enose® DUST/DY GAS TRANSMITTER

enose® Technology

INSTALLATION AND OPERATING INSTRUCTIONS

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WARNINGS and CAUTIONS

Before using the enose® transmitters make sure you have read and understood the operating and installation instructions in the present manual.

- Make sure the cover is properly fastened before operating the transmitter
- Do not paint the sensor head or the detector assembly
- At start up calibrate the transmitter and then at least every 90 days.
- Do not expose the transmitter to electrical and/or mechanical shock.
- Make sure the air inlet to the sensor through the sinter filter or the wire mesh are clean of dirt and/or condense and keep away from accidental painting.
- Any repairing to the enose transmitters shall be executed by Oggioni authorised personell only. Non Oggioni repair attempts will void the warranty.

STORAGE

For storage we suggest to store in a clean and dry area and within the temperature range quoted in the Specifications (See chapter 2.3 on page 9).

When prolonged storage is known, instruments should be sealed, together with a desiccant, into plastic bags and double wrapped for protection.

EC Declaration of Conformity

We, Oggioni s.a.s,
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Italy
declare under our sole responsibility that the mentioned product is in accordance with the applicable european directive and to the listed harmonized standards or normative documents. Where applicable, a competent body has been released the relevant EC Type Examination

This Declaration of Conformity is relevant to the following products

Gas detector, DUST series

relevant european directive **94/9/EC**
2004/108/EC

EN-60079-0:2006	Electrical apparatus for explosive gas atmospheres: General requirement
EN 60079-29-1: 2007	Explosive atmospheres. Gas detectors.Performance requirement
EN-50270 :2006	Electromagnetic Compatibility - Electrical apparatus for detection and measurement of combustible gases, toxic gases or oxigen

Type of protection: **II 3G**
Ex nA II T6 IP65

Notification of Quality System according to annex VII of 94/9/EC directive no. 03 ATEX 4539Q issued by Notified Body Nemko AS – CE0470

Signature of manufacturer

General Director Managing Director

Date: 15/02/2010

Table of Contents

I INTRODUCTION

1.1 General Description

The enose® DY transmitters are designed to measure and display concentrations of combustible gases in the range of 0-100% Lower Explosive Level (LEL) or concentrations of toxic gases, in ppm range, in an atmosphere generally consisting of air.

A modular design of the transmitters allows the usage of sensors in various technologies: IR, Pellistor, Electrochemical Cell and MOS.

Made in SMT technology, the enose® Transmitter is extremely compact and sealed in the detector's head. It may be used either as an autonomous detecting device featuring electrical controls right next to the sensor, or it may be connected to remote data monitoring systems.

enose® GM2 Sensor Head

The GM2 sensor head is a self contained microprocessor controlled device, designed with a non-volatile memory, allowing a non intrusive calibration, easily performed with a magnetic tool by one person only. The air sample to be analysed enters the head's measuring chamber, where the sensor is located, by convection and diffusion through a flame arrester sintered stainless steel filter or wire mesh screened opening.

Fig. 1.1.1 DUST/DY /

1.2 Features

The DUST enose® gas transmitters are microprocessor based devices featuring a 4-20 mA output, three voltage free relay contacts and an RS-485 digital interface.

DUST /DY versions features an LCD Display 8x2 characters.

The transmitters are fully programmable and easy to maintain being designed for a Non Intrusive "One Person" calibration.

Small size
Low Power consumption

1.3 Typical Application

Ideal for detect combustible gas and solvents
Strong poison resistant properties
Built-in or separate sensor transmitter
Built-in relays enable full stand-alone capability

DUST /DY sensors are made in compliance with European standard EN54 and following ATEX directives.

II SPECIFICATION

2.1 General specification

Sensor Technologies	IR Catalytic Electrochemical MOS
IP Rating	IP65
Location	**NON** Hazardous area
Short-term repeatability	±2% FSD 60 min.
Long-term repeatability	±5% FSD 3 months
Accuracy	±5% FSD

2.2 Electrical Specification

Supply Voltage	12÷30 Vdc
Max. Power consumption	**IR Combustible sensors** 140mA@13.5V; 80mA@24V **Catalytic combustible sensors** H.Q. Sensor: 140mA@13.5V; 110mA@24V Standard Sensor: 75mA@13.5V; 55mA@24V **Oxygen/Toxic gas sensors:** 60mA@13.5V; 40mA@24V **MOS sensors**: 100mA@13.5V; 70mA@24V Relays Configuration: +20mA@13.5V; +10mA@24V each energized relay, for a maximum of 3 relays.
Supply fuse	500 mA
Signal fuse	63 mA
Analog output	4-20 mA
Load	0-300 ohms at 24 Vdc
Cable Type	4-20mA: 3 conductor shielded cable Relays: 2 conductor
Relays	2 Low level/High level alarms relays 1 Fault relay Programmable for normally energised/de-energised, latching/non-latching Max. contact resistance 150 mΩ Max. switching voltage 100Vdc Max. switching current 1A

2.3 Environmental Specification

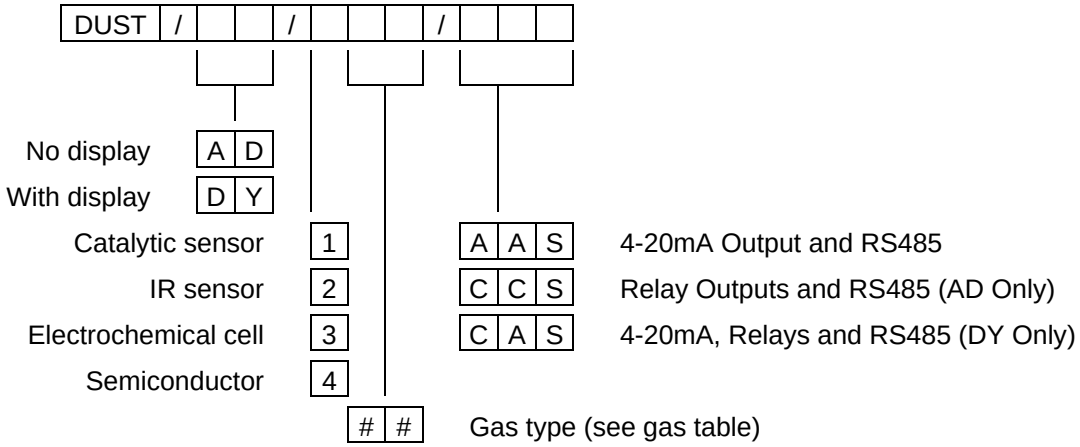
EMC susceptibility	According to EN 610000-4
Storage temperature	-40 to85 °C
Operating temperature	-20 to 70 °C - excluded electrochemical cells -20 to 50°C - for electrochemical cells only
Humidity range	90% R.H. n.c.
Pressure range	80-120kPa – for electrochemical cells only

2.4 Mechanical Specification

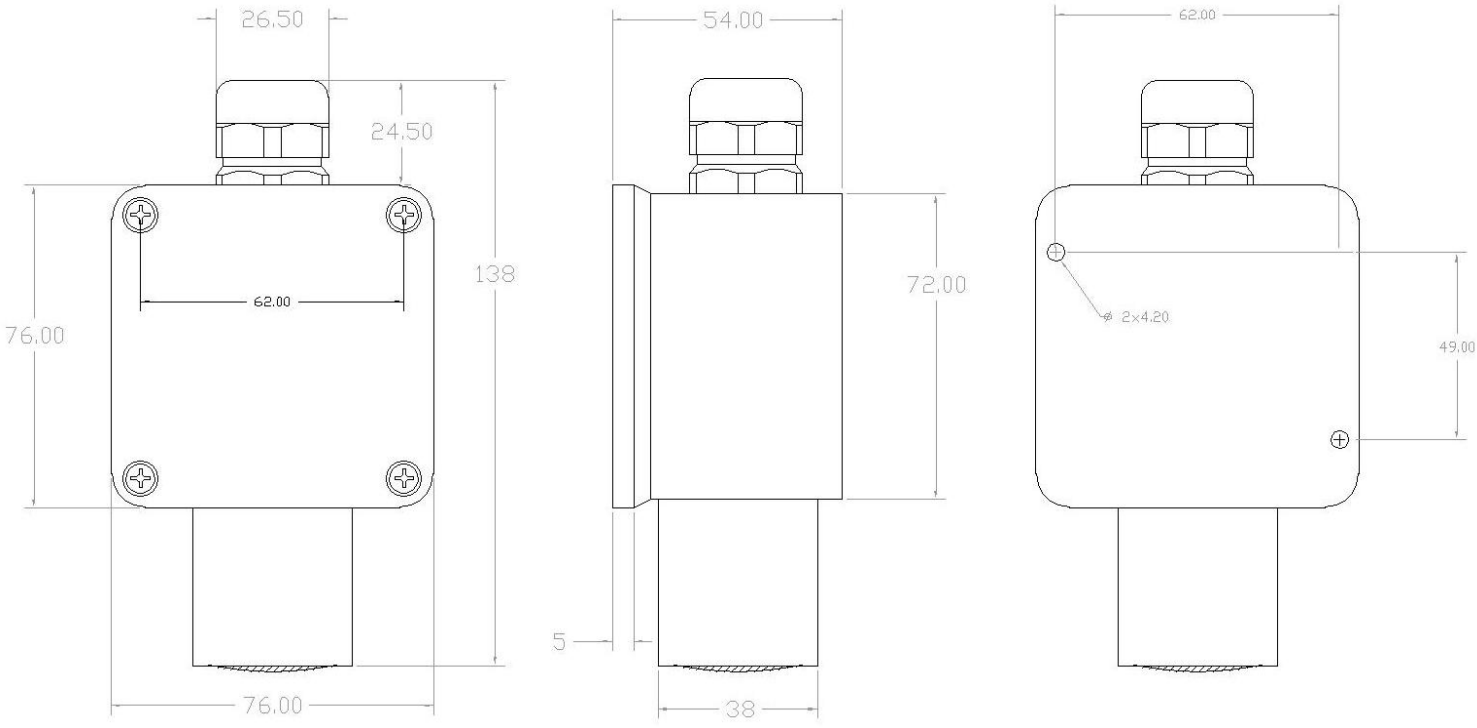
Overall dimensions	170x100x70 mm
Weight	0.4 Kg
Mounting	2x6 mm holes
Termination	Screw terminal block for cables up to 2,5mm^2
Junction box attachment	PG-16

2.5 Detector Configurations

The DUST detectors may have various output configurations according to the application requests. In brief, the coding below, groups together the various options.



2.6 Outline drawing



III INSTALLATION

Installation must be carried out by well skilled and competent personnel only.
Site the sensors so as to facilitate routine recalibration and maintenance.
Always mount the sensors vertically with the detection head facing downwards and the cable entry on top.
The DUST sensors, must be installed in accordance with the certification documents and the relevant regulations of the country concerned.

3.1 Sensor Location Guidelines

The first factor to be considered when deciding the position of the sensors is the type of gas that has to be detected.

Normally, for gases with a lower density than the air (hydrogen, methane, etc.), the sensors are uniformly distributed at about 30cms, from the highest point of the ceiling, because these gases are easily defused in the air.

It is as well to avoid places where there are air currents or where the air is likely to be very still because of certain irregularities of the ceiling e.g. beams etc. which stop the gas moving around freely.

For gases with a higher density than the air the sensors should be placed near the floor and in proximity to possible air vents.

Particular points such airspaces, junction boxes, manholes, and weigh-bridges should always be controlled by a sensor.

For gases with a specific weight similar to that of the air or for toxic substances in low concentration it is a good general rule to distribute the sensor at different levels to heighten the chances of intercepting an eventual leak.

Always have the gas sensor head pointing downwards so that the gas inlet is protected from water and accumulation of dust and/or dirt. Site the sensors to facilitate routine recalibration and maintenance.

3.2 Sensor Poisoning – installation precautions

There are certain substances that if present in the atmosphere being analysed can alter considerably the response of the sensor. These in the main are chemical poisons.

The more important poisons are:

Halides (Compounds containing fluorine, chlorine, bromine and iodine).

Glycol Sulphur (Compounds which polymerise on the bead).

Heavy Metals (Tetraethyl lead).

If the presence of these substances is to be expected on the site in which the sensors have been installed, it is advisable to verify frequently the sensitivity of the detectors using calibration gas.

3.3 Generic wiring guidelines

The use of shielded cables is recommended.

Should more than one strand of wire be used in the wiring be sure that the cable screen is continuous and that the conductors are soldered at the joints.

The cable screen must be connected to safety earth in safe area.

Furthermore it must be remembered that the protective shielding must be earthed only on the control unit or power supply side and should never be connected to the detector.

The use of terminal leads is recommended, otherwise the joints on the power cable must be clamped with flat tab connectors or soldered.

It is recommended to avoid detectors connection to the same power source. Inductive loads could generate 'noises' on the power supply to the system.

In any case the usage of auxiliary winding is recommended on the main power transformer, for supply suppression devices, actuators, sounders or other devices.

Complete all cable insulation testing before connecting the cable at either end.

When all wiring has been completed and tested, the system may be powered-up.

The following table gives a guide about the wire section and the distance correspondence.

Distance	Section	Section
Km.	AWG	mm^2
<1	17	1
1.5	15	1.6
2.5	13	2.5

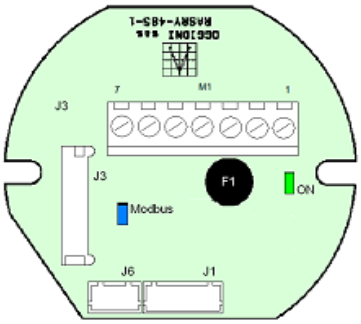
We suggest to use cables type FG7OH2R or equivalent.

3.4 Cable connection guidelines

Unscrew the fixing screws on the front, to access the main board below, in order to make the cable wiring.

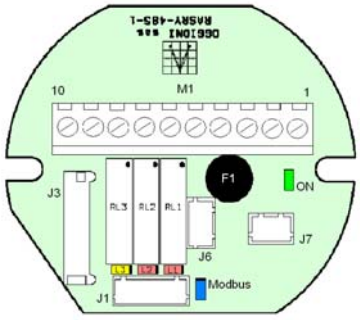
The two versions of the main board are presented in the following:

a) 4-20mA with serial line RS485 version / .. / DY / AAS



Terminal pins	Signal	Description
1	(-)	Negative
2	+12÷24VDC	Power supply
3	4-20mA	Analogue output
4	(-)	Negative
5	A	A RS-485
6	B	B RS-485
7	Screen	Screen

b) 4-20mA, RS485 serial line and 3 relays / .. / DY / CAS



Terminal pins	Signal	Description
M1 Connector		
1	(-)	Negative
2	+12÷24VDC	Power supply
3	4-20mA	Analogue output
4	NO/NC	First alarm threshold
5	Common	First alarm threshold
6	NO/NC	Second alarm threshold
7	Common	Second alarm threshold
8	NO/NC	Fault
9	Common	Fault
10	Cable shield	
Terminal pins	**Signal**	**Description**
J7 Connector	A	A RS-485
	B	B RS-485

LED Indications	Colour	Function
ON	Green	Power on
L1	Red	First alarm threshold
L2	Red	Second alarm threshold
L3	Yellow	Fault
Modbus	Blue	RS-485 communication status

NOTE:

All three relays are featuring one single contact only. Therefore while the relay is not activated the contact will remain open (N.O.) and LEDs will be OFF.

With the relay energized the contact will be closed and its related LED will be ON. So, should the relays be programmed as normally energized, the related contacts will be closed in normal operation and relative LED will be ON, and they will open when the associated event occurs (Alarm, Fault) or in case of main power interruption and related LED will automatically switch OFF.

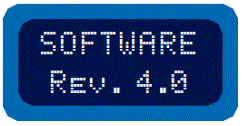
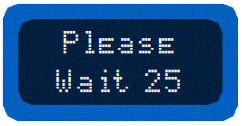
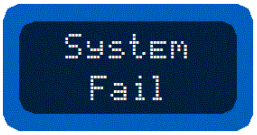
Relays alarm thresholds are programmed during production by the manufacturer on customer request and can be modified only by connecting the gas detector to a PC using a specific software called “enoseBlu2” (see enoseBlu2 software Instruction Manual for relays alarm thresholds modification procedure).

3.5 Final inspection and Start Up

Complete all cable insulation testing before connecting the cable at both ends.

The cable screen must be isolated and it must not be connected to the electronic circuitry of the sensor.

After all the wiring has been connected, the detector should be closed, sealed and eventually, the instrument may be powered on.

	Once powered on, the display shows the SW version for about 10s. Simultaneously the warm up procedure starts.
	The device will warm up for 60 seconds, during which the 4-20mA output will be still at 2mA and the LCD display will show a counter up to 60sec.
	For some sensors, for a very short time a “System Fail” message may occur after the 60s, as the warm up time of the sensor may be longer than the warm-up of the display.
	Finally, after the end of the warm up procedure the display should show the fresh air concentration.

During the start-up procedure above, only the green led ON will be lit.

3.6 Fault conditions and Actions

Fault conditions are indicated by the detector by activation of fault relay and giving 2mA on the analogue output signal, the Fault message (depending on the cause) will be showed on the display .

The following table gives indication of fault conditions and possible actions:

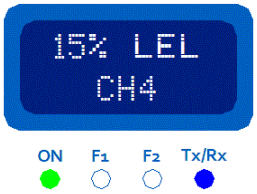
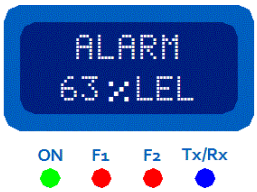
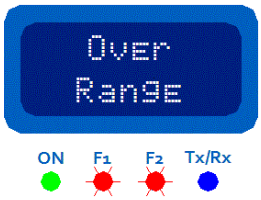
Condition	Display Message	Mode	Actions
Power up	PLEASE WAIT	Automatic reset	Wait for end of start-up cycle, about 1 minute
Start Up Fail	START UP FAIL	Latching	Switch the instrument OFF and ON again, if problem is not solved Check sensor status and if necessary replace it
Sensor Fault	SYSTEM FAIL	Latching	Check sensor status and if necessary replace the sensor
EEPROM CRC Error	SYSTEM FAIL	Latching	Restart the instrument, if problem is not solved send the instrument back to the supplier
Calibration Error	SYSTEM FAIL	Latching	Try to make a new calibration, if problem is not solved replace the sensor
Over Range	OVER RANGE	Automatic reset	Check absence of gas in ambient, switch the instrument OFF and ON again, if problem is not solved Check sensor status and if necessary replace it
Sensor negative drift	SYSTEM FAIL	Automatic reset	Restart the instrument or make a new zero calibration

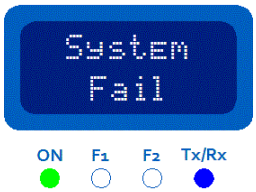
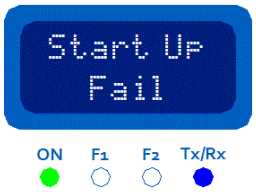
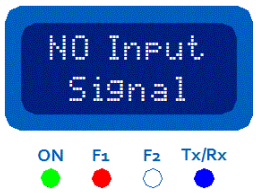
3.7 Changing the relays alarm settings (for …/CAS version only)

	During the 60s instrument warm up, press the “Enter” key. ENT This will get into the alarm thresholds settings: ALARM and WARN.
	Now the display shows the message ALARM SETTING. To confirm the procedure press again the “Enter” key. ENT The display will show the default alarm threshold - ALARM. In the same time, as the “ENT” key is activated, both LED’s F1 and F2 are lit.
	Press UP or DOWN to increase or decrease the alarm threshold. While key “Up” is pressed the F1 LED is lit. While instead the “Down” key, is presset the F2 LED will be lit. **! WARNING !** : *Be aware the alarm and prealarm levels are expressed in percentage refered to the detector full scale value*.
	Pressing the “Enter” key ENT the alarm threshold is being confirmed and the procedure passes to the prealarm setting – WARN.

	The display now shows the predefined prealarm threshold - WARN. Follow the same procedure for set the the prealarm threshold.
	Press again the “Enter” key  to confirm the procedure end to exit.
	The display will turn back to the warm up screen, showing the message PLEASE WAIT with the related countdown . Finished the countdown the instrument will start operating.

3.8 Detector operation

NORMAL STATUS	
	In the NORMAL status, the display will show the actual concentration read. While the concentration is below the WARN threshold, the screen will report just the actual concentration as in the figure. The LED's F1 and F2 are off. The ON LED is on. The Tx/Rx LED will blink if the serial communication is active.
WARN STATUS	
	In the WARN status, while the read concentration exceeded the WARN threshold, the display will show the WARN message accompanied by the actual concentration read. The WARN threshold, by default is set at 25% FS. The F1 LED is lit and the F2 LED is off. The ON LED is lit. The Tx/Rx LED will blink if the serial communication is active.
ALARM STATUS	
	In the ALARM status, while the read concentration exceeded the ALARM threshold, the display will show the ALARM message accompanied by the actual concentration read. The ALARM threshold, by default is set at 50% FS. Both F1 and F2 LED's are lit. The ON LED is lit. The Tx/Rx LED will blink if the serial communication is active.
	While the gas concentration decreases, when turning back from an ALARM situation, until zero level is reached, both F1 and F2 LED's will be lit until "Enter" key will be pressed to aknowledge.
OVERRANGE	
	When the read concentration exceeds the full scale of the instrument, the display will show the OVERRANGE message. Both F1 and F2 LED's are blinking. The ON LED is lit. The Tx/Rx LED will blink if the serial communication is active.

FAULT SITUATIONS	
	Any situation where the analogue 4-20mA output is at 2mA, will be notified by a SYSTEM FAIL message.
	After the 60s of start-up, should the analogue signal output stays at 2mA, the display will show a START UP FAIL message. The F1 and F2 LED's are off.
	The NO INPUT SIGNAL is shown when the 4-20mA input signal is not present. The F1 LED is on and F2 LED is off.
	When the six months set by default for the calibration were exceeded, the display will show the word CAL below the read concentration. In the same time, the F1 LED is on.

IV CALIBRATION

The instrument is factory calibrated for one determined/specific gas.

It is recommended to check every three months the sensor response using a predetermined gas/air mixture conform to UN1956

To make a correct calibration, the following instruments are requested:

- Calibration kit with head adaptor for GM1 head.
- Cylinder with test gas (preferably with a concentration at 50% of the instrument range)
- For Oxygen calibration a 99,99%Vol. Nitrogen is requested.
- Manual gas valve 0,3 l/min.
- Polyurethane pipe
- Magnet for Calibration procedure.

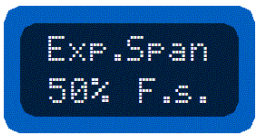
4.1 ZERO Calibration

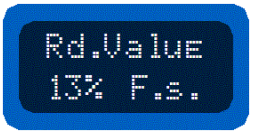
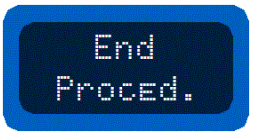
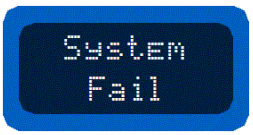
Fig. 1
Starting from this position, slowly move the magnet until reaching the final position in Fig. 2

Fig. 2
From this position remove the magnet and the zero calibration procedure is terminated

4.2 SPAN Calibration

To start the span calibration, mount the GM1 adapter to the sensor head and the gas cylinder via the rapid plug as in the picture.
Start the calibration procedure following the steps and the indications on the display as explained below.

	a) Put the calibration magnet on the left side of the sensor, as shown in figures 1 and move the magnet 120° to the right, as shown in figure 2, and then bring the magnet back in the start position to the left side again (as shown in fugure 1). Remove the magnet from the instrument head. In this moment the detector enters the span adjustment status and the display will show the message as in the figure.
	b) Next, the expected calibration value will be shown, that corresponds by default to 50% of the full scale. This value may be changed by the operator, should the calibration bottle concentration have a different value. See the NOTES below. The expected value screen will be stable for about 20s

	c) Next the detector will show the real gas value read so the display will show 0% read if the calibration gas bottle was not yet opened. Slowly open the valve of the adaptor until you have a flow no greater than 1 l/min. and maintain a constant flow of test gas for about 60". The read value will increase until a maximum value is reached and the readout gets stable. Here a typical screen while the gas is being given to the instrument. This step takes about 1min to get the readout eventually stable.
	d) At this point, after about 1minute reading the gas given, close the gas flow and take off the calibration cap from the detector head. As the read value decreases below 80 % of the maximum read the detector will end the span procedure. The software will use the highest value and assign it to the expected value (by default 50% FS). While doing this, the LCD image will show the “End Procedure” screen.
	The image will last for about 20s, then turning back to the real gas value in that moment. Considering the gas may be still inside the sensor head, the diplay will probably show a concentration value dropping towards zero as in the left image.
	**!! WARNING!!** If the calibration fails, eventually the display will show the message SYSTEM FAIL. In this case switch off the power, then power on again, wait for the detector to warm up and then repeat the calibration procedure.

If the calibration is successful, after the 4-20mA output gets stable to zero again, it is recommended to check the calibration giving gas again from the bottle.

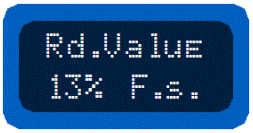
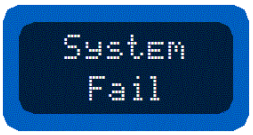
NOTES – Changing the expected calibration gas concentration:

To change the expected span concentration, as soon as the message of point b) is shown, placing the magnetic tool to the head again (in centre/front position) and keeping it there, the value of the expected concentration will start increasing. When the desired expected concentration value has been reached, the magnet should be removed.

If the desired value is lower than the default 50%, the magnet should be kept on until the full scale is reached after which the counting will start over from zero again. The same as above, when the desired expected concentration value has been reached, the magnet should be removed.

4.3 SPAN Calibration for Oxygen sensors

To start the span calibration, mount the GM1 adapter to the sensor head and the gas cylinder (containing 99.99% Nitrogen) via the rapid plug.
Start the calibration procedure following the steps and the indications on the display as explained below.

	a) Open the canister valve regulator until you have a flow no greater than 1 l/min. and maintain a constant flow. When you reach zero Oxygen reading, put the calibration magnet on the left side of the sensor, as shown in figures 1 and move the magnet 120° to the right, as shown in figure 2, and then bring the magnet back in the start position to the left side again (as shown in fugure 1). Remove the magnet from the instrument head. In this moment the detector enters the span adjustment status and the display will show the message as in the figure.
	b) Next, the expected calibration value will be shown, that corresponds by default to 20,9%Vol. Oxygen. The expected value screen will be stable for about 20s
	c) Next the detector will show the real gas value read so the display will show 0% read if the calibration gas bottle was not yet opened. Close the canister valve, **remove first the tubing from the adaptor**, then slowly remove the calibration adaptor from the detector head. The read value will increase until a maximum value is reached (20,9%Vol. Oxygen) and the readout gets stable. This step takes about 1min to get the readout eventually stable.
	d) At this point the detector will end the span procedure. While doing this, the LCD image will show the “End Procedure” screen.
	**!! WARNING!!** If the calibration fails, eventually the display will show the message SYSTEM FAIL. In this case switch off the power, then power on again, wait for the detector to warm up and then repeat the calibration procedure.

If the calibration is successful, after the 4-20mA output gets stable to air value again, it is recommended to check the calibration giving gas again from the bottle using a 18%Vol. Oxygen canister.

Table 1 – Response time various sensors

Gas	Formula	Sensor Technology	Standard Range	Response T_{50}	Response T_{90}
Flammable		Standard Catalytic	0 - 100% LEL	n.a.	< 10 sec.
		High Qualità Catalytic	0 - 100% LEL	n.a.	< 10 sec.
		Infrared	0 - 100% LEL	n.a.	< 30 sec.
Various		MOS	Various	n.a.	< 10 sec.
Oxygen	O2	Electrochemical cell	0 - 30% Vol.	n.a.	< 15 sec.
Carbon Monoxide	CO	Electrochemical cell	0-300/500 ppm	< 10 sec.	< 30 sec.
			0-500/1500 ppm with H2 and SO2 filter	< 10 sec.	< 30 sec.
Carbon Dioxide	CO2	Infrared	0 - 10000 ppm	n.a.	< 30 sec.
			0 - 5% Vol.	n.a.	< 30 sec.
			0 - 100% Vol.	n.a.	< 30 sec.
Hydrogen	H2	Electrochemical cell	0 - 1% Vol.	n.a.	< 70 sec.
			0 - 4% Vol.	< 40 sec.	< 60 sec.
Ammonia	NH3	Electrochemical cell	0 - 100 ppm	< 20 sec.	< 60 sec.
			0 - 500 ppm	< 30 sec.	< 90 sec.
			0 - 1000 ppm	< 20 sec.	< 90 sec.
			0 - 5000 ppm	< 30 sec.	< 90 sec.
Hydrogen Cyanide	HCN	Electrochemical cell	0 - 30 ppm	< 25 sec.	< 50 sec.
Hydrogen Chloride	HCl	Electrochemical cell	0 - 30 ppm	< 30 sec.	< 70 sec.
Hydrogen Bromide	HBr	Electrochemical cell	0 - 30 ppm	< 30 sec.	< 70 sec.
Chlorine	Cl2	Electrochemical cell	0 - 10 ppm	< 30 sec.	< 60 sec.
			0 - 50 ppm	< 20 sec.	< 60 sec.
Hydrogen Sulfide	H2S	Electrochemical cell	0 - 30 ppm	< 15 sec.	< 30 sec.
			0 - 100 ppm	< 15 sec.	< 30 sec.
Sulphure Dioxide	SO2	Electrochemical cell	0 - 20 ppm	n.a.	< 35 sec.
Silane	SiH4	Electrochemical cell	0 - 50 ppm	< 10 sec.	< 60 sec.
Boron Trifluoride	BF3	Electrochemical cell	0 - 10 ppm	< 30 sec.	< 90 sec.
Hydrogen Fluoride	HF	Electrochemical cell	0 - 10 ppm	< 30 sec.	< 90 sec.

Ensure a complete understanding of all applicable State, Provincial and Local Health and Safety regulations before using these products.

V MAINTENANCE

Safety Warning

Installation and maintenance must be carried out by suitably skilled and competent personell only.
Before starting any maintenance procedure, all responsible security personnel should be informed and all alarm systems which might be connected to the system should be switched off.

If correctly installed, the instruments need a routine maintenance, including the regular calibration. It is recommended that at least once a year a system check-up is being done that includes the following:

- The sensor is calibrated in the factory specifically for the substance requested by the client. Nevertheless it is a good practice to check (possibly every three months) the sensor response in gas and recalibrate if necessary.
- Make sure the atmosphere is clean and free of other gases before proceeding with the calibration and always use certified gas mixture bottles and never use them after the expiration date
- The detector is provided with a sintered filter that during the operation may clogg due to the water, dust, oil etc. Check the filter by removing it and have it cleaned with compressed air if necessary before refitting it.

  DO NOT use compressed air on filter while fit on the detector head!
- At the end of the maintenance inspection, update the plant registers making sure to keep records of the action taken and the new calibration parameters.

VI MODBUS RTU Serial Interface

6.1 Introduction

The Modbus communications interface is based on the two wire half-duplex RS485 standard in conformity to the EIA-485 specification.
The Transmitter implements the RTU protocol, the RTU mode and serial format must be the same for all devices connected on the network.

The Modbus interface factory default are set as follow:
Address 127
Baud rate 19k2
Parity none
Stop Bit 1

6.2 Modbus read command

- READ-MULTI-HR (cod. 03 dec. Read holding register)

6.3 Memory map

(Holding Registers)

REGISTER CATEGORY	MODBUS ADDRESS	NAME	UNIT	MEMORY	ACCESS LEVEL
DIAGNOSTIC	12	Warning Quantity	General	E2PROM	READ ONLY
DIAGNOSTIC	13	Alarm Quantity	General	E2PROM	READ ONLY
DIAGNOSTIC	14	Maximum Gas	One Tenth of milliAmp	E2PROM	READ ONLY
DIAGNOSTIC	54	SIL Level	General	E2PROM	READ ONLY
DIAGNOSTIC	74	ResetHW Counter	General	E2PROM	ADMIN
READING FROM SENSOR	6	Percent Gas	Percentage	RAM	READ ONLY
READING FROM SENSOR	7	Sensor Output	milliVolt	RAM	READ ONLY
READING FROM SENSOR	9	Detected Gas Quantity	One Tenth of milliAmp	RAM	READ ONLY
READING FROM SENSOR	10	FBack Gas Quantity	One Tenth of milliAmp	RAM	READ ONLY
READING FROM SENSOR	11	Temperature	One Tenth of Centigrade	RAM	READ ONLY

VII ACCESSORIES

Splash Guard	**Cod. GDA - SD**	
Collector cone	**Cod. GDA - CO**	
Sensor flow adaptor	**Cod. GDA – FA/GM2**	
Portable calibration Kit	**Cod. GDA - TK**	

NOTES

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The brochure includes general specifications which are subject to change without prior notice.