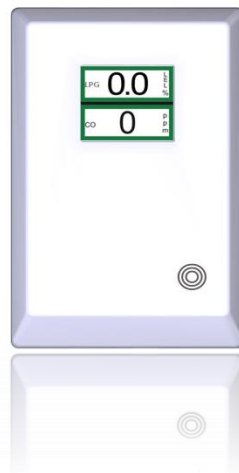




## MINI MERLIN LPGCO

### Dual Gas Detector

Liquid Petroleum & Carbon Monoxide Gas



## Installation & Operation Manual

Please read this manual carefully and retain for future use.

Your new Mini Merlin is a dual gas sensor carefully designed and tested to monitor levels of liquid petroleum gas (LPG) and carbon monoxide (CO) in the air. If there is a dangerous build-up of gas or unsafe levels of carbon monoxide at the sensor, this device can shut off the gas supply via a gas safety valve and/or a gas fired appliance.

This device has additional features for resetting systems, as well as audible and visual alarms - It can also be integrated with a Building Management System (BMS).

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# CARBON MONOXIDE GAS

## General Information

Carbon monoxide (CO) is a poisonous, colourless, odourless, and tasteless gas. Although it has no detectable odor, CO is often mixed with other gases that do have an odor. So, you can inhale carbon monoxide right along with gases that you can smell and not be aware that CO is present.

## SYMPTOMS OF CARBON MONOXIDE GAS POISONING

The following symptoms are related to CO poisoning and should be discussed with ALL members of the household, facility or person/s frequenting monitored areas.

### Mild Exposure:

Slight headache, nausea, vomiting, fatigue, flu-like symptoms.

### Medium Exposure:

Severe headache, drowsiness, confusion, increased heart rate.

### Extreme Exposure:

Unconsciousness, convulsions, cardio-respiratory failure, death.

If you experience even mild symptoms of CO exposure – consult a doctor/ physician immediately.

## CARBON MONOXIDE GAS LEVELS – PARTS PER MILLION

This device is equipped with a digital display that shows levels of CO (displayed in PPM: parts per million).

### Dangerous levels:

Generally above 100ppm. This should be treated as an urgent situation.

### Medium levels:

Generally between 50ppm to 100ppm. This should be cause for concern and should not be ignored or dismissed.

### Low levels:

Maximum acceptable indoor level of CO is <9ppm.

Anything above this level may cause possible health effects with long-term exposure.

See the specification table (5) for how your device monitors CO.

## POSSIBLE SOURCES OF CARBON MONOXIDE GAS

Inside your home or facility, gas appliances used for heating, water heating and cooking are the most likely sources of CO. Vehicles running in attached garages can also produce dangerous levels of CO.

CO can be produced when burning any fossil fuel, such as gasoline, propane, natural gas, oil and wood. It can be produced in any fuel burning appliance that is malfunctioning, improperly installed or insufficiently ventilated.

- Automobiles, gas stoves, water heaters, portable fuel burning heaters, fireplaces.
- Blocked chimneys or flues, corroded or disconnected vent pipes.
- Vehicles and other combustion engines running in open or confined spaces.
- Burning charcoal or fuel in grills in an enclosed area or near the home.

For more information, please visit our website or contact your local AGS distributor.

# LIQUID PETROLEUM GAS

## General Information

### WHAT IS LIQUID PETROLEUM GAS?

Liquefied petroleum gas or liquid petroleum gas – (LPG), are constituents of propane and butane, both flammable hydrocarbon fuel gases used for heating, cooking and vehicles.

It is;

- Obtained during the processing of crude oil, or direct from the sea;
- Colourless and odourless. An odourising agent is added before distribution;
- Half as heavy as water when in liquid form. It will float on water before vaporising.
- Easily liquefied by pressure, taking up only around 1/250th of its gaseous volume. This means that a large amount of LPG can be stored in a small place.
- Either commercial butane or commercial propane - similar in use but propane has a lower boiling point and hence a higher storage pressure. Commercial propane is predominantly an outdoor fuel, commercial butane is predominantly an indoor fuel.

### HOW IS LPG COMMONLY USED?

LPG is used in your home, including cooking, heating, hot water, autogas, aerosol propellant, air-conditioning refrigerant and back-up generator applications. LPG used in your home is typically supplied in 45kg LPG gas bottles and commonly used for BBQ's and camping.

Business and industry use LPG fuel for a multitude of processes including steam boilers, kilns, ovens and LPG forklifts.

### WHAT ARE THE HAZARDS OF LPG?

- LPG is approximately twice as heavy as air when in gas form and will tend to sink to the lowest possible level and may accumulate in cellars, pits, drains etc.
- LPG in liquid form can cause severe cold burns to the skin owing to its rapid vaporisation.
- Vaporisation can cool equipment so that it may be cold enough to cause cold burns.
- LPG forms a flammable mixture with air in concentrations of between 2% and 10%. Your device is designed to warn you at 0.16% concentration BV (by volume of air) and will alarm at 0.2% BV – this is 8% & 10% of the Lower Explosive Limit (LEL).
- Vapour/air mixtures arising from leakages may be ignited some distance from the point of escape and the flame can travel back to the source of the leak.
- At very high concentrations when mixed with air, vapour is an anaesthetic and can subsequently asphyxiate by diluting the available oxygen.
- A vessel that has contained LPG is nominally empty but may still contain LPG vapour and be potentially dangerous. Therefore treat all LPG vessels as if they were full.

For more information, please visit our website or contact your local AGS distributor

# INSTALLATION

## Planning

Our monitors should be installed in areas at risk of gas leaks e.g. over boilers, valves or meters or storage areas of LPG. Take in to account the design of the air flow patterns within the zone area. Detectors should be installed in the correct orientation, as recommended by the manufacturer, and ease of access should be accounted for to allow for any bump tests, recalibration and other forms of maintenance.

### Areas to avoid

Avoid conditions of any other environmental factors that could potentially impede the accuracy and operation of the detector such as; condensation; vibration; temperature, pressure, the presence of other gases, electromagnetic interference and draft zones.

### Area of coverage

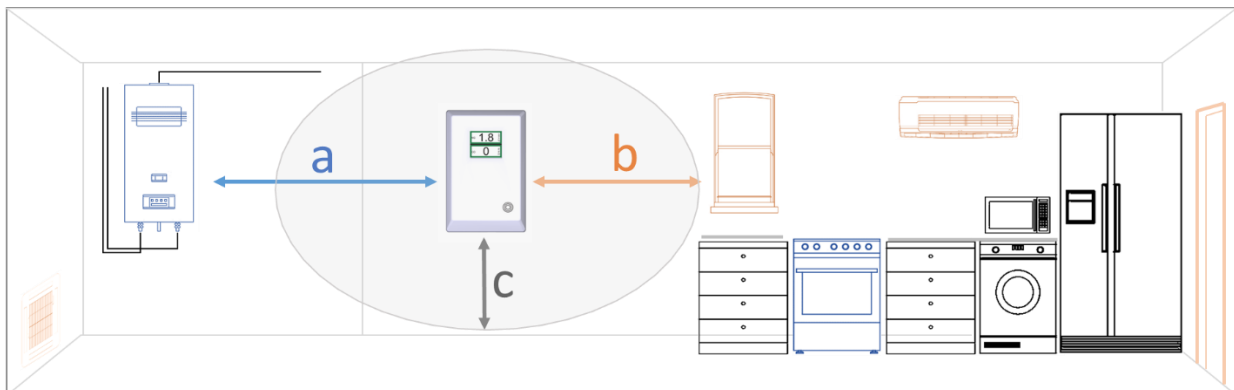
Consider the coverage required and function of the area. Emphasis should be placed on airflow patterns and correct placement, not perceived detecting ranges. The target gas will only be identified when contact is made with the sensing element itself.



Multiple detectors may be required to adequately protect property and persons.

## Typical Location and Positioning

Locations for detectors will vary based on the intended application, they should be located near identified sources of a potential gas leaks/ pockets where hazardous gas could quickly accumulate and areas of identified consequential risk.



- a) (6ft) from sources of combustion i.e. boilers/heaters and gas fired cooking appliances etc.
- b) (4ft) from draft zones and ventilation areas i.e. windows, doorways and A/C units etc.
- c) (5ft) from ground level.

Recommended heights may vary based on air flow and temperature conditions in addition to the proposed application and location. The device should be mounted near the boiler or gas fired appliance/s such as domestic & commercial boiler rooms and basements.

When choosing your location, make sure you are able to hear the alarm from all areas.

## Fixing

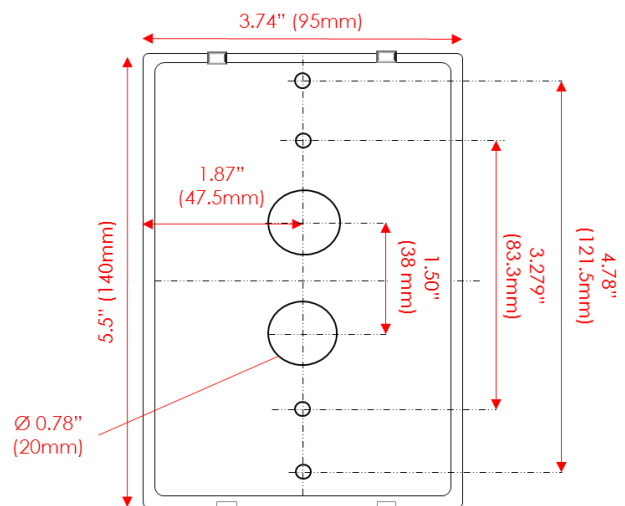
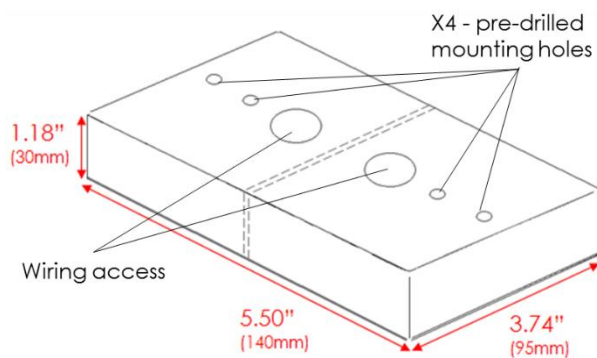
### Unpack all the parts!

This device is designed for surface mounting using 2 mounting screws (not supplied) and must be installed by a licensed, insured contractor.

1. Carefully remove the rear cover from the unit.
2. Using the rear cover - mark the screw holes to the wall.  
Ensure the wall surface is flat to prevent base distortion.
3. There are two pre-fractured areas for cable entry and a divider to separate low and high voltage connections.
4. Placing at eye level allows for optimum monitoring of the digital display screen, or as guide, 5 feet (1.5 meters) from ground level.
5. After executing the mounting and connections – secure the rear cover.

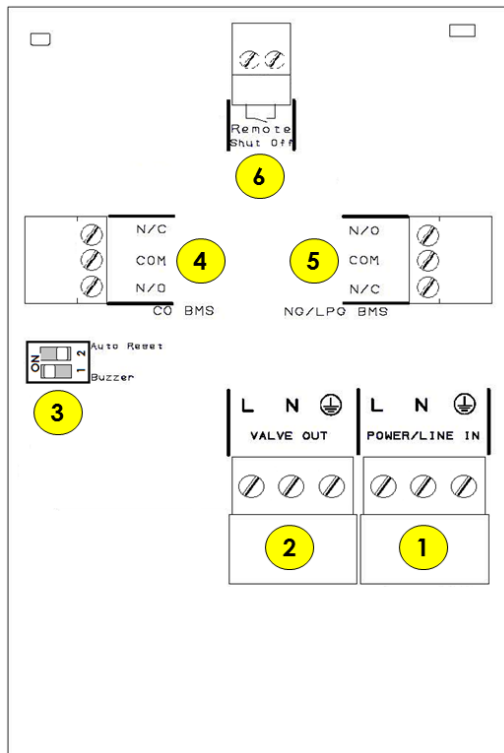


Be careful when creating access for cables – Damage to boards will void any warranty.



Do not attempt to remove the Circuit Board! This will void any warranty.

## Board Overview



### 1. POWER/LINE IN

Mains power input. 110-120v AC

### 2. VALVE OUT

Gas valve power output. 110-120v AC

### 3. AUTO RESET & BUZZER SWITCH

### 4. CO BMS

Relay will switch when CO gas reaches the alarm level.

### 5. NG/ LPG BMS

Relay will switch when LPG gas reaches the alarm level.

### 6. REMOTE SHUT OFF

Closed out as a factory setting and during normal operation, this input shuts off the gas valve relay in the event of external detectors being triggered.

## Auto Reset and Buzzer Switch options

	Auto Reset	Buzzer
<b>OFF</b>	When the power is restored after a power loss, the unit must be restarted manually	The audible alarm will not sound at any level but the digital display gas level indicators will remain active.
<b>ON</b>	This will instruct the unit to restart automatically when power is restored.	The alarm will sound every 15 seconds during pre-alarm gas levels and continuously when gas levels are high.

## Building Management System Integration

This device can be integrated with a Building Management System (BMS), a home alarm system, or be used as part of a boiler low voltage safety limit to make or break a circuit on both gases separately, (valve open or valve closed) depending on the system.

These switches can be used for a variety of purposes including triggering alarm contacts, operating and external relay for multiple appliance shut-down and generating status signals for a BMS system.

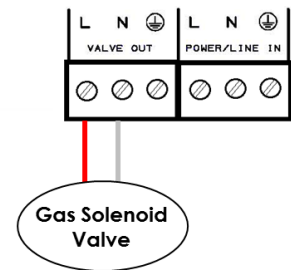
## Wiring the Device

### Gas Supply Controlled by 100-120VAC Solenoid Valve

A 110-120VAC gas solenoid valve should be powered using the terminals marked [VALVE OUT].

When the GAS VALVE terminal is wired to a normally closed (NC) gas solenoid valve, the device can be used to isolate gas supply for multiple appliances.

*If you use a gas solenoid valve, please note that standing pilots will need to be re-lit.*



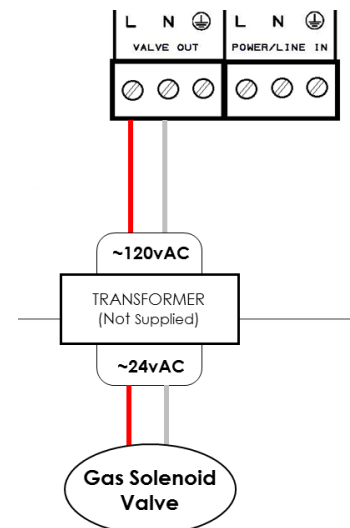
**⚠ CAUTION:** We do not recommend installing a gas solenoid valve with standing pilots.

### Gas Supply Controlled by 24VAC Solenoid Valve

When the GAS VALVE terminal is wired to a normally closed (NC) gas solenoid valve, the device can be used to isolate gas supply for multiple appliances.

The diagram shown opposite uses an external transformer (not supplied) to close a 24vAC gas solenoid valve that could supply gas to one or more appliances.

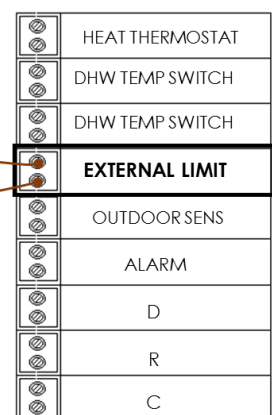
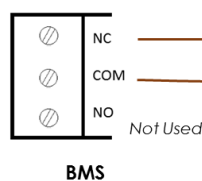
*If you use a gas solenoid valve, please note that standing pilots will need to be re-lit.*



**⚠ CAUTION:** We do not recommend installing a gas solenoid valve with standing pilots.

### Appliance Limit Circuit

The device can be used to directly shut down a gas appliance when a fault condition is detected (gas leak), by wiring the normally closed (NC) and common (COM) terminals of the low volt BMS switches into the low voltage safety limit circuit of the appliance.



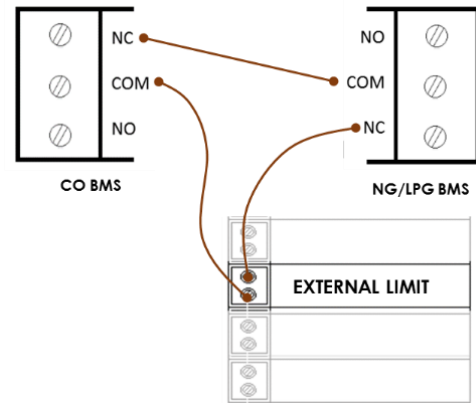
Typical Boiler Low Volt Control Board

If gas is detected, the limit circuit is opened, disabling the appliance.



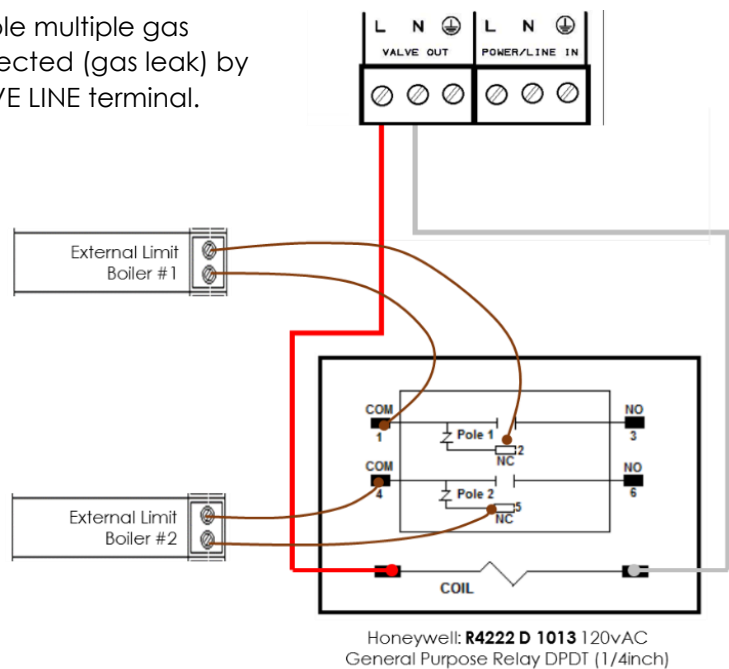
### Appliance Limit Circuit

To connect both **CO** and **NG** to the safety limit circuit of an appliance - wire in series as per the following diagram.



### Multiple Appliance Limit Circuit

The device can be used directly to disable multiple gas appliances when a fault condition is detected (gas leak) by wiring a multi-pole relay to the GAS VALVE LINE terminal.



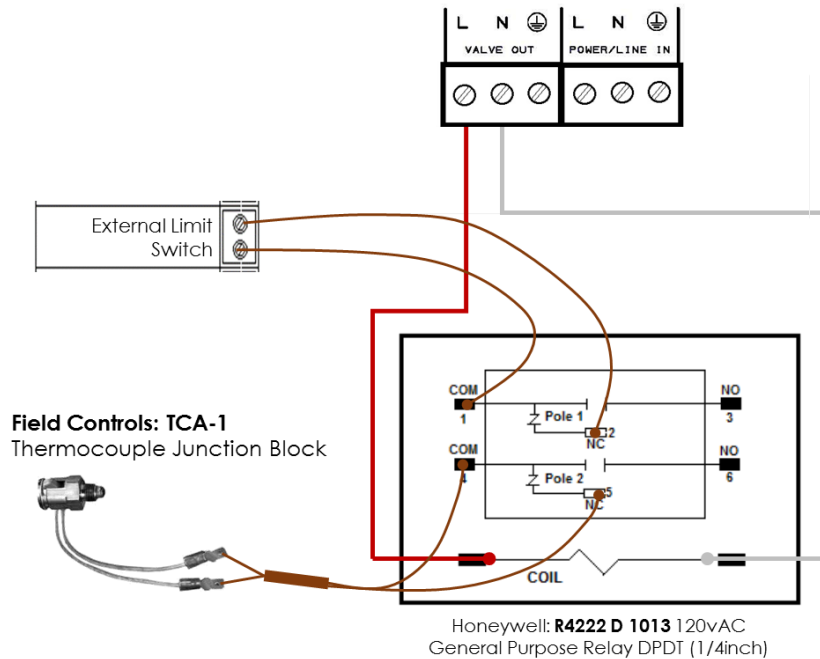
Low voltage wiring is to be inserted into the external limit circuit of a gas appliance.

*Honeywell Relay has a 120vAC primary coil with two sets of switches, each with Normally Open (NO) and Normally Closed (NC) contacts.*

*These contacts are rated for up to 12A AFL. They can be used to break either a low or line volt limit circuits or completely remove power to an appliance.*

### Pilot Water Heater and Boiler Limit Breaker

The device can be used to directly shut the pilot of a water heater using a product from Field Controls. The BMS terminals may also be used to connect to a home alarm system.



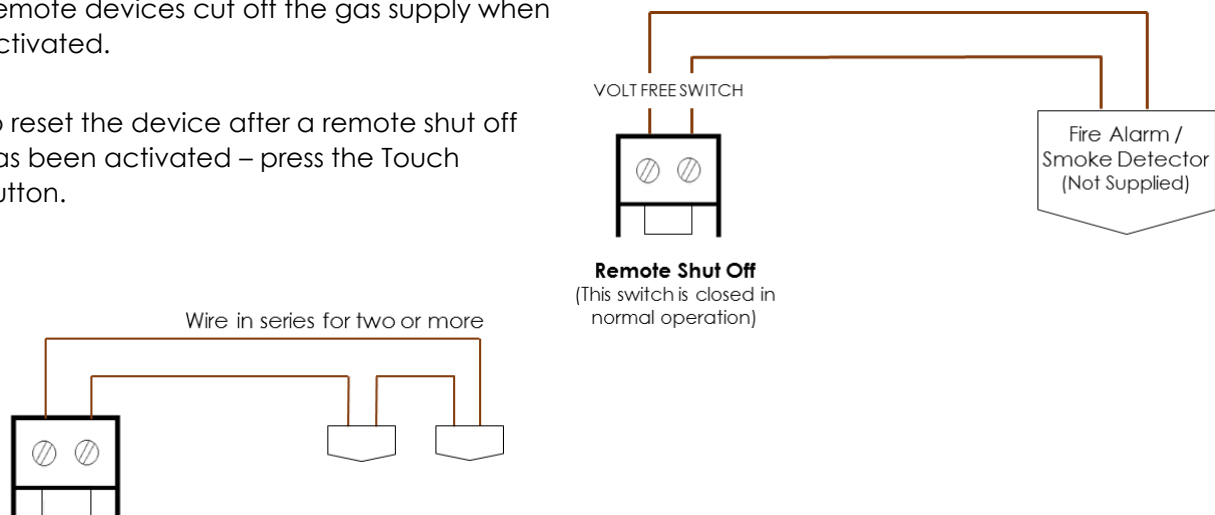
### Remote Shut Off

Your device has a facility for remote devices to be connected.

The [Remote Shut Off] terminal is NC (Normally Closed) and will alarm when energised Open.

Remote devices cut off the gas supply when activated.

To reset the device after a remote shut off has been activated – press the Touch Button.



**WARNING:** When using the remote panic input, only the mains utility output shall de-energize. If you are using the CO or LPG relay to shut down a boiler's external limit circuit you will need to wire the remote panic in series with the relay output.

### Audible Alarm Switch

The user can choose whether to have an audible alarm when dangerous gas levels are detected. The alarm will continuously sound – there are no provisions to silence the alarm, gas levels must drop to a safe level for the alarm to stop.

The buzzer measures approx. 65dB from a distance of 300mm/1ft (tested in quiet conditions). See section 'Board Overview'.

### Auto Reset Switch

When the power is restored after a power loss, your device can either restart automatically or manually. See section 'Board Overview'.

### Factory Set Condition

Buzzer / Audible Alarm	<b>ON</b>
Auto Reset	<b>OFF</b>

### Trouble Shooting

<b>Fault.</b>	<b>Possible Cause/Correction.</b>
Device not responding.	<ul style="list-style-type: none"> <li>Incorrect wiring. Check Power/ Line In terminal.</li> </ul>
End of Life message on screen	<ul style="list-style-type: none"> <li>Detector requires replacement – contact supplier,</li> </ul>

### Specification

Product:	AGS Mini Merlin – LPGCO
Visual Indicators	Traffic Colour Gas Status / End of Life / Remote Shut Off
Display	1.8" TFT – Thin Film Transistor
Screen Brightness	Non- adjustable
Initial Stabilisation Time	60 Seconds approx.
Power Input Voltage	100-120V AC
Consumption	3W
Accuracy @ 25°C / 77°F	± <10%
Operating Temp	32 – 122°F 30-85%RH Non-Condensing
Test Conditions	77° ± 41°F
Gas Sensor Type	LPG: Semi-conducting CO: Electromechanical
Gas Sensor Measuring Range	LPG: 500-10,000ppm CO: 0-1000ppm
Gas Value Pre-Alarm	LPG: >8% LEL (0.16%BV) CO: 20ppm
Gas Value Alarm	LPG: >10% LEL (0.2% BV) CO: 20ppm after two (2) hours 50ppm after one (1) hour 100ppm after ten (10) minutes 300ppm after one (1) minute
Volt Free BMS relay output	0.5A switching current (resistive load)
Dimensions (Inch)	3.7(W) x 5.5(H) x 2.4 (D)
Weight	8.54oz Approx.

# OPERATION

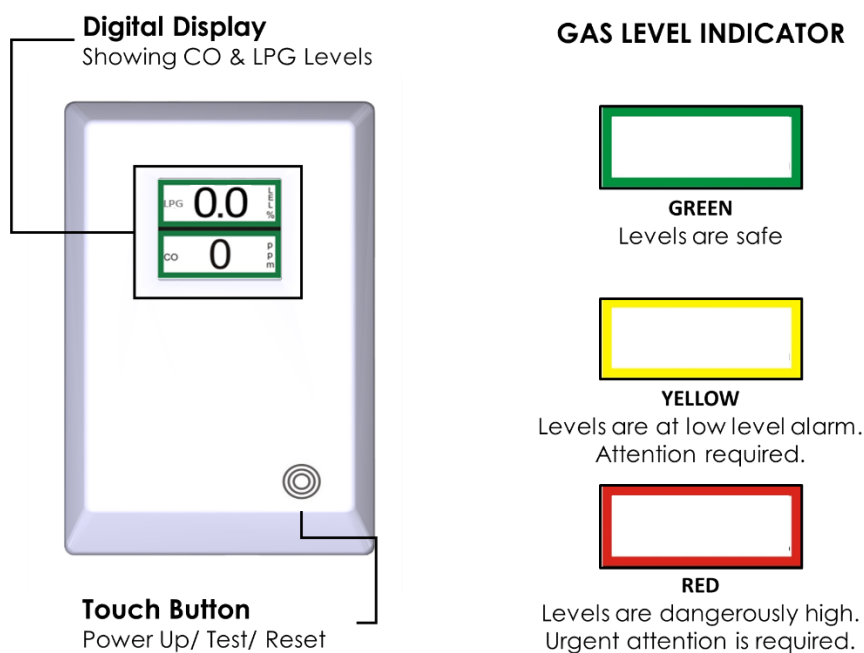
## First Power Up

Supply mains electrical supply and press and hold the touch button for 3 seconds.

The device enters 'sensor stabilisation' phase for approximately 60 seconds – during this period the screen will display an 'initialisation' message indicating that the device is not yet ready for gas detection.




To switch your device off - remove or switch off the mains power supply.

## Gas Level Display



At dangerous gas levels, the alarm will continuously sound if the buzzer dip-switch is ON.  
There are no provisions to silence this alarm.  
Only when gas levels are at a safe level will the audible alarm stop.

## Audible Alarm Characteristics

-  **NO ALARM** – Gas concentration levels are safe. No alarm sound.
-  **PRE- ALARM** – Alarm will 'beep' every 15 seconds.
-  **ALARM** – Continuous alarm sound.

The alarm will only sound if the Buzzer is switched to ON.

## Touch Button

### POWER UP

Press and hold for 3 seconds when electrical supply is connected.

### RESET

To reset after a gas alarm - press the touch button once.

### TEST

Press and hold for 3 seconds when powered to test screen colouration, audible alarm and gas/BMS relay.

## Remote Shut Off



If this device is connected to remote shut off devices (optional).

When activated, the digital display will indicate that it/they are activated and will shut off the gas supply if installed and configured to do so.

## End of Life Indicator

This message indicates that the detector has reached its expected operational lifecycle. No gas levels will be displayed. Contact your supplier and replace the unit immediately.



The expected lifecycle may vary depending on environmental conditions.

## Maintenance

Keep your detector in good working order follow these basic principles;

- DO carefully remove any accumulated dust from the outer enclosure once a month.
- NEVER use detergents or solvents to clean your device – this may permanently or temporarily damage the gas sensing elements.
- NEVER spray air fresheners, hair spray, paint or other aerosols near the device.
- NEVER paint the device. Paint will seal vents and interfere with the device.

High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements – such as; wine; deodorants; stain removers; thinners etc.

Other gases and substances to avoid; Corrosives (i.e. chlorine & hydrogen chloride); Alkali metals; Basic or acidic compounds; Silicones; Tetraethyl lead; Halogens and halogenated compounds.

## Bump Testing

### What is Bump Testing?

Bump testing is a term used for checking a gas detector is functioning correctly by exposing it to the target gas. A known concentration of the target gas is applied to the device to trigger an alarm condition and ascertain the detector is working safely.

### Why is it Important?

A detector may visually appear in good order, but its sensitivity can be inhibited by external factors such as, dust; humidity; temperature fluctuations; cleaning products; contaminants or sensor drift (ageing). All can cause a decline in sensitivity and eventual failure.

The aim of the bump test is to make sure a gas detector is working at its optimum by briefly exposing the unit to a known concentration of the target gas. The reading (if displayed) is compared to the actual content of gas present, as stated on the test gas cylinder and if the detector goes into alarm within an acceptable range of the actual concentration, usually within 10%, then it is working safely.

If the bump test results are not within the acceptable range, the gas detector must not be used until a full calibration has been conducted.

Bump testing has a number of benefits for the end user:

- Peace of mind that the system does actually detect the gas in question.
- Allows the site to practice safe operations in a similar manner to the fire system.
- Early indication of any issues.

### How Often?

Regular bump tests are important to make sure the detector is able to detect a release of gas as early as possible. A bump test usually takes seconds (gas type dependant) and is often completed alongside a scheduled fire alarm test, however the frequency should be determined following a risk assessment by the end user.

Current standards recommend that for new installations - it may be prudent to carry out a bump test frequently (perhaps weekly), following a successful initial period and as confidence grows in the installation concerned, the frequency could be reduced.

Remember, bump testing does not remove the need to have gas detectors inspected, calibrated and serviced periodically by a trained engineer. You should not attempt this yourself and should employ the services of a specialist company.

For more information on this, contact us.



## IMPORTANT WARNING STATEMENTS

The information contained within this manual should be referenced for typical installation and operation only.

For site specific requirements that may deviate from the information in this guide – contact your supplier.

The expected lifetime of gas sensor elements is 5 years upon initial power up. The device will display a message to indicate this time and should immediately be replaced.

It is recommended that this device be commissioned upon installation and serviced annually.

Do not apply lighter gas or other aerosols to the device – this will cause extreme damage.

High concentrations of alcohol/ ethanol found in many products may damage, deteriorate or affect the gas sensing elements – Avoid exposure near your device.

This device is designed to detect carbon monoxide and natural gas from any source of combustion. It is NOT designed to detect smoke, fire or other gases and should NOT be used as such.

This device provides early warning of the presence of LPG or carbon monoxide, usually before a healthy adult would experience symptoms. This early warning is possible provided your alarm is located, installed and maintained as described in this guide.

This device requires a continual supply of electrical power – it will not work without power.

This device should not be used to substitute proper installation, use and/or maintenance of fuel burning appliances including appropriate ventilation and exhaust systems.

This device does not prevent LPG or carbon monoxide from occurring or accumulating.

Actuation of your alarm indicates the presence of dangerous levels of LPG or CO. Seek fresh air supply and contact your local gas emergency service should you suspect a gas leak.

This unit may not fully safeguard individuals with specific medical conditions. If in doubt, consult a doctor/physician.

Your product should reach you in perfect condition, if you suspect it is damaged, contact your supplier.

### Manufacturer's Warranty

#### Two Year Warranty

**Coverage:** The manufacturer warrants to the original consumer purchaser, that this product will be free of defects in material and workmanship for a period of three (3) years from date of purchase or one (1) years for oxygen detectors.

The manufacturer's liability hereunder is limited to replacement of the product with repaired product at the discretion of the manufacture. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material or workmanship.

This warranty extends to the original consumer purchaser of the product only.

**Disclaimers:** Any implied warranties arising out of this sale, including but not limited to the implied warranties of description, merchantability and intended operational purpose, are limited in duration to the above warranty period. In no event shall the manufacturer be liable for loss of use of this product or for any indirect, special, incidental or consequential damages, or costs, or expenses incurred by the consumer or any other user of this product, whether due to a breach of contract, negligence, strict liability in tort or otherwise. The manufacturer shall have no liability for any personal injury, property damage or any special, incidental, contingent or consequential damage of any kind resulting from gas leakage, fire or explosion. This warranty does not affect your statutory rights.

**Performance:** During the above warranty period, your product will be replaced with a comparable product if the defective product is returned together with proof of purchase date. The replacement product will be in warranty for the remainder of the original warranty period or for six months – whichever is the greatest.



#### Information on waste disposal for consumers of electrical & electronic equipment. (EEE)

When this product has reached the end of its life it must be treated as Waste Electrical & Electronics Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used.

Please contact your supplier or local authority for details of recycling schemes in your area.

For all correspondence regarding your device:

**AGS Head Office**

Tel: (727) 608-4375

Fax: (727) 538-4237

[info@americangassafety.com](mailto:info@americangassafety.com)



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