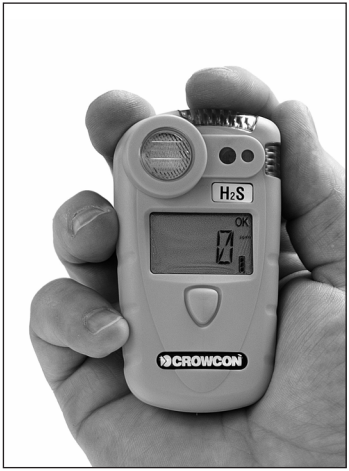
Gasman
Personal Gas Monitor



User Manual

M07630

October 2008
Issue 7

CROWCON
Gas Detection You Can Trust

Safety information:

- Read and understand all instructions in the operation section of this manual before use.
- Do not substitute components as this may impair intrinsic safety and invalidate warranty.
- Observe all warnings and instructions marked on the unit and within this manual.
- Observe site health and safety procedures for gases being monitored and evacuation procedures.
- Make sure you understand the screen display and alarm warnings.
- If this product is not working properly, read the troubleshooting guide or call Crowcon.
- Ensure qualified service personnel change sensors and operating system.
- Ensure maintenance and calibration are carried out in accordance with the procedures in the manual.

Instructions specific for use in hazardous areas

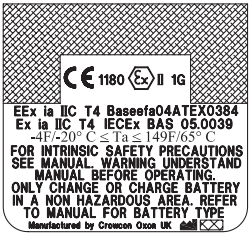
The following instructions apply to equipment covered by certificate number:

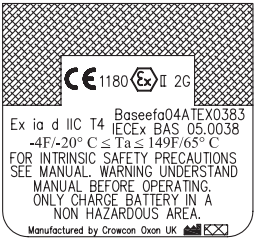
Baseefa04ATEX0383 Flammable Gas

Baseefa04ATEX0384 Oxygen or Toxic Gas

The following information covers all relevant points listed in clause 1.0.6 of the EHSR's of the ATEX directive.

1. The certification marking is as follows:





2. The equipment may be used in Zones 1 and 2 for flammable versions and Zones 0, 1, and 2 for toxic and oxygen versions, for Group IIA, IIB, and IIC gases and vapours for Temperature Classes T1, T2, T3 and T4
3. The equipment is certified for use in ambient temperatures in the range –20°C to +65°C (-4 to +149 F). The equipment should not be used outside these ranges.
4. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN60079-0:2004 + Amds 1 & 2, EN60079-1:2004 and EN60079-11:2006, as certified by Baseefa. Compliance with gas detection performance standards EN50054, EN50057, EN61779-1, EN50104 and EN50270 has been certified by Lloyd's Register.
5. Repair of this equipment and gas sensor replacement shall be carried out by the manufacturer or in accordance with the applicable code of practice.
6. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
7. The rechargeable battery must only be charged in non-hazardous (safe) areas by connection to the specified Crowcon charger.
8. Only the following cell types may be fitted in the battery compartment of the non-rechargeable battery pack: CR2 of the following brands only: Panasonic, GP, Energiser and Maxell. Do not fit a Duracell battery

The cells must only be changed in a non-hazardous (safe) area.

9. The equipment is not certified for use in atmospheres containing more than 21% oxygen.

Area Classifications: -

Zone 1: An area classified as Zone 1 is likely to have ignitable concentrations of flammable gases, vapours or liquids present under normal operating conditions.

Zone 2: An area classified as Zone 2 is not likely to have ignitable concentrations of flammable gases, vapours or liquids present under normal operating conditions.

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Gasman
Personal Gas Monitor

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Gasman
Personal Gas Monitor

Thank you for purchasing the new Gasman Personal Gas Monitor. Gasman has redefined portable gas monitoring and will give you years of unparalleled service and reliability.

Please read the instructions carefully before use. Keep the manual for future reference.

Unpacking

Remove the Gasman Personal Gas Monitor from the packaging. The Gasman accessories will be located in the bottom of the box. Check the contents are complete, you should have:

- Gasman unit with standard pocket clip;
- A configuration report detailing the sensor installed, alarm settings and a calibration certificate;
- Calibration flow cap and tubing;
- User manual.

Optional battery chargers and other accessories will be packed in a separate box.

Gasman units ordered with an Alligator clip will receive this clip in place of the standard pocket clip.

Battery check

The Gasman Personal Gas Monitor has two battery options: Li-ion rechargeable or non-rechargeable batteries.

Rechargeable units

Gasman uses a Li-ion battery pack and should arrive with sufficient charge so that the unit can be used straight out the box. However, if this is the first time you have used the Gasman unit, you may need to charge the battery to attain the full operating time. (The actual operating time will depend on the types of sensor installed.) The flammable Gasman will operate for at least 12 hours on a fully charged battery

Warning: rechargeable units

Do not attempt to recharge the rechargeable battery with any other charger other than the Crowcon charger supplied with this unit. Failure to comply could invalidate safety certification and may result in permanent damage to the unit.

Non-rechargeable units.

Gasman uses a CR2 battery which can be easily field replaced. Ensure only the correct types of battery are fitted to maintain compliance with certification.

Gasman IR CO_2 Personal Detector

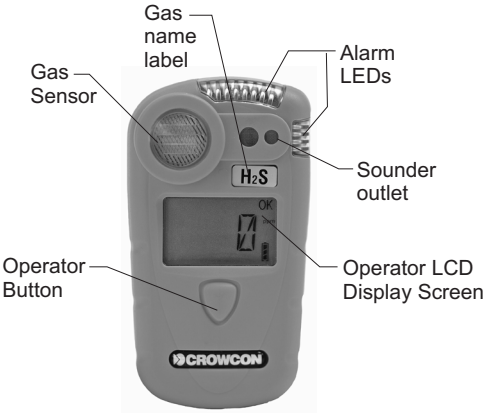
The Gasman IR CO_2 personal detector uses a newly developed i-module with an infrared gas sensor for CO_2 detection. This version of Gasman is not designed or certified for use in a hazardous area, and the safety certification data in Section X is non applicable. Operation and maintenance of the Gasman IR CO_2 is essentially the same as for other Gasman units but with the following points to note.

CO_2 is present in ambient air at a background concentration of just under 400ppm. In any enclosed environment the ambient CO_2 concentration will increase as a result of respiration and if the room is poorly ventilated concentrations well in excess of 1000ppm (0.1%) can occur. CO_2 levels in the outdoor air will also be enhanced by any emitted CO_2 e.g. from vehicle exhausts or boiler flues venting to atmosphere so it is normal to see fluctuating levels of CO_2 on the display whether indoors or outside.

Quickstart guide

1. Getting started

Review your Gasman unit



Switching on your unit

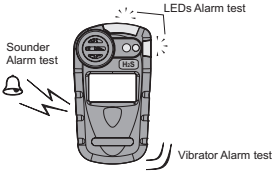
Gasman requires little setting up, follow these simple steps to get your unit ready for use.

1. **Ensure the unit is in clean air.**
2. **Switch on**
   Press and hold the operator button for approximately 3 seconds until the red LEDs flash.

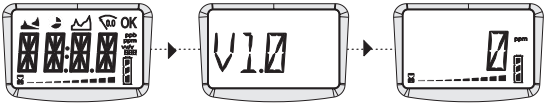
   The operator display screen will light up and the unit will begin a warm up sequence.

Gasman warm up sequence

a) The unit will test the alarm LEDs, sounder, vibration alerts, and the operator display screen. The sounder may be silenced by pressing the button.

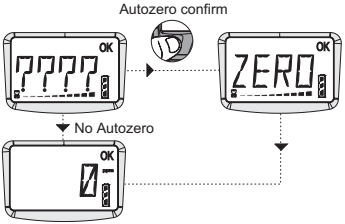


b) The unit will continue through a warm up sequence as shown below, this will take approximately 20 seconds.



c) **Autozero**

If Autozero is enabled (default), the unit will display the Autozero confirm screen: the display will alternate between 'ZERO' and '????'. Press the operator button with a single click to confirm Zero. If the operator button is not pressed within the 10 second time out, Gasman will proceed directly to Run mode without performing Zero.



Screen Icons

- Warm up
- OK — Flashing icon, Gasman running normally
- AL - 1, AL - 2 — Alarms
- Battery
- 0.0 — Autozero

Run mode

Your unit is now ready to use.

Familiarise yourself with the gas being monitored in your unit and make sure you understand site health and safety procedures in the event of alarm conditions.

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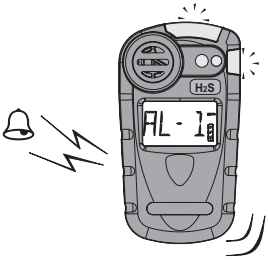
Confidence signals
In normal Run mode, Gasman will emit a short beep accompanied by a blue LED flash every 10 seconds and the OK icon flashes to show operational health. These confidence signals can be disabled using the PC software.

2. In the event of an alarm

Alarm signals

In the event of gas concentrations exceeding the alarm thresholds for the gas being monitored, Gasman will activate the alarm signals.



Alarm signals

The red and blue alarm LEDs will flash, the sounder will emit a loud, fast series of beeps, the internal vibrator alarm will activate. The operator screen will display the alarm level and gas reading alternately.
See the figure to the left.

AL - 1 — Alarm level one

AL - 2 — Alarm level two

1. When the gas level returns to normal, press the operator button. This will reset your Gasman unit to normal Run mode. If the gas level is still in alarm, the button will have no effect.

The Gasman alarm is set to latch by default. The unit will still continue in alarm mode even when the gas level returns to normal, pressing the operator button will clear the alarm.

3. Switch off unit and storage

Switching off unit

1. Press and hold the button for 5 seconds until the display shows OFF. The display will count down to switch off.

Storing conditions

In order to optimise sensor performance and lifetime, your Gasman unit should be stored in a safe, non-hazardous area, 0-30°C, 10-90%RH.

4. Additional information

For battery recharging information go to section III.

For fixing accessories go to section V.

For sampling section go to section VI.

For calibration information go to section VII.

For troubleshooting guide go to section XII.

I. Introduction

Thank you for purchasing the new Gasman Personal Monitor. Gasman is a portable single gas detector, designed to be carried or worn by individuals working in hazardous environments such as confined spaces. It is suitable for use in classified hazardous areas. Gasman monitors a single gas and displays the reading on a display screen. Alarm warnings are given through a combination of a loud audible alarm, a bright visual alarm of blue/red flashing LEDs and an internal vibrator. Gasman can be fitted with a wide range of modular, plug and play gas sensors. The sensor carries an intelligent processor which contains calibration and sensor information.

Gasman is battery operated and is available with rechargeable batteries or dry cell battery options. The dry cell battery option is only available for toxics and oxygen Gasman units. A battery charger for single and multiple Gasman units is available for rechargeable units, see section XI for more information.

At Crowcon we recognised the need for a reliable and robust personal monitoring system, which is both small, light and easy to use. Gasman has a single operator button, and an intelligent user-friendly display with automatic backlight. The gas level is continuously monitored providing normal gas readings, peak readings and time weighted averages (TWA). Gasman is available as a diffusion sampling instrument, see section XI for sampling accessories. Configuration and data/event logging is handled by Crowcon Portables PC software, the PC communication link is provided as a link on the charger unit.

Gasman's compact shape and design makes it comfortable to wear and as non-intrusive as possible, with a non-slip grip for better handling. Extra accessories, such as pocket clip, hard hat clip, alligator clip, shoulder strap and chest harness, can be purchased.

Gasman has been designed from top to bottom to bring you a lighter, compact design with single button operation for ease of use, maintenance and extreme reliability. Through innovative and rigorous design technology, we have introduced several new features.

i-module gas sensor

Gasman uses unique plug and play i-module sensor technology. Each sensor unit incorporates its own intelligent processor holding sensor configuration and calibration data. Different sensors can be purchased, and once inserted, are immediately ready to run. Flammable units are only available with rechargeable batteries. Plug and play will ease maintenance time and cost, and the intelligent modular system will remove the need to calibrate the sensor. Gasman can be reconfigured by purchasing additional pre-calibrated i-modules from your local supplier.

Reliable, anti-shock mechanics and robust housing

The Gasman housing is built from resilient material, giving it strength and flexibility to withstand the hardest of working conditions, water and dust tight to IP65 and IP67, with a non-slip grip. If the unit is dropped, there will be no disruption of power or function, ensuring reliability and service for years to come.

Software

The internal software in Gasman has been designed and written in accordance with the requirement of IEC 61508 to ensure quality and integrity of operation. Gasman has been designed to give a truly reliable personal gas monitoring system. The internal circuitry includes an independant watchdog, the software monitors for any malfunction within the unit and will display an error warning to the user should they occur.

II. Operation

2.1 Switch-on sequence

1. **Ensure the unit is in clean air.**

   NB. For CO_2 detectors see zeroing, Section VII.

2. **Switch on**

   Press and hold the operator button for approximately 3 seconds until the red LEDs flash.

   The instrument begins with testing all the LCD segments on the operator display screen, the red and blue alarm LEDs, sounder and internal vibrator alert. The sounder may be silenced by pressing the button. The unit enters a warm up mode and displays a sequence of screens, see page 3 for more details. At the end of warm up, the Autozero menu will be displayed.

The Autozero function can be disabled or set to run automatically, without user confirmation: Autozero will not appear.

See section VIII PC Interface and software.

Battery check

Use this time to check there is sufficient charge in the battery pack

Calibration check

During the warm up sequence, if the next calibration date is due in less than 31 days, 'CAL - nn' will be displayed, where nn is the number of days to the next calibration. If the date has expired, the Gasman unit will display a warning message 'CAL'. The instrument can still function, but it is strongly recommended the unit is sent for calibration as soon as possible.

Press the button to continue to Run mode.

Gasman can be set, using the Portables PC software, for the instrument to lock in the event of the calibration date expiring, to prevent further operation of the instrument.

3. **Autozero**

   Press the operator button with a single click to confirm Autozero. Flammable and toxic units will be set to read zero, and oxygen units set to read 20.9%. If the operator button is not pressed within 10 seconds Gasman will proceed directly to normal operation without performing a zero.

NB. If Autozero fails, a warning message will be displayed.

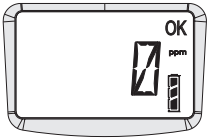
Switch off

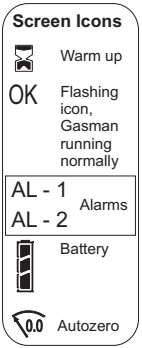
To switch off the unit, press and hold the operator button for 5

seconds. The display will count down from 5, continue to hold the button until the unit counts down to shut off.

2.2 Run mode

The Gasman unit displays the gas reading on the operator display screen. A typical display is shown below:





The sensor channel will display the current value of the gas being monitored and units of measurement, the 'OK' symbol will flash indicating unit is working correctly. Familiarise yourself with the gas currently being monitored in your unit. Ensure you understand site health and safety procedures. For information on Peak and TWA readings, go to section 2.4.

Confidence signals
To reassure users the unit is working correctly, the Gasman unit will emit a short beep accompanied by a blue LED flash every 10 seconds and the OK icon will flash.

2.3 Display symbol guide

Battery

A full battery is represented by a battery icon showing a full three bars. A low battery charge will show 1 bar. When zero bars are shown the battery icon flashes and the sounder will emit warning bleeps.
If the battery becomes too low, Gasman will switch off.

TWA alarm

Gasman will display the TWA alarm when the 15 minute or 8 hour time weighted average alarm threshold is passed for toxic gases.
Gasman will display 'LTWA' and 'STWA'. TWA alarms cannot be cleared.

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2.4 Display options

Gasman provides four additional selectable displays:

Peak display
When Peak mode is selected the instrument shows the highest value for flammable and toxic gases, or the lowest value for oxygen since switch on or last Peak Reset. This is useful for vertical entry checks where the whole instrument can be lowered down the shaft rather than using a sampling tube and for viewing peak exposure at the end of a shift.

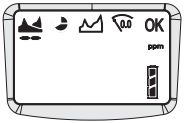
TWA display
Shows the 15 minute or 8 hour time weighted average (TWA), for toxic gases, monitored since last turn on.

Peak Reset
Before a Peak entry test is performed select this menu option to clear any previously stored Peak value.

Zero
Performs Zero on your Gasman unit.

How to display the menu

1. To view the additional display Option menu, double-click the operator button. The menu icons will appear on the screen, as shown.

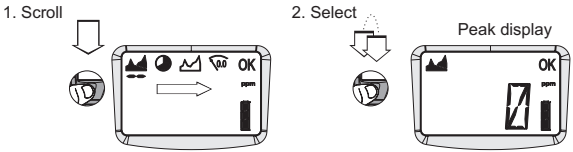


Note: Only instruments for toxic gas monitoring will display the TWA menu option.

2. Press the operator button with a single click to scroll across the list. When the underscore appears under your choice, double-click the operator button.

   If Peak or TWA is selected, Gasman will display the icon on the operator screen.

Peak test
When performing a Peak test, such as a vertical entry check, previous readings can be cleared by selecting the Peak Reset menu option .



Zero
To perform Autozero, select the Zero function from the menu. When Zero is completed, the instrument will return to normal Run mode.

2.4 Logging

Gasman incorporates both data and event logging which can be accessed using the RS232 communications link available with the *Single Way Charger Plus PC Interface* (part No.C01940), using Crowcon Portables PC software. See section VIII.

Data is recorded every minute (this rate can be adjusted using the PC software). The log can record 900 hours of data at 1-minute intervals.

Gasman also records the time and date for a number of operating and diagnostic events including:

- Switch on and switch off;
- Level 1, Level 2 and Time Weighted Average Alarms (TWA), alarm on, alarm off and the peak level during the alarm;
- Zero, calibration and gas test with success or failure;
- Flammable sensor saver on and off;
- The battery condition is logged every switch on and switch off while the instrument is operating, and certain configuration changes are also logged;
- The Event log can record over 4800 events.

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III. Batteries

3.1 Rechargeable batteries

Recharge time for the Li-ion batteries is less then 6 hours (less, if they are not fully discharged). Rechargeable batteries will typically last 12+ hours for flammable units.

3.2 Gasman Charging Unit

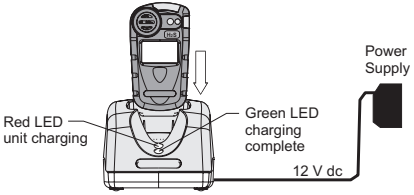
There are 3 models of charging units available for Gasman; a single way drop in charger unit, a single way charger unit with integral PC Interface, and a multiway charger unit. The multiway charger unit can accommodate up to 5 Gasman units. Note: the multiway charger unit does not have a PC interface option.

The charger units are powered by a nominal 12 V dc input. Power Supplies are available with UK, EUR or US pins, alternately a universal 90-260 V power supply is available for any other configuration. The multiway charger includes a universal power supply. A vehicle lighter socket lead can also be supplied, please see section XI Parts and Accessories.

As a condition of certification, charging voltages must be limited to less than 9 V. Communications are only permitted via Crowcon charger-interface C01940.

Charging the batteries

1. **Ensure you are in a safe area.**
2. Plug the charger power supply into a mains socket, and connect to the charger



3. To charge your Gasman unit, simply drop the Gasman into the charger in an upright position with the screen facing outwards, see diagram below:
The Gasman would normally be left switched off for charging. During charging the red LED on the front of the charger unit will be lit. When charging is complete the red LED is extinguished. (Early units had a green LED illuminate on completion of charge).

During charging, the display will show the battery icon sweeping from empty to full. (Early units only show this when the instrument Is switched on.) On removing Gasman from the charger unit, if the Gasman is on, the display icon will update in 20 seconds to show actual charge state.

The charging time will be longer if the unit is switched on during charging.

When Gasman is fully charged and switched on the battery icon will display three full segments.

Changing rechargeable batteries

It is recommended that rechargeable batteries should be changed by an authorised Crowcon service centre.

3.3 Non-rechargeable batteries

Gasman uses a Lithium Cell battery pack which will give up to two years of operation.

Always switch the Gasman off before opening the case to change the battery.

To replace the battery pack, ensure you are in a safe, non-hazardous area. Remove the back cover and remove the battery pack. Replace the Lithium Cell, then reinsert the battery into the instrument and replace and securely fasten the back cover.

IV. Alarm indications

Gasman provides two instantaneous alarm levels, designated level 1 and level 2. For toxic gas sensors, there are also two time weighted average alarms (TWA), one for short term exposure (STEL): based on a 15 minute time weighted average, and the second TWA alarm is for long term exposure: based on a 8 hour time weighted average.

Alarm configurations are set via the Crowcon Portables PC software. The following settings can be made:

AL-1
AL-2

Alarm thresholds for each sensor: Level 1 and level 2 alarms can be set for the gas sensor.

Alarm trigger: This can be set to rising levels of gas concentration, or as falling. Oxygen units are set to falling for deficiency monitoring.

Alarm latching: Alarms can be set to be latched or unlatched. Latched alarms will require the operator button to be pressed in order to clear the alarm. This is the default setting. Unlatched alarms will clear automatically when the gas hazard has passed.

Alarm mute: The sounder can be set to mute for level 1 alarm only; pressing the operator button during an alarm condition i.e. presence of hazardous gas, will silence the sounder and stop the vibration alarm. The alarm LEDs will continue to flash.

Alarm sounder tone: Different distinctive tones can be selected for the each alarm condition to achieve the best performance for the monitoring conditions available.

In the event of a Time Weighted Alarm (TWA)

LTWA
STWA

In the event the 15 minute or the 8 hour TWA is triggered, Gasman will go into alarm and display a TWA warning with the toxic gas readings. The 8 hour TWA alarm cannot be cleared.

In the event of a Flammable overange alarm

9999

If flammable gas concentrations exceed 100% LEL Gasman locks into alarm and displays '9999' showing an overange condition. Gasman will temporarily cut off power to the sensor to prevent burn out and display a progress bar for 200 seconds. When the timeout is complete, either press the button to continue or optionally switch your unit off and on to restart. This option is programmable with Crowcon Portables PC software.

V. Fixing Accessories

Clip Accessories

Gasman is supplied with a simple pocket clip, other clip options are:

Hard hat clip

Allows Gasman to be clipped to a hard hat, a method of wearing a portable gas detector preferred by many users.

Alligator clip

A strong alligator clip allowing the user to wear Gasman on a belt, sleave, jacket lapel etc.

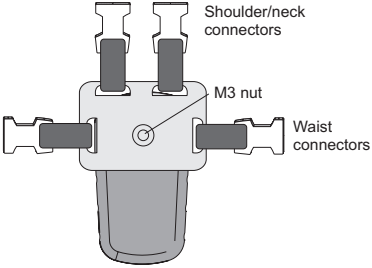
Universal harness plate

Crowcon provide a universal harness plate which can be used with either a chest harness or a shoulder strap.

How to wear your Gasman unit

Chest harness

Use the M3 fixing on the back of your Gasman unit to attach the chest harness plate. Create a chest harness by attaching one strap to the top connectors, to go around the neck, and the other to link around the waist using the side connectors. Adjust the lengths until the Gasman unit is in a comfortable working position.



Chest harness plate

Shoulder strap

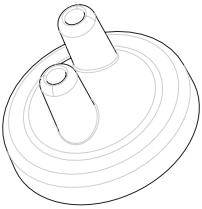
With the universal harness plate in place on the belt clip, attach the shoulder strap accessory onto the top connectors. Adjust to a comfortable working position.

See accessories, section XI, for full list.

VI. Flow sampling

Attaching the flow cap

To perform manual sampling using Gasman, a flow cap must be fitted onto the front of the unit, over the sensor. A flow cap is included with your Gasman unit.



1. To fit the flow cap, slip the flow cap over the sensor on the front of your Gasman unit, until the cap is tightly fitted into place.
2. Attach the sampling tube or flow accessory onto the gas inlet nozzle.
3. Attach the aspirator bulb onto the gas outlet nozzle.
4. To remove the flow cap, gently tease the cap from the sensor and lift the cap away from the instrument.

When using the manual aspirator kit, adopt a consistent style whilst using the hand aspirator. Crowcon recommend squeezing once per second to achieve a flow rate of approximately 0.5 - 1 litre/min. At least 10 pumps per sample are recommended.

The sampling tube supplied is normally a 2m (6ft) length. Longer lengths of sampling tube can be provided, but will increase the time taken to get a sample from the point of sampling to the Gasman instrument. When using an extended length of tubing a response time test is recommended. Gas of known concentration should be sampled along the full length of tubing to be used and the time taken for the sensor reading to reach the known gas levels should be noted. This time should be used as the minimum for sampling before readings should be taken.

Gasman gas test accessory kit

The Gas Test Accessory is a gas testing kit designed to enable gas testing and one button calibration of your Gasman gas detector using a specially formulated, high stability long life single gas mix. It can be used with Gasman units having sensors for Flammable, Oxygen, Carbon Monoxide and Hydrogen Sulphide gases.

6.1 Gas testing

Gas testing checks the sensor is responding within set limits to an applied gas of known composition. This can be performed as often as desired, but would usually be carried out each time the Gasman is issued for use. The Gasman itself will determine Pass/Fail status for the gas test.

In order to perform successful gas tests ensure:

- The gas used has the correct gas concentration, and that it is within the validity date specified by the supplier.
- The gas flow path is leak tight. It is important to check that the flow cap is properly fitted to the Gasman unit, and the outlet tubing is not restricted in any way, nor additional tubing length used.

The Gas Test Accessory Kit comprises a gas cylinder containing the gas, a 'Trigger' regulator with interconnect tubing, a magnet - used to activate Test mode, a flow cap to attach to the Gasman, and a vent line. The kit is supplied in a convenient carry case. The Trigger regulator can be operated in two ways: (1) squeeze and hold - allows gas flow as long as the lever is held in, or (2) by lifting the lever - the flow is locked on.

6.2 How to perform a gas test

1. Ensure your Gasman unit is switched on and in normal operation.
2. Fit the flow cap onto the front of the sensor and attach the hose from the Trigger regulator.
   Attach the outlet hose to ‘vent gas away’ - do not extend this hose and do not restrict or allow kinks.
3. Touch the magnet, vertically aligned onto the case, to the left hand side of the display. Your Gasman unit will activate the Gas Test and show ‘TEST’ on the display.

4. Gasman will display a progress bar. Apply the gas whilst the progress bar is counting down.

   Gasman will display ‘PASS’ or ‘FAIL’

   In the event Gasman displays ‘FAIL’, please see the troubleshooting guide in the first instance or contact Crowcon.
5. To abort the gas test press the button at any time whilst the test is in progress.

6.3 How to perform a one button calibration test

To perform a one button calibration test, you must first perform a Zero on your Gasman unit.

1. **Ensure you are in clean air.**

   Double click the button and select Zero from the Options menu.

   Gasman will perform a Zero.

To perform a one button Calibration, complete the next steps within 15 minutes of completing the Zero.

2. Follow steps 1 to 3 given in 6.2, Gasman will display ‘CAL’ and ‘????’ alternately. Press the button to confirm one button Calibration.

   If the button confirmation for calibration is not made within 10 seconds then the process will revert to test as in 6.2.
3. Apply calibration gas following step 4 in 6.2.
4. To abort the Calibration test press the button at any time whilst the test is in progress.

Your Gasman unit will adjust the value for the gas channel to match the stored calibration gas value within the sensor i-module.

If your Gasman unit does not calibrate successfully, Gasman will display ‘FAIL’. Your Gasman unit must be sent for re-calibration.

Gas Test ‘pass’ and ‘fail’, and calibration ‘pass’, ‘fail’ and values are stored in the Event log.

6.4 Gas test/calibration troubleshooting

Symptom	Possible Cause	Action
No response to gas	Gas cylinder empty	Check gauge, replace cylinder as needed
	Hose blocked or kinked	Ensure no restriction to flow
Gasman fails gas test	Gas cylinder empty	Check gauge, replace cylinder as needed
	Gas cylinder out of date	Check date and replace as needed
	Hose blocked or kinked	Ensure no restriction to flow
	Calibration drifted	Calibrate Gasman
	Gas flow not started immediately	Repeat test, starting gas immediately
Gasman fails calibration	Gas cylinder empty	Check gauge replace bottle as needed
	Gas cylinder out of date	Check date and replace as needed
	Hose blocked or kinked	Ensure no restriction to flow
	Calibration drifted	Calibrate Gasman
	Stabilisation time too short	Reset using PC software
Gasman passes gas test but will not enter calibration mode	Menu Zero not performed	Select Zero from menu
	Gasman not field calibration version	Send for re-configuration

Note: Remove regulator from gas cylinder when not in use over a prolonged period.

For parts list, see section XI.

One button Calibration will check for small drifts of stored calibration value, but Crowcon recommends Gasman is sent for full certified calibration at six monthly intervals.

VII. Maintenance and Calibration

Gasman is designed to operate almost maintenance free under most conditions. However, some small items of routine maintenance are recommended.

General

To keep the display panel and operator button free from dirt build up, regularly wipe over your Gasman unit with a damp cloth.

Filter

Inspect the front filter at regular intervals for dirt or damage. Clean as necessary.

Zero and calibration

Gasman is supplied with an Autozero function on start-up. This function can be configured to operate automatically, on user confirmation (see quick start guide), or can be disabled. This configuration can be set with the Crowcon Portables PC software, see section VIII. Gasman also has a Zero function in the menu. See section 2.4.

Crowcon recommends, as a minimum, a monthly gas test to confirm sensor operation. A test gas of known composition, needs to be applied, to verify sensor response and alarm function, see section 6.1.

Instrument calibration of sensor should be performed at 6 month regular intervals.

Calibration method

Gasman calibration can be performed using the Gas Test Kit as per 6.3, or with Crowcon Portables PC software and calibration gas mixtures. Appropriate certified calibration gases should be used. Calibration gas is applied using the appropriate flow cap. Refer to Crowcon Portables PC software help file for further information.

Gasman IR CO_2 Personal Detector

A properly zeroed Gasman IR CO_2 monitor will read 0.04% in uncontaminated ambient air.

Zeroing in air usually means going outside into clean air well away from a building or any CO_2 emissions, and holding the unit well away from the breathing zone of the operator – i.e. at arm's length. When Gasman IR CO_2 is zeroed in fresh air it automatically sets the CO_2 baseline level to 0.04%.

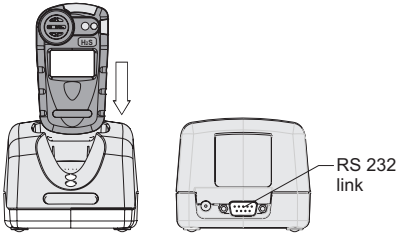
Gasman IR CO_2 can also be set to zero in nitrogen using the PC interface and Portables PC software. This is in effect a zero point calibration rather than a normal zero. To do this, after uploading the instrument configuration file, note the existing calibration gas level, then set the calibration value to 0.00%, apply nitrogen gas and click the Calibrate button. After this zero point calibration is completed remember to re-set the calibration gas level to its previous level.

Nitrogen for zeroing should be provided from a suitable gas bottle at a regulated flow of 0.5 l/min (1 SCFH), connected to the standard flow cap clipped over the sensor aperture. Recommended calibration gas is 2% CO_2 in a background of nitrogen.

Care should be taken to vent the nitrogen flow away from the operator and not allow nitrogen flow for longer than necessary to complete the zeroing. If indoors it is recommended to vent gas out of a window or into an extracted fume cupboard.

VIII. PC interface and software

Gasman can be connected to a PC using the single way charger unit with optional PC interface. The charger unit is fitted with a D-type 9 pin RS232 socket which is located at the rear of the charger, see diagram below. The PC requires Crowcon Portables PC software. A USB-RS232 adaptor is also available from Crowcon.



The software provides the user with access to reconfigure alarm levels, operation, run calibrations, print reports and to access data and event log files.

Set-up

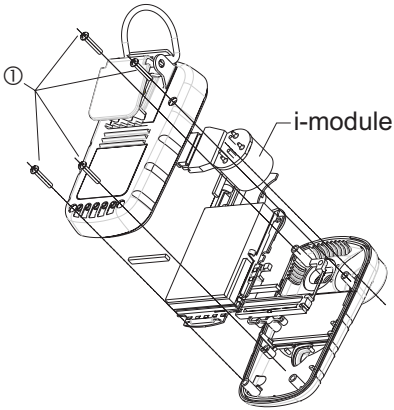
1. Install Portables PC software on PC and attach the RS 232 cable to the charger and PC.
2. Switch on the Gasman unit and drop it into the charger unit ensuring it is upright and the display is facing forward.
3. Open the Portables PC software and either use the Wizard or the Engineer's Form, select Gasman and upload the configuration.

For more information on using the Crowcon Portables PC software, see installed help file.

IX. i-module replacement

Installing or replacing an i-module

1. Ensure you are in a non-hazardous (safe) area, with suitable ESD protection.
   Switch off the unit
2. Remove the back cover by unscrewing the four M2.5, 12 mm Torx screws as shown the in the drawing, point ①. Do not touch the charging elastomer connector with your fingers.



3. Place the Gasman unit face down on a surface.
4. Unclip the i-module from its retaining support clip. Ease one side out at a time. Ensure the elastomer which is retained within the body of the support clip remains in place.
5. Unwrap the i-module from any packaging, ensure the sensor is fully seated on the module board.

If replacing an i-module with one of the same type, instrument specific configuration will be retained. If replacing with a different i-module its default configuration will be loaded.

6. Ensure the gasket is in place on the sensor, slip the sensor onto the sensor housing. Click the quick release fixings around the i-module board, ensuring the i-module is held in place firmly and the sensor is still tightly located on the module board.
7. Replace the back of the Gasman case.
8. Switch on the Gasman unit. The new i-module will be automatically recognised.
9. Crowcon advise carrying out a calibration check when any new sensor is fitted.

X. Specification

Dimensions	90 x 48 x 24 mm (3½ x 1.9 x 1 inches)
Weight	130 g flammable 105 g oxygen 90 g toxic
Housing, degree of protection	Ingress protection IP65 (NEMA 4) & IP67
Operating temperature	-20°C to +55°C (-4°F to +131°F)
Humidity	0-99% RH, non-condensing for continuous operation
Display	Custom LCD with backlight. Starburst characters for number and text display, plus screen icons for status and mode.
Warm up time	1½ minute maximum
Response time (typical)	(T90) : approx 20 seconds for most toxic and flammable sensors, 10 seconds for oxygen.
Audible Alarms	95 dBA Multiple alarm sounds allow selection of distinctive tones for different alarms.
Visible Alarms	Dual colour red/blue flashing LEDs in gas hazard.
Vibrating Alarm	Internal vibrating alarm.
Repeatability	±2% FSD, 6 months
Explosion protection	Intrinsically Safe
ATEX	Essential Health and Safety Requirement, clause 15.9
Safety certificate no.	BASEEFA04ATEX0383 Flammable Gas BASEEFA04ATEX0384 Oxygen or Toxic Gas
IECEx	IECExBAS05.0038 Flammable Gas IECExBAS05.0039 Oxygen or Toxic Gas
Approval codes Europe:	 ATEX II 1G Ex ia IIC T4, (Tamb -20°C to +65°C) Toxic/Oxygen ATEX II 2G Ex ia d IIC T4, (Tamb -20°C to +65°C) Flammable
USA:	Class I Division 1, Groups A, B, C and D
Canada:	Class I Division 1, Groups A, B, C and D

Standards	
Safety:	EN60079-0, EN60079-1, EN60076-11, 94/9/EC
USA:	UL913
Canada:	CSA22.2, 152
Operation	EN50270, EN50271, IEC61508, EN61779

XI. Accessories and spare parts

Accessory list

Crowcon part number	Description
Single way chargers	
C01941	12 V DC input single way charger
C01942	Single way charger with 230 V UK style power supply
C01943	Single way charger with 230 V EUR style power supply
C01944	Single way charger with 110 V US style power supply
C01945	Single way charger with 90-260 V in line power supply
C01297	Vehicle lighter socket lead
C01940	Single Way Combined charger and PC interface
C01947	Single way charger/interface with 230 V UK style power supply
C01948	Single way charger/interface with 230 V EUR style power supply
C01949	Single way charger/interface with 110 V US style power supply
C01950	Single way charger/interface with 90-260 V in line power supply
Multiway charger	
C01951	5 way Multicharger with 90-260 V in line power supply
i-modules:	
S011424	0-100% LEL methane
S011436	0-100% LEL propane
S011437	0-100% LEL pentane
S011439	0-100% LEL butane
S011440	0-100% LEL ethylene
S011460	0-100% LEL hydrogen
S011423	0-25% oxygen
S011422	0-500 ppm carbon monoxide
S011421	0-100 ppm hydrogen sulphide
S011425	0-10 ppm sulphur dioxide
S011429	0-1000 ppm hydrogen
S011426	0-10 ppm nitrogen dioxide
S011428	0-5 ppm chlorine
S011432	0-1 ppm ozone
S011430	0-25 ppm hydrogen cyanide

S011435	0-100 ppm ammonia
S011438	0-1000 ppm ammonia
S011431	0-5 ppm phosphine
S011434	0-1 ppm fluorine
S011433	0-10 ppm hydrogen fluoride
S012015	Gasman IR CO_2 i-module

Sampling accessories:

M02340	Alligator Clip
M04851	Flow cap
C01937	Aspirator Assembly
	Calibration gas contact Crowcon - required gases depend on sensor combination

Carrying and wearing:

C01952	Harness Plate
C01843	Shoulder Strap
C01844	Chest Harness Straps
C01953	Hard Hat Clip

Communications:

E07532	PC Interface Lead
C01832	PC Software
C02097	USB to RS232 adaptor

Spares / consumables:

M04856	Rear Moulding
M04973	Gasman IR CO_2 Front and rear case assembly
C03329	Metal Clip
E01918	Disposable Battery
E07621	i-module Elastomer
E07620	LCD Elastomer
M04682	Sensor Sealing Ring
MO3705	Clip retaining nut M3
MO3793	Case screw
MO5910	Crowcon domed label
EO1535	Power supply for charger 230 V for UK only
EO1536	Power supply for charger 230 V for EUR only
EO1537	Power supply for charger 110 V for USA only
E01552	Power Supply for charger - 230 V No plug
E01553	Power Supply for charger - 115 V No plug
CO1979	Power supply for charger Universal 90-260 V

XII. Troubleshooting guide

Symptom/ error message	Cause	Action
Instrument won't switch on	Flat battery	Recharge or replace battery.
No confidence beep	Function disabled	Reconfigure with PC software.
Gas reading when no gas present	Zero drifted	Restart instrument in clean air.
Unstable/inaccurate gas reading	Sensor failure	Do not use; exit hazardous area immediately. Return instrument for recalibration or sensor replacement.
Autozero failed	Zeroing in contaminated atmosphere	Switch off and restart in clean air.
Cannot Autozero due to alarm	Zeroing in contaminated atmosphere	Switch off and restart in clean air.
Calibration expired	The calibration due date has passed	Send for calibration.
Display shows empty battery symbol on switch on	Battery depleted	Charge or change as appropriate.

Appendix: Limitations of sensors

Sensor limitations

The sensors used in Gasman have limitations common to all such gas sensors, and users should be aware of the points listed below. Crowcon can advise on particular situations and suggest alternative sensors if the instrument is likely to experience extreme conditions.

Gasman Flammable uses a catalytic gas sensor, which measures the flammability of the gas. For this reason, readings displayed on the unit will be unreliable over concentrations of approximately 120% LEL. Oxygen is necessary for catalytic sensors to operate. A 'pellistor saver' is used to disconnect power to the pellistor sensor in the event of over-range to prevent burn out. This locks out for 200 seconds after which a button press will reconnect power to the pellistor. If the sensor power is reconnected when the unit is exposed to an over-range gas concentration there is a risk of damage to the pellistor sensor. Restart should be carried out in a known fresh air environment. Depleted oxygen levels can reduce the flammable gas reading, and if oxygen levels are below safe breathing limits it should be assumed that the flammable reading is low.

Electrochemical gas sensors, toxic gases or oxygen, contain chemicals. Extreme levels of humidity can also cause problems. The sensors are rated for an (average) ambient of 15-90% R.H. However they are used from the tropics to deserts to tundra without this normally being a problem.

Water should not be allowed to collect on the sensor as this may impede gas diffusion.

Persistent exposure to high levels of toxic gas will shorten the life of toxic sensor. If the high level gas is corrosive (e.g. hydrogen sulphide) damage may occur over time to metal components.

Sensors may be cross sensitive to other gases. If unsure, contact Crowcon or your local agent.

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