

GEM5000 Gas Analyzer

Operating Manual



For Instrument Firmware Versions 1.5.x and above.

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Manual guidelines










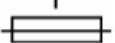

0.5 Document history

Issued By	Issue Date	Change Control ID	Issue No.	Reason for Change
	JAN 2012	5K-MNL-GEM5000	1.09	New Instructions.
	May 2012	5K-MNL-GEM5000	1.10	Minor corrections
	Oct 2012	5K-MNL-GEM5000	1.12	'Gas Check' Changes for Firmware v1.5.15 +

0.6 Hazard warnings and safety symbols

 Warning	<p>Information in this manual that may affect the safety of users and others is preceded by the warning symbol.</p> <p>Caution - Failure to follow the correct information may result in physical injury which in some cases could be fatal. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.</p>
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0.7 General product label symbols are listed as follows:

	CE conformity-The CE-marking is the manufacturer's statement to the EU authorities that the product complies with all relevant CE-marking Directives.		If the CSA mark appears with the indicator "US" or "NRTL" it means that the product is certified for the U.S. market, to the applicable U.S. standards.
	VDE mark is a symbol for electrical, mechanical, thermal, toxic, radiological and other hazards.		Separate collection, handling and disposal for waste electrical and electronic equipment and its components.
	Electric shock warning.		Refer to operators manual.
	Double insulated construction - does not require an Earth.		Specific marking of explosion protection (ATEX only).
II 2G	Equipment group and category. G = gases; the type of explosive atmosphere.		IECEx licensed mark (IECEx only).
	Fuse.		Equipment for indoor use only.

0.8 Notes

Important/useful information and instructions are shown clearly throughout the manual in a note format. For example:

✍ Note: For further information please contact Technical Support at LANDTEC at +1 (909) 783-3636 or email technical@landtecna.com

1 Introduction


This manual explains how to use the GEM5000 landfill gas analyzer. The GEM5000 measures flow and calculates the calorific values of the gas as well as being a useful tool for balancing the gas field. The GEM5000 gas analyzer may be used to monitor, calculate, adjust and record the flow at each monitoring point.


This instrument may also be used in GA (gas analyzer) mode of operation if required. The operator may change the analyzer between a gas extraction monitor (GEM mode) or a landfill gas analyzer (GA Mode). The mode of operation can be changed from the 'Special Action' menu. Please refer to the section 'Taking Readings' for further instruction.

The 5000 series of gas analyzers complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference.
- 2) This device must accept any interference received, including interference that may cause undesired operation.

1.1 Safety instructions—English

 Warning	<p>The 5000 series of gas analyzers can be used for measuring gases from landfill sites and other sources as described in this manual.</p> <p>The operator may be exposed to harmful gases during the use of the instrument. Inhaling these gases may be harmful to health and in some cases may be fatal.</p> <p>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 analyzer must be piped to an area where it is safe to discharge the gas.</p> <p>Hazardous gas can also be expelled from the instrument when purging with clean air.</p>
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 **Note:** Gas analyzers are a sensitive piece of scientific equipment, and should be treated as such. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.

1.2 Instructions for safe use

For ATEX and IECEx the 5000 series of gas analyzers are certified to Hazardous Area Classification

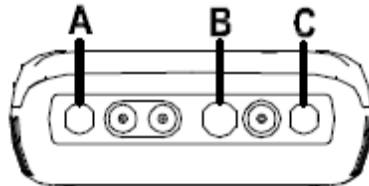
II 2G Ex ib IIA T1 Gb (Ta = +14°F to +122°F)

It is vital that instructions be followed closely. It is the responsibility of the operator to determine the protection concept and classification required for a particular application.

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

The following instructions apply to equipment covered by certificate numbers SIRA 11ATEX2197X and IECEx Directive SIR 11.0089X:

- The equipment may be used with flammable gases and vapors with apparatus group IIA and temperature class T1.
- The equipment is only certified for use in ambient temperatures in the range (- 10°C to +50°C) and should not be used outside this range.
- The equipment must not be used in an atmosphere of greater than 21% oxygen.
- Repair of this equipment shall be carried out in accordance with the applicable code of practice.
- When used in a hazardous area only use (TP-5000 temperature probe (SIRA 11ATEX2197X and IECEx SIR11.0089X)). The analyzer should not be connected to any other devices in the hazardous area including the 5000-USB cable (connector A) or GEM5000 BC battery charger (connector B) supplied with the analyzer.



Do not charge, recharge or open in a potentially explosive atmosphere.
In hazardous area only use "TP-5000 Temperature Probe" in Connector B.
Connector C (Uo=10V,Io=5mA,Po=50mW,Ci=0,Li=0,Co=100uF,Lo=1000mH),
Connector B (Uo=5V,Io=6mA,Po=7mW,Ci=0,Li=0,Co=100uF,Lo=1000mH)

MAXIMUM NON-HAZARDOUS SUPPLIES:
Connector A - Um=6V Connector B - Um=10.1V

- If the equipment is likely to come into contact with harmful 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 relative pressure range is +/-200 in H₂O (+/-500 mbar). Note, however, that the input pressure should not exceed +/-200 in H₂O (+/- 500 mbar) relative to

atmospheric pressure and the output pressure should not exceed 40 in H₂O (+/- 100 mbar) relative to atmospheric pressure.

For CSA (Canada) the 5000 series of gas analyzers are certified to Hazardous Area Classification

CLASS 2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems - For Hazardous Locations



Ex ib IIA:

Model GA 5000, GEM5000 and BIOGAS 5000 Methane Detectors; portable, battery powered with non-field-replaceable Battery Pack P/N 20087; intrinsically safe and providing intrinsically safe circuits (“[ib]” for Zone 1) to Model TP-5000 Temperature Probe (Connector B) and with entity output parameters as tabulated below; Temperature Code T1; 14 °F ≤ Tamb. ≤ +122°F (-10 °C ≤ Tamb. ≤ +50°C).

Connector	Entity Parameters						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5.0	6	7	100	1000	0	0
C	10.0	5	50	100	1000	0	0

⚡ Note: This device has been investigated for electrical safety features only.

For CSA (USA) the 5000 series of gas analyzers are certified to Hazardous Area Classification

CLASS 2258 83 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems – For Hazardous Locations - CERTIFIED TO U.S. STANDARDS



AEx ib IIA:

Model GA 5000, GEM5000 and BIOGAS 5000 Methane Detectors; portable, battery powered with non-field-replaceable Battery Pack P/N 20087; intrinsically safe and providing intrinsically safe circuits (“[ib]” for Zone 1) to Model TP-5000 Temperature Probe (Connector B) and with entity output parameters as tabulated below; Temperature Code T1; 14 °F ≤ Tamb. ≤ +122°F (-10 °C ≤ Tamb. ≤ +50°C)

Connector	Entity Parameters						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5.0	6	7	100	1000	0	0
C	10.0	5	50	100	1000	0	0

⚡ Note: This device has been investigated for electrical safety features only.

1.3 MCERTS (applied for)

MCERTS is the UK Environment Agency's Monitoring Certification Plan. The Plan provides a framework within which environmental measurements can be made in accordance with the Agency's quality requirements. The scheme covers a range of monitoring, sampling and inspection activities.

The GEM5000 instrument is MCERTS certified only if:

- The MCERTS logo appears on the screen after initial power on.
- ✎ Note: MCERTS - Cross sensitivity tests using hydrogen sulfide were not carried out on this instrument. Therefore, users should be aware if H₂S is present on sites, as there may be an interferential effect.

MCERTS promotes public confidence in monitoring data and provides industry with a proven framework for choosing monitoring systems and services that meet the Environment Agency's performance requirements.

The Environment Agency has established its Monitoring Certification Scheme (MCERTS) to deliver quality environmental measurements. The MCERTS product certification scheme provides for the certification of products according to Environment Agency performance standards, based on relevant CEN, ISO and national standards.

MCERTS certified instruments have been tested by an independent body to ensure that they meet certain performance requirements. In addition the manufacturer of an MCERTS product is regularly audited to ensure that the performance requirements of the certification are being continually met.

The 5000 series of gas analyzers have been certified to Version 3.1 of the 'Performance Standards for Portable Emission Monitoring Systems'.

1.4 Declaration of conformity

Products	<ul style="list-style-type: none"> • GEM5000 - Landfill Gas Analyzer and Extraction Monitor • BIOGAS 5000 - Anaerobic Digester Gas Analyzer
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Geotechnical Instruments (UK) Limited a LANDTEC Subsidiary declares 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

SIRA certificate number	SIRA 11ATEX2197X
Standards applied	EN60079-0 :2006 EN60079-0 :2009 EN60079-11 :2007

IECEX

Certification body	SIRA Certification Service
Notified body number	0518
Address	Rake Lane, Eccleston, Chester, CH4 9JN
IECEX certificate number	SIR 11.0089X
Standards applied	IEC60079-0 :2004 Ed4 IEC60079-0 :2007 Ed5 IEC60079-11 :2006 Ed5

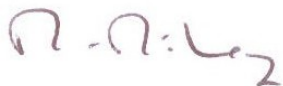
CSA (Canada and USA)

Certification body	CSA International
Address	178 Rexdale Boulevard, Toronto, ON, Canada M9W 1R3
CSA Certificate number	CSA 11 2445306
Standards applied	C22.2 No. 0-10 - General Requirements – Canadian Electrical Code, Part II CAN/CSA-C22.2 No. 60079-0:07 - Electrical apparatus for explosive gas atmospheres - Part 0: General Requirements CAN/CSA-C22.2 No. 60079-1:07 - Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures "d" CAN/CSA-E60079-11:02 - Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic Safety "i" ANSI/UL 60079-0:09 - Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements ANSI/UL 60079-1:09 - Electrical Apparatus for Explosive Gas Atmospheres - Part 1: Flameproof Enclosures "d" ANSI/UL 60079-11:09 - Electrical apparatus for Explosive Gas Atmospheres - Part 11: Intrinsic Safety "i"

EMC Directive 2004/108/EC

<p>EN 301 489 Pt 1 (V1.9.1 – 2011-04)</p>	<p>Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements</p>
<p>EN 301 489 Pt 17 (V2.1.1 – 2009-05)</p>	<p>Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for Broadband Data Transmission Systems EMC for broadband data transmission systems</p>
<p>EN 301 489 Pt 19 (V1.2.1 – 2002-11)</p>	<p>Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications EMC for Receive Only Mobile Earth Stations (ROMES)</p>
<p>BS EN 61000-3-2: 2006 + A2:2009</p>	<p>Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)</p>
<p>BS EN 61000-3-3: 2008</p>	<p>Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection</p>

Signed:



Dr. Roger Riley
NPI Director and Authorized Person

2 The GEM5000 gas analyzer

2.1 The GEM5000



Figure 1—GEM5000 gas analyzer

The GEM5000 gas analyzer is designed to monitor landfill gas extraction systems.

Key Benefits:

- Designed specifically for use on landfills to monitor landfill gas (LFG) extraction systems, flares, and migration control systems.
- No need to take more than one instrument to site
- Can be used for routine sub-surface migration monitoring of landfill site perimeter probe for measuring gas composition, pressure and flow in gas extraction systems
- The user is able to setup comments and questions to record information at site and each sample point.
- Ensures consistent collection of data for better analysis
- Streamlined user experience reduces operational times

Features:

- Measures CH₄, CO₂ and O₂ percent by volume, static pressure and differential pressure
- Calculates balance gas, flow (SCFM) and energy
- CO and H₂S (on Plus models)
- High Accuracy and Fast Response Time
- Lighter and More Compact
- Certified intrinsically safe for landfill use
- Annual recommended factory service
- Calibrated ISO/IEC 17025
- 3 year warranty with optional service plan

Applications:

- Landfills
- Gas Extraction Wells
- Flare Monitoring

- Subsurface Migration Probes.

2.2 GEM5000 standard product package (shown with optional temperature probe)



Figure 2—GEM5000 instrument package

Reference:

- A High Visibility Hard carry case
- B Gas Analyzer Instrument
- C USB download cable
- D Calibration Certificate
- E LSGAM & Instrument Manual on USB or CD-Rom
- F Hosekit with watertrap
- G Battery Charger
- H Temperature Probe (optional)

3 GEM5000 products and accessories

3.1 *LANDTEC System Gas Analyzer Manager – LSGAM*

LANDTEC System Gas Analyzer Manager (LSGAM) enables the operator to maximize the operation of the gas analyzer. It enables direct communication with the unit, features a simple upload and download facility and is compatible with Microsoft™ operating systems (XP, Vista, Windows 7).

Features:

- Organization and transfer of Device IDs and readings to and from the gas analyzer.
- Configuration of the gas analyzer.
- Structured organization of transferred data.
- Automatic detection of instrument type and available options.
- Secure data mode to prevent tampering.
- Enables flow measurements for GEM5000 gas analyzers.

3.2 *Optional products*

The GEM5000 gas analyzer has a number of optional products for purchase which enhance the usability and enable further analysis of data and reading information.

✍ Note: For more information on the features listed in this section please contact Sales at LANDTEC at +1 (909) 783-3636 or email at sales@landtecna.com

3.2.1 **Pitot tube (optional)**

The GEM5000 gas analyzer enables the use of a pitot tube to aid with flow measurement where an in situ flow device is not present. The pitot tube is used for gas extraction systems and the pressure readings are taken in inches of water (mbar if in metric). Gas flow is calculated in the analyzer in SCFM (m³/hr if in metric).

3.2.2 **Temperature probe (optional)**

The GEM5000 gas analyzer has the facility to automatically display and record the sample temperature via an optional temperature probe.

When a temperature probe is fitted the temperature reading will be displayed on the 'Main Gas Read Screen' and recorded with all other data.

✍ Note: Temperature probes with an Ex label are part of the GEM5000 Ex certification SIRA 11ATEX2197X and IECEx SIR11.0089X, and therefore certified for use under the same conditions as the analyzer.

3.2.3 H₂S filter (optional)

The GEM5000 gas analyzer has the capability to use an H₂S filter and is required as standard if the compensated CO cell is fitted and configured at the time the instrument is manufactured. H₂S gas can have a cross-gas effect on the CO reading. By using a filter, the H₂S is removed from the gas sample, therefore providing a more accurate CO reading.

The filter only needs to be used when you are trying to get rid of any possible cross gas effects H₂S might have on other gases. Do not use the filter on other monitoring points. For additional information related to H₂S filters please refer to <http://www.landtecna.com>.

3.2.4 GPS (optional)




An optional GPS feature is available for the GEM5000 gas analyzer. It enables the gas technician to automatically locate sample locations using GPS satellite signal from predefined sample location IDs uploaded from LANDTEC System Gas Analyzer Manager or set on the analyzer when out in the field prior to taking a reading. The GPS reading data is stored with each reading providing an audit trail, as it confirms where the reading was taken.












3.2.5 Bluetooth dongle (optional)

An optional Bluetooth feature enables the operator to set and utilize Bluetooth technology. This may be useful when downloading gas readings from the analyzer to the PC instead of connecting the analyzer to a PC via a USB cable. Bluetooth comes standard on many portable computers. For desktop / stationary computers, Bluetooth is activated by plugging the dongle into a pc USB port. The analyzer's Bluetooth discovery is activated by switching on the Bluetooth discovery option feature in the settings menu on the analyzer.

3.3 Instrument accessory products

Optional accessory and replacement parts must ONLY be purchased for the GEM5000 gas analyzer directly from LANDTEC or an authorized distributor. Please contact Sales@landtecna.com for further details on pricing and how to order.

Ref	Description	Part Number
	High Visibility Hard carry case	5K-HCase
	Soft carry case	5K-SCase
	Battery charger	5K-BC





Ref	Description	Part Number																									
	Temperature probe (ATEX certified)	5K-TP																									
	Hose Kit—In-line water trap filter, tubing, chrome quick connects	5K-HK																									
	Water trap with barbed filters (pack of 1) Water trap with barbed filters (pack of 5)	3-00000-5083 (QTY 1) 1-00000-5083 (QTY 5)																									
	Chrome Quick Connects / Gas ports connectors (pack of 5)	1-22502-0000																									
	Flexible Clear sampling tube length PVC tubing (1/4" id)	3-00000-0006																									
	Flexible Blue Tint sampling tube (1/4" id)	3-00000-0005																									
	Flexible Yellow Tint Exhaust tubing (1/4" id)	3-00000-7013																									
	3PSI pressure Relief Valve	2-00000-1226																									
	LANDTEC System Gas Analyzer Manager (LSGAM)	LSGAM																									
	USB Cable	5K-USB																									
	Bluetooth Dongle	BTDongle																									
	H ₂ S filter—Used to remove hydrogen sulfide from your sample gas stream.	1-00000-5155 (QTY 5) 3-00000-5155 (QTY 1)																									
	Filter Adsorber / Charcoal Filter used to remove non-methane hydrocarbons from the gas sample	1-00000-5084 (Qty 4) 3-00000-5084 (QTY 1)																									
	Printed Manual	5K-MNL-GEM5000																									
	Check gas regulator and tubing for calibration gas. Calibration gas cylinder. Please contact sales@landtecnica.com for gas cylinder concentrations	CGKit																									
	Calibration gas* "Mix-N-Match" from any combination of the following gas(es):	CG-Case (Qty 12 Cyl.) CG-4PKG (Qty 4 Cyl.)																									
	<table border="1"> <thead> <tr> <th>Part#</th> <th>CH₄</th> <th>CO₂</th> <th>O₂</th> <th>N₂</th> </tr> </thead> <tbody> <tr> <td>CG-50-35-00</td> <td>50</td> <td>35</td> <td>0</td> <td>15</td> </tr> <tr> <td>CG-15-15-00</td> <td>15</td> <td>15</td> <td>0</td> <td>70</td> </tr> <tr> <td>CG-00-00-04</td> <td>0</td> <td>0</td> <td>4</td> <td>96</td> </tr> <tr> <td>CG-N2-00</td> <td>0</td> <td>0</td> <td>0</td> <td>100</td> </tr> </tbody> </table>	Part#	CH ₄	CO ₂	O ₂	N ₂	CG-50-35-00	50	35	0	15	CG-15-15-00	15	15	0	70	CG-00-00-04	0	0	4	96	CG-N2-00	0	0	0	100	
Part#	CH ₄	CO ₂	O ₂	N ₂																							
CG-50-35-00	50	35	0	15																							
CG-15-15-00	15	15	0	70																							
CG-00-00-04	0	0	4	96																							
CG-N2-00	0	0	0	100																							


*Calibration gas and certain accessories only sold regionally. Consult with your nearest

LANDTEC office or distributor for availability.

4 GEM5000 instrument features

4.1 Physical characteristics of the instrument panel

Front view:	Reference:
	A Main Gas Read Screen
	B Soft-keys 
	C Backlight Key 
	D Menu Key 
	E Key 2 - Page Up 
	F Key 4 - Scroll Left 
	G Pump Key 
	H LED Light
	I On/Off Key 
	J Assistance Key 
	K Key 6 - Scroll Right 
	L Key 8 - Page Down 
	M Enter Key 
	N General Keys 

Back view:	Reference:
	O Serial Number
	P Part Number
	Q Certification Number
	R Recalibration Due

4.2 GEM5000 Part Number Legend

The GEM5000 part number consists of a variety of options that can be fitted to meet specific customer needs. All GEM5000 series instruments begin with GM5K followed by a series of options. An "x" represents an option. A "0" represents option not selected or reserved for future use.

G	M	5	K	x	x	x	x	-	x	x	x	-	L
<p>0—Reserved for Service Plan designation</p> <p>0—Reserved for Future Use</p> <p>0—Feature not installed 2—NAV</p> <p>0—Reserved for Future Feature</p> <p>0—Empty A—H₂S 50ppm B—H₂S 200ppm C—H₂S 1000ppm D—H₂S 5000ppm E—H₂S 9999ppm F—CO 1000ppm G—CL₂ 20ppm F—SO₂ 20ppm G—SO₂ 100ppm H—HCN 100ppm I—NO₂ 20ppm J—H₂ 1000ppm</p> <p>0—Empty A—CO/H₂ 2000ppm--(CO compensated)</p> <p>0—Empty A—H₂S 500ppm B—CO 500ppm C—NH₃ 1000ppm D—HCN 100ppm E—NO₂ 20ppm F—SO₂ 100ppm G—H₂ 1000ppm H—CL₂ 20ppm</p>													

Typical Configurations:

- GM5K0000-000-L GEM5000 Base Model
- GM5K0000-200-L GEM5000 with GPS option
- GM5KAA00-000-L GEM5000 with CO & H₂S (500PPM)

4.3 Analyzer features and keys

A	Main Reading Screen		Start and end screen when using the instrument.
B	Soft-keys		The function of the three 'soft-keys' on the front of the instrument panel is determined by menu options taken. Functions vary from screen to screen.
C	Backlight Key		Enables the operator to backlight the analyzer display panel.
D	Menu Key		Press the 'Menu' key to view and maintain User, Device and Operation settings.
E	Page Up Key		Also 'Key 2'. Press scroll up to view further information on the instrument screen.
F	Scroll Left Key		Also 'Key 4'. Enables the operator to scroll left to display more information.
G	Pump Key		Press the 'Pump' key to start or stop the pump.
H	LED Light		LED power light is visible on the front of the analyzer when the instrument is powered on.
I	On/Off Key		Press the 'On/Off' key briefly to switch the instrument on and off.
J	Assistance Key		Press the 'Assistance' key to view help text relevant to the analyzer screen you are currently displaying.
K	Scroll Right Key		Also 'Key 6'. Press scroll right to view further information on the instrument screen.
L	Page Down Key		Also 'Key 8'. Enables the operator to scroll down to display more information.
M	Enter Key		The 'Enter' key accepts/confirms choices made by the operator. Also required to confirm numeric data entry.
N	General Keys		Keys 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
O	Model Number		Instrument model type identification.
P	Serial Number		Unique identification for the instrument. Verification of the serial number will be required if Technical Support assistance is needed.
Q	Part Number		Manufacturer part number.
R	Certification Number		Displays instrument certification information.

S	Recalibration Due		The date displayed is the date the instrument is due to be calibrated.
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4.4 Instrument connection points

Top view:

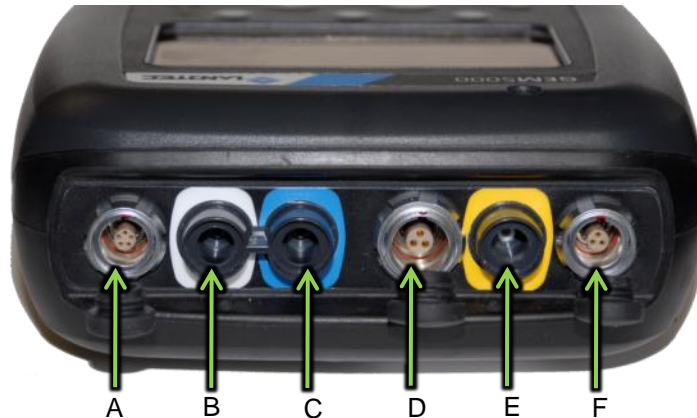


Figure 3—Connection Points

Ref:	Connection Point:	Function:
A	Connector & Dust Cap	Attach the USB cable for PC-to-analyzer connectivity.
B	Inlet Port & Static Pressure Port (White port)	Attach the sample tube to take a gas sample. Also used to measure the static pressure.
C	Differential Pressure Port (Blue port)	Attach the sample tube to measure differential pressure.
D	Connector & Dust Cap	Attach the temperature probe while taking readings. Attach the wall charger to the analyzer for charging.
E	Gas Outlet Port (Yellow port)	The gas outlet port is the point at which the sample gas is expelled. Tubing may also be attached to the port.
F	Connector & Dust Cap	Reserved for future accessories that will be developed.
	Dust Caps	Dust caps are used to protect the connector points of the instrument.

5 The LANDTEC System Gas Analyzer Manager (LSGAM) Software

LSGAM software is used to communicate with the GEM5000 and GEM2xxx family of instruments. This allows a simple upgrade of information from older GEM2xxx instruments to the GEM5000 instruments.

Configuration Options

The GEM5000 instruments and LANDTEC System Gas Analyzer Manager (LSGAM) software can be utilized in a number of ways:

- Configured for operation with the LANDTEC System online service
- Used offline as a local application storing information on the desktop/laptop computer
- Use of the GEM5000 out of the box without software; (this does not allow the user to generate flow rate values, select comments or select IDs with the instrument. This also prevents downloading of readings to the computer.)

5.1 LANDTEC System Online Users

The procedures included in this section are intended for those who connect to the LANDTEC System online service. The LANDTEC System is an online collaboration tool to Collect, Validate, Analyze, and Communicate information based on field data obtained using LANDTEC instrumentation. LANDTEC offers a variety of On-Line service subscription levels for LANDTEC System software.

If you are a currently registered user on the LANDTEC System, please log in at <http://www.landtecsystem.com/>. If you are not currently using the LANDTEC System, you may register by contacting LANDTEC in the US: (800) 821-0496 or International: +1 (909) 783-3636.

Online reference for using LANDTEC System Gas Analyzer Manager (LSGAM) with the LANDTEC System can be found under the About → Help & Support menu within the LANDTEC System.



If you do not have login information please contact LANDTEC System Technical Support at +1 (909) 783-3636 extension 6131. Alternatively, you may contact your local LANDTEC office for information on connecting to the LANDTEC System online service.

5.2 Offline Users

The procedures included in the section describe use of the LANDTEC System Gas Analyzer Manager (LSGAM) Software while **NOT** connected to the LANDTEC System online service.

5.3 Installation with the CD or memory stick



System Requirements

- Windows XP, Vista, 7
- Pentium 750MHz or faster
- 128MB RAM
- 200MB Hard Drive Space Available
- CD-ROM Drive
- Available USB port or bluetooth connection

NOTE: The computer may need administrative privileges to install the program. Program may run on other versions of Windows but LANDTEC has not tested the program on older versions of windows or with lesser processor and memory requirements.

As part of LANDTEC's continual improvement process, LANDTEC has consolidated its product

information and instrument communications software into one menu structure. On your memory stick or CD you will find technical information, instrument communication software, USB cable drivers, videos and instrument manuals.

To install the USB Cable Drivers and LSGAM (instrument communication software) from this media format, you will need to place your CD or memory stick into your computer. If you have a CD it should automatically start. If you have a memory stick, you may have to browse to it in your computer and then click on the **ClickHereToStart.htm** icon. If you don't have a CD or memory stick, simply call LANDTEC's technical support for internet links required to install the software.

Once the media opens, you should see the GEM5000 and GEM2000 instruments on the homepage.



Click on the GEM5000 instrument to open the LSGAM Software Setup.



From the setup screen you will see four buttons directly related to the GEM5000:

- Step1 Communications Driver
- Step2 Install LSGAM Software
- 5000 Manual
- Instructional Videos

Note: Technically the communications drivers differ between the GEM2000 and GEM5000 instruments, however, the driver package included with the 5000 instruments shipping after Nov 1, 2012 include drivers for both the GEM5000 and GEM-2000 instruments. The LSGAM software for the GEM5000 is backwards compatible for the GEM2000 instruments.

The LSGAM software will automatically update if an internet connection is available when the software starts. This software has been tested with Windows XP and Windows 7.

Should you have any difficulties, please don't hesitate to contact us. Our Software support group can be reached at (909) 783-3636 x6131 or support@landtecna.com

The instrument communicates to the computer by means of a USB cable or by bluetooth. The USB cable requires drivers to be installed prior to use on the computer. From the CD (or USB memory stick) choose

the first option titled “Step 1”. A Bluetooth connection requires the instrument to be paired to the computer. Refer to the section “[Configuring Communications](#)” for more details.

The Java programming is an import part of this software and will be loaded with the installation. If you have internet access, it is recommended to update your java to the latest version by going to <http://www.java.com/en> then clicking the button for the Free Java download. Once at the Java downloads you’ll see links to download the latest version of Java for your computer.

The Java icon, shown below, will be in the task tray at the bottom of your computer screen where your time is shown. There will also be a GAM log icon, shown below, that will be created on your desk top during installation.



5.4 Startup

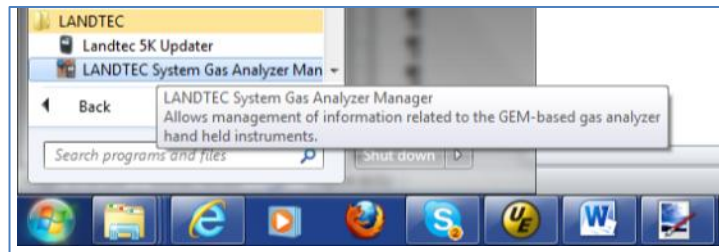
Once the USB cable drivers are installed and you’ve checked for the latest Java Runtime from the www.java.com/en website, click on “Step 2 — Install LSGAM”. LSGAM will install placing an Icon on your desktop and a new Start Menu Group named LANDTEC.

Starting LSGAM can be easily done by doing one of the following:

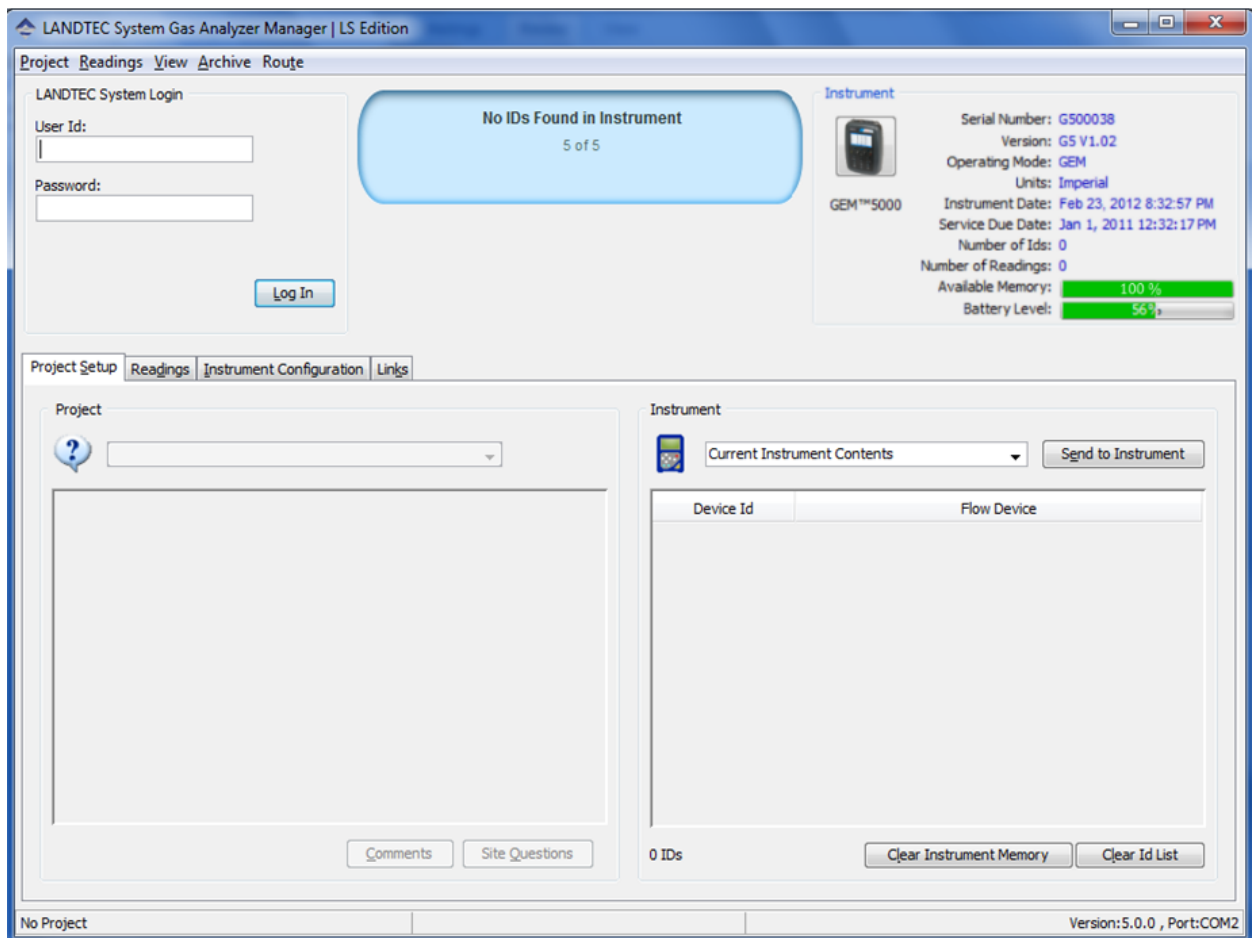


Double-Click on the Desktop icon. OR - go to;

Start → All Programs → LANDTEC → LANDTEC System Gas Analyzer Manager



The software will start.

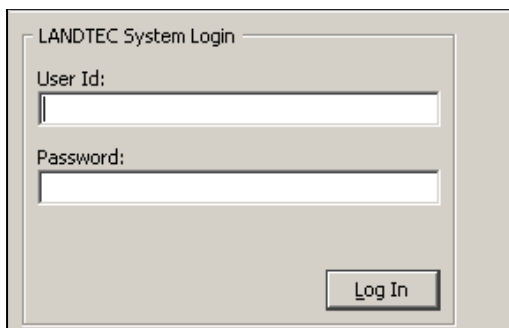


5.5 Navigation

The LANDTEC System Gas Analyzer Manager User Interface allows for easy access and navigation to various utilities to use the LANDTEC portable instrument on a day to day basis. The following is a general description of the user interface.

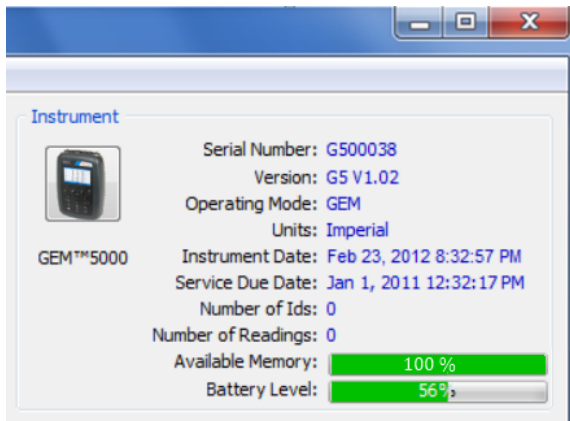
LANDTEC System Login

When LSGAM is used with the LANDTEC System online service, the username and password will be entered in the screen below, if you are using LSGAM as a desktop application the User Id and Password fields do not need to be filled in.

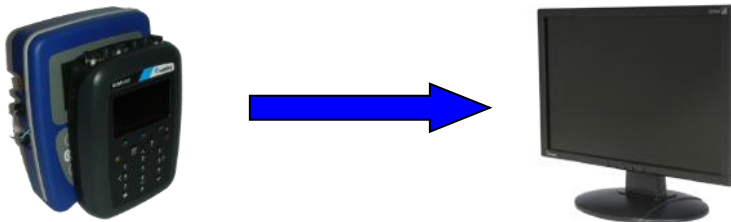


The Progress section indicates the status of the current process. For example, when starting up LSGAM, this will show you the activity of the software.

The Instrument section displays whether or not an instrument is connected. This also downloads the IDs, readings, and comments. If an instrument is found the following details are shown about the instrument:



5.6 Connecting to the Instrument



- Connect the GEM5000 to your computer with either the USB cable or a Bluetooth connection. In the event you instrument has difficulty connecting, refer to [Appendix—Configuring Communication Connections](#) for more information setting up and testing USB Serial communications and Bluetooth Serial communications.
- The Instrument must be powered ON and in the Gas Reading screen
- Launch the LSGAM software by clicking on the icon on your desktop

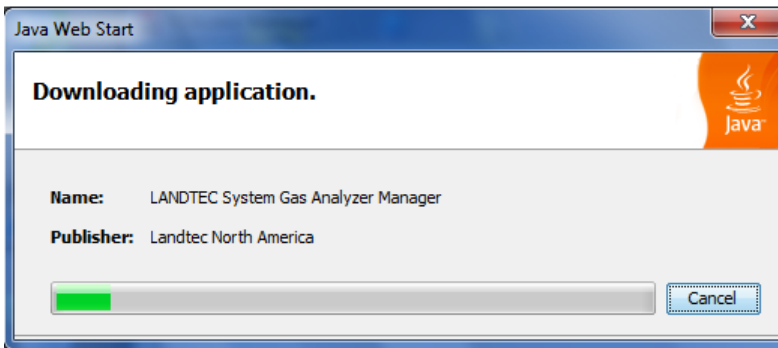


This is the first screen you will see when starting the program.



Once the software is installed on your computer with an internet connection this instrument communications program has Auto application updates. This enables you to always have the most current version of the instrument communications LSGAM.

If an update to LSGAM is available, you will be prompted to install the update.

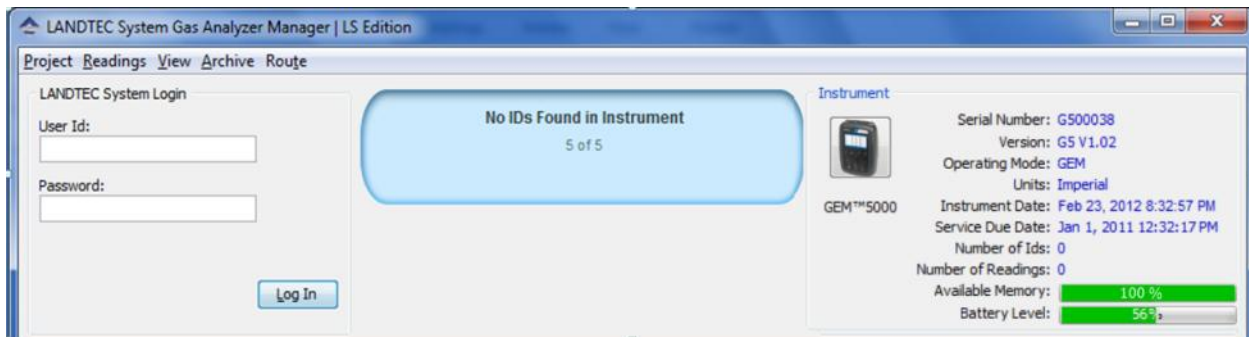


Click on OK this will return you to the desktop and you will then need to click on the LSGAM shortcut again.

The GEM5000 must be connected to computer and turned ON. It must also be in the Gas Reading screen. The LSGAM software will automatically download any information in the instrument including readings, comments and IDs.

Note: *Connection of instrument to computer should not be performed in a hazardous area.*

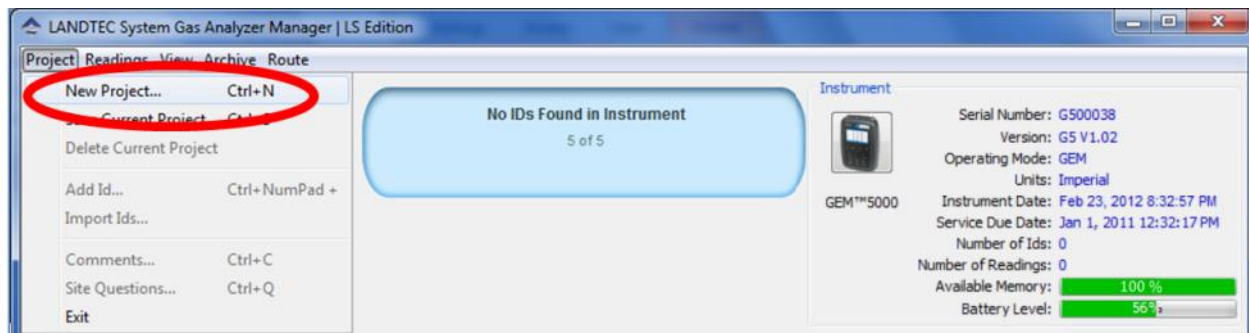
A new instrument containing no information will display only the instrument information: Serial Number, Version, Operating Mode, Instrument Date, Service Due Date, Number of IDs, Number of Readings, Available Memory, and Battery Level.



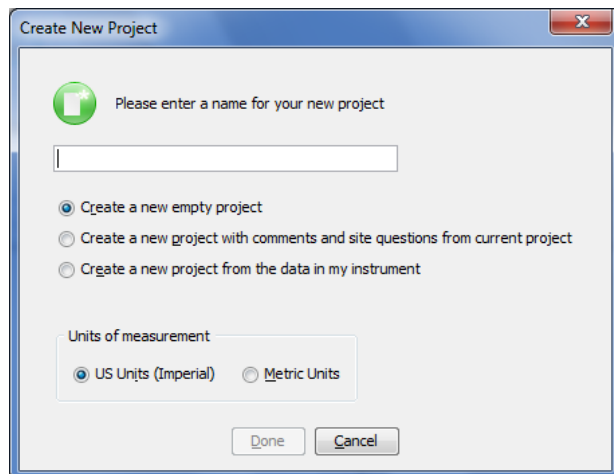
5.7 Create a Project / Select a Project

Projects are a collection of Device IDs and their associated reading history. A project can be created using LSGAM to contain a group of sequenced IDs and chronological history of instrument readings.

To create a Project, click on the Project menu and select New Project.



Upon selecting **New Project...** you will be prompted to enter a Project Name and select from one of three options.



Create a New Empty Project

This option creates a blank project where you configure all IDs and Comments. Alternately ID's can be loaded from a file using the DataField CS version 3.4 ID file format.

Create a New Project with comments and site questions from a Current Project

Selecting this option allows the user to create a new project that will have the same Comments and Site Questions as an existing project.

Create a New Project from the data in a GEM instrument

This option will create a New Project and automatically associate the IDs, Comments, and Site Questions that exist in the connected portable instrument.

5.7.1 ID Setup

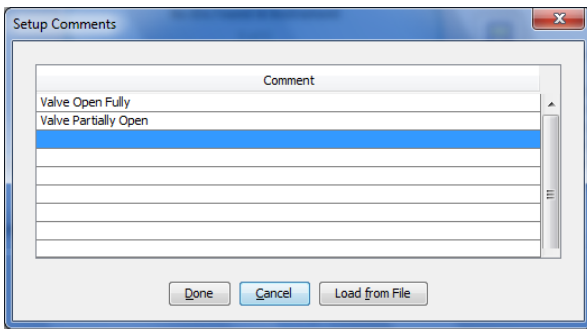
An ID represents a physical sampling point in the field. An ID can be allocated to field components such as extraction wellheads, gas transmission lines, or passive monitoring probes. LSGAM allows users to configure an ID for each sampling point in order to obtain accurate readings with LANDTEC portable instrumentation

IDs are created, modified, and removed from the Project Setup tab in the software.

5.7.2 Creating Comments

Comments should be setup prior to creating new IDs. The user can define Comments that can be associated with a reading in the portable instrument.

If you selected Create a New Project, when creating your project, you will need to click on the Create Comments button. Comments can be entered in this setup screen or loaded from a text file and will be displayed in the user interface. Comments can be 64 characters in length. "Notepad" or another text editor can be used to create a file containing one comment per line up to 64 comments in total.



Typical Comments Might Include
Valve Fully Open
Valve Partially Open
Valve Closed
Air Leak in Wellhead
Water Blockage in Header
Surging at well
Sample Port Needs Replacement
More Vacuum Needed
5 Day Recheck

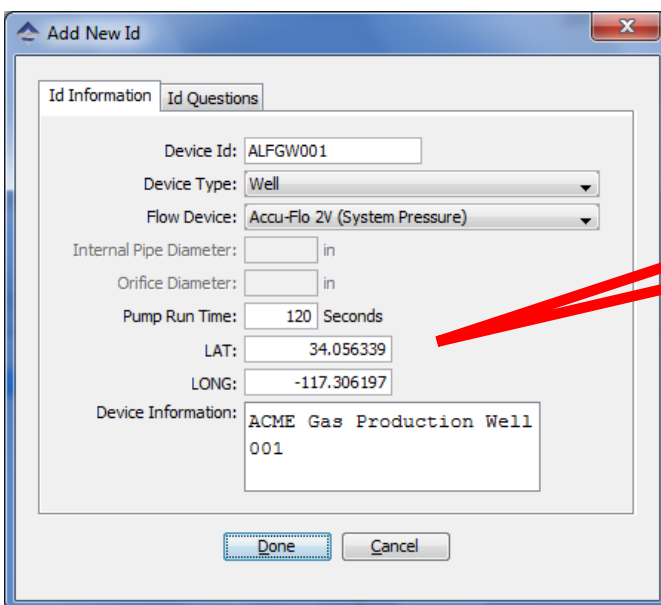
5.7.3 Creating IDs

There are several ways to input IDs to the Project. The following describes each process:

Creating new IDs with LSGAM

To create a new ID using the LANDTEC System Gas Analyzer Manager, Right Click on the left ID pane beneath your active project and select the Add New ID option.

The Add New ID form will be displayed. From the ID Information tab of this form, entry of the following is available:



*Note: LAT & LONG will only be available on **GEMs with the NAV option***

ID INFORMATION

Device ID: Must be eight (8) alphanumeric character spaces. (For example, ALFGW001)

Device Type:

- Well: An active gas extraction well connected to a piping network which may require a flow rate reading.
- Sample Port: A sample point along a gas transmission line that may require a flow rate.
- Probe: A passive gas migration monitoring probe that does not require a flow rate.

The GEM5000 calculates flow rate values specific to each device type (listed above). The available flow devices programmed in GEM mode are listed below.

Flow Devices:

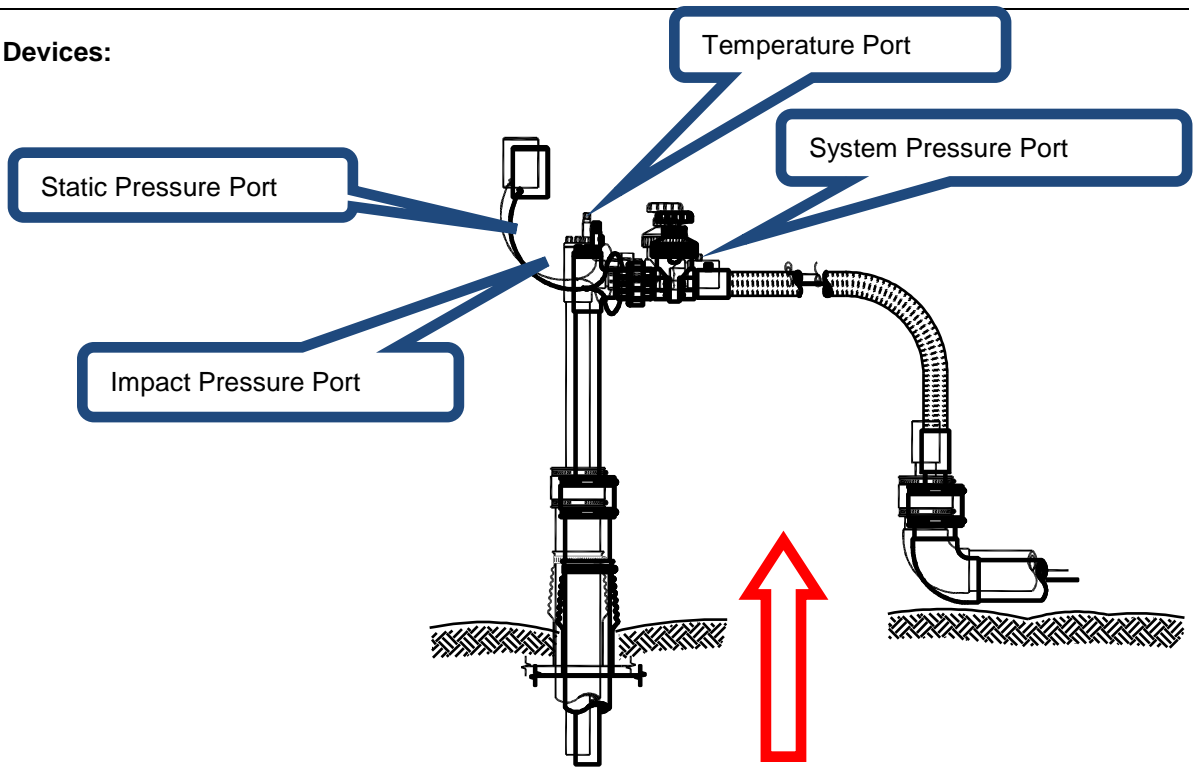


Figure 4 - ACCU-FLO Vertical Wellhead

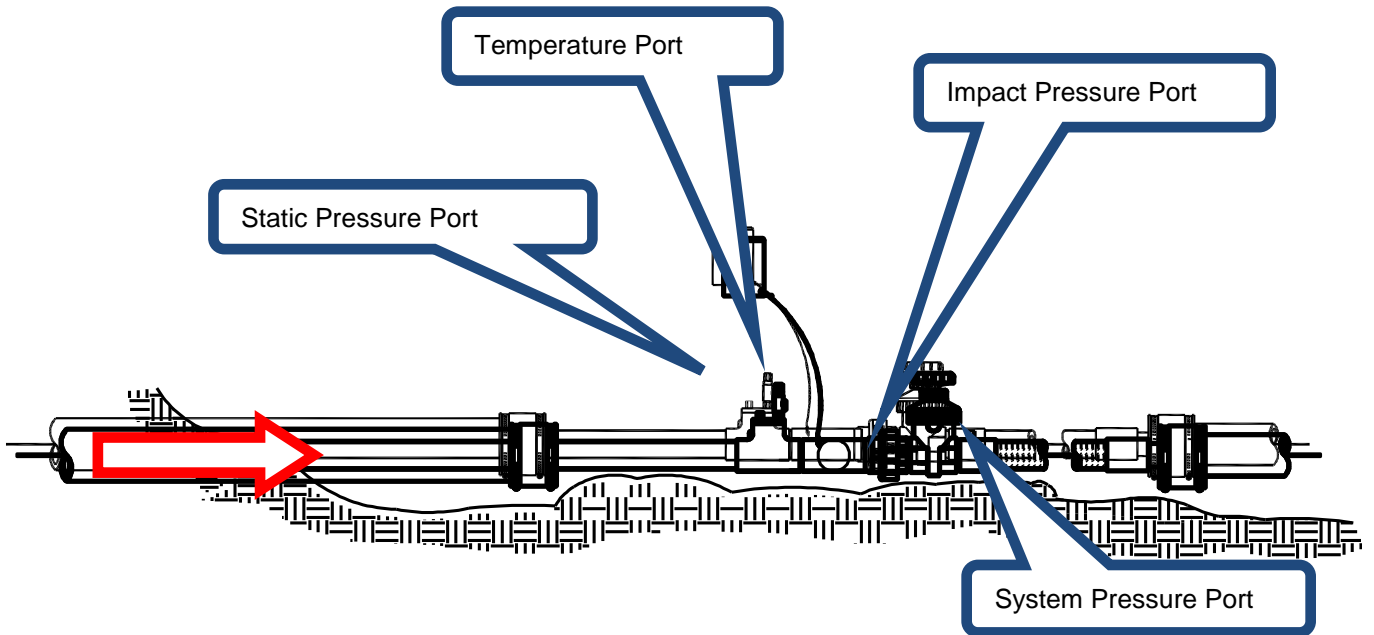


Figure 5 - ACCU-FLO Horizontal Wellhead

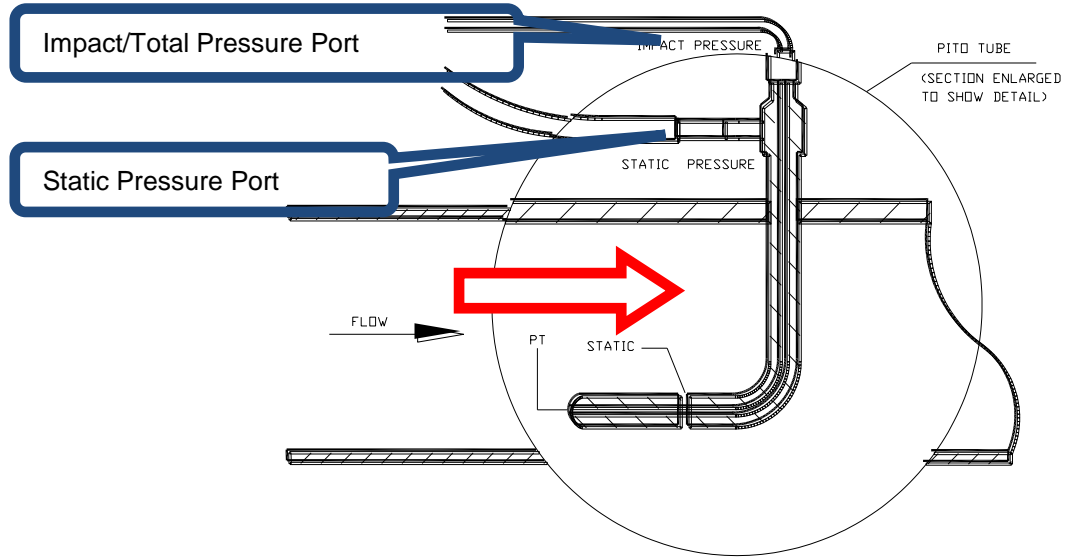


Figure 6 - Pitot Tube

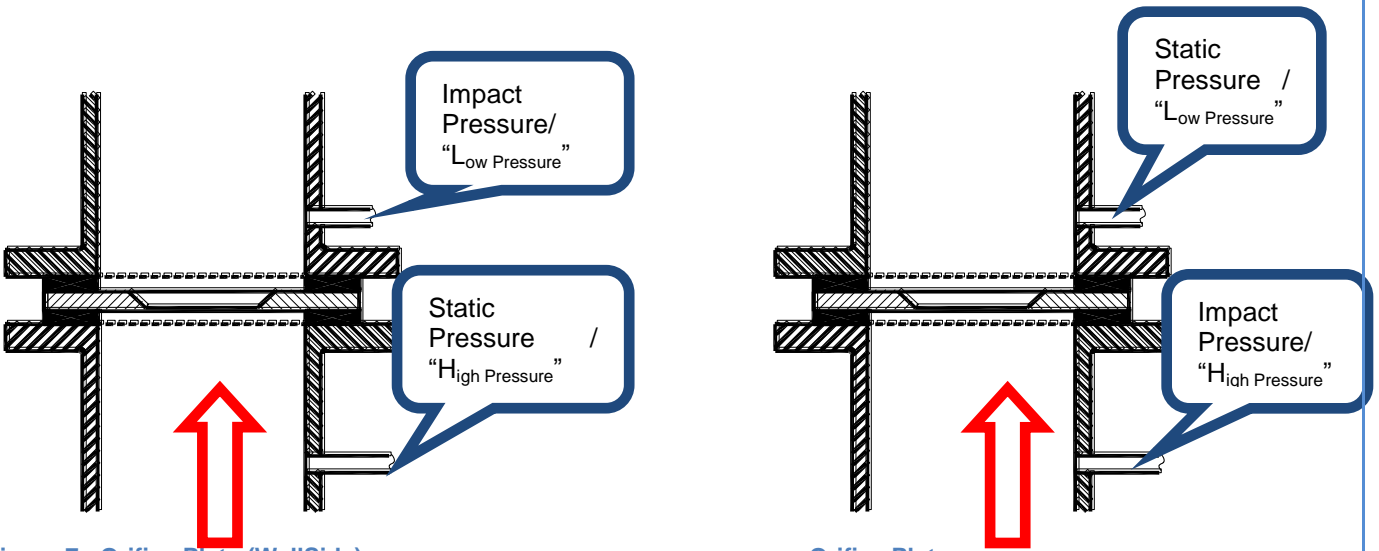


Figure 7 - Orifice Plate (WellSide)

Orifice Plate

Flow Device Name Programmed in GEM	Orientation	Size (Inches)	Flow Range (SCFM)	System Pressure
No Flow (GA Mode) *				
ACCU-FLO 1.5V	Vertical	1.5	1-50+	
ACCU-FLO 1.5H	Horizontal	1.5	1-50+	
ACCU-FLO 2V	Vertical	2.0	5-125+	
ACCU-FLO 2H	Horizontal	2.0	5-125+	
ACCU-FLO 3V	Vertical	3.0	35-300+	
ACCU-FLO 3H	Horizontal	3.0	35-300+	
Orifice Plate				
Pitot Tube				
User Input				
Orifice Plate WellSide				
ACCU-FLO-1.5V (System Pressure)	Vertical	1.5	1-50+	✓
ACCU-FLO-1.5H (System Pressure)	Horizontal	1.5	1-50+	✓
ACCU-FLO-2V (System Pressure)	Vertical	2.0	5-125+	✓
ACCU-FLO-2H (System Pressure)	Horizontal	2.0	5-125+	✓
ACCU-FLO-3V (System Pressure)	Vertical	3.0	35-300+	✓
ACCU-FLO-3H (System Pressure)	Horizontal	3.0	35-300+	✓
Orifice Plate-System Side (System Pressure)				✓
Pitot Tube (System Pressure)				✓
User Input (System Pressure)				✓
Orifice Plate WellSide (System Pressure)				✓

- *Note: Use of the No Flow type of device on a Probe will allow the instrument to automatically switch to the GA workflow when the ID is selected. The user can always use special actions from the menu to switch workflows between GEM and GA.

Pipe Diameter: The pipe inside diameter (ID) is required for Orifice Plate and Pitot Tube type flow devices.

Orifice Diameter: The field for orifice bore diameter is available for all Orifice Plate flow devices.

Note: For the instrument to calculate a flow the ratio of orifice size to pipe diameter must be between 0.25 and 0.75.

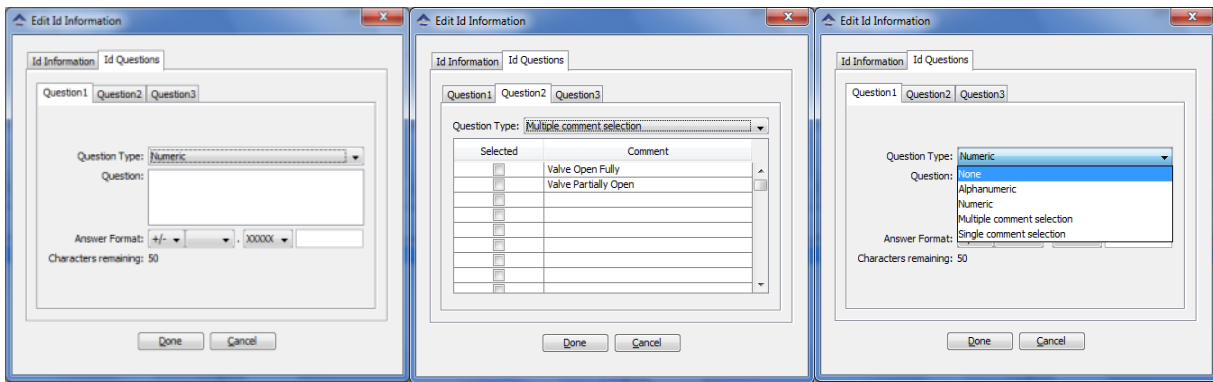
Pump Run Time: Indicates the duration the instrument's pump will run while sampling for the selected ID.

Device Information: Allows the user to enter general information for the device. This will display on the screen of the instrument if the user chooses the ③ View ID Details option from the ID selection screen on the instrument.

ID QUESTIONS

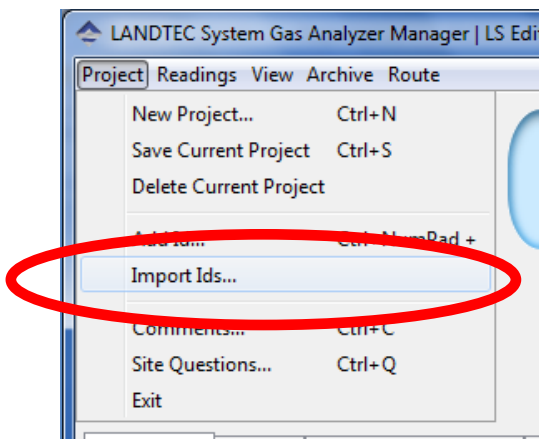
There are 5 Question Types that can be selected:

- **None** - No question will be prompted to the user
- **Alphanumeric** - An alphanumeric answer can be entered when taking a reading
- **Numeric** - A numeric only answer can be entered when taking a reading
- **Multiple Comment selection** - Up to 8 comments that may be appropriate for this device ID can be selected in the ID setup. Then one or all of the comments can be selected when taking a reading.
- **Single comment selection** - Up to 8 comments that may be appropriate for this device ID can be selected in the ID Setup but only one comment can be selected when taking a reading. Comments related to valve position are often used with a Single Comment Selection because the valve can only be in one position.

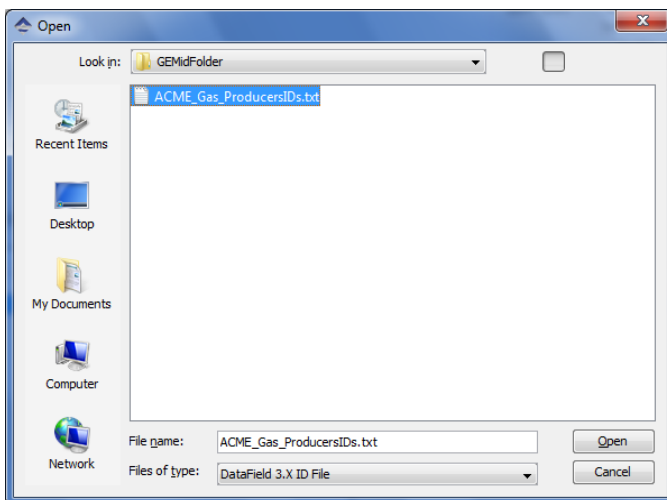


5.7.4 Importing DataField CS IDs

If you have existing ID files from DataField CS v3.4.x, these files can be imported by LSGAM. To begin this operation select the **Import IDs...** option from the **Project** menu.

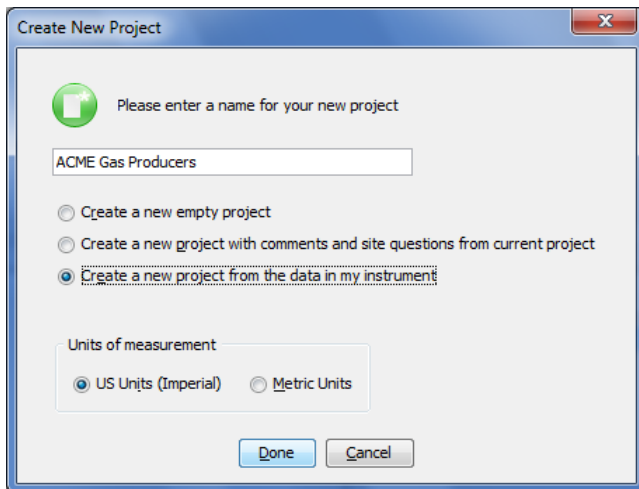


Select an ID file generated by DataField CS v3.4.x.



5.7.5 Create a new project based upon IDs ALREADY IN THE INSTRUMENT:

To create a Project based on the information in the instrument, select **Create a new project from the data in my instrument.**



*Note: When using the **Creating a new project from the data in the instrument** option, only IDs NOT associated with other projects will be created into the new project.*

Creating a Device ID that does not measure flow Example- Probe or Sample Port

If there is no flow device you can choose the “No Flow (GA Mode)” option. Alternatively, you can also choose User Input. When choosing the User Input option you will need to enter the appropriate pipe inside diameter. A pump run-time must be specified in with either type of flow device.

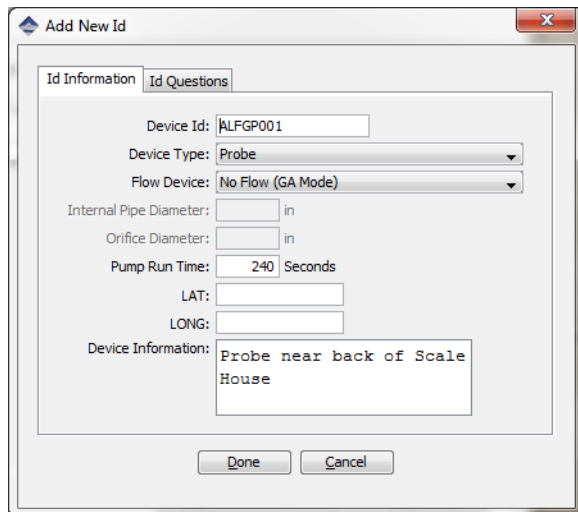


Figure 8--Probe Definition using "No Flow" option

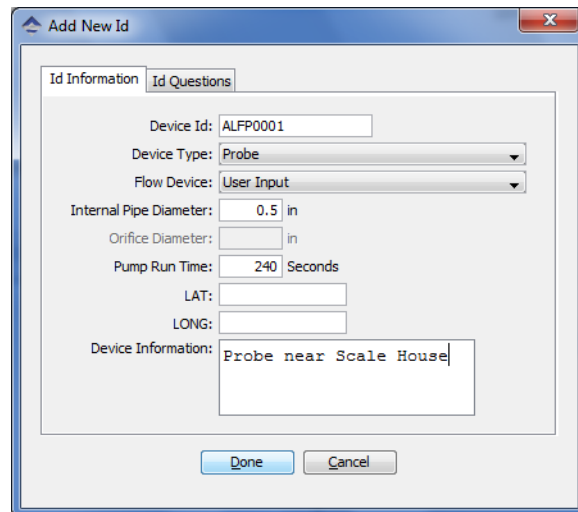
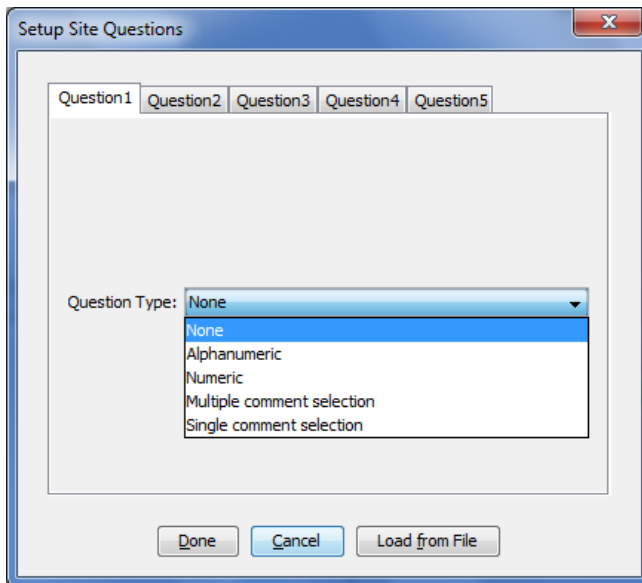


Figure 9--Probe Definition using "User Input"

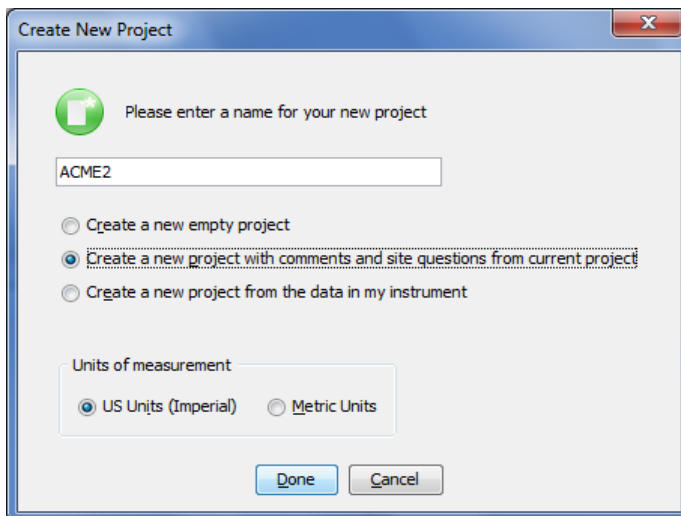
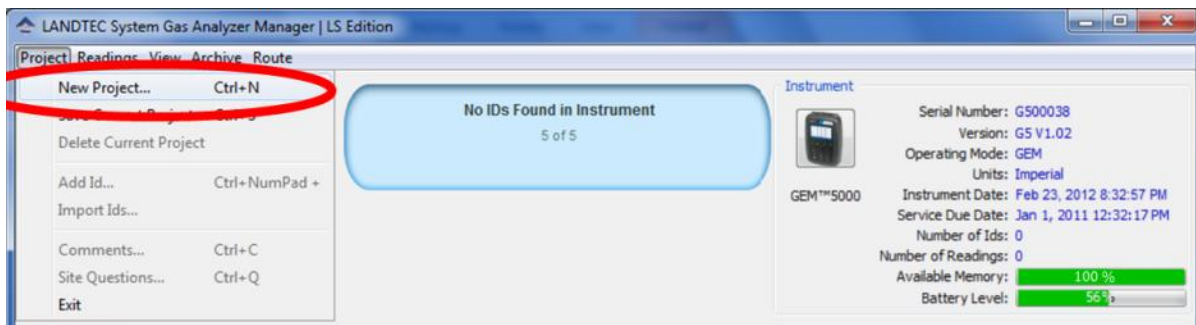
5.7.6 Creating your Site Questions

Site questions are setup in the same manner as ID questions however unlike ID questions, the answers for Site questions will apply to all subsequent readings until the site question is updated. A total of 5 site questions can be sent to your instrument. These must be updated each time you use the GEM. This is done by going to the ① Menu selection on the instrument and choosing [Update Site Data]

The options for questions are Alphanumeric – Numeric – Multiple or Single comment selection.



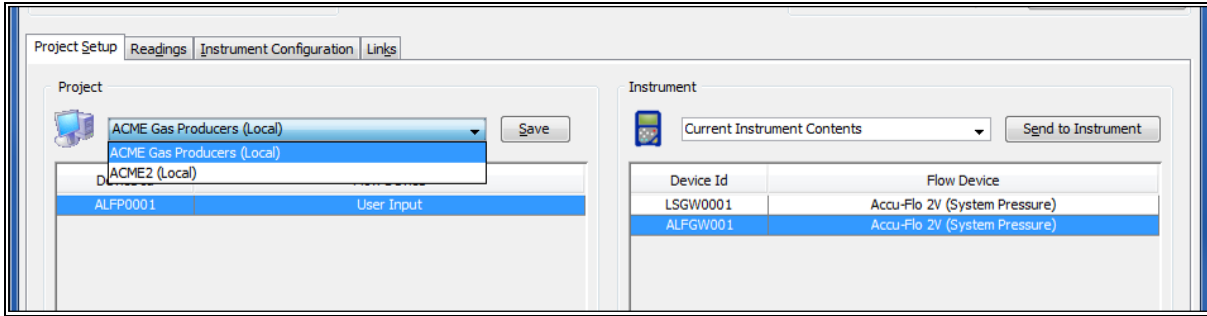
These Site Questions may be used again with another project by selecting the Create New Project and create new project with comments and **site questions** from current project.



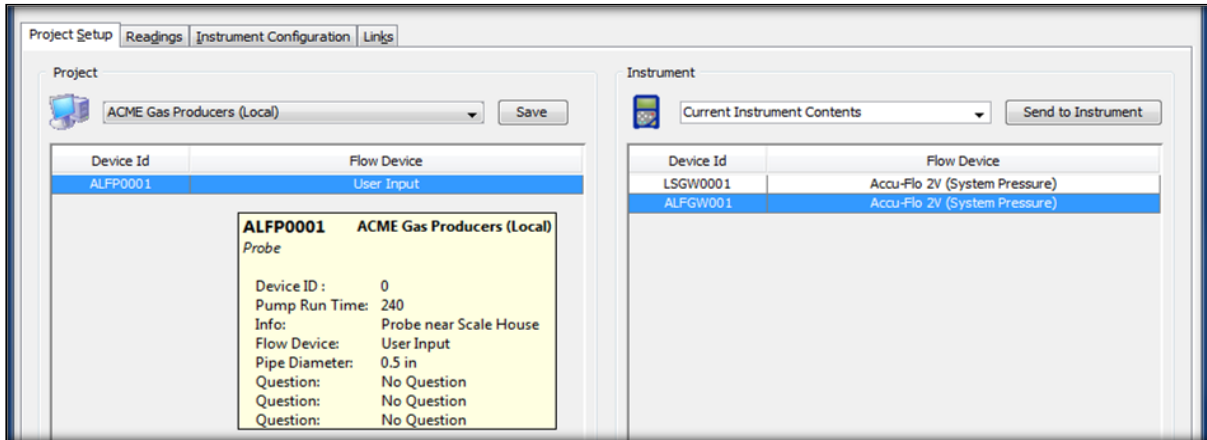
The project will be created and the IDs, Comments, and Site Questions that exist in the instrument will be applied to the new project.

5.7.7 Working with Device IDs

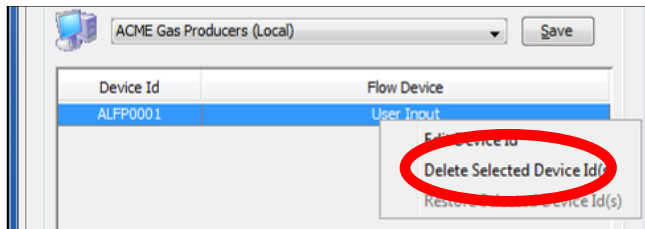
Once some IDs are added to your project you may need to occasionally edit them or reference them. First select the project which you want to work with from the project drop down list.



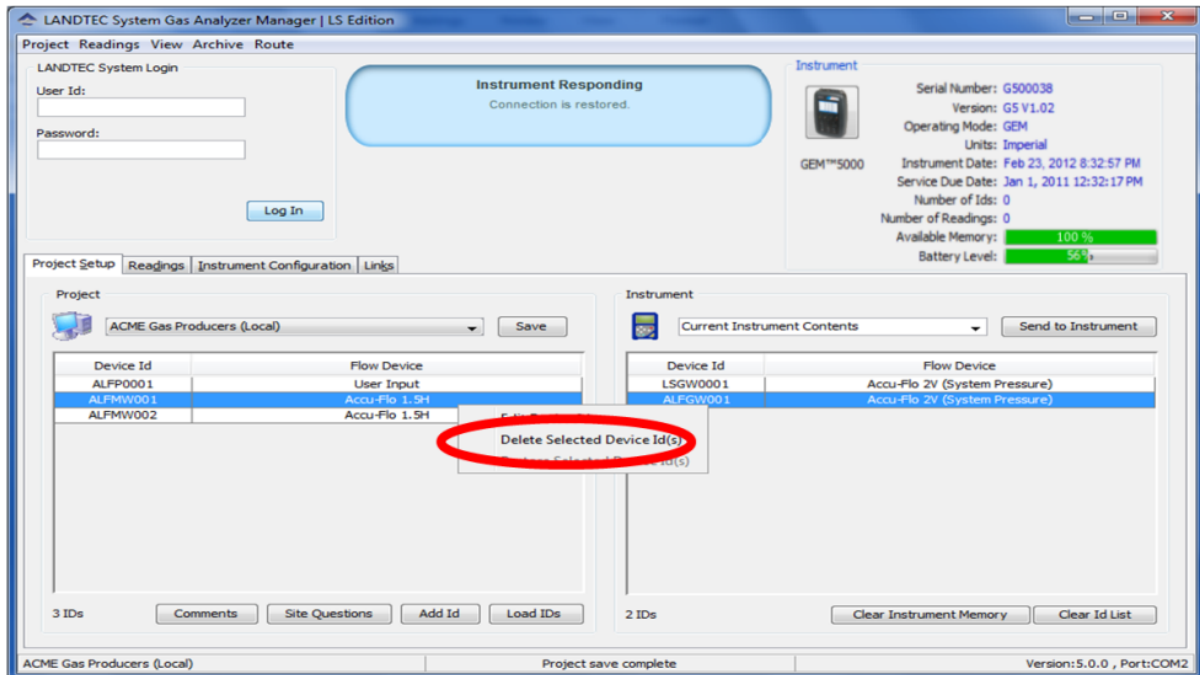
Placing the mouse cursor over a specific device ID will show detailed information about that ID.



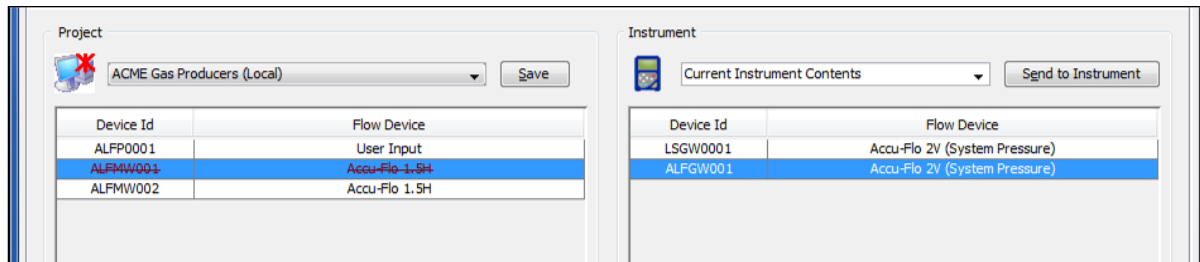
To edit a Device ID, right click on the desired device and select **Edit Device ID**.




To delete an existing ID, right click on the desired device and select **Delete Selected Device ID(s)**.



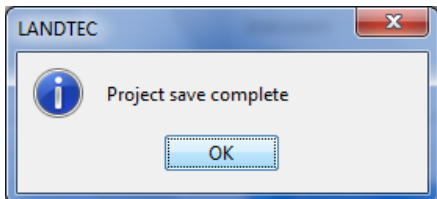
Upon clicking on Delete Selected Device Id(s) you will see the line ~~strikeout~~.




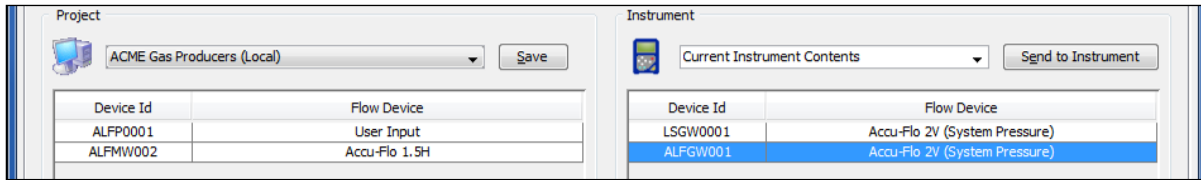
The computer icon will now display a red asterisk ^{*} over the image . This indicates that the IDs are NOT saved. Deleted IDs are displayed with a line through the information on the screen. To restore a deleted ID, right click on the ID and click **Restore Selected Device ID(s)**.

Note: Deleted ID's can only be restored while the project state is unsaved. Once saved, the ID changes are saved and restoration cannot be completed.

Once all work with the device ID's is complete, click on the Save button.



After clicking on OK, the device is removed and the computer icon returns to the unaltered state .



5.7.8 Sending IDs to the instrument

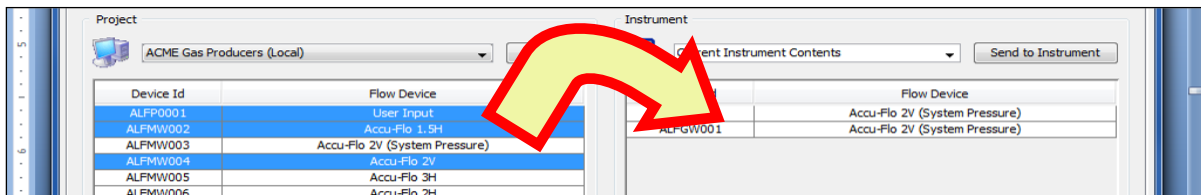
Once IDs have been created in the project, they must be uploaded to the instrument. To perform this operation, select the desired IDs from the left hand table under the Project name (computer side), left click and hold while dragging the IDs to the right hand table and release the mouse button. This is action is known as a “Drag & Drop”.

Three basic methods of selecting IDs exist.

- Select Specific ID(s)
- Select a Range of IDs
- Select All IDs

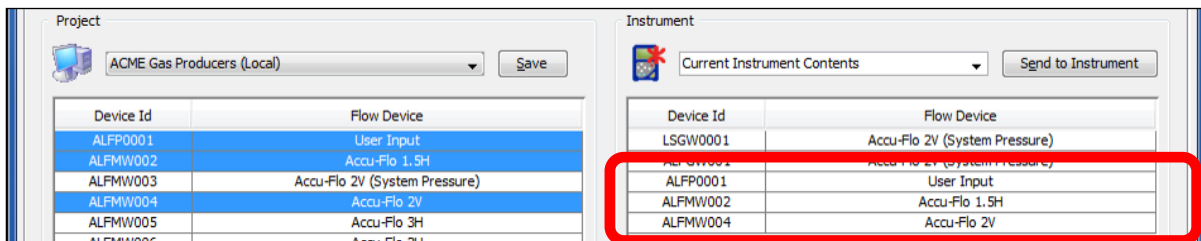
Specific IDs

To Select Specific IDs from the List, place the mouse arrow at the edge of the first cell and hold down the left Ctrl key. Now click the next ID cell that you wish to select. Repeat this as many times as necessary.




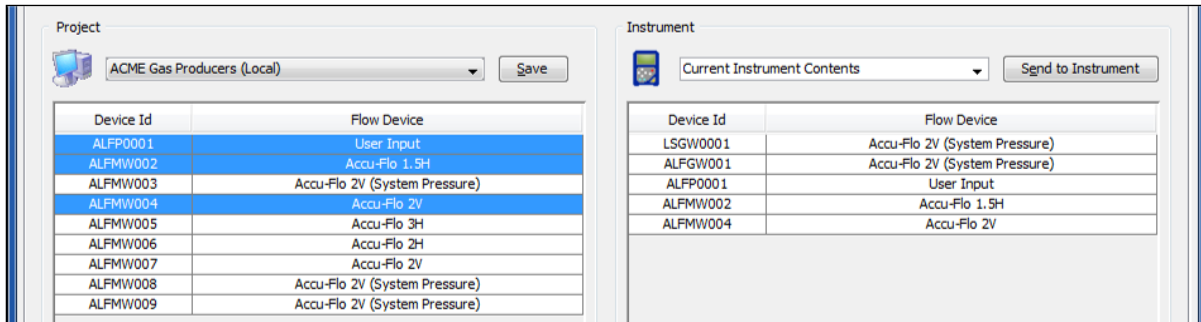
Selected IDs (shown as Highlighted). Arrow depicts "Drag & Drop" action after selection.


Now “Drag & Drop” the IDs from the left (computer window) to the right (instrument window). During the “Drag &Drop” process, the arrow will change to a no-drag symbol.



The selected IDs ALFP001, ALFMW002, and ALFMW004 now appear on the Right (Instrument) side. At this point the IDs are on the Instrument side but have NOT been sent to the instrument. The instrument

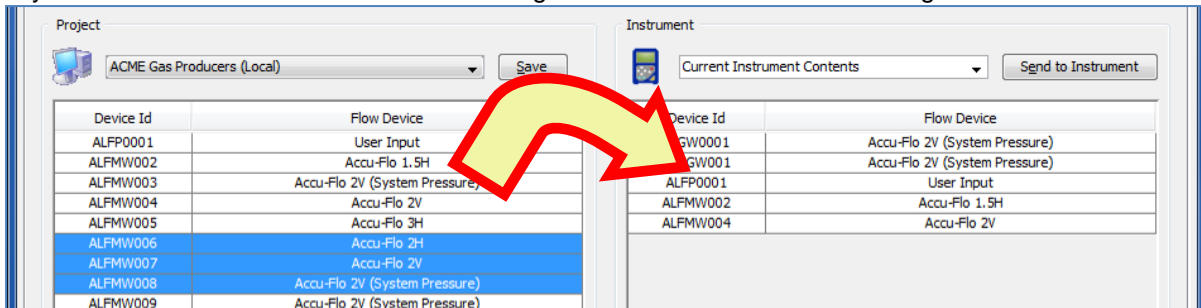
with the red asterisk * indicates this unsent ID state. Click on the Send to Instrument button  to send these IDs to the instrument.



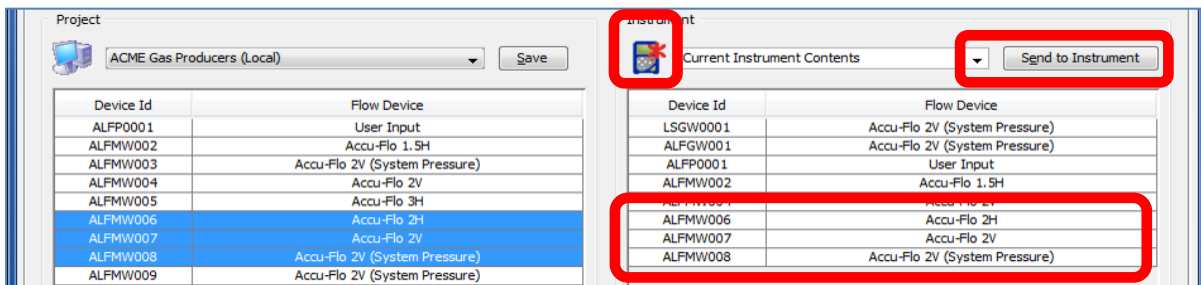
After the IDs are sent to the instrument, the instrument  will appear without the red asterisk *

Range of IDs

To Select A Range of IDs, place the mouse arrow at the edge of the first cell and hold down the left shift key. Now click the last cell in the range. The entire selected range will now be selected.



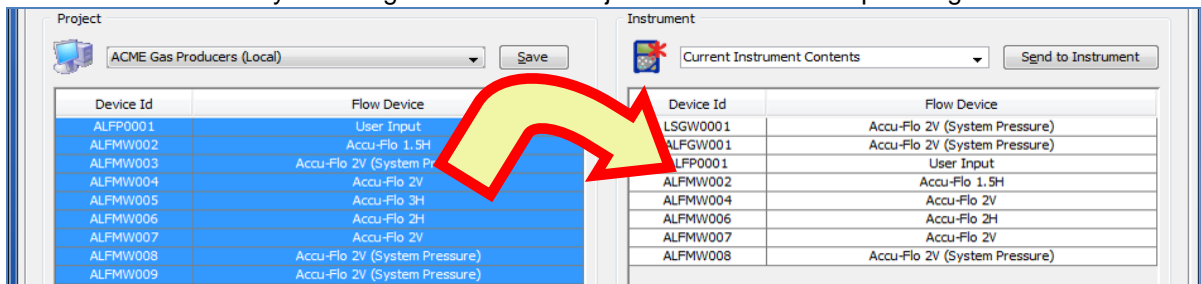
As with selecting specific IDs once the IDs are selected, they are moved to the Instrument side by “Drag & Drop”. The Instrument icon will appear with a red * and the ID’s will need to be sent to the instrument.



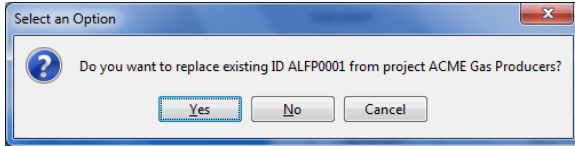
Click on the Send to Instrument button  to send these IDs to the instrument.

Selecting All IDs

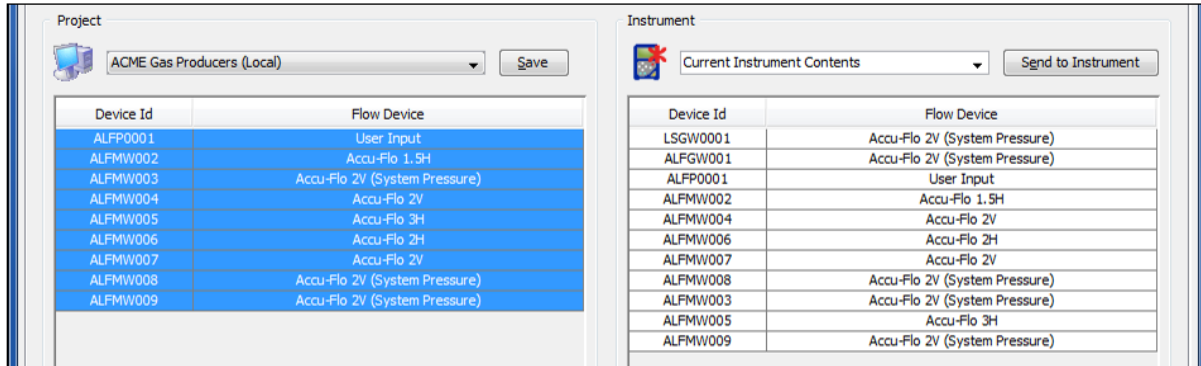
All IDs can be selected by selecting one ID in the Project window and then pressing Ctrl-A.



Now move IDs from the Project Side to the Instrument Side by dragging and dropping them.

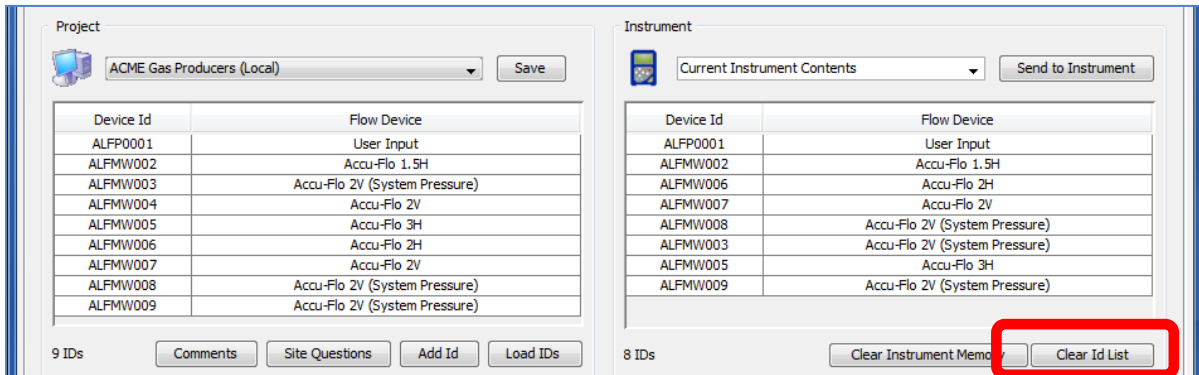


If you are dragging and dropping an ID that is already on the instrument side, you will be prompted with the above message. Answer Yes to update the IDs on the instrument side from those on the computer side. Answer No to ignore IDs that are already in the instrument. Answer Cancel to cancel the action without sending ID's to the instrument side.

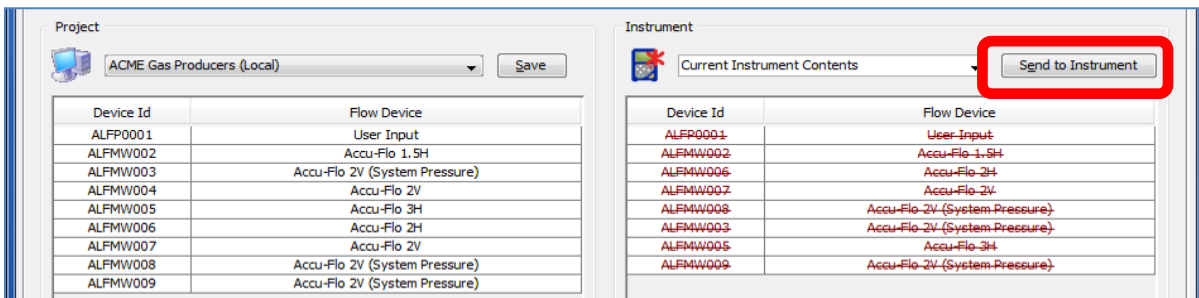


Click on the Send to Instrument button  to send these IDs to the instrument.

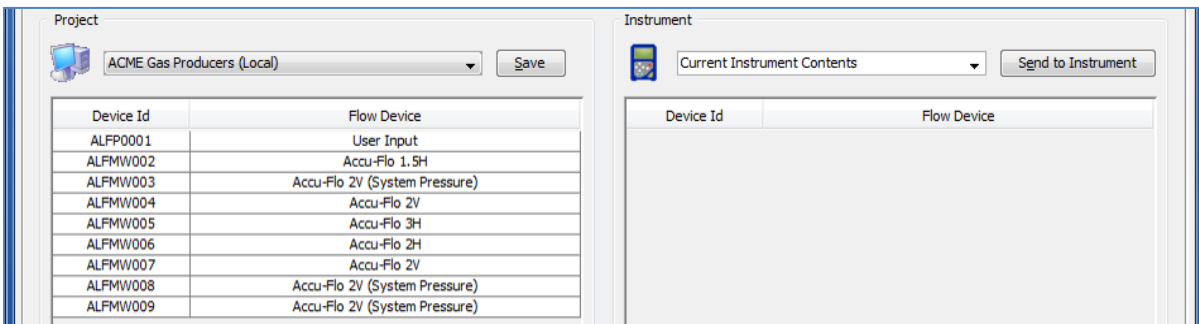
5.7.9 Clearing IDs from your instrument or Deleting a Project



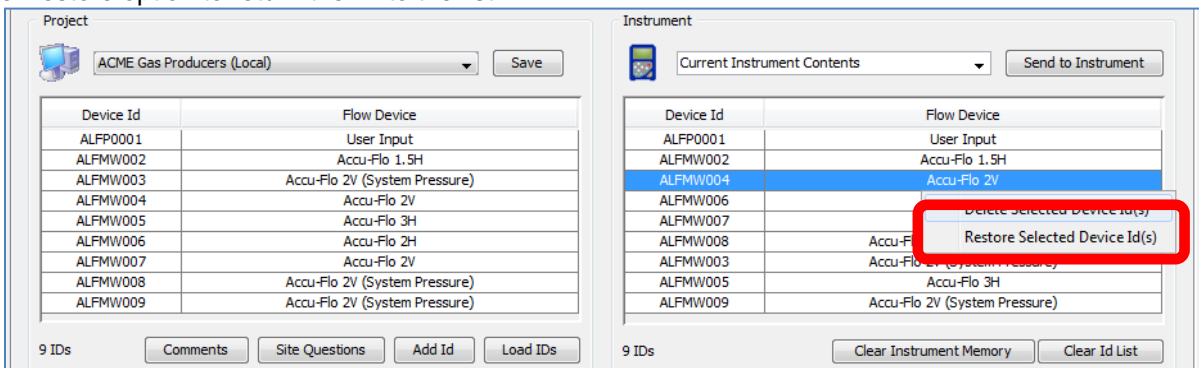
In current instrument contents when selecting the **Clear ID List** option, lines will be drawn through the IDs.



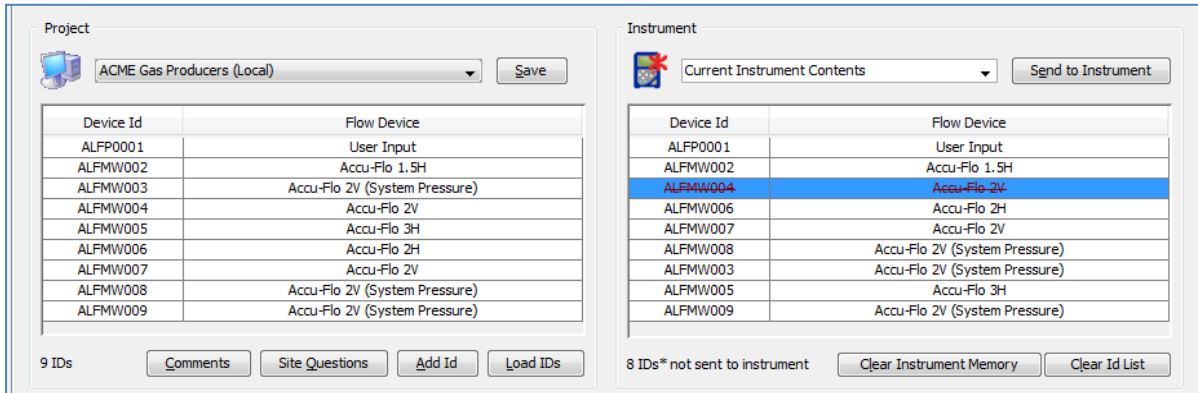
You then need to select **Send to Instrument**. This will clear all IDs from the instrument.



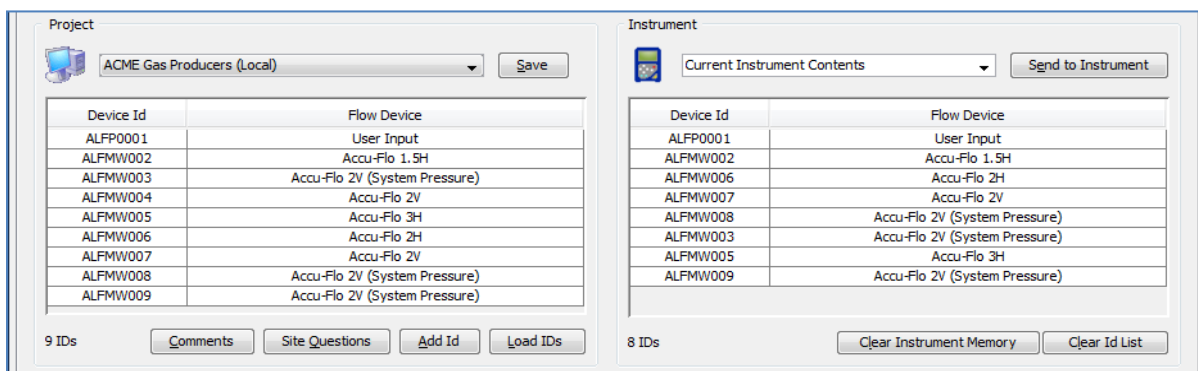
You may also delete one ID from a list by highlighting the ID RIGHT CLICK with your mouse and select the **Delete Selected Device** option. If you have selected the wrong ID and deleted then you may select the Restore option to return the ID to the list.



Upon selecting Delete Selected Device Id(s) you will see a ~~strikeout~~ line appear through the ID



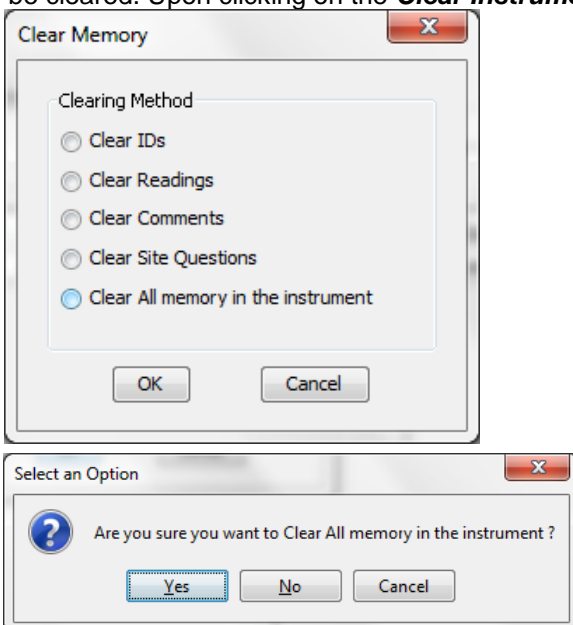
Click on the Send to Instrument button  to send the ID corrections to the instrument.



The instrument contents will now be updated and the ALFMW004 ID no longer shows in the instrument side of the list.

5.7.10 Clearing the Instrument Memory

The Clear Instrument Memory function  allows various parts of the instrument's memory to be cleared. Upon clicking on the **Clear Instrument Memory** button the following options are available.

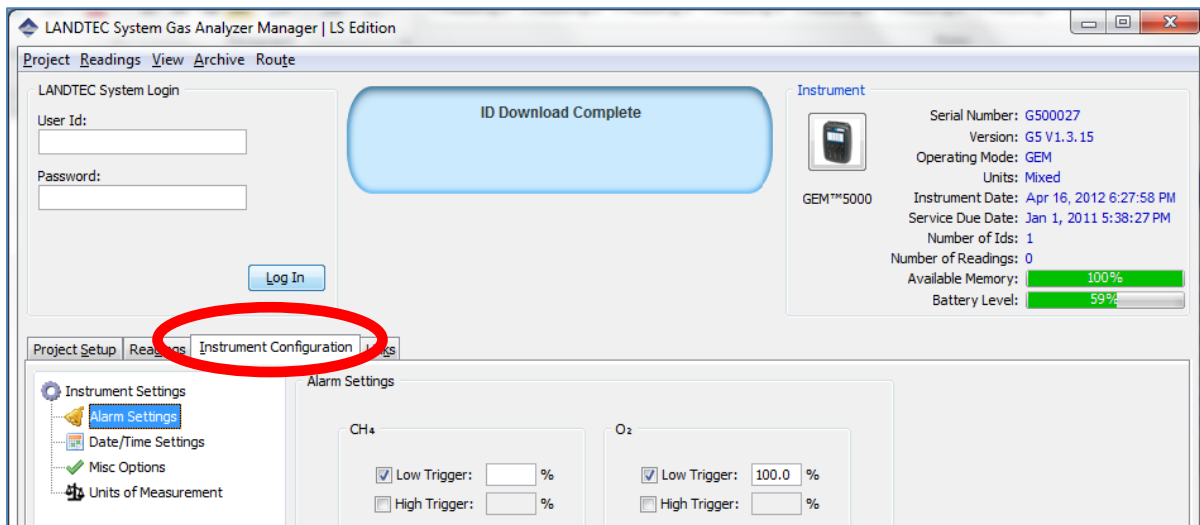


Answer **Yes** to perform the action.

Answer **No** or Cancel to return to the clear memory dialog.

5.7.11 Instrument Settings

The LANDTEC System Gas Analyzer Manager software allows users to change many of the operational settings of the instrument. To view and change the available settings click on the **Instrument Configuration** tab.



In the Instrument Configuration user interface, there is an Instrument Settings option tree. The Instrument Settings tree allows for easy navigation to the following categories:

- **Alarm Settings**
- **Date/Time Settings**
- **Misc Options**
- **Units of Measurement**

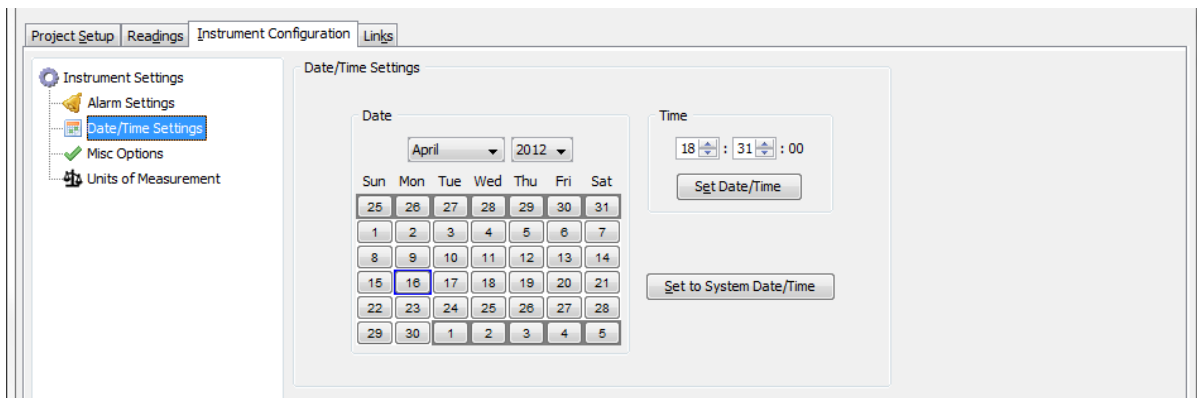
The following sections describe each option category.

5.7.12 Alarm Settings

The screenshot displays the LANDTEC System Gas Analyzer Manager software interface. The window title is "LANDTEC System Gas Analyzer Manager | LS Edition". The interface includes a navigation menu with "Project", "Readings", "View", "Archive", and "Route". A "LANDTEC System Login" section contains fields for "User Id:" and "Password:" with a "Log In" button. A blue notification box states "ID Download Complete". An "Instrument" section shows details for a GEM™5000, including Serial Number: G500027, Version: G5 V1.3.15, Operating Mode: GEM, Units: Mixed, Instrument Date: Apr 16, 2012 6:31:14 PM, Service Due Date: Jan 1, 2011 5:38:27 PM, Number of Ids: 1, Number of Readings: 0, Available Memory: 100%, and Battery Level: 59%. The "Instrument Configuration" tab is active, showing "Alarm Settings" for CH₄, O₂, and CO₂. The "Alarm Settings" section is highlighted with a red circle. The "Set Alarms" button is visible at the bottom right of the configuration area. The status bar at the bottom indicates "sfd (Local, Imperial)" and "Version:6.0.20120413 'Beta' , Port:COM17".

The Alarm Settings options control the activation and deactivation of the audible alarms in the instrument. Audible alarms can be configured for CH₄, CO₂, and O₂ parameters. Each parameter can be configured with a Low Trigger and/or High Trigger for the alarm. To activate any specific alarm, click and place a checkmark in the desired box. This will activate the entry field to place the value. The values must be 0 – 100 percent. When alarms are set, the instrument will beep and flash the parameter on the screen if an alarm threshold is surpassed when taking a gas reading.

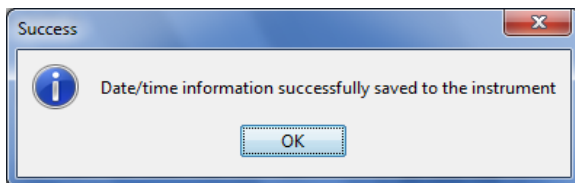
Date/Time Settings



The **Date/Time Settings** screen allows the user to set the date and time of the instrument.

Setting the Computer's Date and Time

To set the instrument's date and time to that of the computer, click on the Set to System Date/Time button.



Answer OK and the instrument's date/time will be set to that of the computer.

Date

Use the calendar options to select the desired date.

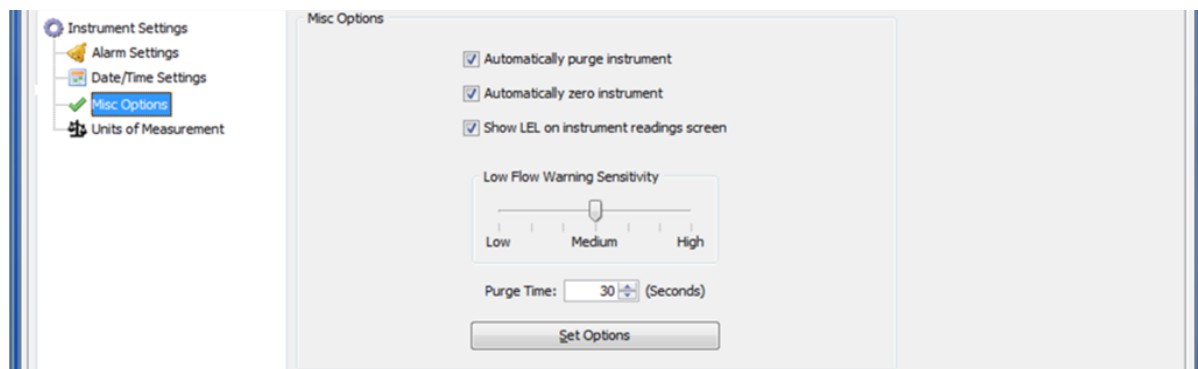
Time

Use the up and down controls to select the desired hour and minutes.

Set Date/Time in the instrument

Click the Set Date/Time button to apply the settings to the instrument

5.7.13 Misc Options



Under the miscellaneous options interface the user can change the following instrument settings:

Automatically purge instrument

Activates and deactivates the automatic purge feature in the instrument

Automatically zero instrument

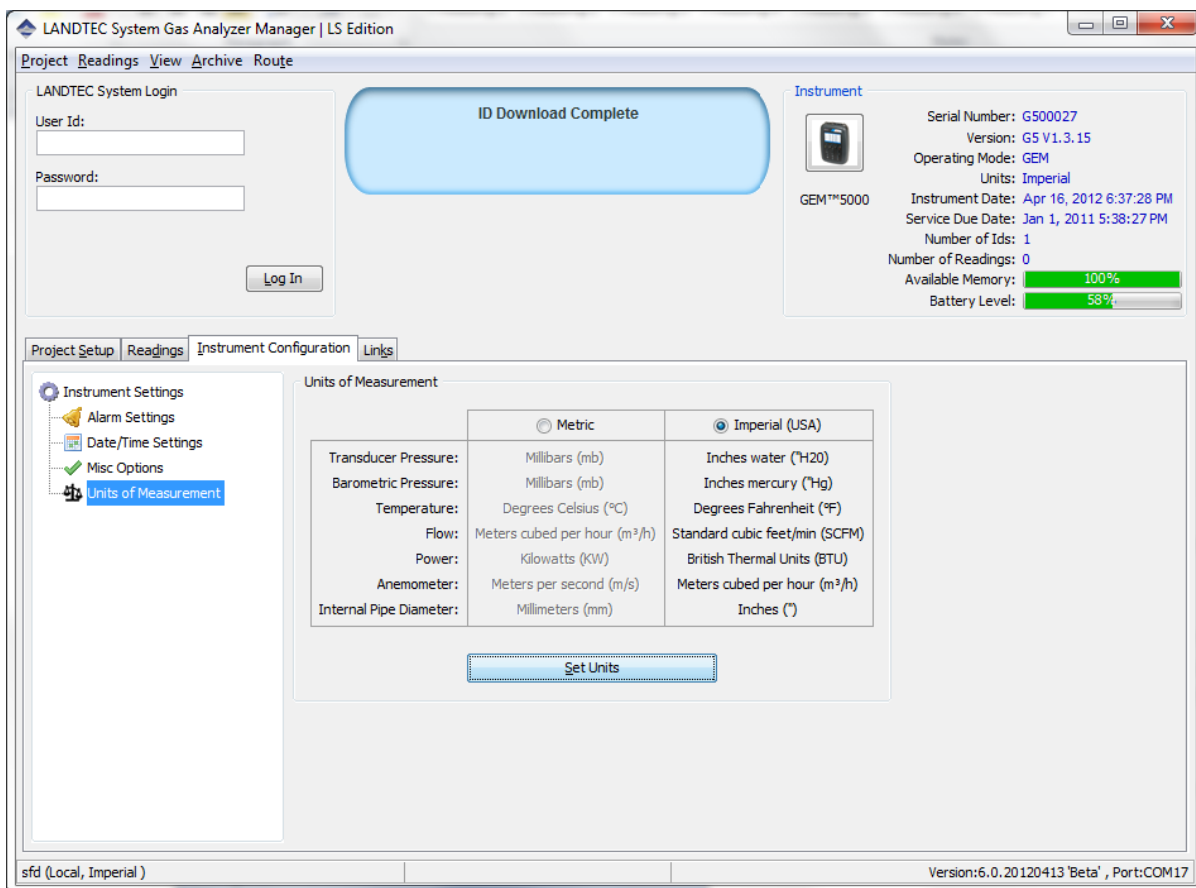
Activates and deactivates the automatic zero feature in the instrument

Low Flow Warning

Specifies the point at which the instrument will “Flow Fail”. If the instrument detects that it is not able to extract the appropriate gas flow for analysis the word “Flow” will flash in the upper left part of the screen where the pump timer is normally shown. If flow does not increase the pump will automatically be stopped. Adjusting the setting to “Low” will allow the pump to run with less flow going through the instrument. This may help avoid flow fail conditions when sampling from high vacuum systems.

Purge Time

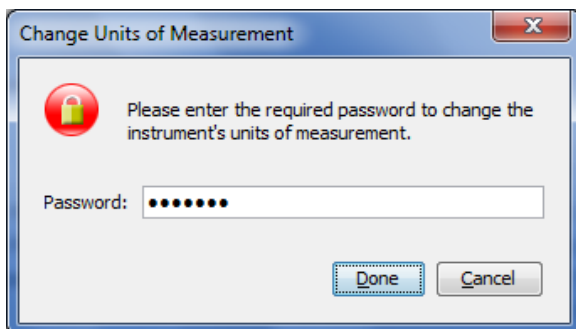
Specifies the duration the pump will run when activated by the purge feature of the instrument.

5.7.14 Units of Measurement

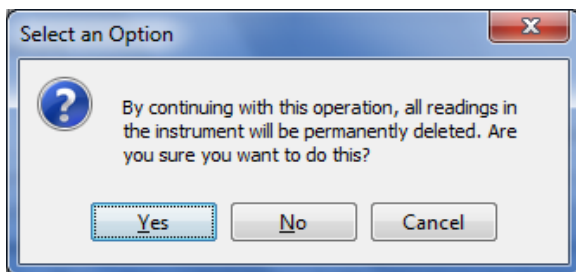
The Units of Measurement interface allows users to select whether to operate the instrument in metric or imperial units. The units for each parameter are displayed on the screen.

WARNING: *Units of Measure are as critical as the values of the readings stored. Be certain to verify the appropriate Units of Measure for your project prior to making a change to this option. Changing the Units of Measure will **NOT** convert any existing values stored in the instrument. To avoid confusion, download any stored readings prior to changing the Units of Measurement.*

Clicking on the Set Units button will bring up the Change Units Password box. If you must change the units of measure please call LANDTEC's Software Support for a password.



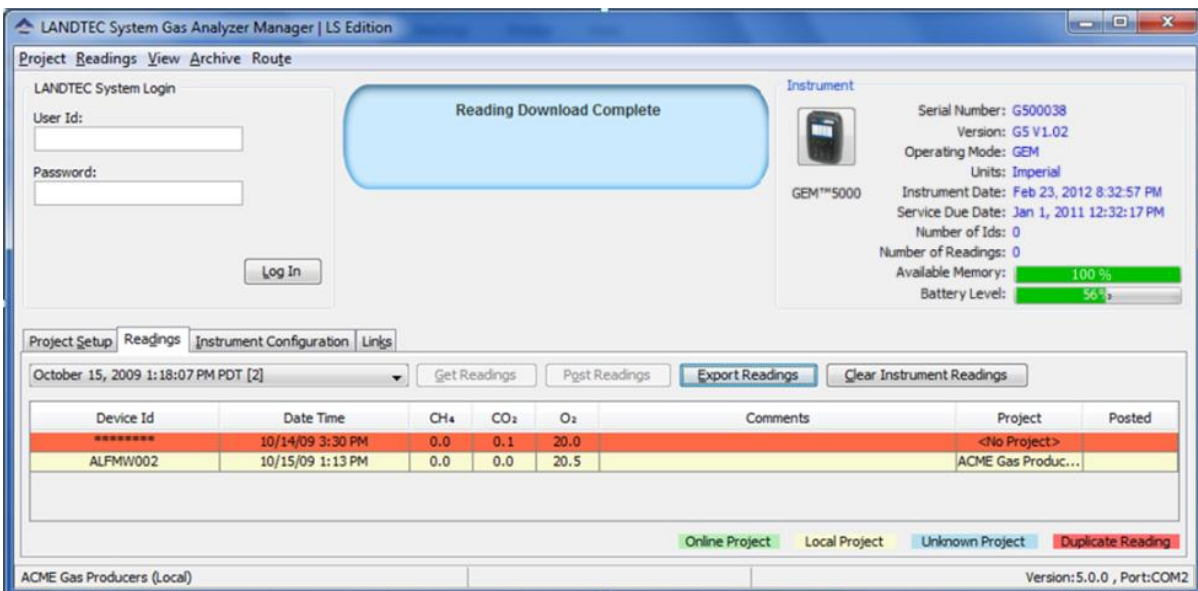
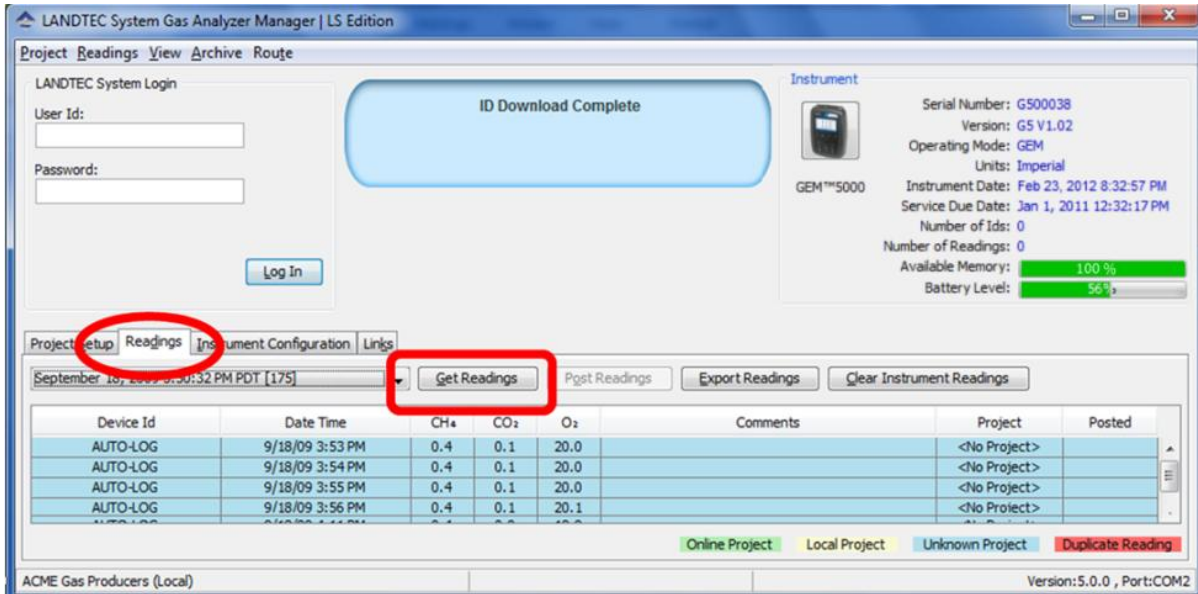
Upon entering the password you'll be prompted one last time to download your data from the instrument. If you have not downloaded your instrument press the **No** or **Cancel** buttons. Click Yes only if you have all data from your instrument as changing the units of measure must erase data that is in the instrument to ensure data integrity.



5.7.15 Downloading Readings

After successfully creating projects, IDs, and setting appropriate instrument settings, the instrument is ready for field use. When used in the field, **readings** are collected and stored within the instrument's memory. The readings consist of the measured, input, and calculated parameters such as CH₄, CO₂, O₂, Gas Temperature, Flow Rate, etc. These readings must be downloaded from the instrument to be reviewed on the computer and stored for review at a later time. This section of the Operation Manual reviews the process of downloading and storing readings from the instrument.

To view your readings from the instrument, select the Readings tab of the LANDTEC System Gas Analyzer Manager software. Then click on the **Get Readings** button



When the instrument is initially detected by the LSGAM software, the Get Readings button will activate if there are readings in the instrument to be downloaded.

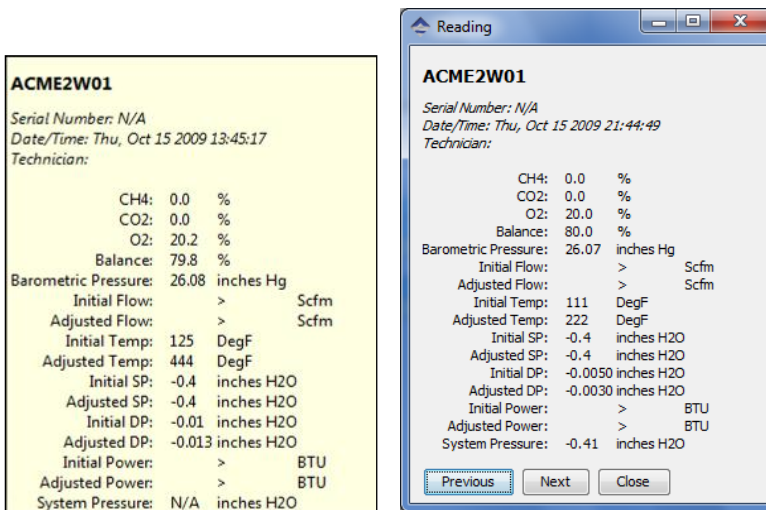
Readings will be highlighted based upon the following:

- **Online Project:** If the readings were taken against an ID belonging to an On-Line Enterprise


System which the download computer is configured for as (REMOTE) the readings will highlight in a green color.

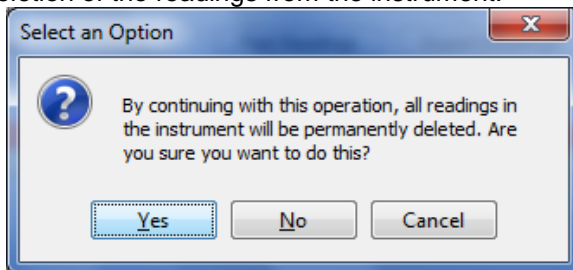
- **Local Project:** If the readings were taken against a project that is setup on the computer as a local project then they will highlight in a beige color.
- **Unknown Project:** IDs in the instrument that do not match any of the Local or Remote projects on the download computer. This is the result of uploading an instrument with IDs from one computer but downloading on a different computer without the exact same project configuration(s).
- **Duplicate Reading:** This does not imply that the reading was taken twice. Rather it is an indication that the reading was previously downloaded and exists on the computer in a different readings file.

Placing your mouse over a reading will display additional parameters of the reading. As shown below on the left, clicking on a reading will open a Reading details window and allow you to click through the readings one-by-one in detail by clicking the **Previous** and **Next** buttons.



5.7.16 Clear Readings

To clear the readings from your instrument, after the readings are downloaded successfully, click the **Clear Instrument Readings** button . A prompt will verify the permanent deletion of the readings from the instrument.

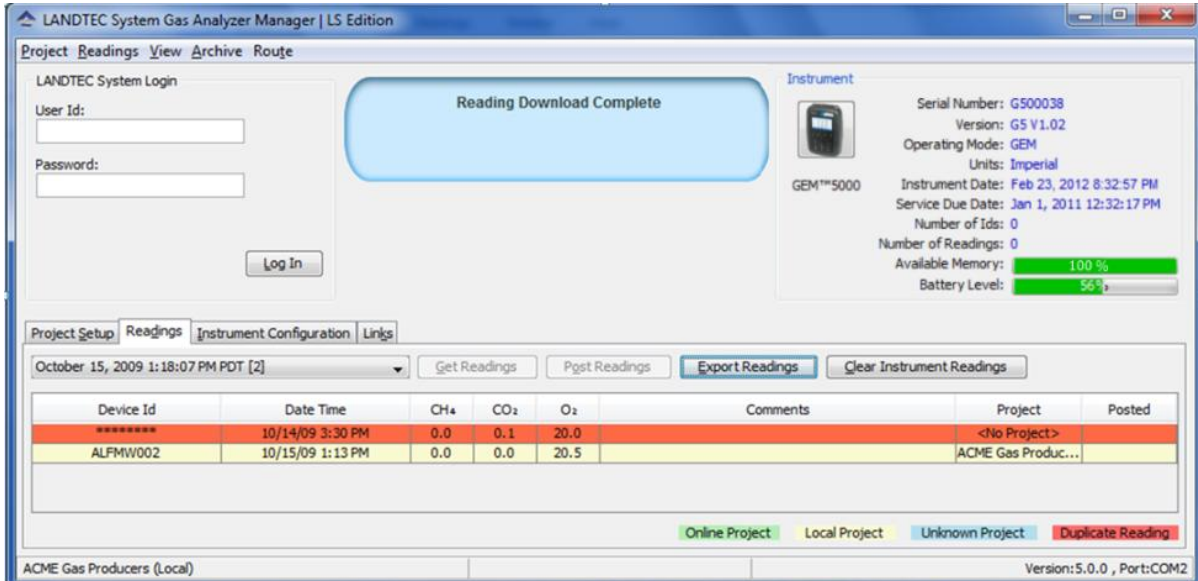


This will clear information within the GEM and GA Mode **simultaneously**.

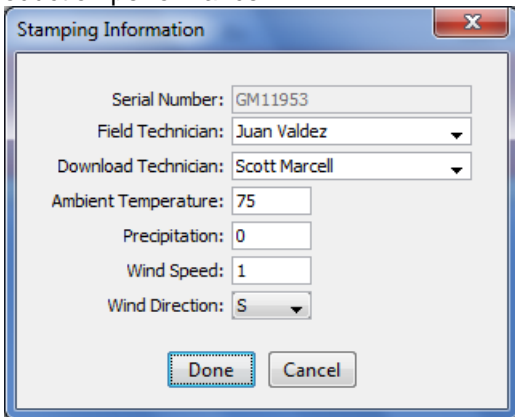
Note: Clicking yes will NOT check to ensure all data is saved from the instrument. If you plug in an instrument and click the Clear Instrument Readings button without first performing a Get Readings operation, data not previously downloaded will be lost!

5.7.17 Exporting Readings

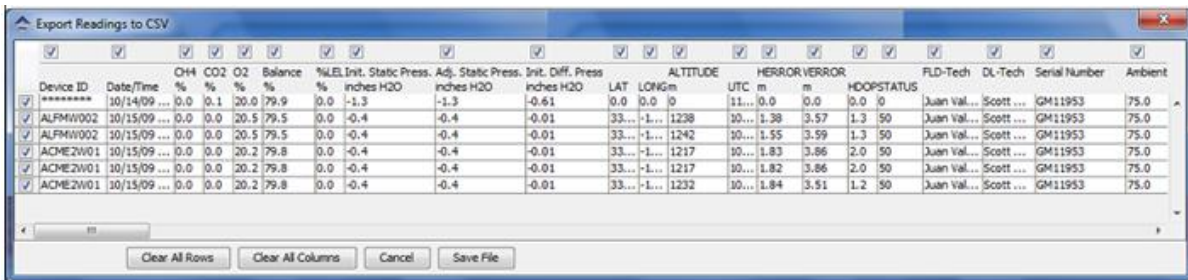
To export readings to a file, click the **Export Readings** button.



This will open the Stamping Information Screen. Stamping information are details that are most often stored with the historical data but not directly stored by the instrument. Detailed historical Stamping Information can assist when reviewing the data as atmospheric conditions do impact a gas system’s production performance.



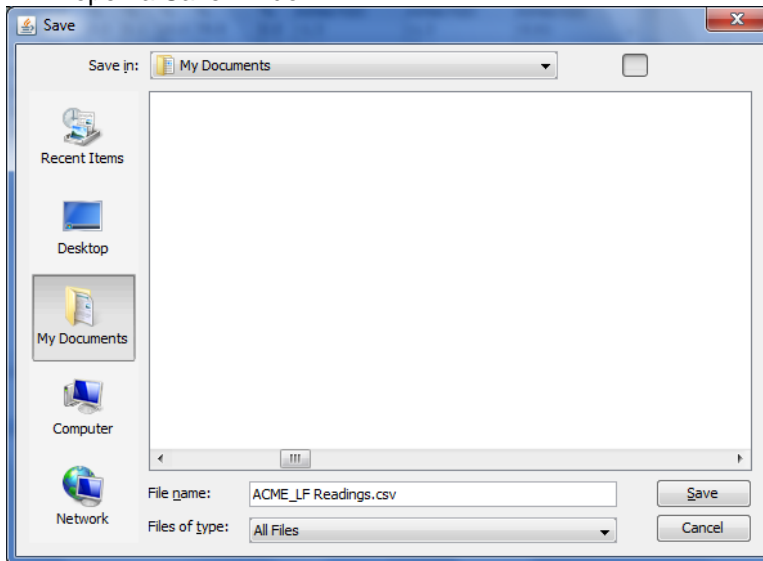
Clicking on Done will open the **Export Readings to CSV** screen.



Note: Depending upon your specific Instrument model you will see additional fields specific to the instrument. For example “NAV” option models have the fields of Latitude, Longitude, Altitude, Herror, Verror, and HDOP Status that the others models do not have.

This interface provides several options described below.

- To add or remove a single reading from export, uncheck the checkbox in the leftmost column.
- To add or remove a specific parameter from export, uncheck the corresponding checkbox across the top.
- To clear all row checkboxes, click the **Clear All Rows** button at the bottom of the screen. After Clearing all Rows you can click the button and it will change to **Set all Rows**
- To clear all column selections, click on the **Clear All Columns** button at the bottom of the screen. After Clearing All Columns the button will change and you can then choose **Set All Columns**
- To exit the operation without saving, click the **Cancel** button.
- To specify a filename and save the selection to a file, click the **Save File** button. Clicking this button will open a Save window.



The save file dialog will open and default to the My Documents of the user who is currently logged in on the computer. Specify a filename and location then click the Save button. The selected readings will be saved in comma separated value (.CSV) format. The .CSV file may now be opened in another application such as Microsoft Office Excel or Open Office Calc.

6 General Operational Instructions

6.1 *Switching the instrument on*

- 1) To switch on the analyzer, press and hold the 'On/Off' key. The LANDTEC logo will display followed by the instrument warm up.
- 2) Following the instrument warm up, the 'Date and Time' screen is displayed if the battery was completely ran down. Otherwise date and time must be updated from LSGAM Software.
- 3) When complete select the soft-key to 'Exit' and the 'Power On Self-test' screen is displayed followed by instrument status. Instrument status displays the instruments service due date, serial number, options, service scheme and software version. Text will also display stating 'Self-test complete'.
- 4) Select the soft-key 'Next' to move onto the next screen and the 'Technician Login' screen is displayed.
- 5) Use the cursor keys to move through the list of ID's. Select either the required 'Technician ID' from the list followed by the soft-key 'Accept', or select 'Default' followed by the soft-key 'Accept' to continue to the 'Main Gas Read Screen'.

⚠ Note: The selected technician ID is displayed at the top left corner of the Main Gas Read Screen.

6.2 *Power on self-test*

When switched on, the read-out will perform a pre-determined self-test sequence. During this time many of the analyzer's functions are tested, including:

- General operation
- Gas flow measurement
- Calibration
- Screen Backlight / Brightness
- Battery charge level

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

- Manufacturer's service due date
- The last gas check date
- Software version programmed
- Date format
- Serial number
- Operating language
- Model specific features

⚠ Note: The self-test should only be done with the analyzer sampling fresh air.

6.3 *Switching the analyzer off*




- 1) To switch off the analyzer, press and hold the 'On/Off' key, at which point a clean air purge will be carried out and the instrument will then switch off.
- 2) If for any reason the analyzer 'locks up' and will not switch off in this manner, press

and hold the 'On/Off' key for about 20 seconds until the red light above the power key turns on, momentarily; this will force the instrument to switch off.

6.4 Instrument status icons

The following icons may be displayed on the instrument screen:

Icon	Description	Icon	Description
	Battery charge state Gives the operator an estimation of the battery charge state. For example 100% (green icon) gives about 8 hours use in the field and 50% (orange icon) would mean that there is approximately 4 hours battery life remaining.		Battery charge state The red battery icon indicates less than 1 hour of charge remaining.
	Pump status The black pump icon is displayed along with a counter showing the pump run-time. This counts down where the operator has specified the pump run-time; if not it counts up; the icon turns red when stalled.		Pump stalled The red pump icon is displayed when the pump stalls. The instrument's gas inlet (or outlet) may be blocked. This warning is most commonly caused by a water-logged or dirty sample filter. Change the sample filter and check for obvious blockages in the sample tubes. Alternatively, a small amount of adjustment can be made to the low flow detection point to compensate for minor changes in the performance of the pump fitted to the instrument.
	GPS signal strength This icon shows the signal strength the analyzer's GPS module is able to provide. Full, okay and fair strength respectively.		GPS failure The GPS was unable to get a line of sight lock on enough satellites. Or, it may be that it hasn't had time to get a lock.
	This indicates when Bluetooth has been enabled. The color changes from grey to blue when connected.		USB connected to PC (flickers when transferring data)
	Onboard Diagnostics Indicator		Language This icon indicates the currently selected operating language. This can be changed through the main menu.

	Current date is within one month of service due date.		Current date is after service due date
	A fault has been detected that requires return for service to repair		

6.5 Instrument power LED power indications

When the instrument is powered on a LED power light is visible on the front of the analyzer, located above the 'On/Off' key. The following LED power light indications are as follows:

- Steady yellow Unit turning on. This will extinguish when software has loaded correctly.
- Flashing (rapid) Unit is powering off.
- Flashing (slow) Power off is being delayed for purge/shutdown handling.
- Flashing yellow Unit is turning off due to power button being pressed.
- Flashing red Unit is turning off due to critically low battery.

Note: Pressing and holding the power button for ~20s. The light will turn red indicating the reset of the analyzer. Press the power button one more time after the red light turns off to turn the analyzer on.

6.6 Changing between parameters

By default, the instrument displays the 'Main Gas Read Screen' (for gas measurement). The instrument will return to this screen after power on or when returning from the menus. The 'Scroll' keys can be used to switch to another measurement screen.

6.7 Entering data

During normal operation the operator may be prompted to enter data or information via the keypad, i.e. selecting a Device ID code or setting an alarm level.

When entering data into the instrument all fields are fixed format and are populated from the left.

Text:

Entering text uses similar multi-tap functionality as a mobile phone. Key the numeric/alpha key pad the required number of times to select the appropriate letter. To key numeric data continue to press the numeric/alpha key until the required number is displayed.

Numeric data:

To enter a new date 09/11/12 the operator would type in 091112 using the numeric keypad in the following sequence:-

- * 0 _ / _ / _
- * 09 / _ / _

- * 09/1/_/_
- * 09/11/_/_
- * 09/11/1_
- * 09/11/12

Press the 'Enter' key to confirm/accept data keyed.

Any mistakes can be corrected using the 'Delete' soft-key which will delete the last digit typed. Alternatively, the sequence can be retyped before the 'Enter' key is pressed and the existing numbers will be pushed off the screen.

⚠ Note: The instrument will not allow invalid data to be entered; invalid data should be deleted and re-entered.

6.8 Instrument main gas read screen

The 'Main Gas Read Screen' is considered to be the normal operating screen and all operations are carried out from this starting point.

The actual data shown on this display will depend on the version of the instrument and the options that have been selected. In general, all of the main readings will be shown.

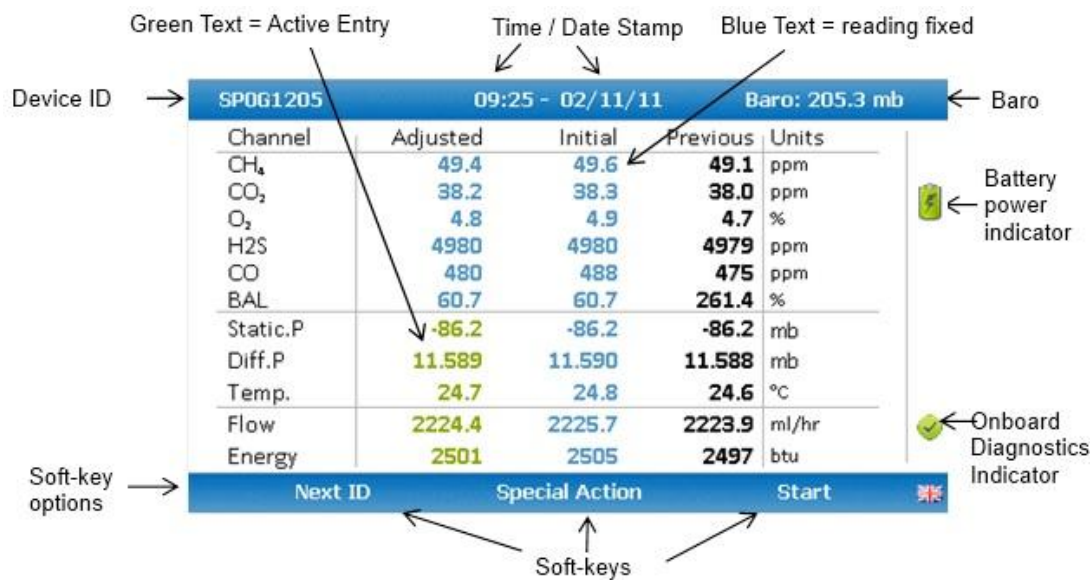


Figure 10—Main Gas Read Screen-change screen

6.9 Physical Storage

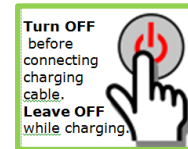
The analyzer should not be exposed to extreme temperature. For example, do not keep the analyzer in a hot truck. When not in use analyzers should be kept in a clean and dry environment, such as an office and protect the analyzer with either the soft carry case or store in the hard carry case provided with the instrument.


The instrument should be discharged and fully charged at least once every four weeks, regardless of indicated charge state. **Allowing the instrument to sit for longer than four weeks without charging it is likely to cause discharge of the batteries to a point where the batteries will NO LONGER BE ABLE TO TAKE A CHARGE. Such a discharge will require a factory service and battery replacement.**

6.10 Battery/charging

The battery used in the 5000 series of gas analyzers is nickel metal hydride and manufactured as a pack from six individual cells. This type of battery is not so susceptible to the top-up charging ‘memory effects’ as nickel cadmium batteries. However as a best practice it is suggested to cycle the batteries charge as much as possible and then fully charge the batteries. Although small top-up charges can be used to complete a day’s readings, if necessary, they are NOT suggested.

Note: To charge, the analyzer must be switched OFF before attaching the charger. Switching the analyzer on or off during charging will cancel the current charge. The analyzer should be left OFF during the charging cycle.



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

The battery charger is intelligent and will indicate when the unit is charging and charged. Refer to the following:

Charger State	Description	Indicator Light Color	Light Behavior
Standby	This occurs when the charger is plugged into the wall but not the instrument.	Yellow	Solid
Pre Charge	Occurs for approximately 3 to 5 minutes while the charger profiles the battery.	Yellow	Slow Blink (1x per second)
Rapid Charge	Occurs for approximately 3 to 4 hours during the charge cycle.	Green	Rapid Blink (3x per second)
Maintain/Trickle Charge	Occurs after the rapid charge cycle.	Green	Slow blink (1x per second)
Ready	Occurs after the trickle charge cycle.	Green	Solid
Error	An error has been detected. Call LANDTEC Technical Support.	Yellow / Green	Slow Blink alternating Yellow / Green (1x per second)

The charger should only be disconnected when fully charged is indicated.

The instrument must be charged ONLY using the battery charger supplied with the instrument. The battery charger supplied is intended for indoor use only. Please ensure adequate ventilation while charging.

Note: Connect the charger to A/C power by attaching the appropriate adaptor. To ensure good contact between the adaptor and the charger plug the charger into the wall and observe the indicator light on the charger. You should observe it is in Standby and remains. Contact LANDTEC for further information if the charger’s light indicator is not observed to be in standby or to inquire about obtaining other wall adaptors for your particular region.

Battery Charger front and back:

Charger:	Input voltage:	100-240V AC +/- 10%
	Input frequency:	50-60Hz +/- 10%
	Input current:	0.4A@100VAC 0.2A@240VAC
	Output voltage:	10.1VDC max
	Output current:	1.5A max

⚠ Note: This charger has been internally restricted to 1.5A

A full charge will take approximately **3-4 hours**. Typically, a fully charged battery will last 7-8 hours. A quick 30 minute charge can be used to give approximately one hour of use in the field but may shorten the battery life. The battery charge status will be indicated on the charger plug. Temperature can dramatically affect the battery life; please take this into account when estimating battery life. The unit should be switched-off while charging to give a complete and consistent charge. Turning off Bluetooth and dimming the contrast will increase battery life.

6.11 *Cleaning instructions*

Do NOT use any cleaning agents to clean the analyzer or battery charger as they may have an adverse effect on the safe use of these devices. The analyzer can be wiped off with a damp cloth.

6.12 *Memory*

The analyzer's memory is stored in sections for readings and configuration information.

⚠ Note: The analyzer should never be stored for prolonged periods with valuable data in its memory. It is advisable to download all readings at the end of each day's monitoring. To clear the memory, please refer to the section covering LANDTEC System Gas Analyzer Manager (LSGAM).

6.13 *Warning and error codes*

Upon the initial startup of the analyzer a self-test is performed. If any notable warnings or errors exist they will be displayed. BEFORE using the instrument with warnings or errors it is advised that you should contact Technical Support at +1 (909) 783-3636 or email technical@landtecna.com.

When switched on the instrument will perform a predetermined self-test sequence taking approximately ten seconds. During this time many of the instrument's working parameters and settings are checked. If any operational parameters are out of specification or if the pre-programmed recommended calibration/service date has passed,

errors and/or warnings may be displayed.

✍ Note: For further information please refer to section "10 Problem solving".

7 Operator settings

7.1 Menu key

The 'Menu' key enables the operator to select options to set up specific parameters and perform operational tasks prior to sample readings being taken or to view data and information stored in the instrument.

- 1) Select the 'Menu' key on the front of the analyzer and the following screen is displayed:



Figure 11—Device Settings

- 2) Press the relevant numeric key on the analyzer keypad to select the desired menu option.
- 3) To exit this menu, select the soft-key 'Exit' on the front of the analyzer and the operator is returned to Main Gas Read Screen.

7.2 Device settings

7.2.1 Date and time



Date and Time

This option enables the operator to set the instrument date and time or to receive and update the settings automatically from satellite signal.

- 1) Select the 'Menu' key on the front of the analyzer to display the 'Device Settings' menu followed by 'Key 1 - Date and Time' and the following screen is displayed:



Figure 12—Date and Time

- 2) Select 'Key 1 – Set Date' and key in the required date. Type the date using the numeric keypad. Press the soft-key 'Date Format' to toggle and select the required date format i.e. dd/mm/yy. Press the 'Enter' key to confirm and update the date setting.
- 3) Select 'Key 2 – Set Time' and key in the required time (hh:mm). Type the time using the numeric keypad and press the 'Enter' key to confirm the update.
- 4) The operator may also change the default time zone. Selecting the 'Key 4 Scroll-left' or 'Key 6 – Scroll right' to move through the different time zones. Press the 'Enter' key to confirm your default setting.
- 5) Select the soft-key 'Exit' to exit and return to the 'Device Settings' menu.

7.2.2 Bluetooth



This option enables the operator to utilize Bluetooth technology. This may be useful when downloading gas readings from the analyzer to the PC instead of connecting the analyzer to a PC via a USB cable.

- 1) Select the 'Menu' key on the front of the analyzer to display the 'Device Settings' menu.
- 2) Select 'Key 2 – Bluetooth' and the following screen is displayed:

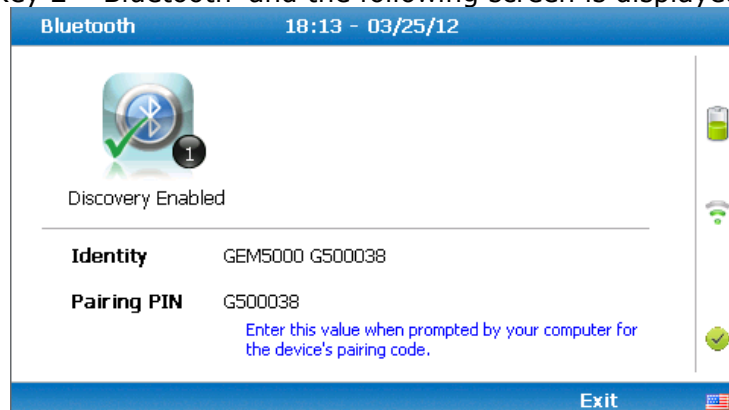


Figure 13—Bluetooth Menu

- 3) Enter the 'Pairing PIN' value when prompted by your computer for the device's pairing code.
- 4) Select soft-key 'Exit' to exit the screen and return to the 'Device Settings' menu.

7.2.3 Device information



Device Information

This option displays default instrument information and settings such as serial number, service due date, last zero calibration date and last span calibration date.

- 1) Select the 'Menu' key on the front of the analyzer to display the 'Device Settings' menu.
- 2) Select 'Key 3 – Device Information' and the following screen is displayed:

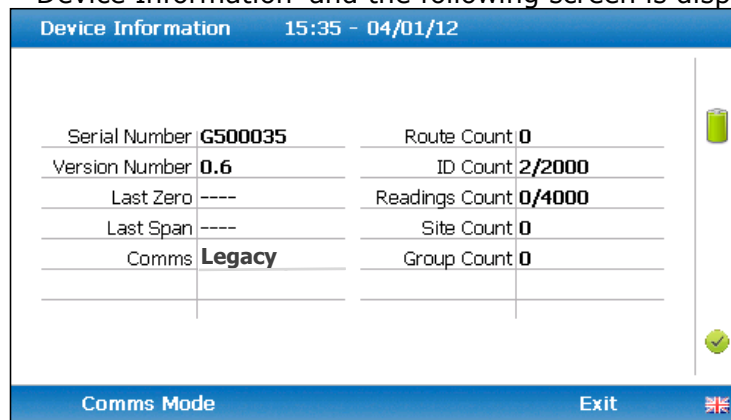


Figure 14—Device Information

- 3) The information displayed on this screen is informational only and cannot be edited by the operator. The operator may be asked for serial number, service due date and version number information when contacting LANDTEC.
 - ✍ Note: The comms setting 'Legacy' mode is for use with LSGAM. GA5K mode is reserved for future applications.
- 4) Select soft-key 'Exit' to exit the screen and return to the 'Device Settings' menu.

7.2.4 Space has been left for a future feature

- 1) Select the 'Menu' key and the 'Device Settings' menu is displayed.
- 2) The 'Key 4' has been reserved for future functionality.

7.2.5 Navigation (optional)



This option enables the operator to switch the 'GPS Navigation' functionality on or off. (This is optional and dependent upon purchasing the navigation option). The power on self-test screen will display "GPS" in the enabled options screen if the analyzer has been fitted with GPS

- 1) Select the 'Menu' key and the 'Device Settings' menu is displayed.
- 2) Select 'Key 5 – Navigation On' to switch on the GPS navigation functionality or 'Key 5 – Navigation Off' to switch the GPS navigation functionality off.



Navigation is On



Navigation is Off

Note: For further information please refer to section '8.0 – Taking Readings'.

7.3 User settings

To access the 'User settings' menu, select the 'Menu' key on the front of the analyzer to display the 'Device Settings' menu followed by the soft-key to display 'User Settings' menu. The following menu is displayed:

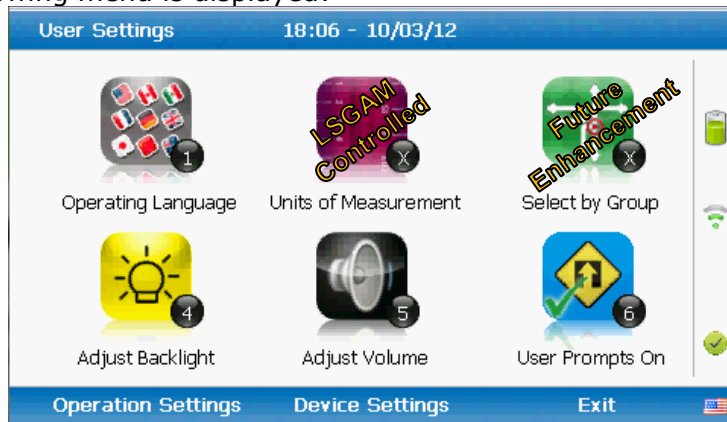


Figure 15—User Settings Menu

To exit the user settings menu select the soft-key 'Exit'.

7.3.1 Operating language



This option enables the operator to specify the operating language displayed for the instrument.

- 1) Select 'Key 1 – Operating Language' and the following screen is displayed:

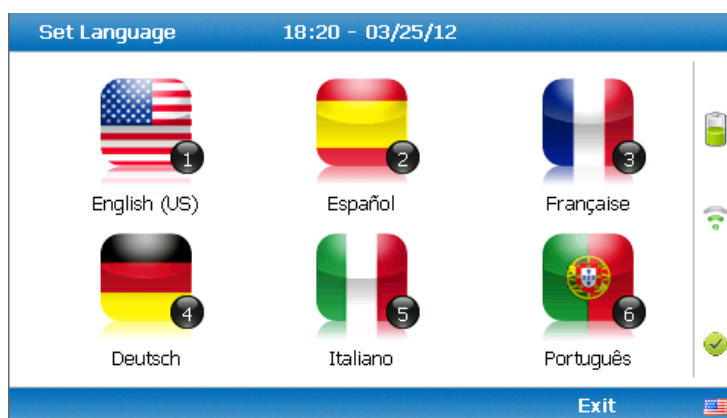


Figure 16—Set Language

- 2) Set the desired operating language for the gas analyzer by selecting the appropriate function key. Choose from:
 - 1 English
 - 2 Spanish
 - 3 French
 - 4 French (This is planned as a future enhancement)
 - 5 Italian
 - 6 Portuguese
- 3) To exit this option, select the soft-key 'Exit' and the operator is returned to the 'User Settings' menu.

7.3.2 Units of measurement



Units of measure are controlled through the LSGAM Software and can not be directly changed on the Analyzer. This protects from the potential storing of different units of measure for the same project.

7.3.3 Select by route/group (requires LSGAM)



This is a future enhancement option to enable the operator to display IDs by group or by specific route which have been uploaded from LANDTEC System Gas Analyzer Manager (LSGAM) software to the instrument.

7.3.4 Adjust backlight



Adjust Backlight

This option enables the operator to adjust the backlight (brightness). Setting this to a darker setting will help preserve the battery power.

- 1) Select 'Key 4 – Adjust Backlight' and the following screen is displayed:

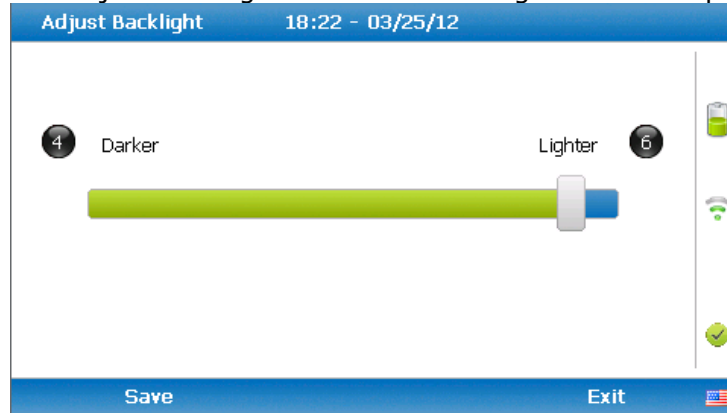



Figure 17—Adjust Backlight

- 2) Manual adjustment of the instrument backlight is available via this option and can be carried out with use of 'Key 4 - Scroll left' (<) darker and 'Key 6 - Scroll right' (>) lighter.
- 3) Select the soft-key 'Save' to store the setting or select soft-key 'Exit' to exit the screen without saving the change.
- 4) The operator will return to the 'User settings' menu.

 **Note:** Setting a lighter screen will utilize more battery power than setting a darker screen. On overcast days, using a Darker screen setting will allow for less battery consumption.

7.3.5 Adjust volume



Adjust Volume

This option enables the operator to adjust the volume for the internal speaker, for example the alarm tone. A lower setting will help preserve the battery power.

- 1) Select the 'Menu' button on the front of the analyzer to display the 'Device Settings' menu. Press the soft-key to display 'User Settings'.
- 2) Select 'Key 5 – Adjust Volume' and the following screen is displayed:

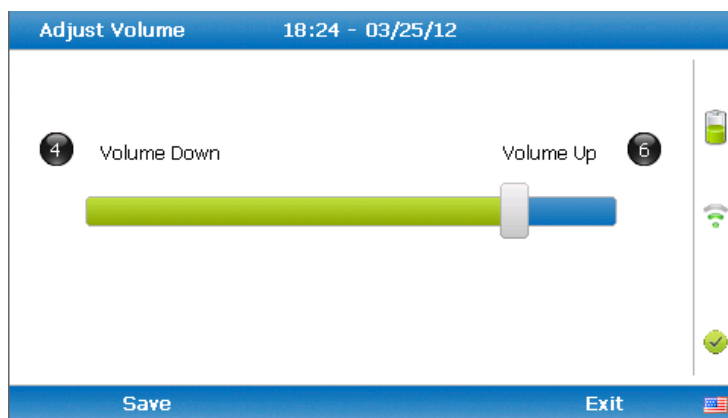





Figure 18—Adjust Volume


- 3) Manual adjustment of the volume is available via this option and can be carried out with use of 'Key 4 - Scroll left' (<) volume down and 'Key 6 - Scroll right' (>) volume up.
- 4) Select the soft-key 'Save' to store the setting or select soft-key 'Exit' to exit the screen without saving the change.
- 5) The operator will return to the 'User settings' menu.

7.3.6 User Prompts

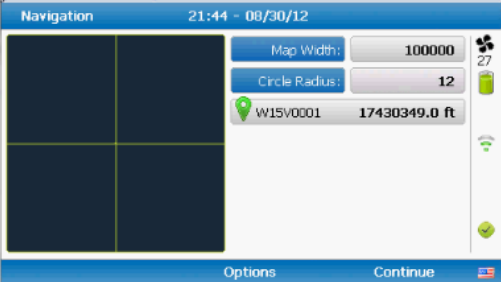
User Prompts can be thought of as a mode for “Expert” or “Experienced” users to have a more streamlined workflow for collecting readings. User prompts are **On** by default. To toggle user prompts between **On** and **Off**, the operator must press the  and then go to “User Settings” and press the  key. With User Prompts turned Off, users will not be prompted to go through all of the screens demonstrating how to connect hoses, zero transducers, and some of the popup acknowledgement prompts etc...



User Prompts On



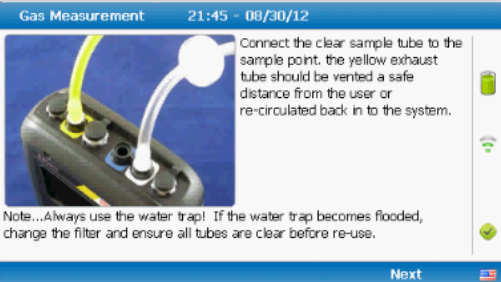
User Prompts Off



Navigation 21:44 - 08/30/12

Map Width: 100000
Circle Radius: 12
W15V0001 17430349.0 ft

Options Continue



Gas Measurement 21:45 - 08/30/12

Connect the clear sample tube to the sample point, the yellow exhaust tube should be vented a safe distance from the user or re-circulated back in to the system.

Note...Always use the water trap! If the water trap becomes flooded, change the filter and ensure all tubes are clear before re-use.

Next

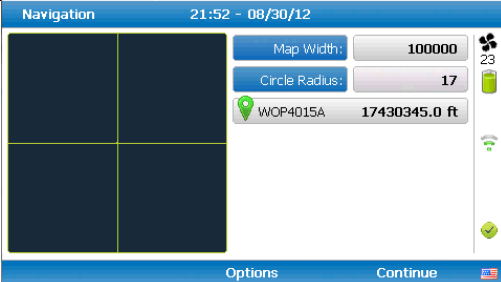
Channel	Adjusted	Initial	Previous	Units
CH ₄		0.1	---	%
CO ₂		0.0	---	%
O ₂		>>>>	---	%
CO		0	---	ppm
H ₂ S		0	---	ppm
Bal.		74.9	---	%
Static.P			---	"H ₂ O
Diff.P			---	"H ₂ O
Temp.			---	°F
Flow			---	SCFM
Power			---	BTU/h

Next ID Special Action Next

Channel	Adjusted	Initial	Previous	Units
CH ₄		0.1	---	%
CO ₂		0.0	---	%

Initial Gas Readings Fixed

Dismiss



Navigation 21:52 - 08/30/12

Map Width: 100000
Circle Radius: 17
WOP4015A 17430345.0 ft

Options Continue

The “connect sample tube” screen has been removed when user prompts are off.

Channel	Adjusted	Initial	Previous	Units
CH ₄		0.0	0.1	%
CO ₂		0.0	0.0	%
O ₂		>>>>	>>>>	%
CO		0	0	ppm
H ₂ S		0	0	ppm
Bal.		74.9	74.9	%
Static.P			0.2	"H ₂ O
Diff.P			-0.029	"H ₂ O
Temp.			0.0	°F
Flow			<<<<	SCFM
Power			****	BTU/h

Next ID Special Action Initial Flow

Channel	Adjusted	Initial	Previous	Units
CH ₄		0.0	0.1	%
CO ₂		0.0	0.0	%

Initial Gas Readings Fixed

Dismiss



User Prompts On



User Prompts Off

Zero Transducers 21:45 - 08/30/12

Disconnect all tubing from the sample points and wait for the readings to stabilize. Continue if readings return to zero, otherwise to remove an offset perform a zero.

Note...Stable readings at zero are important and are required to give accurate pressure readings.

Pressure

Static: 0.1 [°]H₂O

Diff.: 0.000 [°]H₂O

Zero Next

Flow 21:45 - 08/30/12

Connect the clear tubing to the static pressure sample point. The blue tubing should be connected to the differential pressure sample point. The yellow exhaust tube must be vented to atmosphere, a safe distance from the user; do NOT re-circulate back in to the system.

Flow Next

W15V0001 21:45 - 08/30/12 Baro: [°]Hg

Channel	Adjusted	Initial	Previous	Units
CH ₄	0.1	0.1	---	%
CO ₂	0.0	0.0	---	%
O ₂	>>>>	>>>>	>>>>	%
CO	0	0	---	ppm
H ₂ S	0	0	---	ppm
Bal.	74.9	74.9	---	%
Static.P				[°] H ₂ O
Diff.P				[°] H ₂ O
Temp.	123.0	123.0	---	[°] F
Flow				SCFM
Power				BTU/h

Delete 123

W15V0001 21:45 - 08/30/12 Baro: [°]Hg

Channel	Adjusted	Initial	Previous	Units
CH ₄	0.1	0.1	---	%
CO ₂	0.0	0.0	---	%
O ₂	>>>>	>>>>	>>>>	%
CO	0	0	---	ppm
H ₂ S	0	0	---	ppm
Bal.	74.9	74.9	---	%
Static.P				[°] H ₂ O
Diff.P				[°] H ₂ O
Temp.	123.2	123.0	---	[°] F
Flow				SCFM
Power				BTU/h

Delete 123

W15V0001 21:45 - 08/30/12 Baro: [°]Hg

Channel	Adjusted	Initial	Previous	Units
CH ₄	0.1	0.1	---	%
CO ₂	0.0	0.0	---	%
O ₂	>>>>	>>>>	>>>>	%
CO	0	0	---	ppm
H ₂ S	0	0	---	ppm
Bal.	74.9	74.9	---	%
Static.P				[°] H ₂ O
Diff.P				[°] H ₂ O
Temp.	123.2	123.0	---	[°] F
Flow				SCFM
Power				BTU/h

Delete 123

The "Zero Transducers" screen has been removed when user prompts are turned off. If transducers need to be zeroed, the "Special Action" menu can be used to Zero Transducers.

The "Connect Tubing" screen for the flow reading has been removed from the workflow when user prompts are off.

WOP4015A 21:53 - 08/30/12 Baro: [°]Hg

Channel	Adjusted	Initial	Previous	Units
CH ₄	0.0	0.0	0.1	%
CO ₂	0.0	0.0	0.0	%
O ₂	>>>>	>>>>	>>>>	%
CO	0	0	0	ppm
H ₂ S	0	0	0	ppm
Bal.	74.9	74.9	---	%
Static.P				[°] H ₂ O
Diff.P				[°] H ₂ O
Temp.	123.0	123.0	---	[°] F
Flow				SCFM
Power				BTU/h

Delete 123

WOP4015A 21:53 - 08/30/12 Baro: [°]Hg

Channel	Adjusted	Initial	Previous	Units
CH ₄	0.0	0.0	0.1	%
CO ₂	0.0	0.0	0.0	%
O ₂	>>>>	>>>>	>>>>	%
CO	0	0	0	ppm
H ₂ S	0	0	0	ppm
Bal.	74.9	74.9	---	%
Static.P				[°] H ₂ O
Diff.P				[°] H ₂ O
Temp.	123.0	123.0	---	[°] F
Flow				SCFM
Power				BTU/h

Dismiss 123

WOP4015A 21:53 - 08/30/12 Baro: [°]Hg

Channel	Adjusted	Initial	Previous	Units
CH ₄	0.0	0.0	0.1	%
CO ₂	0.0	0.0	0.0	%
O ₂	>>>>	>>>>	>>>>	%
CO	0	0	0	ppm
H ₂ S	0	0	0	ppm
Bal.	74.9	74.9	---	%
Static.P				[°] H ₂ O
Diff.P				[°] H ₂ O
Temp.	125.0	123.0	---	[°] F
Flow				SCFM
Power				BTU/h

Delete 123



7.4 Operation settings


To access the 'Operation settings' menu, select the 'Menu' key  on the front of the analyzer to display the 'Device Settings' menu followed by the soft-key to display the 'Operation Settings' menu. The following menu is displayed:



Figure 19—Operation Settings

7.4.1 Timers



Data Logging

The timers function enables the operator to set standard purge times and set auto-power off if the unit is untouched for the period of time specified.


- 1) Select 'Key 1 – Timers' and the following screen is displayed:



Figure 20—Timers

- 1) Select 'Key 1' to edit the purge time. Enter the 'Pump Running Time' in seconds; this is the length of time you wish to run the pump to draw the sample, e.g. key in 030 then press the 'Enter' key to accept. Entering a time of 000 minutes will disable the auto-off purge.
- 1) Select 'Key 2' to edit the auto power off time. Enter the 'Auto power off' in minutes; the instrument will automatically power off to preserve the battery life after the specified time if no activity has occurred on the instrument. Press the 'Enter' key to accept.

Select the soft-key 'Exit' key to exit the screen and return to the 'Operation settings' menu.

-  **Note:** Setting the purge time and auto power off functions to 000, disables the option. It is not recommended to reduce the purge time to below 30 seconds.

7.4.2 Gas Check (aka Field Calibration)



Gas Check

This option displays the 'Gas Check' menu and enables the operator to calibrate the instrument's gas channels to a zero and span value. Historical/previous gas check data can also be viewed and factory settings can be restored.

- 1) Select the 'Menu' button on the front of the analyzer to display the 'Device Settings' menu. Press the soft key to display 'Operation Settings'.
- 2) Select 'Key 2 – Gas Check' and the following menu is displayed:

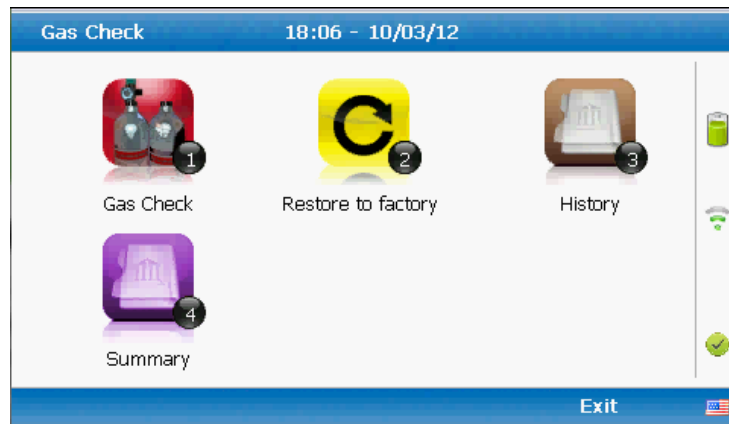


Figure 21—Gas Check

- 3) For more information about the Gas Check Menu please refer to section 9.0 – Calibration.
- 4) Select soft-key 'Exit' to exit operation settings and return to the main screen.

7.4.3 View data



This option enables the operator to view the readings collected and stored on the instrument. Readings may be downloaded to the LANDTEC System Gas Analyzer Manager (LSGAM) software if further analysis is required.

- 1) Select the 'Menu' button on the front of the analyzer to display the 'Device Settings' menu. Press the soft-key to display 'Operation Settings'.
- 2) Select 'Key 3 – View Data' and the following screen is displayed:



Figure 22—View Data

Note: Depending upon your instrument's configuration, there may be empty rows or different gases where Figure 22—View Data shows a highlight over CO, H₂ and H₂S.

- 3) Browse through the readings by selecting 'Key 4 – Scroll left' and 'Key 6 – Scroll right' on the analyzer. Once at a particular reading, select 'Key 2 – Page up' and 'Key 8 – Page down' to show more detail for that reading.

Select the soft-key 'Filter' to filter the data by sample point ID, or specify before or after date. Press the soft-key 'Exit' to exit the filter menu and return to the 'View Data' screen. The screen shown in Figure 23 will filter for the ID named "ANAW0001". All dates in the instruments history will be used because an "After Date" and a "Before Date" is not specified 00/00/00.

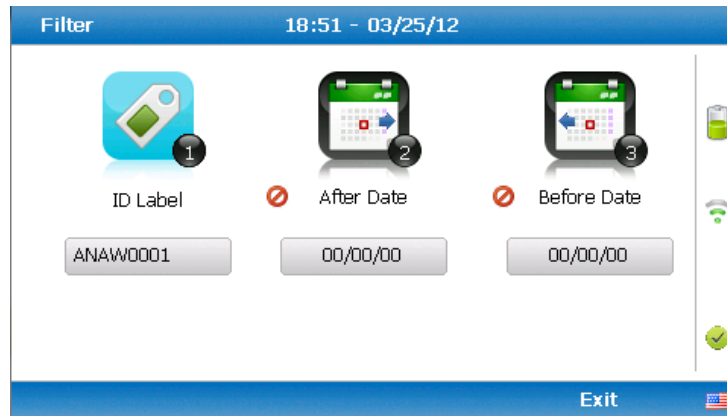


Figure 23—Filter Data

- 4) Select the soft-key 'Delete' followed by the appropriate soft-key to delete a single reading or all filtered readings. Press soft-key 'Cancel' to cancel the deletion request.
- 5) Select the soft-key 'Exit' to exit the view data screen.

7.4.4 Set alarms



This option enables the operator to define the conditions for which an alarm will be triggered. These conditions apply to the general operation of the instrument and are not ID specific. A summary of the alarm settings can be found in 'Key 3 - Summary'.

- 1) Select the 'Menu' button on the front of the analyzer to display the 'Device Settings' menu. Press the soft key to display 'Operation Settings'.
- 2) Select 'Key 4 - Set Alarms' and the following menu is displayed:



Figure 24—Set Alarms

- 3) Select 'Key 2' to select the gas for which you wish to set an alarm trigger followed by 'Key 1' to change the trigger condition of an alarm.
- 4) To manually adjust the alarm set press (<) 'Key 4 - Scroll left' or (>) 'Key 6 - Scroll right' and enter the trigger value.
- 5) To disable all alarm settings select the soft-key 'Disable All'.
- 6) Select the 'Enter' key' to store the setting or select soft-key 'Exit' to exit the screen without saving the change.
- 7) A summary of the alarm settings can be displayed using 'Key 3 - Summary'. Select soft-key 'Exit' to exit alarms summary and the operator returns to the 'Operation Settings' menu.

Once an alarm is set, the main reading screen will show an Orange line when the alarm condition has triggered. For example, Figure 24 shows an alarm of 4% being set. With this alarm set the analyzer will display an orange highlight indicating an alarm once the $O_2 > 4\%$ condition is met.

19:15 - 03/25/12		Baro: 26 "Hg		
Channel	Adjusted	Initial	Previous	Units
CH ₄		0.1	4.9	%
CO ₂		0.2	5.0	%
O ₂		16.0	0.6	%
Bal.		83.7	89.5	%
Static.P			-0.9	"H ₂ O
Diff.P			0.929	"H ₂ O
Temp.			213.8	°F
Flow			56.6	SCFM
Power			169.9	BTU/h


Next ID 

Figure 25—Orange Highlight Indicates Alarm Condition

7.4.5 Adjust flow fail



This option enables the operator to adjust the flow fail tolerance of the instrument, i.e. the operator can adjust the sensitivity for when the pump will stop operating on the presence of a blockage or low flow.

- 1) Select the 'Menu' button on the front of the analyzer to display the 'Device Settings' menu. Press the soft-key to display 'Operation Settings'.
- 2) Select 'Key 5 - Adjust Flow Fail' and the following screen is displayed:

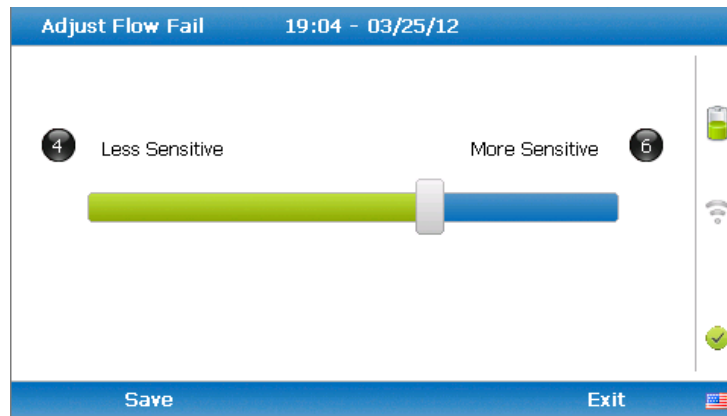



Figure 26—Adjust Flow Fail

- 3) Manual adjustment of the flow fail is available via this option and can be carried out with use of 'Key 4 - Scroll left' (<) less sensitive and 'Key 6 - Scroll right' (>) more sensitive.
- 4) Select the soft-key 'Save' to store the setting or select soft-key 'Exit' to exit the screen without saving the change.
- 5) The operator will return to the 'Operation settings' menu.

 **Note:** Changing the flow fail setting to a less sensitive setting may decrease the life of the pump. The default setting displays the bar in the center. BEFORE altering this setting, please contact Technical Support at +1 (909) 783-3636 or email technical@landtecnica.com

7.3.7 Technician login



Technician Login

This option enables the operator to select from a pre-defined technicians or to add a Technician ID. All subsequent readings will be tagged with this Technician Login ID.

- 1) Select the 'Menu' button on the front of the analyzer to display the 'Device Settings' menu. Press the soft key to display 'User Settings'.
- 2) Select 'Key 6 - Technician login' and the following screen is displayed:

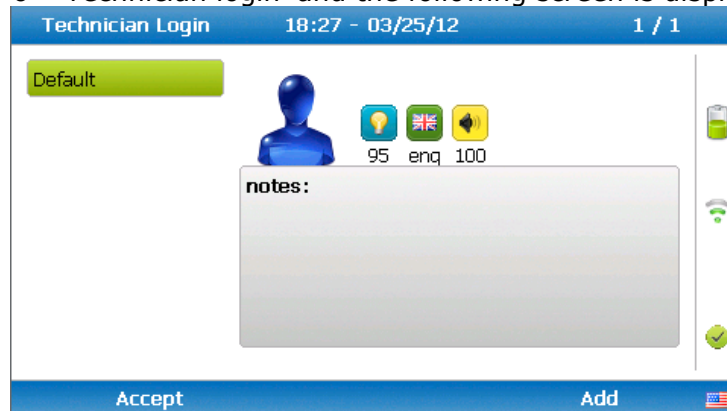
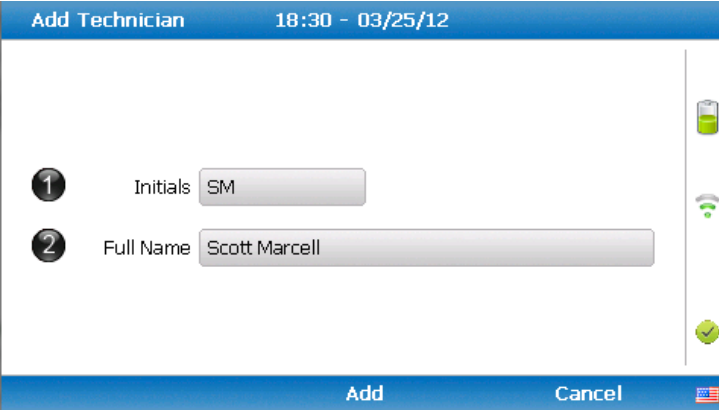


Figure 27—Technician Login

- 3) Use the cursor keys to move throughout the list of IDs displayed; select the 'Enter' key to select choice of ID, default if no IDs are listed.
- 4) Alternatively you may Add a new technician to the list by clicking the soft-key 'Add'

Press the '1' key to enter in the initials. The initials field will turn green. Tap each key on the keyboard repeatedly similar to a cell phone text entry until the desired letters are entered. When done press the enter key. Press the '2' key to enter the Full Name of the technician.



Once done, press the soft-key 'Add'.

- 5) The operator will return to the 'User settings' menu.

Note: If no technicians are loaded via LSGAM this section is skipped during start up and the 'Technician ID' icon is removed from the menu.

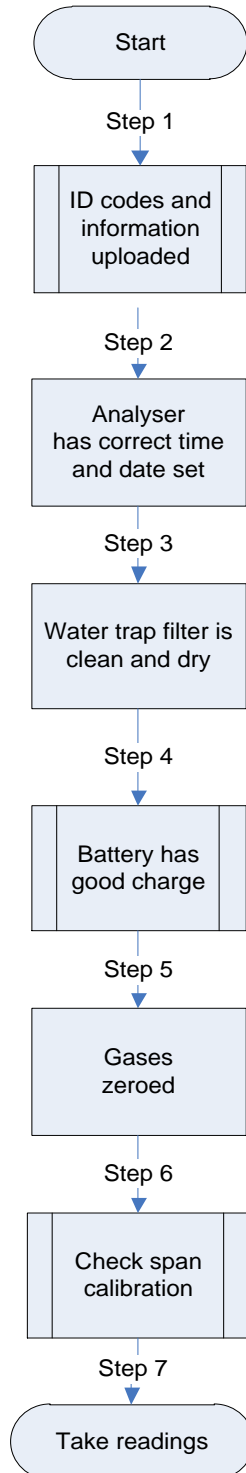
7.4.6 Exit menu

- 1) Press the 'Menu' button on the front of the analyzer to exit settings.

8 Taking readings

8.1 Preliminary checks before taking readings (best practice)

Prior to use, it is good practice to ensure that:



Step 1 If using LSGAM - all necessary ID codes and information have been uploaded from LSGAM to the analyzer.

Step 2 The instrument has the correct time and date set.

Step 3 The water trap filter is fitted and is clean and dry.

Step 4 The battery has a good charge (minimum 25% charge, even if only a few readings are required).

Step 5 The channels CH₄, H₂S and CO have been zeroed, without gas concentration present.

Step 6 If necessary check the span calibration with a known concentration calibration gas.


Step 7 Take readings.

**Warning**

Inhaling hydrogen-sulfide gas (H₂S) or other harmful gases can cause death. It is the responsibility of the user to ensure that he/she is adequately trained in the safety aspects of using H₂S and other harmful gases. In particular, where hazardous gases are being used the gas exhausted from the analyzer 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.

Good practice

- Travel to site with the gas analyzer in its protective hard case, preferably in the vehicle's interior - not in the back of a truck, where it may be subjected to extremes of temperature and possible shock damage. Do not place the gas analyzer against anything hot (e.g. gas extraction pipe, car body or in an unattended car during the summer) as this will cause a temperature increase in the gas analyzer and may cause erroneous readings.
- As with most instrumentation it is recommended to, protect the gas analyzer from strong direct sunlight and heavy rain.
- Always use the water trap! If the water trap becomes flooded, change the filter and ensure all tubes are clear of moisture before re-use.

 Note: If the exhaust of a 5000 series gas analyzer is connected to a pressurized system then this results in a flow of gas out of the inlet flow port.

8.2 Update site questions

Prior to taking the readings at a particular site, the site questions should be updated. This is accessed via the 'Special Action' menu. The answers to these questions are then stored and appended to each reading stored thereafter, until the site data is updated for another site. If using LANDTEC System Gas Analyzer Manager (LSGAM) software this data will be uploaded to LSGAM along with the reading data.

8.3 Special action

This menu enables the operator to perform additional functions out of sequence if so desired. The options available may change depending upon ID setup, step in the reading workflow, and purchased instrument options (Instrument Part Number).

- 1) From the 'Main Gas Read Screen' select the soft-key 'Special Action' and the following menu is displayed:



Figure 28—Special Actions

- Note: The list of special action options displayed on the special action menu is dependent upon device type, mode, and step in the reading sequence. Site & ID Questions will only be available if established in LSGAM software. Refer to 5.7 Create a Project / Select a Project.

The following actions may be available:

Action	Function
Restart Process	This action enables the operator to restart the current process again from the beginning. The operator will return the Main Gas Read Screen.
Site Questions	This action enables the operator to update site questions prior to taking a reading.
ID Questions	This action enables the operator to update ID questions specific to sample points prior to taking a reading.
System Pressure	GEM mode – This action enables the operator to measure available system vacuum before the well's valve when taking a reading. Refer to ACCU-FLO well device diagram in Section 5.7.3.
Enter Temperature	This action enables the operator to enter the temperature manually if a temperature probe is not installed.
Simple Gas Reading	The Simple Gas Reading or "Pump & Read" is a Gas Composition Only reading. The reading workflow is simply 1) connect hose, 2) pull sample, 3) obtain gas composition only, 4) store reading. This can be invoked by the special action menu prior to starting a reading or by simply turning on the pump rather than pressing "Start".
Filter H ₂ S	This function can allow for better CO readings by removing H ₂ S from the gas sample. Refer to 8.8 How to use an H ₂ S filter.

- 2) Select the soft-key 'Exit' to exit this menu and return to the 'Main Gas Read Screen'.

8.4 GEM analyzer in Gas Analyzer (GA) mode

The operator may toggle between GEM (a gas extraction monitor) and GA (a landfill gas analyzer) mode of operation if required. From the 'Special Action' menu, select the middle soft-key to toggle between GEM and GA Mode.

Note: The GEM5000 differs from the GEM2000 series of analyzers in that all IDs and Memory within the instrument are contained in a single area. They are not specific to GEM or to GA mode. GEM and GA mode should be considered as "modes of workflow" rather than instrument modes. Readings can be taken in either workflow mode GEM or GA.

LSGAM now supports a new flow device called "NO FLOW" for probes. If "NO FLOW" is selected during ID Setup, the instrument will default to the GA workflow after a Device ID containing "NO FLOW" is selected. Subsequent selection of an ID without "NO FLOW" for the flow device will cause the instrument to return to the GEM workflow.



Figure 29—Analyzer in GA Mode—Main Gas Reading Screen

8.5 Simple GAS (special action)



Simple Gas

A simple gas reading is similar to that of a GA mode reading except that it does not record temperature nor does it record relative pressure. This is useful if strictly a gas composition is desired.

There are two ways to start a simple gas reading. The First is to press 'special action' followed by simple gas (1) before pressing 'start' to begin a reading. The other is to simply press the pump key before pressing the 'start' button on the reading screen. Once the Simple Gas reading is activated the Start button will become a store button.

TEQUW001		18:12 - 10/03/12		Baro: 28.94 "Hg	
Channel	Adjusted	Initial	Previous	Units	
CH ₄		0.0	0.0	%	116
CO ₂		0.1	0.1	%	
O ₂		20.4	20.1	%	
CO		0	0	ppm	
H ₂ S		1	1	ppm	
Bal.		79.6	79.8	%	
Static.P		----	----	"H ₂ O	
Diff.P		----	----	"H ₂ O	
Temp.		----	----	°F	
Flow		----	----	SCFM	
Power		----	----	BTU/h	
Next ID		Special Action		Store	

The reading is literally as simple as “pumping and storing”. If an ID has questions, system pressure or other elements setup they will be ignored for the simple reading. GPS coordinates are stored if available along with a simple gas reading.

Note: A simple gas reading can be used as a mechanism to record a downloadable record of a gas check. Consider establishing one or more ID's that are used to check gas mixtures. Take a simple gas reading against these ID's and store the reading.

8.6 The GEM5000 as a Gas Extraction Monitor (GEM) gas flow measurement screen



The GEM5000 gas extraction monitor enables gas and flow measurements to be recorded by using:

- A flow device i.e. an Accu-Flo Wellhead, Pitot tube, Orifice plate, or User Input.
 - Refer to 5.7.3 Creating IDs for a full explanation of flow devices handled by the GEM
- A temperature probe.

The GEM5000 instrument has the extra functionality to measure the calculated calorific (energy) value of the gas. The field technician uses the information recorded by the analyzer to make adjustments to the gas flow for specific wells. The initial and adjusted flow rates are recorded.

Optionally, Questions and an additional System Pressure may be recorded as a part of the reading workflow if setup in the ID.

Please note that when using select comments type of questions only 5 of the possible 8 comments can be displayed on the screen at a time. Additional comments may be

available. Scroll to them use of the scroll down  and scroll up  keys similar to choosing IDs from the ID selection screen.

8.7 How to use a pitot tube (optional)

The GEM5000 gas analyzer enables the field technician to take gas measurements using a pitot tube. The pitot tube is used for gas extraction systems and the pressure readings are taken in mbar. Gas flow is calculated in the analyzer in SCFM (standard cubic feet per minute) or in m³/hr (meters cubed per hour) depending upon the units of


measure setting.



Figure 30—Example of a Pitot Tube

Fitting a pitot tube to the analyzer:

- 1) It is important to seat the pitot tube into the monitoring point with the tip facing into the gas flow. The pitot tube should also be housed half way down the monitoring pipe.
- 2) Make sure that the sample tubing attached to the pitot tube fits correctly.
- 3) Attach the sample tube from the top connection of the pitot tube to the 'blue port' (the differential port) on the analyzer making sure that the gas port connector secure into place.
- 4) Attach the sample tube from the side of the pitot tube to the 'white port' (inlet port/static pressure port) on the analyzer making sure that the gas port connector secures into place.
- 5) House the pitot gland correctly onto the monitoring point.
- 6) When taking a gas reading and flow measurement follow the instruction as displayed on the front of the instrument.

 Note: Please refer to the following section for a diagram showing how to fit the tubing to the pitot tube.

8.8 *How to use an H₂S filter (optional)*

8.8.1 **Cross gas effects on chemical cells**

Measurements of CO are important in landfill management. The GEM5000 analyzer incorporates an improved CO measurement. Measurements of CO can be affected by

two other gases that can be found in landfill gas – hydrogen and hydrogen sulfide.

To reduce the effect of hydrogen, the GEM5000 analyzer uses a technique that is hydrogen compensated. Hydrogen compensation is achievable up to a level of around 2000ppm. Above this level the CO reading will not be compensated for.

In order to assist the operator the GEM5000 instrument also indicates the level of hydrogen present as low, medium or high. If a high hydrogen reading is present then the CO reading may be affected.

The effect of hydrogen sulfide is eliminated by the use of a H₂S filter.

CO measurement

The CO measurement is sensitive to hydrogen sulfide. The presence of hydrogen sulfide can cause the CO reading to elevate (not to be the true value due to the interfering gas). If the presence of hydrogen sulfide is suspected to be causing false CO readings, then it is recommended that the external hydrogen sulfide filter is used while obtaining the CO measurement.

The H₂S filter only needs to be used when you are trying to remove any possible cross gas effects H₂S might have on other gas channels. Do not use the filter on all devices.

When using the H₂S filter you will need to increase the gas sample and clean air purge run-time, as using an H₂S filter decreases the response time of the analyzer.

✍ Note: There is an internal H₂S filter incorporated in the chemical cell that removes the H₂S; however this has a limited life span.

The electrochemical cells used to measure H₂S and CO do suffer from cross-gas effects. Such effects are not accurately specified. However, the following table may be useful as a guide; it represents how many ppm would be read by a cell if 100 ppm of the interfering gas were applied, with no other cross-contaminates being present in the sample.

GEM5000

		Interfering Gas				
		CO	H ₂ S	SO ₂	NO ₂	H ₂
Chemical Cell	CO (H ₂ compensated)	100	0 / ~300*	0	0	<1
	CO	100	<4 / ~300*	0	-20 to +5	<60
	H ₂ S	<4	100	20	<-25	<0.2

*after internal filter depleted.

✍ Note: Other gases could cause cross-gas effects. If you suspect a cross sensitivity problem please contact the Technical Support Team at +1 (909) 783-3636.

8.8.2 Cross-gas effects on methane, carbon dioxide and oxygen

Methane is measured using dual beam infrared absorption. Analyzers are calibrated

using certified methane mixtures and will give correct readings, provided there are no other hydrocarbon gases present within the sample (e.g. ethane, propane, butane, etc...). If there are other hydrocarbons present, the methane reading will typically be higher 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.

✂ Note: The effect can be reduced by using an H₂S filter as it can reduce higher order hydrocarbons. When using the H₂S filter you will need to increase the gas sample and clean air purge run-times, as using an H₂S filter increases the response time of the analyzer.

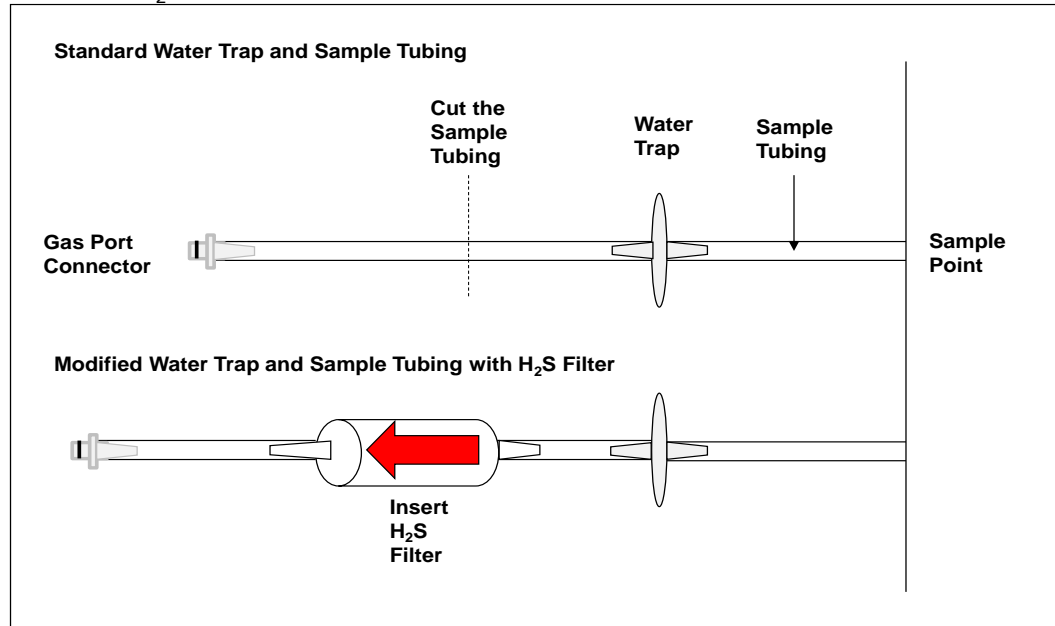
Carbon dioxide is measured by infrared absorption at a wavelength specific to carbon dioxide. Therefore, the carbon dioxide reading will not be affected by any other gases usually found on landfill sites.

The 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.

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'.

H₂S filter:**Instructions for use:**

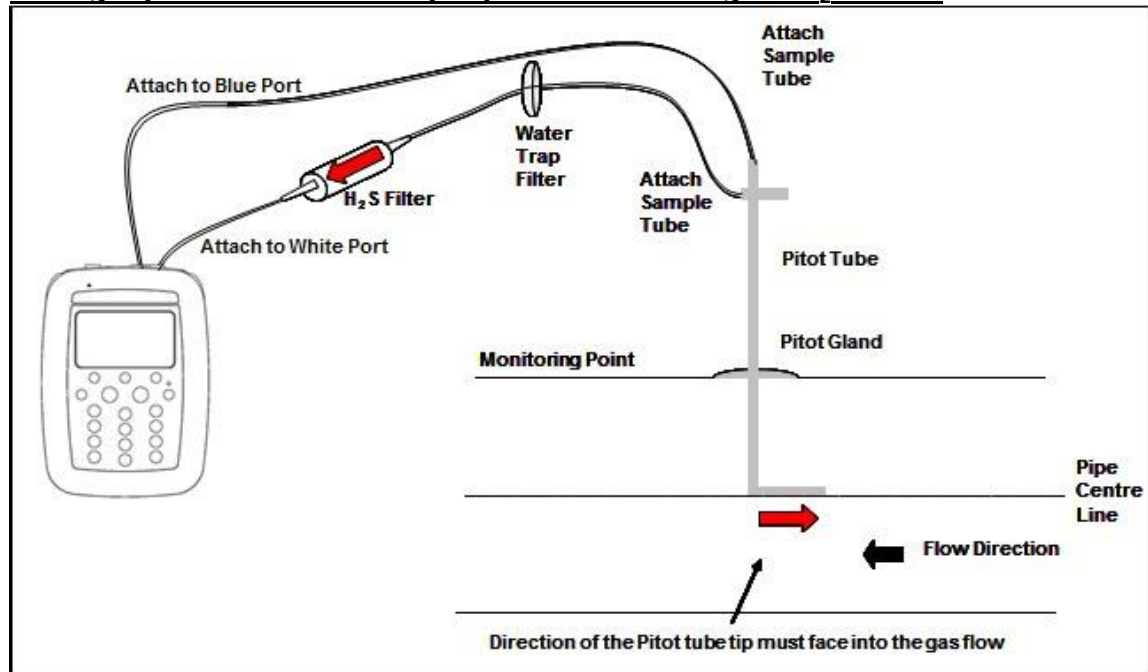
The following diagram shows how to modify the standard water trap and sample tubing to fit the H₂S filter.



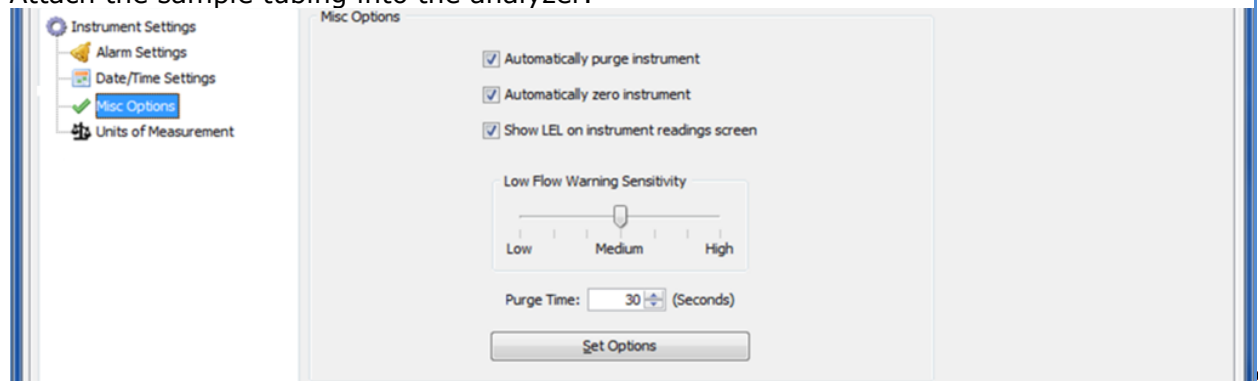
⚠ Note: When onsite the field technician must have an unmodified water trap assembly in addition to the modified water trap with a H₂S filter in order to take readings with and without a filter.

- 1) Once the H₂S filter is fitted follow the instructions as detailed on the front of the gas analyzer displayed when taking readings using a H₂S filter.

⚠ Note: This is only for analyzers fitted with the CO compensated cell. Please refer to section 4.2 GEM5000 Part Number Legend

Fitting a pitot tube to a sample point when using an H₂S filter:

- 2) Make sure the water trap filter is fitted as close as possible to the pitot tube. This will help protect and trap moisture before it reaches the H₂S filter. Make sure that the water trap filter is clean and dry.
- 3) Attach the sample tubing into the analyzer.



- 4) To take flow readings using a pitot tube, please follow the instructions displayed on the front of the instrument. The user will be prompted to complete each step and should follow the instructions on screen or those initially provided with the Pitot Tube.

Note: It is important to center the pitot tube within the pipe and ensure it is parallel with the pipe.

8.8.3 How to use a temperature probe (optional)


The temperature probe enables the field technician to measure the temperature of the gas within a sample point. The GEM5000 gas analyzer uses the temperature of the gas to give more accurate flow measurement readings as part of the instrument calculation.



Figure 31—Temperature Probe Use

Instructions for use:

- 1) The temperature probe reading is taken along with the flow measurement reading.
- 2) The analyzer must be at the 'Main Gas Read Screen'.
- 3) Attach the temperature probe to the middle connector 'D'(refer to 4.4 – Instrument connection points).
- 4) Insert the temperature probe into the sample point (well device) at the same time as you attach the sample tube to the sample point (two sample points are required for the well).
- 5) Follow the instructions on the front of the instrument when taking your gas and flow measurement reading.
- 6) At the point in which the operator presses 'Enter' to store the gas reading the temperature is recorded.

 **Note:** Temperature probe readings can be analyzed further when downloaded to LANDTEC System Gas Analyzer Manager (LSGAM).

8.8.4 How to locate a device ID using the GPS feature (optional)

An optional GPS feature is available for the GEM5000 gas analyzer. It enables the field

technician to automatically locate Device IDs using GPS satellite signal from predefined Device IDs uploaded from Gas Analyzer Manager. The GPS reading data is stored for each measurement reading.

Note: Device IDs may be uploaded from LSGAM with or without location information. If location details are not uploaded, the location longitude and latitude coordinates can be stored when the Device ID is located and downloaded to LSGAM with the reading measurements.

Screen navigation:

- 1) Switch on the analyzer and wait for the self-test warm-up to complete and the analyzer will display the 'Main Gas Read Screen'.
- 2) In order to use the navigation function , you must switch 'Navigation - On' on the analyzer. Select the 'Menu' then Device Settings key followed by 'Key 5' to toggle navigation to on. Select the 'Menu' key to exit and return to the 'Main Gas Read Screen'.
- 3) Select the soft-key 'Next ID', then select a device ID from the list displayed and press the 'Enter' key to continue.

<p>Warning</p>	<p>Before entering the GPS Navigation Screen for the first time the following health and safety message will be displayed.</p> <p>"Please be aware of the terrain when using this screen. You are responsible for your own safety while walking on-site!"</p>
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- 4) After reading the user warning message, select the soft-key 'Dismiss'. Use the tracking display to locate the device.

Note: There is often a wait time frame of between 30 seconds to two minutes while acquiring a satellite signal. Be aware that heavy rain, trees overhead etc. will give a bad fix.

- 5) Once the operator selects a Device ID the 'GPS Navigation' screen is displayed.



Figure 32—Navigation using GPS

- 6) If required select soft-key 'Options' to go to the 'Navigation Options' menu and the following screen is displayed:

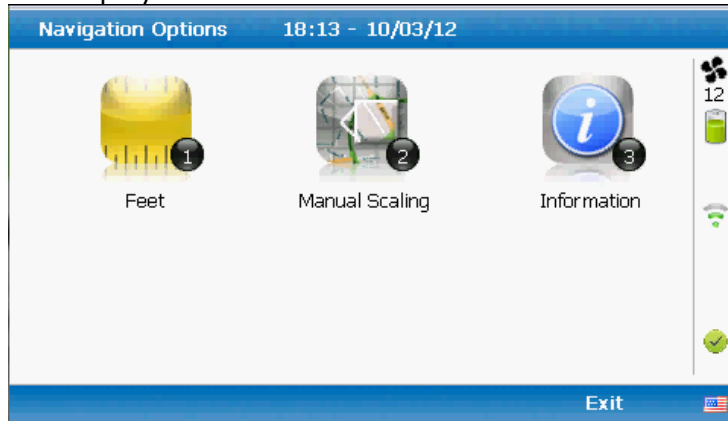


Figure 33—Navigation Options

- 1 Key 1 to toggle between 'Meters', 'Feet' or 'Yards' to define the unit of measurement for navigational purposes.
- 2 Key 2 to toggle between 'Manual Scaling' and 'Automatic Scaling' to locate a sample point using a satellite signal.
- 3 Key 3 to display sample point information:



- Bearing: Direction.
- UTC time: 'Universal Time Code' received from the satellite and displays GMT.
- Latitude: Latitude displays as degrees, minutes, seconds and decimal seconds. The equator is 0.
- Longitude: E (East) or W (West) displays the longitude as degrees, minutes,

seconds and decimal seconds. The Greenwich meridian defines the zero point.

Altitude: Altitude displays in meters, feet or yards.

Satellite: This is the number of satellites that the system can select. Four satellites will give reasonable position accuracy; eight or more satellites will increase accuracy.

Horizontal: Estimate of horizontal error on the indicated position. The location is accurate to horizontal error 1.6m.

Vertical: Estimate of vertical error on the indicated position.

HDOP: 'Horizontal Dilution of Precision' which measures the accuracy of the indicated position.

Status: Status is the indicator as to the functional state of the GPS. The number presented is a value 1 through 4 and corresponds to the GPS signal strength indicators



GPS failure/No Fix—the GPS was unable to get a line of sight lock on enough satellites. Or, it may be that it hasn't had time to get a lock



Poor to fair signal strength



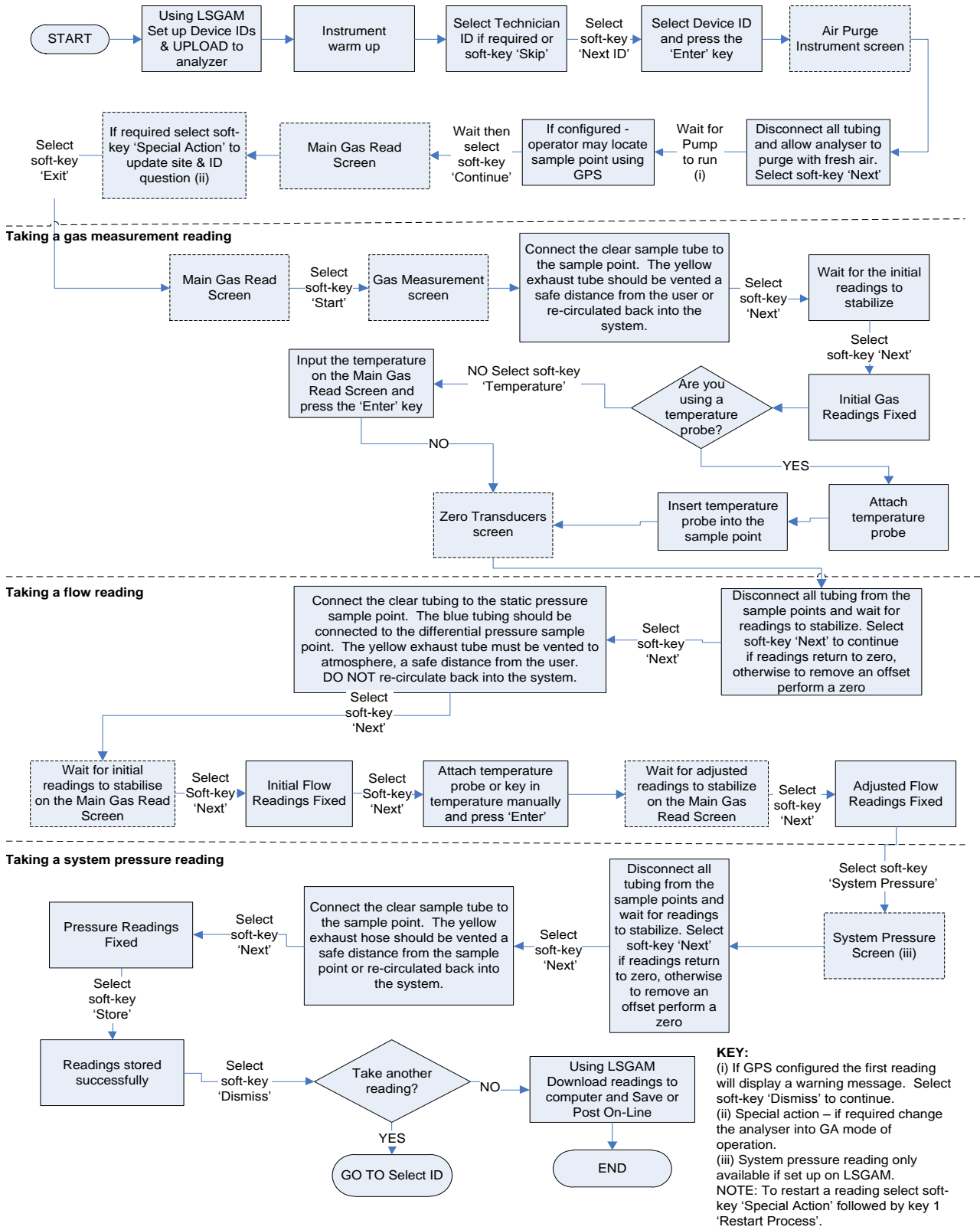
Okay strength



Good Signal / Full Strength

Select soft-key 'Continue' and the operator is returned to the 'Main Gas Read Screen'.

8.8.5 Taking gas and flow measurement



9 Calibration

9.1 Calibration introduction

The GEM5000 gas analyzer is carefully calibrated at time of manufacturer and when returned for service. However, it is desirable to be able to carry out a calibration process between services.

This section outlines the correct procedures to enable the field technician to field calibrate the gas analyzer.

✎ Note: This does not replace the factory service and calibration. If this calibration is completed incorrectly it may decrease the accuracy of the gas analyzer.

CH₄, CO₂ and O₂ can be measured by all GEM5000 gas analyzer models as a standard; these channels can be user calibrated. Optionally, the analyzers can have other gas channel specified at purchase; these channels can be calibrated as well. This section will describe in detail how to calibrate the three standard gas channels plus the CO channel.

The GEM5000 instrument can have a H₂ compensated CO channel. This option requires that H₂ is used in the calibration process and is also set out within this section. Refer to section 4.2 GEM5000 Part Number Legend to determine if you have an H₂ compensated CO channel. While H₂ is used for calibration of the compensated CO cell, it is not a gas that is measured by the instrument as a part of a reading. As such it only appears on the gas check and View Data screens but not the reading screen.

For the other gas channel options contact LANDTEC for advice.

Two important terms that are used within this section are '**Zero**' and '**Span**'.

Zero: The point at which the gas analyzer is calibrated when there is none (Zero percent or ppm) of the target gases present.

Span: The point at which the gas analyzer is calibrated when a known quantity of the target gas is present.

9.2 Frequency of calibration—best practice.

The GEM5000 gas analyzers can be checked against a known concentration of gas, to give confidence that the analyzer is operating as expected at the time and conditions in which it is being used. A field calibration should be performed if the ambient temperature changes by more than 20° Fahrenheit over the course of a monitoring since the last field calibration.

It is recommended that the instrument is regularly serviced and calibrated by LANDTEC. Please refer to the instrument's calibration certificate for the last date of calibration.

When defining the frequency of user calibration, the following are factors to be considered:

- The frequency of use of the analyzer. (daily?/monthly?)
- The level of confidence and accuracy required for readings to be taken.
- Historical user calibration data.
- Site specific requirements or conditions.
- Historical understanding of expected readings on site.

Zeroing of the gas analyzer should be undertaken at the start of each day's monitoring.

Use historical data to drive your frequency of calibration.

If there is no historical data a good starting point for a daily monitoring round is performing a calibration daily at the beginning of a monitoring event.

The results of the calibrations will need to be recorded to monitor over time whether the frequency of calibration needs to be increased or decreased relative to the confidence required.

The confidence required is most often driven by the site specific, user, and/or regulatory requirements.

When undertaking the monitoring with an understanding of the history of the gas levels of that site, a calibration check could be triggered if the readings measured are different to what is expected.

✍ Note: For assistance please contact Technical Support at +1 (909) 783-3636

9.3 Calibration gases

User calibration of a gas analyzer will greatly 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 the use of CG-00-00-04 and CG-15-15-00 is recommended. To improve calibration at higher levels use of CG-50-35-00 is recommended.
- For standard CO only 100ppm CO gas is needed.
- For CO (H₂ compensated) both CO 100ppm and H₂ 1000ppm gases are needed.

The following table indicates a partial listing of gases sold by LANDTEC for calibration:

Calibration gas Part Number	CH ₄	CO ₂	O ₂	N ₂
CG-00-00-04	0%	0%	4%	Balance
CG-15-15-00	15%	15%	0%	Balance
CG-50-35-00	50%	35%	0%	Balance
CG-N2-00	0%	0%	0%	100%

Calibration targets for gas cells are dependent on the gas/range and type of cell fitted. Contact Technical Support for assistance.

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

✍ Note: The above gases and most other gas concentrations can be supplied by LANDTEC. For further information please contact Sales on +1 (909) 783-3636 email sales@landtecnica.com

⚠ Warning	Calibration gases can be dangerous. For each gas used the appropriate material safety data sheet must be read and understood before proceeding.
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9.4 Calibration set-up

⚠ Warning	Do NOT attach the gas supply to the gas analyzer before putting the analyzer into the 'Gas Check' screen. Select 'Check Spans' from the 'Operation Settings' menu.
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The regulator supplied with the calibration kit has been configured to deliver a fixed flow.

As the regulator's flow is factory set, it only requires a few turns to open, no adjustment is necessary.

⚠ Warning	<p>Exhaust port</p> <p>When the gas analyzer is being calibrated, there are two possible exits for the gas, via the usual manner out of the exhaust (yellow) port of the analyzer or through the optional pressure relief valve. In cases of over-pressurization the port on the pressure relief valve will open.</p> <p>It is recommended that tubing is attached to the instrument during a calibration or gas check. The exhaust tubing must emerge in a well-ventilated area. Ensure there are no leaks in the tubing and connections.</p> <p>The calibration of the gas analyzer should be carried out in a safe area with all necessary precautions taken when using potentially dangerous, explosive or toxic gases.</p>
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9.5 Calibration equipment

The following diagram displays the regulator, tubing and carrying case used for user calibration:



Figure 34—LANDTEC Calibration Gas Kit

- Certified calibration gas cylinders are supplied with the LANDTEC calibration kit. The volume of gas is typically 34 liters. Certain gas mixtures may have different volumes. Please refer to the LANDTEC website www.landtena.com for further information.
- The regulator supplied with the calibration kit is pre-set for flow and pressure rates that are factory set. If using other gas sources and regulators please match the flow and pressure of the LANDTEC regulators. An optional pressure relief valve is suggested if using a NON-LANDTEC regulator just as a safety precaution. Over pressurization of the analyzer can cause damage to the analyzer and cause it to malfunction.

9.6 Gas Check (Field Calibration)



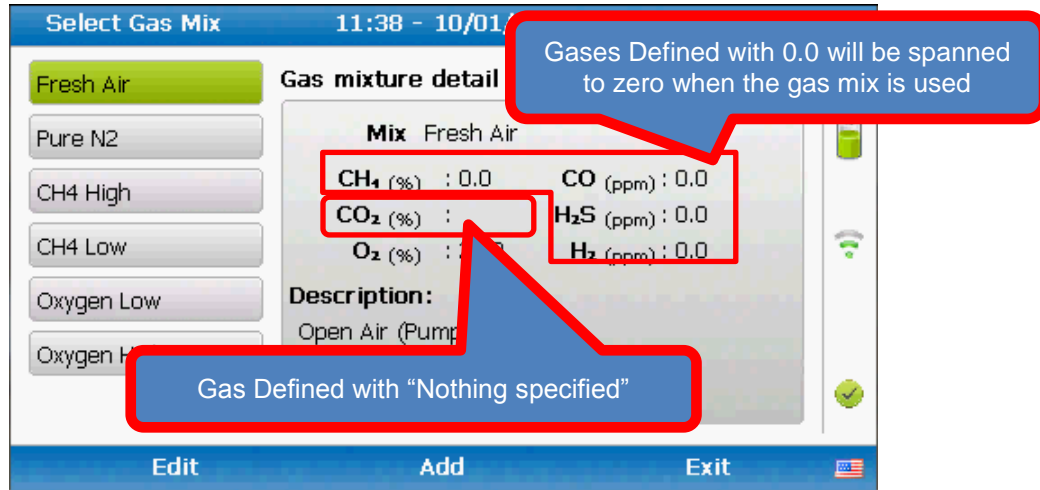
Gas Check

The GEM5000 instrument series has a "Gas Check" to both perform a test or check the gases and then allow calibration to a known standard or "gas mix". The calibration will calibrate to a zero target or other target value if defined. If a gas is missing or not defined in the mix, then the Gas Check Calibration will not calibrate to it.

A default set of "gas mixes" covering the majority of scenarios for basic calibration of CH₄, CO₂, & O₂ have been preloaded into the instrument for your convenience. To meet your particular needs, you are able to adjust the existing mixes to or add additional gas mixes. The following table shows the mixes that are pre-loaded into your instrument.

	CH ₄	CO ₂	O ₂	CO	H ₂ S	Pump On
Fresh Air	0.0		20.9*	0.0	0.0	Yes
Pure N ₂	0.0		0.0	0.0	0.0	No
CH ₄ :High	50.0	35.0	0.0			No
CH ₄ Low	15.0	15.0	0.0			No
Oxygen Low			4.0			No
Oxygen High			20.9			Yes

On the instrument, this would be displayed as follows:




It is important to note that a 0.0 is different than Nothing defined. In the above example for Fresh Air, only CO₂ is not defined or has "Nothing specified". What this means is that when the mix named Fresh Air is applied to the instrument you will Zero the CH₄, O₂, CO, H₂S & H₂ Channels. You will Span Oxygen to 20.9 percent. Carbon Dioxide CO₂ will not be touched when Fresh Air is applied. This distinction is important because as gas mixes are defined you may choose to omit defining a constituent as 0.0 if you want to span only and not Zero a particular gas. The following example will describe this in a step-by-step single bottle gas check/calibration sequence.

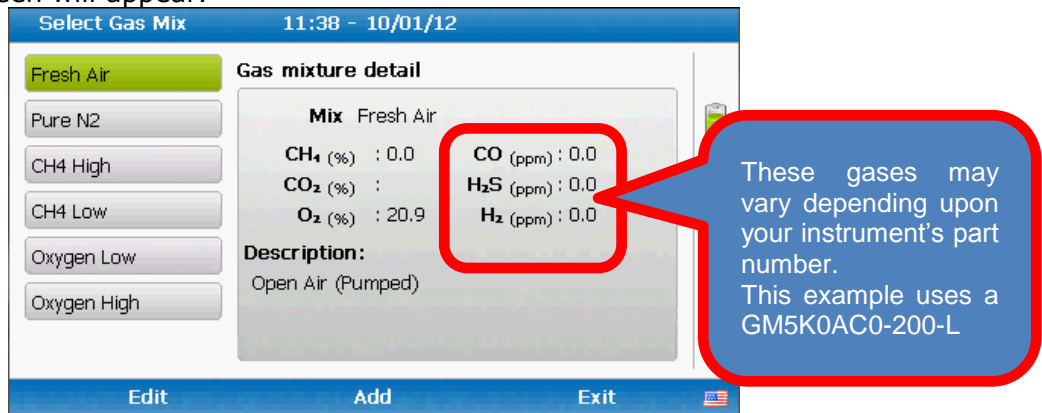
Single Bottle Calibration

The following will walk through a typical calibration using Air and a single bottle of 50% Methane / 35% Carbon Dioxide / Balance Nitrogen.


The three simple steps to performing this calibration are:

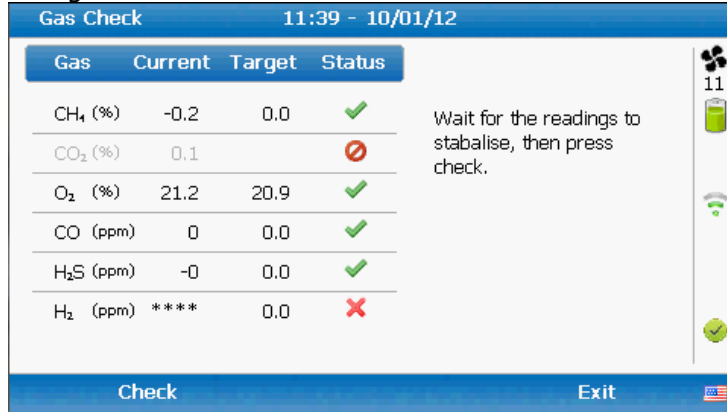
- Apply Fresh air, Zero channels
- Apply Span to CH₄, CO₂, Zero O₂
- Apply Span for O₂

To begin, press the Menu Key  on the instrument. From the Operations Settings Menu, press 2 for Gas Check. From the Gas Check Screen, press 1 to perform the Gas Check. The Select Gas Mix screen will appear.







Step 1) "Fresh Air" step.

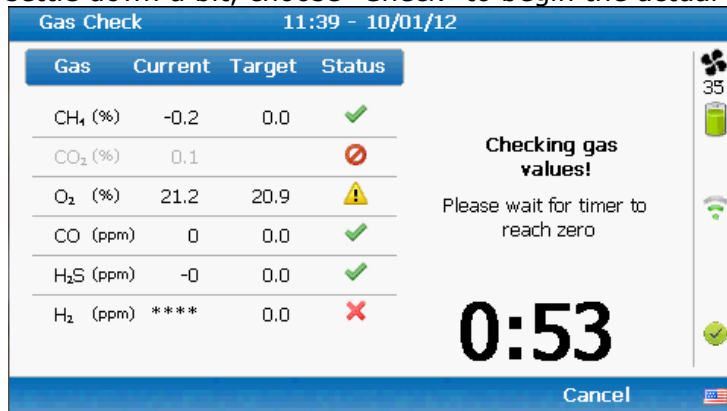
Highlight the mix labeled "Fresh Air" and press the enter key . The "Gas Check" screen will appear. The pump will automatically turn on and you will see the values in the Current column changes as the gas stabilizes.



Several symbols are used on the Gas Check screens to indicate the status of the Gas Check.

Status Symbol	Meaning
	The Gas channel is disabled or cannot be zeroed
	The Gas channel is out of tolerance and recommended to span the channel.
	The Gas channel is within specification
	The Gas channel is out of range and has failed the check. Also the value is consider out of limits and will not allow for calibration of the channel to occur.

Once the numbers settle down a bit, choose "Check" to begin the actual check process.



You will see the countdown timer while the gas is being checked. Once complete a screen will appear indicating the status of the various gas channels.

At this point, you are prompted to either Retry the check, Calibrate the instrument or Record the check event.

Gas Check				11:40 - 10/01/12	
Gas	Current	Target	Status	Check complete	
CH ₄ (%)	-0.2	0.0	✓	Calibration check failed.	
CO ₂ (%)	0.1		✗	• Retry - to allow the gas to flow for longer.	
O ₂ (%)	21.2	20.9	⚠	• Calibrate - to apply a user calibration and record result.	
CO (ppm)	0	0.0	✓	• Record - to record results of the calibration check.	
H ₂ S (ppm)	-0	0.0	✓		
H ₂ (ppm)	****	0.0	✗		

Retry Calibrate Record

Press Calibrate to:

- Span the Methane to a Target value of Zero
- Span the Oxygen to 20.9
- Span CO₂, H₂S, and H₂ Channels to a Target of Zero.

Gas Check				11:40 - 10/01/12	
Gas	Current	Target	Status	Result Saved	
CH ₄ (%)	0.0	0.0			
CO ₂ (%)	0.1		✗		
O ₂ (%)	20.9	20.9			
CO (ppm)	0	0.0			
H ₂ S (ppm)	0	0.0			
H ₂ (ppm)	****	0.0			




Exit





This concludes the first step of the calibration. Press Exit to return to the Gas Mix screen. Now you will span CH₄, CO₂ and span O₂ to zero.

Step 2) Span Methane, Carbon Dioxide, & Zero Oxygen





Select Gas Mix		11:41 - 10/01/12	
Fresh Air	Gas mixture detail Mix CH4 High CH ₄ (%) : 50.0 CO (ppm) : CO ₂ (%) : 35.0 H ₂ S (ppm) : O ₂ (%) : 0.0 H ₂ (ppm) : Description: High CH4 Target Gas Mix		
Pure N2			
CH4 High			
CH4 Low			
Oxygen Low			
Oxygen High			

Edit Add/Delete Exit

Use the up  **2** & down  **8** arrow keys on the instrument to navigate through the gas mixes until the mix "CH4 High" is highlighted green. Then press the enter  key.





Gas Check				11:42 - 10/01/12	
Gas	Current	Target	Status		
CH ₄ (%)	-0.1	50.0	✘	Connect bottle, adjust flow and wait for the readings to stabilise, then press check.	  
CO ₂ (%)	0.1	35.0	✘		
O ₂ (%)	20.9	0.0	✘		
CO (ppm)	0		⊘		
H ₂ S (ppm)	0		⊘		
H ₂ (ppm)	****		⊘		
			Check	Exit	

Initially you may see many red X in the gas screen because the current value varies widely from the expected target. At this point, connect the 50%CH₄ / 35%CO₂ bottle to the white port on the top of the analyzer and begin the flow of gas. Once gas flows, the values will probably change.

Gas Check				11:42 - 10/01/12	
Gas	Current	Target	Status		
CH ₄ (%)	49.0	50.0	⚠	Connect bottle, adjust flow and wait for the readings to stabilise, then press check.	  
CO ₂ (%)	34.1	35.0	⚠		
O ₂ (%)	2.1	0.0	⚠		
CO (ppm)	0		⊘		
H ₂ S (ppm)	0		⊘		
H ₂ (ppm)	****		⊘		
			Check	Exit	

Now the gases for CH₄, CO₂, & O₂ are much closer and are within a range that is able to be calibrated.

Press Check to begin the process of checking the gas. The countdown will begin.

Gas Check				11:43 - 10/01/12	
Gas	Current	Target	Status		
CH ₄ (%)	49.4	50.0	⚠	Checking gas values! Please wait for timer to reach zero <h1>0:17</h1>	  
CO ₂ (%)	35.2	35.0	✔		
O ₂ (%)	0.3	0.0	✔		
CO (ppm)	0		⊘		
H ₂ S (ppm)	0		⊘		
H ₂ (ppm)	****		⊘		
			Cancel		

Once the timer countdown is complete a summary of the calibration check is displayed.

Gas Check 11:43 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	49.5	50.0	⚠
CO ₂ (%)	35.2	35.0	✓
O ₂ (%)	0.2	0.0	✓
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Check complete
 Calibration check OK.

- Record - to record results of the calibration check.
- Calibrate - to apply a user calibration and record result.
- Retry - to allow the gas to flow for longer.

Retry Calibrate Record

Choose Calibrate.

Gas Check 11:43 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	49.5	50.0	
CO ₂ (%)	35.1	35.0	
O ₂ (%)	0.2	0.0	
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Calibrating, please wait...

Cancel

The channels of CH4, CO2, & O2 will calibrate.

Gas Check 11:43 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	50.0	50.0	✓
CO ₂ (%)	35.0	35.0	✓
O ₂ (%)	-0.0	0.0	✓
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Calibration successful
 All channels were adjusted successfully.

- Exit - to return to Gas Mix Selection.
- Retry - to try again.

Retry Exit

Upon Completion, the current values will be identical or very close to the Target.

Gas Check				11:44 - 10/01/12	
Gas	Current	Target	Status		
CH ₄ (%)	50.1	50.0		Result Saved, disconnect bottle	
CO ₂ (%)	35.1	35.0			
O ₂ (%)	0.0	0.0			
CO (ppm)	0		⊘		
H ₂ S (ppm)	0		⊘		
H ₂ (ppm)	****		⊘		
				Exit	

The results will be saved. The calibration gas bottle can be disconnected.

To recap:

- **Step 1** Spanned CH₄ to Zero.
- **Step 2** Spanned CH₄ to 50% & CO₂ to 35%. Spanned O₂ to Zero.
- **Step 3** will Span will span O₂ to a non-zero span-target.

Step 3) Spanning Oxygen

Select Gas Mix		11:44 - 10/01/12	
Fresh Air	Gas mixture detail Mix Oxygen High CH ₄ (%) : CO (ppm) : CO ₂ (%) : H ₂ S (ppm) : O ₂ (%) : 20.9 H ₂ (ppm) : Description: Ambient Air Oxygen Span Target (Pumped)		
Pure N2			
CH4 High			
CH4 Low			
Oxygen Low			
Oxygen High			
Edit	Add/Delete	Exit	

To span the Oxygen channel to ambient air choose the gas mix "Oxygen High".

Gas Check				11:45 - 10/01/12	
Gas	Current	Target	Status		
CH ₄ (%)	49.2		⊘	Connect bottle, adjust flow and wait for the readings to stabilise, then press check.	
CO ₂ (%)	34.7		⊘		
O ₂ (%)	0.2	20.9	✘		
CO (ppm)	0		⊘		
H ₂ S (ppm)	0		⊘		
H ₂ (ppm)	****		⊘		
				Check	Exit

The "Oxygen High" gas mix is defined for just Oxygen and no other gases are defined. This allows for oxygen to be spanned without spanning CH₄, CO, H₂S, or H₂ to Zero. Press Check to begin checking the O₂. As the gas is displaced from the previous Span in the instrument the current value will rise.

Gas Check 11:45 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	0.1		⊘
CO ₂ (%)	0.2		⊘
O ₂ (%)	19.1	20.9	⚠
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Connect bottle, adjust flow and wait for the readings to stabilise, then press check.

Check Exit

Press Check to have the instrument begin checking the gas values.

Gas Check 11:46 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	0.0		⊘
CO ₂ (%)	0.1		⊘
O ₂ (%)	20.5	20.9	⚠
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Checking gas values!

Please wait for timer to reach zero

0:58

Cancel

Gas Check 11:47 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	0.0		⊘
CO ₂ (%)	0.1		⊘
O ₂ (%)	20.5	20.9	⚠
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Check complete

Calibration check OK.

- Record - to record results of the calibration check.
- Calibrate - to apply a user calibration and record result.
- Retry - to allow the gas to flow for longer.

Retry Calibrate Record

Once the check is complete, Press Calibrate to span the Oxygen.

Gas Check 11:47 - 10/01/12

Gas	Current	Target	Status
CH ₄ (%)	0.0		⊘
CO ₂ (%)	0.1		⊘
O ₂ (%)	20.5	20.9	
CO (ppm)	0		⊘
H ₂ S (ppm)	0		⊘
H ₂ (ppm)	****		⊘

Calibrating, please wait...

Cancel

Once the calibration is complete, press Exit to return to the gas check screen.

Gas Check				11:47 - 10/01/12	
Gas	Current	Target	Status		
CH ₄ (%)	0.0		⊘	Calibration successful All channels were adjusted successfully. • Exit - to return to Gas Mix Selection. • Retry - to try again.	
CO ₂ (%)	0.1		⊘		
O ₂ (%)	20.9	20.9	✓		
CO (ppm)	0		⊘		
H ₂ S (ppm)	0		⊘		
H ₂ (ppm)	****		⊘		
			Retry	Exit	

Note: A 'Simple Gas' reading is a way of creating a recordable and downloadable composition only reading to document a calibration check event. Refer to 8.3 Special action for more details about 'Simple Gas' Readings.


9.6.1 Adding / Deleting Gas Mixtures


If your instrument is capable of measuring gases other than Methane, Carbon Dioxide, and Oxygen, then it will be necessary to define the additional span gases that you will use to calibrate your instrument. The following will demonstrate how to add a gas mix and delete a gas mix.

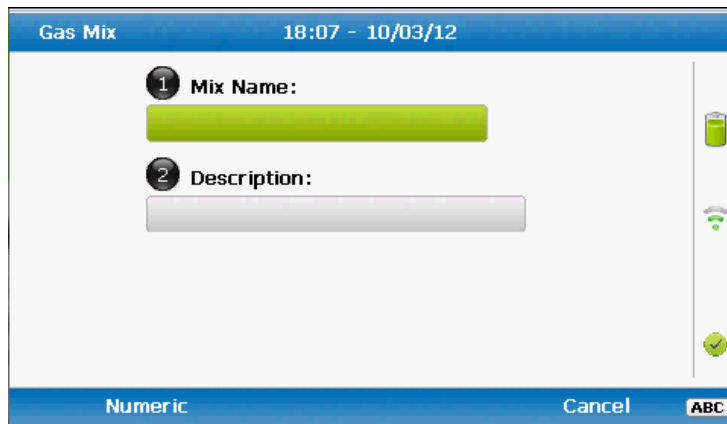
Adding a "Span Target" for H₂S

From the "Select Gas Mix" screen choose 'Add'


Select Gas Mix		18:07 - 10/03/12	
Fresh Air	Gas mixture detail		
Pure N2	Mix Fresh Air		
CH4 High	CH ₄ (%) : 0.0	CO (ppm) : 0.0	
CH4 Low	CO ₂ (%) :	H ₂ S (ppm) : 0.0	
Oxygen Low	O ₂ (%) : 20.9	H ₂ (ppm) : 0.0	
Oxygen High	Description: Open Air (Pumped)		
		Edit	Add
			Exit



The Gas Mix Screen will appear. Press the  key to allow for the editing of the Mix Name. Typically the last mix name defined will appear. Press any key to change the mix name and the Delete Key will

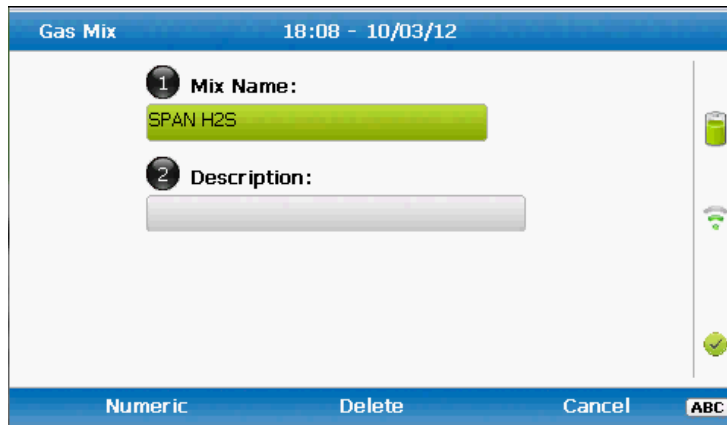
appear. You can also press the center  for 'Delete'.



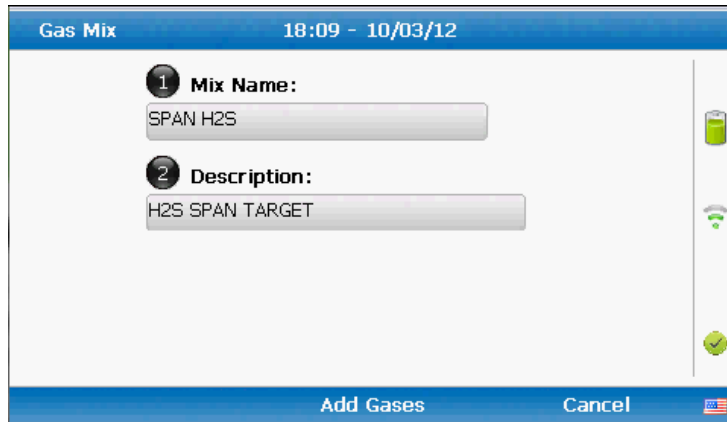
Using the instrument keypad, tap out the Mix Name. The entry process is very similar to entering a text message on a cell phone's numeric keypad.


For example, to enter the Mix Name of “SPAN H2S” you would enter in the following key sequence on the numeric keypad. If you make a mistake press the center  for Delete even if it is not labeled on the screen.

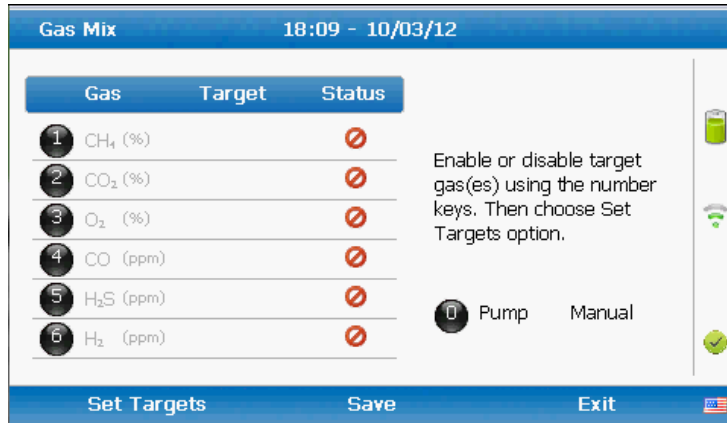
Sequence	Result
7 7 7 7	S
7	P
2	A
6 6	N
0	{space}
4 4	H
2 2 2 2 or press  for Numeric then 2	2
7 7 7 7	S
 to end the entry for the Mix Name	



Now press  to begin editing the Description. Follow the same process to enter the Description as for the Mix Name.

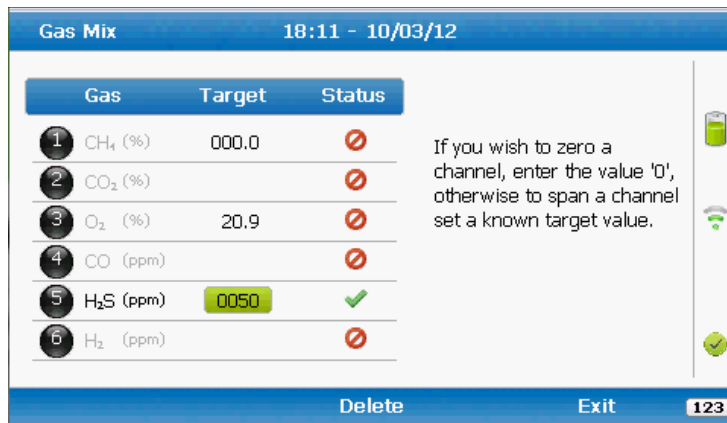


Press “Add Gases” to define what gases will be a part of this gas mix. Remember that gases should be zeroed and then spanned. With this basic rule this span gas for this example will be defined for H₂S and not for any other gases. Press the  button to toggle the pump between ‘Manual’ and ‘Automatic’ operation of the pump. As a general rule, if the gas is in a calibration gas cylinder then this should be set to ‘Manual’. If the gas is atmospheric or in a non-pressurized container such as a Tedlar bag then the pump should be set to ‘Automatic’. Irrespective of the pump definition in the Gas Mix setup, it can be overridden while checking and calibrating with gases.



Press the number corresponding to the desired gas to edit. Press **5** set H₂S as a gas that will be targeted for this gas mix. Once targeted a will appear in the Status column indicating this gas has been targeted. A indicates the gas is NOT targeted and will be ignored during the check or calibration. Once all gases are selected for targeting press 'Set Targets' to edit the concentrations for each of your targeted gases.

Press the 5 key to edit the target value for H₂S. To set the target to 50ppm you will need to enter in '0 0 5 0'.

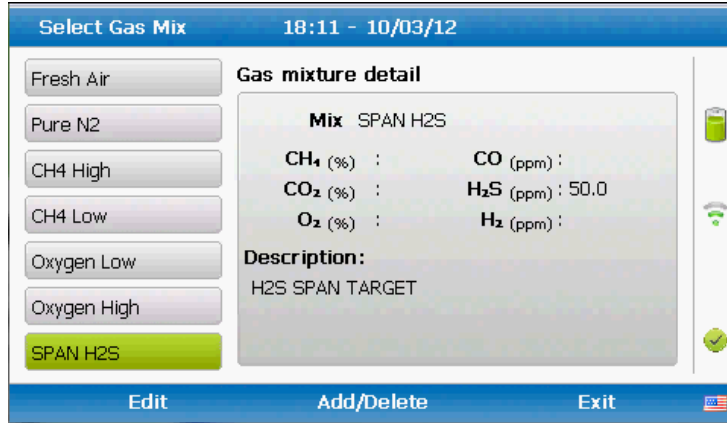


To leave the editing for H₂S press .

Once all gases are entered, the option for 'Save' will appear

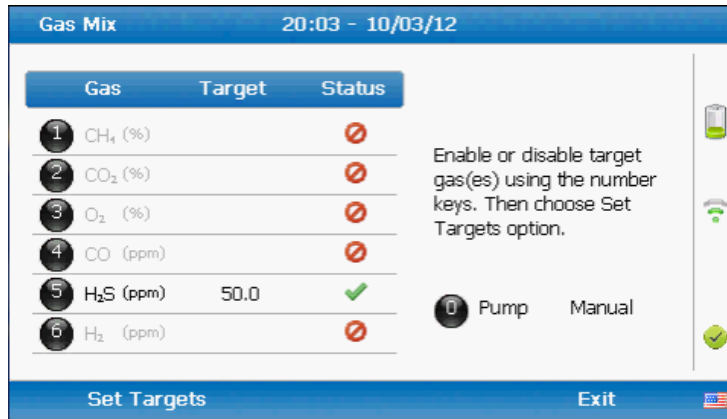


Press 'Save' then exit to return to the "Select Gas Mix" screen. You will now see your newly created gas appear.

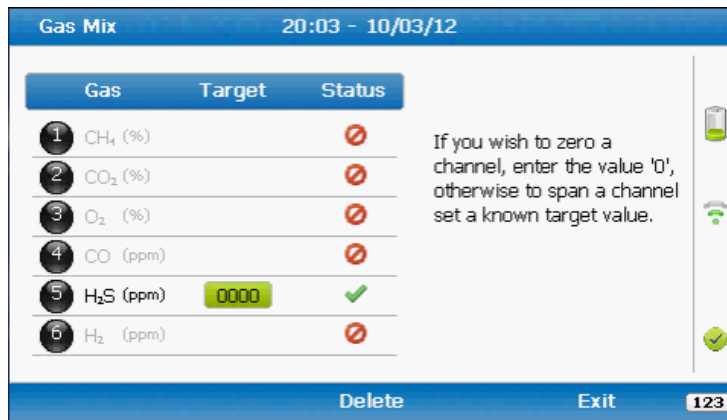


Editing a Gas Mix's value(s)

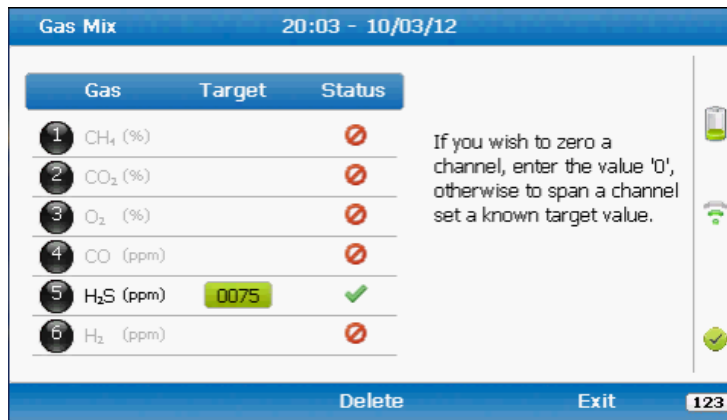
Editing a gas mix is similar to adding a gas mix. To begin, press the 'Edit' button to edit the presently selected gas.




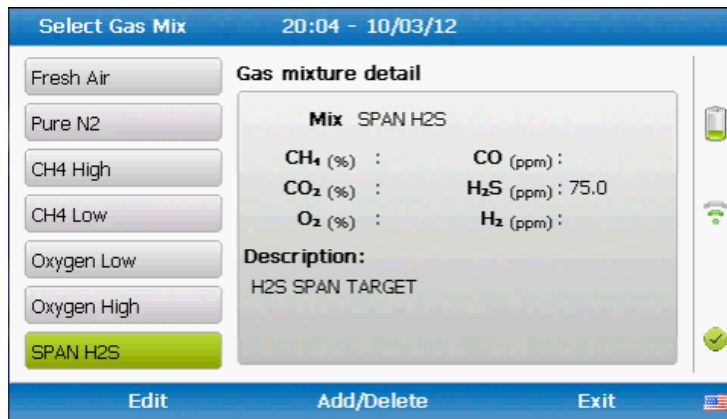
If an additional Target gas is needed press the corresponding gas number **1**, **2**, **3**, **4**, **5**, or **6**. This example will simply change the concentration for H₂S. Press 'Set Targets' to be able to edit the concentration of the Target gases. Press the **5** key to begin editing the H₂S target.



Enter in '0 0 7 5' for the new H₂S concentration.



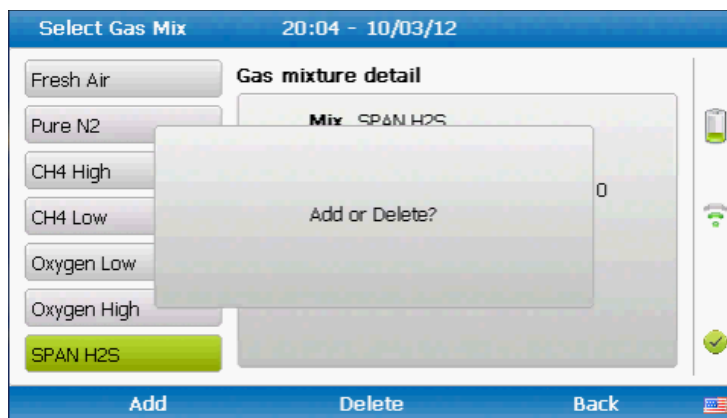
Press  to end editing of the current Target gas. Press Save to save the current edits. Once the current edits are saved, press Exit to return to the 'Select Gas Screen'. The edited Gas Mix will display the new values.



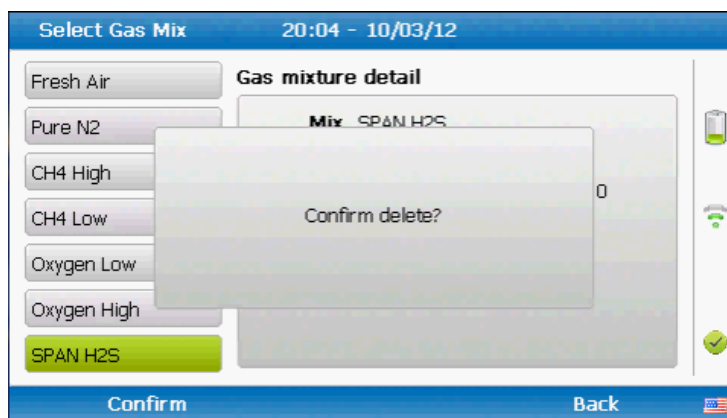
If the edited values do not display as expected, simply repeat the process ensuring to Save the values before exiting.

Deleting a "Gas Mix"

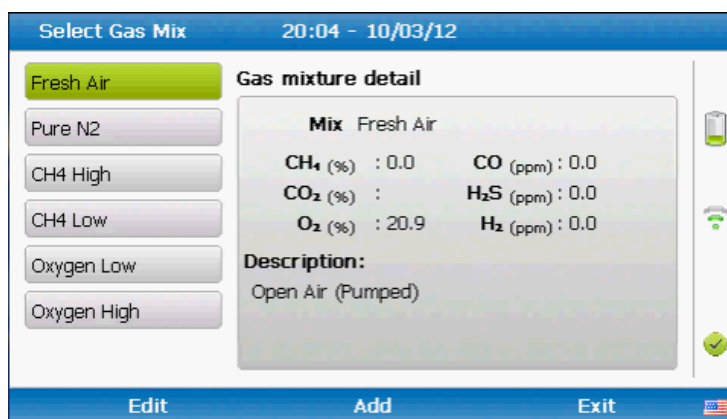
Deleting a Gas Mix is simple. Press the Add/Delete button from the 'Select Gas Mix' screen.



Choose Delete. If the proper gas is selected for deletion, press 'Confirm' otherwise press 'Back'.



Once the Confirm button is pressed the gas mix will be deleted from the list and the first gas mix on the screen will become the currently selected mix.



9.6.2 Restore to factory



Restore to factory

This option will reset the gas analyzer to all of its factory programmed settings and will clear ALL the user defined calibration points.

If in any doubt please contact Technical Support at +1 (909) 783-3636 or email: technical@landtecna.com.

- 1) Select the 'Menu' key.
- 2) Select soft-key 'Operation Settings'.
- 3) Select 'Key 2 - Gas Check'.
- 4) Select 'Key 3 - Restore to factory' followed by the soft-key 'Confirm' or 'Cancel'.
- 5) A validation message is displayed 'Reset user calibration?' Press the soft-key 'Confirm' to continue with the factory settings or soft-key 'Cancel' to cancel the operation and return to the Gas Check menu.

9.7 Gas Check / Calibration history



The GEM5000 gas analyzer has the facility to log user calibrations. These are visible within the instrument. At this time LANDTEC System Gas Analyzer Manager (LSGAM) is not able to download the user calibration information. To view the Gas Check information.

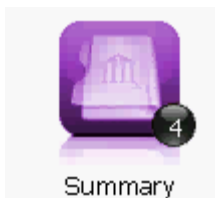
Select the 'Menu' key.

- 1) Select soft-key 'Operation Settings'.
- 2) Select 'Key 1 - Gas Check'.
- 3) Select 'Key 3 - History'.

Cal History		18:11 - 10/03/12		45 / 46	
ID: 61		10/01/12 14:34:25			
Calibration Type: User Zero Cal		Calibration Result: Success			
Channel	Before	After	Result		
CH4 (%)	50.06	50.00	✓		
CO2 (%)	34.74	35.00	✓		
O2 (%)	-0.12	-0.00	✓		
Filter		Exit			

- 4) The operator may view the calibration data stored. Use the soft-key 'Filter' to add a sort filter to the history enquiry.

9.8 Gas Check Summary




The GEM5000 gas analyzer has the facility to display the logged Gas Checks. These are visible within the instrument. At this time LANDTEC System Gas Analyzer Manager (LSGAM) is not able to download the History. To view the Gas Check history, perform the following:

Select the 'Menu' key.

- 1) Select soft-key 'Operation Settings'.
- 2) Select 'Key 1 - Gas Check'.
- 3) Select 'Key 4 - Summary'.

Cal History Summary 18:11 - 10/03/12				
ID	Date/Time	Technician	Type	Result
62	10/01/2012 21:36:34	JOSE MUNOZ	User Zero Chk	Passed
61	10/01/2012 21:34:25	JOSE MUNOZ	User Zero Adj	Passed
60	10/01/2012 21:29:32	JOSE MUNOZ	User Zero Adj	Passed
59	10/01/2012 21:23:05	JOSE MUNOZ	User Zero Chk	Passed
58	10/01/2012 21:08:41	JOSE MUNOZ	User Zero Adj	Passed
57	10/01/2012 21:05:38	JOSE MUNOZ	User Zero Adj	Passed
56	10/01/2012 20:45:28	JOSE MUNOZ	User Zero Adj	Passed
55	10/01/2012 20:41:34	JOSE MUNOZ	User Zero Chk	Failed

Exit 

10 Problem solving

This section outlines various warning and error messages which the operator may receive during general operation of the instrument.

For further assistance please contact Technical Support at +1 (909) 783-3636 or email technical@landtecnica.com

11 Warning and error display

When switched on the instrument will perform a pre-determined self-test sequence taking approximately 15 seconds. During this time many of the instrument's working parameters and settings are checked.

If any operational parameters are out of specification or the pre-programmed recommended calibration/service date has passed, errors or warnings may be displayed.

Use the 'Scroll up' and 'Scroll down' keys to move through the list if required.

Only three warnings/errors can be displayed at any time.

To ascertain if more errors have occurred use 'Key 8' - Scroll down' and 'Key 2' - Scroll up' 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:

1. 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.
2. Operational parameters that could affect the performance of the analyzer: Cell out of calibration, CH₄ out of calibration, CO₂ out of calibration.

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.

12 Event log

The GEM5000 gas analyzer incorporates the facility to log significant events performed on the analyzer via the 'Event Log'. This can be used as an aid to LANDTEC service staff as a diagnostic tool.

Events are stored in the event log automatically. No user intervention is required. If the log becomes almost full, a warning will be given on the start-up screen. If the log becomes full then no further events will be stored.


At the present time, the log cannot be downloaded, viewed or cleared by the LANDTEC System Gas Analyzer Manager.

✍ Note: The event log cannot be viewed directly on the analyzer.

13 Service

The GEM5000 gas analyzer should be regularly serviced to ensure correct and accurate operation. LANDTEC recommends a service and recalibration every **12 months**.

The GEM5000 analyzer is CSA and 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 CSA, ATEX, and other certifications.

 Warning	<p>If the GEM5000 is to be serviced by trained LANDTEC personnel. Service by any untrained personnel will negate service technicians serviced by unqualified engineers the CSA, ATEX, and other certifications may be invalidated and the instrument may be unsafe for use in a potentially explosive atmosphere.</p>
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User serviceable parts:

There are no user serviceable parts inside the instrument.

The following parts can be user serviced:

In-line water filter	This should be regularly inspected for obstructions, moisture 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.
Sample tubing	Always ensure that sample tubes are not contaminated or damaged.
Gas port connectors	Periodically check that the O-rings on the gas port connectors of the hoses are not damaged. A damaged O-ring can let air into the sample gas and result in incorrect readings. If the O-ring it should be replaced immediately.
H ₂ S filter material	When the filter material changes color to a <i>light grey</i> color the filter should be replaced.

13.1 *Warranty policy*


This instrument is guaranteed, to the original end user purchaser, against defect in materials and workmanship for a period of **1 year** from the date of the shipment to the user. The 1 year warranty may be extended up to 3 years with the purchase of a "Diamond Service Agreement". Please contact your LANDTEC representative for more details.

During this period LANDTEC will repair or replace defective parts on an exchange basis.

The decision to repair or replace will be determined by LANDTEC.



To maintain this warranty, the purchaser must perform maintenance and calibration as prescribed in the operating manual.

Normal wear and tear, and parts damaged by abuse, misuse, negligence or accidents are specifically excluded from the warranty.

 Note: Please contact Technical Support at +1 (909) 783-3636 for further information.

13.2 Sample certificate of calibration

This is a sample certificate of calibration supplied at the time of purchase and updated when the instrument is serviced.

CERTIFICATION OF CALIBRATION																																									
ISSUED BY: Landtec North America Instrument Services Facility Date Of Calibration: March 6, 2012 Certificate Number: G500038_6/6442																																									
		 No. 66916 Page 1 of 2 Approved By Signatory Jose Munoz Laboratory Inspection																																							
Landtec North America Instrument Services Facility, 850 South Via Lata, Suite 112, Colton CA, 92324 Web site: www.landtecnica.com																																									
Customer:	LANDTEC Valued Customer																																								
	850 S Via Lata Suite 112 Colton, CA 92324																																								
Description:	GEM5000	Model: GEM5000 Serial Number: G500038																																							
Accredited Results:	<table border="1"> <thead> <tr> <th colspan="3">Methane (CH₄)</th> </tr> <tr> <th>Certified Gas (%)</th> <th>Instrument Reading (%)</th> <th>Uncertainty (%)</th> </tr> </thead> <tbody> <tr> <td>50.01</td> <td>50.01</td> <td>1.10</td> </tr> <tr> <td>15.02</td> <td>15.02</td> <td>0.66</td> </tr> <tr> <td>5.00</td> <td>5.00</td> <td>0.42</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Carbon Dioxide (CO₂)</th> </tr> <tr> <th>Certified Gas (%)</th> <th>Instrument Reading (%)</th> <th>Uncertainty (%)</th> </tr> </thead> <tbody> <tr> <td>49.99</td> <td>49.94</td> <td>1.20</td> </tr> <tr> <td>14.99</td> <td>14.67</td> <td>0.71</td> </tr> <tr> <td>4.99</td> <td>4.76</td> <td>0.43</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Oxygen (O₂)</th> </tr> <tr> <th>Certified Gas (%)</th> <th>Instrument Reading (%)</th> <th>Uncertainty (%)</th> </tr> </thead> <tbody> <tr> <td>21.01</td> <td>21.05</td> <td>0.25</td> </tr> </tbody> </table>		Methane (CH ₄)			Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)	50.01	50.01	1.10	15.02	15.02	0.66	5.00	5.00	0.42	Carbon Dioxide (CO ₂)			Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)	49.99	49.94	1.20	14.99	14.67	0.71	4.99	4.76	0.43	Oxygen (O ₂)			Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)	21.01	21.05	0.25
Methane (CH ₄)																																									
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)																																							
50.01	50.01	1.10																																							
15.02	15.02	0.66																																							
5.00	5.00	0.42																																							
Carbon Dioxide (CO ₂)																																									
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)																																							
49.99	49.94	1.20																																							
14.99	14.67	0.71																																							
4.99	4.76	0.43																																							
Oxygen (O ₂)																																									
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)																																							
21.01	21.05	0.25																																							
Gas cylinders are traceable and details can be provided if requested. CH ₄ , CO ₂ 33.2°C/91.7°F Barometric Pressure: 28.73"hg O ₂ readings recorded at: 24.1°C/75.4°F																																									
Method of Test: The analyser is calibrated in a temperature controlled chamber using reference gases.																																									
<i>The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.</i>																																									
<small>This certificate is issued in accordance with the laboratory accreditation requirements of the National Institute of Standards and Technology. It provides traceability of measurement to recognized national standards, and to units of measurement realized at the National Institute of Standards and Technology or other recognized national standards laboratories. Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.</small>																																									

CERTIFICATION OF CALIBRATION

PJLA ACCREDITED CALIBRATION LABORATORY NO. 66916

Certificate Number
G500038_6/6442

Page 2 of 2

Non-Accredited results:

Barometer (mb)	
Reference	Reading
0975mb / 28.80"hg	0973mb / 28.73"hg

Sample

As received gas check readings:

Methane (CH4)	
Certified Gas (%)	Instrument Reading (%)
60.01	59.72
15.02	14.98
5	4.98

Carbon Dioxide (CO2)	
Certified Gas (%)	Instrument Reading (%)
39.99	40.11
14.99	15.00
4.99	4.98

Oxygen (O2)	
Certified Gas (%)	Instrument Reading (%)
21.01	20.70

As received Gas readings recorded at: 24.28°C/75.7°F

As received Barometric Pressure recorded at: 29.01 "hg

As received gas check readings are only recorded if the instrument is received in a working condition. Where the instrument is received damaged no reading can be taken.

End of Certificate

13.3 *Important notice to all customers*



The recycle bin symbol displayed on the instrument signifies that the apparatus must not be disposed of through the normal municipal waste stream but through a recycling process.


When your instrument is at the end of its life, please contact the Sales team at LANDTEC for advice on the next step in order to properly dispose of the instrument.

14 Glossary of terms

5000 series	The 5000 series refers to the GA5000, GEM5000 and the Biogas5000 gas analyzers.
Accu-Flo	A flow device used to aid in accurate flow measurement. Accu-Flo is a wellhead flow measurement product manufactured by LANDTEC and its flow characteristics are pre-programmed in the GEM
Altitude	The height above sea level.
Analyzer error messages	<p>Operational errors are prefixed on the analyzer by the word ERROR followed by an error code.</p> <p>Refer to the list of standard error codes for more information.</p>
Analyzer warning	Analyzer warnings are prefixed by the word WARNING followed by a relevant description. There are two types of warning messages displayed; general warnings that may not necessarily affect the instrument's function (for example, battery power low) and operational parameters that could affect the performance of the analyzer (for example, CH ₄ out of calibration).
ATEX certification	The GEM5000 is ATEX certified to zone 1 & 2 areas above ground not in mines.
Auxiliary channel	This refers to the channels where external devices will be connected or displayed.
Backlight	The analyzer has a built-in backlight for low ambient light conditions. This can be toggled on/off using the backlight key.
Barometric pressure	The atmospheric pressure at the given location.
Bearing	Direction for GPS.
Device ID, Well, Probe, or Sample Port	Typical location from which a gas sample is obtained.
Calibration	The gas analyzer is carefully calibrated against known standards.
Calibration record	The GEM5000 instrument has the facility to log user calibrations as a validation tool.

Calorific value	The amount of heat released during combustion. Simply thought of as Energy.
CH₄	Methane
Chemical cells	A method of gas detection that works on the basis of a chemical reaction with the target gas.
Clean air purge	Process used to clear out gas from the sample tube and analyzer prior to taking a new reading.
CO	Carbon monoxide
CO₂	Carbon dioxide
Device ID	See ID
Download	Terminology used for the movement of data from the analyzer to the LSGAM application on the PC.
Dual beam infrared absorption	Method of gas detection by measuring how much infrared is absorbed by the target gas.
Event log	<p>Used as an aid to monitoring the use of the analyzer. It can also be used as a diagnostic tool.</p> <p>The event log can be viewed via LANDTEC System Gas Analyzer Manager. It <u>cannot</u> be viewed on the analyzer screen.</p>
Exhaust port	The usual manner for the gas to exit the analyzer is via the exhaust port located on the top side of the analyzer. This port should have an exhaust tube attached.
Exhaust tube	Tubing used to expel gases from the exhaust port. LANDTEC supplies a yellow colored hose for this purpose.
Factory settings	Default settings preset at time of manufacture or service.
Firmware	Firmware is the term by which the internal analyzer software is known and is not accessible by the client. The firmware is updated to the latest version when the analyzer is returned to LANDTEC under a service agreement.
Flow measurement	Flow measurements are on a volume flow rate SCFM or m ³ /hr.
Flow port	For the measurement of gas flow at the sample point.
Gas channels	The gases that are analyzed by the instrument.

Gas velocity	The positional rate of change of the gas. Measured using the optional anemometer.
General warnings	Displayed throughout the documentation with a warning symbol. Warning information may affect the safety of operators.
H₂	Hydrogen
H₂S	Hydrogen sulfide
H₂S filter	Filter required for removal of H ₂ S. When the filter material changes color to a light grey color or if H ₂ S values are displayed, then the filter should be replaced.
HDOP	Horizontal Dilution of Precision—a measure of the position indicated by the GPS.
Horizontal Error (HError)	The estimated horizontal error for the position indicated by the GPS at a given moment in time.
Hydro-carbons	Organic compound consisting of only hydrogen and carbon.
ID or Device ID	The user definable identification tag “Device ID” allocated to a sample point (well, probe or sample port).
In-line water filter	The component used to help protect the instrument from liquid ingress.
LANDTEC System Gas Analyzer Manager	Also referred to as LSGAM. PC based software which enables the operator to upload and download information to/from the analyzer. LANDTEC System Gas Analyzer Manager enables operators to maximize the operation of their gas analyzer. It features a simple upload and download facility and is fully compatible with the latest Microsoft™ operating systems.
Latitude or LAT	Latitude displays as degrees, minutes, seconds and decimal seconds. The equator is zero.
LCD display	Liquid Crystal Display
LEL	Lower Explosive Limit. Lower explosive limit of methane in air. 5% methane in air is the point at which it becomes explosive. 100% LEL equates to 5% methane.

Longitude or LONG	E (East) or W (West) displays the longitude as degrees, minutes, seconds, and decimal seconds. The Greenwich meridian defines the zero point.
m³/hr	Meters cubed per hour – volumetric flow rate measurement.
Main Gas Read Screen	The main analyzer screen for normal operations and all operations are carried out from this screen.
Material safety data sheet	Document from which information about a certain substance can be obtained. This document contains relevant health & safety information along with physical characteristics of the substance.
MCERTS certification	MCERTS is the UK Environment Agency's Monitoring Certification Scheme. The scheme provides a framework within which environmental measurements can be made in accordance with the Agency's quality requirements. The scheme covers a range of monitoring, sampling and inspection activities.
Memory	Location where data and ID information is stored. The analyzer memory should not be used as a permanent storage medium. Stored data should be regularly transferred using the LSGAM download software.
NO₂	Nitrogen dioxide
Operating language	The operator can choose the default operating language for the analyzer. Choices are English, Spanish, and Portuguese.
PPM	Parts per million
Pump	Used to draw the gas sample from the sample point to the analyzer. Select the pump key  on the analyzer to activate.
Relative pressure	The pressure at the sample point 'relative' to atmospheric (barometric) pressure.
Relative pressure transducer	The internal component used to measure the relative pressure.
Sample tube	The tube used to obtain a sample of gas from the sample point to the analyzer.
Satellite	This is the number of satellites that the system can select. Four satellites will give a reasonable position. Eight or more satellites will increase the position of

	the accuracy. (lower HError, VError and HDOP numbers)
SCFM	Standard Cubic Feet per Minute – Volumetric Flow Rate
Status Span	Overall representation of the GPS Signal Quality. The point at which the gas analyzer is calibrated when a known quantity of the target gas is present.
Span multi gas	Term by which the span calibration of the three main gas channels is known. This option must only be used when the calibration gas being used is a combination of CH ₄ CO ₂ O ₂ .
Technician ID	An alpha-numeric code tagged to each gas reading.
Temperature probe	External device used to measure the gas temperature at the sample point. This is optional.
Update site data	Enables the operator to answer pre-defined questions relating to the site, environment etc. These questions are defined via 5GAM software.
Upload	Terminology used for the movement of data from the PC via GAM software application to the analyzer.
UTC Time	Coordinated Universal Time (UTC) received from the satellite and displayed as Greenwich Mean Time (GMT).
Vertical (VError)	An estimate of the amount of vertical error on the GPS indicated position.
Volume flow rate	The volume of a gas that passes through a given surface per unit of time e.g. m ³ /hr
Warm-up self-test	Pre-determined self-test sequence to test the analyzer functions which takes place after the analyzer is switched on.
Warranty	The instrument is under guarantee against defect in materials and workmanship for a period of 3 years from the date of shipment to the operator and is subject to the recommended service and recalibration requirements.
Water trap	Device used to protect the instrument from water or moisture ingress.
Zero	The point at which the gas analyzer is calibrated when there is none of the target gas present.
Zero transducers	This option allows the relative pressure transducer to be zeroed.

15 Appendix—Configuring Communication Connections

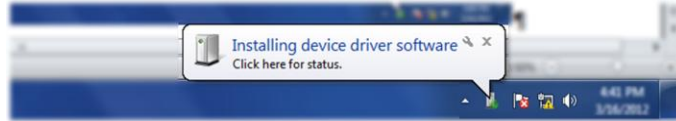
15.1 Legacy Serial Communications Driver Installation

The instrument supports two modes of communication “Legacy” and “GA5K”. At present the instrument communications software will only communicate in the “Legacy” communications mode.

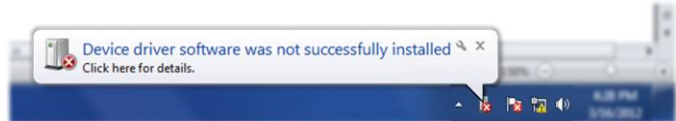
IMPORTANT: Irrespective of operating system, the instrument will need to be set to Legacy communications mode. The drivers will need to be installed using a Windows login account with administrative privileges. If more than one instrument is connected to the computer, it will automatically install the software for the second instrument because an administrator has already installed it initially. Each instrument on a given computer will have a unique COMxx port assigned to the instrument. COMxx port assignments are unique to the computer and not to the instrument. This means the one instrument may be COM17 on a desktop computer and COM6 on a laptop computer.

15.1.1 Windows 7

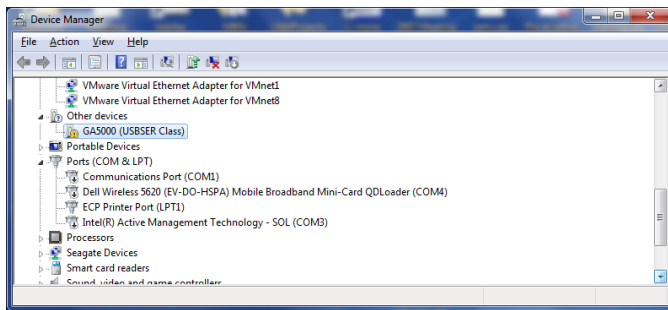
Upon plugging in the cable you'll see the following bubble appear near the system tray.



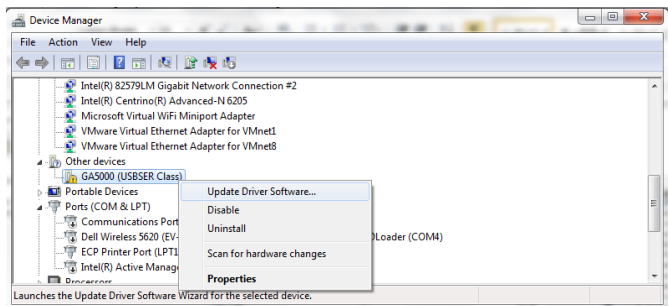
Then you'll see that the software fails.



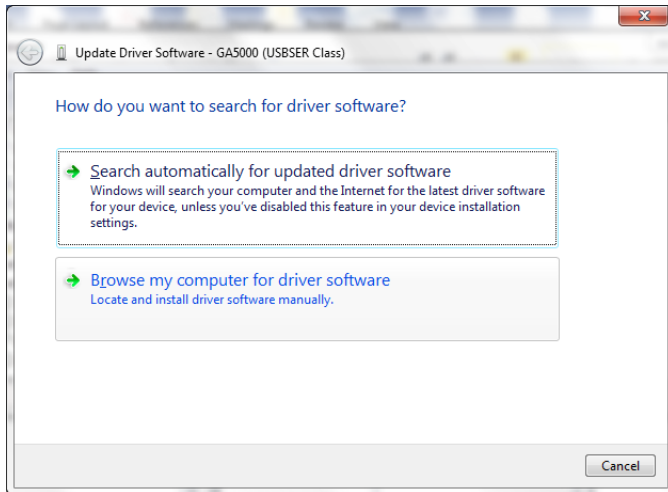
After it fails, click **Start** then enter **devmgmt.msc** into the search box and press **Enter**. The device manager will open.



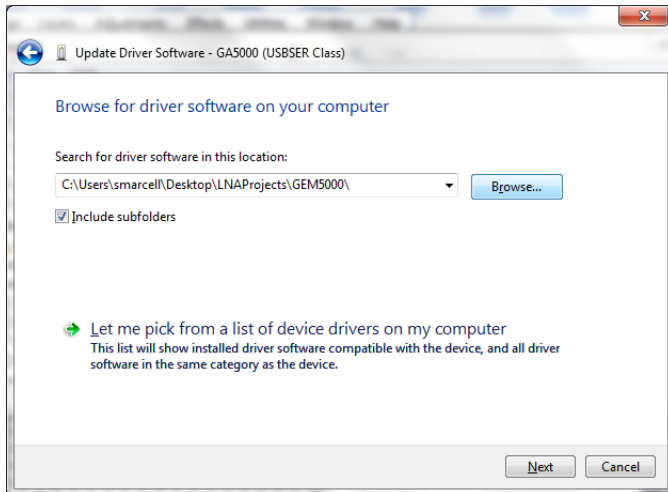
Look for any items in the tree with an exclamation point.



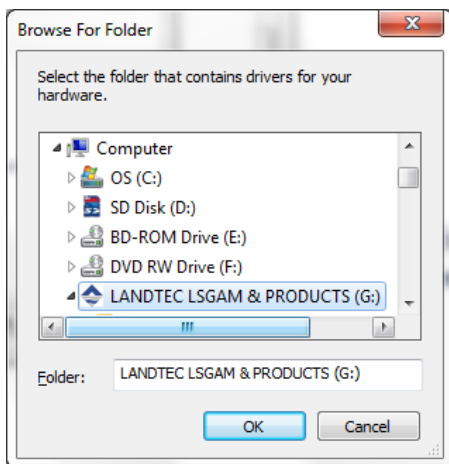
Find an entry named **GA5000 (USB SER Class)**. Then **right click** and choose **Update Driver Software**.



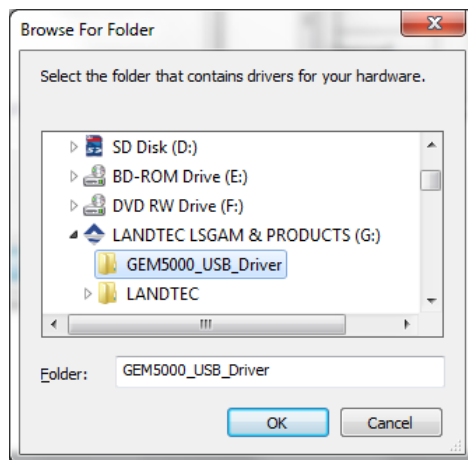
Click on the section titled **“Browse my computer for driver software”**.



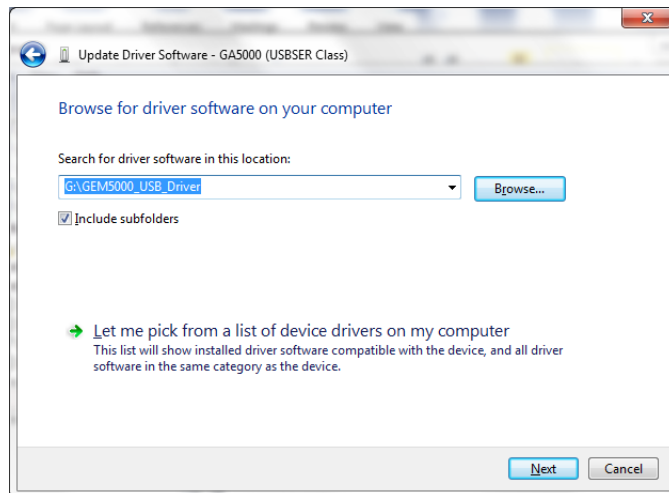
Click on the **Browse** button.



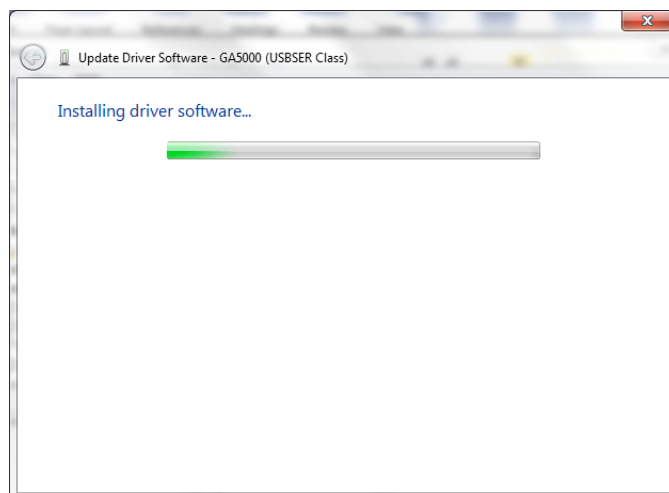
Browse to the drive containing your memory stick or CD-Rom for LSGAM.



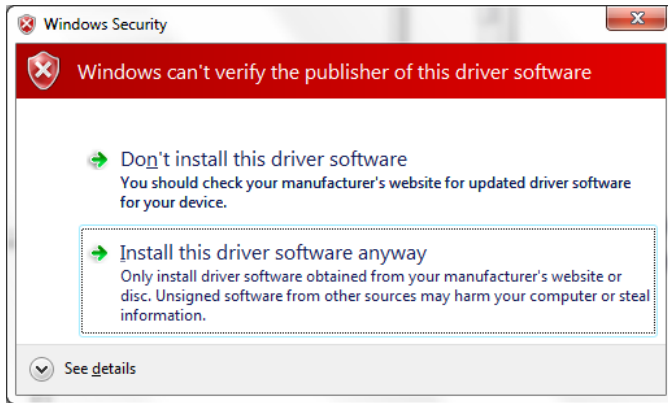
Expand the memory stick or CD-Rom containing the **LANDTEC LSGAM & Products** and browse down one level and **click** on **GEM5000_USB_Driver** to select it. Once the GEM5000_USB_Driver is selected. **Click** on the **OK** button.



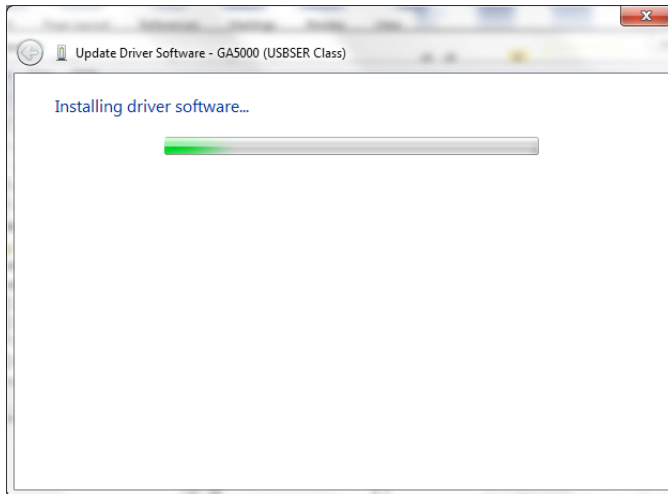
Click **Next** to continue.



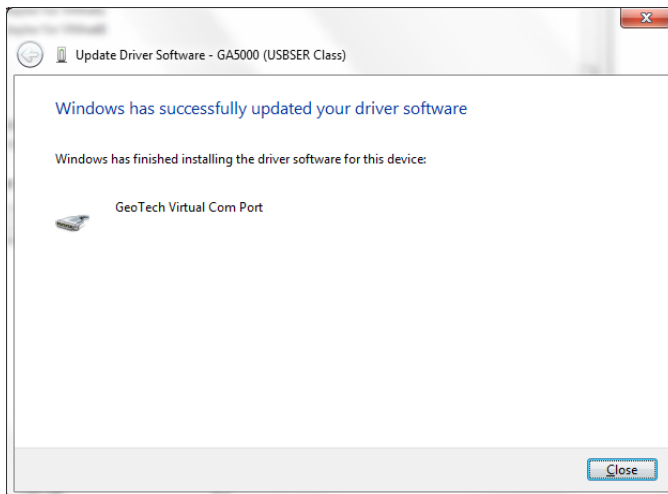
The drivers will begin to install. Eventually a warning will pop-up indicating that the publisher of the driver software can not be verified.



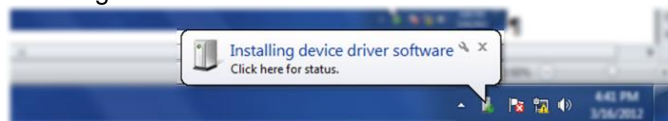
Click on the “Install this driver software anyway” section of the box.



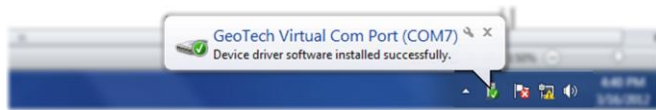
The software will continue to install.



Eventually it will indicate “GeoTech Virtual Com Port” or “LANDTEC Virtual Com Port” has finished installing the driver software for the device.



In the systray a bubble will pop-up indicating “Installing device driver software”. Unlike the first time this popped up, it will be able to complete the process.



The previous bubble will disappear and an additional bubble will appear indicating the **GeoTech Virtual Comp Port (COMxx)** or **LANDTEC Virtual Comp Port (COMxx)** is installed successfully.

15.1.2 Windows XP

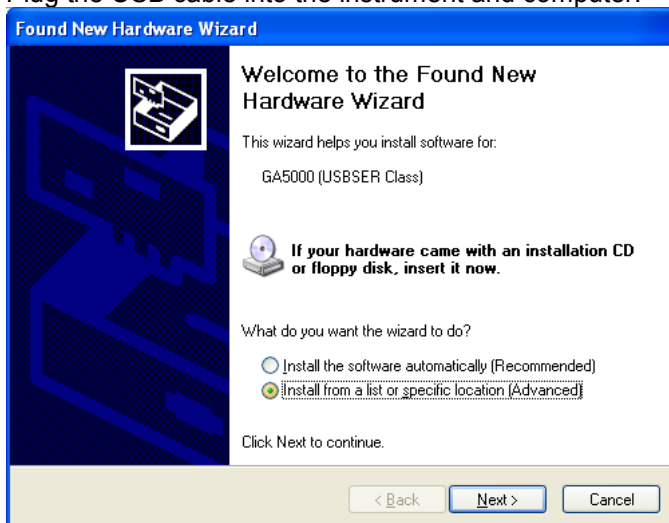
To install the serial drivers you will need to do the following:

Turn on the instrument without the USB cable plugged in. Wait for the self test to complete and press the **Next** soft-key. On the instrument press the **menu** key. Then press the appropriate soft-key until you get to the **device settings** menu. Press 3 for Device Information. Ensure the Comms is set to Legacy. If not, press the soft-key **Comms Mode**. Press the Comms Mode soft-key until the Comms item is set to Legacy.

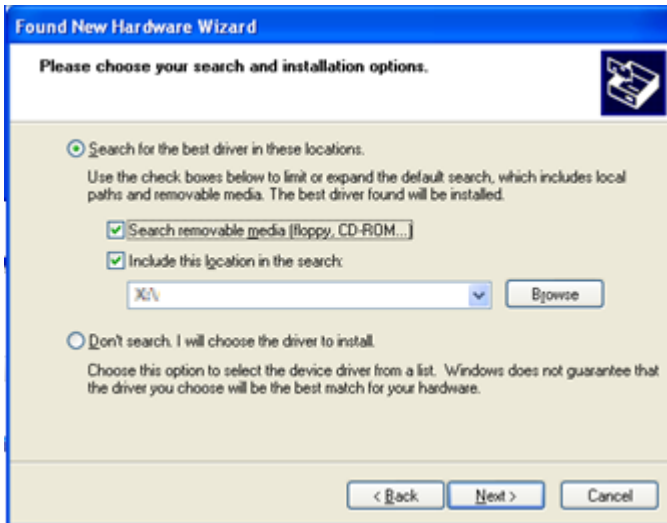


Now the instrument is ready to accept serial communications.

Plug the USB cable into the instrument and computer. The “Found new hardware” wizard should open.



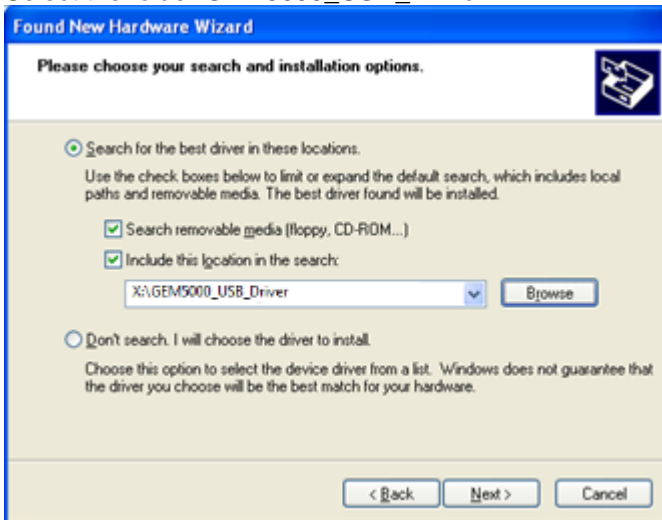
Choose the second option “**install from a list or specific location (Advanced)**” and click the **Next** button.



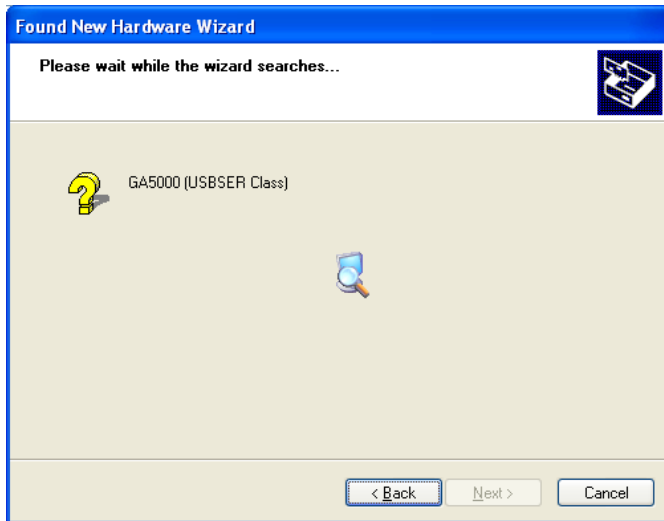
Click the browse button and navigate to the **memory stick** or **CD** with your software.



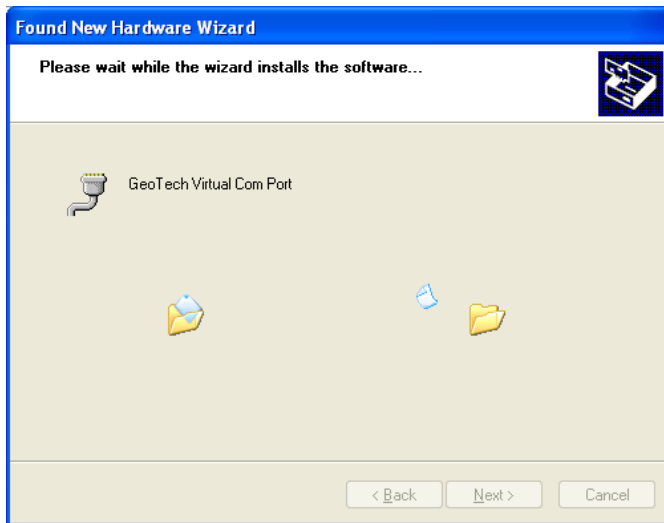
Select the folder **GEM5000_USB_Driver**.



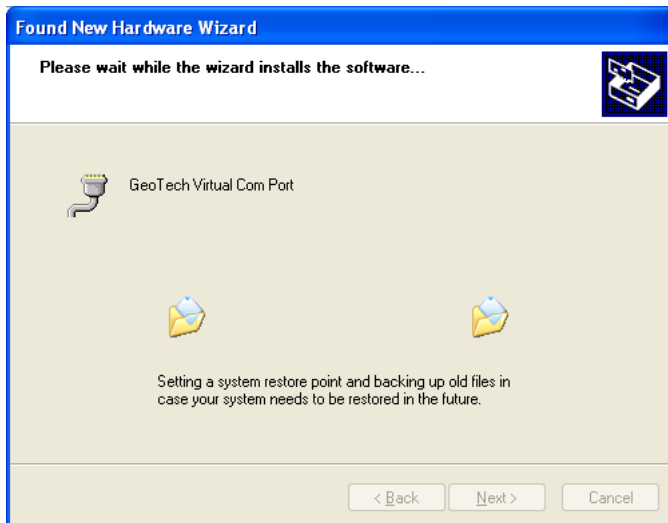
Now click the **Next** button.



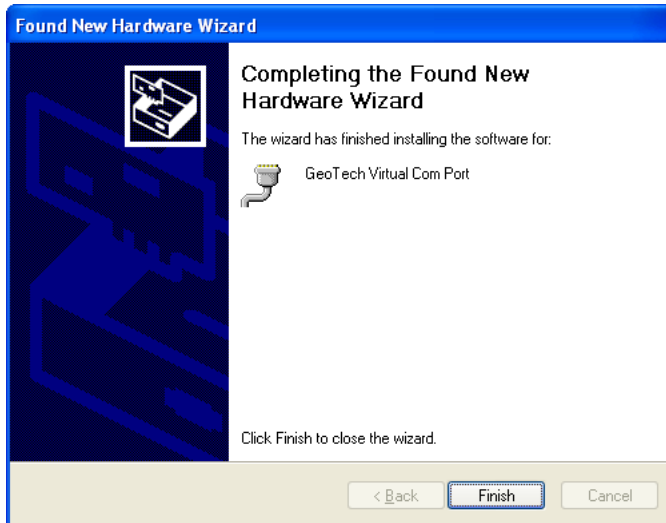
The wizard will begin the installation process and will install the GeoTech Virtual Com Port



During the installation process a warning box may appear discussing driver signing and authentication. Click the **“Continue Anyway”** button to allow Windows to complete the installation



A system restore point will be created and the process will continue.



Eventually the installation process will complete and indicate it has finished installing “**GeoTech Virtual Com Port**”. Click the **Finish** button.

15.2 Bluetooth Serial Communications

Bluetooth communications is dependent upon having a Bluetooth radio transmitter connected to your computer. This is typically built in on many laptops by the manufacturer. Most desktop computers do not have the radio transmitter built in. In such a case a USB adapter is often the most cost effective solution.

15.2.1 Windows 7

To pair the GEM5000 to Windows 7 first ensure the following:

- 1) The Bluetooth radio is turned on in your laptop or desktop computer. To ensure your computer is seeing your Bluetooth radio verify this in Windows Device Manager.
 - a. Click on **Start** → Search box → then type in **devmgmt.msc** and click on **OK**. Device Manager will open and you should see an item named “Bluetooth Radios” towards the top of the list.



If you do not see the Bluetooth Radios button you may not have your Bluetooth turned on. If using a Bluetooth dongle you can unplug it and plug it back in. If using a laptop, there may be a physical switch, keyboard shortcut, or other utility to turn the Bluetooth on and off. Please toggle the Bluetooth off and then on again. The Device manager should refresh and display the Bluetooth Radios menu item. If this doesn't resolve the Bluetooth radio from appearing, please consult your computer hardware manufacturer's documentation.

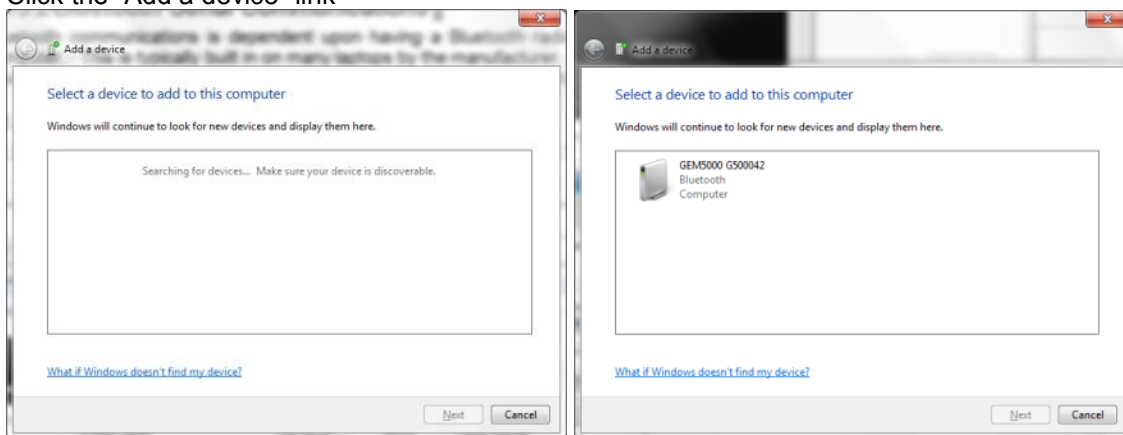
- 1)
- 2) The GEM5000 is turned on and has a green battery status indicator.
- 3) The GEM5000's Bluetooth discover is enabled. To check this, press the Menu button and then press the left or middle soft-key repeatedly until the “Device Settings” menu is displayed. Next press key-2 Bluetooth. (keep this screen open on the instrument as you will need information

from it during the pairing process).

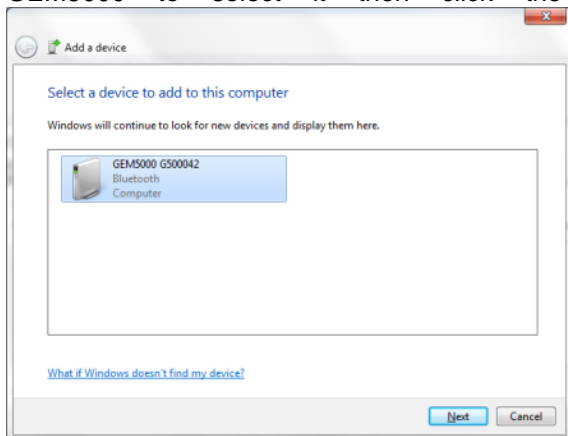
Click on **Start→Devices and Printers**.



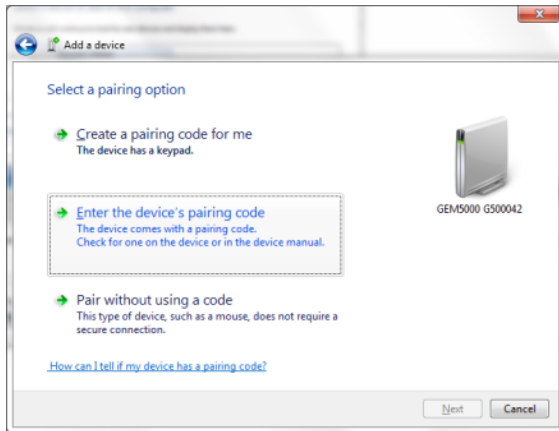
Click the "Add a device" link



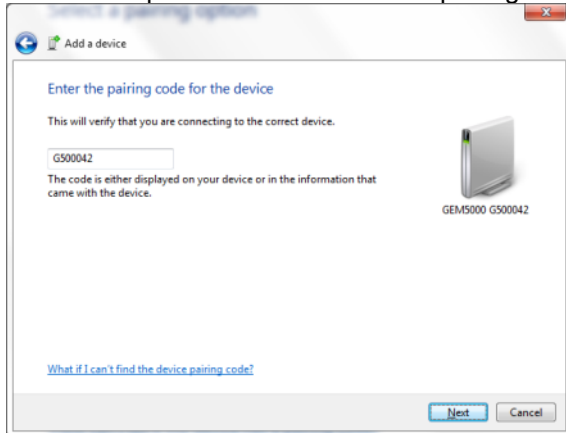
Once your instrument is seen by the computer it will appear in the Add a device dialog box. Click on the GEM5000 to select it then click the next button to complete the pairing process.



Click Next to continue



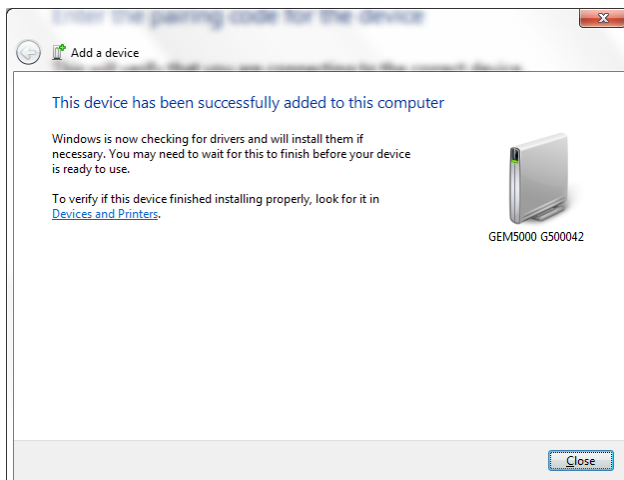
Select the option "Enter the device's pairing code", then click next.



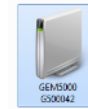
The pairing code can be found on the Bluetooth screen of the Instrument.

Note: the pairing code is cAsE sEnSitive and must be entered exactly as shown on the instrument.

Click Next.



The device should successfully add to the computer. Click the close button.



A new icon will appear in the printers and devices window under the section Devices.

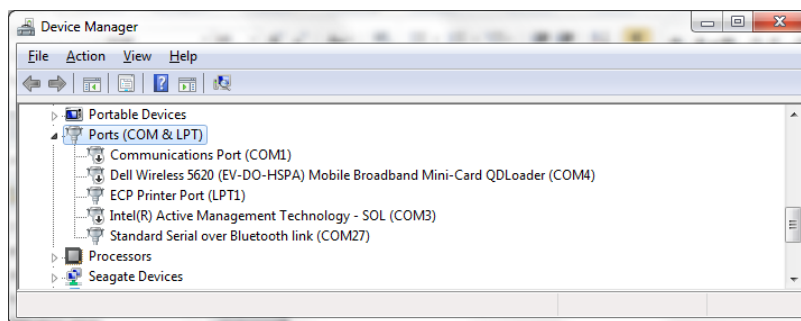
To verify the hardware configuration, you can go to device manager to see the comport which it added as. To do this you will go to **“Start”** then in the search box type in



devmgmt.msc

And press the enter key or click on OK.

Windows Device Manager will open



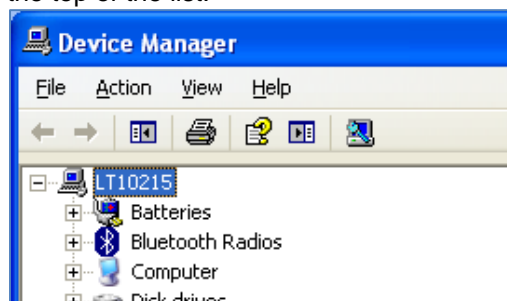
Navigate down the tree and expand the noted titled “Ports (COM & LPT)”.

You will see a “Standard Serial over Bluetooth link (COMxx)” entry in the list. This will be the communications port which LSGAM will connect to your instrument. At this point LSGAM can be started and should automatically connect. Refer to the section on [LSGAM Startup](#).

15.2.2 Bluetooth on Windows XP

To pair the GEM5000 to Windows XP first ensure the following:

- 2) The Bluetooth radio is turned on in your laptop or desktop computer. To ensure your computer is seeing your Bluetooth radio verify this in Windows Device Manager.
 - a. Click on **Start** → **Run** → then type in **devmgmt.msc** and click on OK
Device Manager will open and you should see an item named “Bluetooth Raidos” towards the top of the list.

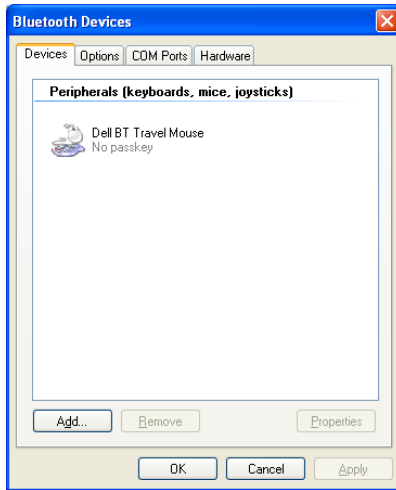


If you do not see the Bluetooth Radios button you may not have your Bluetooth turned on. If using a Bluetooth dongle you can unplug it and plug it back in. If using a laptop, there may be a physical switch, keyboard shortcut, or other utility to turn the Bluetooth on and off. Please toggle the Bluetooth off and then on again. The Device manager should refresh and display the Bluetooth Radios menu item. If this doesn't resolve the Bluetooth

radio from appearing, please consult your computer hardware manufacturer's documentation.

- 3) The GEM5000 is turned on and has a green battery status indicator.
- 4) The GEM5000's Bluetooth discover is enabled. To check this, press the Menu button and then press the left or middle soft-key repeatedly until the "Device Settings" menu is displayed. Next press key-2 Bluetooth. (keep this screen open on the instrument as you will need information from it during the pairing process).

In Windows XP there are several ways to start the Bluetooth device manager. The simplest is to Click **Start**→**Run** then type in **bthprops.cpl** and click **OK**. The Bluetooth Devices dialog box will appear



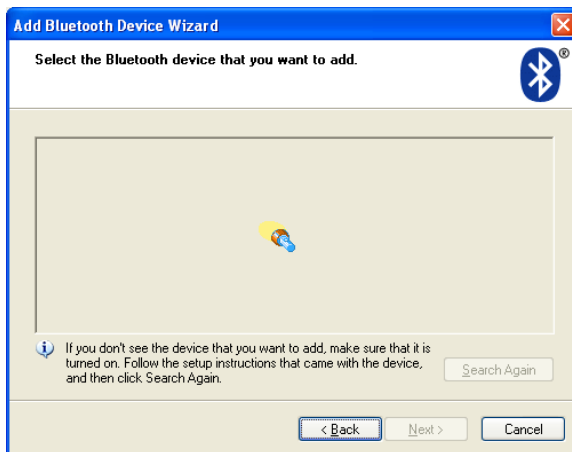
Once it appears click the **Add** button to begin the process of pairing the GEM5000 to your Windows XP computer.



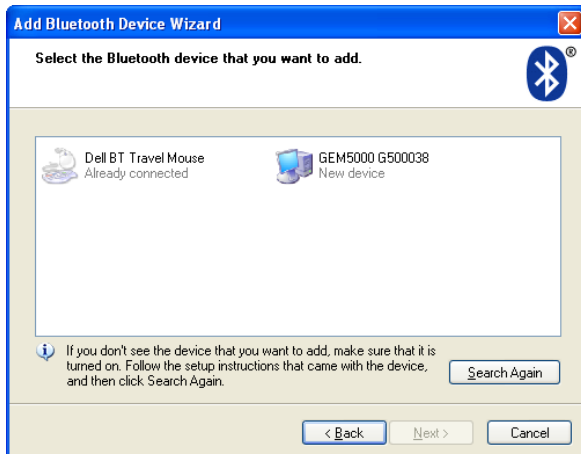
Check the checkbox in front of "My Device is setup and ready to be found."



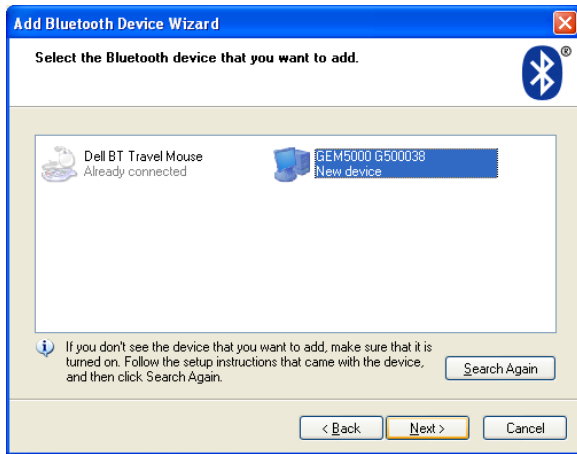
Click the **Next** button to continue.



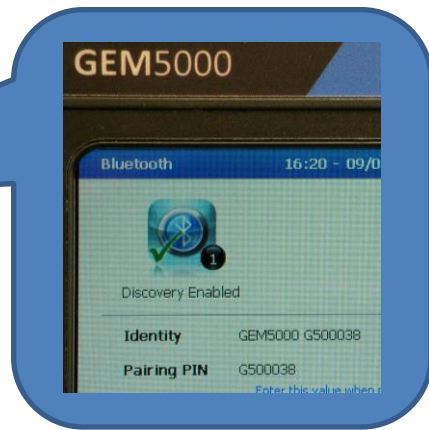
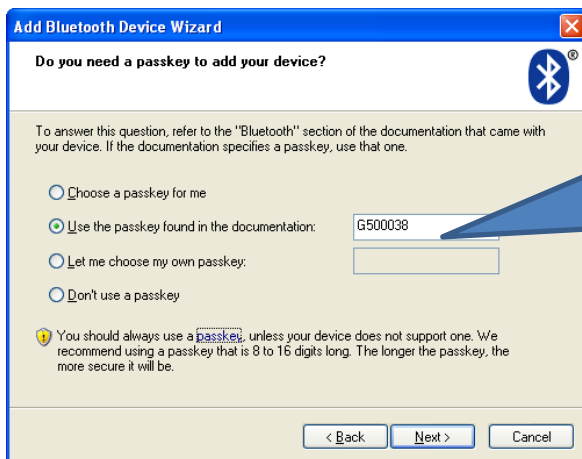
The Bluetooth Device Wizard will begin searching for devices. Depending upon the computer, other devices in the area, and other factors it may take several minutes for your computer to detect the GEM5000 instrument.



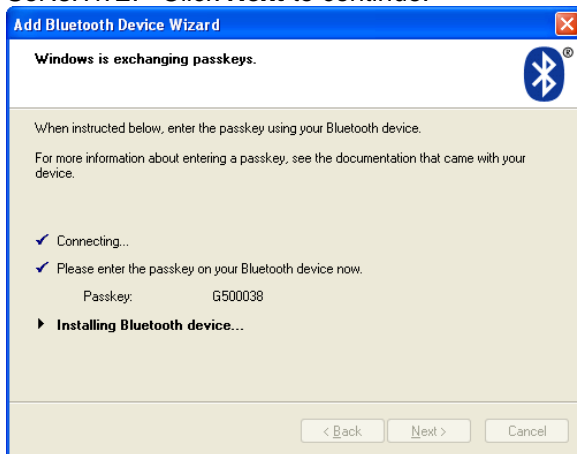
Once the search is complete it will display all discoverable devices within range of the computer.



Click on the GEM5000 computer icon. Now click the Next button to continue.

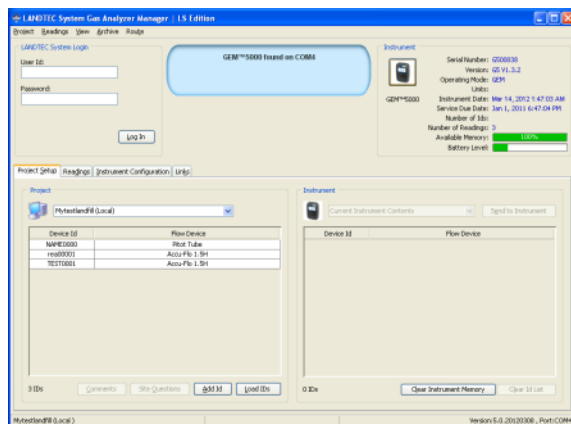


Enter in the Pairing PIN exactly as shown the instrument's Bluetooth screen. The Pairing PIN is cAse SeNsITivE. Click **Next** to continue.





Click the **Finish** button to complete the wizard. You can now start LSGAM to connect to the instrument. [Refer to section titled Start-up.](#)




There are many varied scenarios related to Bluetooth devices. Should you have difficulty in pairing your instrument to the computer you may search the internet for troubleshooting articles specific to your brand of computer. A general resource to refer to is <http://support.microsoft.com/kb/883259> for additional information related to Bluetooth on Windows XP.

16 Appendices – safety instructions

16.1 Instructions for safe use – Spanish language

Instrucciones de seguridad


 Advertencia	<p>La serie 5000 de analizadores de gas puede usarse para medir gases de vertederos y otras fuentes de la forma descrita en este manual.</p> <p>El operario puede estar expuesto a gases perjudiciales durante el uso del instrumento. La inhalación de estos gases puede ser nociva para la salud y, en algunos casos, incluso mortal.</p> <p>El usuario es responsable de garantizar que está debidamente formado en los aspectos de seguridad de los gases utilizados y que se respetan los procedimientos adecuados, especialmente en los lugares en los que se usan gases peligrosos, en los cuales el gas emitido por el analizador debe conducirse por un tubo hasta una zona en la que pueda liberarse con seguridad.</p> <p>El instrumento también puede emitir gases peligrosos si se purga con aire limpio.</p>
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☞ Nota: los analizadores de gas son instrumentos especialmente delicados del equipamiento científico y deben tratarse con especial cuidado. Un uso del equipo no conforme a las especificaciones del fabricante podría afectar al sistema de protección.

La serie 5000 de los analizadores de gas cumple las estipulaciones establecidas en la Parte 15 de la normativa de la FCC. El funcionamiento depende de las dos condiciones siguientes:

- 1) El instrumento no debe causar interferencias perjudiciales.
- 2) El instrumento debe admitir cualquier interferencia que pueda recibir, incluidas aquellas que podrían causar un funcionamiento no deseado.

En cuanto a las directivas ATEX e IECEx, la serie 5000 de analizadores de gas ha recibido la certificación de clasificación de área peligrosa

 **II 2G Ex ib IIA T1 Gb (Ta = de -10 °C a +50 °C)**

Es de vital importancia que se sigan rigurosamente las instrucciones. El operario es responsable de determinar la noción de protección y la clasificación necesaria para cada aplicación específica.

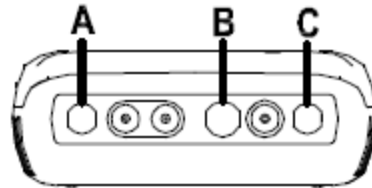
Instrucciones de seguridad (español)

(Directiva europea ATEX de referencia 94/9/CE, anexo II, 1.0.6.)

Las siguientes instrucciones se aplican a los instrumentos cubiertos por los números de

certificado SIRA 11ATEX2197X y la norma IECEx SIR 11.0089X:

- El instrumento puede utilizarse con gases y vapores inflamables con el grupo de aparatos IIA y la clase de temperatura T1.
- El instrumento sólo está certificado para su uso a temperatura ambiente, comprendida entre -10 °C y +50 °C, y no debe utilizarse a diferentes temperaturas.
- El instrumento no debe usarse en lugares con una concentración de oxígeno superior al 21 %.
- La reparación del instrumento ha de realizarse de acuerdo con el código profesional aplicable.
- Si se utiliza en un área peligrosa, utilice solo la sonda de temperatura TP-5000 (SIRA 11ATEX2197X e IECEx SIR11.0089X). En cuanto al conector C, utilice el anemómetro GF5.4 (BVS 04ATEXE194) únicamente con ATEX. En las mencionadas zonas de riesgo, el analizador no debe conectarse a ningún otro aparato en el área peligrosa, incluidos el cable USB-5000 (conector A) o el cargador de batería GEM5000 BC (conector B) suministrados con el propio analizador.



No cargar, recargar o abrir en lugares en los que exista riesgo de explosión. En áreas peligrosas, utilice solo la "sonda de temperatura TP-5000" en el conector B.

**Conector C (Uo=10 V, Io=5 mA, Po=50 mW, Ci=0, Li=0, Co=100 uF, Lo=1000 mH),
Conector B (Uo=5 V, Io=6 mA, Po=7 mW, Ci=0, Li=0, Co=100 uF, Lo=1000 mH)**

**SUMINISTROS MÁXIMOS NO PELIGROSOS:
Conector A - Um=6 V Conector B - Um=10,1 V**

- En caso de riesgo de contacto con sustancias agresivas, p. ej. líquidos o gases ácidos que pueden atacar a los metales o disolventes que pueden afectar a los materiales poliméricos, el usuario es responsable de adoptar las medidas de precaución adecuadas, como las comprobaciones periódicas que sean necesarias como parte de las inspecciones rutinarias o determinar, a partir de la hoja de especificaciones del material, su resistencia a determinados productos químicos que puedan anular sus cualidades de protección, gracias a lo cual se asegura que el tipo de protección no queda comprometido.
- El intervalo de presión relativa es +/- 500 mbar. Tenga en cuenta que, sin embargo, la presión de entrada no debería exceder +/- 500 mbar ni la presión de salida +/- 100 mbar en relación a la presión atmosférica.

Con respecto a la CSA (Canadá), la serie 5000 de analizadores de gas cuenta con la certificación de clasificación de área peligrosa

CLASE 2258 03 - EQUIPO DE CONTROL DE PROCESOS - Sistemas intrínsecamente seguros y no inflamables - Para ubicaciones peligrosas

Ex ib IIA:

Detectores de metano modelos GA 5000, GEM5000 y BIOGAS 5000; paquete de batería portátil, alimentado por batería no recambiable en el lugar de uso N/P 20087; intrínsecamente seguro y con circuitos intrínsecamente seguros ("ib" para zona 1) a la sonda de temperatura (conector B) modelo TP-5000 y con los parámetros de salida de entidad como se indica en la siguiente tabla; código de temperatura T1; temperatura ambiente de -10 °C a +50 °C.≤≤

Conector	Parámetros de entidad						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1000	0	0
C	10,0	5	50	100	1000	0	0

⚠ Nota: Se ha investigado este instrumento únicamente en relación a las características de seguridad eléctrica.

Con respecto a la CSA (EE. UU.), la serie 5000 de analizadores de gas cuenta con la certificación de clasificación de área peligrosa

CLASE 2258 83 - EQUIPO DE CONTROL DE PROCESOS - Sistemas intrínsecamente seguros y no inflamables - Para ubicaciones peligrosas - CERTIFICADO PARA LA NORMATIVA DE EE. UU.

**AEx ib IIA:**

Detectores de metano modelos GA 5000, GEM5000 y BIOGAS 5000; paquete de batería portátil, alimentado por batería no recambiable en el lugar de uso N/P 20087; intrínsecamente seguro y con circuitos intrínsecamente seguros ("ib" para zona 1) a la sonda de temperatura (conector B) modelo TP-5000 y con los parámetros de salida de entidad como se indica en la siguiente tabla; código de temperatura T1; temperatura ambiente de -10 °C a +50 °C.≤≤

Conector	Parámetros de entidad						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1000	0	0
C	10,0	5	50	100	1000	0	0

⚠ Nota: Se ha investigado este instrumento únicamente en relación a las características de seguridad eléctrica.

MCERTS

MCERTS es el Esquema de certificación de control de la Agencia del Medio Ambiente del

Reino Unido. Dicho esquema constituye el marco en el que realizar las mediciones medioambientales de acuerdo con los requisitos de calidad de la Agencia, y engloba toda una serie de actividades de control, recogida de muestras e inspección.

El instrumento GEM5000 cuenta con la certificación de MCERTS solo si:

- Aparece el logotipo de MCERTS en la pantalla al encenderlo.

✍ Nota: MCERTS - no se han llevado a cabo en este instrumento pruebas de sensibilidad cruzada con sulfuro de hidrógeno. Por lo tanto, el usuario debe tener en cuenta la posibilidad de interferencias en caso de presencia de H₂S.

El MCERTS proporciona fiabilidad y confianza a la supervisión de datos y ofrece a la industria un marco contrastado para la elección de los sistemas de supervisión y servicios conformes con las exigencias de rendimiento de la Agencia del Medio Ambiente.

El objetivo de la creación del Esquema de certificación de control (MCERTS) de la Agencia del Medio Ambiente es realizar controles medioambientales de calidad. El MCERTS ofrece certificaciones de productos de acuerdo con las normas de rendimiento de la Agencia del Medio Ambiente, tomando como base normas relevantes CEN, ISO y nacionales.

Los instrumentos con la certificación MCERTS han sido evaluados por un organismo independiente con el fin de garantizar el cumplimiento con determinadas exigencias de rendimiento. Además, el fabricante de un producto con certificación MCERTS está sometido a auditorías periódicas que garantizan el constante cumplimiento con las exigencias de rendimiento del certificado.

La serie 5000 de analizadores de gas cuenta con la certificación de la versión 3.1 de las Normas de rendimiento para sistemas portátiles de control de emisiones.

Batería y carga

La batería de la serie 5000 de analizadores de gas es un paquete de hidruro metálico de níquel compuesto por seis células individuales. Este tipo de batería es menos susceptible a los "efectos de memorización" en las cargas máximas que las baterías de níquel-cadmio, si bien no es recomendable cargar la unidad al máximo.

No desconecte el cargador hasta que se indique que el instrumento está totalmente cargado.



Advertencia

NO se aplica la certificación Ex al cargador de la batería.
Cargue siempre la batería en lugares seguros.

El cargador inteligente de la batería indica el estado de carga de la unidad y el fin de la carga.

El instrumento debe cargarse SÓLO con el cargador suministrado con el instrumento. El cargador de batería está concebido para su uso en interior. Asegúrese de que la ventilación es adecuada mientras carga la unidad.

Cargador: Voltaje de entrada: 100-240 V CA +/- 10%
Frecuencia de entrada: 50-60 Hz +/- 10%
Corriente de entrada: 0,4 A a 100 VCA .. 0,2 A a 240 VCA


Tensión de salida: 10,1 VCC máx.
Corriente de salida: 1,5 A máx.

✍ Nota: Conecte el cargador a la red eléctrica con el adaptador apropiado. Para más información, póngase en contacto con el fabricante.

Instrucciones de limpieza

NO utilice agentes limpiadores para limpiar el analizador o el cargador de la batería, ya que podrían tener efectos adversos en el uso seguro de los dispositivos.

Consejos de utilidad para efectuar lecturas

 Advertencia	La inhalación de sulfuro de hidrógeno (H ₂ S) o de otros gases nocivos puede ser mortal. El usuario es responsable de garantizar que está debidamente formado en aspectos de seguridad en cuanto al uso de H ₂ S y de otros gases nocivos especialmente en los lugares en los que se usan gases peligrosos, en los cuales el gas emitido por el analizador debe conducirse por un tubo hasta una zona en la que pueda liberarse con seguridad. El instrumento también puede emitir gases peligrosos si se purga con aire limpio.
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Consejos de utilidad

- En los desplazamientos, el analizador de gas debe llevarse en el interior del vehículo (nunca en el maletero), con objeto de evitar daños por temperaturas extremas o posibles impactos. No coloque el analizador de gas sobre superficies calientes (p. ej., tuberías de extracción de gas, carrocerías o vehículos aparcados a altas temperaturas); el aumento de la temperatura del analizador de gas afectaría a la precisión de las lecturas.
- Cuando se mueva por una zona, proteja el analizador de gas de la luz solar directa y la lluvia intensa.

Utilice siempre el colector de agua. Si rebosa, cambie el filtro y asegúrese de que ningún tubo esté húmedo antes de volver a usarlo.

✍ Nota: Si el escape de un analizador de gas de la serie GA5000 se conecta a un sistema presurizado, el gas se saldrá del orificio de entrada.


Calibrado

 Advertencia	Los gases de calibrado pueden ser peligrosos. Lea atentamente las especificaciones de seguridad de cada gas utilizado antes de proceder al calibrado.
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El regulador suministrado con el juego de calibrado está configurado para proporcionar un caudal fijo.

Dado que el caudal del regulador se ajusta en fábrica, solo hay que girarlo unas vueltas

para abrirlo; no es necesario ajustarlo.


<p> Advertencia</p>	<p>Orificios de escape</p> <p>Durante el calibrado del analizador de gas, existen dos salidas posibles para el gas: por la vía habitual, es decir, el orificio de escape del analizador (amarillo) o, en caso de sobrepresión, el orificio de 1,58 mm de la válvula ^{roja} de alivio de la presión situado en el regulador.</p> <p>Se recomienda conectar tubos de escape en ambos orificios.</p> <p>Los tubos de escape deben llegar a un área con ventilación suficiente. Asegúrese de que no haya fugas en los tubos ni las conexiones.</p> <p>El calibrado del analizador de gas debe realizarse en un área segura con todas las precauciones necesarias en el uso de gases potencialmente peligrosos, explosivos o tóxicos.</p>
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✎ Nota: También es posible que salga gas del orificio de caudal interno (azul) del analizador de gas (solo se aplica al GA5000).

Mantenimiento

Debe realizarse regularmente el mantenimiento de la serie 5000 de analizadores de gas con el fin de garantizar el funcionamiento correcto y preciso. Geotech (UK) Limited recomienda que se lleve a cabo el mantenimiento y el recalibrado cada 6 meses.

La serie 5000 de analizadores de gas cuenta con la certificación ATEX para su uso en lugares con riesgo de explosión. Por lo tanto, únicamente los ingenieros cualificados pueden realizar el mantenimiento. En caso contrario, la garantía quedará anulada y podría invalidar la certificación ATEX.

<p> Advertencia</p>	<p>Toda operación de mantenimiento del analizador de gas realizada por personal no cualificado puede dar lugar a la invalidación de la certificación ATEX, pudiendo igualmente afectar a la seguridad del uso del instrumento en lugares con riesgo de explosión.</p>
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Mantenimiento realizable por el usuario:

Este instrumento no contiene ninguna pieza o componente interior de cuyo mantenimiento pueda encargarse el usuario.

No obstante, el usuario puede encargarse del mantenimiento de los siguientes elementos:

<p>Filtro de agua en línea</p>	<p>Comprobar periódicamente obstrucciones, humedad o daños y cambiar en caso necesario. No usar el instrumento sin el filtro de agua en línea; de lo contrario, podría penetrar agua en el interior.</p>
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Tubo de muestreo	Comprobar que no están contaminados ni dañados.
Conectores de los orificios de gas	Comprobar periódicamente que las juntas tóricas de los conectores de los orificios de gas no están dañadas. Una junta tórica dañada puede dejar pasar el aire en el gas de muestra y afectar a la precisión de las lecturas. En caso de daños en la junta tórica, sustituir todo el conector.
Material filtrante de H ₂ S	Si observa que el material filtrante cambia a un color <i>gris claro</i> , sustituir el filtro.

Declaración de conformidad (español)

Productos	<ul style="list-style-type: none"> GA5000: analizador de gas para vertederos GEM5000: analizador de gas para vertederos y monitor de extracción BIOGAS 5000: analizador de gas para digestores anaerobios
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Geotechnical Instruments (UK) Limited declara la conformidad de los productos descritos con las siguientes normas:

Directiva ATEX 94/9/CE

Organismo de certificación	Servicio de certificación SIRA
Número de organismo notificado	0518
Dirección	Rake Lane, Eccleston (Chester) - CH4 9JN
Número de certificado SIRA	SIRA 11ATEX2197X
Normas aplicadas	EN60079-0 :2006 EN60079-0 :2009 EN60079-11 :2007

IECEX

Organismo de certificación	Servicio de certificación SIRA
Número de organismo notificado	0518
Dirección	Rake Lane, Eccleston (Chester) - CH4 9JN
Número de certificado IECEX	SIR 11.0089X
Normas aplicadas	IEC60079-0 :2004 Ed4 IEC60079-0 :2007 Ed5 IEC60079-11 :2006 Ed5

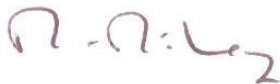
CSA (Canadá y EE. UU.)

Organismo de certificación	CSA International
Dirección	178 Rexdale Boulevard, Toronto, ON, Canadá M9W 1R3
Número de certificado CSA	CSA 11 2445306
Normas aplicadas	<p>C22.2 N° 0-10 - Requisitos generales – Código Eléctrico Canadiense, Parte II</p> <p>CAN/CSA-C22.2 N° 60079-0:07 - Aparatos eléctricos para atmósferas explosivas - Parte 0: Requisitos generales</p> <p>CAN/CSA-C22.2 N° 60079-1:07 - Aparatos eléctricos para atmósferas explosivas - Parte 1: Compartimiento ignífugo "d"</p> <p>CAN/CSA-E60079-11:02 - Aparatos eléctricos para atmósferas explosivas - Parte 11: Seguridad intrínseca "i"</p> <p>ANSI/UL 60079-0:09 - Aparatos eléctricos para atmósferas explosivas - Parte 0: Requisitos generales</p> <p>ANSI/UL 60079-1:09 - Aparatos eléctricos para atmósferas explosivas - Parte 1: Compartimiento ignífugo "d"</p> <p>ANSI/UL 60079-11:09 - Aparatos eléctricos para atmósferas explosivas - Parte 11: Seguridad intrínseca "i"</p>

Directiva CEM 2004/108/CEE

EN 301 489 Pt 1 (V1.9.1 – 2011-04)	Compatibilidad electromagnética y espectro radioeléctrico (ERM); Normativa de compatibilidad electromagnética (CEM) para equipos y servicios de radio; Parte 1: Requisitos técnicos comunes
EN 301 489 Pt 17 (V1.9.1 – 2009-04)	Compatibilidad electromagnética y espectro radioeléctrico (ERM); Normativa de compatibilidad electromagnética (CEM) para equipos de radio; Parte 17: Condiciones específicas para sistemas de transmisión de datos de banda ancha CEM para sistemas de transmisión de datos de banda ancha
EN 301 489 Pt 19 (V1.2.1 – 2002-11)	Compatibilidad electromagnética y espectro radioeléctrico (ERM); Normativa de compatibilidad electromagnética (CEM) para equipos y servicios de radio; Parte 19: Condiciones específicas para estaciones terrenas móviles de solo recepción (ROMES) que funcionan en la banda de 1,5 GHz proporcionando comunicaciones de datos CEM para estaciones terrenas móviles de solo recepción (ROMES)
BS EN 61000-3-2: 2006 + A2:2009	Compatibilidad electromagnética (CEM). Límites. Límites para las emisiones de corriente armónica (equipos con corriente de entrada ≤ 16 A por fase)
BS EN 61000-3-3: 2008	Compatibilidad electromagnética (CEM). Límites. Límites de las variaciones de tensión, fluctuaciones de tensión y flicker en las redes públicas de alimentación de baja tensión para equipos con corriente asignada ≤ 16 A por fase y no sujetos a una conexión adicional.


Firmado:



Dr. Roger Riley

16.2 Instructions for safe use – French language

Instructions concernant la sécurité

 Avertissement	<p>Les analyseurs de gaz de la série 5000 sont conçus pour mesurer les gaz des sites d'enfouissement et d'autres sources, comme le décrit le présent manuel.</p> <p>L'opérateur risque d'être exposé à des gaz nocifs pendant l'utilisation de l'instrument. L'inhalation de ces gaz peut être nuisible à la santé et, dans certains cas, mortelle.</p> <p>Il incombe à l'utilisateur de s'assurer qu'il a reçu une formation adaptée aux aspects de la sécurité des gaz utilisés et de s'assurer du respect des procédures appropriées. En particulier, lors de l'utilisation de gaz dangereux, les gaz en sortie de l'analyseur doivent être évacués dans une zone où ils ne présentent aucun danger.</p> <p>Des gaz dangereux peuvent être également expulsés de l'instrument lors d'une purge à l'air propre.</p>
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☞ Remarque : Les analyseurs de gaz sont des instruments scientifiques sensibles qu'il convient de traiter en conséquence. Toute utilisation du matériel non conforme aux instructions du fabricant risque d'amoinrir la protection assurée par l'instrument.

Les analyseurs de gaz de la série 5000 sont conformes à l'article 15 de la réglementation FCC (Federal Communications Commission - Conseil supérieur de l'audiovisuel américain). Son utilisation est soumise aux deux conditions suivantes :

- 1) Cet appareil ne doit pas provoquer d'interférences nuisibles.
- 2) Cet appareil doit accepter toutes les interférences reçues, y compris celles qui pourraient provoquer un fonctionnement indésirable.

Dans le cadre des certifications ATEX et IECEx, l'analyseur de gaz de la série 5000 est certifié pour la catégorie zone dangereuse.

 **II 2G Ex ib IIA T1 Gb (Ta = -10°C à +50°C)**

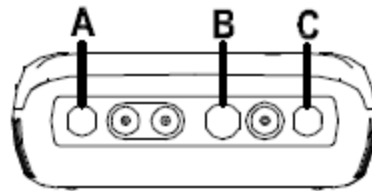
Il est absolument indispensable de respecter les instructions contenues dans ce manuel. Il incombe à l'utilisateur de déterminer le type et la classification de protection requise pour une application spécifique.

Instructions pour une utilisation sûre – Français

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

Les instructions suivantes s'appliquent au matériel couvert par les numéros de certificat SIRA 11ATEX2197X et IECEx Directive SIR 11.0089X :

- Le matériel est utilisable avec des gaz et des vapeurs inflammables et des appareils de groupe IIA et de classe de température T1.
- Le matériel est certifié uniquement pour une utilisation à température ambiante entre -10°C et +50°C et ne doit pas être utilisé en dehors de cette plage.
- Le matériel ne doit pas être utilisé dans une atmosphère contenant plus de 21% d'oxygène.
- Ce matériel devra être réparé conformément au code de pratique applicable.
- Lors d'une utilisation en zone dangereuse, utiliser exclusivement une sonde de température TP-5000 (SIRA 11ATEX2197X et IECEx SIR11.0089X). Pour le connecteur C, l'anémomètre GF5.4 (BVS 04ATEXE194) ne s'utilise qu'avec les dispositifs certifiés ATEX. L'analyseur ne doit être raccordé à aucun autre dispositif dans la zone dangereuse, ni au câble 5000-USB (connecteur A) ni au chargeur de batterie GEM5000 BC (connecteur B) fourni avec l'analyseur.



Ne pas charger, recharger ni ouvrir en atmosphère potentiellement explosive. Dans une zone dangereuse, utiliser exclusivement la sonde de température TP-5000 branchée dans le connecteur B.
Connecteur C (Uo=10 V, Io=5 mA, Po=50 mW, Ci=0, Li=0, Co=100 uF, Lo=1 000 mH),
Connecteur B (Uo=5 V, Io=6 mA, Po=7 mW, Ci=0, Li=0, Co=100 uF, Lo=1 000 mH)

ALIMENTATIONS MAXIMALES NON DANGEREUSES :
Connecteur A - Um=6 V Connecteur B - Um=10,1 V

- Si le matériel est amené à être en contact avec des substances corrosives, par exemple des liquides ou des gaz acides susceptibles d'attaquer les métaux, ou des solvants pouvant 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 matériau à des produits chimiques spécifiques, ceci afin de préserver l'intégrité de la protection.
- La plage de pression relative est de +/-500 mbar. Cependant, il convient de noter que la pression d'entrée ne doit pas dépasser +/- 500 mbar par rapport à la pression atmosphérique et la pression de sortie ne doit pas dépasser +/- 100 mbar par rapport à la pression atmosphérique.

Pour CSA (Canada), l'analyseur de gaz de la série 5000 est certifié pour la catégorie zone dangereuse

CLASSE 2258 03 - ÉQUIPEMENT DE CONTRÔLE DES PROCÉDÉS - Appareils à sécurité intrinsèque et appareils non incendiaires pour emplacements dangereux



Ex ib IIA :

Détecteurs de méthane Modèle GA 5000, GEM5000 et BIOGAS 5000 ; appareils portatifs, avec batterie alimentée par bloc de batterie (numéro de pièce 20087) non remplaçable sur place ; à sécurité intrinsèque et fournissant des circuits à sécurité intrinsèque (« [ib] » pour zone 1) pour sonde de température modèle TP-5000 (connecteur B) et avec paramètres de sortie comme indiqué au tableau ci-dessous ; code de température T1; $-10\text{ °C} \leq T_{amb.} \leq +50\text{ °C}$.

Connecteur	Paramètres						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1 000	0	0
C	10,0	5	50	100	1 000	0	0

☞ Remarque : Les tests effectués sur cet appareil concernaient uniquement la sécurité électrique.

Pour CSA (États-Unis), l'analyseur de gaz de la série 5000 est certifié pour la catégorie zone dangereuse

CLASSE 2258 83 - ÉQUIPEMENT DE CONTRÔLE DES PROCÉDÉS - Appareils à sécurité intrinsèque et appareils non incendiaires pour emplacements dangereux - CERTIFICATION AUX NORMES AMÉRICAINES (ÉTATS-UNIS)



AEx ib IIA :

Détecteurs de méthane Modèle GA 5000, GEM5000 et BIOGAS 5000 ; appareils portatifs, avec batterie alimentée par bloc de batterie (numéro de pièce 20087) non remplaçable sur place ; à sécurité intrinsèque et fournissant des circuits à sécurité intrinsèque (« [ib] » pour zone 1) pour sonde de température modèle TP-5000 (connecteur B) et avec paramètres de sortie comme indiqué au tableau ci-dessous ; code de température T1; $-10\text{ °C} \leq T_{amb.} \leq +50\text{ °C}$.

Connecteur	Paramètres						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1 000	0	0
C	10,0	5	50	100	1 000	0	0

☞ Remarque : Les tests effectués sur cet appareil concernaient uniquement la sécurité électrique.

MCERTS

MCERTS est le programme de certification de la surveillance, établi par l'agence britannique à l'Environnement. Ce programme forme le cadre dans lequel des mesures environnementales peuvent être effectuées conformément aux exigences de qualité de

l'agence. Il couvre un ensemble d'activités de surveillance, d'échantillonnage et d'inspection.

L'instrument GEM5000 n'est certifié MCERTS que si :

- Le logo MCERTS s'affiche à l'écran après la mise sous tension de l'instrument.
- ☞ Remarque : MCERTS - Cet instrument n'a pas fait l'objet de tests de sensibilité croisée utilisant le sulfure d'hydrogène. Par conséquent, les utilisateurs doivent être conscients qu'en cas de présence de H₂S sur les sites, il peut y avoir un effet d'interférence.

Le programme MCERTS contribue à renforcer la confiance du public vis-à-vis des données de surveillance et donne à l'industrie des paramètres sûrs pour le choix de systèmes et de services de surveillance répondant aux exigences de performance de l'agence.

L'agence à l'Environnement a établi ce programme MCERTS (Monitoring Certification Scheme) pour fournir des valeurs mesurées environnementales de qualité. La certification MCERTS concerne les produits aux normes de performance de l'agence à l'Environnement, sur la base des normes nationales, CEN et ISO pertinentes.


Les instruments certifiés MCERTS sont testés par un organisme indépendant pour assurer leur conformité à certaines exigences de performance. En outre, le fabricant de produits MCERTS fait l'objet d'audits réguliers pour s'assurer du respect continu des exigences de performance de ses produits aux fins de certification.

Les analyseurs de gaz de la série 5000 ont été certifiés conformément à la version 3.1 des « Normes de performance des systèmes portatifs de surveillance des émissions de substances dans l'atmosphère ».

Batterie et mise en charge

Les analyseurs de gaz de la série 5000 sont dotés d'une batterie au nickel-métal-hydrure, à six cellules individuelles intégrées. Ce type de batterie n'est pas aussi sensible à « l'effet de mémoire » qui affecte les capacités des piles au nickel cadmium. Il est cependant déconseillé de recharger la batterie par à-coups.

Débrancher le chargeur uniquement après indication de pleine charge.

 Avertissement	<p>Le chargeur de batterie n'est PAS couvert par la certification Ex. La batterie ne doit être chargée que dans un endroit sûr.</p>
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Le chargeur de batterie est intelligent et indique que la batterie est en cours de chargement ou chargée.

La batterie doit être chargée UNIQUEMENT à l'aide du chargeur fourni avec l'instrument. Le chargeur de batterie doit être utilisé uniquement à l'intérieur. Veiller à assurer une ventilation adéquate pendant le chargement.

Chargeur : Tension d'entrée : 100-240 V CA +/- 10 %
 Fréquence d'entrée : 50-60 Hz +/- 10 %

Courant d'entrée : 0,4 A@100 V CA.. 0,2 A@240 V CA

Tension de sortie : 10,1 V CC max


Courant de sortie : 1,5 A max

☞ Remarque : connecter le chargeur à l'alimentation secteur à l'aide de l'adaptateur approprié. Contacter le fabricant pour de plus amples informations.

Instructions de nettoyage

Ne PAS utiliser d'agents nettoyants pour nettoyer l'analyseur ou le chargeur de batterie car ces produits risquent d'avoir un effet préjudiciable sur l'utilisation sûre de ces appareils.

Bonnes pratiques lors des mesures

 Avertissement	L'inhalation de sulfure d'hydrogène (H ₂ S) ou d'autres gaz dangereux peut entraîner la mort. Il incombe à l'utilisateur de s'assurer qu'il a reçu la formation adaptée aux aspects sécurité de l'utilisation de H ₂ S et d'autres gaz dangereux. En particulier, lors de l'utilisation de gaz dangereux, les gaz en sortie de l'analyseur doivent être évacués dans une zone où ils ne présentent aucun danger. Des gaz dangereux peuvent aussi être expulsés de l'instrument lors d'une purge à l'air propre.
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Bonnes pratiques

- Lors d'un déplacement vers un site d'utilisation, transporter l'instrument dans l'habitacle du véhicule, et non pas dans le coffre où il pourrait être soumis à des températures extrêmes, voire à des chocs risquant de l'endommager. Ne pas placer l'analyseur de gaz contre des surfaces chaudes (conduite d'extraction de gaz, carrosserie d'une voiture ou voiture laissée sans surveillance en été, par exemple) car les effets de la chaleur sur l'analyseur risquent d'entraîner des valeurs mesurées incorrectes.
- Lors du déplacement sur site, protéger l'analyseur de gaz de la lumière solaire directe et des fortes intempéries.

Toujours utiliser le piège à eau ! Si le piège à eau déborde, changer le filtre et vérifier que tous les tuyaux ne présentent aucune trace d'humidité avant toute utilisation.


☞ Remarque : si l'évacuation d'un analyseur de gaz de la série GA5000 est connectée à un système sous pression, un flux de gaz s'échappera du port de débit d'entrée.

Étalonnage

 Avertissement	<p>Les gaz d'étalonnage peuvent être dangereux.</p> <p>Pour chaque gaz utilisé, il convient de lire et de comprendre la fiche de données de sécurité correspondante avant de poursuivre.</p>
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Le régulateur fourni avec le kit d'étalonnage a été configuré pour assurer un débit fixe.

Le débit du régulateur étant réglé en usine, il ne faut que quelques tours pour l'ouvrir et aucun réglage n'est nécessaire.


 Avertissement	<p>Orifice d'évacuation</p> <p>Lors de l'étalonnage de l'analyseur de gaz, le gaz peut être évacué par deux orifices : par l'orifice d'évacuation normal (jaune) de l'analyseur ou, dans les cas de surpression, par l'orifice de 1/16 de pouce de la soupape de surpression rouge située sur le régulateur.</p> <p>Il est recommandé de raccorder des tuyaux d'évacuation à ces deux orifices.</p> <p>Le tuyau d'évacuation doit laisser les gaz s'échapper dans un endroit bien ventilé. Vérifier que les tuyaux et les raccords ne présentent aucune fuite.</p> <p>L'étalonnage de l'analyseur de gaz doit s'effectuer dans un endroit sûr, en observant toutes les précautions nécessaires en présence de gaz potentiellement dangereux, explosifs ou toxiques.</p>
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☞ Remarque : le gaz peut être aussi expulsé au niveau du port de débit interne (bleu) de l'analyseur de gaz (applicable uniquement au modèle GA5000).

Entretien

Pour un fonctionnement correct et précis, l'analyseur de gaz de la série 5000 doit faire l'objet d'un entretien régulier. Geotech (UK) Limited recommande un entretien et un réétalonnage tous les 6 mois.

Les analyseurs de gaz de la série 5000 sont certifiés ATEX pour l'utilisation en environnements potentiellement explosifs. En conséquence, leur entretien doit être effectué uniquement par des techniciens qualifiés. Le non-respect de cette exigence entraînera l'annulation de la garantie, voire de la certification ATEX.

 Avertissement	<p>Si l'analyseur de gaz 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 dans un environnement potentiellement</p>
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	explosif.
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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, d'humidité ou de dommages ; le 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.
Tuyau d'échantillonnage	Toujours vérifier que les tuyaux d'échantillonnage ne sont ni contaminés ni endommagés.
Raccords d'orifices de gaz	Contrôler périodiquement les joints toriques des raccords d'orifices de gaz pour s'assurer qu'ils ne sont pas endommagés. Un joint torique endommagé peut laisser passer l'air dans le gaz d'échantillonnage et entraîner des valeurs mesurées incorrectes. Remplacer le raccord complet si le joint torique est endommagé.
Matériau du filtre à H ₂ S	Remplacer le filtre lorsque le matériau du filtre change de couleur et devient <i>gris clair</i> .

Déclaration de conformité – English Language [Français]

Produits	<ul style="list-style-type: none"> • GA5000 - Analyseur de gaz de sites d'enfouissement • GEM5000 - Analyseur de gaz de sites d'enfouissement et moniteur d'extraction • BIOGAS 5000 – Analyseur de gaz de digesteur anaérobie
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Geotechnical Instruments (UK) Ltd déclare que les articles décrits ci-dessus sont conformes aux normes suivantes :

ATEX Directive 94/9/EC

Certification body	SIRA Certification Service [Service de certification SIRA]
Numéro d'organisme notifié	0518
Adresse	Rake Lane, Eccleston, Chester, CH4 9JN, Royaume-Uni
Numéro de certificat SIRA	SIRA 11ATEX2197X
Normes appliquées	EN60079-0 :2006 EN60079-0 :2009 EN60079-11 :2007

IECEX

Organisme de certification	SIRA Certification Service [Service de certification SIRA]
Numéro d'organisme notifié	0518
Adresse	Rake Lane, Eccleston, Chester, CH4 9JN, Royaume-Uni
Numéro de certificat IECEX	SIR 11.0089X
Normes appliquées	IEC60079-0 :2004 Ed4 IEC60079-0 :2007 Ed5 IEC60079-11 :2006 Ed5

CSA (Canada et États-Unis)

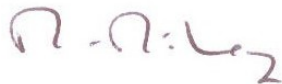
Organisme de certification	CSA International
Adresse	178 Rexdale Boulevard, Toronto, ON, Canada M9W 1R3
Numéro de certificat CSA	CSA 11 2445306
Normes appliquées	<p>C22.2 No. 0-10 - Règles générales - Code canadien de l'électricité, Deuxième partie</p> <p>CAN/CSA-C22.2 No. 60079-0:07 - Matériel électrique pour atmosphères gazeuses explosives - Partie 0 : Règles générales</p> <p>CAN/CSA-C22.2 No. 60079-1:07 - Matériel électrique pour atmosphères gazeuses explosives - Partie 1 : Enceintes antidéflagrantes « d »</p> <p>CAN/CSA-E60079-11:02 - Matériel électrique pour atmosphères gazeuses explosives - Partie 11 : Sécurité intrinsèque « i »</p> <p>ANSI/UL 60079-0:09 - Matériel électrique pour atmosphères gazeuses explosives - Partie 0 : Règles générales</p> <p>ANSI/UL 60079-1:09 - Matériel électrique pour atmosphères gazeuses explosives - Partie 1 : Enceintes antidéflagrantes « d »</p> <p>ANSI/UL 60079-11:09 - Matériel électrique pour atmosphères gazeuses explosives - Partie 11 : Sécurité intrinsèque « i »</p>

Directive CEM 2004/108/CEE

EN 301 489 Partie 1 (V1.9.1 - 2011-04)	Compatibilité électromagnétique et spectre radioélectrique (ERM) ; Norme de compatibilité électromagnétique (CEM) pour les équipements et services radio ; Partie 1: Exigences techniques communes
EN 301 489 Partie 17 (V2.1.1 - 2009-05)	Compatibilité électromagnétique et spectre radioélectrique (ERM) ; Norme de compatibilité électromagnétique (CEM) pour les équipements et services radio ; Partie 17 : Conditions particulières pour

<p>EN 301 489 Partie 19 (V1.2.1 – 2002-11)</p> <p>BS EN 61000-3-2 : 2006 + A2:2009</p> <p>BS EN 61000-3-3 : 2008</p>	<p>Les systèmes de transmission de données à large bande CEM pour les systèmes de transmission de données à large bande</p> <p>Compatibilité électromagnétique et spectre radioélectrique (ERM) ; Norme de compatibilité électromagnétique (CEM) pour les équipements et services radio ; Partie 19 : Conditions particulières pour les stations terriennes mobiles fonctionnant seulement en réception (ROMES) dans la bande de fréquences de 1,5 GHz pour la réception de données CEM pour les stations terriennes mobiles fonctionnant seulement en réception (ROMES)</p> <p>Compatibilité électromagnétique (CEM) Limites. Limites pour les émissions de courant harmonique (courant appelé par les appareils ≤ 16 A par phase)</p> <p>Compatibilité électromagnétique (CEM) Limites. Limitation des variations de tension, des fluctuations de tension et de l'oscillation dans les réseaux publics d'alimentation basse tension, pour les matériels ayant un courant assigné ≤ 16 A par phase et non soumis à un raccordement conditionnel</p>
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Signature:



Dr. Roger Riley

16.3 Instructions for safe use – German language

Sicherheitsvorschriften

 Warnhinweise	<p>Die Gasanalysatoren der 5000er Serie können zum Messen der Gase von Deponien und anderen Quellen wie in diesem Handbuch beschrieben verwendet werden.</p> <p>Der Bediener kann bei Verwendung des Geräts schädlichen Gasen ausgesetzt werden. Das Einatmen dieser Gase kann gesundheitsschädlich und in manchen Fällen sogar tödlich sein.</p> <p>Es liegt in der Verantwortung des Benutzers sicherzustellen, dass er/sie angemessen über die Sicherheitsaspekte der eingesetzten Gase geschult ist und geeignete Verfahren befolgt werden. Vor allem beim Einsatz gefährlicher Gase muss das vom Analysator ausströmende Gas in einen Bereich geleitet werden, in dem das Gas sicher abgeführt werden kann.</p> <p>Gefährliches Gas kann ebenso vom Gerät ausgestoßen werden, wenn es mit sauberer Luft gereinigt wird.</p>
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☞ Hinweis: Gasanalysatoren sind empfindliche wissenschaftliche Geräte und sollten entsprechend behandelt werden. Wenn das Gerät anders als vom Hersteller spezifiziert verwendet wird, kann der vom Gerät gebotene Schutz beeinträchtigt werden.

Die Gasanalysatoren der 5000er Serie erfüllen Abschnitt 15 der FCC-Vorschriften. Der Betrieb unterliegt den folgenden zwei Bedingungen:

- 1) Dieses Gerät darf keine schädlichen Funkstörungen verursachen.
- 2) Dieses Gerät muss mögliche empfangene Funkstörungen und dadurch verursachte Funktionsstörungen dulden.

Für ATEX und IECEx sind die Gasanalysatoren der 5000er Serie für den Einsatz in explosionsgefährdeten Bereichen zertifiziert.

 **II 2G EX ib IIA T1 Gb (Ta = -10°C bis +50°C)**

Die Vorschriften müssen unbedingt genau befolgt werden. Es liegt in der Verantwortung des Betreibers, das Schutzkonzept und die erforderliche Schutzklasse für eine bestimmte Anwendung festzulegen.

Vorschriften zur sicheren Verwendung - Deutsch

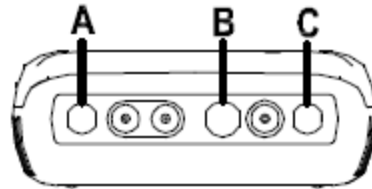
(Siehe Europäische ATEX-Richtlinie 94/9/EC, Anhang II, 1.0.6.)

Die folgenden Vorschriften gelten für Geräte, die in den Zertifikaten Nr. SIRA 11ATEX2197X und IECEx Richtlinie SIR 11.0089X behandelt werden:

- Die Geräte dürfen mit brennbaren Gasen und Dämpfen mit Apparategruppe IIA und

Temperaturklasse T1 eingesetzt werden.

- Die Geräte sind nur für den Einsatz bei Umgebungstemperaturen im Bereich von -10 °C bis +50 °C zertifiziert und sollten nicht außerhalb dieses Bereichs eingesetzt werden.
- Die Geräte dürfen nicht in einer Atmosphäre mit mehr als 21 % Sauerstoffgehalt eingesetzt werden.
- Die Reparatur dieser Geräte darf nur entsprechend der maßgeblichen Anleitung durchgeführt werden.
- Bei Einsatz in einem explosionsgefährdeten Bereich darf nur Temperaturfühler TP-5000 (SIRA 11ATEX2197X und IECExSIR11.0089X) verwendet werden. Anemometer GF5.4 (BVS 04ATEXE194), nur für den Einsatz mit ATEX, in Anschluss C. Der Analysator darf nicht an andere Geräte im explosionsgefährdeten Bereich angeschlossen werden, einschließlich des im Lieferumfang enthaltenen 5000-USB-Kabels (Anschluss A) bzw. Ladegeräts GEM5000 BC (Anschluss B).



In einer explosionsgefährdeten Atmosphäre nicht laden, wieder aufladen oder öffnen.

In einem explosionsgefährdeten Bereich nur „Temperaturfühler TP-5000“ in Anschluss B verwenden.

**Anschluss C (Uo=10 V, Io=5 mA, Po=50 mW, Ci=0, Li=0, Co=100 uF, Lo=1000 mH),
Anschluss B (Uo=5 V, Io=6 mA, Po=7 mW, Ci=0, Li=0, Co=100 uF, Lo=1000 mH)**

**MAXIMALE VERSORGUNG IN NICHT EXPLOSIONSGEFÄHRDETEN BEREICHEN:
Anschluss A - Um=6 V Anschluss B - Um=10,1 V**

- Falls die Möglichkeit besteht, dass die Geräte mit aggressiven Substanzen in Berührung kommen, z. B. mit sauren Flüssigkeiten oder Gasen, die Metalle angreifen können, oder mit Lösungsmitteln, die Polymerwerkstoffe schädigen können, liegt es in der Verantwortung des Benutzers, geeignete Sicherheitsvorkehrungen zu treffen, z. B. regelmäßige Kontrollen als Teil der Routineinspektionen oder die Prüfung des Materialdatenblatts darauf, ob das Gerät mit speziellen Chemikalien kompatibel ist, die es vor Schäden schützen, um zu gewährleisten, dass diese Art des Schutzes nicht beeinträchtigt wird.
- Der relative Druckbereich ist +/-500 mbar. Es ist jedoch zu beachten, dass der Eingangsdruck +/- 500 mbar relativ zum Atmosphärendruck nicht überschreiten darf und dass der Ausgangsdruck +/- 100 mbar relativ zum Atmosphärendruck nicht überschreiten darf.

Für CSA (Kanada) sind die Gasanalysatoren der 5000er Serie für den Einsatz in explosionsgefährdeten Bereichen zertifiziert.

KLASSE 2258 03 - PROZESSKONTROLLGERÄT - Eigensichere und nicht zündgefährliche Systeme - Für explosionsgefährdete Standorte

Ex ib IIA:

Methandektoren Modell GA 5000, GEM5000 und BIOGAS 5000; tragbar, batteriebetrieben mit nicht im Feld austauschbarem Akkupack Teilern. 20087; eigensicher, bietet eigensichere Kreise („[ib]“ für Zone 1) für Temperaturfühler Modell GFS.2 (Anschluss B), mit Entitätsausgabenparameter wie unten aufgeführt; Temperaturcode T1; $-10\text{ °C} \leq T_{amb.} \leq +50\text{ °C}$.

Anschluss	Entitätsparameter						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1000	0	0
C	10,0	5	50	100	1000	0	0

☞ Hinweis: Dieses Gerät wurde nur auf elektrische Sicherheitsfunktionen untersucht.

Für CSA (USA) sind die Gasanalysatoren der 5000er Serie für den Einsatz in explosionsgefährdeten Bereichen zertifiziert.

KLASSE 2258 83 - PROZESSKONTROLLGERÄT - Eigensichere und nicht zündgefährliche Systeme - Für explosionsgefährdete Standorte - NACH US-AMERIKANISCHEN NORMEN ZERTIFIZIERT

**AEx ib IIA:**

Methandektoren Modell GA 5000, GEM5000 und BIOGAS 5000; tragbar, batteriebetrieben mit nicht im Feld austauschbarem Akkupack Teilern. 20087; eigensicher, bietet eigensichere Kreise („[ib]“ für Zone 1) für Temperaturfühler Modell GFS.2 (Anschluss B), mit Entitätsausgabenparameter wie unten aufgeführt; Temperaturcode T1; $-10\text{ °C} \leq T_{amb.} \leq +50\text{ °C}$.

Anschluss	Entitätsparameter						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1000	0	0
C	10,0	5	50	100	1000	0	0

☞ Hinweis: Dieses Gerät wurde nur auf elektrische Sicherheitsfunktionen untersucht.

MCERTS

MCERTS ist das Monitoring Certification Scheme (Zertifizierungsprogramm für Überwachungsgeräte) der britischen Umweltagentur. Das Programm bietet einen Rahmen, in dem Umgebungsmessungen gemäß den Qualitätsanforderungen der Agentur durchgeführt werden können. Es umfasst eine Reihe von Überwachungs-, Probenahme-

und Prüfaufgaben.

Das Instrument GEM5000 ist nur MCERTS-zertifiziert, falls:

- Das MCERTS-Logo nach dem erstmaligen Einschalten auf dem Bildschirm erscheint.
 - ☞ Hinweis: MCERTS - Bei diesem Gerät wurden keine Störempfindlichkeitsprüfungen mit Schwefelwasserstoff durchgeführt. Daher sollten Benutzer wissen, ob H₂S vor Ort vorhanden ist, da dies eine Störwirkung zur Folge haben könnte.

MCERTS fördert das öffentliche Vertrauen in Überwachungsdaten und liefert der Industrie einen erprobten Rahmen zur Auswahl von Überwachungssystemen und -dienstleistungen, die die Leistungsanforderungen der Umweltagentur erfüllen.

Die britische Umweltagentur hat MCERTS (Monitoring Certification Scheme) initiiert, um hochwertige Umweltmessungen bereitzustellen. Das MCERTS Produktzertifizierungsprogramm ermöglicht die Zertifizierung von Produkten gemäß den Leistungsstandards der Umweltagentur basierend auf den entsprechenden CEN-, ISO- und nationalen Normen.


MCERTS-zertifizierte Geräte wurden durch eine unabhängige Stelle geprüft, um zu gewährleisten, dass bestimmte Leistungsanforderungen erfüllt werden. Darüber hinaus wird der Hersteller eines MCERTS-Produkts regelmäßig geprüft, um zu gewährleisten, dass die Leistungsanforderungen der Zertifizierung durchgehend erfüllt werden.

Die Gasanalysatoren der 5000er Serie wurden gemäß Version 3.1 der „Leistungsanforderungen für tragbare Emissionsüberwachungssysteme“ zertifiziert.

Akku und Aufladen

Bei dem Akku, der in den Gasanalysatoren der 5000er Serie verwendet wird, handelt es sich um einen Nickel-Metallhydrid-Akku, der als Akkupack aus sechs einzelnen Zellen hergestellt wird. Dieser Akkutyp ist weniger stark für den Memoryeffekt anfällig als Nickel-Kadmium-Akkus. Trotzdem wird davon abgeraten, das Gerät mit kleinen Ladungen nachzuladen.

Das Ladegerät sollte nur getrennt werden, wenn komplette Ladung angezeigt wird.

 Warnhinweise	Das Akkuladegerät ist NICHT in der ATEX-Zertifizierung enthalten. Der Akku darf nur in einem sicheren Bereich aufgeladen werden.
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Das Akkuladegerät ist intelligent und zeigt an, wenn die Einheit aufgeladen wird bzw. wenn sie vollständig aufgeladen ist.

Das Gerät darf NUR mit dem mitgelieferten Akkuladegerät aufgeladen werden. Das Akkuladegerät ist nur für den Gebrauch in Innenräumen vorgesehen. Bitte sorgen Sie für ausreichende Belüftung während des Aufladens.

Ladegerät:	Eingangsspannung:	100-240 V AC +/- 10 %
	Eingangsfrequenz:	50-60 Hz +/- 10 %
	Eingangsstromstärke:	0,4 A bei 100 VAC .. 0,2 A bei 240 VAC


Ausgangsspannung: Max. 10,1 VDC
Ausgangsstromstärke: Max. 1,5 A

☞ Hinweis: Schließen Sie das Ladegerät durch Verbinden des entsprechenden Adapters an das Stromnetz an. Wenden Sie sich für weitere Informationen an den Hersteller.

Reinigungsanweisungen

Verwenden Sie KEINE Reinigungsmittel zum Reinigen des Analysegeräts oder Akkuladegeräts, da sie die sichere Verwendung dieser Geräte beeinträchtigen können.

Good Practice beim Ablesen

 Warnhinweise	Das Einatmen von Schwefelwasserstoffgas (H ₂ S) oder anderer schädlicher Gase kann tödlich sein. Es liegt in der Verantwortung des Benutzers sicherzustellen, dass er/sie angemessen über die Sicherheitsaspekte beim Einsatz von H ₂ S und anderer schädlicher Gase geschult ist. Vor allem beim Einsatz gefährlicher Gase muss das vom Analysator ausströmende Gas in einen Bereich geleitet werden, in dem das Gas sicher abgeführt werden kann. Gefährliches Gas kann ebenso vom Gerät ausgestossen werden, wenn es mit sauberer Luft ausgeblasen wird.
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Good Practice

- Transportieren Sie den Gasanalysator im Inneren des Fahrzeugs an den Einsatzort - nicht auf der Ladefläche, wo er Temperaturschwankungen und möglichen Stößen ausgeliefert ist. Platzieren Sie den Gasanalysator nicht direkt an oder auf etwas Heißem (z. B. Gasleitung, Karosserie oder in einem unbeaufsichtigten Auto während des Sommers), da dies einen Temperaturanstieg im Gasanalysator verursacht und zu fehlerhaften Messwerten führen kann.
- Schützen Sie den Gasanalysator am Einsatzort vor starkem, direktem Sonnenlicht und starkem Regen.

Verwenden Sie stets den Wasserabscheider! Wenn der Wasserabscheider überschwemmt wird, tauschen Sie den Filter aus, und stellen Sie sicher, dass alle Schläuche frei von Feuchtigkeit sind, bevor Sie sie erneut verwenden.

☞ Hinweis: Wenn der Auslass eines Gasanalysators der Serie GA5000 an ein druckbeaufschlagtes System angeschlossen ist, dann führt dies zu einem Gasstrom aus dem Einlassstromanschluss.


Kalibrieren

 Warnhinweise	Eichgase können gefährlich sein. Vor dem Verfahren müssen die Materialsicherheitsdatenblätter aller verwendeten Gase
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	gelesen und verstanden werden.
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Der mit dem Kalibrierset gelieferte Regulator wurde so konfiguriert, dass er einen unveränderlichen Durchfluss liefert.

Da der Durchfluss des Regulators werkseitig eingestellt ist, lässt der Regulator sich mit nur wenigen Drehungen öffnen; eine Einstellung ist nicht erforderlich.


 Warnhinweise	<p>Austrittsöffnung</p> <p>Wenn der Gasanalysator kalibriert wird, gibt es zwei mögliche Ausgänge für das Gas: auf die übliche Art über die Austrittsöffnung (gelb) des Analysators oder bei Überdruck über die 1/16" Öffnung des roten Druckentlastungsventils, das sich am Regler befindet.</p> <p>Für beide Öffnungen wird das Anbringen von Auslassrohrleitungen empfohlen.</p> <p>Die Auslassrohrleitungen müssen in einen gut belüfteten Bereich führen. Stellen Sie sicher, dass es in den Rohrleitungen und an den Verbindungen keine Undichtigkeiten gibt.</p> <p>Das Kalibrieren des Gasanalysators muss in einem sicheren Bereich unter Anwendung aller notwendigen Sicherheitsvorkehrungen durchgeführt werden, wenn möglicherweise gefährliche, explosive oder toxische Gase eingesetzt werden.</p>
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☞ Hinweis: Es besteht außerdem die Möglichkeit, dass Gas aus dem internen Strömungsanschluss (blau) des Gasanalysators ausgestoßen wird (gilt nur für GA5000).

Wartung

Die Gasanalysatoren der 5000er Serie müssen regelmäßig gewartet werden, um den korrekten und genauen Betrieb zu gewährleisten. Geotech (UK) Limited empfiehlt ein Wartungs- und Neukalibrierungsintervall von 6 Monaten.

Die Gasanalysatoren der 5000er Serie sind für den Einsatz in explosionsgefährdeten Bereichen ATEX-zertifiziert. Daher dürfen sie nur von qualifizierten Technikern gewartet werden. Im Falle der Nichtbefolgung erlischt die Garantie, und die ATEX-Zertifizierung kann ihre Gültigkeit verlieren.

 Warnhinweise	<p>Falls der Gasanalysator von unqualifizierten Technikern gewartet wird, kann die ATEX-Zertifizierung ihre Gültigkeit verlieren, und das Gerät ist möglicherweise für den Einsatz in einer explosionsgefährdeten Atmosphäre nicht mehr sicher.</p>
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Teile, die durch den Benutzer gewartet werden können:

Im Gerät gibt es keine Teile, die durch den Benutzer gewartet werden können.

Die folgenden Teile können durch den Benutzer gewartet werden:

Wasserleitungsfilter	Er muss regelmäßig auf Verstopfungen, Feuchtigkeit bzw. Beschädigungen untersucht und, falls erforderlich, ausgetauscht werden. Das Gerät darf nie ohne den Wasserleitungsfilter betrieben werden, da dies dazu führen könnte, dass Wasser in das Gerät eindringt.
Probenrohrleitungen	Stellen Sie stets sicher, dass die Probenrohrleitungen weder verunreinigt noch beschädigt sind.
Gasausgangsanschlüsse	Prüfen Sie periodisch, ob die O-Ringe an den Gasausgangsanschlüssen beschädigt sind. Durch einen beschädigten O-Ring kann Luft in das Messgas eindringen und zu falschen Messwerten führen. Falls der O-Ring beschädigt ist, muss der gesamte Gasausgangsanschluss ausgetauscht werden.
H ₂ S Filtermaterial	Sobald die Farbe des Filtermaterials <i>leicht grau</i> wird, muss der Filter ausgetauscht werden.

Konformitätserklärung - Deutsch

Produkte	<ul style="list-style-type: none"> • GA5000 - Deponiegasanalysator • GEM5000 - Deponiegasanalysator und Extraktionsüberwachungsgerät • BIOGAS 5000 - Gasanalysator für anaerobe Biogasanlage
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Geotechnical Instruments (UK) Limited erklärt, dass das/die oben beschriebene(n) Produkt(e) den folgenden Normen entsprechen:

ATEX-Richtlinie 94/9/EG

Zertifizierungsstelle	SIRA Certification Service
Nummer der benannten Stelle	0518
Adresse	Rake Lane, Eccleston, Chester, CH4 9JN, UK
SIRA Bescheinigungsnummer	SIRA 11ATEX2197X
Angewendete Normen	EN60079-0 :2006 EN60079-0 :2009 EN60079-11 :2007

IECEX

Zertifizierungsstelle	SIRA Certification Service
Nummer der benannten Stelle	0518
Adresse	Rake Lane, Eccleston, Chester, CH4 9JN, UK
IECEX Bescheinigungsnummer	SIR 11.0089X
Angewendete Normen	IEC60079-0 :2004 Ed4 IEC60079-0 :2007 Ed5 IEC60079-11 :2006 Ed5

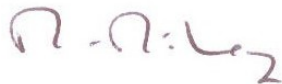
CSA (Kanada und USA)

Zertifizierungsstelle	CSA International
Adresse	178 Rexdale Boulevard, Toronto, ON, Kanada M9W 1R3
CSA Bescheinigungsnummer	CSA 11 2445306
Angewendete Normen	<p>C22.2 Nr. 0-10 – Allgemeine Anforderungen – Kanadische Elektrorichtlinie, Teil II</p> <p>CAN/CSA-C22.2 Nr. 60079-0:07 - Elektrisches Gerät für explosionsfähige Gasatmosphären - Teil 0: Allgemeine Anforderungen</p> <p>CAN/CSA-C22.2 Nr. 60079-1:07 - Elektrisches Gerät für explosionsfähige Gasatmosphären - Teil 1: Druckfeste Kapselung „d“</p> <p>CAN/CSA-E60079-11:02 - Elektrisches Gerät für explosionsfähige Gasatmosphären - Teil 11: Eigensicherheit „i“</p> <p>ANSI/UL 60079-0:09 - Elektrisches Gerät für explosionsfähige Gasatmosphären - Teil 0: Allgemeine Anforderungen</p> <p>ANSI/UL 60079-1:09 - Elektrisches Gerät für explosionsfähige Gasatmosphären - Teil 1: Druckfeste Kapselung „d“</p> <p>ANSI/UL 60079-11:09 - Elektrisches Gerät für explosionsfähige Gasatmosphären - Teil 11: Eigensicherheit „i“</p>

EMC Richtlinie 2004/108/EG

EN 301 489 Teil 1 (V1.9.1 - 2011-04)	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM); Elektromagnetische Verträglichkeit (EMV) für Funkeinrichtungen und -dienste; Teil 1: Gemeinsame technische Anforderungen
EN 301 489 Teil 17 (V2.1.1 - 2009-05)	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM); Elektromagnetische Verträglichkeit (EMV) für Funkeinrichtungen; Teil 17: Spezifische Bedingungen für Breitband-Datenübertragungssysteme EMV für Breitbandübertragungssysteme
EN 301 489 Teil 19 (V1.2.1. - 2002-11)	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM); Elektromagnetische Verträglichkeit (EMV) für Funkeinrichtungen und -dienste; Teil 19: Spezifische Bedingungen für mobile Empfangs-Erdfunkstellen (ROMES) zur Datenübertragung im 1,5-GHz-Frequenzband EMV für mobile Empfangs-Erdfunkstellen (ROMES)
BS EN 61000-3-2: 2006 + A2:2009	Elektromagnetische Verträglichkeit (EMV). Grenzwerte. Emissionsgrenzwerte für Oberschwingungsstrom (Geräteeingangstrom ≤ 16 A je Leiter)
BS EN 61000-3-3: 2008	Elektromagnetische Verträglichkeit (EMV). Grenzwerte. Begrenzung von Spannungsänderungen, Spannungsschwankungen und Flimmern in öffentlichen Niederspannungs- Versorgungsnetzen für Geräte mit einem Bemessungsstrom ≤ 16 A je Leiter, die keiner Sonderanschlussbedingung unterliegen.


Unterschrift:



Dr. Roger Riley

16.4 Instructions for safe use – Italian language

Istruzioni per la sicurezza

<p> Avvertenza</p>	<p>Gli analizzatori di gas serie 5000 possono essere utilizzati per misurare i gas provenienti da discariche o da altre fonti, come descritto in questo manuale.</p> <p>L'operatore può essere esposto a gas nocivi durante l'utilizzo dello strumento. L'inalazione di questi gas può danneggiare la salute e in alcuni casi essere letale.</p> <p>Spetta all'utente controllare di essere sufficientemente informato sugli aspetti riguardanti la sicurezza dei gas utilizzati e di seguire le procedure appropriate. In particolare nel caso di gas pericolosi, quelli scaricati dall'analizzatore devono essere convogliati in un'area in cui lo scaricotale operazione possa essere effettuata in condizioni di sicurezza.</p> <p>È possibile che lo strumento scarichi gas pericolosi anche durante lo spurgo quando viene utilizzato per spurgare con aria pulita.</p>
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☞ Nota: gli analizzatori di gas sono apparecchi scientifici delicati e vanno trattati come tali. Utilizzando l'apparecchio in modo diverso da quanto specificato dalla casa produttrice, l'apparecchio stesso potrebbe non fornire più la protezione prevista.

Gli analizzatori di gas serie 5000 sono conformi alla Parte 15 delle norme FCC. L'utilizzo è soggetto alle seguenti due condizioni:

- 1) il dispositivo non deve causare interferenze dannose
- 2) il dispositivo deve accettare le interferenze che riceve, anche se possono causare effetti indesiderati per il suo funzionamento.

Gli analizzatori di gas della serie 5000 sono certificati con riferimento alla classificazione delle aree pericolose secondo ATEX e IECEx.

 **II 2G Ex ib IIA T1 Gb (Ta = da -10°C a +50°C)**

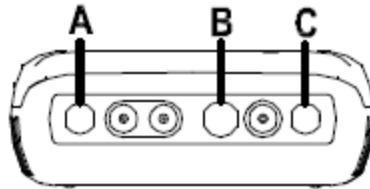
È essenziale seguire scrupolosamente le istruzioni. Spetta all'operatore definire il concetto di protezione e la classificazione richiesta per una data applicazione.

Istruzioni per l'uso in sicurezza - Italiano

(Riferimento alla Direttiva europea ATEX 94/9/CEC, Allegato II, 1.0.6.)

Le seguenti istruzioni si applicano agli apparecchi coperti dai certificati SIRA 11ATEX2197X e SIR 11.0089X della Direttiva IECEx:

- Gli apparecchi possono essere utilizzati con gas e vapori infiammabili di gruppo IIA e temperature di classe T1.
- Gli apparecchi sono certificati solo per l'uso a temperatura ambiente compresa tra -10°C e +50°C e non vanno utilizzati al di fuori di questo intervallo.
- Gli apparecchi non vanno utilizzati in un'atmosfera che contenga più del 21% di ossigeno.
- Le riparazioni di questi apparecchi vanno effettuate in conformità al codice professionale rilevante.
- In aree pericolose, utilizzare solo la sonda di temperatura TP-5000 (SIRA 11ATEX2197X e IECEx SIR11.0089X). Per il connettore C, l'anemometro GF5.4 (BVS 04ATEXE194) da usare esclusivamente con apparecchi ATEX. Nella zona pericolosa, l'analizzatore non va collegato ad altri dispositivi in dotazione, come il cavo 5000-USB (per il connettore A) o il caricabatteria GEM5000 BC (per il connettore B).



**Non caricare, ricaricare o aprire in un'atmosfera potenzialmente esplosiva.
In aree pericolose, utilizzare solo la "sonda di temperatura TP-5000" con il
connettore B.**

**Connettore C (Uo=10V,Io=5mA,Po=50mW,Ci=0,Li=0,Co=100uF,Lo=1000mH),
Connettore B (Uo=5V,Io=6mA,Po=7mW,Ci=0,Li=0,Co=100uF,Lo=1000mH)**

**ALIMENTAZIONI MASSIME NON PERICOLOSE:
Connettore A - Um=6V Connettore B - Um=10,1V**

- Se esiste la possibilità che l'apparecchio potrebbe venire in contatto con sostanze aggressive, ad esempio liquidi acidi o gas che possono attaccare i metalli o solventi che possono agire su materiali polimerici, spetta all'utente adottare le precauzioni necessarie, ad es. controlli regolari come da programma o verifica della resistenza a sostanze chimiche specifiche consultando la scheda tecnica, per evitare effetti negativi e non compromettere il tipo di protezione di cui è dotato l'apparecchio.
- L'intervallo di pressione relativa è di +/-500 mbar. Si noti tuttavia che la pressione in entrata non deve superare +/- 500 mbar relativamente alla pressione atmosferica e la pressione in uscita non deve superare +/- 100 mbar relativamente alla pressione atmosferica.

Gli analizzatori di gas della serie 5000 sono certificati con riferimento alla classificazione delle aree pericolose secondo CSA (Canada)

CLASSE 2258 03 - APPARECCHIATURE DI CONTROLLO DEI PROCESSI - Sistemi intrinsecamente sicuri e ignifughi - Per luoghi pericolosi.



Ex ib IIA

Rilevatori di metano Modello GA 5000, GEM5000 e BIOGAS 5000; portatili, a batteria, con pacco batterie non sostituibile sul campo, cod. parte 20087; intrinsecamente sicuri, per circuiti intrinsecamente sicuri ("ib" per Zona 1) fino alla sonda di temperatura Modello TP-5000 (Connettore B) e con parametri di entità in uscita come indicato nella tabella sottostante; Codice temperatura T1; $-10\text{ °C} \leq \text{Tamb.} \leq +50\text{°C}$.

Connettore	Parametri entità						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5.0	6	7	100	1000	0	0
C	10,0	5	50	100	1000	0	0

☞ Nota: questo dispositivo è stato controllato solo per quanto riguarda le caratteristiche di sicurezza elettrica.

Gli analizzatori di gas della serie 5000 sono certificati con riferimento alla classificazione delle aree pericolose secondo CSA (USA)

CLASSE 2258 83 - APPARECCHIATURE DI CONTROLLO DEI PROCESSI - Sistemi intrinsecamente sicuri e ignifughi - Per luoghi pericolosi - CERTIFICATE PER USA NORME



AEx ib IIA

Rilevatori di metano Modello GA 5000, GEM5000 e BIOGAS 5000; portatili, a batteria, con pacco batterie non sostituibile sul campo, cod. parte 20087; intrinsecamente sicuri, per circuiti intrinsecamente sicuri ("ib" per Zona 1) fino alla sonda di temperatura Modello TP-5000 (Connettore B) e con parametri di entità in uscita come indicato nella tabella sottostante; Codice temperatura T1; $-10\text{ °C} \leq \text{Tamb.} \leq +50\text{°C}$.

Connettore	Parametri entità						
	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Ci (uF)	Li (mH)
B	5,0	6	7	100	1000	0	0
C	10,0	5	50	100	1000	0	0

☞ Nota: questo dispositivo è stato controllato solo per quanto riguarda le caratteristiche di sicurezza elettrica.

MCERTS

MCERTS sta per Monitoring Certification Scheme, il programma di certificazione della Environment Agency, l'ente istituzione britannico per la protezione ambientale. Il programma offre uno schema in base al quale effettuare le misurazioni ambientali rispettando i requisiti qualitativi dell'Environment Agency e comprende varie attività di monitoraggio, campionatura e ispezione.

Lo strumento GEM5000 ha la certificazione MCERTS solo se:

- Dopo l'accensione iniziale, sullo schermo compare il logo MCERTS.
- ☞ Nota: MCERTS - Su questo strumento non si sono effettuati test di sensibilità incrociata con l'utilizzo di idrogeno solforato. Pertanto gli utenti devono accertare la presenza di H₂S, che potrebbe avere un effetto interferenziale.

MCERTS promuove fiducia nel monitoraggio dei dati e offre al settore una struttura sperimentata per scegliere sistemi e servizi di monitoraggio che soddisfino i requisiti dell'Environment Agency.

L'Environment Agency ha istituito il Monitoring Certification Scheme (MCERTS) per conseguire misurazioni ambientali qualitativamente valide. Il programma MCERTS offre la certificazione dei prodotti secondo gli standard qualitativi dell'Environment Agency, in base alle norme CEN, ISO e nazionali.

Gli strumenti con certificazione MCERTS sono stati testati da un organismo indipendente per verificare che soddisfino determinate caratteristiche di prestazione. Inoltre le aziende dei prodotti MCERTS vengono regolarmente controllate per accertare che le caratteristiche di prestazione da attestare nel certificato siano sempre conseguite.

Gli analizzatori di gas della serie 5000 sono stati certificati secondo la versione 3.1 delle 'Caratteristiche di prestazione dei sistemi portatili di monitoraggio delle emissioni'.

Batteria e ricarica

La batteria utilizzata negli analizzatori di gas della serie 5000 è al nichel-idruro metallico e viene prodotta come pacco con sei celle individuali. Anche se questo tipo di batteria non è soggetta all'effetto memoria della ricarica come quelle al nichel cadmio, non è consigliabile raccomandabile effettuare piccole ricariche parziali.

Il caricabatteria va scollegato solo quando indica la carica completa.



Avvertenza

Il caricabatteria NON è coperto dalla certificazione Ex. La batteria va caricata solo in un'area sicura.

Il caricabatteria è intelligente e indica lo stato di carica in corso o avvenuta.

Lo strumento va caricato utilizzando ESCLUSIVAMENTE il caricabatteria fornito in dotazione, che è inteso solo per l'uso in un locale interno. Effettuare la ricarica in un locale ventilato.

Caricabatteria:	Tensione d'ingresso:	100-240V CA +/- 10%
	Frequenza d'ingresso:	50-60Hz +/- 10%
	Corrente d'ingresso:	0,4A@100VCA .. 0,2A@240VCA
	Tensione d'uscita:	10,1VCC max
	Corrente d'uscita:	1,5A max


☞ Nota: collegare il caricabatteria all'elettricità di rete utilizzando l'adattatore

necessario. Per ulteriori informazioni rivolgersi alla casa produttrice.

Istruzioni per la pulizia

NON utilizzare detergenti per pulire l'analizzatore o il caricabatteria, perché potrebbero avere un effetto negativo sulla sicurezza del loro uso.

Prassi ottimali per rilevare le letture

 Avvertenza	L'inalazione del gas di solfuro d'idrogeno (H ₂ S) o di altri gas nocivi può causare la morte. Spetta all'utente accertarsi di essere sufficientemente addestrato negli aspetti della sicurezza relativi all'uso di H ₂ S e altri gas nocivi. In particolare nel caso di gas pericolosi, quelli scaricati dall'analizzatore devono essere convogliati in un'area in cui lo scaricatore operazione possa essere effettuata in condizioni di sicurezza. È possibile che lo strumento scarichi gas pericolosi anche durante lo spurgo quando viene utilizzato per spurgare con aria pulita.
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Prassi ottimali

- Nel recarsi al luogo di utilizzo, collocare l'analizzatore di gas nell'abitacolo del veicolo, non nel bagagliaio, dove potrebbe essere soggetto a estremi di temperatura e danneggiarsi per eventuali urti. Non appoggiare l'analizzatore di gas contro superfici calde (ad es. tubo di aspirazione del gas, carrozzeria di un'autovettura o interno di un'autovettura incustodita in estate), perché ciò fa aumentare la temperatura dell'analizzatore di gas e può falsare le letture.
- Negli spostamenti nell'area di utilizzo dell'analizzatore di gas, proteggerlo dalla luce diretta del sole e dagli scrosci di pioggia.

Usare sempre il sifone per lo scarico della condensa!. Se il sifone si allaga, cambiare il filtro e controllare che tutti i tubi siano liberi dalla condensa prima di riutilizzarlo


☞ Nota: se lo scarico di un analizzatore di gas serie GA5000 è collegato ad un sistema pressurizzato, ciò fa uscire un flusso di gas dall'entrata.

Taratura

 Avvertenza	I gas di taratura possono essere pericolosi. Per ciascun gas da utilizzare, leggere preventivamente la relativa scheda tecnica di sicurezza, accertandosi di comprenderne il contenuto.
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Il regolatore fornito col kit di taratura è stato configurato per permettere l'erogazione di un flusso fisso.

Dato che il flusso del regolatore è impostato in fabbrica, può essere aperto con una semplice rotazione, senza effettuare regolazioni.


<p> Avvertenza</p>	<p>Luce di scarico</p> <p>Durante la taratura dell'analizzatore, vi sono due possibili uscite per il gas: come di norma dalla luce di scarico (gialla) dell'analizzatore o, in caso di sovrappressione, dalla luce di 1/16" della valvola limitatrice di pressione rossa situata sul regolatore.</p> <p>Si raccomanda che entrambe le luci siano dotate di tubi di scarico,</p> <p>che devono sboccare in un'area ben ventilata. Controllare che i tubi e i raccordi non presentino perdite.</p> <p>La taratura dell'analizzatore di gas va eseguita in un'area idonea, adottando tutte le precauzioni necessarie per l'utilizzo di gas potenzialmente pericolosi, esplosivi o tossici.</p>
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☞ Nota: è possibile anche che il gas esca dall'uscita del flusso interno (blu) dell'analizzatore di gas (vale solo per GA5000).

Manutenzione

Gli analizzatori di gas della serie 5000 devono essere sottoposti a regolare controllo di manutenzione per accertare che il funzionamento sia corretto e preciso. Geotech (UK) Limited raccomanda che la manutenzione e la taratura siano effettuate ogni 6 mesi.

Gli analizzatori di gas della serie 5000 hanno la certificazione ATEX per l'utilizzo in aree potenzialmente esplosive. In quanto tali, la loro manutenzione deve essere affidata esclusivamente a tecnici qualificati. La mancata osservanza di questa regola invalida la garanzia ed eventualmente anche la certificazione ATEX.

<p> Avvertenza</p>	<p>Se la manutenzione dell'analizzatore di gas viene effettuata da tecnici non qualificati, la certificazione ATEX può venirne compromessa, pregiudicando così l'utilizzo in condizioni di sicurezza dello strumento in un'atmosfera potenzialmente esplosiva.</p>
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Parti riparabili dall'utente:

Non vi sono parti riparabili dall'utente all'interno dello strumento.
Le parti seguenti possono essere riparate:

Filtro acqua in linea	Va controllato regolarmente per evidenziare eventuali ostruzioni, condensa o danneggiamenti e sostituito se necessario. Lo strumento non va mai usato senza il filtro in linea, per evitare possibili infiltrazioni dperché vi entrerebbe l'acqua.
Tubi di campionamento	Controllare sempre che i tubi di campionamento non siano contaminati o danneggiati.
Raccordi del gas	Controllare periodicamente che i gommini O-ring dei

	raccordi del gas non siano danneggiati. Se danneggiati, gli O-ring lasciano entrare aria nei tubi di campionamento, sfalsando le letture. Se l'O-ring risulta danneggiato, è necessario sostituire tutto il raccordo.
Materiale del filtro H ₂ S	Quando il materiale del filtro cambia colore e diventa <i>grigio chiaro</i> , il filtro va sostituito.

Dichiarazione di conformità – Italiano

Prodotti	<ul style="list-style-type: none"> • GA5000 – Analizzatore di gas per discariche • GEM5000 - Analizzatore di gas e monitor di estrazione per discariche e monitor per l'estrazione • BIOGAS 5000 – Analizzatore di gas per impianti di digestione anaerobica
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Geotechnical Instruments (UK) Limited dichiara che gli articoli sopra descritti sono conformi ai seguenti standard:

Direttiva ATEX 94/9/CE

Organismo di certificazione	SIRA Certification Service Servizio di certificazione SIRA
Numero dell'organismo notificato	0518
Indirizzo	Rake Lane, Eccleston, Chester, CH4 9JN, GB
N° certificazione SIRA	SIRA 11ATEX2197X
Norme applicate	EN60079-0 :2006 EN60079-0 :2009 EN60079-11 :2007

IECEX

Organismo di certificazione	SIRA Certification Service Servizio di certificazione SIRA
Numero dell'organismo notificato	0518
Indirizzo	Rake Lane, Eccleston, Chester, CH4 9JN, GB
N° certificazione IECEX	SIR 11.0089X

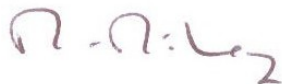
Norme applicate	IEC60079-0 :2004 Ed4 IEC60079-0 :2007 Ed5 IEC60079-11 :2006 Ed5
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CSA (Canada e USA)

Organismo di certificazione	CSA International
Indirizzo	178 Rexdale Boulevard, Toronto, ON, Canada M9W 1R3
N° certificazione CSA	CSA 11 2445306
Norme applicate	C22.2 No. 0-10 - Requisiti generali – Codice elettrico canadese, Parte II CAN/CSA-C22.2 No. 60079-0:07 - Apparecchi elettrici per atmosfere con gas esplosivi - Parte 0: Requisiti generali CAN/CSA-C22.2 No. 60079-1:07 - Apparecchi elettrici per atmosfere con gas esplosivi - Parte 1: Custodie a prova di esplosione "d" CAN/CSA-E60079-11:02 - Apparecchi elettrici per atmosfere con gas esplosivi - Parte 11: Sicurezza intrinseca "i" ANSI/UL 60079-0:09 - Apparecchi elettrici per atmosfere con gas esplosivi - Parte 0: Requisiti generali ANSI/UL 60079-1:09 - Apparecchi elettrici per atmosfere con gas esplosivi - Parte 1: Custodie a prova di esplosione "d" ANSI/UL 60079-11:09 - Apparecchi elettrici per atmosfere con gas esplosivi - Parte 11: Sicurezza intrinseca "i"

Direttiva EMC 2004/108/CE

EN 301 489 P. 1 (V1.9.1 – 2011-04)	Compatibilità elettromagnetica e questioni relative allo spettro delle radiofrequenze (ERM) Norma di compatibilità elettromagnetica (EMC) per apparecchiature e servizi radio Parte 1: Prescrizioni tecniche comuni
EN 301 489 P. 17 (V2.1.1 – 2009-05)	Compatibilità elettromagnetica e questioni relative allo spettro delle radiofrequenze (ERM) Norma di compatibilità elettromagnetica (EMC) per apparecchiature radio Parte 17: Condizioni specifiche per sistemi di trasmissione dati su banda larga EMC per sistemi di trasmissione dati su banda larga
EN 301 489 P. 19 (V1.2.1 – 2002-11)	Compatibilità elettromagnetica e questioni relative allo spettro delle radiofrequenze (ERM) Norma di compatibilità elettromagnetica (EMC) per apparecchiature e servizi radio Parte 19: Condizioni specifiche per soli ricevitori di stazioni mobili terrestri (ROMES) operativi nella banda 1,5 GHz che forniscono comunicazioni di dati EMC per soli ricevitori di stazioni mobili terrestri (ROMES)
BS EN 61000-3-2: 2006 + A2:2009	Limiti di compatibilità elettromagnetica (EMC) . Limiti per le emissioni di corrente armonica (apparecchiature con corrente di ingresso ≤ 16 A per fase)
BS EN 61000-3-3: 2008	Limiti di compatibilità elettromagnetica (EMC) . Limitazione delle fluttuazioni di tensione e del flicker in sistemi di alimentazione in bassa tensione per apparecchiature con corrente nominale ≤ 16 A e non soggette ad allacciamento su condizione

Firmato


Dr. Roger Riley