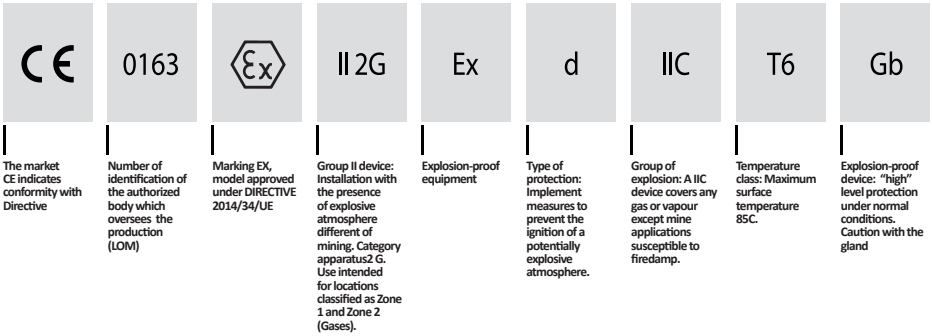
2. CERTIFICATION AND MARKING

C.A.E.,S.L. declares that flammable GRS FIDEGAS® Ref.S/3-2 is certified and marked according to all the requirements of the EN 60079-29-1 standard, under which the equipment has been certified:

- 2014/34/UE(ATEX) directive and standards: EN 60079-29-1, EN 60079-0 and EN 60079-1

Marking labels are placed at the bottom side of the enclosure of the equipment and allows the user to identify all the main characteristics of the equipment.

Figure 1: Identification tags and marking (Serial Nº and Gas specified in paragraph 7)



* GRS: acronym for Gas Remote Sensor.

3. LOCATION

The GRS FIDEGAS® Ref.S/3-2 is a Group II and Category 2 equipment suitable for its use in gas atmospheres classified as zone 1 and zone 2 (probability of forming a flammable gas mixture under normal conditions).

The GRS has to be placed such a way that any gas accumulation is detected before an important risk is reached. An inappropriate placing of the GRS can decrease the gas detection system efficiency.

The GRS has to be placed with the sensor face down, where the gas tends to accumulate, 1.5 meters away from the gas consumption points or smoke outlets and separated from air currents.

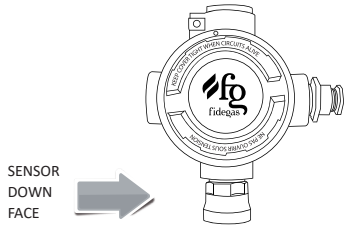


Figure 2: Correct orientation of the GRS

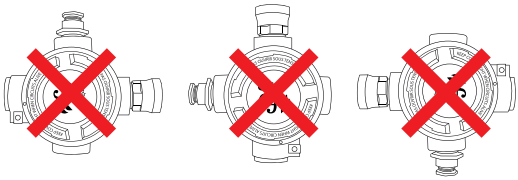


Figure 3: Wrong orientations of the GRS

Avoid places where dirt could obstruct the sensors gas inlet, considering an approximated coverage area of 25 m2 applied to the perimeter of the gas consumption points, trying to cut the gas path in its advance.

The position of the GRS has to be decided in collaboration with people with knowledge of the facilities and the affected equipment operation, together with the technical staff involved in the safety procedures. For further information or assistance contact FIDEGAS® or the authorized installation partner.

Each GRS location has to be recorded and provided to the safety staff.

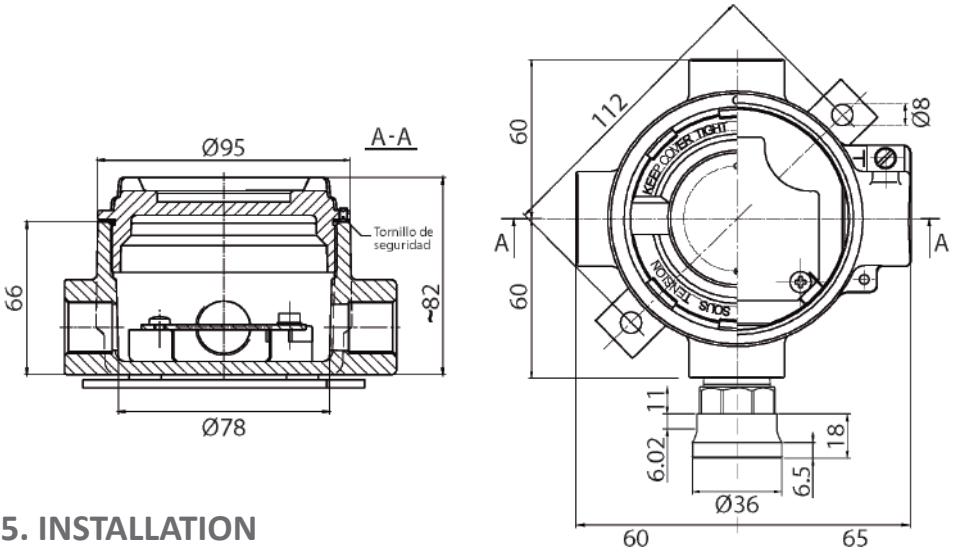
GRS have to be placed where gas can accumulate depending on its relative density as shown in the next table.

Density	Gas	Location
Gases lighter than air	Natural Gas and Hydrogen	Less than 0.3 m from the ceiling or the roof itself
Gases heavier than air	Butane / Propane	A maximum height of 0.2 m ground

In addition, next warnings have to be considered when placing the GRS:

- For maintenance and inspection purposes, the equipment has to be easily accessible.
- Leakage sources and risk levels have to be taken into consideration.
- Equipment and its ATEX gland have to be protected against facilities operation related risks.
- The detector has to be protected against vibrations and mechanical impacts risks.
- Never place a GRS directly over or under a water or liquid outlet.
- When placed in the outside, protection against rain and/or sun must be provided.
- Do not install the remote sensor in an air current.

4. TECHNICAL DRAWING



5. INSTALLATION

5.1 Wiring

- Wiring must comply with local standards and regulations.
- The outer diameter of the cable must not exceed the maximum dimensions of the ATEX gland.
- Wires should be peeled and inserted in such a way that they cannot produce unwanted contacts.
- Gland must tighten the cable insulation ensuring airtight.
- Cable shield must be connected to ground, the control unit provides clamps in order to performance this connection easily.
- In the remote sensor, the cable shield must make contact with the gland inside, see 5.2.1.

For further information about connection to the central unit consult central unit user manual.

To ensure ATEX protection of the system, control unit – remote sensor connection must be done by a shielded minimum section 3x0.75 mm2 cable for a maximum length of 200 meters.

For proper signal transmission, remember not splicing.

It is highly recommended using the cable provided for in the certification Ref. Cable S3 or a similar one subject to the following features:

Composition: Z1C4Z1-K Shielded 3x0.75 mm2, polished copper braid 85% tin plated, halogen free polyolefin. Outer diameter 6.6 mm. 400V, -10 ºC / +60ºC, < 26 Ω/Km for 0.75 mm2.

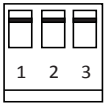
Compliance: Reaction to fire CPR Cca-s1b,d1,a1 according to UNE-EN 50575:2014+A1:2016.

5.2 Connections

Together with the GRS, an ATEX gland, a gasket and an Allen wrench are supplied

Loosen the security Allen screw and unscrew counterclockwise the cap. Once the connections are made, screw back the cap and finish tightening the Allen screw. The purpose of the tool is difficult unauthorized actions.

GRS Ref. S/3-2connections are carried through the terminal strip numbered from 1 to 3 as shown in figure 4:

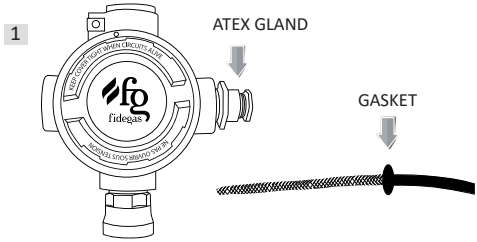


1- Positive power supply (12 to 24 Vdc)
2- Output signal 4 - 20mA
3- Common negative power and signal

Figure 4: Identification connections.

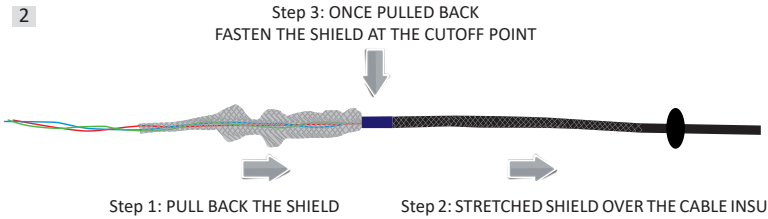
5.2.1 3 wire GRS connection

A) Install the ATEX gland in the GRS and tighten it with a wrench. Loosen the glands adjustment ring. Insert the cable through the supplied gasket and strip away the cable insulation about 15 cm as shown in picture 1.



A common break down source are the loose wires before cable peeling.

B) Pull back the cable shield over the insulation until it is fully stretched . Fasten the shield at the cutoff point with adhesive tape so it has no return.

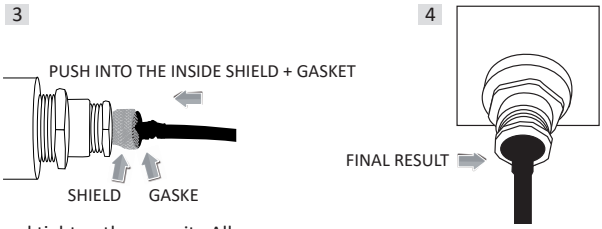


C) Insert the cable through the gland until the tape appears, tighten the adjustment ring with a wrench so that the cable and the shield are firmly tied.

D) Finally push the shield with the gasket into inside of the gland, finishing by fixing both as shown in pictures 3 and 4.

E) Proceed with the wire striping and connect wires to the terminal strip of the GRS in such a way that wire colors and strips numbers are equal in the GRS and in the central unit, as shown in 5.2.2.

Remember that the cable shield must not touch the electronic circuit.



F) Close the cap and tighten the security Allen screw.

5.2.2 Connection of the GRS to a FIDEGAS® Control Unit

Proceed with the connections in such a way that wire colors and strips numbers are equal in the GRS and in the control unit

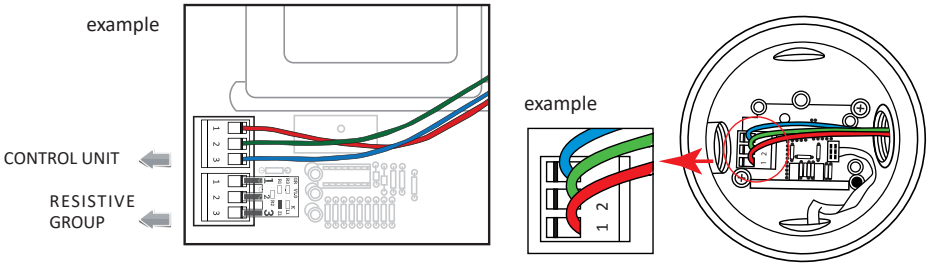


Figure 5: Control Unit-GRS connection.

If an input for GRS is not used in the control unit a 'Resistive Group " must be placed instead, these are supplied within the control unit.

The cable must not be "tight" neither in the Control Unit nor in the GRS

5.2.3 GRS connection to other devices

When connecting the GRS to other PLC device it should be checked that it provides standard 4-20 mA inputs or voltage analog inputs.

To transform the 4-20 mA signal voltage is necessary to connect the device resistance between the negative supply (3) and the output signal 4-20 mA (2). The value of this resistance depends on the voltage range, using the formula R = V / I

For more information related to connecting to other devices, see the user manual of the device.

Example: to transform the range 4-20 mA, 1-5 Vdc 250 Ω resistor is used

I = 4 mA = 0,004 A	V = 1 Vdc =>	R = V / I = 1 / 0,004 = 250 Ω
I = 20 mA = 0,02 A	V = 5 Vdc =>	R = V / I = 5 / 0,02 = 250 Ω

6. MAINTENANCE

Before performing maintenance operations should be advised that the property is to proceed with the activation of alarms gas detection system and the scheduled performances.

Check regularly that there is no dust clogging the gas inlet.

When the sintered filter head detection is contaminated with solvents, gases or vapors gas must be replaced by a spare GRS and verify proper operation.

6.1 Operating test

Do not use lighters, flammable vapors that may lead to false conclusions. When the Test Kit has low pressure it will require longer gas application for verification. The Test Kit is invalid for further testing when there is no outlet pressure.

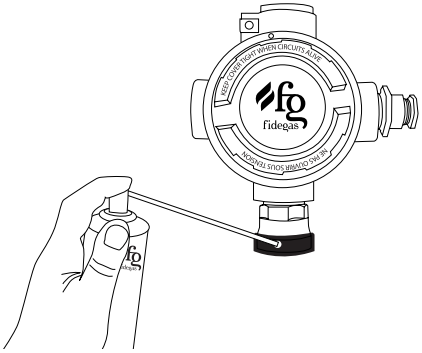
FIDEGAS® provides a Test Kit in compliance with current regulations:

1. Remove the Mask from the Test Kit (tester) and place it on the sensor head.

2. Introduce the cannula (tube) through the hole in the mask and release gas from 2, 3 seconds, wait five secondsunit the alarm is activated. If the alarm is not activated, repeat the operation releasing more gas.

3. Once the operating test is done do not forget to remove the mask from the sensor head and keep it with the Test Kit.

OPERATING TEST MUST BE DONE ONCE EVERY 6 MONTHS.



6.2 Replacing the GRS

A spare SRG is composed of an electronic circuit and a cap incorporating the sensor. These elements have been calibrated together at the factory, therefore should not be interchanged with other parts.

Before replacing the electronic circuit of the GRS, disconnect the system from the mains supply and / or auxiliary batteries, the GRS must not be opened or tampered with tension.

- Loosen the Allen screw and unscrew the cap.
- Disconnect the connection strip (1-2-3) and the connector on the electronic board sensor.
- Unscrew the two fixing screws and remove the electronic plate, unscrew the cap incorporating the sensor, attach it to its electronic board and remove it.
- Unseal the new part of the GRS, disconnect the electronic board cap and screw it into place, finish tightening with the help of a tool.
- Set the new electronic board in its location and tighten the two screws in their place.
- Connect the connection strip (1-2-3) and the connector cap to the electronic board.
- Finally, screw the lid of the GRS and tighten the screw Allen safety.
- Put the label / s marking supplied / s.

7. TECHNICAL CHARACTERISTICS

Supply Voltage	12 to 24 Vdc
Consumption	100 mA 12 Vdc / 50 mA 24 Vdc
Fault detection	0 mA at the output, this fault signal is detected by alarm central units Ref. CA- ...
Type of Output	Current Loop 4-20 mA (three wires)
Measuring range	0 to 100% LEL Connected to Central Ref. CA-: Prealarm 12% LEL and Alarm 20% LEL
Sensor type and lifetime	Catalytic Sensor. Four (4) years in clean air approximately. It is recommended to carry out the test every six (6) months
Warm-up time	15 seconds
Stabilization time	5 min, the GRS acquires the fullness of its metrological characteristics
Response time (T90)	Methane < 10 seconds Propane < 15 seconds Hydrogen < 10 seconds
Cobbering area	Approximately 25 m2
Calibration gas	Methane (GRS Marked as GAS: NATURAL) Propane (GRS Marked as GAS: PROPANE) (The Certificate covers detection BUTANE) Hydrogen (as marked on the GRS GAS: HYDROGEN)
Temperature and Humidity	-25 to 55 ºC 10 to 90 %HR
Operation Pressure	80 to 110 kPa
Cable entry diameter	3,2 to 8,7 mm
Certification	LOM 03ATEX2095X, when it used in conjunction with the central CA-
Marking	CE 0163 Ex II 2G Ex d IIC T6 Gb EN 60079-29-1 Apparatus Group II: installation presence of different mining explosive atmosphere. Category 2 G. use intended to sites classified as Zone 1 and Zone 2 (Gases)
Serial Nº	CCCC: Product Code YYMM: Year and month of manufacture XXXX: Number of manufactured
Degree of protection	IP66 (see WARNINGS) ⚠
Size	140 x 162 x 91 mm
Weight	1.150 gr

EU DECLARATION OF CONFORMITY

MANUFACTURER: Comercial de Aplicaciones Electrónicas S.L.

ADDRESS: Paseo Ubarburu 12 - 20014 San Sebastián - Spain

PRODUCT DESCRIPTION:

Remote Gas Sensor Ref. S/3-2:

Marking CE 0163 Ex II 2 G Ex d IIC T6 Gb EN 60079-29-1

The product above mentioned is declared, under our responsibility, in accordance with the following European directives requirements:

1.Directive ATEX 2014/34/EU Equipment and protective systems intended for use in potentially explosive atmospheres abolishing Directive 94/9/CE (DOCE 29/03/2014 - Serie L, nº 96 /309).

This conformity is assumed in reference with the following harmonised standards:

- **EN 60079-29-1:2016/A1:2022/A11:2022** Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases. (There are no relevant technical changes regarding EN 60079-29-1: 2007 version)

- **EN IEC 60079-0:2018** Explosive atmospheres - Part 0: Equipment - General requirements. (There are no relevant technical changes regarding EN 60079-0: 2009 version)

- **EN 60079-1:2014** Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d". (There are no relevant technical changes regarding EN 60079-1: 2007 version)

The "Laboratorio Oficial J.M. Madariaga" (LOM) located in Eric Kandel, 1 (Tecnogetafe) E-28906 Getafe - Madrid has **CERTIFIED** that the product conforms with these standards and has acted as the **Notified Body nº 0163 for factory production inspection, issuing the Production quality assurance notification N. LOM 03ATEX9122, in Madrid, 30 July 2003, and the EC-type examination certificate N. LOM 03ATEX2095 in Madrid, 10 July 2003.**

Supplement no.1 CE Examination Certificate of Type: LOM 03ATEX2095 X, On July 24, 2008

Supplement no.2 CE Examination Certificate of Type: LOM 03ATEX2095 X, On March 15, 2011

Certificate **AENOR no. 030/001429.** Issued on: **2001/06/01**

In San Sebastian,

JULIO BOUZAS FUENTETAJA
GENERAL MANAGER

Respectful and Solidarity with the Environment

This product complies with the European Directive 2012/19/UE WEEE, transposed to the Spanish legislation through RD 110/2015 WEEE (Waste of Electrical and Electronic Equipment). The Directive provides the general framework valid throughout the field of the European Union for the removal and reuse of waste from electrical and electronic equipment. Do not throw this product in the trash at the end of its life, take it to your FIDEGAS® distributor or to the collection points authorized by the town halls.

OFFICIAL DISTRIBUTOR

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EXPERTS IN GAS DETECTION