



Biogas ✓

Operating Manual



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1. Instructions Specific to Hazardous Area Installations

(Reference European ATEX Directive 94/9/EC, Annex II, 1.0.6.)

The following instructions apply to equipment covered by certificate numbers Sira 06ATEX2202X:

- The equipment may be used with flammable gases and vapours with apparatus group IIA and temperature class T1
- The equipment is only certified for use in ambient temperatures in the range 0°C to +40°C and should not be used outside this range
- Installation shall be carried out in accordance with the applicable code of practice by suitably trained personnel
- Repair of this equipment shall be carried out in accordance with the applicable code of practice.
- The manufacturer will specify those materials which are important to the type of protection.
- When the Biogas ✓ instrument is in the hazardous area it shall only be externally attached via connector A to devices that are marked with the certificate number Sira 06ATEX2202X.
- If the equipment is likely to come into contact with aggressive substances, e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials, then it is the responsibility of the user to take suitable precautions, e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.


The Biogas ✓ has been certified to Hazardous Area Classification

 II2G EEx ibd IIA T1 (Ta = 0°C to +40°C)

It is vital the instructions in this manual are followed closely.


It is the responsibility of the operator to determine the protection concept and classification required for a particular application.

1.1 Safety Related Information In This Manual

Information in this manual that may affect the safety of users and others is preceded by the following symbol:  **Warning.**

Failure to follow this information may result in physical injury which in some cases could be fatal.

1.2 Safety Information

 Warning	The Biogas ✓ can be used for measuring gases from landfill sites and other sources as described in this manual. Inhaling these gases may be harmful to health and in some cases may be fatal. It is the responsibility of the user to ensure that he/she is adequately trained in the safety aspects of the gases being used and appropriate procedures are followed. In particular, where hazardous gases are being used the gas exhausted from the analyser must be piped to an area where it is safe to discharge the gas. Hazardous gas can also be expelled from the instrument when purging with clean air.
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2. Introduction

This manual explains how to use the Biogas ✓ range of instruments.

Note	The Geotechnical Instruments range of gas analysers are sensitive pieces of scientific equipment, and should be treated as such.
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2.1 Main features of the Instrument

Measurement of the following gases:

- Methane and Carbon Dioxide by Infra-Red Absorption
- Oxygen by chemical cell
- Other gases possible by way of external gas pods - contact supplier

- Measurement of system pressure
- Measurement of barometric pressure

- Measurement of gas flow by use of Anemometer, orifice plate, or pitot tube.
- Measurement of Static and Differential pressures.

2.2 Physical Characteristics of the Analyser



3. General Operational Features

3.1 Switching the Instrument On And Off

When switching the instrument on a long beep will be emitted followed by the Geotechnical Instruments (UK) Ltd logo being displayed along with the product name. A power-on self-test will then commence. Assuming there are no warnings to display the instrument will continue to the main gas reading screen.

When switching the analyser off, the on/off button must be held down for approximately 1.5 seconds, at which point a clean air purge will be carried out. If for any reason the analyser 'locks-up' and will not switch off in this manner, press and hold the on/off button for 15 seconds; this will force the instrument to switch off.

3.2 Keypad lock

The keypad can be locked by pressing and holding the 'backlight' key for 2 seconds. This will avoid accidental key presses when carrying the analyser between sample points. Press and hold again to unlock the keypad.

3.3 Warm-up Self Test



When switched on the instrument will perform a pre-determined self-test sequence taking approximately 30-40 seconds. During this time many of the analyser's functions are tested, including:

- General operation
- Pump function
- Gas flow measurement
- Calibration
- Backlight function
- Solenoid function

During the self-test the following information is also displayed:

- Manufacturer's service due date
- The last gas check date
- Software version
- Date format
- Serial number
- Operating language
- Baud rate

3.4 Warning and Error Display

During the self-test, if any operational parameters are out of specification or the pre-programmed recommended calibration/service date has passed, various errors or warnings may be displayed. Only three warnings/errors can be displayed at any time, use the   cursor keys to scroll through the list.

Warnings Displayed

All warnings displayed will be prefixed by the word 'WARNING' followed by a relevant description. There are two types of warning that may be displayed, firstly the general warnings that may not affect the instrument's function and those where the self-test has detected a function that is outside the usual programmed operating criteria, e.g. battery charge low, memory nearly full. The second being operational parameters that could affect the performance of the analyser: CH₄ out of calibration, CO₂ out of calibration.

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The most likely reason for the errors is either an incorrect user calibration, or sensor failure. If an incorrect user calibration has caused the warning it should be correctable by way of returning the instrument to factory settings, zeroing or carrying out a user calibration as necessary for the relevant function.

Errors Displayed

All errors displayed will be prefixed by the word 'ERROR' followed by a error code. The errors detected by the self-test are usually caused by a user calibration being out of specification or possible memory corruption and will affect the instrument's function and should therefore be corrected before use, e.g. 01-User cal data, CH₄ reading out of specification, 02-User cal data, CO₂ reading out of specification, 04-User cal data.

Note	If any other types of warning or error are displayed it is advisable to contact Geotechnical Instruments (UK) Ltd for further information.
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Under and Over Range Codes




If a reading is under range (ie below zero) it will be displayed with 'less than' chevrons (<<.<). This can occur if a channel has been incorrectly calibrated or has exceeded it's specified range. If a reading is over range (ie above the maximum allowed reading) it will be displayed with 'more than' chevrons (>>.>).

A number displayed as '***.' indicates an error, usually where the instrument has been unable to complete a particular calculation. Where there is no data is available dashes (--.) are displayed. This usually occurs when a particular reading or parameter has been skipped by the user.



3.5 Cold Start

Note	This function should only be used as a last resort. For gas calibration error messages ensure a factory setting and user calibration has been carried out first.
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A cold start should only be carried out if no other course of action has proved successful, as this function will clear the instrument memory entirely, reset all factory settings and reset the internal time and date to a default setting.

To carry out a cold start, switch the instrument ON and during the self-test press and continue to hold the  enter key until such time as the self-test has been completed. Upon completion of the self-test a 'Pass-code Entry' screen will be displayed. At this point the  key may be released. Input the code '12345' and press  to confirm. After the pass-code has been accepted the instrument's serial number will be displayed along with the hours of operation and two options:

- 1-Cold Start
- 0-Exit

Only select option  if a cold start is to be carried out. After selection, key  will require pressing again to confirm this operation. The cold start menu will be displayed again; press key '0' to continue with normal operation.

3.6 Storage

The instrument should not be exposed to extremes of temperature. Do not keep the instrument in a hot vehicle. When not in use instruments should be kept in a clean, warm and dry environment, such as an office. The instrument should be discharged and fully charged at least once every four weeks, regardless of indicated charge state.

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3.7 Battery/Charging

⚠ Warning

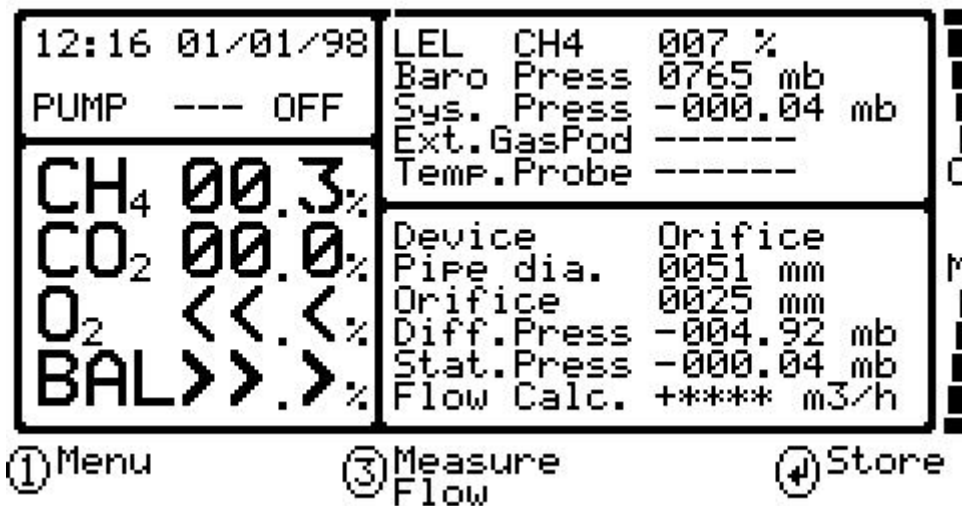
The battery charger is NOT covered by the Ex certification. The battery must be charged only in a safe area.

The battery used in the Biogas ✓ instrument is Nickel Metal Hydride and manufactured as an encapsulated pack from six individual cells. This type of battery is not as susceptible to the top-up charging 'memory effects' as Nickel Cadmium batteries, although it is not recommended that the unit be given small top-up charges. The charger should only be disconnected when 'charged' is indicated.

The battery charger is intelligent and will indicate when the unit is charging, charged or if there is a fault. A full charge should take approximately two hours.

3.8 Main Reading Screen

The main reading screen is also considered to be the normal operation screen and most operations are carried out from this starting point. All of the instrument readings are displayed in this screen. Most other operations can be selected via the main menu, key ① in this screen. Whenever a key is pressed the unit will emit a short 'beep' as an acknowledgement. This function cannot be turned off.




3.9 Memory

The analyser's memory is volatile, although it is retained by a battery back-up system.



The memory is not to be used as a permanent storage medium and any data should be transferred to a more permanent storage medium as soon as possible. An analyser should never be stored for prolonged periods with valuable data in its memory.

Although unlikely, sudden shocks, high levels of electromagnetic interference or static discharge may cause memory corruption or loss. If this occurs the memory should be cleared and the calibration reset to factory settings before further use.



3.10 Clear Reading Memory

Selected via the main menu the clear memory screen enables the user to check how many readings have previously been taken and clear them if necessary. Clearing readings is a simple process just follow the on-screen instructions. Before readings are actually deleted a caution is displayed as once readings have been deleted they cannot be recovered. The Biogas ✓ instrument can store up to 100 readings. Once the reading memory is full it is not possible to store any more readings. When the  store key is pressed the instrument will show a brief message stating that the memory is full.

3.11 View Readings

Stored readings can be viewed via the main menu. The   cursor keys can be used to scroll through the available readings either forwards or backwards. One complete reading is displayed on each page using a similar layout to the main reading screen.


3.12 Adjust Contrast

The Biogas ✓ instrument automatically adjusts the screen contrast to maintain a normal viewing contrast according to the current display temperature. Manual adjustment of the contrast is also available and can be carried out with using the   cursor keys. The manually set contrast setting is retained when the read-out is switched off and therefore may require re-setting when next switched on.

3.13 Instrument Settings

The instrument settings screen allows the user to configure the reading sequence and various other options as desired. When selected the current settings are displayed. These include the following parameters:

- Purge Time
- Prompt for ID reading
- Prompt for temperature reading
- Flow device
- Pipe and Orifice diameters
- Units of measurement

Pressing the  key brings up a sub-menu where you can select the parameter to be edited. Most of the parameters are self-explanatory. There are limits on the size of pipe and orifice diameters. These can be affected by the units of measurement currently selected. Also, the ratio of the orifice to pipe diameter cannot exceed 75% and the orifice cannot be larger than the pipe diameter.

3.14 Set Time / Date

Selected via the main menu the set time/date screen enables the user to check or set the internal clock. This value is appended to every stored reading. It is also displayed in the top-left corner of the main read screen. Setting the clock is a simple process - just follow the on-screen instructions. It is also possible to switch the date format between dd/mm/yy and mm/dd/yy formats if required. Please note the clock will need to be manually adjusted to cope with daylight saving changes or changes when crossing time zones.


3.15 Set Gas Alarms

The Biogas ✓ instrument has the facility to set rising or falling alarms for the three main gas channels (CH₄, CO₂ and O₂). Once enabled these alarms become active in the main reading screen. If an alarm is triggered a flashing bell symbol is displayed next to the appropriate gas value and a beeper is sounded until the gas level has dropped below the trigger point.

3.16 Operating Language

The Biogas ✓ instrument has the facility to select from the following operating languages: English, German, French, Italian and Spanish. Due to the nature of the various languages the screen layout may change slightly, although the functionality will always remain the same.

4. Taking Readings

 Warning	Inhaling hydrogen sulphide gas can cause death. It is the responsibility of the user to ensure that he/she is adequately trained in the safety aspects of using H ₂ S. In particular, where hazardous gases are being used the gas exhausted from the analyser must be piped to an area where it is safe to discharge the gas. Hazardous gas can also be expelled from the instrument when purging with clean air.
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4.1 Preliminary Checks

Prior to going to site, it is good practice to ensure:

- The instruments time and date are correct.
- The water trap has a clean and dry filter fitted.
- The inlet port micro-fibre filter is clean and dry.
- A supply of spare filters is available in case of accidental water blockage or contamination
- The battery has a good charge (minimum 25% charge, even if only a few readings are required)
- The memory has sufficient space available.
- The main gases have been auto-zeroed, without gas concentration present.
- If necessary, check the span calibration with a known concentration calibration-check gas.

DO's

- Travel to site with the instrument in the vehicle's interior - not in the boot, where it may be subjected to extremes of temperature and possible shock damage.
- Protect the instrument from strong direct sunlight which will quickly raise the temperature of the instrument beyond its operating range and the LCD display will appear almost black and the contrast setting cannot alter the contrast.
- Remember always use the water trap! If the water trap becomes flooded, change the filter and ensure all tubes are clear before re-use.

DONT's

- Do not place the instrument against anything hot (e.g., gas extraction pipe or car body) or in an unattended car during the summer) as this will cause excessive internal temperatures which may cause erroneous readings.
- Get the the instrument wet, for example exposure to heavy rain.

4.2 Taking Readings

Depending on the user settings the exact reading procedure can change. The following method is considered best practice and when followed correctly will allow quick and consistent readings to be recorded. There are essentially two stages which enable a complete reading to be stored. Firstly, the main gases are recorded which need to be fixed before a flow reading can be taken.

1. When the instrument is first switched on it should be purged with fresh air and allowed to stabilise for a few minutes. At this point it is good practice to zero all channels and devices to be used. These options are available via the main menu. You should now be ready to take your first reading.

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You can do this by pressing key **5** to re-set the reading procedure or by pressing **↓** store reading. Either option allows a new reading sequence to begin.

2. At this point connect the sample tube (with water trap) from the sample point to the inlet port of the instrument, ensuring the connector 'clicks' into place. If using a gas pod, it should be plugged-in to external port 1 and connected to the outlet of the instrument. At this point you will see the system pressure reading change as it responds to the pressure on the inlet hose. It is important to remember that the system pressure reading is only active during this initial phase. After the pump is activated or if the user presses **3** measure flow or **↓** store reading the system pressure is frozen until the next reading cycle has begun.
3. Pressing the **⊗** pump key draws a gas sample into the instrument. You should see the main gas readings start to change. It is recommended to run the pump until the gas readings have stabilised (typically 30 seconds) using the counter provided. If you are only interested in the main gases pressing the **↓** store key now would record these values and re-start the reading cycle. Note...If you have enabled gas alarms a flashing bell symbol may be displayed next to the appropriate gas reading value if a pre-set alarm condition has been passed.
4. Assuming you have selected a flow device (via instrument settings) press key **3** to take a flow reading. At this point you should see a brief message confirming that the gas readings have been fixed (i.e. stored temporarily). Depending on which flow device you have selected the operation may vary. For example if you have no flow device selected then you will not have a key **3** option, pressing the **↓** store key will store the currently displayed data to memory.
5. If enabled (via instrument settings) you will be prompted to enter a temperature reading or attach a temperature probe. If you are not using an external gas pod you might want to disable this option. You can then plug a temperature probe in to external port 1 (in place of the gas pod) at the start of the reading cycle. The temperature reading is then displayed on the main gas screen and will be frozen when key **3** is pressed to start the flow measurement phase. Otherwise simply follow the on-screen instructions to record a valid temperature reading either by attaching a probe or manually entering the temperature recorded using a third party sensor. If no temperature is available then 20 degrees centigrade is assumed for the subsequent flow calculations.
6. If you have selected either pitot tube or orifice plate as your device type you will now be asked to zero the static and differential pressure transducers. It is possible to skip this stage but it is important to zero the transducers for repeatable results especially on very low flows. To zero the transducers simply follow the on-screen instructions. Remember you will have to disconnect the hoses from the sample point and wait a few seconds for the readings to stabilise before zeroing. You will then be returned to the main read screen where the flow calculation will be displayed along with the current static and differential pressures. You will also be able to review the Orifice and pipe diameter that are currently selected. These can be changed (via instrument settings) if required. Once the flow reading has stabilised simply press store **↓** to record the reading.
7. If you have selected an anemometer as your device type there is no need to zero the transducers and this stage is skipped automatically. You are returned directly to the main read screen where the velocity and flow will be displayed along with the currently selected pipe diameter (required for a valid flow calculation). The anemometer should be plugged into external port 2 on the instrument. After it has been correctly inserted into the sample point, allow the flow reading to stabilise and press store **↓** to record the reading.
8. If you have selected user input as your device type you will be prompted to enter a flow reading manually. After typing in the flow reading you can return to the main reading screen and the flow measurement you entered will be displayed. Press store **↓** to complete the reading.
9. After the **↓** store key is pressed and if enabled (via instrument settings) you will be prompted to enter an 8 character identification code for the current reading set. This is done by using the cursor keys to navigate around a grid of alphanumeric characters. The **↓** enter key is used to select each character as required. Key **1** is used to complete the process and exit this screen. At anytime the **⊗** backspace key can be used to erase any selected characters if required.

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10. After each reading the instrument is automatically purged. You will be prompted to disconnect all hoses from the instrument before the purge begins. The purge time can be varied but a minimum of 30 seconds is recommended. You should be looking for the gas readings to return to nominal values for fresh air. You may want to reconnect the gas pod at this stage to ensure that this also receives a purge. Of course an additional purge could also be performed manually if required. After the purge has completed you will be prompted to re-attach your hoses ready for the next reading.

Depending on the user settings and accessories used the following will be stored for each reading:

- ID code
- Current time / date
- Main gas readings and balance (CH₄, CO₂, O₂)
- LEL CH₄
- Barometric pressure
- System pressure
- Static pressure
- Differential pressure
- Temperature
- Flow [including device type, orifice diameter and pipe diameter where applicable]
- Anemometer
- External gas pod

When the analyser is switched off a clean air purge is automatically started for a pre-determined time. This ensures that the analyser is free from gas and ready for the next measurement. This final purge is especially important for the oxygen sensor and external gas pod sensor as it will continue to degrade if stored whilst contaminated with gas.

4.3 Temperature Probe Reading

The Biogas ✓ instrument has the facility to automatically display and record the borehole temperature via an optional temperature probe. When a temperature probe is fitted to external port 1 (RS232 port), the temperature will be displayed in the main reading screen and recorded with all other data. The operation of the temperature probe will differ slightly depending on what instrument settings have been selected.

Please note...The temperature probe is part of the Biogas ✓ Ex certification and is therefore certified for use under the same conditions as the analyser.

4.4 External Gas pod Reading

The Biogas ✓ instrument can read external gas pods. When a gas pod is fitted to external port 1 (RS232 port), the gas type and reading will be displayed in the main reading screen and recorded with all other data. Although the temperature probe and gas pod use the same port it is possible to read both by configuring the instrument to prompt for a temperature reading. This way the gas pod can be used when drawing in a gas sample. The instrument will prompt you to swap the devices at the appropriate point in the reading sequence. External gas pods can be user calibrated (via the gas calibration screen) for both zero and span.

Please note...The gas pod is NOT part of the analyser Ex certification and is therefore NOT certified for use in potentially explosive atmospheres.

4.5 Anemometer Probe Reading

When an anemometer probe is fitted to the analyser's external port 2 (charger socket), if configured correctly the flow will be displayed in the 'Read Gas Levels' screen and recorded with all other data.

The Anemometer reads in both velocity and flow rate. In order to calculate the volume flow rate the pipe diameter will need to be entered into the instrument via the instrument settings screen. The anemometer can be zeroed via the gas calibration screen.

Please Note...The anemometer probe is NOT part of the analyser Ex certification and is therefore NOT certified for use in a potentially explosive atmosphere.

4.6 Cross-Gas Effects

Methane, Carbon Dioxide and Oxygen

Methane is measured using dual beam infra-red absorption. Your instrument is calibrated using certified methane mixtures and will give correct readings provided there are no other hydrocarbon gasses present within the sample (e.g. ethane, propane, butane, etc.). If there are other hydrocarbons present, the methane reading will be higher (never lower) than the actual methane concentration being monitored.

The extent to which the methane reading is affected depends upon the concentration of the methane in the sample and the concentration of the other hydrocarbons. The effect is totally non-linear and difficult to predict.

Carbon Dioxide is measured by infra-red absorption at a wavelength specific to carbon dioxide. Therefore, the carbon dioxide reading will not be affected by any other gases usually found on landfill sites.

The infrared sensors will not be "poisoned" by other hydrocarbons and will revert to normal operation as soon as the gas sample has been 'purged'.

The oxygen sensor is a galvanic cell type and suffers virtually no influence from CO₂, CO, H₂S, NO₂, SO₂ or H₂, unlike many other types of oxygen cell.

H₂S Measurement

H₂S measurement via the external gas pod could be affected by other gases. The main cross gas effects are:

- SO₂: 20% effect
- NO₂: 20% effect

Other cross sensitivities are possible. If you suspect a cross sensitivity problem please contact your supplier for additional information.

5. User Calibration

5.1 Introduction

The Geotechnical Instruments range of Gas Analysers are calibrated during manufacture and when returned for service. However, to improve accuracy between services a user calibration can be performed. Only the three main gases CH₄, CO₂ and O₂ may be user calibrated.

This section sets out the correct procedures to achieve an accuracy user calibration.

If this calibration is completed incorrectly it may decrease the accuracy of the Gas Analyser.

Two important terms that are used within this section are “Zero” and “Span”.

Zero: The point at which the Gas Analyser is calibrated when there is none of the target gas present.
Span: The point at which the Gas Analyser is calibrated when a known quantity of the target gas is present.

5.2 Calibration Gases

User calibration of a Gas Analyser will improve the data accuracy in the range of the calibration gases used. This may cause less accurate readings of concentrations outside this calibrated range. Users should select the correct calibration gas for the expected gas levels on their particular application.

- To improve calibration at lower levels requires the use of gas mixtures 1 and 2.
- To improve higher levels use gas mixture 3.

Calibration gas	CH ₄	CO ₂	O ₂
Mixture 1	5%	5%	6%
Mixture 2	5%	10%	0%
Mixture 3	60%	40%	0%

These are for general use but other gas concentrations can be used.

Only use gases with a known certified concentration.

Note: The above gases and most other gas concentrations can be supplied by Geotechnical Instruments (UK) Ltd.

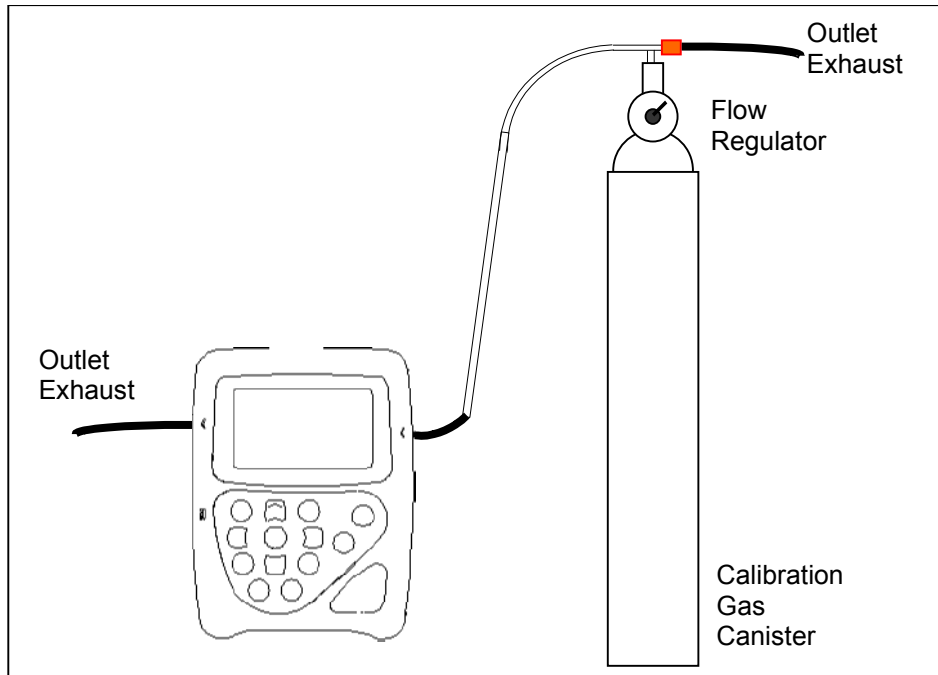
Warning

For each gas used the appropriate material safety data sheet must be read and understood before proceeding. Calibration gases can be dangerous.

Biogas ✓ Operating Manual

5.3 Set-Up

Important	Do NOT attach the gas supply to the instrument before putting it into the "Field Calibration Screen" by selecting 'FIELD CALIBRATION' from the main menu.
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The regulator's flow is factory set. It only requires a few turns to open, but no adjustment is necessary.

Warning	Exhaust port When the Gas Analyser is being calibrated, there are two possible exits for the gas, via the usual manner out of the exhaust port of the analyser or in cases of over-pressurisation the 1/16" port on the pressure relief valve. It is recommended that both ports have exhaust tubing attached. The exhaust tubing must emerge in a well-vented area. Ensure there are no leaks in the tubing and connections. The calibration of the Gas Analyser should be carried out in a safe area with all necessary precautions taken when using potentially dangerous, explosive or toxic gases. <i>For each gas used the appropriate material data sheet should be read and understood before proceeding.</i>
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5.4 Equipment

Calibration gas mixtures as specified as above in 58 litre gas canisters.

The regulator supplied by Geotechnical Instruments is recommended as flow and pressure rates are factory set.

5.5 Gas Analyser

To achieve the processes set out below choose “Field Calibration” from the Biogas ✓ menu.

The first screen to appear (“Check Calibration”) provides the option of checking the gas channels against known calibration gases before proceeding to re-calibration. Ensure the unit is stabilised at its working temperature before performing any of the calibration operations.



Readings on the line “a” are the current readings for the channels listed. The figures displayed in line “b” are the span targets i.e. the concentrations of the calibration gases to be used.

Please note: Depending on the configuration certain gas channels may not be active and will be shown as “N/A”.

Step 1: Enter Target Concentrations

DO NOT CONNECT CALIBRATION GAS YET.



Enter the certified concentrations of your calibration gases. For two-gas mixtures that contain 0.0% O₂, enter the certified O₂ value at 20.9%. For three-gas mixtures with an O₂ component enter the O₂ certified concentration.

- Press ③ to Edit target concentrations.
- Select CH₄ from the menu using ② ④ and enter the certified CH₄ concentration. Then press ④.
- Press ③ to Edit target concentrations.
- Select CO₂ from the menu using ② ④ and enter the certified CO₂ concentration. Then press ④.
- Press ③ to Edit target concentrations.
- Select O₂ from the menu using ② ④ and enter the certified CO₂ concentration or 20.9% for air calibration. Then press ④.






Step 2: Zero CH4 and CO2 channels

- Press ⑤ allow the pump to run for approximately two minutes or until reading stabilises; this purges the unit of gas.
- Press ⑤ to switch off the pump.
- Press ④ to select “Calibration Menu”.

Biogas ✓ Operating Manual








- Press  to select "Zero Channel(s)".
- Press  to select "Zero CH4".
- "USER ZERO COMPLETE." should be displayed.
- Repeat for other channels if required (except O2)

Step 3: Zero O2 channels








- Attach the calibration equipment as pictured above with gas mixture 2 and turn on gas at regulator. **Do not run the pump.**
- Allow the gas to flow through the unit for approximately two minutes or until reading stabilises.
- Press  to select "Calibration Menu".
- Press  to select "Zero Channel(s)".
- Scroll   to "ZERO O2".
- Press  to select "Zero O2".
- "USER ZERO COMPLETE." should be displayed.

Step 4: Span CH4 and CO2 channels

Use Step 5 instead, when a 3 gas calibration mixture is available.

- Continue to flow calibration gas or if the zero O2 step has not been required attach the calibration equipment as pictured above and turn on gas at regulator. **Do not run the pump.**
- Allow the gas to flow through the unit for approximately two minutes or until reading stabilises.
- Press  to select "Calibration Menu".
- Scroll   to "SPAN CHANNEL(S)".
- Press  to select "SPAN CHANNEL(S)".
- Scroll   to "SPAN CH₄ @ 05.0%" (the value set previously).
- Press  to select "SPAN CH₄ @ 05.0%"
- "CALIBRATION COMPLETE" should be displayed.

Repeat for CO2:








- Press  to select "Calibration Menu".
- Scroll   to "SPAN CHANNEL(S)".
- Press  to select "SPAN CHANNEL(S)".
- Scroll   to "SPAN CO₂ @ 05.0%" (the value set previously).
- Press  to select "SPAN CO₂ @ 05.0%"
- "CALIBRATION COMPLETE" should be displayed.

Go to step 6.

Step 5: Span CH4, CO2 and O2 channels

Alternative to Step 4 when a 3 component gas is available








Multi-gas option requires a mix with components of CH₄, CO₂ and O₂, eg 40% CH₄, 50% CO₂, 10% O₂.

- Press  to select "Calibration Menu".
- Scroll   to "SPAN CHANNEL(S)".
- Press  to select "SPAN CHANNEL(S)".
- Scroll   to "SPAN MULTI-GAS"
- Press  to select "SPAN CO₂ @ 05.0%"
- "CALIBRATION COMPLETE" should be displayed.

Step 6: Span O2 channels

Alternative to Step 4 when a 3 component gas is available

Multi-gas option requires a mix with components of CH₄, CO₂ and O₂, eg 40% CH₄, 50% CO₂, 10% O₂.

- Press  to select "Calibration Menu".
- Scroll   to "SPAN CHANNEL(S)".
- Press  to select "SPAN CHANNEL(S)".
- Scroll   to "SPAN O2 @ 20.9%" and press  to select.
- "CALIBRATION COMPLETE" should be displayed.

5.6 Trouble Shooting





Error message	Remedy
"User Zero failed"	A possible reason for this is because the instrument is trying to zero to a level which is outside the pre-determined range set when the unit was first calibrated at the factory. To rectify this, first ensure the unit contains absolutely none of the gas which is being zeroed. For all but O ₂ (which requires O ₂ free gas) run the pump to purge with fresh air and repeat the zeroing process. If it will not zero, then refer to the instructions given in the 'Factory Settings' section. If the Gas Analyser continues to fail in zeroing then the unit must be returned to Geotechnical Instruments (UK) Ltd for investigation.
"Calibration failed"	Check the span is set to the correct value, if not, correct and retry spanning the channel. Repeat the entire procedure, including zeroing the channel and then calibrate the span. Ensure the reading is stable before spanning the channel. This message may also appear if attempting to use the 'Span Multi Gas' option when not using a gas containing concentrations of CH ₄ , CO ₂ and O ₂ .

5.7 Factory Settings

This option will reset the instrument to all of its factory programmed characteristics and will clear ALL the user defined calibration points.

If in any doubt contact Geotechnical Instruments (UK) Ltd.

From the main "CHECK CALIBRATION" screen:

- Press  to enter the calibration menu.
- Scroll   to "FACTORY SETTINGS".
- Press  to Select "FACTORY SETTINGS".
- Two messages will follow, "Resetting please wait." and "Factory settings restored."

5.8 Last Field Calibration

This option can be found in the calibration menu of the 'field calibration' section. When selected, this option will display the time and date that the last field calibration was performed on the instrument. It is also available in the instrument information screen.

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6. Service

Your Biogas ✓ instrument should be regularly serviced to ensure correct and accurate operation. Geotechnical Instruments recommends a service and recalibration every 6 months.

The Biogas ✓ instrument is ATEX certified for use in potentially explosive areas. As such it should be serviced only by qualified engineers. Failure to observe this will result in the warranty becoming invalid and could invalidate the ATEX certification.

 Warning	If the Biogas ✓ instrument is serviced by unqualified engineers the ATEX certification may be invalidated and the instrument may be unsafe for use in a potentially explosive atmosphere.
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User serviceable parts

There are no user serviceable parts inside the instrument. Please do not attempt repair as this may invalidate any warranty supplied with your instrument.

The following parts are supplied by Geotechnical Instruments and can be user serviced:

In line water filter	This should be regularly inspected for obstructions or damage and changed if needed. The instrument should never be operated without the in line water filter as this may result in water entering the instrument.
Particulate filter	The particulate filter is located on the underside of the instrument and is accessed by removing the plastic plug. This can be removed by unscrewing using a suitable sized coin. The filter should be replaced if it is contaminated. Never operate the instrument without the particulate filter. When replacing the plug be sure not to over tighten it - finger tight is adequate.
Sample tubing	Always ensure that sample tubes are not contaminated or damaged.
QRC connectors	Periodically check that the O-rings on the QRC gas connectors are not damaged. A damaged O-ring can let air into the sample gas and result in incorrect readings. If the O-ring is damaged the complete QRC connector should be replaced.

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7. Technical Specification

POWER SUPPLY	
Battery type	Rechargeable Nickel Metal Hydride battery pack containing six 4AH cells (not user replaceable)
Battery life	Typical use 10 hours from fully charged
Battery lifetime	Up to 1000 charge/discharge cycles
Battery charger	Separate intelligent 2A battery charger powered from mains supply (100-240V 47-63Hz)
Charge time	Approximately 2 hours from complete discharge
Alternative power	Can be powered externally for fixed in place applications. Contact Geotechnical Instruments (UK) Ltd for further information
Memory backup battery	Lithium Manganese for data retention.

GAS RANGES				
Gases measured	CO ₂ and CH ₄	By dual wavelength infrared cell with reference channel		
	O ₂	By internal electrochemical cell		
	H ₂ S 0-5000ppm	By external gas pod		
Oxygen cell lifetime	Approximately 3 years in air			
Range	CH ₄	0 - 70% to specification, 0-100% reading		
	CO ₂	0 - 40% to specification, 0-100% reading		
	O ₂	0 - 25%		
Typical accuracy	Gas	0-5% vol	5-15% vol	15%-FS
	CH ₄	±0.5%	±1.0%	±3.0%
	CO ₂	±0.5%	±1.0%	±3.0%
	O ₂	±1.0%	±1.0%	±1.0%
Response time, T⁹⁰	CH ₄	≤20 seconds		
	CO ₂	≤20 seconds		
	O ₂	≤20 seconds		

FACILITIES	
Temperature measurement	With optional probe -10°C to +75°C
Temperature accuracy	±0.2°C (± probe accuracy)
Visual and audible alarm	User selectable CO ₂ , CH ₄ and O ₂ alarm levels
Communications	RS232 protocol with variable baud rate
Relative pressure	±500 mbar from calibration pressure
Relative pressure accuracy	<ul style="list-style-type: none"> • ±4mbar typically (should be zeroed before reading) • ±15mbar max
Static pressure measurement	±500 mbar
Static pressure accuracy	±4mbar typically (should be zeroed before reading)
Differential pressure measurement	±125 mbar
Differential pressure accuracy	±0.5mbar typically (should be zeroed before reading)
Available memory	100 Complete readings

PUMP	
Flow	300cc/min typically
Flow fail point	50cc/min approximately
Flow with 200mbar vacuum	250cc/min approximately
Vacuum pull	400mbar approximately

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ENVIRONMENTAL CONDITIONS	
Operating temperature range	0°C - 40°C
Relative humidity	0 – 95% non condensing
Case seal	IP65
Barometric pressure	±200mbar from calibration pressure
Barometric pressure accuracy	±5mbar typically

PHYSICAL	
Weight	2 Kilograms
Size	L 63mm, W 190mm, D 252mm
Case material	ABS
Keys	Membrane panel
Display	<ul style="list-style-type: none">• Liquid crystal display, 40 x 16 characters• Fibre optic woven back-light for low light conditions
Gas sample filters	User replaceable integral fibre filter at inlet port and an external PTFE water trap filter

CERTIFICATION RATING	
Certified to EEx ibd IIA T1	

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8. EC Declaration of Conformity

Products	• Biogas ✓ instrument
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Geotechnical Instruments (UK) Ltd declare that the item(s) described above are in compliance with the following standards:


ATEX Directive 94/9/EC

Certification body	SIRA Certification Service
Notified body number	0518
Address	Rake Lane, Eccleston, Chester, CH4 9JN
Certificate number	Sira 06ATEX2202X
Standards applied	EN50014:1997 + Amds 1 and 2 EN50020:2002 EN50018:2000 + Amds 1

EMC Directive 89/336/EEC

EN 61000-6-4:2001	Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments
EN 61000-4-3:2006	Electromagnetic compatibility (EMC). Testing and measurement techniques. Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-2:1995	Electromagnetic compatibility (EMC). Testing and measurement techniques. Electrostatic discharge immunity test.
EN 61000-4-6:1996	Electromagnetic compatibility (EMC). Testing and measurement techniques. Immunity to conducted disturbances, induced by radio-frequency fields
EN 50270:1999	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Tests carried out according to ENV 50204:1996 Radiated electromagnetic field from digital radio telephones. Immunity test

Signed:



Dr. Roger Riley
NPI Manager and Authorised Person

9. Instructions for safe use – Italian Language

Istruzioni per un uso sicuro


9.1 Istruzioni specifiche per le installazioni in aree pericolose

(Vedere la direttiva europea ATEX 94/9/EC, Allegato II, 1.0.6.)

Le seguenti istruzioni valgono per le apparecchiature coperte dai numeri di certificato Sira 06ATEX2202X:

- L'apparecchiatura va usata con gas e vapori infiammabili con il gruppo di macchinari IIA e la classe di temperatura T1
- Questa apparecchiatura è certificata unicamente per l'uso con temperature ambiente comprese nell'intervallo da 0 °C a +40 °C e va usata con temperature al di fuori di questo intervallo
- L'installazione va effettuata nel rispetto del codice di pratica applicabile e a cura di personale specializzato
- La riparazione di questa apparecchiatura va eseguita nel rispetto del codice di pratica applicabile.
- Il produttore specificherà quali materiali sono importanti per il tipo di protezione necessario.
- Quando il rilevatore di metano Biogas ✓ si trova in un'area pericolosa, sarà collegato solo esternamente mediante il connettore A ai dispositivi che sono contrassegnati con il numero di certificati Sira 06ATEX2202X.
- Se si prevede che l'apparecchiatura venga a contatto con sostanze aggressive, ad esempio liquidi o gas acidi che potrebbero attaccare i metalli, oppure solventi che potrebbero agire sui materiali polimerici, è responsabilità dell'utente prendere le dovute precauzioni, come ad esempio effettuare controlli regolari nell'ambito dei controlli di routine o verificando nella documentazione tecnica se essa è resistente a determinati prodotti chimici che evitano che subisca ripercussioni negative, garantendo quindi l'integrità del tipo di protezione.


L'analizzatore di gas Biogas ✓ è stato certificato per la classificazione nell'area pericolosa

 II2G EEx ibd IIA T1 (Ta = da 0°C a +40°C)

È essenziale attenersi scrupolosamente alle istruzioni contenute in questo manuale.


È responsabilità dell'operatore determinare il concetto di protezione e classificazione necessario per una particolare applicazione.

9.2 Informazioni di questo manuale relative alla sicurezza

Le informazioni contenute in questo manuale che potrebbero influenzare la sicurezza degli utenti e delle altre persone sono precedute dal seguente simbolo:  **Avvertenza**.

Il mancato rispetto delle informazioni qui contenute potrebbe determinare lesioni personali che in alcuni casi potrebbe essere fatale.

9.3 Informazioni sulla sicurezza

 Avvertenza	Il Biogas ✓ può essere usato per misurare i gas che fuoriescono dalle discariche e da altre fonti, come descritto in questo manuale. L'inalazione di questi gas potrebbe essere pericolosa per la salute e, in alcuni casi, fatale. È responsabilità dell'utente assicurarsi che sia adeguatamente formato in merito agli aspetti della sicurezza dei gas usati e relativamente alle procedure adeguate cui attenersi. In particolare, quando vengono usati gas pericolosi, il gas esausto che fuoriesce dall'analizzatore va convogliato verso un'area in cui è sicuro scaricarlo. I gas pericolosi possono essere espulsi anche dallo strumento durante la fase di spurgo con aria pulita.
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9.4 Visualizzazione di avvertenze ed errori

Durante l'auto-test, se un parametro operativo non soddisfa le specifiche della taratura consigliata preprogrammata o se la data prevista per la manutenzione è passata, potrebbero venire visualizzati degli errori o delle avvertenze. Possono essere visualizzate solo tre avvertenze o errori. Per visualizzare se sono stati visualizzati più errori, usare i tasti "v" e "^" per scorrere verso il basso o verso l'alto nell'elenco.

Avvertenze visualizzate


Tutte le avvertenze visualizzate vengono precedute dalla parola AVVERTENZA seguita dalla relativa descrizione.

Il motivo più probabile per il verificarsi di errori è una taratura dell'utente errata, oppure un sensore guasto. Se una taratura errata dell'utente ha determinato la visualizzazione di un'avvertenza, il problema potrebbe risolversi ripristinando lo strumento sulle impostazioni di fabbrica, impostandolo su zero o effettuando una calibrazione personalizzata a seconda delle necessità, per la relativa funzione.

Errori visualizzati

Tutti gli errori visualizzati sono preceduti dalla parola ERRORE seguita da un codice di errore. Gli errori rilevati dall'auto-test di solito dipendono dalla taratura dell'utente che non rientra nelle specifiche oppure da un possibile danneggiamento della memoria e influenzeranno le funzioni dello strumento e pertanto vanno corrette prima dell'uso, ad esempio 01-User cal data (dati taratura utente), CH₄ reading out of specification (lettura CH₄ fuori intervallo), 02-User cal data (dati calibrazione utente), CO₂ reading out of specification (lettura CO₂ fuori dalle specifiche), 04-User cal data (dati taratura utente), Cell 1 reading out of specification (lettura Cell 1 fuori dalle specifiche).

9.5 Batteria/ricarica

 Avvertenza	Il caricabatterie NON è coperto dalla certificazione Ex. La batteria va caricata solo in un'area sicura.
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La batteria è all'idruro di nickel metallico ed è costituita da un gruppo incapsulato a sei celle. La ricarica completa dovrebbe durare circa due ore.

9.6 Lettura del rilevatore della temperatura

Il rilevatore della temperatura fa parte della certificazione Instrument Ex e pertanto è certificato per l'uso nelle stesse condizioni dell'analizzatore.

9.7 Accessori che non possono essere usati in un'atmosfera potenzialmente esplosiva.


I seguenti accessori non vengono trattati dalla valutazione Ex dello strumento e non sono certificati per

Biogas ✓ Operating Manual

l'uso in un'atmosfera potenzialmente esplosiva.

Tutti i serbatoi di gas
Rilevatore dell'anemometro


9.8 Taratura

 Avvertenza	Foro di scarico <p>Quando l'analizzatore del gas viene tarato, ci sono due possibili uscite per il gas, o nel modo consueto mediante il foro di scarico dell'analizzatore, oppure, nei casi di pressurizzazione eccessiva, mediante la porta da 1/16 poll. sulla valvola regolatrice della pressione.</p> <p>È consigliabile che a entrambi i fori abbiano siano collegati i tubi di scarico.</p> <p>Il tubo di scarico deve emergere in un'area ben ventilata. Assicurarsi che non vi siano perdite nelle tubazioni e nei collegamenti.</p> <p>La taratura dell'analizzatore del gas va effettuata in un'area sicura con tutte le necessarie precauzioni da prendere quando si utilizzano gas potenzialmente pericolosi, esplosivi o tossici.</p> <p><i>Per ciascun gas utilizzato, prima di procedere è opportuno leggere e comprendere tutta la documentazione tecnica appropriata.</i></p>
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9.9 Manutenzione

L'analizzatore va sottoposto a regolare manutenzione, per garantire un funzionamento corretto e accurato. Geotechnical Instruments consiglia di effettuare la manutenzione e la taratura ogni 6 mesi.

L'analizzatore gode della certificazione ATEX per l'uso nelle aree potenzialmente esplosive. Di conseguenza, va sottoposto a manutenzione esclusivamente da parte di tecnici qualificati. Il mancato rispetto di questa indicazione renderà non valida la garanzia e potrebbe rendere nulla la certificazione ATEX.

 Avvertenza	Se l'analizzatore viene sottoposto alla manutenzione da parte di tecnici qualificati, la certificazione ATEX potrebbe venire resa nulla e lo strumento potrebbe essere non sicuro per l'uso in un'atmosfera potenzialmente esplosiva.
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Componenti sottoponibili a manutenzione da parte dell'utente

In questo strumento non ci sono componenti sottoponibili a manutenzione.

I seguenti componenti possono essere sottoposti a manutenzione da parte dell'utente.

Filtro dell'acqua in linea	Va regolarmente controllato per verificare la presenza di ostruzioni o danni e, se necessario, sostituito. Lo strumento non viene mai utilizzato senza il filtro dell'acqua in linea, in quanto questo potrebbe far sì che l'acqua penetri nello strumento.
Filtro antiparticolato	Il filtro antiparticolato si trova sul fondo dello strumento e vi si può accedere rimuovendo il tappo di plastica. Se è sporco, il filtro va sostituito. Non usare mai lo strumento senza il filtro antiparticolato. Durante la sostituzione del tappo, fare attenzione a non serrarlo eccessivamente; è sufficiente stringerlo con le dita.
Tubo campione	Assicurarsi sempre che i tubi campione non siano sporchi né

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	danneggiati.
Connettori QRC	Controllare periodicamente che le guarnizioni ad anello dei connettori del gas QRC non siano danneggiate. Una guarnizione ad anello può lasciar entrare l'aria nel gas campione e determinerà delle letture errate dei valori. Se la guarnizione ad anello è danneggiata è necessario sostituire tutto il connettore QRC.

9.10 Dichiarazione di conformità EC

Prodotti	• Biogas ✓ - Analizzatore gas Landfill
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Geotechnical Instruments (UK) Ltd dichiara che gli elementi sopra descritti sono conformi ai seguenti standard:

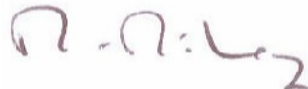
Direttiva ATEX 94/9/EC

Ente certificatore	Assistenza certificazione SIRA
Numero ente notificato	0518
Indirizzo	Rake Lane, Eccleston, Chester, CH4 9JN, Regno Unito
Numero certificato	Sira 06ATEX2202X
Standard applicati	EN50014:1997 + Amds 1 e 2 EN50020:2002 EN50018:2000 + Amds 1

Direttiva EMC 89/336/EEC

EN 61000-6-4:2001
EN 61000-4-3:2006
EN 61000-4-2:1995
EN 61000-4-6:1996
ENV 50204:1996
EN 50270:1999

Firmato



Dr. Roger Riley

10. Instructions for safe use – German language

Anweisungen für den sicheren Gebrauch


10.1 Anweisungen für Installationen in Gefahrenbereichen

(Referenz: Europäische ATEX-Richtlinie 94/9/EG, Anhang II, 1.0.6)

Die folgenden Anweisungen gelten für Geräte, die durch die Zertifikatsnummern Sira 06ATEX2202X abgedeckt sind:

- Das Gerät kann mit brennbaren Gasen und Dämpfen mit Gerätegruppe IIA und Temperaturklasse T1 verwendet werden
- Das Gerät ist nur zertifiziert für den Einsatz bei Umgebungstemperaturen im Bereich von 0 °C bis +40 °C und sollte außerhalb dieses Bereichs nicht eingesetzt werden
- Die Installation wird in Übereinstimmung mit dem anwendbaren Merkblatt durch entsprechend geschultes Personal vorgenommen
- Die Reparatur dieses Geräts wird in Übereinstimmung mit dem anwendbaren Merkblatt vorgenommen
- Der Hersteller legt die Materialien fest, die für den Schutztyp wichtig sind
- Wenn sich der Methan-Detektor Biogas ✓ im Gefahrenbereich befindet, wird er extern nur über Anschluss A mit Geräten verbunden, die mit der Zertifikatsnummer Sira 06ATEX2202X versehen sind.
- Besteht die Wahrscheinlichkeit, dass das Gerät in Kontakt mit aggressiven Stoffen gelangt, z. B. saure Flüssigkeiten oder Gase, die Metalle angreifen können, oder Lösungen, die Polymerstoffe schädigen können, liegt es in der Verantwortung des Benutzers, geeignete Vorkehrungen zu treffen, z. B. regelmäßige Prüfungen als Bestandteil von Routineinspektionen oder Überprüfungen anhand des Materialdatenblatts, dass das Material gegenüber bestimmten Chemikalien beständig ist und nicht beeinträchtigt werden kann. So stellt er sicher, dass der Schutztyp erhalten bleibt.

Der Gasanalysator Biogas ✓ ist zertifiziert anhand der Klassifizierung für Gefahrenbereiche

 **II2G EEx ibd IIA T1 (Ta = 0 °C bis +40 °C)**

Es ist unerlässlich, dass die Anweisungen in diesem Handbuch sorgfältig befolgt werden.


Es liegt in der Verantwortung des Bedieners, das Schutzkonzept und die für einen bestimmten Einsatzzweck erforderliche Klassifikation festzulegen.

10.2 Sicherheitsrelevante Informationen in diesem Handbuch

Informationen in diesem Handbuch, die die Sicherheit von Benutzern und anderen Personen betreffen, sind durch folgendes Symbol gekennzeichnet:  **Warnung**.

Eine Nichtbeachtung dieser Information kann zu Personenschäden führen, in manchen Fällen auch mit Todesfolge.

10.3 Sicherheitsinformation

 Warnung	Der Biogas ✓ kann – wie in diesem Handbuch beschrieben – zur Messung der Gasentwicklung an Mülldeponien sowie an anderen Quellen eingesetzt werden. Das Einatmen dieser Gase kann gesundheitsschädlich und in manchen Fällen tödlich sein. Es liegt in der Verantwortung des Benutzers, dafür zu sorgen, dass er hinsichtlich der Sicherheitsaspekte der eingesetzten Gase angemessen geschult wird und dass geeignete Prozeduren eingehalten werden. Im Besonderen müssen dort, wo gesundheitsgefährdende Gase eingesetzt werden, die vom Analysator abgegebenen Gase mit Schläuchen in einen Bereich transportiert werden, wo sie sicher abgelassen werden können. Auch beim Spülen mit sauberer Luft können gesundheitsgefährdende Gase aus dem Instrument entweichen.
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10.4 Warn- und Fehleranzeige

Wenn während des Selbsttests Betriebsparameter außerhalb des spezifizierten Bereichs liegen oder das vorprogrammierte empfohlene Kalibrierungs-/Wartungsdatum vergangen ist, können Fehler- oder Warnmeldungen angezeigt werden. Es können immer nur drei Warn-/Fehlermeldungen gleichzeitig angezeigt werden. Um festzustellen, ob weitere Meldungen vorhanden sind, blättern Sie mit den Tasten „v“ und „^“ in der Liste nach oben und unten.

Anzeige von Warnmeldungen


Allen angezeigten Warnmeldungen wird das Wort „WARNING“ vorangestellt, dem eine relevante Beschreibung folgt.

Der wahrscheinlichste Grund für die Fehlermeldungen ist entweder eine falsche Benutzerkalibrierung oder ein Sensordefekt. Falls eine falsche Benutzerkalibrierung die Warnmeldung verursacht hat, sollte sie dadurch behoben werden können, dass das Instrument je nach Notwendigkeit für die relevante Funktion auf die Werkseinstellungen zurückgesetzt oder genullt wird oder eine Benutzerkalibrierung durchgeführt wird.

Anzeige von Fehlermeldungen

Allen angezeigten Fehlermeldungen wird das Wort „ERROR“ vorangestellt, dem ein Fehlercode folgt. Die während der Selbsttests erkannten Fehlermeldungen werden normalerweise dadurch verursacht, dass eine Benutzerkalibrierung außerhalb der Spezifikation liegt, oder durch eine Speicherbeschädigung. Dadurch wird die Funktion des Instruments beeinträchtigt, und der Fehler sollte vor Einsatz des Gerätes behoben werden, z. B. 01 – Benutzerkal.-daten, CH₄-Wert außerhalb der Spezifikation, 02 – Benutzerkal.-daten, CO₂-Wert außerhalb der Spezifikation, 04 – Benutzerkal.-daten, Wert von Zelle 1 außerhalb der Spezifikation.

10.5 Akku/Ladevorgang

 Warnung	Das Akkuladegerät ist NICHT Ex-zertifiziert. Der Akku darf nur in einem sicheren Bereich aufgeladen werden.
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Beim Akku handelt es sich um ein Nickel-Metallhydrid-Modell, in dem sechs Einzelzellen verkapselt sind. Ein vollständiger Ladevorgang sollte etwa zwei Stunden dauern.

10.6 Temperaturfühler


Der Temperaturfühler gehört zur Ex-Zertifizierung des Instruments und ist daher für den Einsatz unter denselben Bedingungen wie der Analysator zertifiziert.

10.7 Zubehör, das in einem explosionsgefährdeten Bereich nicht eingesetzt werden darf.

Das folgende Zubehör ist von der Ex-Einstufung des Instruments nicht abgedeckt und damit für den Einsatz in einem explosionsgefährdeten Bereich nicht zertifiziert.

Alle Gaskapseln
Anemometer-Fühler


10.8 Kalibrierung

<p> Warnung</p>	<p>Auslassöffnung</p> <p>Wenn der Gasanalysator kalibriert wird, gibt es für das Gas zwei Auftretsmöglichkeiten: der übliche Austritt über die Auslassöffnung des Analysators oder bei einer Überdrucksituation die 1/16"-Öffnung am Überdruckventil.</p> <p>Es wird empfohlen, an beiden Öffnungen Auslassschläuche anzubringen.</p> <p>Die Auslassschläuche müssen in einen gut gelüfteten Bereich geführt werden. Überprüfen Sie, dass es an Schläuchen und Verbindungen keine Undichtigkeiten gibt.</p> <p>Die Kalibrierung des Gasanalysators sollte in einem sicheren Bereich stattfinden, und beim Einsatz potenziell gefährlicher, explosiver oder giftiger Gase müssen alle notwendigen Sicherheitsvorkehrungen getroffen werden.</p> <p><i>Vor der Durchführung der Arbeiten muss für jedes eingesetzte Gas das entsprechende Materialdatenblatt gelesen und verstanden werden.</i></p>
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10.9 Wartung

Der Analysator sollte zur Wahrung des korrekten und präzisen Betriebs regelmäßig gewartet werden. Geotechnical Instruments empfiehlt alle sechs Monate eine Wartung und Neukalibrierung.

Der Analysator ist für den Einsatz in explosionsgefährdeten Bereichen ATEX-zertifiziert. Deshalb sollte er nur von entsprechend qualifizierten Technikern gewartet werden. Wird dies nicht beachtet, wird seine Garantie hinfällig und seine ATEX-Zertifizierung könnte ungültig werden.

<p> Warnung</p>	<p>Wird der Analysator von nicht entsprechend qualifizierten Technikern gewartet, kann seine ATEX-Zertifizierung ungültig werden und das Instrument ist möglicherweise beim Einsatz in explosionsgefährdeten Bereichen unsicher.</p>
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Teile, die vom Benutzer gewartet werden können

Das Instrument enthält keine Teile, die vom Benutzer gewartet werden können.

Die folgenden Teile können vom Benutzer gewartet werden

Biogas ✓ Operating Manual

Zwischengeschalteter Wasserfilter	Er sollte regelmäßig auf Hindernisse oder Beschädigung überprüft und bei Bedarf ausgewechselt werden. Das Instrument sollte niemals ohne den zwischengeschalteten Wasserfilter betrieben werden, da andernfalls Wasser in das Instrument eintreten kann.
Partikelfilter	Der Partikelfilter befindet sich an der Unterseite des Instruments und ist durch Entfernen des Kunststoffstopfens zu erreichen. Der Filter sollte ersetzt werden, wenn er verschmutzt ist. Betreiben Sie das Instrument niemals ohne Partikelfilter. Achten Sie bei dem Wiedereinsetzen des Stopfens darauf, ihn nicht zu fest zu ziehen. Es reicht, wenn er handfest angezogen ist.
Messschläuche	Achten Sie immer darauf, dass Messschläuche nicht verschmutzt oder beschädigt sind.
QRC-Anschlüsse	Überprüfen Sie regelmäßig, dass die O-Ringe an den QRC-Gasanschlüssen nicht beschädigt sind. Ein beschädigter O-Ring kann Luft in das gemessene Gas eintreten lassen, was zu falschen Messwerten führt. Wenn der O-Ring beschädigt ist, sollte der gesamte QRC-Anschluss ausgewechselt werden.

10.10 EG-Konformitätserklärung

Produkte	• Biogas ✓ – Gasanalysator für Mülldeponien
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Geotechnical Instruments (UK) Ltd. erklärt, dass der/die oben genannten Artikel mit den folgenden Normen konform sind:

ATEX-Richtlinie 94/9/EG

Zertifizierungsbehörde	SIRA Certification Service
Nummer der Behörde	0518
Adresse	Rake Lane, Eccleston, Chester, CH4 9JN, Großbritannien
Zertifikatsnummer	Sira 06ATEX2202X
Angewandte Normen	EN50014:1997 + Nachträge 1 und 2 EN50020:2002 EN50018:2000 + Nachtrag 1

EMV-Richtlinie 89/336/EWG

EN 61000-6-4:2001
EN 61000-4-3:2006
EN 61000-4-2:1995
EN 61000-4-6:1996
ENV 50204:1996
EN 50270:1999

Unterschrift:



Dr. Roger Riley

11. Instructions for safe use – French language

Instructions pour une utilisation sûre

11.1 Instructions spécifiques pour les installations dans des emplacements dangereux

(Référence Directive européenne ATEX 94/9/CE, Annexe II, 1.0.6.)

Les instructions suivantes s'appliquent au matériel couvert par le numéro de certificat Sira 06ATEX2202X :

- Le matériel est utilisable avec des gaz et des vapeurs inflammables avec des appareils de groupe IIA et classe de température T1
- Le matériel est certifié uniquement pour une utilisation à température ambiante entre 0 °C et +40 °C et ne doit pas être utilisé en-dehors de cette plage
- L'installation devra être effectuée conformément au code de pratique applicable et par un personnel qualifié
- Ce matériel devra être réparé conformément au code de pratique applicable
- Le fabricant devra spécifier les matériaux importants pour le type de protection
- Dans l'emplacement dangereux, le détecteur de méthane Biogas ✓ ne devra être raccordé extérieurement par le raccord A qu'à des appareils portant la marque de numéro de certificat Sira 06ATEX2202X.
- Si le matériel est amené à être en contact avec des substances agressives, par exemple des liquides ou des gaz acides susceptibles d'attaquer les métaux, ou des solvants susceptibles d'affecter des polymères, il incombe alors à l'utilisateur de prendre des précautions appropriées, par exemple des contrôles réguliers dans le cadre d'inspections systématiques ou des vérifications sur la fiche technique de la résistance du matériel à des produits chimiques spécifiques, ceci afin de préserver l'intégrité de la protection.


L'analyseur de gaz Biogas ✓ a été certifié à la Classification Emplacement dangereux

 **II2G EEx ibd IIA T1 (Ta = 0°C à +40°C)**

Il est absolument indispensable de respecter les instructions contenues dans le présent manuel.


Il incombe à l'opérateur de déterminer le type et la classification de protection requise pour une application spécifique.

11.2 Informations en matière de sécurité contenues dans le présent manuel

Dans le présent manuel, les informations relatives à la sécurité des utilisateurs et autres personnes sont précédées par le symbole :  **Avertissement.**

Le non-respect de ces informations peut être à l'origine de blessures corporelles qui, dans certains cas, peuvent être mortelles.

11.3 Informations en matière de sécurité

 Avertissement	Le Biogas ✓ peut être utilisé pour mesurer les gaz émis par les sites d'enfouissement et autres sources, comme décrit dans le présent manuel. L'inhalation de ces gaz peut être dangereuse, voire mortelle dans certains cas. L'utilisateur doit veiller à avoir reçu une formation appropriée en matière de sécurité concernant les gaz utilisés et à observer les procédures appropriées. En particulier, dans le cas de présence de gaz dangereux, le gaz émis par l'analyseur doit être évacué vers un emplacement permettant une évacuation sûre. Il peut y avoir également évacuation de gaz dangereux lors de la purge de l'appareil avec de l'air propre.
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11.4 Affichage d'avertissements et d'erreurs

Pendant l'essai automatique, il peut y avoir affichage d'erreurs ou d'avertissements en cas de non-conformité des paramètres opérationnels ou de dépassement de la date de l'étalonnage/de l'entretien recommandée préprogrammée. Seulement trois avertissements/erreurs peuvent être affichés simultanément. Pour vérifier s'il y a eu d'autres avertissements/erreurs, utiliser la touche « ∨ » et « ∧ » pour faire défiler la liste.

Affichage d'avertissements


Tous les avertissements affichés seront précédés par le mot « AVERTISSEMENT [WARNING] » suivi d'un texte approprié.

Le plus souvent, les avertissements sont affichés en raison d'un étalonnage incorrect par l'utilisateur, ou d'une défaillance des capteurs. Un étalonnage incorrect peut être rectifié en remettant l'appareil sur les valeurs réglées en usine, en effectuant une remise à zéro ou l'étalonnage requis pour la fonction pertinente.

Affichage d'erreurs

Toutes les erreurs affichées seront précédées par le mot « ERREUR [ERROR] » suivi d'un code d'erreur. En général, les erreurs détectées par l'essai automatique sont dues à un étalonnage non-conforme par l'utilisateur ou quelquefois à la corruption de la mémoire de l'appareil et affecteront le fonctionnement de l'appareil. Les erreurs affichées, par exemple 01-User cal data, CH₄ reading out of specification, 02-User cal data, CO₂ reading out of specification, 04-User cal data, Cell 1 reading out of specification. [01-Données cal. utilisateur, mesure CH₄ non conforme, 02-Données cal. utilisateur, mesure CO₂ non conforme, 04-Données cal. Utilisateur, Mesure Cellule 1 non-conforme] devront être rectifiées avant d'utiliser l'appareil.

11.5 Batterie/Mise en charge

 Avertissement	Le chargeur de la batterie n'est PAS couvert par la certification Ex. La batterie doit être chargée uniquement dans un emplacement sûr.
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La batterie est de type Nickel Métal Hydride à six cellules intégrées. La durée de charge complète est d'environ deux heures.

11.6 Sonde de mesure de température

La sonde de température est couverte par la certification Ex de l'appareil et est donc certifiée pour une utilisation dans les mêmes conditions que l'analyseur.

11.7 Accessoires non utilisables en atmosphères potentiellement explosives


Les accessoires suivants ne sont pas couverts par la certification Ex de l'appareil et ne sont donc pas

Biogas ✓ Operating Manual

certifiés pour une utilisation en atmosphères potentiellement explosives.

Sondes de gaz
Sonde d'anémomètre


11.8 Etalonnage

 Avertissement	Orifice d'évacuation <p>Lors de l'étalonnage de l'analyseur de gaz, le gaz peut être évacué par deux orifices d'évacuation, à savoir par l'orifice d'évacuation de l'analyseur, ou, en cas de surpression, par l'orifice 1/16" sur la soupape de surpression.</p> <p>Il est recommandé de raccorder des tuyaux d'évacuation aux deux orifices.</p> <p>Le tuyau d'évacuation doit sortir dans un emplacement bien ventilé. Contrôler l'étanchéité des tuyaux et des raccords.</p> <p>L'étalonnage de l'analyseur de gaz doit être effectué dans un emplacement sûr, en observant toutes les précautions nécessaires en présence de gaz potentiellement dangereux, explosifs ou toxiques.</p> <p><i>Pour chaque gaz utilisé, lire attentivement la fiche technique appropriée avant d'exécuter la tâche.</i></p>
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11.9 Entretien

Pour un fonctionnement correct et précis, l'analyseur de gaz doit faire l'objet d'un entretien régulier. Geotechnical Instruments recommande un entretien et un réétalonnage tous les 6 mois.

L'analyseur est certifié ATEX pour une utilisation en atmosphères potentiellement explosives. A ce titre, son entretien doit être effectué uniquement par des techniciens qualifiés. Le non-respect de cette prescription entraînera l'annulation de la garantie et risque d'annuler la certification ATEX.

 Avertissement	Si l'analyseur fait l'objet d'un entretien par des techniciens non qualifiés la certification ATEX risque d'être annulée et l'appareil peut ne pas être sûr en cas d'utilisation en atmosphères potentiellement explosives.
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Composants pouvant faire l'objet d'un entretien par l'utilisateur

L'appareil ne contient aucun composant interne pouvant faire l'objet d'un entretien par l'utilisateur.

Les composants suivants peuvent faire l'objet d'un entretien par l'utilisateur

Filtre à eau en ligne	Contrôler ce filtre régulièrement pour rechercher la présence d'obstructions ou de dommages; remplacer si besoin est. L'appareil ne doit jamais être utilisé sans le filtre à eau en ligne pour prévenir la pénétration d'eau dans l'appareil.
Filtre à particules	Le filtre à particules est situé sur la face inférieure de l'appareil ; ôter l'obturateur en plastique pour y accéder. Remplacer tout filtre contaminé. Ne jamais utiliser l'appareil sans le filtre. Veiller à ne pas trop serrer l'obturateur – un serrage à main est suffisant.
Tuyau d'échantillonnage	Toujours s'assurer que les tuyaux d'échantillonnage ne sont ni contaminés ni abîmés.
Raccords rapides	Contrôler périodiquement l'état des joints toriques des raccords de gaz rapides. Un joint torique défectueux peut entraîner la pénétration d'air dans l'échantillon de gaz et des lectures incorrectes. Remplacer le raccord complet si le joint torique est défectueux.

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11.10 Déclaration de conformité CE

Produits	• Biogas ✓ – Analyseur de gaz de sites d'enfouissement
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Geotechnical Instruments (UK) Ltd déclare que l'(es) article(s) décrit(s) ci-dessus est (sont) conforme(s) aux normes suivantes :

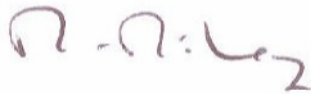
Directive ATEX 94/9/CE

Organisme de certification	SIRA Certification Service [<i>Service de certification SIRA</i>]
Numéro d'organisme notifié	0518
Adresse	Rake Lane, Eccleston, Chester, CH4 9JN
Numéro de certificat	Sira 06ATEX2202X
Normes appliquées	EN50014:1997 + Amds 1 et 2 EN50020:2002 EN50018:2000 + Amds 1

Directive CEM 89/336/CEE

EN 61000-6-4:2001
EN 61000-4-3:2006
EN 61000-4-2:1995
EN 61000-4-6:1996
ENV 50204:1996
EN 50270:1999

Signature :



Dr. Roger Riley

12. Instructions for safe use – Spanish language

Instrucciones para la utilización segura

12.1 Instrucciones Específicas para Instalaciones en Áreas de Peligro

(Directiva Europea de Referencia ATEX 94/9/EC, Anexo II, 1.0.6.)

Las siguientes instrucciones son aplicables para los equipos cubiertos por los certificados Sira N° 06ATEX2202X:

- El equipo puede utilizarse con vapores y gases inflamables con aparatos del grupo IIA y temperatura clase T1
- El equipo sólo está certificado para utilizarlo a temperatura ambiental entre 0°C y +40°C y no debe utilizarse fuera de estos rangos.
- La instalación debe ser efectuada de acuerdo con el código de práctica aplicable y por personal debidamente formado.
- La reparación de este equipo debe ser efectuada de acuerdo con el código de práctica aplicable.
- El fabricante deberá especificar los materiales que son importantes para el tipo de protección.
- Cuando los detectores de metano Biogas ✓ estén en el área de peligro, sólo se podrán conectar externamente mediante el conector A a dispositivos marcados con el certificado Sira N° 06ATEX2202X.
- Si existe la posibilidad de que el equipo entre en contacto con sustancias agresivas como por ejemplo gases o líquidos ácidos que puedan atacar a los metales, o disolventes que puedan afectar a los materiales poliméricos, será responsabilidad del usuario tomar las medidas adecuadas, es decir, comprobaciones regulares como parte de las inspecciones de rutina o determinando a partir de las hojas de datos de los materiales, o la resistencia a los productos químicos específicos para asegurar que el tipo de protección no se vea adversamente afectada.


El Analizador de Gas Biogas ✓ ha sido certificado de acuerdo a la Clasificación de Área de Peligro

 **II2G EEx ibd IIA T1 (Ta = 0°C a +40°C)**

Es de vital importancia cumplir con las instrucciones de este manual.


Es responsabilidad del operario determinar el concepto de protección y la clasificación necesaria para una aplicación determinada.

12.2 Información relacionada con la seguridad en este manual.

En este manual, la información que puede afectar a la seguridad de los usuarios y terceros está precedida por el siguiente símbolo:  **Advertencia.**

El incumplimiento de esta información podría provocar lesiones físicas que en algunos casos, podrían resultar fatales.

12.3 Información de seguridad

 Advertencia	Los Biogas ✓ pueden utilizarse para medir gases en vertederos y otras fuentes, como se describe en este manual. La inhalación de estos gases puede ser nociva para la salud y en algunos casos puede resultar fatal. Es responsabilidad del usuario asegurar que él/ella esté debidamente formado/a en los aspectos de seguridad de los gases utilizados y de tomar las medidas correspondientes. En particular, al utilizar gases peligrosos, el gas expulsado del analizador debe ser canalizado hacia un área donde la descarga sea segura. El gas peligroso también puede ser expulsado del instrumento al purgar con aire limpio.
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12.4 Advertencia y visualización de error

Durante la prueba automática, si los parámetros operativos se encuentran fuera de lo especificado o si se ha superado la fecha de revisión/calibración preprogramada recomendada, se pueden visualizar errores o advertencias. Hay tres errores/advertencias que pueden visualizarse en cualquier momento. Para asegurarse de que no se han producido más, utilice las teclas 'v' y '^' para desplazarse hacia arriba/abajo de la lista.

Advertencias visualizadas


Todas las advertencias visualizadas irán precedidas por la palabra 'ADVERTENCIA' y seguidas por la descripción correspondiente.

La razón más probable de los errores es la calibración de usuario incorrecta o el fallo del sensor. Si la calibración de usuario es incorrecta y ha provocado la advertencia, debe corregirse corrigiendo el instrumento a los ajustes de fábrica, poniéndolo a cero o efectuando una calibración de usuario adecuada para la función correspondiente.

Errores visualizados

Todos los errores visualizados irán precedidos por la palabra 'ERROR' y seguidos por un código de error. Normalmente, los errores detectados por la prueba automática son provocados porque la calibración del usuario es distinta a la especificada o por una posible corrupción de la memoria que afectará al funcionamiento del instrumento y por lo tanto, debe corregirse antes de utilizarlo. Por ejemplo: 01- User datos de cal, CH₄ lectura fuera de lo especificado, 02- User datos de cal, CO₂ lectura fuera de lo especificado, 04- User datos de cal, Cel 1 lectura fuera de lo especificado.

12.5 Batería/Carga

 Advertencia	El cargador de batería NO está cubierto por el certificado Ex. La batería sólo debe cargarse en un área segura.
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La batería es de Hidruro de Níquel-Metal y está fabricada como un paquete encapsulado de seis celdas individuales. Una carga completa debería tardar aproximadamente dos horas.

12.6 Lectura de la sonda de temperatura

La sonda de temperatura forma parte de la certificación Ex del instrumento y por lo tanto, está certificada para la utilización en las mismas condiciones que el analizador.


12.7 Accesorios que no pueden utilizarse en una atmósfera potencialmente explosiva

Los siguientes accesorios no están cubiertos por la clasificación Ex del instrumento y no están certificados para utilizarse en una atmósfera potencialmente explosiva.

Biogas ✓ Operating Manual

Todos los gas pods
Sonda del anemómetro


12.8 Calibración

 Advertencia	Terminal de escape <p>Cuando se está calibrando el analizador de gas, hay dos posibles salidas del gas: mediante la forma usual por el terminal de escape del analizador o en los casos de sobrepresión, a través del terminal de 1/16" de la válvula de seguridad.</p> <p>Es recomendable que en ambos terminales se monten tubos de escape.</p> <p>Los tubos de escape deben emerger hacia un área bien ventilada. Asegúrese de que no hay fugas en los tubos o conexiones.</p> <p>La calibración del analizador de gas debe efectuarse en una zona segura tomando todas las precauciones necesarias cuando se utilizan gases tóxicos, explosivos o potencialmente peligrosos.</p> <p><i>Para cada gas utilizado, deben leerse y comprenderse las hojas de datos del material correspondiente antes de proceder.</i></p>
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12.9 Revisión

El analizador debe ser regularmente revisado para asegurar el funcionamiento correcto y preciso. Geotechnical Instruments recomienda una revisión y recalibración cada 6 meses.

El analizador cuenta con un certificado ATEX para su utilización en áreas potencialmente explosivas. Como tal, sólo debe ser revisado por técnicos cualificados. El incumplimiento de esta norma anulará la garantía y podría invalidar la certificación ATEX.

 Advertencia	Si el analizador es revisado por técnicos no cualificados, la certificación ATEX podría quedar invalidada y el instrumento podría no ser seguro para su utilización en una atmósfera potencialmente explosiva.
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Piezas utilizables por el usuario

No hay piezas utilizables por el usuario dentro del instrumento.

Las siguientes piezas pueden ser revisadas por el usuario

Filtro de agua en línea	Debería comprobarse regularmente que el filtro no presente obstrucciones ni esté dañado y cambiarlo cuando sea necesario. El instrumento no debe utilizarse nunca sin el filtro de agua en línea ya que podría entrar agua en el instrumento.
Filtro de partículas	El filtro de partículas está situado en la parte inferior del instrumento y se accede quitando el tapón de plástico. El filtro debe cambiarse cuando está contaminado. Nunca debe utilizarse el instrumento sin el filtro de partículas. Al volver a poner el tapón asegúrese de no apretarlo demasiado, el apriete con los dedos es suficiente.
Tubos para muestras	Asegúrese de que los tubos para muestras no estén contaminados ni dañados.
Conectores QRC	Compruebe periódicamente que las juntas tóricas de los conectores de gas QRC no estén dañadas. Una junta tórica dañada puede permitir la entrada de aire al gas de muestra y provocaría lecturas incorrectas. Si la junta tórica está dañada, debe cambiarse el conector QRC completo.

Biogas ✓ Operating Manual

12.10 Declaración de Conformidad CE

Productos	• Biogas ✓ Analizador
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Geotechnical Instruments (UK) Ltd declara que los elementos arriba descritos cumplen con las siguientes normas:

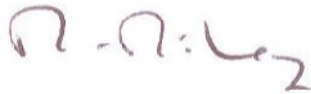
Directiva ATEX 94/9/EC

Organismo de Certificación	Servicio de Certificación SIRA
Nº del Organismo Notificado	0518
Dirección	Rake Lane, Eccleston, Chester, CH4 9JN
Nº de Certificado	Sira 06ATEX2202X
Normas aplicadas	EN50014:1997 + Enmiendas 1 y 2 EN50020:2002 EN50018:2000 + Enmienda 1

Directiva EMC 89/336/EEC

EN 61000-6-4:2001
EN 61000-4-3:2006
EN 61000-4-2:1995
EN 61000-4-6:1996
ENV 50204:1996
EN 50270:1999

Firmado:



Dr. Roger Riley

13. An important notice to all our customers

WEEE COMPLIANT



The wheelie bin symbol now displayed on equipment supplied by Geotechnical Instruments signifies that the apparatus must not be disposed of through the normal municipal waste stream but through a registered recycling scheme.

The Waste Electrical and Electronic Equipment directive (WEEE) makes producers responsible from July 1st 2007 in meeting their obligations, with the fundamental aim of reducing the environmental impact of electrical and electronic equipment at the end of its life.

Geotechnical is now registered with the Environmental Agency as a producer and has joined a recycling scheme provider who will manage and report on our electrical waste on our behalf.

Our Producer Registration Number is WEE/GB0052TQ

So when your instrument is at the end of its life, contact our Sales team who will advise you on the next step in order to help us meet our obligations.



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



UK Office

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P.O. Box 2124, Chelmsford, Essex, CM1 3UP, England.

Tel: +44 (0)1245 600560

Fax: +44 (0)1245 600030

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Please note - Product designs and specifications are subject to change without notice.
The user is responsible for determining the suitability of this product.