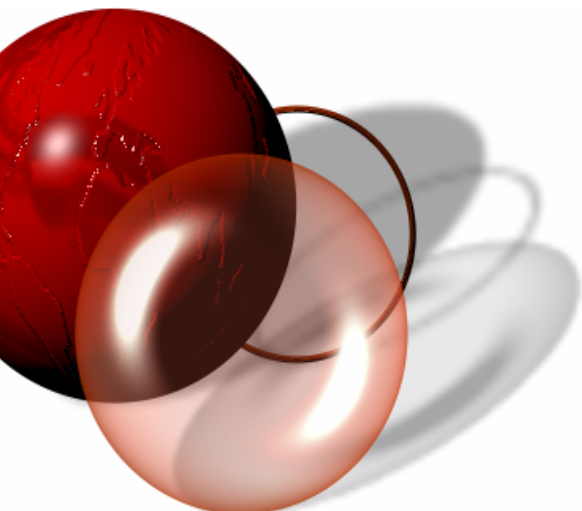




CAR PARK MONITORING RANGE



THE SAFER SOLUTION



EURO-GAS
MANAGEMENT SERVICES LTD

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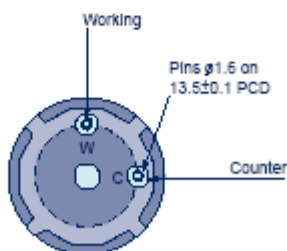
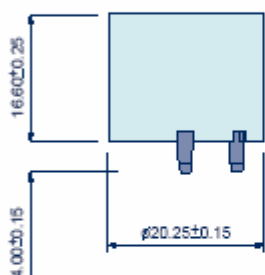
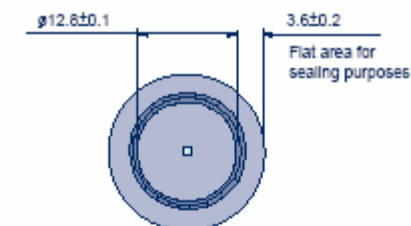
MODBUS CARD

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ECO-Sure (2e) SENSOR

The ECO-Sure® (2e) is a high quality, cost effective 2-electrode electrochemical cell designed for the detection of carbon monoxide in a range of applications but particularly for domestic Carbon Monoxide detection and industrial fire detection applications. The ECO-Sure (2e) is a recognised component under UL2075.

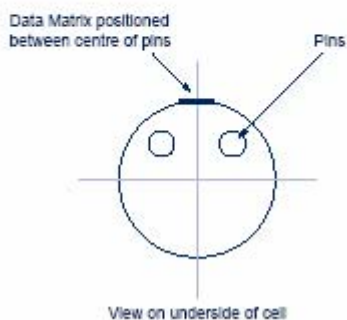


SPECIFICATION

Operating Principle:	2-electrode electrochemical
Gas Detected:	Carbon Monoxide
Measurement Range:	0 – 500 ppm
Maximum Overload:	1,000 ppm
Expected Operating Life*:	> 6 years in normal use from date of manufacture
Output Signal:	0.045 ± 0.015µA per ppm
Temperature Range*:	Continuous: -10°C to +50°C Intermittent: -20°C to +50°C
Pressure Range*:	1 atm ± 10%
Humidity Range* (non-condensing):	Continuous: 15 - 90% Intermittent: 0 - 99%
Response Time (T⁵ 90):	<50 seconds over complete temperature range
Baseline Offset (clean air):	<-2 to 4 ppm equivalent
Zero Shift* (-10°C to +50°C):	<±10 ppm
Long Term Output Drift:	<5% per annum
Repeatability:	<±5%
Linearity:	<±5%
Recommended Load Resistor:	5 Ω
Bias Voltage:	Not required



ECO-Sure (2e) SENSOR



Intrinsic Safety Data

Maximum at 1,000ppm:	0.1mA
Maximum o/c Voltage:	1.3V
Maximum s/c Current:	<1.0A

Physical Specification

Weight:	5g (approx)
Orientation:	Any
Housing Material:	Noryl 110
Storage Life:	6 months in sealed container
Storage Conditions:	+10°C to +30°C
Warranty Period:	Up to 60 months
Part Number:	2112B3000

All measurements were taken at 20°C and 505 rH at 1 atmosphere pressure unless otherwise indicated. The performance data detailed in this document refer to new sensors. With the exception of items marked * the following parameters have been verified under the UL component recognition programme.

Customer Specification

Symbology: 2D Data Matrix (ECC 200)

Dot size: 0.428mm

Format: 12x12 dot array

Dot colour: White dot on black substrate

Data contained in Data Matrix code: 10 digit encrypted number with Julian date code and sensitivity in nA/ppm

Data contained in number printed below Data Matrix code : 3 digit number with encrypted sensitivity in nA/ppm

Tolerance on sensitivity data: Typically $\pm 5\%$, Better than $\pm 10\%$

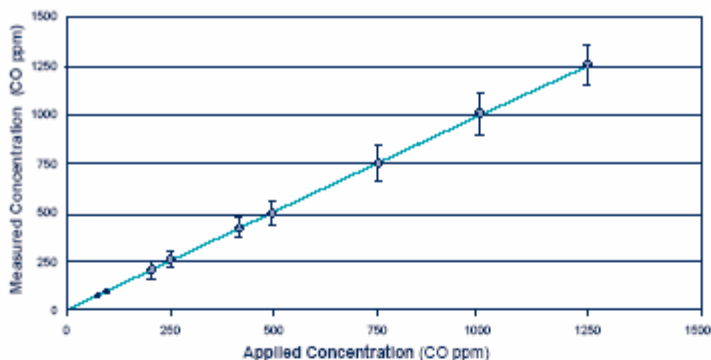
Scanning recommendations: In order to achieve a reliable read rate, the installation of a fixed scanning device is recommended. Typically a Matrix 2000 fixed scanner from www.datalogic.com. The scanner should be set to dot matrix. A white ring light should be positioned above the cell to be scanned in preference to the scanners in-built light source. A hand held scanner can be used but a reduction in read rate may be experienced. A keyboard may be used to key in the 3 digit encrypted nA/ppm number displayed underneath the Data Matrix.

Encryption and software licence: Data contained in the Data Matrix code and 3 digit number is encrypted. Encryption software and user licence are required to convert the data.



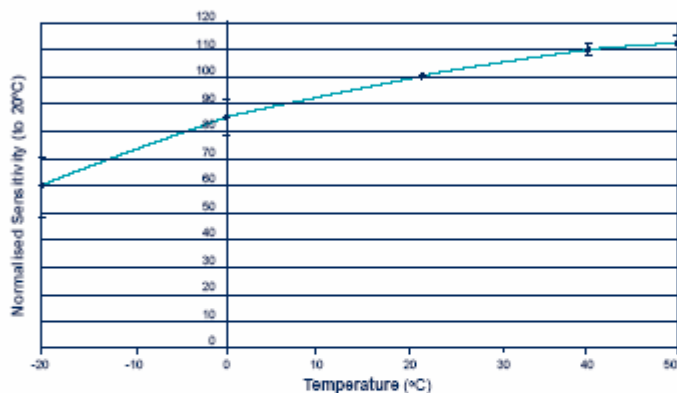
ECO-Sure (2e) SENSOR

Linearity of ECO-Sure Cells (0 to 1250 ppm CO)



Note: Temperature coefficients and cross sensitivity are not verified under the UL component recognition programme

Temperature Coefficients of ECO-Sure Cells



Cross Sensitivity Table			
Gas	Concentration Used (ppm)	Exposure Time (mins)	Reading (ppm CO)
Carbon Monoxide	100	5	100
Hydrogen Sulphide	25	5	0
Sulfur Dioxide	50	600	<0.5
Nitrogen Dioxide	50	900	-1.0
Nitric Oxide	50	5	8
Chlorine	2	5	0
Hydrogen	100	5	20
Carbon Dioxide	5000	5	0
Ammonia	100	5	0
Ethanol	2000	30	5
Iso-Propanol	200	120	0
Acetone	1000	5	0
Acetylene	40	5	80

*Note: The figures in this table are typical values and should not be used as a basis for cross calibration. Cross sensitivities may not be linear and should not be scaled. For some cross interference, break through will occur if gas is applied for a longer time period.

The data contained in this document is intended for guidance only and it is the Clients' responsibility to perform any necessary tests to ensure correct performance of this product in specific application for which it is intended. In the interest of product improvement, Sixth Sense reserve the right to alter and amend the product and its performance without notice. As this product may be used by the Client in circumstances outside the control of Sixth Sense, we cannot give any warranty as to the accuracy of these details in any specific application.



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.

Approved by TÜV according to VDI 2053 for OEM applications with CO monitoring systems for underground car parks



Fig. 1:

ECO-Sure CO sensor
with 4-20mA transmitter

Part no. 2112B1005

FEATURES & BENEFITS

- TÜV approval according to VDI 2053 systems
- Signal 4 – 20 mA standard interface
- Pre-calibrated on 0 – 300 ppm CO in air allowing direct integration with system
- Optional range of 0-500 ppm
- Two wire cabling reduces installation costs
- Signal testable at pins on p.c.b allowing one man testing and calibration
- Automatic zero adjustment meaning reduced maintenance effort
- Accessories: fixing ring, sinter metal disc and sensor holder allow easy assembly with wall mounting boxes
- Test gas cap suitable for applying test gas



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.

SPECIFICATION

Detection principle:	Electrochemical
Operation:	continuous
Gas entry:	by diffusion
Measuring range:	0 – 300 ppm CO in air
Reproducibility:	< 3ppm
Response time t90:	< 60 sec
Cross sensitivity:	< 2% on 300 ppm CO according VDI 2053
Linearity:	< 2% on 300 ppm CO according VDI 2053
Temperature range:	-10°C to +40°C
Humidity range:	15 - 95% relative humidity
Power supply:	20 – 28 V d.c.
Signal:	4 – 20 mA, max. load 300W
Zero adjustment:	automatic
Sensitivity adjustment:	via potentiometer
R.F.I. :	according EN 50 081-1 resp. EN 50 082-2 B
Storage temperature:	0 – 20 °C
Mechanical design:	CO Sensor plugged onto p.c.b. terminals on p.c.p, vertically or horizontally pluggable
Dimensions:	21 mm \varnothing , 30 nun high incl. terminals
Weight complete:	approx. 10g
Sensor housing material:	Noryl 110
Accessories:	
Installation kit	Sensor holder, protection disc, O-ring and installation ring for assembling into a wall mounting box. Part no 2112B1002
Aluminium housing	Complete assembly also available in aluminium housing. Part no: 2112B1013
Test gas flow cap	Part no: 2112B1010



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.

Approved by TÜV according to VDI 2053 for OEM applications with CO monitoring systems for underground car parks



Fig. 1: ECO-Sure CO sensor + 4-20mA transmitter.
Standard measuring range: 0-300ppm. Optional
measuring range: 0-500ppm. Part no. 2112B1005

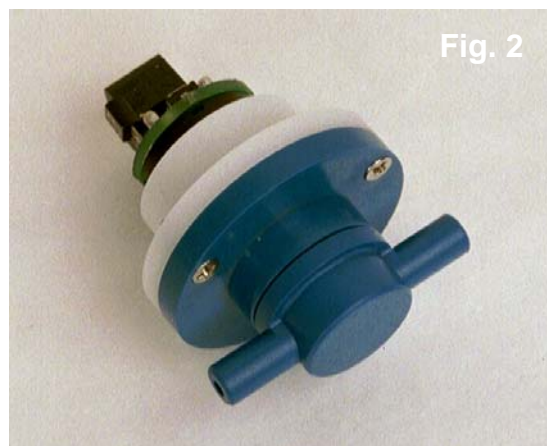


Fig. 2: ECO-Sure CO sensor plus 4-20mA transmitter with sensor holder, screwed to blue installation ring and plugged-in test gas cap.
Standard measuring range: 0-300ppm. Optional measuring range:
0-500ppm. Part nos. 2112B1005, 2112B1010
This unit is ready for installation into plastic or aluminium housing.



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.



Fig. 3

Fig. 3: Components from left to right: test gas cap; installation ring; sinter metal disc; sensor holder; ECO-Sure CO sensor with O-Ring and 4-20mA transmitter; pluggable terminal block.

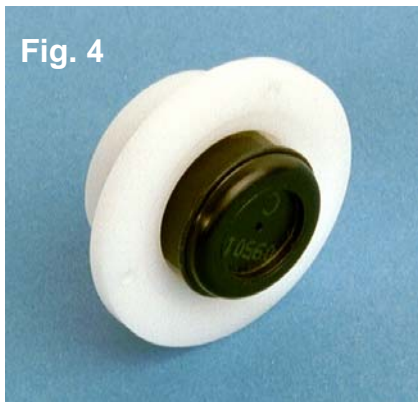


Fig. 4

Fig. 4: Sensor holder with half-fitted ECO-Sure sensor



Fig. 5

Fig. 5: Test gas cap



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.



Fig. 6: ECO-Sure CO sensor with 4-20mA transmitter and installation kit, provided as a complete unit, fitted into Euro-Gas aluminium housing. Standard measuring range: 0-300ppm. Optional measuring range: 0-500ppm. Part no. 2112B1013

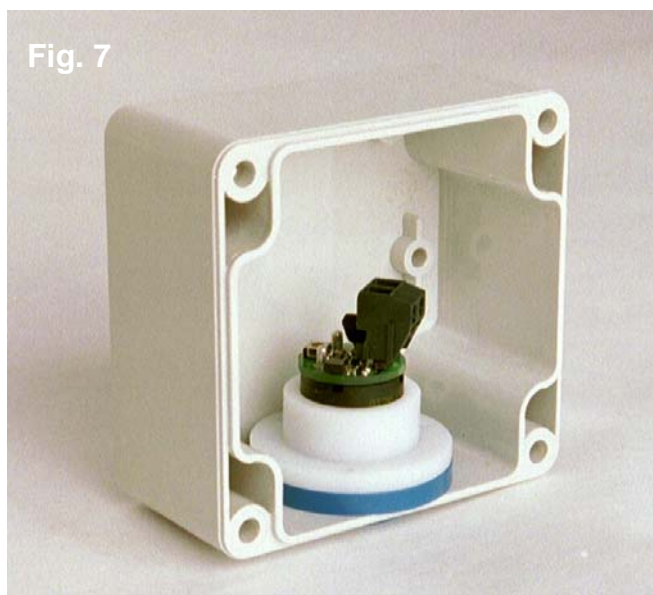


Fig. 7: ECO-Sure CO sensor with 4-20mA transmitter with installation kit and, as an example, built into Bopla wall mounting housing (please note: Bopla plastic housing is shown as an example only and is not available from Euro-Gas).



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.

Questions and answers

? Which components are TÜV approved according to VDI 2053

! The ECO-Sure CO sensor in conjunction with the 4-20 mA p.c.b.

? Does an existing TÜV certificate on a complete CO monitoring system become invalid if a manufacturer undertakes a sensor change in favour of ECO-Sure + 4-20 mA p.c.b.

! No, the TÜV that has issued the original certificate will rewrite the original certificate.

? How does the automatic zeroing circuit work

! This is a company secret

? Which cross-sensitivities are to be expected with the ECO-Sure CO sensor

! The cross-sensitivity on the ECO-Sure CO sensor has been tested by TÜV according to the requirements of VDI 2053 and shows a cross-sensitivity to other gases in an underground car park that is much lower than tolerated.

? What does "ECO-Sure" mean

! 1) **ECO** means cost-effective

2) **Sure** is its relationship to the new "SureCell" technology of the manufacturer.

It has the highest possible performance at extreme high and low atmospheric humidities, and a reproducible temperature profile and high quality sealings to prevent leaks.

? Are the terminals marked with + resp. -

! There is free choice on the polarity



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.

Questions and answers

? Why is there a sinter metal disc with the accessories

! The sinter metal disc protects the CO sensor from dust and splash water and restrains test gas turbulence within the test gas cap. Furthermore, the sinter metal disc protects the CO sensor from vandalism

? Is the usage of the sinter metal disc mandatory

! No, instead of the sinter metal disc, any other protection against dust and water can be used, for example a Goretex disc

Tips + Tricks

When using the test gas cap for regular testing and calibration, a test gas flow of 0.5 l/min is recommended.

For glueing the CO sensor into the installation ring, a glue which is free from hydrocarbons and solvents has to be used.

When the ECO-Sure CO sensor is plugged into the 4-20 mA p.c.b., the CO sensor is perfectly stabilised. However, if the CO sensor is separated from the 4-20 mA p.c.b. for any reason, the CO sensor has to be left without power for a time period of 2 – 3 hours for stabilisation purposes before replugging the CO sensor back into the 4-20 mA p.c.b.



ECO-SURE (2E) CO SENSOR + 4-20mA p.c.b.

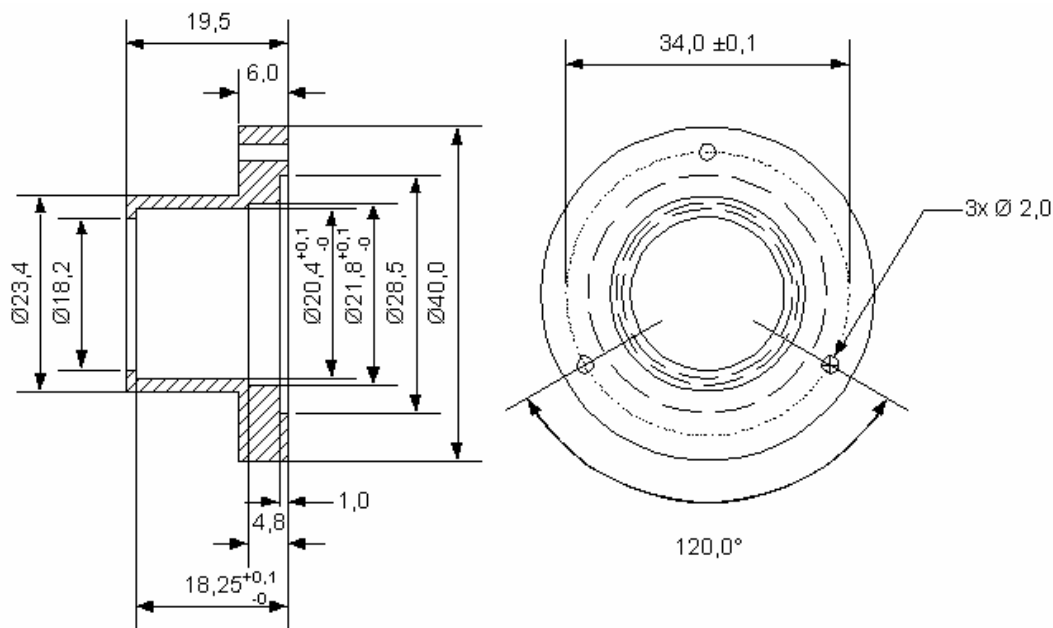


Fig. 10: Sensor holder

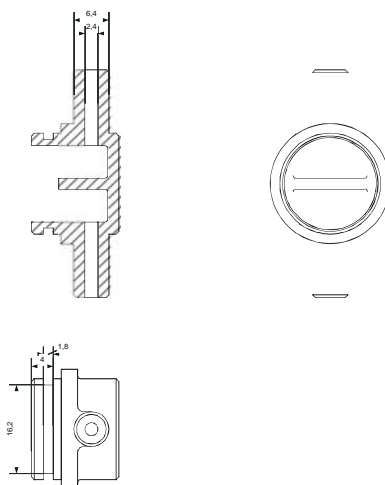


Fig. 11: Test gas cap



ECO-SURE (2e) CO SENSOR + 4-20 mA p.c.b. Operating Instructions

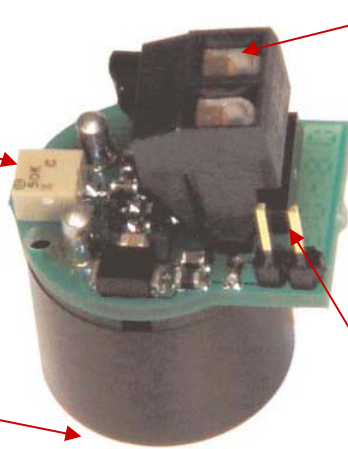
Potentiometer

for calibration adjustment

Please note: No zero adjustment required as automatically compensated

Test Gas

For calibration, flow 300ppm CO through a test flow cap. Test Gas Cap, installation kit and Calibration Gases also available from Euro-Gas. Please ask for details



Two wire screw terminal

for 24V d.c. power supply (+/-10%); +4-20mA signal output

Please note: No polarity (+/-) requirements

Test pins for one man calibration; 0.4 – 2.0 volts signal output

Two wire screw terminal: The transmitter has a two wire screw terminal to connect a 24V d.c. power supply. There is no polarity requirement across the two screw terminals (i.e. there is no +/- logic).

On the same two wires, you will receive the 4-20 mA signal output. The transmitter is precalibrated on 0-300ppm CO. When there is zero CO concentration, you will receive a 4mA signal. With a 300ppm concentration, you will receive a 20mA signal.

Potentiometer: This is used for adjusting the signal to the correct value if you apply a test gas concentration to the transmitter and it gives an incorrect signal.

Test pins: The two test pins allow for one man calibration. Please kindly note that the signal here is not 4-20 mA but **0.4 – 2.0 Volts**.

Carbon Monoxide concentration	0ppm	100ppm	200ppm	300ppm
Signal at wires	4 mA	9.33 mA	14.7 mA	20 mA
Signal at test pins	0.4 V	0.93 V	1.47 V	2.0 V



NO₂ SENSOR FOR OEM APPLICATIONS

SPECIFICATION

Detection principle:	electrochemical
Operation:	continuous
Gas entry:	by diffusion
Measuring range:	0 – 20 ppm NO ₂
Reproducibility:	smaller than 2% of measuring signal
Response time t₉₀:	smaller than 60 seconds
Temperature range:	-20°C up to +50°C
Humidity range:	15-90% relative humidity, non-condensing
Pressure range:	atmospheric ± 10%
Typical baseline range (pure air, 20°C):	-0,2ppm to +0,2ppm
Maximum zero shift (+20°C to +40°C):	0,2ppm equivalent
Expected long term output drift:	<2% signal loss/month
Recommended load resistor:	33 Ohm
Bias voltage:	not required
Output signal:	-250 ± 75 nA/ppm
Output linearity:	linear
Resolution:	0.1ppm
Life time:	2 years in air
Dimensions:	20 mm diameter Height 20.7mm including pin projection
Part no:	2112B9998



NO₂ SENSOR FOR OEM APPLICATIONS

PHYSICAL CHARACTERISTICS

Weight:	approximately 5.4g
Position sensitivity:	none
Storage life:	six months in a container
Recommended storage temp.:	+5 °C up to +20°C
Warranty period:	12 months from date of despatch
Part no:	2112B9998

Accessories:

4-20mA transmitter	including NO ₂ sensor and installation kit. Part no: 2112B9999
Installation kit	Sensor holder, sinter disc, O-ring, installation ring and installation screws for assembling into a wall mounting box. Part no: 2112B1012
Test gas flow cap	Part no: 2112B1010
Aluminium housing	Complete assembly also available in aluminium housing. Part no: 2112B9995

CROSS SENSITIVITY DATA

Interfering Gas	Concentration	Reading
CO	300ppm	0ppm
SO ₂	5ppm	0ppm
NO	35ppm	0ppm
H ₂	300ppm	0ppm
Ethylene	100ppm	0ppm
Cl ₂	10ppm	approx 8ppm

Performance data conditions: 20°C, 50% RH and 1013 mbar



NO₂ SENSOR + 4-20 mA PCB FOR OEM APPLICATIONS



Fig. 12: NO₂ sensor + 4-20 mA p.c.b. and screw terminals

Features

- Signal 4-20 mA
- Pre-calibrated on 0 – 20 ppm NO₂
- Two-wire system
- Automatic zeroing
- Signal test pins on p.c.b.
- Accessory installation kit
- Accessory test gas cap

User Benefits

- Standard interface
- Integrates directly with system
- Reduced installation costs
- Reduced maintenance costs
- 4-20 mA signal available on p.c.b., allows for one man calibration
- Allows easy assembly into wall mounting boxes
- Suitable to plug onto installation ring to apply test gas mixture

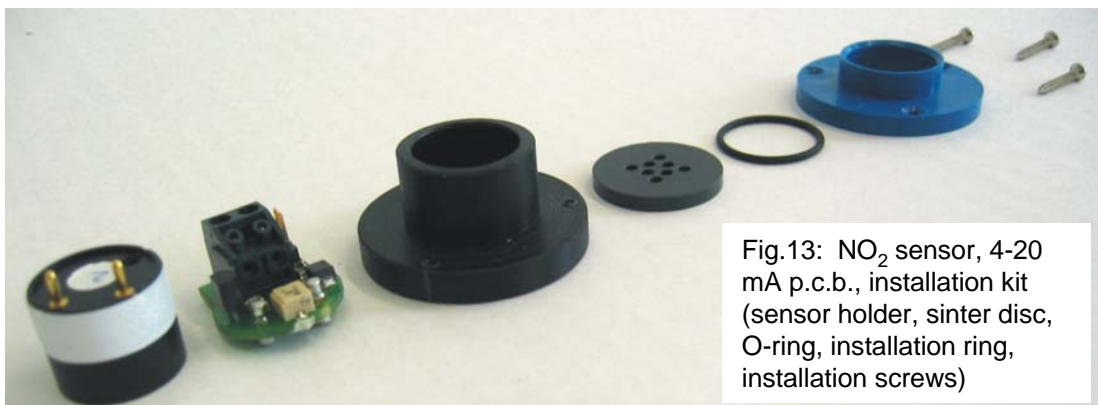


Fig.13: NO₂ sensor, 4-20 mA p.c.b., installation kit (sensor holder, sinter disc, O-ring, installation ring, installation screws)



NO₂ SENSOR + 4-20 mA PCB FOR OEM APPLICATIONS

SPECIFICATION

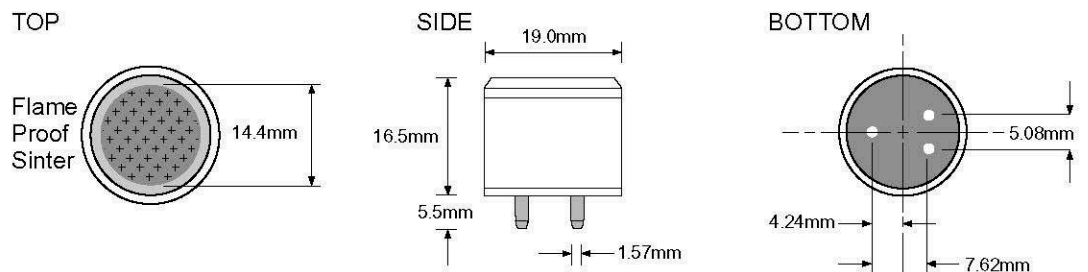
Detection principle:	electrochemical
Operation:	continuous
Gas entry:	by diffusion
Measuring range:	0 – 20 ppm NO ₂
Reproducibility:	smaller than 2% of measuring signal
Response time t90:	smaller than 60 sec
Temperature range:	-15 °C up to +40°C
Humidity range:	15-90% relative humidity, non-condensing
Life time:	2 years
Power supply:	20-28 V d.c.
Signal:	4-20 mA, max. load 300 Ohm
Zero adjustment:	automatic
Sensitivity adjustment:	via potentiometer
R.F.I.:	according EN 50081-1 resp. EN 50082-2 B
Recommended storage temp.:	+5 °C up to +20°C
Dimensions:	NO ₂ Sensor: 20 mm diameter Height 30 mm incl. terminal block
Part no:	2112B9999
Accessories:	
Installation kit	Sensor holder, protection disc, O-ring, installation ring and installation screws for assembling into a wall mounting box. Part no 2112B1012
Test gas flow cap	Part no: 2112B1010
Aluminium housing	Complete assembly also available in aluminium housing. Part no: 2112B9995





CATALYTIC SENSORS

Zellpell Midi Type 1 (3AC)



data sheet

Product description

A range of Electro-Catalytic diffusion limited, combustible gas detectors, supplied in metal housings and fitted with integral connection pins and flame arresting sinters. All versions of Midi are Component Recognised/Approved by UL, CSA and BASEEFA, making them ideal for incorporation into separately certified gas detection apparatus either portable or fixed.

Within the enclosure a variety of alternative detecting elements can be incorporated. These allow the sensor to be tailored for either the industrial, commercial or domestic environments.

Note: Although Midi are components approved by UL, CSA and BASEEFA, further "apparatus approval" must be obtained for the intended equipment for use in Hazardous Areas/locations.

Approvals

UL: File No. 216146 Class 1, Div 1, Groups ABCD and Class 1, Zone 1

CSA: Cert. No. 1205473 Class 1, Div 1, Groups ABCD and Class 1, Zone 1

BASEEFA (Cenelec ATEX): BAS No. 01ATEX2122U EEx d IIC (II 2G)

EURO-GAS
MANAGEMENT SERVICES LTD

General Specification

Operating Performance:

Operating Principle	Constant voltage
Gas Detected	Most combustible gases & vapours
Measurement Range	0-100% LEL
Operating Voltage	3.3V \pm 0.02V
Operating Current	70mA \pm 5mA
Maximum Power Consumption	230mW
Certified Power Dissipation	Pmax 0.4W Vmax 9V
Maximum Methane Concentration	5% v/v
Expected Operating Life	2-years in air
Output Sensitivity	>20mV/% methane
Temperature Range	-55°C to +55°C
Humidity Range (non-condensing)	Continuous: 0-90% RH Intermittent: 0-99% RH
Response Time (T590)	<10 seconds
Long Term Zero Drift	< \pm 5% LEL methane per year
Long Term Span Drift	< \pm 2% LEL methane per month
Linearity	\pm 10% LEL up to 100% LEL

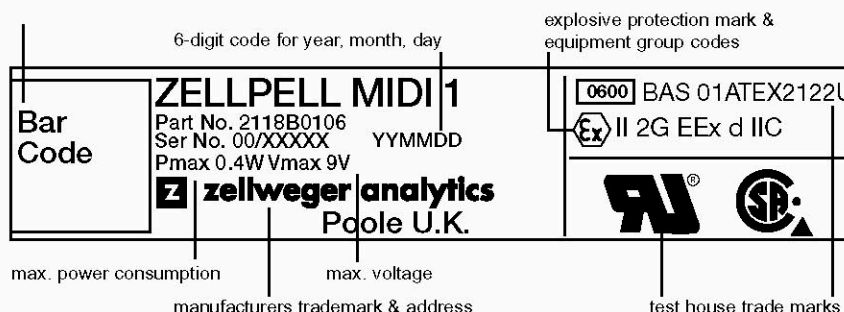
Physical Specification:

Housing Material	Aluminium Alloy (BS4300) – 12.6 gms
Sinter Material	Stainless Steel ANSI 316 90 μ m maximum pore size 4.0 to 4.5g/cm ³ density
Label	Metallised polymer
Storage Life	6 months in sealed container
Storage Conditions	10-20°C, 45-75% RH in clean air
Orientation	Any
Warranty Period	12 months from date of despatch

Ordering Details:

Part Number	2118B0106
-------------	-----------

bar code containing serial no.



Special Conditions of Use: Midi Sinters are "Component Approved/Recognised"

1. All versions of Midi shall be enclosed within a protective enclosure, affording direct impact resistance.
2. Supply pins shall be fed from an intrinsically safe source, e.g. as derived from a multi-gas portable.
3. Additional "Apparatus Approval" must be obtained before incorporation of all versions of Midi Combustible Sensing elements.
4. Intended for use at atmospheric pressure only (1.1 bar).

This publication is not intended to form the basis of a contract, and the company reserves the right to amend the design and specification of the instruments without notice.

EURO-GAS
MANAGEMENT SERVICES LTD

ZELPELL SENSOR + 4-20 mA PCB FOR OEM APPLICATIONS

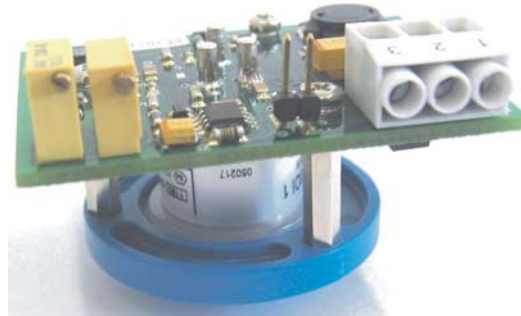


Fig. 14: LEL sensor + 4-20 mA p.c.b. with zero and span potentiometer and screw terminals, with installation ring and distance bolts. Part no: 2112B1000

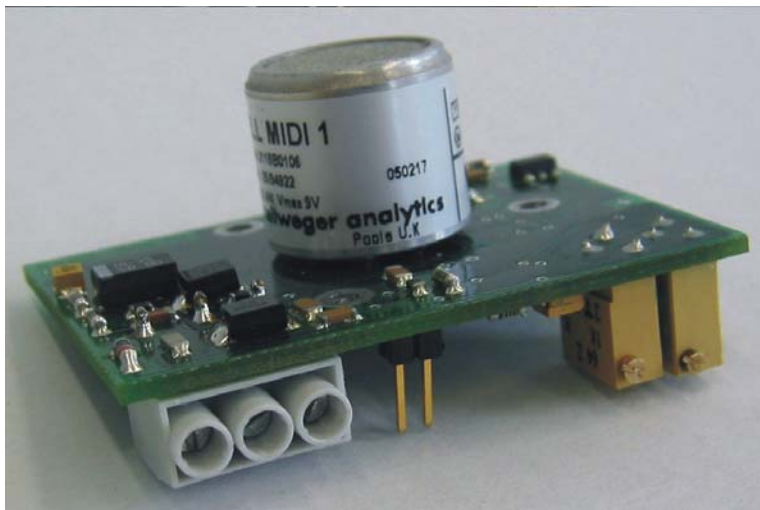


Fig. 15: LEL sensor plugged on 4-20 mA p.c.b.

SPECIFICATION

Principle:	electro-catalytic
Operation:	continuous
Gas entry:	by diffusion
Measuring range:	0-100% LEL of flammable gases
Response time t90:	< 10 sec
Temperature range:	-20 °C up to +40°C
Humidity range:	15-90% relative humidity, non-condensing
Long term zero drift:	smaller +/- 5% LEL / year
Long term span drift:	smaller +/- 2% LEL / year
Power supply:	24 V d.c.
Dimensions:	41 x 56 mm, 26 mm high



MODBUS CARD FOR 4-20mA SIGNALS FOR GAS DETECTION SYSTEMS

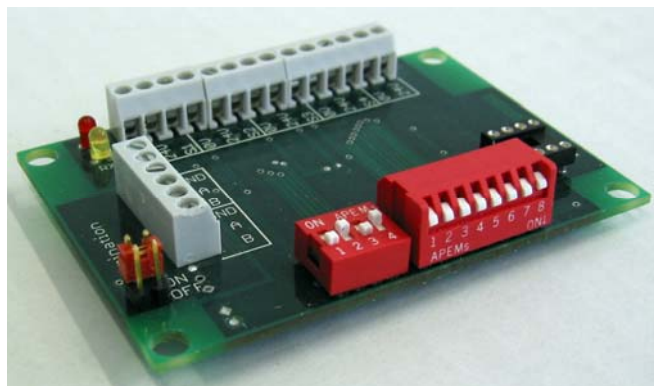


Fig. 16: MODBUS card
Part no: 2112B1050

The central evaluation and processing of measuring signals using a bus system and a central computer is advisable whenever a complex system has to be controlled, such as a system with many remote measuring points within buildings and underground car parks. When determining gas and vapour concentrations in ambient air, a typical signal of 4-20 mA is used with a gas detection system. Although it is possible to connect to a digital data communication system, this is expensive.

The MODBUS card changes these 4-20 mA signals into digital signals and transfers this signal via a serial RS485 interface to a central computer, which can be located up to 1,000 metres away. The MODBUS card makes use of reliable MODBUS RTU protocol.

The MODBUS card is suitable for a maximum of four 4-20 mA input signals and transfers the data, on request, to the central computer.

The digital signal contains the following information:

- Coding of the MODBUS card
- Coding of the channel
- Gas to be measured
- Gas concentration



MODBUS CARD FOR 4-20mA SIGNALS FOR GAS DETECTION SYSTEMS

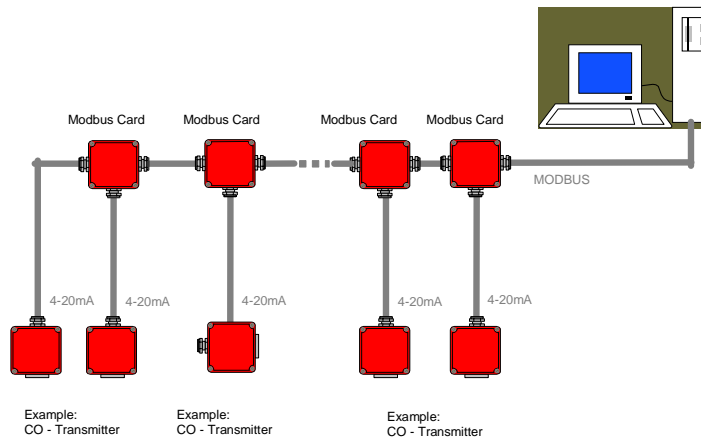


Fig. 17: An example schematic arrangement with a digital CO monitoring system

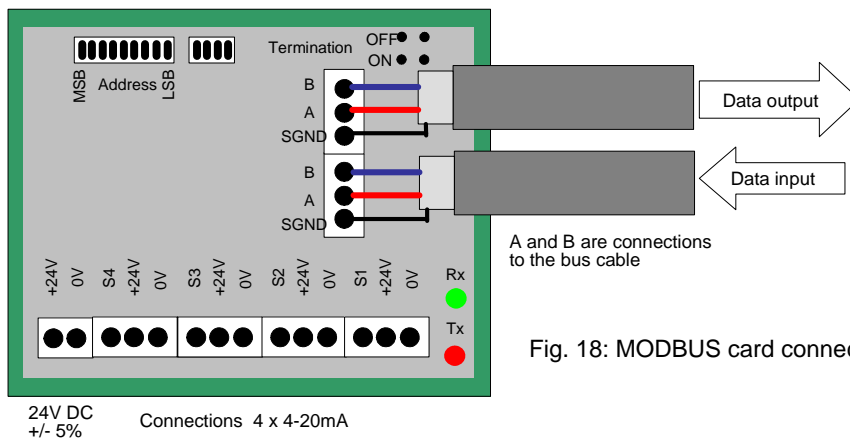


Fig. 18: MODBUS card connections

Specification

Power supply:	+24V d.c.
Power consumption:	depending on cable length and cross-section
Temperature range:	-10°C up to +50°C
Humidity range:	15-95% RH, non-condensing
Dimensions:	78 x 56 x 14 mm (LxWxH)
Indicators:	green LED Rx: Data reading red LED Tx: Data writing
Addressing:	Address switches on card
Accessories:	Also available in aluminium housing complete with cabling glands. Part no: 2112B1055

