GP-CO2 / GJSL-CO2

Instruction and Maintenance Manual

geopal®

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PENDING ITS-I 23ATEXQ36745 DBI reg. no 233.301 DIC444QMS

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1 Safety

Important

Please read this Instruction and Maintenance Manual carefully before the GP-CO2 / GPSL-CO2 is put into operation.

To ensure a safe installation of the GP-CO2 / GPSL-CO2 it is necessary that the installation is carried out only by qualified personnel who are familiar with the relevant national and international legislation, directives, and standards.

Always make sure that the mains voltage corresponds with the voltage indicated on the type label.

Warning
Never remove the lid in an explosive atmosphere.
Beware of electrostatic charging. For cleaning use a damp cloth only.

2 Declaration of conformity

The producer **Geopal System A/S**
Bygmarken 19
DK-3520 Farum

declares that the specified product

Name: GP-CO2 / GPSL-CO2
Type: Gas Alarm Detector

conforms to the following directives and standards:

Low Voltage Directive 2014/35/EU
Electromagnetic Compatibility Directive (EMC) 2014/30/EU

EN 61 000-6-2 (2019)
EN 61 000-6-4 (2019)
EN 50 270 (2015)

This declaration is given in compliance with article 7, subsection 1 of the EMC directive. For specification of the acceptable EMC level, refer to the electrical data of the product.

Farum, 1 June 2025

Christian Møller
(*Producer's signature)*

3 Functions

3.1 *Application*

Geopal GP-CO2 / GPSL-CO2 is a stand-alone gas detector that can be connected directly with existing control and monitoring systems. The detector can also be connected with any of Geopal's other gas alarm monitors, as for instance GJD-02C, GJD-04C or GJ-03R.

Geopal gas detector GP-CO2 / GPSL-CO2 is designed to detect CO_2. The detector continuously monitors the CO_2 concentration. The specific setting and calibration of the individual detector will be indicated on the relevant data sheet and/or the type label.

3.2 *Symptoms from inhaling CO2*

Inhaled CO_2 affects the body in various ways depending on the concentration in the inhaled air.

In concentrations of approximately 3%, the frequency of respiration increases, and is considerably increased at approximately 5%. At the same time headaches can occur. With increasing concentrations, CO_2 can produce symptoms such as respiratory problems, palpitations, dizziness, drowsiness, and loss of consciousness.

As CO_2 is odourless, this progression can develop inconspicuously. However, in concentrations of 10% or more, CO_2 is irritating to the nose and throat. Concentrations of approximately 20–25% causes death within minutes.

3.3 *Principle of operation*

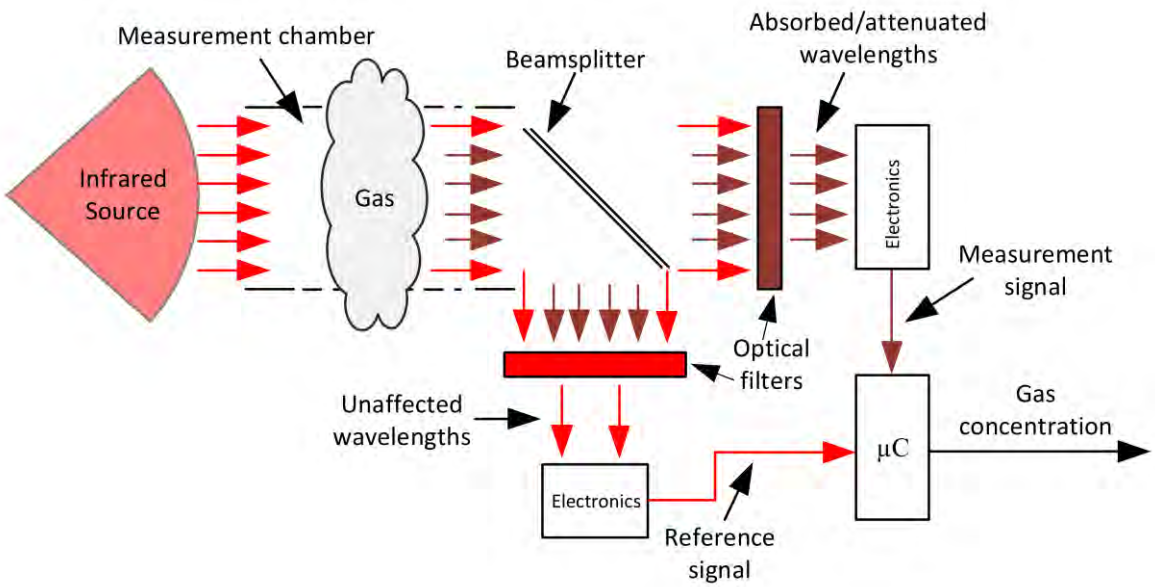


Figure 1 Simplified block diagram of an infrared gas detector.

Infrared waves extend from nominal red edge of the visible spectrum of 700 nm, with frequency around 430 THz, to 1 mm which corresponds to a frequency of 300 GHz.

Infrared gas detection is based on the principle of infrared absorption. The gas enters the measurement chamber, where it gets exposed to infrared light beam. Some of the infrared wavelengths will get absorbed/attenuated by the gas, while others pass through unaffected. The amount of absorption/attenuation depends on the target gas and its concentration.

A microcontroller (µC) compares the absorbed/attenuated wavelengths with a reference, the non-absorbed/attenuated wavelengths. This is done by two optical filters which design is dependent on the target gas. One passes the absorbed/attenuated wavelengths and block the unaffected wavelengths and the other passes the unaffected wavelengths and block the absorbed/attenuated wavelengths.

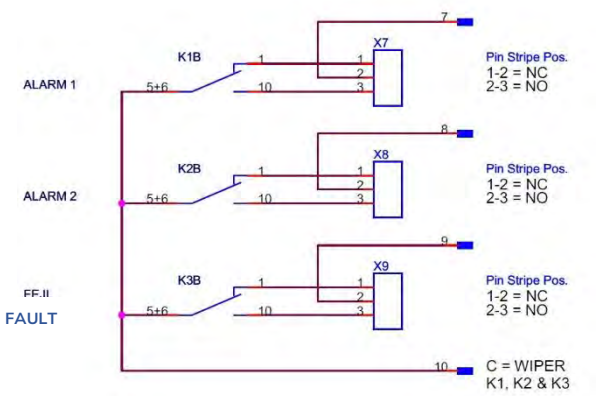
The different wavelengths are then converted into two electrical signals, which are then fed to the µC. The µC detects the difference and outputs the target gas concentration.

3.4 *Construction*

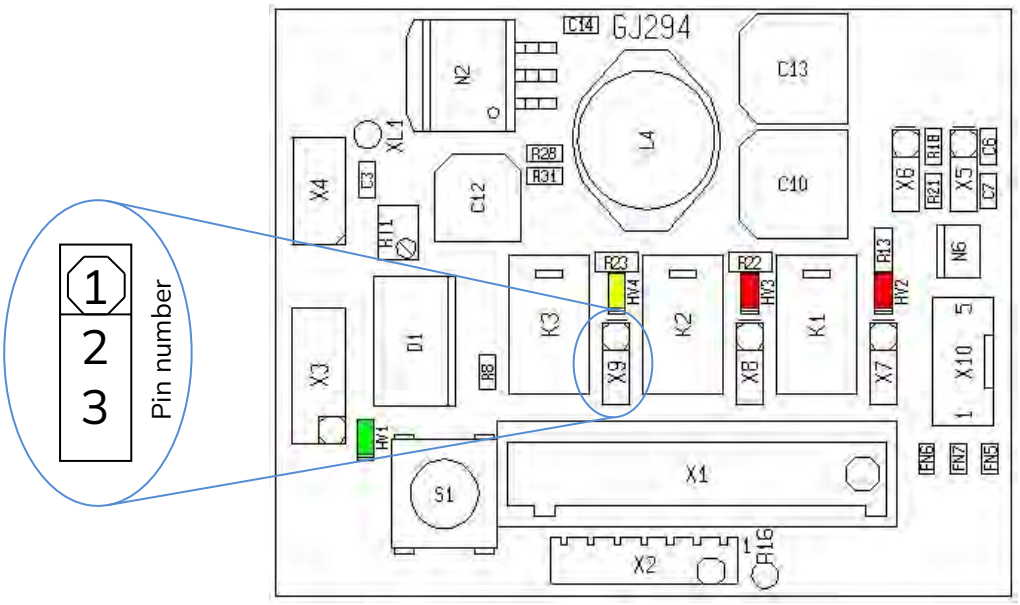
The gas detector has two alarm levels, alarm 1 (low alarm or gas alert) and alarm 2 (high alarm). The requested alarm limit values must be specified when ordering. The current setting is indicated on the detector data sheet.

The detector can be delivered with an analogue output of 0-5 V, 0-10 V or 4-20 mA. The preferred output must be specified when ordering. The analogue output can easily be changed from 0-5 V to 0-10 V and the other way around, but if you wish to change the output from voltage to 4-20 mA (or the reverse), you should call a service employee from Geopal or hand in the detector for re-programming. The current setting should be indicated on the detector data sheet and/or type label.

The detector has three multi-purpose relay outputs with a common arm: one relay for low alarm and one for high alarm, plus one relay for fault (30 V/1 A). These relays can control, via external effect relays, various functions, such as ventilation systems, magnet valves, disconnection of mains supply voltage, etc. The detector can automatically reset alarm and fault relays.



The detector does not have a galvanic separation of supply input and the analogue output. The detector is encased in a sturdy plastic cabinet, encapsulation class P56, DIN 40 050.



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3.5 *Operational mode*

When the green LED, marked HV1, is blinking regularly and the yellow LED, marked HV4, is on constantly, the detector is in operational mode.

3.6 *Alarm mode A1 (low alarm level)*

In case of gas concentrations above the set value for alarm 1, the detector will go into alarm mode A1, which is indicated by the red LED marked HV2 turning on and relay K1 being activated. Depending on the positioning of jumper X7, relay contact K1 will either open (if NC) or close (if NO).

The table below shows the functions of the detector during normal operation – and during alarm 1:

	Normal	**Alarm 1**
NC (X7=1-2)	Relay K1 closed HV2 off	Relay K1 open HV2 on
NO (X7=2-3)	Relay K1 open HV2 off	Relay K1 closed HV2 on

3.7 *Alarm mode A2 (high alarm level)*

In case of gas concentrations above the set value for alarm 2, the detector will go into alarm mode A2, which is indicated by the red LED HV3 turning on and relay K2 being activated. Alarm mode A2 can only occur subsequently to alarm mode A1. Depending on the positioning of jumper X8, relay contact K2 will either open (at NC) or close (at NO).

The table below shows the functions of the detector during normal operation – and in alarm mode 2:

	Normal	**Alarm 2**
NC (X8=1-2)	Relay K2 closed HV3 off	Relay K2 open HV3 on
NO (X8=2-3)	Relay K2 open HV3 off	Relay K2 closed HV3 on

3.8 *Fault mode*

Unlike the alarm relays, the fault relay is always activated in the normal operational mode, which is indicated by the yellow LED, marked HV4, being on. This function will give you a visual indication in the event of power failure.

The detector will go into fault mode, for instance if the sensor element is damaged or removed, or if the calibration of the detector is incorrect, which is indicated by the yellow LED, marked HV4, being turned off and relay K3 being deactivated. Depending on the setting of jumper X9, relay contact K3 will either close (at NC) or open (at NO). Note that this is the reverse of the alarm mode.

The table below shows the functions of the detector in fault mode:

	Normal	**Alarm 1**
NC (X9=1-2)	Relay K3 open HV4 on	Relay K3 closed HV4 off
NO (X9=2-3)	Relay K3 closed HV4 on	Relay K3 open HV4 off

Theoretically, a combination of alarm and fault mode can occur. If, for instance, the fault mode is triggered by the need for correct calibration, the detector will still react in the event of a gas leakage. If, however, the fault mode is caused by a defective sensor, the detector will obviously not function correctly. Consequently, it is always important to investigate the underlying cause of the fault mode.

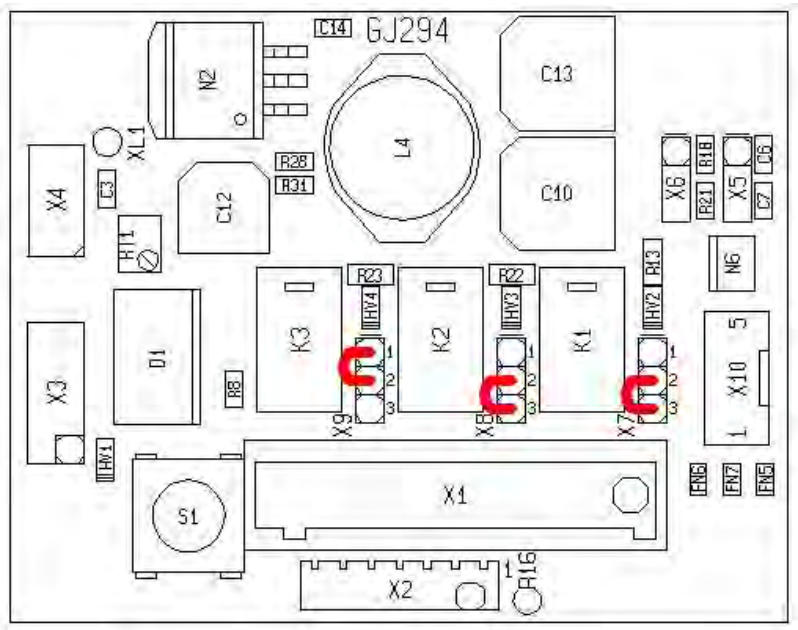
3.9 *Resetting the alarm*

When the gas concentration has dropped to a level below the preset alarm limits, the alarm is automatically reset. Resetting is not possible until the fault has been rectified.

3.10 *Alternative signal on alarm relays*

As an individual option on all alarm relays you can choose either NC (a Normally-Closed switch, i.e. a break contact) or NO (a Normally-Open switch, i.e. a make contact, or closing contact).On the printed circuit board there are three jumpers, marked X7 (A1), X8 (A2) and X9 (fault). By changing the position of the jumper you change the alarm signal for the circuit in question. If the jumper is placed in position 1-2, the relay contact will function as a break contact (NC), and if the jumper is placed in position 2-3, the relay contact will function as a make contact, or closing contact (NO).

In the example below the detector is set up with jumpers X7 and X8 in position 2-3 (NO) and jumper X9 in position 1-2 (NC):



A setup like this would result in the following functions for relays and LEDs in the detector:

Normal	Alarm 1	Alarm 2	Fault
Relay K1 open HV2 off	Relay K1 closed HV2 on	Relay K1 closed HV2 on	Relay K1 open HV2 off
Relay K2 open HV3 off	Relay K2 open HV3 off	Relay K2 closed HV3 on	Relay K2 open HV3 off
Relay K3 open HV4 on	Relay K3 open HV4 on	Relay K3 open HV4 on	Relay K3 closed HV4 off

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4 Installation

4.1 *Detector*

The detector is designed to be installed in places where CO_2 leakage may occur or near ventilation systems where the air flow is led past the detector.

We recommend detectors for CO_2 to be mounted in breathing height.

The GP-CO2 / GP-CO2-V detector should always be positioned so that the sensor is pointed downwards, ie. with the cable coming out on top.

The detector should never be covered by boxes, containers or other objects that might prevent the air movements from reaching the detector.

The detector should always, as far as possible, be placed in such a way that it is conveniently accessible for service and calibration.

4.2 *Detector for wall mounting*

Place the detector where it is desired to measure the CO_2 contents of the air. Typically, it should be installed in breathing height. This is approx. 1.5 m above the floor.

Figure 2 For flexible wall mounted installation, use wall bracket, part number: DET-1050.

4.3 *Detector for duct mounting*

Mounting and dismantling is easier when using the DIN plug type. If the cable gland type is used, it is necessary to disconnect the wires before mounting or dismantling the detector.

To ensure that the measurements of CO_2 in the ventilation duct are correct, it is important to make an airtight seal, so no ambient air is entering the duct and obscuring the measurements. Therefore, the cover of the detector, the cable gland and the top DIN plug must be tightly closed.

Mounting of the sampling probe in the duct
Drill a 14 mm hole for the probe and four 4 mm holes for the mounting screws. Remember to fit the gasket. If the gasket is not sufficient, extra sealing paste must be used.

When mounting the sampling probe, make sure that it does not touch the opposite wall in the duct. Shorten if needed.

Screw the detector onto the sampling probe. Remember to fit the gasket between the probe and the detector nose. Finally attach the cable / DIN plug.

For mechanical drawing and part numbers, please see 8.3.

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4.4 *Electric wiring*

The detector is connected to the central unit by a screened 3 to 8-conductor installation cable. The number of conductors depends on how many of the available outputs are required. The maximum conductor resistance should be 10 Ω per conductor (ie. 20 Ω in loop).

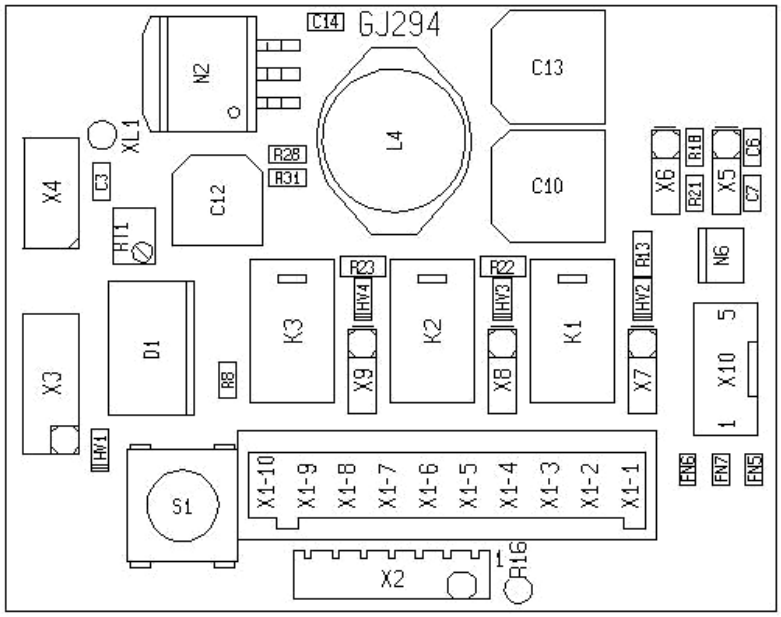
Supply voltage 10-32 V DC is connected to terminals X1-2 and X1-3 on the terminal strip. The screen is connected to X1-1.

The output signal for 4-20 mA or 0-5 V/0-10 V is found on terminals X1-5 and X1-6.

Supply voltage and analog output are not galvanically separated. However, if you want common GND for DC supply and analog output, make sure terminals X1-2 and X1-6 are connected.

The alarm relay outputs are found on terminals X1-7 (Alarm 1), X1-8 (Alarm 2) and X1-9 (Fault). Terminal X1-10 has a joint connection to the changeover switch (Common).

The numbering of terminals on the terminal strip is indicated on the diagram below:



The table below shows an overview of the terminals on the terminal strip:

X1-1	Frame / screen	
X1-2	Supply voltage (-)	10-32 V DC
X1-3	Supply voltage (+)	10-32 V DC
X1-4	Not connected	
X1-5	Analogue out (+)	V_{out} / I_{out}
X1-6	Analogue out (-)	V_{out} / I_{out}
X1-7	Relay out, Alarm 1	NC/NO
X1-8	Relay out, Alarm 2	NC/NO
X1-9	Relay out, Fault	NC/NO
X1-10	Relay in, Common	Common

4.5 *Before use*

On delivery, the detector can be fitted with a protective tape and plug. The purpose of this is to prevent the sensor element from being affected by smoke, gases, vapours, dust etc. during construction and installation work as this may harm the sensor and result in alarm malfunction. These protective devices should be stored and used later if the detector is exposed to harmful gas etc.

4.6 *Final test after installation*

When the supply voltage is turned on, the green LED will emit a series of short, separate blinks until the detector is operational. Meanwhile, the alarm function will be blocked.

When the green LED, marked HV1, is blinking regularly, the detector will be operational. In normal operational mode the red alarm LEDs will be off and the yellow fault LED will be on.

Normally, no calibration is required after installation, as the detector is already calibrated and tested before it is delivered. If you wish to check whether the analogue output is active and the relay functions are working properly, this can be done by using a test gas or blowing into the detector, humans exhale 40.000 ppm Co2.

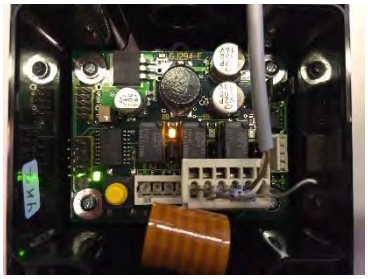
5 Calibration and service

5.1 *Test and calibration procedure for gas detectors*

Detector type: GP-CO2 and GPSL-CO2
The following information is stated in the data sheet / calibration certificate. The original certificate can be obtained from Geopal. (serial no is required).

- Sensor type, gas that needs to be detected (refrigerant, methane, hexane etc.),
- Range (0-2000 ppm, 0-10.000 ppm, 0-30.000 ppm)
- Alarm levels, low alarm/high alarm
- Test gas needed for span calibration (type and concentration)

Standard calibration
Remove cover on detector.
Check status of LED's, correct is:
Green LED must be steady blinking, Frequency of 1 Hz
Yellow LED must be on
Red LED's off



If green LED is not on check supply voltage and connection (12-30 DC), if voltage supply is correct replace PCB (Geopal part no. PRINT-1355D-SA).

If yellow LED is off or/and red LED's is on it can be due to insufficient calibration, perform calibration before further action. (First zero- then span calibration)

If LED's does not return to correct position after calibration replace sensor and perform new calibration.

If sensor replacement does not help replace the PCB and perform new calibration.

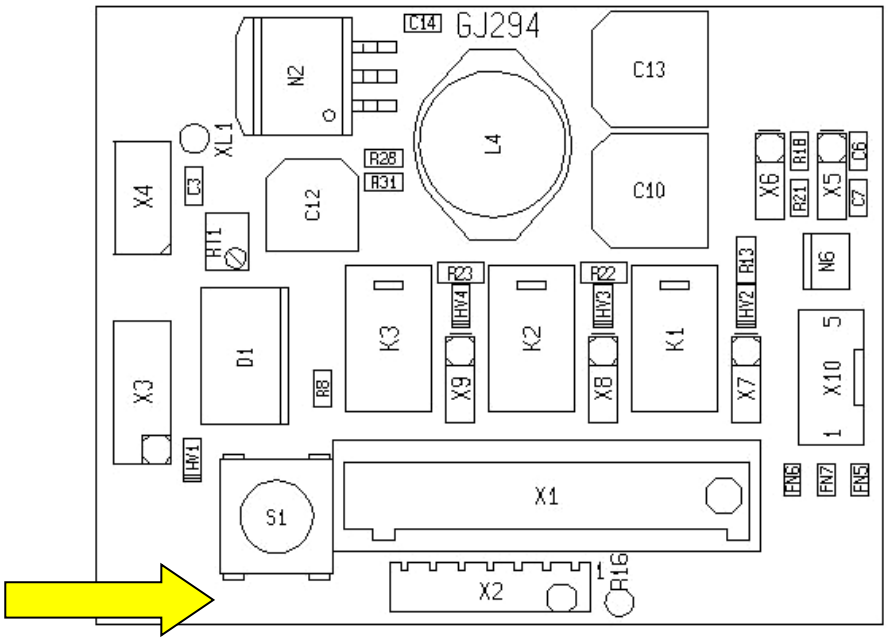
5.2 *Zero calibration*

Normal background CO2 level is 350 ppm, if readings are approx. at this level a zero calibration is not necessary.

Add calibration gas N2 (99,9%).
Press calibration button on the detector hold down until green LED gives a short blink.

The LED will start to blink insynchronous, when green LED returns to steady blinking, by one Hz. Zero calibration is successful completed.

If analogue output is connected to central control system check reading. (must be 0).



5.3 *Span calibration*

Ad test gas using hose connector, valve with flowmeter, test gas can.

Open gas to a flow of 0.1 liter/min, see side of aerosol can.

Press calibration button until green LED gives a short blink. The LED will start to blink insynchronous, when green LED returns to steady blinking by 1 Hz span calibration is successful completed. Red LED's will be activated if alarm levels are under span point. If analogue output is connected to central control system check reading.

Remove test gas.

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If the output goes to zero instead of span point when span calibration is completed it means that the output from the sensor when adding test gas has been so low that the detector has recognized it as a zero calibration and not a span calibration. This can happen if the sensor signal has declined sense last calibration.

When the calibration button is pushed, the detector does not know if it is a zero or a span calibration, but it compares the actual value with the stored Vo and Va values.

If this happens replace, the sensor or connect terminal program to detector.

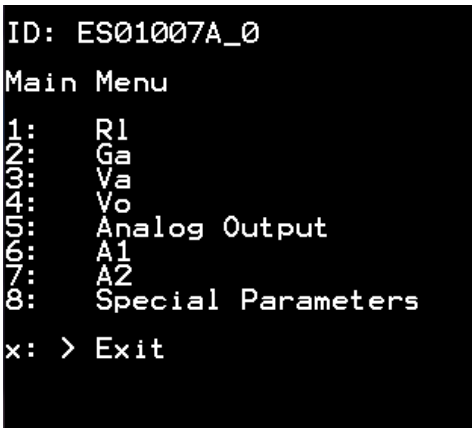
Please see below Terminal program.

When does the detector perform span calibration after adding test gas and pressing the calibration button?

The program in the detector is set to perform the span calibration when the increase in the out-put signal from the sensor over a given time gets under a certain value.

5.4 *Terminal program for communicating with the detector*

Sometimes it can be helpful to connect a computer to the detector by using a communication cable. Please refer to below for program download.



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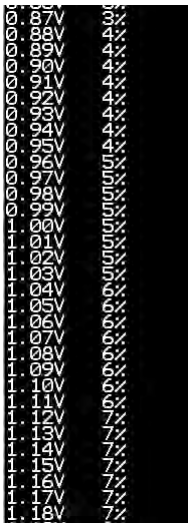
Settings

Software version. ID: ES01007A, ES01006A and ES01005A

1: R1: 999 factory setting not to be changed
2: Ga: 25.00-50.00 % (calibration point, percentage of full range)
3: Va: Span (V) point from latest span calibration.
4: Vo: Zero (V) point from latest zero calibration.
5: Analog Output: 0001 for mA output / 0000 for V
6: A1: Low alarm ex. 0025% (setting of detector relays, 25% of full range)
7: A2: High alarm ex. 0050% (setting of detector relays, 50% of full range)
8: Special parameter:
   Latch 1 (must be 0000 for auto)
   Latch 2 (must be 0000 for auto)
   Sensitivity limit: 01.50



Extra explanations

4: Va — If span calibration fails as described above (red block) the value in Va can be overwritten. When test gas is added the voltage signal increases but if it only reaches ex. 1.4 V and the stored Va value is 3.0 V the detector will performed an zero calibration instead of a span calibration. In this case change Va to 1.5 V add test gas and perform new calibration.
If this occurs, redo the zero calibration, wait atleast 15 min to make sure that the testgas no longer affects the sensor output.

5: A. out — To test max output 20 mA change value from 0001 to 0100.

8: Special parameters

Sensitivity limit:
When to replace the sensor: in the program there is a set value “sensitivity limit” setting is 1.5 (depending on gas and application the factory setting is from 1-1.5). If Vmax – Vo is smaller than 1.5 the detector goes into fault and out-put will be 2 mA and fault relay is activated (yellow LED is off), in this case the sensor must be replaced and a new calibration performed.

So as long as the calibration can be performed: zero in clean air + span and no fault occurs after calibration, the sensor is OK.

Vmax is calculated (the value is not shown) based on R (set of resistance) Ga (span point) Vo & Va.

5.5 *Calibration procedure when computer is connected*

Zero calibration
Normal background CO2 level is 350 ppm, if readings are approx. at this level a zero calibration is not necessary.

Add calibration gas N2 (99,9%).

Press calibration button on the detector hold down until green LED gives short blink.

On the computer screen an arrow pointing to the left will occur < and the green LED will start to blink insynchronous

When * is shown on the screen and the green LED is steady blinking by 1 Hz, zero calibration is performed. Value shown on screen must be 0 % (voltage can vary from 0.1-1V.

Span calibration
Add test gas using hose connector, valve with flowmeter, test gas can.

Open gas to a flow of 0.1 liter/min, se side of aerosol can.

Press calibration button until green LED gives a short blink. The LED will start to blink insynchronous and on the computer screen an arrow pointing to the right will occur >. When * is shown on the screen and green LED returns to steady blinking by 1 Hz.

Remove test gas.

How to install the terminal program
The terminal program is a free ware and can be downloaded free of charge.

Download Tera Term, from the internet. (it is free ware)
Install Tera Term.

Before you start Tera Term connect a communication cable (TEST-1038) in USB laptop.

Wait until USB driver is installed, what happens automatically in windows 7.

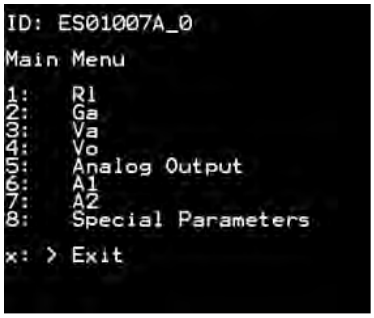
Start Tera Term.

Go to Setup – Serial port and chose

Baud rate	:	2400
Data	:	8 bit
Parity	:	none
Stop	:	1 bit
Flow control	:	none

Go to Setup – Save setup and press save

When you are successfully connected this picture will be shown on the screen when tabbing ENTER



Or the actual values

Necessary calibration equipment:

Set of Communication cables (2 pcs.) (RJ45-10pol and USB-RJ-45)	TEST-1038
Valve with flowmeter and hose	TEST-1020
Hose connector EX/OX/C/SA	MON-1435
Filling adapter w/manometer	TEST-1071
Test gas for span calibration (type of gas to be specified by order)	TEST-1015

5.6 *Service interval*

The detector is very stable and has a very good long-term stability. This means that regular calibration is not necessary, but we recommend that the system is tested once a year to make sure that the detector is working correct and to ensure that the rest of the system is working accordingly.

Add a CO_2 test gas to the detector and make sure that the alarm relays are activated and that the analogue output also increases. (Concentration depends on range, is stated on the detector label)

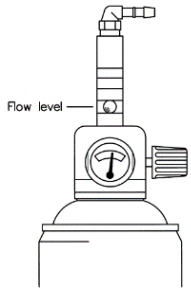
To ensure that the detector is still measuring correct, expose it to ambient air, concentration should be 400 ppm +/-200 ppm. This can be done by simply opening any doors and windows or, if this is not possible, fill a big plastic bag with air from the outside and put the detector into the bag or try pressing the air into the detector.

If the detectors fail above test, It is recommended that the detector is calibrated. A complete calibration comprises a zero calibration, followed by a span calibration with a test gas.
Be aware that humans exhale 40.000 ppm Co2, this can affect both calibration and clean ambient air reading.

5.7 *Calibration equipment*

To be able to perform a calibration of the detector you need a test gas fitted with a valve and a flowmeter, a suitable length of soft plastic hose and a hose connector that will fit on the detector.

Before you perform the calibration, you loosen the screws that hold in the detector lid. Remove the lid to access the detector circuit board.



5.8 *Test gas on aerosol cans*

The detector is designed with a threaded hole at the bottom of the sensor unit (1/4” pipe thread). This hole is intended to facilitate the inflow of test gas during calibration. Via the hose connector the test gas is led to the threaded hole at the bottom. This way the gas is forced in through the bottom hole and out through the two side holes of the sensor unit.
This method makes it possible to use a moderate amount of gas for the calibration.

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6 Warranty and Disposal

6.1 *Warranty*

Warranty coverage
Geopal System A/S provides a 1-year warranty, starting from the date of sale to the end-user. The warranty period must be documented with the original invoice or receipt. The warranty covers defects attributable to the materials and/or workmanship.

Warranty period
The warranty period begins at the date of delivery of the product to the first end-user. If the date of purchase cannot be documented, the warranty period will start at the date of production, as indicated on each product.

Warranty is void if production labels are altered, modified, or missing.

Warranty scope
The warranty does not cover labor costs for installation of replacement products or components, where Geopal System A/S chooses not to repair the product. The provision of replacement products or accessories does not extend the original warranty period. Geopal System A/S reserves the right to offer a similar replacement product or component if the original is no longer available at the time of the complaint.

Coverage pursuant to the warranty requires that the end-user can demonstrate that defects or damages have not directly or indirectly occurred because of:

a) Faulty installation, i.e. installation contrary to the installation instructions or (in the absence of such instructions) contrary to good craftsmanship,
b) Installation outside recommended installation areas,
c) Misuse or abuse,
d) Use of incompatible spare parts or accessories,
e) Transportation, installation, or other type of handling,
f) Product modifications,
g) Other defects or damage not caused by material, production, or structural faults, if the preceding enumeration is not exhaustive.

Moreover, coverage pursuant to the warranty is conditional on the end-user demonstrating that defects or damages are not directly or indirectly attributable to failure (or that defects, damages, and defects could not be prevented by) performing maintenance as prescribed in the instructions and maintenance manual.

Written complaints
To invoke this warranty, the end-user must submit a written complaint during the warranty period to Geopal System A/S or the retailer where the product was purchased. This must occur within two months of when the end-user discovered, or ought to have discovered, the defect.

Geopal System A/S shall then determine whether the product will be repaired, replaced or whether to refund the purchase price.

Repairs under the warranty
Unless Geopal System A/S provides otherwise, the end-user is responsible for the repair. The warranty covers the free supply of spare parts/materials necessary for the end-user's repair of the defect.

Replacement
Redelivery will occur by replacement free of charge of the old product with a new product of the same kind, type, and quality. If, at the time of the complaint, the product is no longer produced or is not produced in the exact same version, Geopal System A/S shall be entitled to exchange it for a similar product.

Transportation/shipping to and from Geopal System A/S and/or the dealer and any dismantling and reassembly of the product shall be agreed with Geopal System A/S before implementation, and if this occurs, the customer shall cover the costs.

The warranty does not cover the following
This warranty does not apply to products other than those listed under "Coverage of the warranty". For accessories, including pre-installed accessories, refer to the manufacturer's warranty, where available. Other Geopal System A/S products, regardless of whether these are pre-installed, are covered by the separate conditions stipulated in this warranty, including those relating to the warranty period referred to under "Warranty coverage".

Geopal System A/S accepts no liability for consequential damages, including consequential loss, or product liability other than what may follow from mandatory legislation.

Geopal System A/S accepts no liability for losses resulting directly or indirectly from circumstances over which Geopal System A/S has no control, including eg. strike, lockout, fire, war, blockades, import restrictions, political unrest, unusual natural occurrences, vandalism or other force majeure.

Geopal System A/S accepts no responsibility for products that are not produced by Geopal System A/S, regardless of whether they are sold or displayed together with the products listed under "Warranty coverage".

6.2 *Disposal of electrical and electronic products*

This product complies with the requirements for marking in the WEEE Directive (2002/96/EC).

The affixed label indicates that this electrical/electronic product must not be disposed of with household waste.

Product category
In relation to Annex 1A of the WEEE Directive 2002/96/EC, the product can be classified in Category 9: "Monitoring and control instruments".

Must not be disposed of via household waste!
More detailed information on environmentally safe disposal of electrical and electronic waste, such as waste equipment, or parts thereof, may be obtained by contacting your dealer. Look at Geopal System A/S website, as marked on the product.

7 Technical specifications

7.1 *General Specifications - GP-CO2 / GP-CO2-V*

Model	GP-CO2 / GP-CO2-V
Gas	CO2 Carbon Dioxide
Detecting range	0-2.000 ppm / 0-10.000 ppm / 0-30.000 ppm 0-3 Vol.-% / 0-20 Vol.-% / 0-100 Vol.-%
Response time T90	< 30 sec.
Repeatability	+/- 2% of FS range
Long-term stability	< 3% FS / 12 months
Self-diagnostic	Continuously
Sensor	NDIR Infrared
Sensor lifetime (expected)	> 15 years
Operating conditions	-20°C to +50°C -35°C to +50°C with build in heather (option)
Humidity	0 %RH to 95 %RH not condensing
Pressure	1013 mbar ±10 %
IP rating	IP56 DIN40050
Weight	0,4 kg
Material housing	Polycarbonate, POM, black
Mechanical dimensions	82 x 90 x 150 mm (LxWxH)

7.2 *General Specifications - GPSL-CO2*

Model	GPSL-CO2
Gas	CO2 Carbondioxide
Detecting range	0-2.000 ppm / 0-10.000 ppm / 0-30.000 ppm
Response time T90	< 30 sec.
Repeatability	+/- 2% of FS range
Long-term stability	< 3% FS / 12 months
Self-diagnostic	Continuously
Sensor	NDIR Infrared
Sensor lifetime (expected)	> 15 years
Operating conditions	-30°C to +50°C
Humidity	0 %RH to 95 %RH not condensing
Pressure	1013 mbar ±10 %
IP rating	IP65 DIN60529
Weight	0,4 kg
Material housing	POM, black
Mechanical dimensions	155 x 80 x 23 mm (LxWxH)

7.3 *Electrical specifications*

Supply voltage	10 to 32 V DC
Power consumption	6 W max.
Electrical connections	3- to 8-conductors depended on required outputs
Analogue output signal (GND)	4-20 mA / (2 mA for fault) = 100-450 Ω or 0-5 V or 0-10 V, min. RL = 600 Ω, nom. 4k7 Ω
Fault relays	2 relay outputs for Alarm 1 and Alarm 2 1 relay output for Fault Signal contact 30 V/1 A

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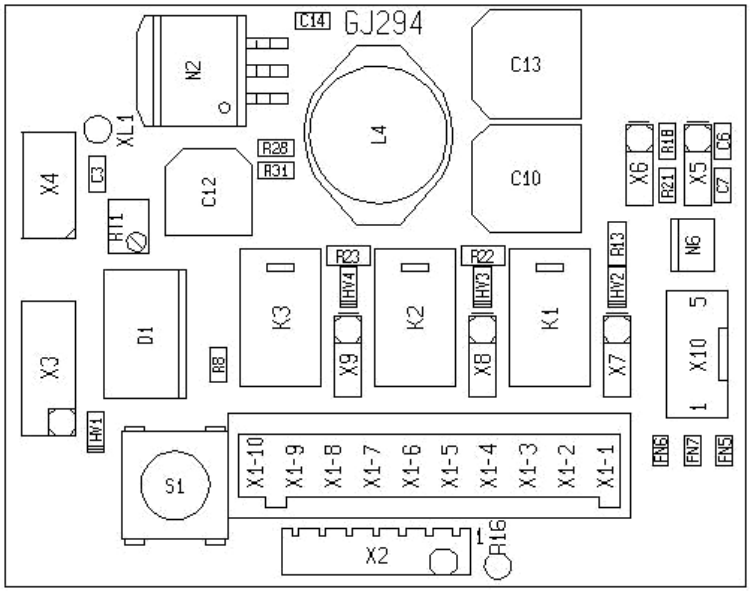
7.4 *Approvals*

Approvals	**Low Voltage Directive** 2014/35/EU **Electromagnet Compatibility Directive** 2014/30/EU EN 61 000-6-2 (2019) EN 61 000-6-4 (2019) EN 50 270 (2015)
Quality	ISO 9001:2015

8 Appendices

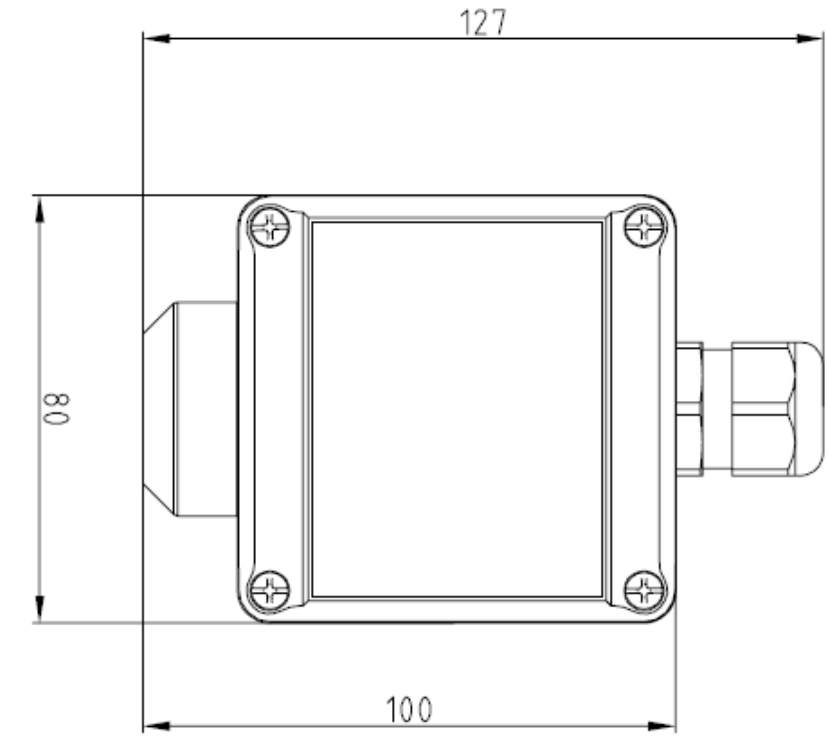
8.1 *PCB*

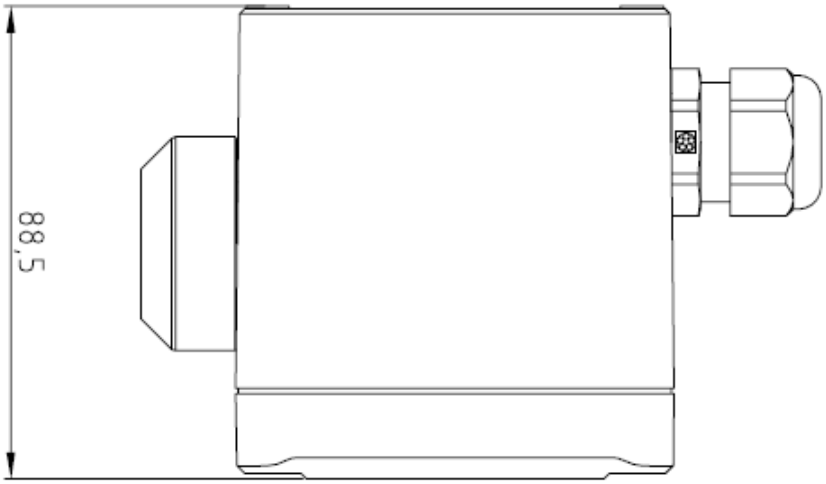


Terminal	Function	Electrical characteristic	Jumper position
X1-1	PE		
X1-2	Supply voltage (-)	10-32 V DC	
X1-3	Supply voltage (+)	10-32 V DC	
X1-4	Not connected		
X1-5	Out 1	0-5 V	X5=2-3, X6=2-3
	Out 2	0-10 V	X5=2-3, X6=1-2
	Out 3	4-20 mA	X5=1-2
	Out 3 - 1*	1-5 V	X5=2-3, X6=2-3
	Out 3 - 2*	2-10 V	X5=2-3, X6=1-2
X1-6	GND		
X1-7	Alarm 1	Relay K1=NC	X7=1-2
	Alarm 1	Relay K1=NO	X7=2-3
X1-8	Alarm 2	Relay K2=NC	X8=1-2
	Alarm 2	Relay K2=NO	X8=2-3
X1-9	Fault**	Relay K3=NC	X9=1-2
	Fault**	Relay K3=NO	X9=2-3
X1-10	Contact arm	Common for A1, A2 & F	

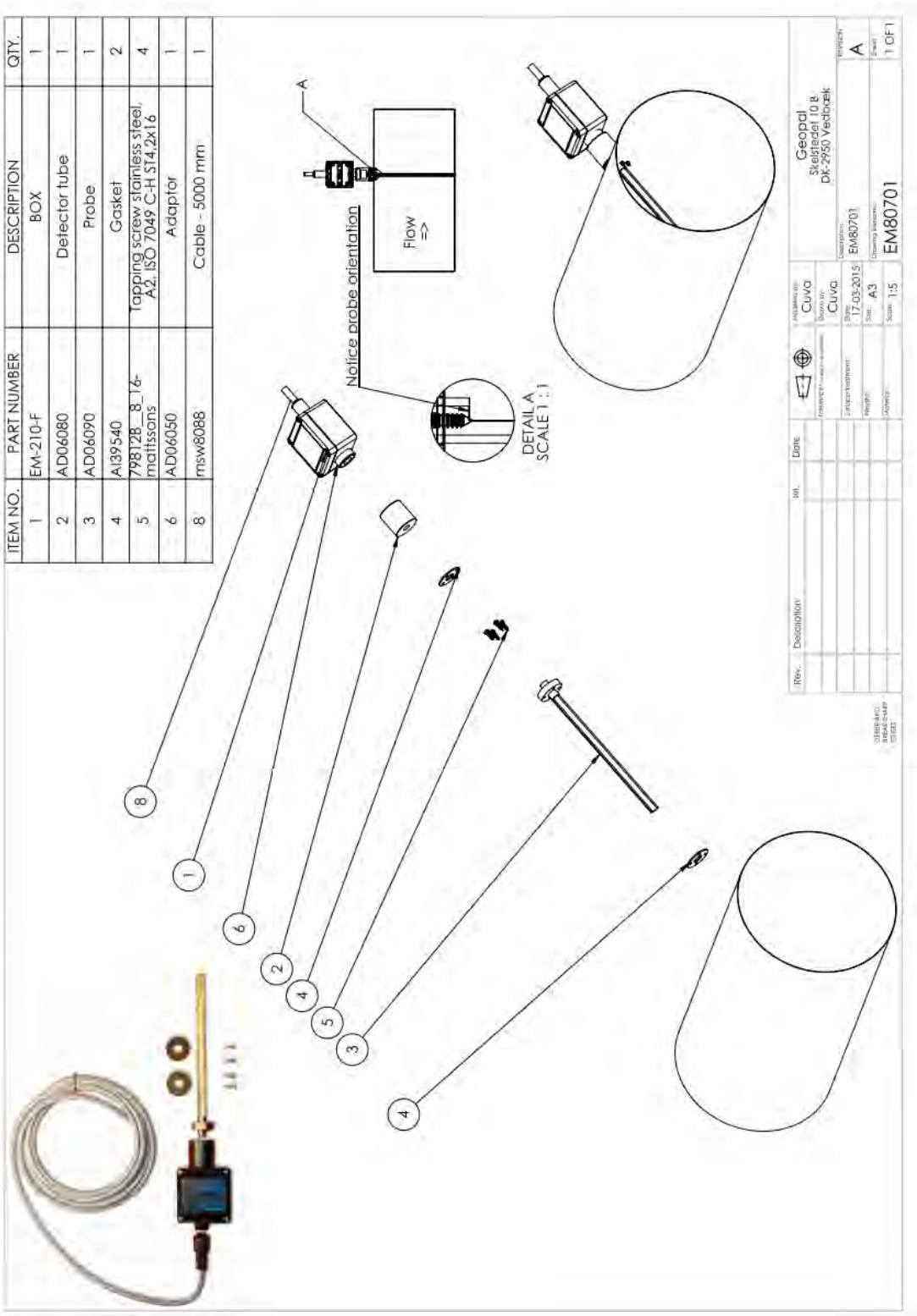
* The output is available only if the detector is set up with the option Iout.
** The fault relay is active during normal operational mode and inactive in case of fault.

8.2 *Layout – GP-CO2*





8.3 *Layout – GP-CO2-V*



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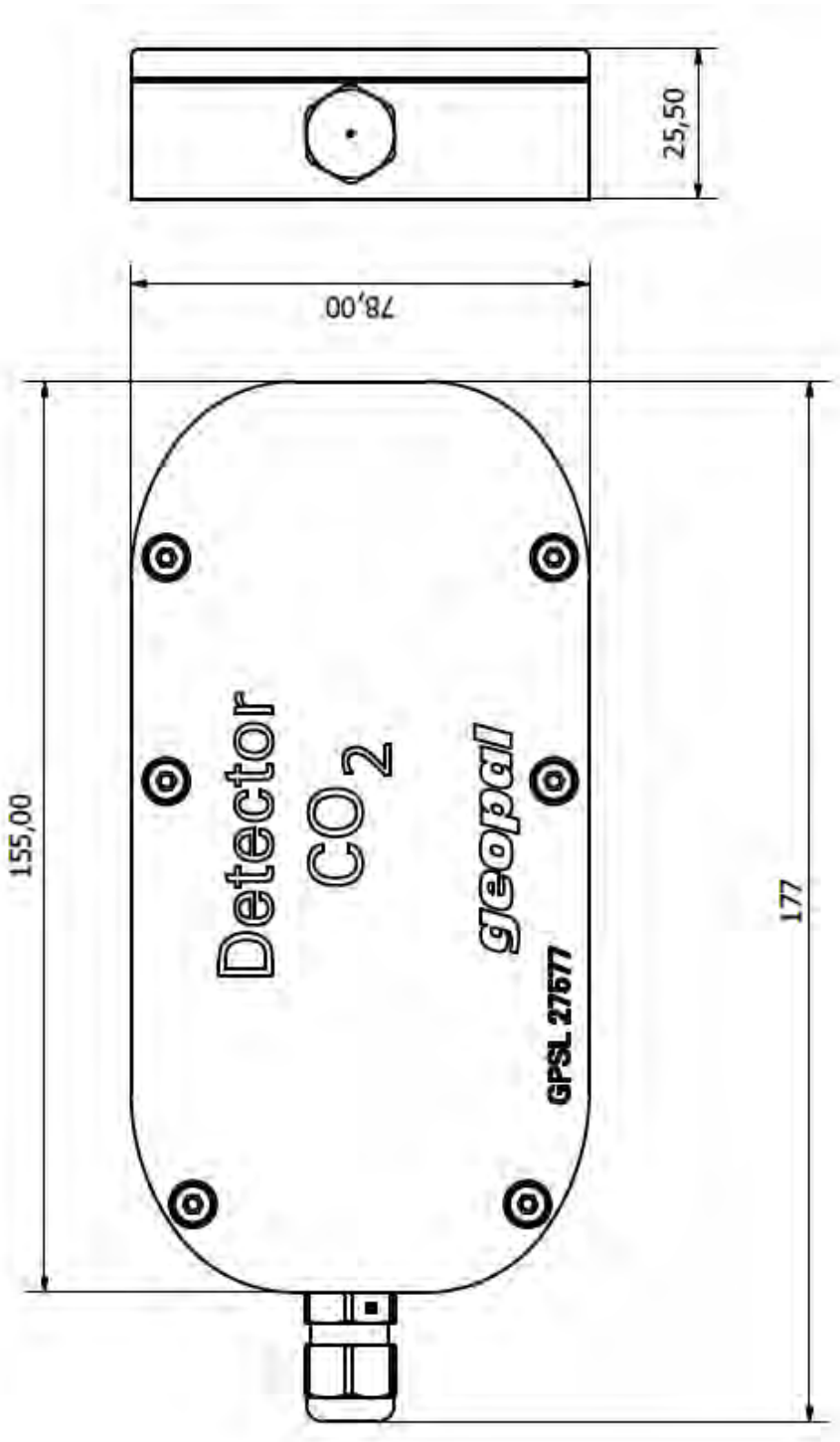
8.4 *Layout – GPSL-CO2*



9 Troubleshooting

Problem						
Green operation LED not on	Yellow fault LED not on	Red alarm 1 LED on	Red alarm 2 LED on	Neither alarm LED on – even though gas is clearly present		
1	2	3	4	5		**What to do**
✓					a	Make sure that the supply voltage is properly connected (see section 4.2)
	✓				b	Make sure that the flex PCB is properly installed in the gas detector
	✓				c	Make sure that the sensor unit is properly installed in the gas detector
	✓				d	Recalibrate the gas detector (see section 5.5 and 5.6).
		✓	✓		e	Investigate whether the alarm could be caused by a gas leak in the room
		✓	✓		f	Investigate whether the alarm could be caused by other activities in the room
		✓	✓	✓	g	Recalibrate the gas detector (see section 5.5 and 5.6).