Read before use!
Observe all safety instructions!
Keep for future reference!

CE

OPERATING INSTRUCTIONS

CO_2 CARBON DIOXIDE GAS MEASURING SYSTEM

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MANAGEMENT SERVICES LTD

CO2 GAS MEASURING SYSTEM

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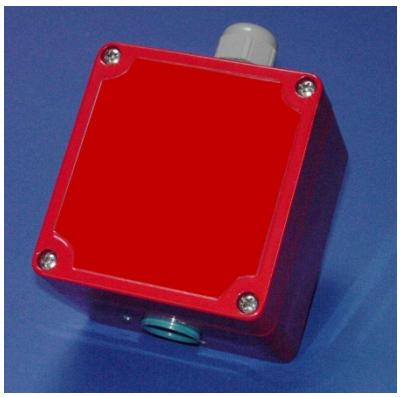
1. FOR YOUR SAFETY



CO2 Gas Measuring Systems

Part no.: 2112B9000
PPM Measuring Ranges:
Standard: 0-3000ppm
Optional: 0-5000ppm, 0-6000ppm,
0-10,000ppm, 0-20,000ppm, 0-30,000ppm

Part no.: 2112B9050
% Measuring Range: **0-5 % Volume**

Observe the instructions for use

Any person handling or operating the gas measuring system must first be fully familiar with and observe these instructions for use. The gas measuring system must only be used as described in section 1.2.

Servicing

The gas measuring system must be inspected and serviced regularly by qualified specialists. Repairs to the gas measuring system must only be carried out by qualified specialists. (See sections 1.4 and 5.)

Do not operate in areas subject to explosion hazards

The gas measuring system is not approved for operation in areas subject to explosion hazards. Do not operate it in any areas where combustible or explosive gas mixtures are likely to occur.

WARNING!

These operating instructions do not contain all the information necessary for the safe operation of the device. Please acquaint yourself with the regulations and operator's obligations that apply in your area. In addition to these operating instructions, for example, you should observe and instruct others concerning the universally valid legal and other binding regulations for the prevention of accidents and protection against accidents.

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1.1 SAFETY INFORMATION AND TIPS

A series of warnings is used in these instructions concerning some of the risks and dangers that may occur when using the gas measuring system. These warnings contain "signal words" designed to draw attention to the degree of danger that is to be expected.

These signal words and the associated hazards are as follows:

DANGER!

Indicates an **imminently** hazardous situation which, if not avoided, **will** result in **death or serious injury**. This signal word is to be limited to the most extreme situations.

WARNING!

Indicates a **potentially** hazardous situation which, if not avoided, **could** result in **death or serious injury**.

CAUTION!

Indicates a **potentially** hazardous situation which, if not avoided, **may** result in **minor or moderate injury**. It may also be used to alert against unsafe practices.

IMPORTANT!

Indicates information concerning use and other useful information.

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1.2 INTENDED USE

The CO2 gas measuring system must be used exclusively for measuring the concentration of CO2 in air. The air mixture must not contain any corrosive substances, such as SO2, NH3, H2S or HF, as they may destroy the sample cell or filters. It is essential that the Carbon Dioxide measuring system is installed only as described in section 3.3 and that the ambient conditions specified (e.g. temperature limits) are adhered to.

There is **one** specific sensor built into the gas measuring system which specifically measures **one** single substance.

DANGER!

Danger to life due to poisoning!

The substance measured by the gas measuring system is toxic to humans. The MAC value (maximum admissible concentration) is 5,000ppm CO2 and the short-term maximum value is 20,000ppm CO2. Users and operators of the facility must make sure that, where there is a raised concentration of Carbon Dioxide, suitable measurements are taken to protect people in accordance with legal regulations. Examples of this include an increased supply of fresh air or evacuation of the facility. **Not all available standard measuring ranges are suitable for people protection!**

DANGER!

Danger of fire and explosion due to sparks!

The Carbon Dioxide measuring system may not be operated in areas where ignitable or explosive gas mixtures can arise.

WARNING!

The measuring system must only be repaired by the manufacturer. Do not modify the system and do not reconstruct it. It may otherwise no longer measure the concentration of carbon dioxide reliably.

IMPORTANT!

The measuring signals from the gas measuring system must be evaluated and further processed by the user's downstream device.

IMPORTANT!

It is essential to observe the information given in these operating instructions with regard to operation, maintenance and servicing.

Faults must be rectified immediately.

1.3 OTHER DANGERS

Despite its careful design, there remain some further dangers associated with handling the gas measuring system:

DANGER!

Mains voltage (230 V, 50 Hz).

Danger to life due to electric shock or burns.

Do not bring into contact with water.

Before opening the gas measuring system, safely disconnect the mains voltage (safe electrical isolation). Electrical work should only be carried out by a qualified electrician.

Only install in a voltage-free state.

DANGER!

Danger to life due to poisoning!

Certain external conditions can lead to the gas measuring system being **unable to signal** an increased gas concentration, e.g. in the event of a power failure. In this case, users and operators of the system must ensure that suitable measures are taken to protect personnel in accordance with legal regulations.

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1.4 QUALIFICATION OF PERSONNEL

Only qualified mechatronic engineers or persons with comparable training may mount, install or commission the gas measuring system or carry out maintenance and servicing work.

Only qualified electricians may carry out work on the electrical system. The operator must instruct all users of the system on the basis of these operating instructions.

The minimum age is 16 years. An experienced person must supervise juveniles and apprentices when working on the gas measuring system.

Any work that is not described in these operating instructions must be executed by the manufacturer.

2. PRODUCT DESCRIPTION

2.1 DESIGN

The two-beam infrared sensor is mounted on a sensor holder in aluminium housing over a diffusion opening. The cable entry is via a screwed cable gland (PG11) located on the opposite side. The aluminium housing additionally contains the transmitter with a signal amplifier and a 4-20mA or 0.1-10V analogue output (output on request).

The transmitter processes and transmits the measurement signals (see Fig. 1). It functions according to the three-wire system.

The output signals from the measuring system are read and further processed according to the customer's specifications in a downstream device.

2.2 PRINCIPLE OF OPERATION

With the aid of a specific two-beam infrared photometer (NDIR), the Carbon Dioxide measuring system determines the absolute CO2 content of the ambient air (atmospheric partial pressure). As the measurement signals are evaluated and processed, according to a new digital algorithm, the measuring system detects the Carbon Dioxide concentration quickly, precisely and economically. The system monitors itself continuously and signals hardware and software malfunctions. The measuring range is linear for ranges of 0-5% volume CO2 and below. A slight calibration curve can be expected for higher ranges greater than 0-5% volume CO2.

Power is supplied via 24V direct current. In normal applications, calibration is not necessary. If required, however, calibration can be carried out by a specialist. The measured values are received via an analogue channel, with output options of 4-20mA or 0.1-10V.

2.3 TECHNICAL DATA

Transmitter

Power supply:	Screw terminals	
	Current:	Approx. 100mA
Connections:	Screw terminal 1:	0V
	Screw terminal 2:	4-20mA or 0.1-10V
	Screw terminal 3:	24 Vdc ±5%
Ambient temperature:	-10° C to +50° C	
Air pressure:	900 hPa to 1100 hPa	
Permissible humidity:	15-95% relative humidity, non-condensing	
Output:	4-20 mA, maximum load 450Ω OR 0.1-10V, minimum 1 K Ω	
Housing:	Aluminium red	
Protection class of electrical connection housing: IP 54		
Weight of housing:	Approx. 500 g	
Size of housing:	Approx. L90 x W85 x H65 mm	
Connecting cable:	3x1.5^2 Cu + functional ground, shielded cable	

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Sensor

Gas access:	By diffusion	
PPM measuring ranges**:**	Part no.:	2112B9000
	Standard:	**0-3000ppm**
	Optional:	0-5000ppm, 0-6000ppm, 0-10,000ppm, 0-20,000ppm, 0-30,000ppm
Volume measuring ranges:	Part no.:	2112B9050
	Standard:	**0-5 % Volume**

Warm-up time:	Approx. 5 min
Accuracy:	± 2% at 25° C, full scale
Reproducibility:	± 1%
Reaction time:	Approx. 30 s

2.4 CERTIFICATION

The gas measuring system complies with EMC Directives EN 61000-6-2 and EN 61000-6-3 and thus Directives 89/336/EEC and 92/31/EEC.

3. TRANSPORTATION AND INSTALLATION

3.1 TRANSPORT

The gas measuring system is supplied together with these operating instructions. Please check the packaging for any damage when the product is delivered and report any damage immediately to the forwarding agency and dealer. Do not throw or drop. The gas measuring system may be damaged or scratched. Protect against wet conditions, humidity, dirt and dust.

3.2 STORAGE

The gas measuring system may be stored in its packaging in dry rooms at temperatures between +10° C and +50° C. Protect against wet conditions, humidity, dirt and dust.

3.3 INSTALLATION

IMPORTANT!

- Mount the measuring system on a level, firm and dry wall.
- When installing, it is essential to remain within the following permissible ambient conditions:
    - Ambient temperature between -10 and **+50° C**. (Sun can heat up the housing considerably!)
    - The measuring system should be protected from water, including splash water and condensation. The device should therefore be protected against the weather when mounted outdoors.
    - Special attention should be paid to material compatibility when installing. The sample cell, for example, must not under any circumstances corrode, and the filters must not become tarnished. For this reason, the air mixture that is to be measured must not contain, for example, any corrosive substances (see 1.2).
    - The device must not be installed in damp locations or areas subject to explosion hazards.
- The housing must be freely accessible and visible at all times.
- Parasitic voltages must not be permitted to occur.

Select the installation site according to the local circumstances and application purpose. If, for example, the Carbon Dioxide concentration will be measured in a fermentation cellar in order to protect workforce, at least one measuring system must be mounted at ground level (lowest point) and a second one at mouth level.

For measuring leakages over time, one measuring system should be mounted as close as possible to the site at which gas will emerge.

IMPORTANT!

Carbon Dioxide is heavier than air and accumulates at ground level (often referred to as a “sea of Carbon Dioxide”). If Carbon Dioxide is measured in order to protect people, one measuring system must always be mounted at ground level.

3.4 ELECTRICAL CONNECTION

DANGER!

Mains voltage (230 V, 50 Hz).
Danger to life due to electric shock or burns.
Do not bring into contact with water.
Before opening the gas measuring system, safely disconnect the mains voltage (safe electrical isolation). Electrical work should only be carried out by a qualified electrician.
Only install in a voltage-free state.

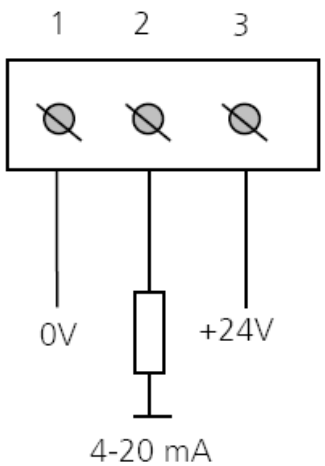

Fig. 2: Pin assignment. Screw terminal 2 has an option of 0.1-10V output on request.

The gas measuring system is connected to the downstream device by means of a four core, shielded cable (see Fig. 2). Do not lay this line next to a high-tension power cable as there is a danger of radiated interference. The cable must be capable of withstanding the anticipated mechanical, chemical and thermal stresses.

The gas measuring system is connected to the electric circuit via Screw terminal 1 and Screw terminal 3. The measured data is read via Screw terminal 2 (4-20mA or 0.1-10V output). The system earth (potential earth) is connected to the housing.

CAUTION!

In accordance with existing safety regulations, the gas measuring system must only be connected to suitable power supply units that comply with the valid technical regulations. It must be ensured that fuse protection is provided that is suitable for the power supply units used (safe electrical isolation)!

4. OPERATION

4.1 COMMISSIONING

Before commissioning, use the following list to check whether all requirements for trouble-free operation are met:

- Has the gas measuring system been installed?
- Is the gas measuring system accessible and visible?
- Have the ambient conditions been taken into account?
- Has the gas measuring system been connected?
- Has the housing been screwed down again?
- Is the power supply switched on?
- Are you sure that the connection cable is not laid next to high-tension power cable?
- Please bear in mind that this is a sensitive measuring instrument!

Next, carry out a test of the measured values. To do this, offer up test gas (at a concentration of half of the measuring range, e.g. 1500ppm CO2) to the diffusion opening and read the measured value on the downstream device.

If the measured value corresponds to the concentration of the test gas ± 2% of FS (warning: allow for the tolerance of the test gas), the gas measuring system is ready for use. Prepare a commissioning report (see section 9.3, Warranty).

4.2 CALIBRATION

The measuring system is designed such that no additional calibration is required, even if the device is in operation for a long period of time. If required, however, calibration can be carried out by a specialist.

A test gas cap is available for ease of test and calibration. Please ask Euro-Gas for details.

Test Gas Cap

Part no: 2112B1010

5. MAINTENANCE AND SERVICING

IMPORTANT!

The gas measuring system is a safety device and must only be repaired by the manufacturer. Do not modify the gas measuring system and do not reconstruct it. It might otherwise no longer measure the gas concentration reliably.

DANGER!

Mains voltage (230 V, 50 Hz).
Danger to life due to electric shock or burns.
Do not bring into contact with water.
Before opening the gas measuring system, safely disconnect the mains voltage (safe electrical isolation). Electrical work should only be carried out by a qualified electrician.
Only install in a voltage-free state

The gas measuring system and the connecting cable must be checked at least every six months by qualified personnel (see section 1.4) and a servicing report must be prepared. Always ensure that the interval between services meets safety requirements!

Check the measured values after each period of non-use or interruption of operation (see section 4.1). If the measured value of the concentration of the test gas corresponds to ± 2% of FS (NOTE: allow for the tolerance of the test gas), the gas measuring system is ready for use again. If the measured value is outside this range, the device is not working correctly. Inform the manufacturer or dealer and have the device repaired.

Carry out appropriate checks to ensure that the gas measuring system and its environment are always clean, accessible and visible. Above and beyond such measures, the gas measuring system is maintenance-free.

6. DECOMMISSIONING

Switch off the supply voltage. Please refer to section 3.2 for information on storage.

7. PACKAGING AND TRANSPORT

This device is a measuring instrument with sensitive electronic components. When returning it, please use the appropriate class of packaging according to the applicable regulations.

8. DISPOSAL

Obsolete devices should be rendered unusable immediately and disposed of according to the relevant regulations. Please contact your local authority for information about disposal.

9. APPENDIX

9.1 SPARE PARTS AND ACCESSORIES

- Test and calibration software and data cable 2.5 metres, part no. 2112B9075
- Test Gas Cap, part no. 2112B1010

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9.2 COPYRIGHT

9.3 WARRANTY

Euro-Gas grants a warranty for this device for a period of 6 months from commissioning, documented by a commissioning report. Within this warranty period, we will at our discretion repair or replace the device free of charge if found to be defective as to workmanship or material.

The warranty excludes: damages attributable to improper use, normal wear and defects that have only a negligible influence on the device's value or suitability for use.

Liability for the functioning of the gas measuring system shall pass at all events to the owner or operator if the gas measuring system is improperly maintained or repaired or if it is used other than for its intended purpose. Euro-Gas accepts no liability for damage caused by failure to observe the above information.

The warranty expires in the event that work is carried out by agents we have not authorised or if parts are used other than original spare parts.

Claims under the warranty may be made in all countries where this device is sold by authorised dealers.

In the event of any claim under the warranty, please return the device to us. The buyer shall bear the costs of transportation and the risk while the device is in transit. The execution of work under the warranty does not affect the warranty period in any way.

The above information does not extend the conditions of warranty and liability contained in the Terms and Conditions of Sale and Delivery of Euro-Gas Management Services Limited.

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