GAS DATA

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GFM 406

Technical User Manual

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Contents

1.0 GFM406 Series User Manual

1.1 Document revision history

Issue: A
Revision: 7
Date: 4th November 2022

ISSUE	REV	DATE	REVISION DESCRIPTION
A	1	29/08/2014	*Initial Release*
A	2	01/09/2014	*Connections to the instrument section moved forward, Instrument feature comparison chart updated*
A	3	09/09/2014	*Reading screens layout section added*
A	4	11/11/2015	*MCERTS accreditation information removed*
A	5	27/11/2019	*Technical review. Branding update.*
A	6	27/10/2020	*Restructure: Removal of 4XX series, Screen display improvements, instruction development and Appendix update*
A	7	09/11/2022	*Brand Update*

2.0 GFM406 General Information

2.1 Introduction

The Gas Data GFM406 handheld gas analyser is designed for monitoring and analysing gas concentration of a sample line. Typical applications for the GFM406 include landfill, biogas and contaminated land sites. This product can be configured from a variety of gas choices and ranges, chosen by the customer.

Operation is simple and the readings obtained are highly accurate. The instrument uses Gas Data's proprietary infra-red methane and carbon dioxide sensors and a combination of industry standard electrochemical gas sensor cells. A variety of external sensors can be plugged in, e.g., vane anemometer to measure gas velocity or a temperature probe for ambient and other temperatures.
The GFM406 Series has rechargeable Nickel Metal Hydride batteries giving up to eight hours of use between charges. A battery charger and mains unit are supplied with the instrument and a field replaceable battery pack is also available as an optional extra.

Features

- Capable of analysing a maximum of 7 gases in one instrument.
- Using optical infra-red analyser, electrochemical cells and balance calculation.
- Optional pressure measurements for atmospheric, static, and differential.
- Optional external temperature probe and Vane Anemometer (gas velocity).
- Built in sample pump.
- Rechargeable and field replaceable battery pack.

2.2 Spares list

Category	Description	GD order code
Filter	GFM external Filters 25mm	18810
	GFM internal Filters 15mm	18811
	GFM external Filters 50mm	18818
Connector	GFM/Click! Sample Pipe Connector (Male Metal)	18812
	GFM Sample Pipe Connectors (Female)	18813
	GFM/Click! Sample Pipe Connector (Male plastic)	18934
	Calibration Check Gas - On Demand Flow Regulator C10 - Stainless Steel	18496
Tube	GFM Sample Pipe	17227
	GFM43x Sample Tube	17226
	GFM43x/610 Flow Tube	16480
Cable	GFM Temperature Probe Extension Cable - 1m	19425
	Vane Anemometer	16502
	Brass Temperature Probe	16503
	Temp Expansion inc. Brass Probe	18730
	T-Piece Temperature Probe	17220
	USB Download cable	16501
	Battery pack	16457
	Universal DC In-Car Multi Voltage Power Adaptor	21266
	AC Mains Battery charger	16455
Casing	Inlet housing	17204
	Battery cover	17203
	Leather cover	16781
	Black carry case	16933

3.0 Safe Use of the GFM406

The Gas Data GFM has been designed to operate in typical field environments where flammable gases may be present.

All '*Special Conditions for Safe Use'* as detailed on the ATEX certificate (see Appendix F) must be adhered to.

Warning

The following points must be observed: -

- *The instrument must be recharged in the non-hazardous area.*
- *The instrument must be checked for normal operation prior to carrying it into the hazardous area:*
    - *BEFORE entering a known hazardous zone, switch on the instrument and make sure the display is visible and that the keys respond correctly.*
    - *BEFORE entering a known hazardous zone, check that the sample pump can be operated.*
- *The instrument must be inspected for damage prior to use and the instrument must not be used if the case is damaged:*
    - *BEFORE entering a known hazardous zone, check the instrument for damage. Pay particular attention to the keyboard and aspirator.*
- *The instrument must be carried in the leather case to avoid the risk of electrostatic discharge:*
    - *BEFORE entering a hazardous zone make sure that the instrument is securely enclosed in its leather case.*

IMPORTANT: Failure to comply the 'Special Conditions for Safe Use' can be potentially hazardous to the user and others.

3.1 Important safety related points

- The safest medium to sample a gas line with the instrument is to connect it to an isolated sample line, accessible by a ball valve (or another suitable alternative).
- Sampled gas will be discharged from the 'sample out' port of the instrument at a rate of approximately 500ml/min.

IMPORTANT: Make sure this gas will not create a hazardous zone worse than ZONE I See Appendix B for full description of hazardous zones.

- Flush the instrument with clean air before sampling to prevent mixing potentially reactive mixtures of gas within the instrument.
- Verify instrument calibration before and after use to minimise the risk of falsely determining an atmosphere as hazardous or safe.
- **Do not** connect a GFM406 Series instrument to gas sources at greater than +50 mbar above atmospheric pressure.
- **Do not** operate the GFM406 in ambient temperatures outside the range of -10 to +40 °C
- **Do not** attempt to dismantle the instrument. It contains no user replaceable parts.
- **Do not** operate the unit if it is damaged in any way (i.e., loose front panel, missing screws etc.).
- **Do not** connect or remove electrical connectors on the top of the instrument in the hazardous area.
- **Do not** use (i.e., power on) the instrument while charging.
- Only charge the batteries in a safe well-ventilated area using the charger supplied.
- Ensure correct filter is used on the Gas In port – If any doubt please contact Gas Data
- Use only Gas Data spares and accessories – See spares list.

For further information please refer to:
Appendix B – *Understanding instruments for use in flammable atmospheres*
Appendix F - *ATEX Certification*

IMPORTANT: Gas Data cannot accept any liability for loss or damage due to its usage. Satisfy yourself that the unit is suitable for the application that you intend to use it for. If in doubt about the suitability of a GFM406 Series instrument for a particular application call Gas Data Ltd for further advice.

4.0 GFM406 Product Specification

4.1 Introduction to the GFM406 Functions and Features

The Gas Data GFM406 offers a highly diverse range of gas options which can be tailored to the customer's needs making the instrument very versatile. It is an ATEX accredited handheld gas analyser which can be used for monitoring and analysing soil gas parameters in greenfield and brownfield (contaminated land) sites and landfill sites, but also accurately carry out tasks such as odour control.

It is of a suitable size and weight to fit one hand and robustly manufactured in a weather resistant case making it suitable for use even in challenging field applications. Out of a variety of 8, it can measure up to 7 different gas concentrations in a gas sample line. External sensors can be attached for the measurement of temperature and gas velocity.

Operation is extremely simple, and the readings obtained are highly accurate. The instrument uses Gas Data's proprietary infra-red methane and carbon dioxide sensors and a combination of industry standard sensors for the other parameters.

The GFM406 has a rechargeable Nickel Metal Hydride battery pack giving around eight hours use between charges. A universal input mains battery charger unit is supplied with the instrument. Additional field replaceable battery packs and an in car 12V DC charger are also available as optional extras.

The GFM406 features data storage allows the instrument to log data with alphanumeric labelling. Data is stored in non-volatile FLASH memory with a capacity of approximately 3000 data sets including the time and date it was stored. Using Gas Data's SiteMan6.05 program data and labels can be transferred to and from a PC via a USB connection cable.

4. 2 GFM406 Instrument Specification

General	
Ex. Rating to:	II 2 G Ex ib IIB T1 Gb
Ambient Temp Range	-10 to 40 °C
Battery Life	8 hours typical
Battery charge time	2 to 4 hours
Aspiration Rate	500 ml/min
Storage Capacity	<3000 Readings
Protection Rating	IP65
Dimensions	230 x 100 x 65 mm (approx.)
Weight	750g typical depending on options installed

GFM406 Channels

	Range	Resolution	Typical Accuracy
Methane	0 to 100%	0.1%	3.0%
	0 to 100% LEL	0.1%	0.3%
Carbon Dioxide	0 to 100%	0.1%	3.0%
Oxygen	0 to 25%	0.1%	0.5%
Hydrogen Sulphide	200 ppm	1ppm	5%
	2000 ppm	1ppm	5%
	5000 ppm	1ppm	5%
Hydrogen	2000 ppm	1ppm	5%
Nitrogen (Balance Gas)	0-100% (Calculated)	0.1%	0.1%
Carbon Monoxide	2000 ppm	1ppm	5%
Atmospheric Pressure	800 to 1200 mbar	1mbar	5 mbar
Static Pressure	+/-200mbar	1mbar	+/- 1 mbar
Differential Pressure	+/-30mbar	0.01mbar	+/- 0.1
Temperature (external fitting needed)	-10 to 100°C	1°C	+/-1.0°C
Gas Velocity (external fitting needed)	0-40 m/s	1 m/s	+/-0.5 m/s resolution

Accessories

Battery Charger, Carry Case, Sample Pipe, Manual, Calibration Certificate,

Optional extras: Temperature Probe, Vane Anemometer

4.3 Specialist Functionality

4.3.1 Lower Explosive Limit

The instrument calculates and displays the Lower Explosive Limit (LEL) of Methane. This function is intended for use where methane has become mixed with air i.e., where oxygen is still present in normal atmospheric proportions with respect to atmospheric nitrogen. This is the worst case so if the gas sample is taken from a location where the oxygen content is depleted e.g., due to biological demand, then the LEL indication will be higher than expected.

4.4 Third Party Approvals

4.4.1 ATEX

This instrument is ATEX Certified under normal operation.

ATEX accreditation is void under the following circumstance:

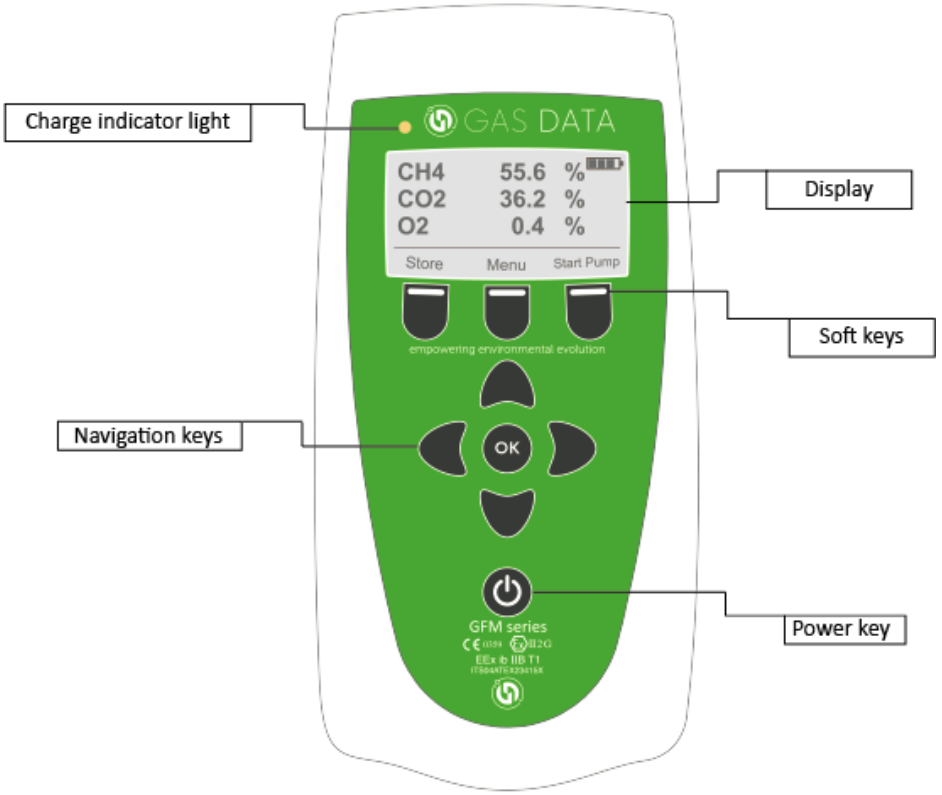
- If the instrument is removed from its leather case
- If the instrument is charging or plugged into a computer i.e., not under normal operation
- When the battery cover or inlet housing has been removed or unscrewed

For full information and details see *'Safe Use of the GFM406 Series'* and Appendix F - *ATEX Certification.*

4.5 In the case

The GFM406 series instruments are supplied in a fitted case containing the following items:

4.6 Front panel control layout

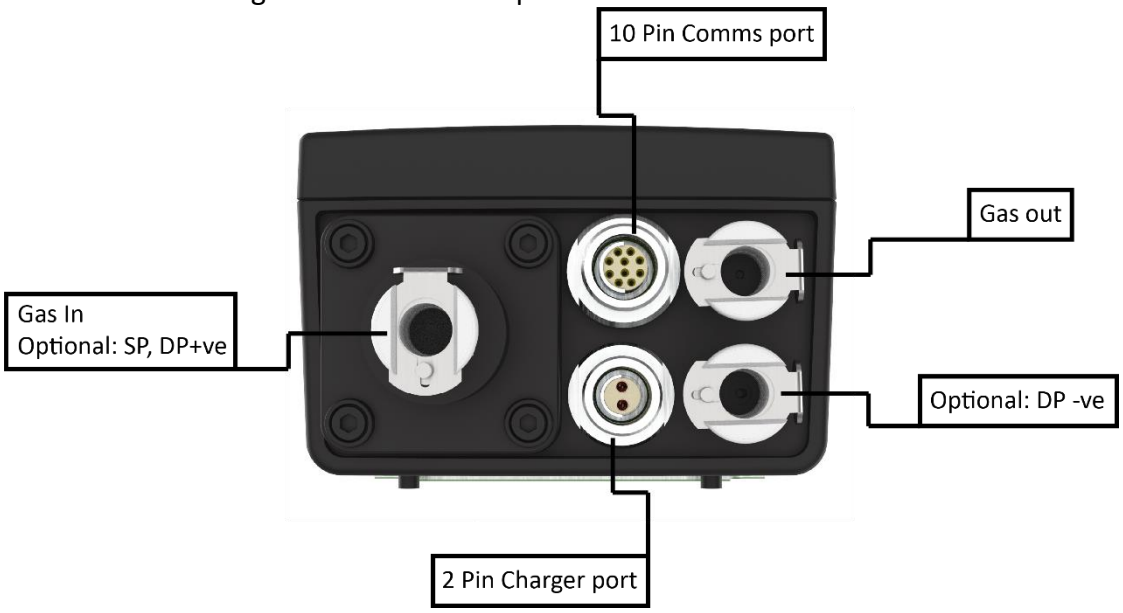


Charge indicator light can be in one of three states:

- Solid red – in fast-charge mode (1.5-2A).
- Solid green – terminated fast-charge mode but still charging (30mA).
- Alternating red & green – In an indeterminable state not suitable for charging (This is usually due to temperature issue. It is advised to move instrument to well-aired area at room temperature, so that the instrument temperature can stabilise).

4.7 Connections on the Instrument

The annotated image below shows the pneumatic and electrical connections to the instrument.



4.8 Connecting the Gas Sample Pipe

Ensure customer gas line ball valve remains closed through the set-up of these instructions.

Ensure the instrument is turned on and has been running a sample to prevent any pressure build up once the sample line in connected.

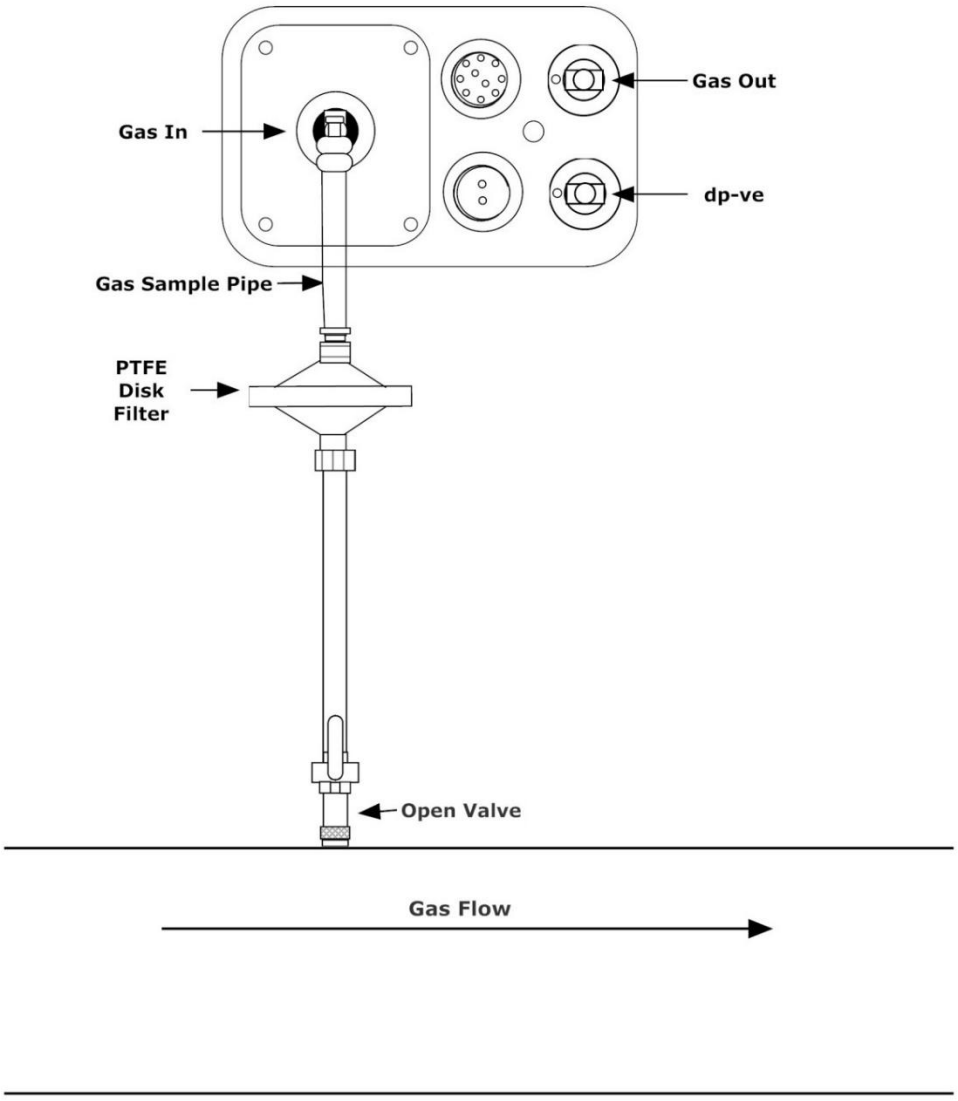
Ensure the instrument is going to suitably exhaust:

- If the instrument is being used indoors, ensure an exhaust pipe is connected and fed to a ventilated area or to the outside.
- If the instrument is being used outside, it is safe to allow the instrument in the air ambiently; however, ensure the Gas Out channel is not pointing toward yourself or that anyone else is too close to it.

IMPORTANT: The instrument will be exhausting toxic, explosive or harmful gas. Though the sample is a lower volume, repeated exposure can be very harmful or cause a build-up if not ventilated properly. Please see 'Safe Use of the GFM406 Series' and Appendix F - ATEX Certification or contact Gas Data Ltd for more information.

To take a gas sample, first connect the Gas Sample Pipe fitted with the filter to the main gas pipe sample line, labelled "Gas Flow" on the diagram below.

Typical connection for taking a gas sample



Connect the other end of the **Gas Sample pipe** (the end with the plastic fitting) to the **Gas In** port.

To do this, push the metal latch down then insert the connector at the end of the sample pipe. The port will lock the pipe in place and prevent it from being pulled out accidentally; it can be removed by pushing the metal latch down and pulling out the sample pipe.

Ensuring that all of the sample pipe is connected and not going to leak, turn on the ball valve.

4.9 Optional Extra Accessories

Vane anemometer – **Air velocity** measuring device. Instructions and information can be found on **Chapter 8.0 – Gas Velocity Readings**.

Brass Temperature Probe – Gas line temperature measuring device. Instructions and information can be found on **Chapter 9.0 – Gas Temperature Readings**.

In Car charger – additional power adapter, available for purchase on request.

Gas Cylinder and demand flow regulator – available for User Calibration, see **chapter 10.6 User Calibration**.

5.0 GFM406 Operation

IMPORTANT: As this product is configurable for customer requirements, some instructions in this manual may not apply to your instrument. Please consult your Calibration Certificate to determine the specification of you instrument.

5.1 Starting Up

Press the Power Key to turn the instrument on.

When turned on the instrument will take a few seconds to boot up. During this time a 'loading' banner will be displayed. After a few seconds, the instrument will show the display below:

After booting up the instrument commences a warm-up period. This is to allow all the sensors to initialise. During this period the letters 'WRM' appear in the top right-hand corner of the display as shown. Please wait until WRM disappears before proceeding.

The screen shows the instrument type (GFM406), its recalibration date, the battery level, and the serial number. If you ever need to contact Gas Data for assistance with your instrument, please quote the serial number.

IMPORTANT: If the instrument has been stored in a cool place, or hasn't ran a sample for at least a week, then allow the pump to run for at least 10 minutes before trying to take a sample. It is advised to still be wary of readings until the instrument is in a routine of being turned on and ran regularly.

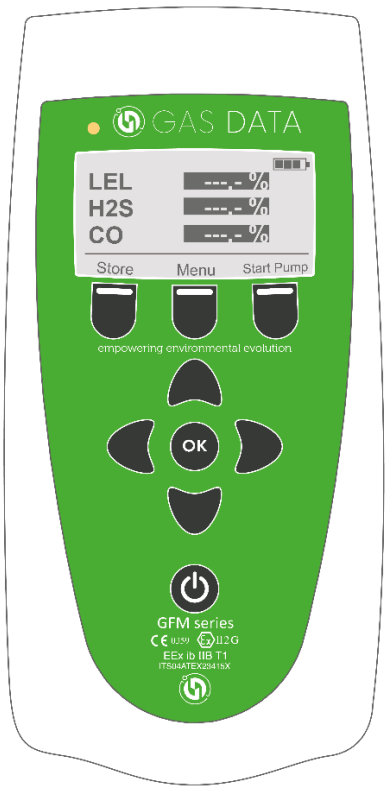
5.2 Navigating the screens

Use the left or right navigation keys to move to the operation screens.

Each operation screen, **Gas**, **Pressure** and **Velocity & Temperature,** has the following functions:

- Run the pump/sample
- Store readings
- Viewing more options in the menu

Three readings are shown on screen at a time. Pressing the **Up and Down Navigation Keys will scroll up and down** to view the other values.



Use the up and down navigation keys to scroll up and down on the display pages.

The next sections will describe each operation that can be carried out on the GFM406. For information on storing the data please see chapter 10.0.

5.3 Reading the displays

Before a sample is first taken, after powering up the instrument, the readings are dashed and blacked out as shown below. You can see this on **Gas Concentration Readings display**, **Gas Pressure Readings Display** and **Gas Velocity and Temperature Readings Display** by pressing the **Right arrow Key**

The Right Soft Key will toggle the pump/sample on and off, changing the readings.

When the pump is running the screen will display live readings being taken from the Gas Sample line or connected accessory.

Pressing the Right soft key again will stop the pump/sample.

When finished with the sample, turn off the pump and the last reading will latch and be displayed on the screen as shown below.

These latched readings can be stored in the instruments non-volatile FLASH memory by pressing the left soft key. The menu shown below appears.

For information on the **Store** function on this display, see chapter 10.1.
Pressing the middle soft key will open the menu shown below.

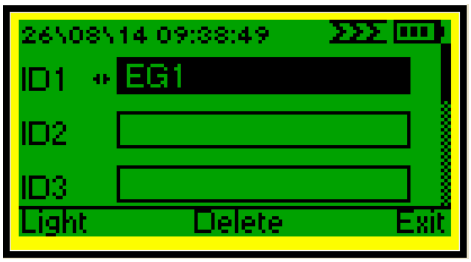
The menu has the following functions:

- Sample Point Setup - Setting up sample points for storing readings through creating an ID structure. Specific instructions for this can be found in **chapter 10.3.**
- Logging Setup - Setting up a logging sequence for automatic sampling over a specified amount of time. Specific instructions on this can be found in **chapter 10.4**.
- View - View readings stored on the instrument. Specific instruction can be found below in **chapter 5.4.**
- Set Clock - Change the time and date on the instrument. Specific instruction can be found below in **chapter 5.5.**

5.4 View reading display

The View Readings Display is a display for viewing and deleting previously stored readings.

Use the Up and Down keys to scroll through the IDs. Pressing the OK Key on the ID you require will select it. Now you can scroll through the sample points under this ID by scrolling left and right using the arrow keys. If an ID is not currently selected then pressing the Left or Right Key will go to the previous or next reading in the currently selected sample point.



The Middle Soft Key, labelled ‘Delete’, will delete the currently viewed reading and show a popup saying ‘Sample deleted’ and the number of free readings available (i.e. the amount of store space remaining).

The Left Soft Key, labelled ‘Light’, switches the backlight on and off and the Right Soft Key, labelled ‘Exit’, returns to the Gas Display.

5.5 Clock Display

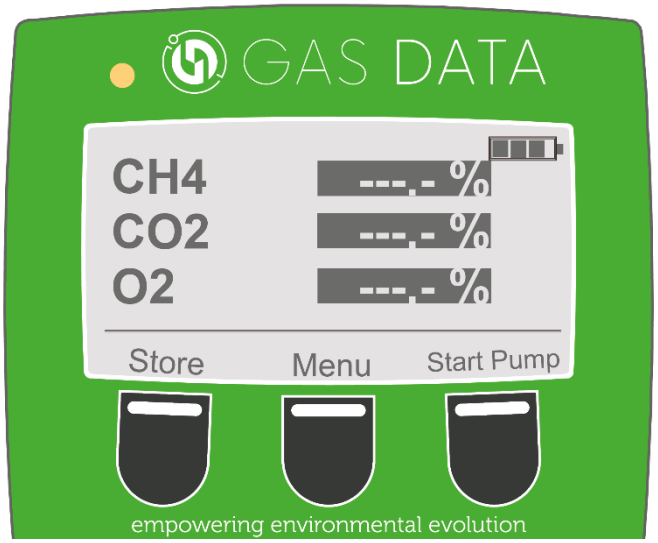
All stored readings are stamped with the date and time. To change the date or time of the instrument, navigate to the Menu and scroll down to “Set clock” and select OK.

Use the arrow keys to navigate to the desired field. Press the OK key to begin editing. Press the Up and Down arrows to change the field.

Press the left soft key to save changes.

6.0 Gas Readings

This screen is the main display for viewing **Gas** readings.



The instrument can show **Methane (CH_4), Carbon Dioxide (CO_2), Oxygen (O_2), Lower Explosive Limit (LEL), Hydrogen Sulphide (H_2S), Carbon Monoxide (CO), Hydrogen (H_2) and Nitrogen (N_2) (balance gas)**. Only the gases chosen by the customer when the GFM406 was purchased will appear on the gas display. Consult the Calibration Certificate to determine exact gas configuration, ranges and accuracies chosen.

6.1 Taking a Gas Reading

It is advised to allow the instrument to sample fresh air for 10 minutes after first turning it on. No piping needs to be fitted for this - ensure fittings atop the instrument are open and unblocked.

To set up for **Gas Readings**, see **4.8 – Connecting the Gas Sample Pipe**

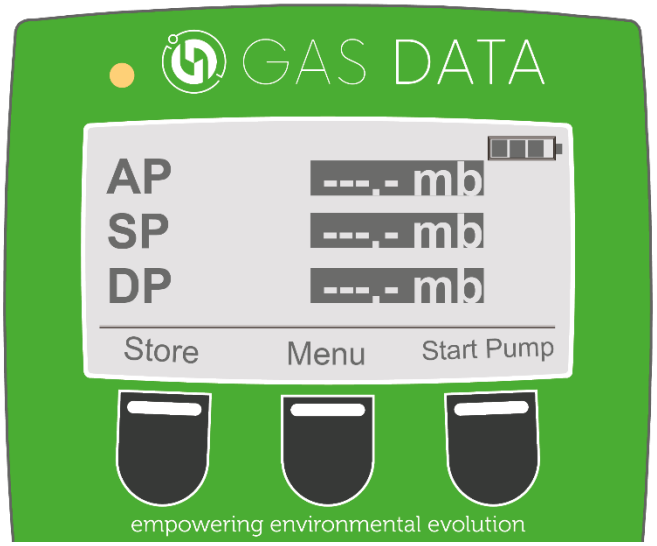
Note: Ensure the system exhausts to a well-ventilated area. Ensure **3.1 - Important safety related points** has been read and understood before any gas samples are introduced to the system.

To understand the format of the display, see 5.4 – Reading the Displays

7.0 Pressure Readings

This screen is the main display for viewing **Pressure** readings.

This display shows the **Atmospheric pressure (AP), Static Pressure (SP) and Differential Pressure (DP)**. Only the pressure variations chosen by the customer will appear on the pressure display. Consult the Calibration Certificate to determine exact gas pressure measurements chosen.



Note: It is important to complete the zeroing in an environment where there is no flow or pressure and ensure that the end of the flow tube is not exposed to any external flows or pressures.

7.1 Taking an Atmospheric Pressure (AP) Measurement

Atmospheric pressure is the pressure exerted by the weight of the atmosphere. It therefore requires no inputs or exhausts. The instrument has a passive Atmospheric Sensor built in.

No set up is required for **Atmospheric Pressure**

Atmospheric Pressure readings cannot be zeroed.

7.2 Taking a Static Pressure (SP) Measurement

Static pressure is the pressure of gas while it is not moving. To measure the Static Pressure, a gas line needs to be connected to the Gas In port in the instrument.

To set up for **Static Pressure**, see **4.8 – Connecting the Gas Sample Pipe**

7.3 Taking a Differential Pressure (DP) Measurement

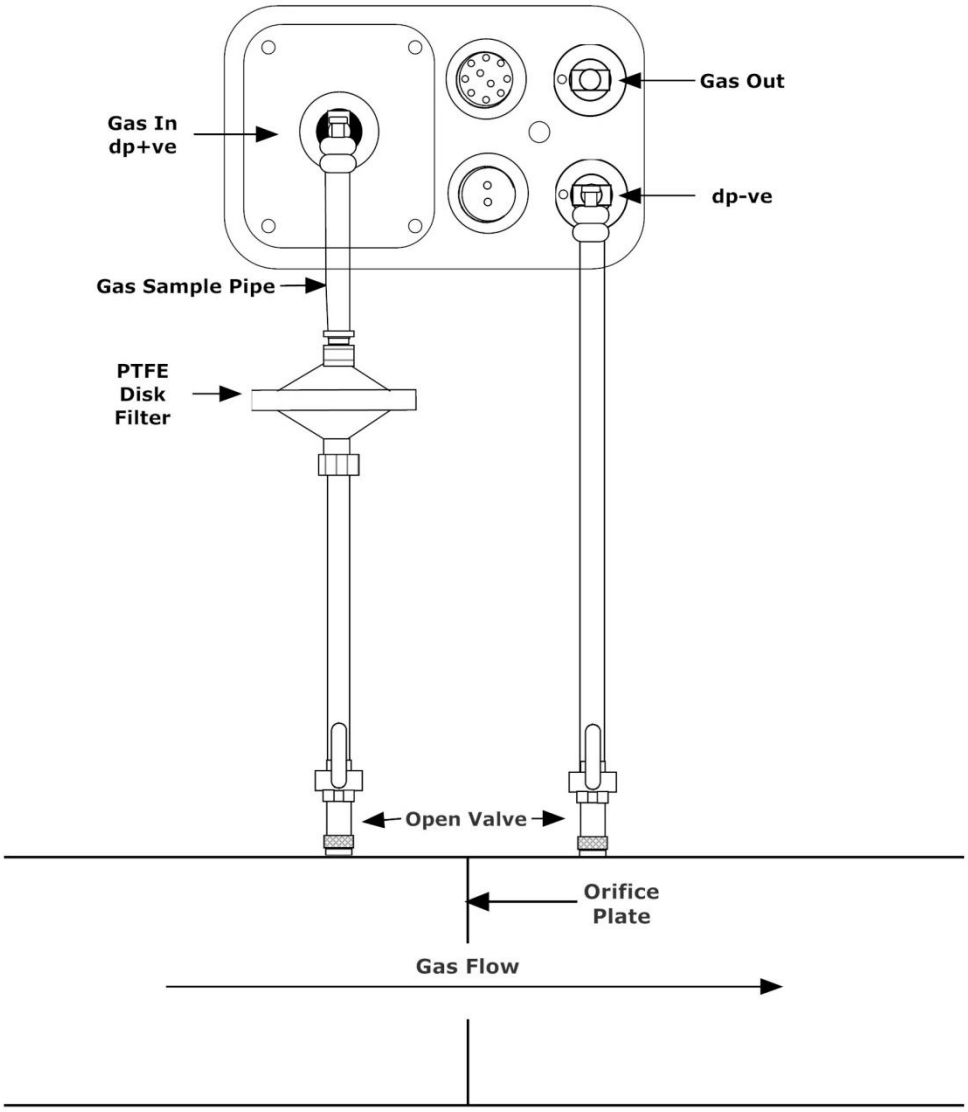
Differential Pressure is the difference in the pressure measured across two separate readings. The instrument can measure **differential pressure across two measured points**, or **across one measured point and Atmospheric pressure**.

To set up for **Differential pressure across two measured points**, see **7.3.1 – Connecting the sample pipe for differential pressure.**

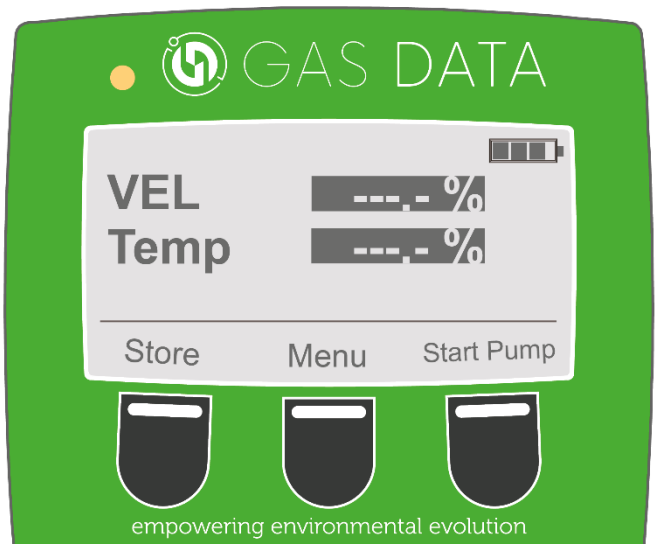
To set up for **Differential Pressure across one measured point and Atmospheric**, see **4.8 – Connecting the Gas Sample Pipe**

7.3.1 Connecting the sample pipe for Differential Pressure

Typical connection to an orifice plate



8.0 Gas Velocity Readings



8.1 Taking a Gas Velocity Measurement

Locate a suitable gland or bung on the pipework and insert the anemometer.

When the anemometer is as far into the gland as possible without opening the tap, open the gas tap.

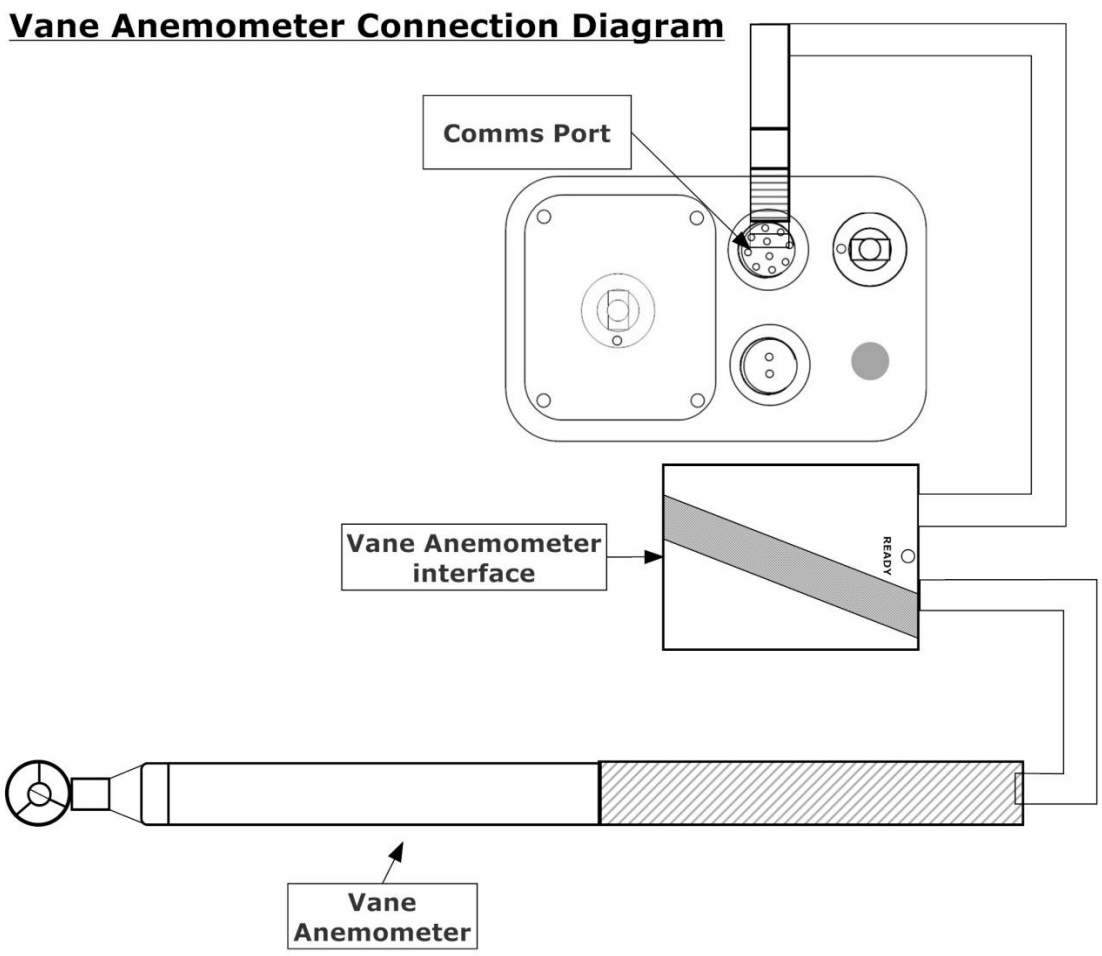
Finally, push the anemometer into the gland far enough to ensure that the impeller is in the centre of the gas pipe.

Now press the ‘Sample’ key to begin measuring the velocity in the pipe.

When the reading has stabilised, press the ‘Sample’ key to retain the reading. The anemometer can now be removed from the pipe.

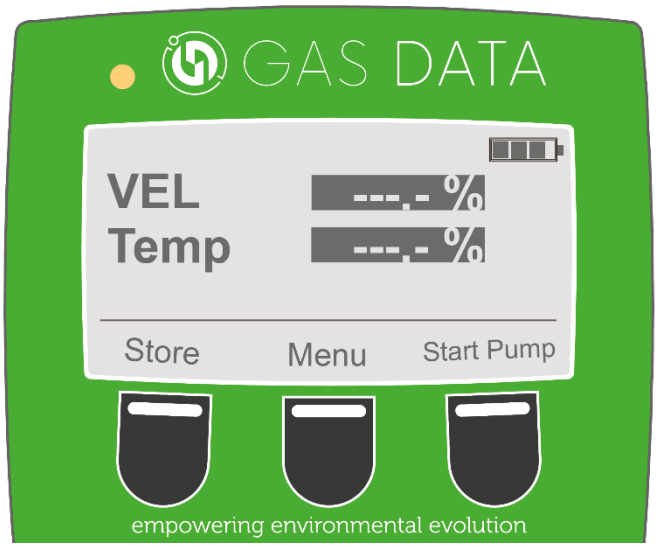
8.2 Connecting the Vane Anemometer for Gas Velocity

Connect the vane anemometer to the Comms port at the top of the instrument.



9.0 Gas Temperature Readings

Gas Temperature shares the same screen as Gas Velocity.

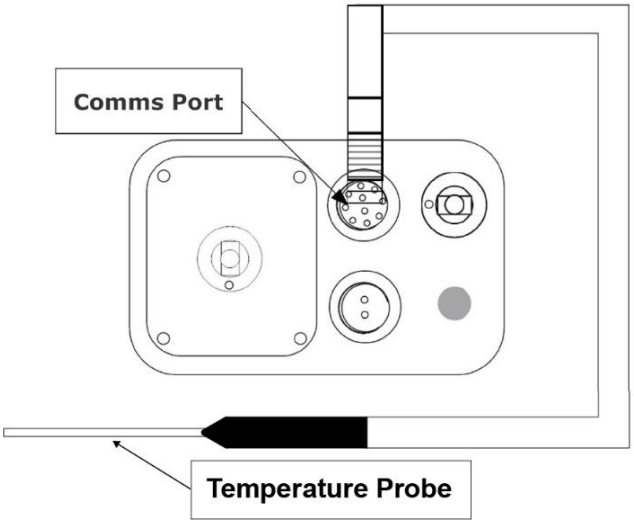


9.1 Taking a Gas Temperature Measurement

Connect the temperature probe to the Comms port at the top of the instrument.
Locate a suitable gland or bung on the pipework and insert the temperature probe.
When the probe is as far into the gland as possible without opening the tap, open the gas tap.
Finally, push the probe into the gland far enough to ensure that the tip is in the centre of the gas pipe.
Now press the 'Sample' key to begin measuring the temperature in the pipe.

When the reading has stabilised, press the 'Sample' key to retain the reading. This will return the highlight area around the temperature figure. The temperature probe can now be removed from the pipe.

9.2 Connecting a temperature probe for Gas Temperature



10.0 Storing Data

The GFM406 has a built-in, non-volatile, FLASH memory which allows the user to save gas concentration, pressure, velocity and temperature readings at the time and date they are saved. The stored readings can be uploaded to a computer using the SiteMan software provided with each instrument. The data is saved in a Comma Separated Value (CSV) format.

With a brief set up, users can configure IDs for their readings to allow for multiple users, sites, or sample points to be defined.

IMPORTANT: Unattended data logging is intended for gas concentration, AP and velocity or temperature measurement. DP and SP may require different piping configurations depending on instrument setup therefore they are not suitable for unattended data logging.

10.1 Storing Data

Once a reading has been taken, or while a reading is being taken, **pressing the left soft key twice**, will save the most recently latched or current reading on the screen.

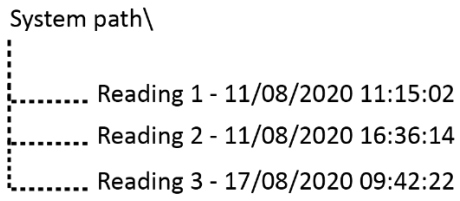
Up to 3000 readings can be recorded on a GFM406. Continuing to store readings this way will add them to device's memory without an ID against it. It will save it against a time and date still.

10.2 Data storage ID structure

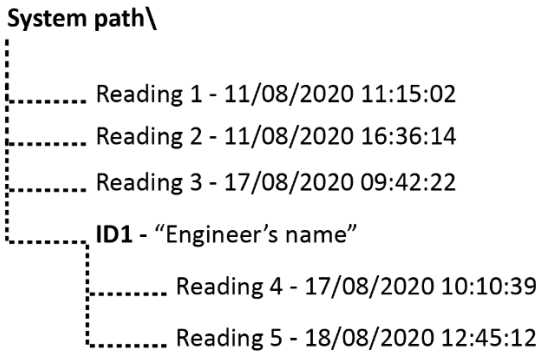
This section will explain how the readings can be marked with an ID up to 3 different levels. Please note, the following diagrams are examples of the structure behind the filing system. They do not represent any display or visuals of the instrument. The content and meaning behind them however is correct.

The IDs are structured like a **folder system path** on a computer.

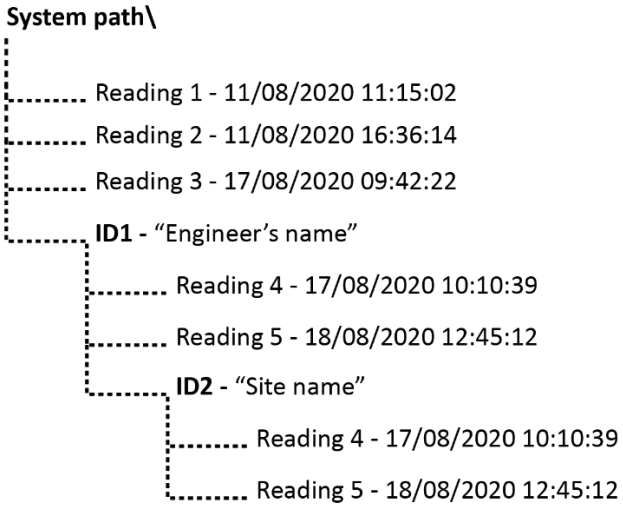
If a reading is **stored under no ID**, then they are saved in the **top level**.



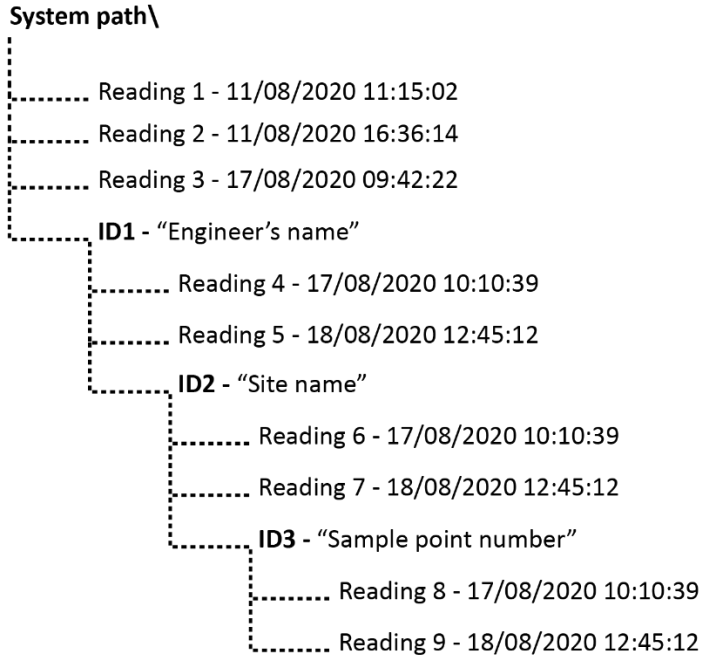
If a reading is **stored within ID1** under a certain name, then it is saved in the equivalent of **a folder within the top level** that is named that specific name.



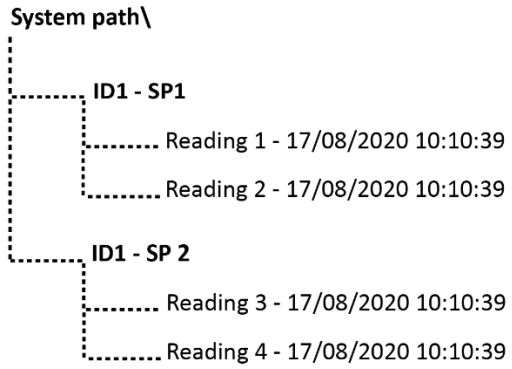
And so, if the reading is **stored under an ID1 and an ID2** then it is the equivalent of being **stored in a folder that is within a folder on a top level**.



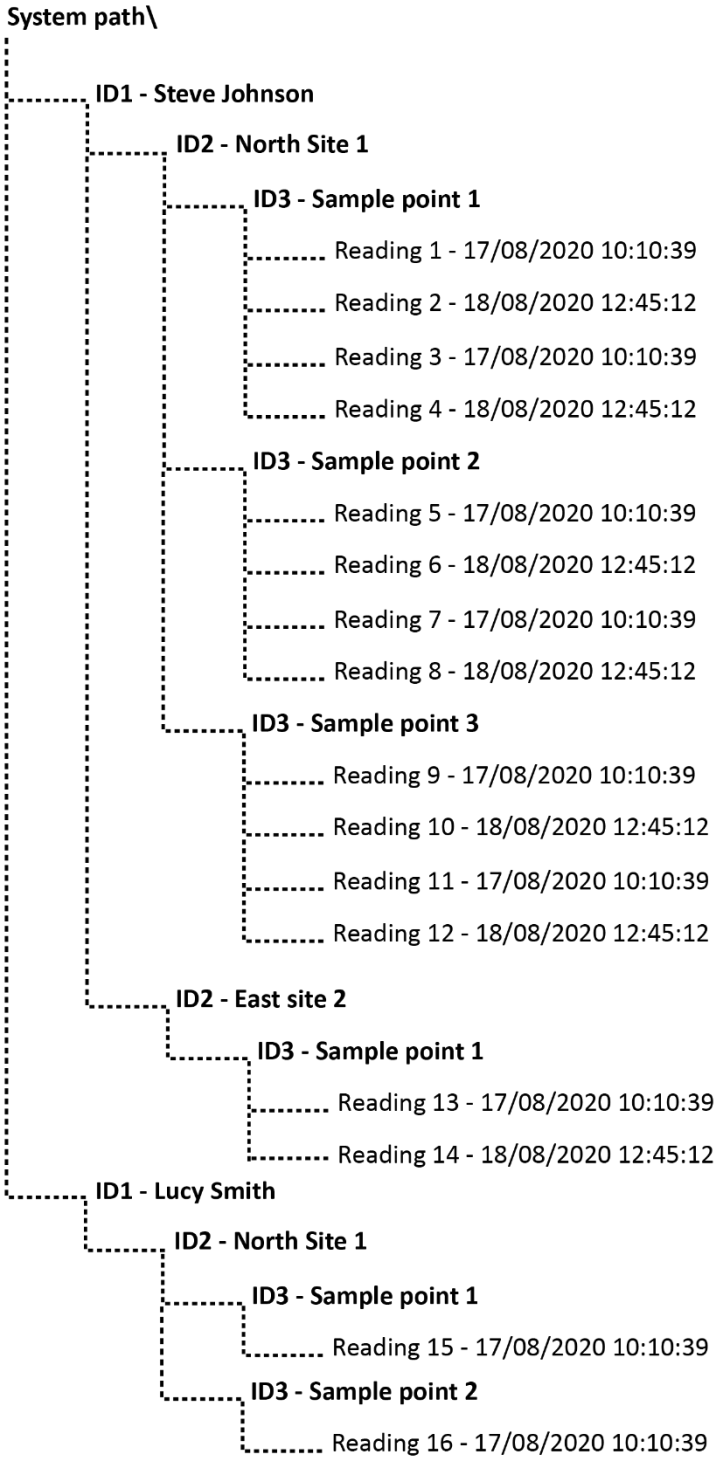
The device allows a **maximum of three ID levels**.



The two diagrams below show examples of how a user may configure the IDs. The first example is **a very simple set up**. This may be used if **the instrument has one user on one site**.



The second example shows a much **more complicated set up** which would be used if there are **multiple users, across a variety of sites**.



Before you can start storing or logging readings you need to create a sample point, essentially a name or location information for your log. This is done using the Sample Point Setup function.

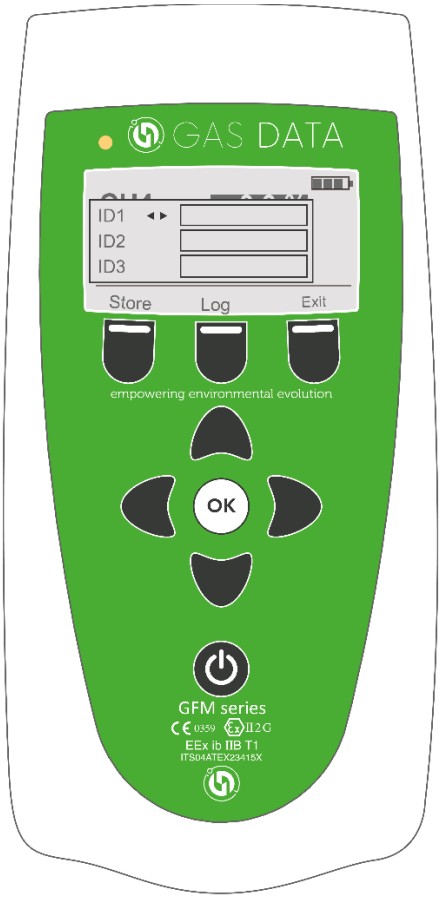
10.3 Sample Point Setup

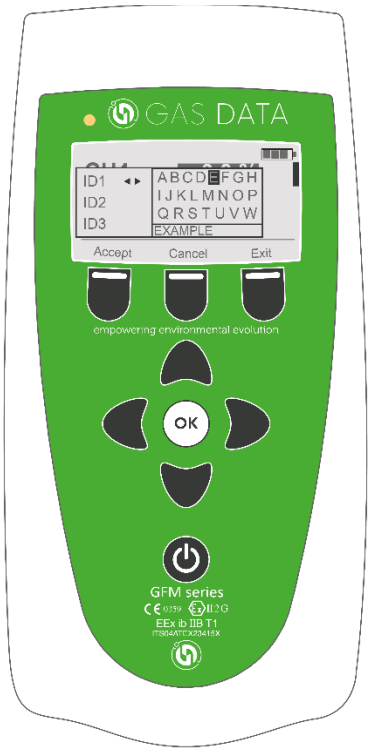
A sample point is the name given to the point at which the instrument draws a sample of gas from a main gas pipe. As there is a great number of different sample points a customer may use, users may set up ID tags on the instruments to symbolise particular sample points (or to symbolise anything the customer desires). Instructions on setting up these sample point IDs are found below:

On the Gas Readings display, using the soft keys, open the menu and select “Sample point setup” using the OK key.

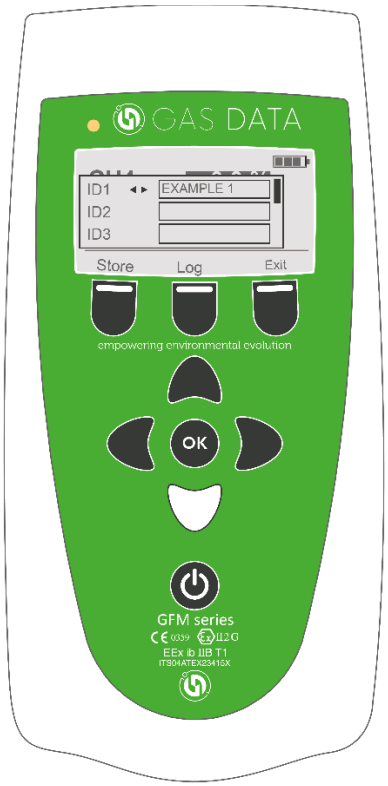
This opens the ID selection table. To understand the structure behind the ID numbers, see chapter **10.2 – Data storage ID structure**.

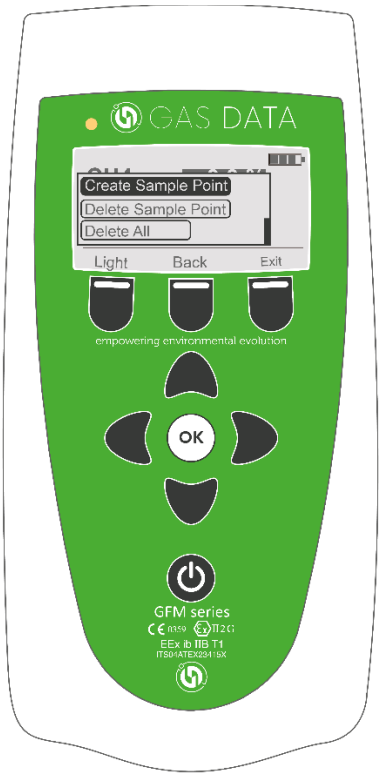
To edit the name of an ID, navigate to the desired cell (either one to be edited or a blank cell for a new entry) and press OK. Use the arrows and OK key to enter the desired name for the ID selected. Then press the left soft key to “Accept”.





When all the appropriate tiers have been given the correct names, scroll down using the arrow keys and select “Create sample point” using the OK key. This menu can also be used to **delete sample points**. Sample points are selected when storing data by pressing “OK” on each ID number and using the “left and right arrows” to select the desired sample point.





Once the sample point is created, the display will read “ID Created”, unless the ID already exists in which case you will be notified when the display reads “ID already existed”.

10.4 Logging Setup

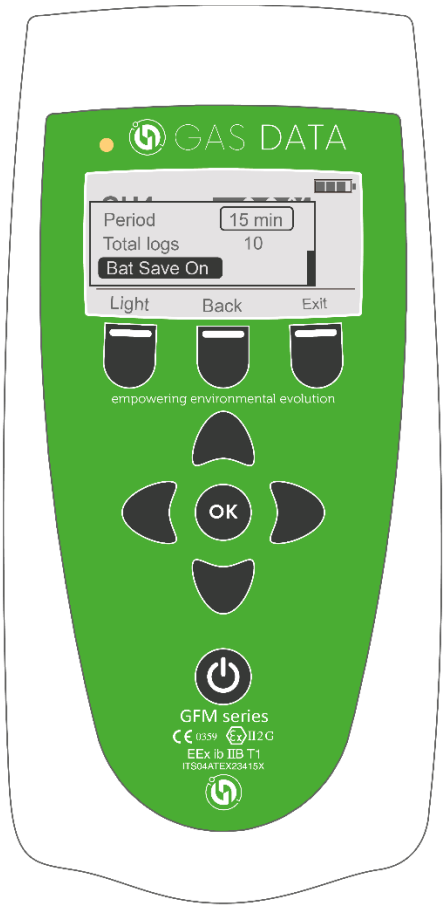
The GFM406 has a built-in 'Unattended Data Logging' facility. This allows the instrument to be programmed to carry out repeated samples over a defined period.

To access the Logging Setup Screen, press the Middle Soft Key ('Menu') from any of the measurement display screens.

Use the arrows to highlight 'Logging Setup' and press the OK button.

Logging Setup is a menu for setting up unattended data logging parameters. The parameters can be found on the list on screen. They are accessed by scrolling up and down with the arrow keys and pressing the OK key to edit.

IMPORTANT: Logging must be set up against a named ID number. If not, the readings will not save. A failed log will be identified by "ILL" appearing in the top right hand corner by the battery symbol. See **chapter 10.0 for instructions on setting up IDs.**



Pump Time

This parameter determines the length of time the pump will run for a while before the gas analysis values are captured, also known as sample time. This is a pre-set list of values to select from - 90 seconds, 2 minutes, 3 minutes, or 4 minutes.

Pressing 'OK' will scroll through these options. When you have selected the required value, use the 'Up/Down' arrows to move to the next parameter.

A selection of 3 minutes, for example, will allow the pump will run for 3 minutes and then the instrument will store the analysis values it measured at the end of the 3-minute period.

Period

This parameter determines the time between samples. This is a pre-set list of values to select from – 10 minutes, 15 minutes, 20 minutes, 30 minutes, 1hr, 2hrs, 3hrs, 6hrs, 12hrs and 1 day.

A selection of 10 minutes, for example, will result in the instrument storing a result every 10 minutes. The instrument will use the Pump Time parameter as it calculates its timings.

For example, if a pump time of 2 minutes and a period of 15 minutes is selected then the pump will be off for 13 minutes, then will operate for 2 minutes so the results are stored every 15 minutes.

Pressing ‘OK’ will scroll through these options. When you have selected the required value, use the ‘Up/Down’ arrows to move to the next parameter.

By default, the Pump Time is 2 minutes, and the period is 15 minutes.

Total Logs

These parameters determine the total number of samples which will be taken.
Unlike Pump Time and Period, you can set Total Logs to any number between 0 and 3000 readings. The upper limit is determined by the remaining store space.
If Total Logs is set to 0 it will Log continually until there is no more store space remaining.

To change Total Logs, select the field and press OK. Then use the Left and Right Key to highlight the digit you wish to change and use the Up and Down Keys to increment or decrement that number. To move to the next digit, use the arrow keys again.

Once you have set your Total Logs press OK to move to the next field.
By default, Total Logs is 10.

Bat Save On

The battery save function is on by default and increases the length of time the instrument can be left to perform unattended data logging by shutting down between samples.

With battery save enabled the instrument will switch itself off 5 seconds after taking a sample unless it is interrupted, for example by a Key being pressed or the log ending, then switch itself back on approximately 30 seconds before it is due to start taking its next sample.

With battery save disabled the instrument will remain turned on at all times, until the battery is empty.

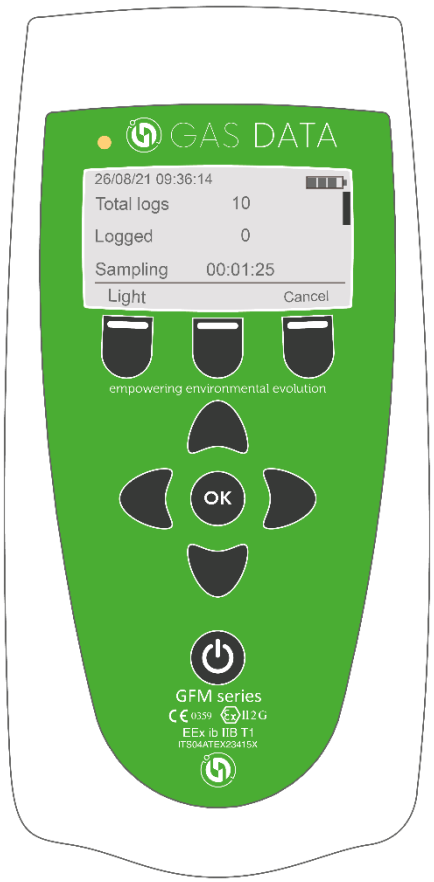
Pressing OK when this parameter is highlighted will toggle this setting

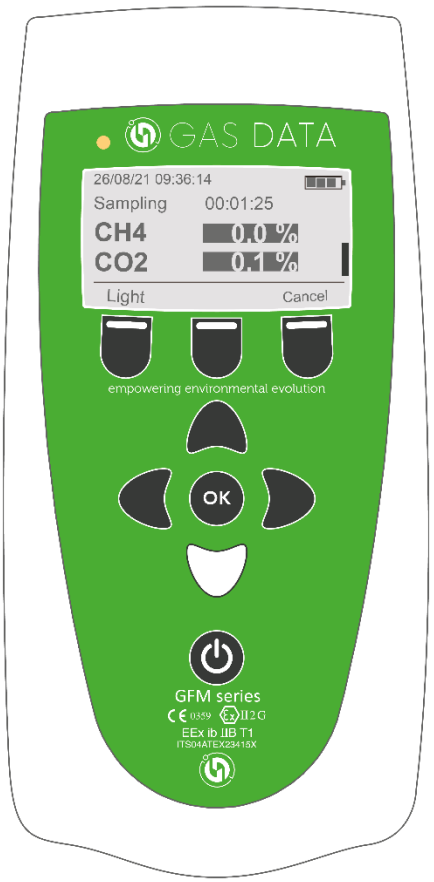
When all the parameters have been selected, press ‘Exit’ to return to the Gas Display screen, and the logging sequence will be saved.

10.5 Logging Display

The Logging Display shows the total number of samples to be taken in the log, ‘Total Logs’, and the number of samples which have been logged, ‘Logged’.

When the pump is running and it is sampling a countdown timer and ‘Sampling’ will be shown, when this reaches 0 the measurements will be stored and a popup will appear saying ‘Reading stored’ and the number of free readings available (i.e. the amount of store space remaining) if the store was successful.





When it is not sampling, ‘Next Sample’ and the time until the next sample will be shown unless the log has finished. Saved readings can be read by scrolling down with the down arrow. As the instrument moves through the number of total logs, readings will be saved against the time and date and under any ID number combinations selected at the start.

After each sample, a pop-up box will appear saying “Reading stored” and then an indication of the remaining memory on the device.

After all the samples are complete (i.e. number of total logs has been reached), another pop-up box will show saying “logging complete”.

NOTE: These Soft Keys are hidden while popups are being shown and pressing a Soft Key while a popup is active will close it.

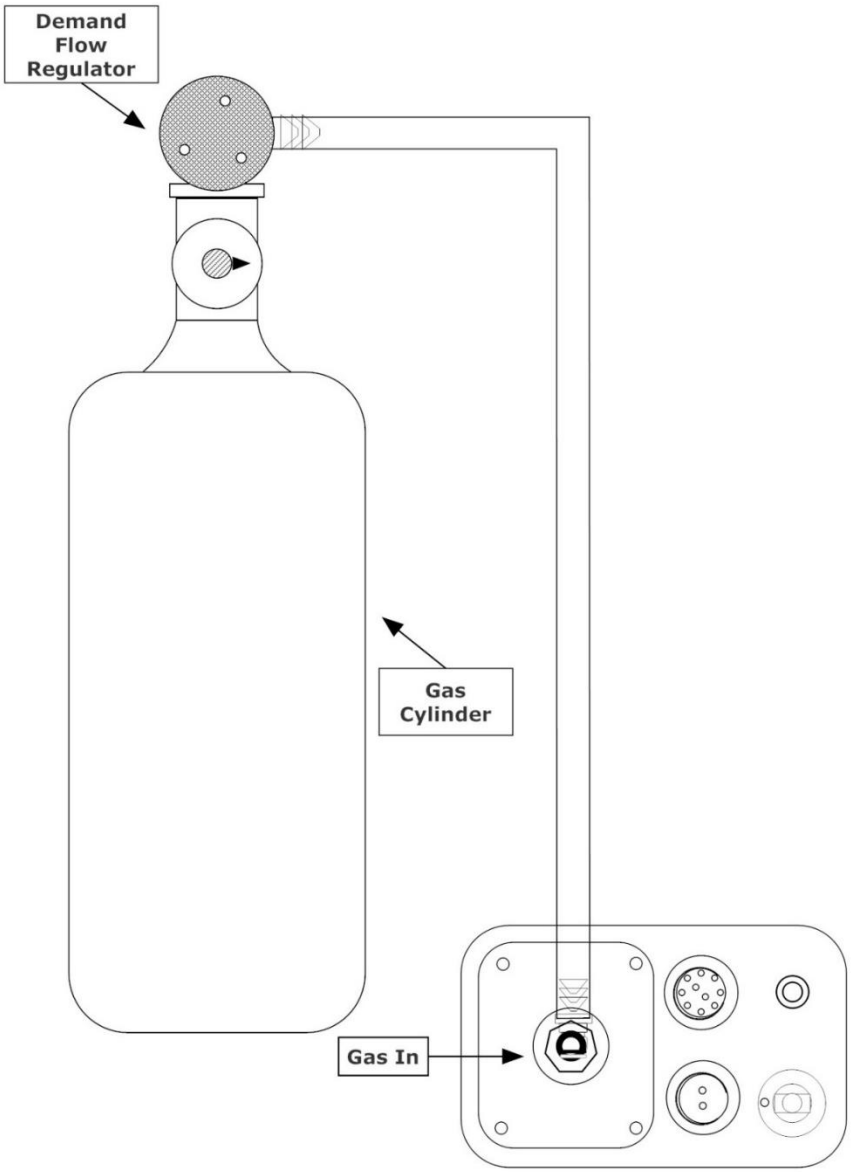
If the battery save function is on the length of time the instrument can be left to perform unattended data logging is increased as the instrument will shut down between samples.

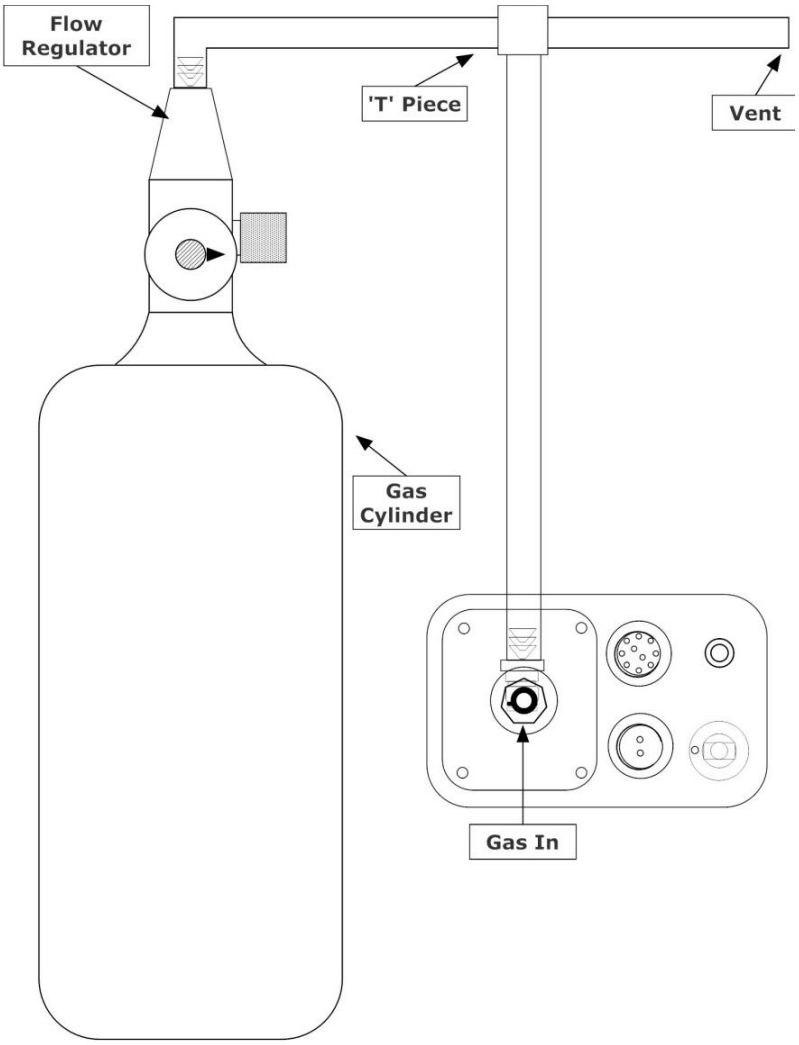
A popup saying ‘WARNING Switching Off May Interrupt Sampling’ will be shown when the instrument wakes itself as manually switching the instrument on or off during logging may interrupt sampling or cause a log to be missed or not taken.

10.6 User Calibration

Calibration of the GFM series of instruments involves the use of pressurised cylinders of test gases.

A cylinder of the appropriate gas at the specified concentration needs to be connected to the 'Gas In' port at the top of the instrument with the valve open when calibrating a point. It is recommended that a demand flow regulator is used. If a demand flow regulator is not used connect the cylinder through a 'T' piece to bypass most of the gas to exhaust and set the gas flow regulator to 500 ml/min.

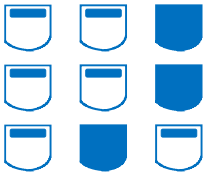


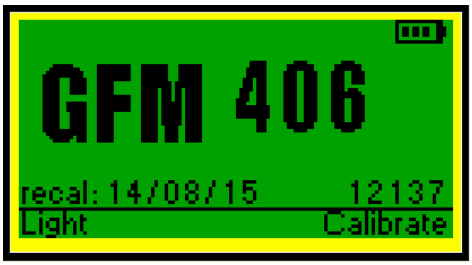


Warning	**The use of pressurised cylinders of test gases may produce hazards including the following:** • **High pressure gas leakage** • **Release of flammable gas mixtures** • **Release of toxic gas mixtures** **Always follow the safety guidelines given by your test gas cylinder supplier.**

On the Banner Display pressing Right Soft Key, Right Soft Key, then Middle Soft Key will reveal a hidden Calibrate button.

Pressing the **Right Soft Key twice,** once after another then the **Middle Soft Key** will reveal a hidden button for the **User Calibration Display.**





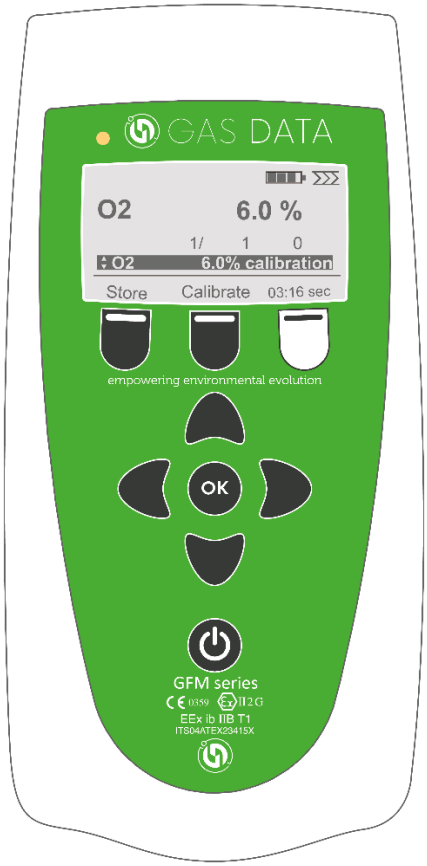
Press the Right Soft Key, labelled ‘Calibrate’ to go to the User Calibration Display.

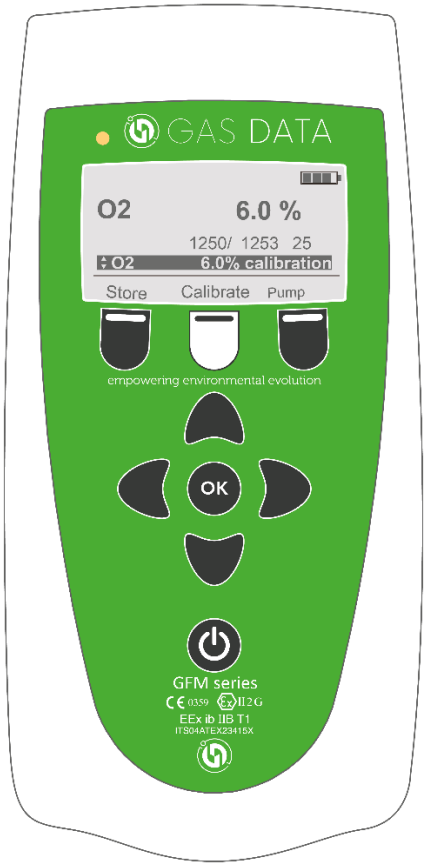
From here, the gas to be calibrated should be selected using the up and down arrows and then the OK key.

Only one gas may be calibrated at a time. Be sure to select the correct calibration option of the four available. This can be done by scrolling with the up and down arrows once the gas has been selected. They are as follows:

1. Reset factory delta	When an instrument is User Calibrated, the “Deltas” are adjusted. These are the three numbers shown below the gas reading. These represent the adjustment ratios of the software to compensate for any drift that the gas channels may have been subject to. Resetting the Factory delta will remove any adjustment ratios. Calibrating the instrument at any point will create new deltas and overwrite the previous ones.
2. Calibrate zero point	A calibration of the instrument when the gas its zero point (0.0% or 0ppm)
3. Calibrate low range point	A calibration of the instrument at a low reading, typically around 5% (different low rangers per gas). This done to improve the accuracy of readings and the lower end of the possible range.
4. Calibrate high range point	A calibration of the instrument at high reading, usually dictated by the composition of the gas composition typically available.

To calibrate an instrument, the pump must be activated when connected to the correct gas source. Allow the instrument to sample the gas for at least 3 minutes, then when the reading stabilises select “Calibrate” with the middle soft key. This will change the deltas and overwrite the previous values.





Note: Ensure the correct gas concentration is connected to the instrument before calibrating. Miss-calibrating will inevitably lead to false results. If anything goes wrong with the user calibration, reset the factory deltas. Please contact Gas Data for any further questions.

The zero Cal point requires a gas known to have 0.0% of the measured gas for the specific gas channel being calibrated. The low and high range Cal points will depend on the specific gas channel being calibrated and is summarised in the following table:

Gas Channel	Zero Cal Point	Low Range Cal Point	High Range Cal Point
CH_4	0.0%	5.0%	60.0%
CO_2	0.0%	5.0%	40.0%
O_2	0.0%	6.0%	20.9%
H_2S	0ppm	100ppm	2000ppm
H_2	Not available for user calibration		
CO	Not available for user calibration		

The same information can be seen built into the instrument when selecting which calibration option to calibrate. Navigate through the different calibration ranges and different gases using the up and down arrow.

NOTE: Only attempt to calibrate a point if the current gas reading is within +/- 5% of the indicated calibration point. If the Middle Soft Key, labelled 'Calibrate', does not appear this means that it is currently not possible to calibrate the desired point. Also, the valve must be open for the gas to flow and starting or stopping the pump will also open and close the valve. If you are using a cylinder of calibration gas without a demand flow regulator, then having the cylinder connected with the regulator open while the valve is closed will cause a back pressure. Having the cylinder connected with the regulator closed or when the cylinder is depleted while the valve is open and the pump is on, may damage the pump.

Scroll using the up and down arrows to find "**GAS Reset factory delta**". Then select "**Reset**". This will remove any user calibration, and return the deltas to 1/1/0

Once calibration is complete, press the Left Soft Key, labelled 'OK', to return to the Banner Display.

10.7 Auto Turn Off

To help prolong the time between charges, the GFM will automatically turn off after 15 minutes of inactivity. This does not occur whilst the instrument is connected to the mains supply.

Appendix A - GFM406 Maintenance

As the GFM406 is an ATEX rated, precision instrument of analysis, it is very important to maintain its good condition for both safety and performance.

GFMs require annual servicing, the date for which is displayed on the opening screen. The following conditions must be met and are essential to the instrument's functionality and reliability:

- It must be stored at room temperature.
- It must be powered up and have a sample taken at least once a week.
- Each day it is used, a sample of fresh air must be taken before and after use.
- It must be charged the same day when the instrument has run out of charge

If these are not done, then instrument is at risk of the following:

- Reducing battery life
- Bringing harm to the electrochemical cells, reducing their lifetime
- Affecting the instrument's performance in gas analysis

11.1 Low battery warning

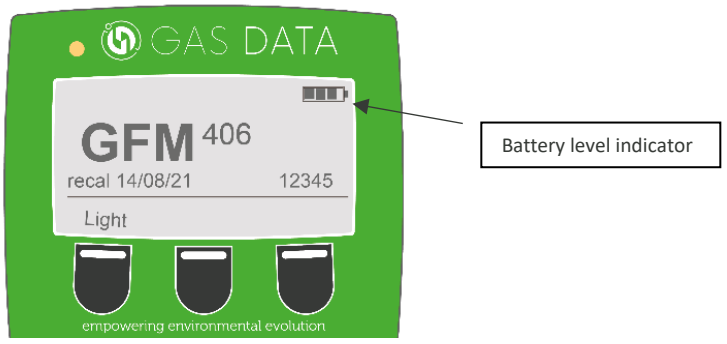
The battery level indicator in the top right of the screen is made up of 3 bars that represent the remaining power in the instrument.

- **3 bars** symbolise the instrument **is fully charged** and so has **8 hours of use left**.

- **2 bars** symbolise the instrument **has a maximum of 2/3 of its charge** remaining and so has **5 hours of use left**.

- **1 bar** symbolises the instrument **has a maximum of 1/6 of its charge** remaining and so has **1.5 hours of use left**.

- **No bars** symbolise the instrument **has none of its charge** remaining and so it is **about to turn off**. At this point the instrument should be plugged into its charger.



11.2 Charging Batteries

The instrument should be charged when the battery level indicator has no bars left. If the instrument needs to be charged when the battery level indicator has one or more bars left then it can, however doing this regularly will harm the life of the battery.

To charge the instrument the charger, provided with each instrument and available with the correct plug for anywhere in the world, must be plugged into a suitable mains supply and then the two pin yellow plug must be connected to the correct port on the instrument.

When the charger is plugged in, the battery indicator will shine. The charge indicator light can be in one of three states:

- Solid red – in fast-charge mode (1.5-2A).
- Solid green – terminated fast-charge mode but still charging (30mA).
- Alternating red & green – In an indeterminable state not suitable for charging (This is usually due to temperature issue. It is advised to move instrument to well-aired area at room temperature, so that the instrument temperature can stabilise).

Other tips:

- The instrument should be fully charged after 3-4 hours of charging.
- Do not use the instrument while it is charging.
- Do not charge the instrument in an ATEX zone.
- Charge the instrument at room temperature

11.3 Changing Batteries

The GFM400 Series uses rechargeable Nickel Metal Hydride cells. If you need to dispose of a set, please take care to do so in line with local requirements.

To change the batteries, remove the two screws on the rear of the instrument, then lift the battery cover and remove the battery pack from the recess.

Place the new battery pack in the recess, making sure that the polarity is correct, replace the battery cover and secure with the two screws.

IMPORTANT: Always replace the battery pack in dry, clean conditions, preferably indoors.

If you replace the batteries in the field, you can, of course, recharge them later when you return to base.

11.4 Changing the gas filter

There is a gas filter built into the input of the instrument. Check this filter weekly and change it when it becomes clogged or dirty. Always use the correct filter of the recommended type, which can be supplied by Gas Data Limited.

NOTE: If you use a non-recommended filter, this will invalidate the warranty on the instrument.

To replace the filter, the External Inlet housing needs to be removed. Using the Allen key provided, remove the four screws around the base of the Sample In port. Lift the top off the port and remove the old filter.

Insert a new filter, making sure to orientate it correctly, replace the top of the port and secure with the four screws.

IMPORTANT: Do not over tighten the screws. This will result in expensive repairs.

IMPORTANT: Ensure the two O-rings are returned to the exact position it was in when the external inlet housing was first opened.

11.6 Deep Discharge

The batteries in the instrument can suffer from **an irreversible loss of capacity** called **Deep Discharge**. It is when the functioning voltage has dropped too low, causing the resistance to raise, rendering the battery unusable.

The **main cause of this fault** is **neglect** toward the battery and the instrument:

- Not powering up the instrument or running a sample for over a week
- Allowing the instrument to be left below room temperature (< 20^{o}C) for over 24 hours

Below are a few tips on preventing **Deep Discharge:**

- When the Battery Level Indicator has no bars remaining, the instrument must be charged immediately
- After using the instrument, return it to a dry and warm (indoor) location
- Be sure to turn on and run a sample on the instrument at least once a week

The following are a **few symptoms** an instrument may show that **suggests it has entered deep discharge**:

- Solid green charging indicator light immediately, and remains so for a few hours, when the instrument has been placed on charge
- When the instrument will not turn on
- Short battery life
- When < 2V is measured across VBAT (+) and GND (-) using a voltmeter

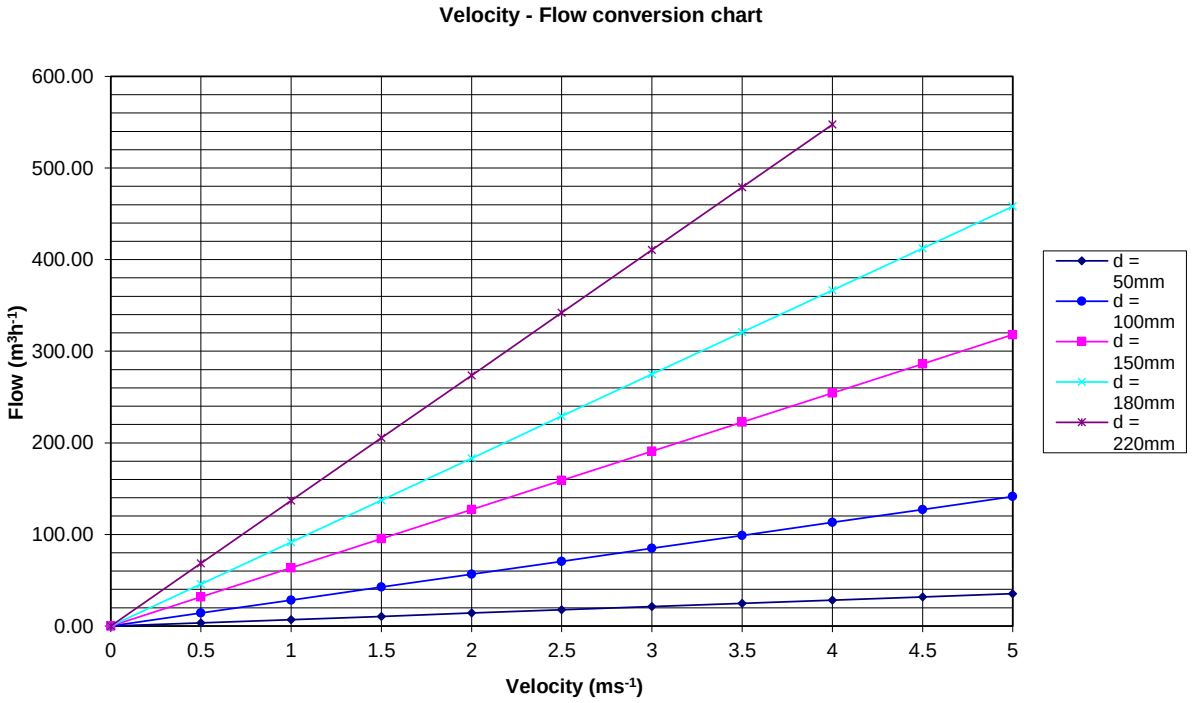
11.7 Troubleshooting

The following table lists problems reported through customer services, that multiple customers have experienced and had been resolved following Gas Data Technical Support. Each problem described is listed with a cause and then a solution.

Problem	Cause	Solution
Negative readings	As the instrument receives an 4-20mA analogue electrical signal to give a gas reading, it is possible for the instrument to read negative reading even though it is impossible for the gas to have a negative concentration. The display of this allows for a greater reliability when calibrating the zero reading.	If the zero reading is ±0.3% (i.e. can reach a minimum of -0.3%), it is within an acceptable tolerance. If the negative reading goes any lower, then the instrument should be recalibrated. See **10.6 - User Calibration** for instructions.
Low O_2	O2 cells expire after 12 months. If they are not aired (cleansed in a sample of fresh air) properly then can expire early.	Run pump to flush with air for >10 minutes. If this does not correct the fault, the O2 cell may need replacing and so you should contact Gas Data for a repair.
Battery ticking	There is not enough charge left to turn on the instrument.	Charge the instrument

Appendix B – Velocity Flow Conversion Charts

The following chart is included to enable the operator to make quick and easy conversions from velocity measurements provided by the vane anemometer to flow rates.



The formula for calculating the conversion is:

$$f = 0.00283 d^2 v$$

where f = flow in m^3h^{-1}

d = pipe inside diameter in mm

v = velocity in ms^{-1}

Appendix C – Understanding Instruments For Use In Flammable Atmospheres

Hazardous areas classified by zones

There are three zones defined to guide users as to the necessary precautions which should be taken when working in potentially flammable atmospheres:

1. **Zone 0** - An area in which an explosive gas/air mixture is continuously present, or present for long periods.

2. **Zone 1** - An area in which an explosive gas/air mixture is likely to occur in normal operation.

3. **Zone 2** - An area in which an explosive gas/air mixture is not likely to occur in normal operation and if it does occur will exist only for a short time.

Make certain that the area in which you intend to work can be described by one of the zones above.

NOTE: The GFM400 Series is suitable for use in Zone 1 and 2.

Different types of gas

Different gases are grouped according to how easily they are ignited. Some examples are given below. (For other gases please contact Gas Data).

Gas	Relative Ignition	Group
Hydrogen/Acetylene	Most easily ignited	IIC
Ethylene		IIB
Carbon monoxide		IIB
Hydrogen sulphide		IIB
Ammonia		IIA
Propane		IIA
Petrol vapour		IIA
Methane	Least easily ignited	I

NOTE: The GFM400 Series is suitable for use in flammable atmospheres caused by the presence of gases in Group I, Group IIa and Group IIb.

Design and construction of intrinsically safe instruments for use in flammable atmospheres

The technique of intrinsically safe design and construction is defined in the European Standard BS EN60079-11:2012. The technique identifies potential sources of ignition (by spark or by heat) and specifies the design of safety circuits that limit the energy of the spark and/or the component temperatures such that they cannot ignite the gases expected within the hazardous area. There are two categories of intrinsically safe instruments;

1. **'ia'** The safety circuits used will prevent the generation of a spark or temperature capable of igniting the gas even if the instrument develops TWO faults.

2. **'ib'** The safety circuits used will prevent the generation of a spark or temperature capable of igniting the gas even if the instrument develops ONE fault.

NOTE: The GFM400 Series is designed to meet the requirements of category 'ib'.

By testing components in fault conditions (as required by 'ib') the worst-case temperature within the instrument is determined. This is used to give the instrument a temperature classification. A guide to temperature classifications is given below.

Temperature Class	Maximum Temperature (ºC)
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

The higher the T class the lower the temperature.

Different gases will be ignited at different temperatures. Some examples are given below.

Gas	MINIMUM Required T class
Acetylene	T2
Hydrogen	T1
Ethylene	T2
Carbon monoxide	T1
Hydrogen sulphide	T3
Ammonia	T1
Propane	T1
Methane	T1

NOTE: The GFM400 Series is designed to meet the requirements of class T1.

Testing and certification

The GFM400 Series has been submitted for European Type Assessment. This assessment examines the design and construction criteria set out above and controls the manufacture. This process is defined in Annex II of the European ATEX Directive 94/9/EC. This allows the instrument to carry the 'Ex' logo followed by a summary of the level of protection that is incorporated into the instrument.

Appendix D – Vane Anemometer

NOTE: Anemometers do not form part of the ATEX certification of the Gas Data GFM series. Contact Gas Data for further advice on the safe use of these probes.

Operating Instructions

These operating instructions are intended to ensure that the measuring instrument and probe remain perfectly serviceable, guaranteeing fault-free and safe operation. We therefore ask you to read these instructions carefully before placing the instrument in operation for the first time:

Avoid moisture, extreme temperatures, and vibrations.

Do not shake!

Clean probes and indication unit only in accordance with the cleaning instructions given below!

Strong electromagnetic interference (e.g. transformers, radio transmitting equipment) may affect the accuracy of the measuring instrument.

Important notes

Every vane anemometer has a designed operating range. The transducers have been developed and produced for this envisaged operating range. The calibration corresponds to the actual state, at the moment measurements are made.

Incorrect handling can adversely affect vane anemometer readings.

It must be ensured that the instrument is operated only by trained personnel, the instrument is regularly serviced and calibrated, and that no changes are made to the instrument except those described in the operating instructions.

Streamline Measuring Head

The form of the measuring head guarantees a high direction insensitivity which is approx. +/- 20 degrees for Micro head and +/- 25 degrees for Mini head.

Response time

Response Time of electronics:

When connected to supply (on/off): immediate

Time to reach 63 % of end value: 424 ms

Response Time of Vanes:

Increase of flow: 1.0 sec.

Decrease of flow: 8.0 sec.

Technical data – MiniAir 6 Micro

Measuring range	0.7 – 40 m/s
Accuracy +/-	1.0% fs
Operating temp.	-10 to +80°C
Head dimensions	11 x 15mm
Access opening	16mm
Probe length	165mm
Storage temp.	-65 to +150°C

Cleaning and maintenance

Vane anemometers are precision products which will give fault-free service if correctly handled. If you handle them as described in the operating instructions, your instruments and probes will remain in a serviceable condition and ensure the reliable operation of the measuring system. Each instrument has its designed range of application and is only to be used for this range.

 **Warning**	**If faults should nevertheless occur, do not attempt to open the instrument and repair it yourself; always have repairs carried out by our after-sales service.**

General handling tips

- Protect the probes against severe vibration
- Do not kink the connector cable (risk of cable break)
- Never allow hard objects to contact rotating impellers
- Always carry out probe cleaning according to the cleaning instructions
- Never immerse probes in solvent
- Never blow probes through with compressed air
- Allow hot temperature probes to cool slowly; never cool by plunging them in cold water or the like.

Cleaning instructions

Vane probes

Instrument and probe must be switched off or disconnected prior to cleaning.

As the probes are highly sensitive measuring instruments, they must be cleaned with very great care.

Fibres or other foreign bodies can be carefully removed with fine tweezers.

When doing so, take care not to bend or otherwise damage the vanes or the spindle.

 **Warning**	**The adjustment of the bearing screws must never be changed. This can result in erroneous measurements.**

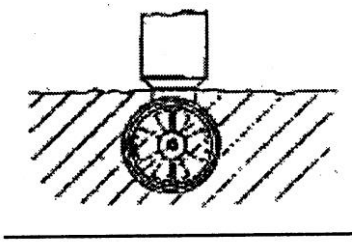
 **Warning**	**Never allow hard objects to contact rotating impellers!**

Cleaning agents which extract the plasticizer from the plastic are never to be used for plastic probes (practically all solvents!).

We recommend the following for cleaning the probes:

- Running Water
- Soapy Water
- Pure Benzene

Cleaning example:



1) Carefully swish the top part of the impeller back and forth in clean, pure benzene for approx. 10 min. Then swish the top part of the impeller back and forth in clean kerosene for approx. 1 min to re-lubricate the impeller bearings.

If soapy water is used as a cleaning agent, it is advisable to wash out the soap solution thoroughly with distilled water before lubrication with kerosene.

2) After cleaning the probe, rub it dry externally with a clean, dry, fluff-free cloth.

3) Leave the top part of the impeller to dry for approx. 30 minutes.

Warning	**Only clean the head of the impeller!**
Warning	**Probes are on no account to be fully immersed in the solution.**

Cable, extension rod, case

The following agents:

- Soapy water
- EDP plastic cleaner
- Window cleaning fluid (without ammonia)
- -For any stubborn deposits, pure benzene
- These solutions are only to be applied to the parts with a fluff-free cloth.

Warning	**Only carry out surface cleaning. The parts are never to be immersed in the solution.**

Snap Head

The snap head fixing system renders it very simple to fit a new impeller to the flow probe: this saves costly non-productive time and in the event of damage to the snap-head enables the operator to have the probe back in service in a matter of seconds by simply changing the snap-head.

Checking/Factory Inspections

Depending on the application and the loads on the instrument we consider it highly advisable to have the probe annually checked or inspected/repaired at our factory.

Appendix E – Warranty Policy

This instrument is guaranteed, to the original end user or purchaser, against defects in materials and workmanship for a period of one year from the date of shipment to the user. During this period, Gas Data Limited will repair or replace defective parts on an exchange basis. Freight charged to and from the Gas Data factory or authorised service centre will be paid by the end user. The decision to repair or replace will be determined by Gas Data Limited.

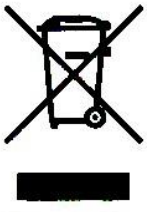
Conditions and exclusions

To maintain this warranty, the purchaser must perform maintenance and calibration as prescribed in this user guide. This includes prompt replacement or repair of defective parts and such other necessary maintenance, calibration and repair as may be required according to the use of the equipment in the reasonable judgement of Gas Data Limited.

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

Disposal

Disposal of old electrical and electronic equipment (applicable throughout the European Union and other European countries with separate collection programmes).



This equipment must not be disposed of as household waste. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring that this product is disposed of correctly, you will help to prevent potential adverse consequences to the environment and human health which could otherwise be caused. The recycling of materials will help to conserve natural resources. For further information, please contact your local city office or waste disposal service.

Appendix F – Declaration of Conformity

9RAD1005 GFM declaration of conformity

Manufacturer Name & Address:

Gas Data Ltd.

Unit 4

Fairfield Court

Coventry

CV3 4LJ

Model Numbers:

(reference list attached on the following page(s))

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The GFM family of instruments are hand-held gas analysers. The models covered by this declaration are the GFM226, GFM406, GFM426, GFM436, GFM526 and GFM610.

The Electromagnetic Compatibility Directive 2014/30/EU:

I hereby certify that the apparatus described above conforms with the protection requirements of Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility, based on the requirements of the following harmonized standards.

Ref. No.	Title
EN 50270:2015	Electromagnetic compatibility – Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 61000-6-3:2007+A1:2011	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

ATEX Directive 2014/34/EU:

I hereby certify that the apparatus described above conforms with the protection requirements of Council Directive 2014/34/EU on the approximation of the laws of the Member States generally concerning equipment and protective systems intended for use in potentially explosive atmospheres, based on the requirements of the following harmonized standards.

Ref. No.	Title
EN IEC 60079-0:2018	Electrical apparatus for explosive gas atmospheres. General requirements
EN 60079-11:2012	Explosive atmospheres. Equipment protection by intrinsic safety "i"

The equipment is marked

II 2G Ex ib IIB T1 Gb

ATEX certificate number ITS04ATEX23415X.

IECEx:

I hereby certify that the apparatus described above conforms with the protection requirements of IECEx equipment and protective systems intended for use in potentially explosive atmospheres, based on the requirements of the following harmonized standards.

Ref. No.	Title
IEC 60079-0:2017	Explosive atmospheres – Part 0: Equipment – General requirements
IEC 60079-11:2011	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "I"

The equipment is marked

ib IIB T1 Gb

IECEx certificate number IECEx ITS 21.0004X.

Notified body

Notified Body responsible for the ATEX certificate:

Intertek Italia S.p.A. via Miglioli, Notified Body number 2575
2/A - 20063 Cernusco sul Naviglio

Milano - Italy

Notified Body responsible for the ATEX QAN:

Intertek Testing Services NA Ltd., Notified Body number 2903
14920-135 Avenue, Edmonton, AB,

T5V 1R9, Canada

Additional information

Product	Description	EMC[1]	ATEX and IECEx[2]
GFM226	Hidden person stowaway detector	Yes[AB]	No
GFM406	Multichannel portable gas analyser	Yes[AB]	Yes
GFM426	Portable landfill gas extraction analyser	Yes[AB]	Yes
GFM436	Site investigation, landfill and compliance analyser	Yes[AB]	Yes
GFM526	Portable landfill gas extraction analyser	Yes[AB]	Yes
GFM610	Flow Monitor	Yes	Yes

Notes relating to CE marking:

[1] Entries in this column may be;

Yes Product conforms to the EMC Directive.
N/R Product is not required to conform to the EMC Directive.

Products marked with note [A] and/or [B] in the EMC column deviate from EN 50270:2015 as described below:

1. May show deviations of up to ±10% of span for O_2 channel, under the influence of a Radiated EM field (ref. EN 61000-4-3), whilst sampling air.
2. May show deviations of up to ±33% of span for chemical cell channels, under the influence of a Radiated EM field (ref. EN 61000-4-3), whilst sampling air.

[2] Entries in this column may be:

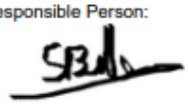
Yes Product conforms to the ATEX Directive and IECEx.

N/R Product is not required to conform to the ATEX Directive and IECEx.

Signature

Signed for and on behalf of Gas Data Ltd, Coventry, UK.

Responsible Person:



Date: 04/03/2022

Name/Title: Steve Billingham, Managing Director

Appendix G – ATEX Certificate

The ATEX, IECEx and UKEx Certificates were added as separate files and can be seen on the USB stick.

GAS DATA

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