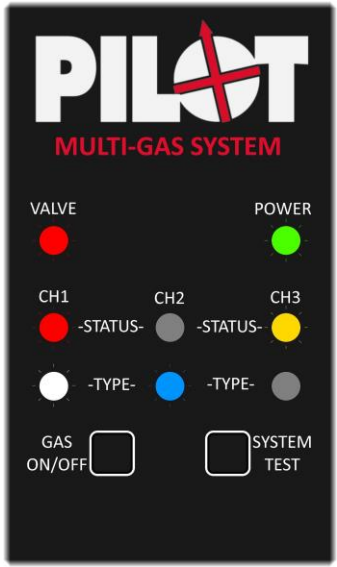
Gas Detection Specialists

Envin SCIENTIFIC LIMITED



MULTI-CHANNEL GAS ALARM

USER MANUAL

Contents

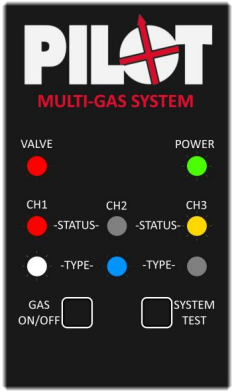
1. Introduction

Welcome to the user manual for your new Pilot Multi-Channel Gas Alarm! This document is designed to guide you through the installation, operation and initial testing of the device, as well provide information on any operational queries or troubleshooting issues you may have.

The Multi-Channel Gas Alarm is our flagship alarm and is suitable for all boat sizes.

This product range provides critical safety features against deadly or extremely dangerous gases. This responsibility requires maximum reliability which is why all of our products endure an extensive testing procedure before leaving Envin Scientific.

2. Your Device



Alarm Main Unit

Your device is a Multi-Gas monitoring alarm with optional automatic gas valve shut off.

The device supports two types of sensors; Carbon Monoxide (CO) and Liquid Petroleum Gas (LPG) and will work with 12V or 24V systems.

In your gas detection system, you can have:

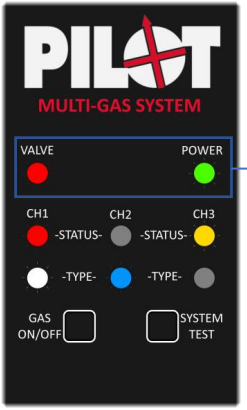
- Up to 1 Gas Solenoid
- Up to 3 CO or LPG sensors, or any combination of these.

CO Sensor

LPG Sensor

Solenoid

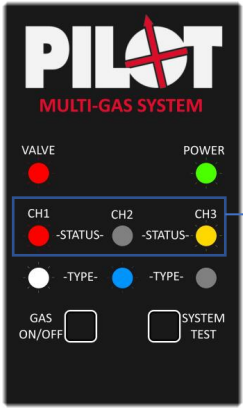
2.1 Front Panel & LED Indicators

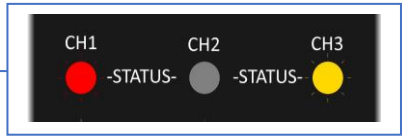


The first two LED's on the front panel of your Multi-Gas Alarm are the Valve and Power Indicators.

Both of these LED's have 3 states:

State	Power	Valve
	The unit is power on correctly.	Valve has been detected and is open.
	Power supply voltage is low. Alarm will beep every second in this state.	Valve has been detected and is closed.
(off)	There is no power to the unit. Check wiring and that the circuit is switched on.	Valve is not connected.

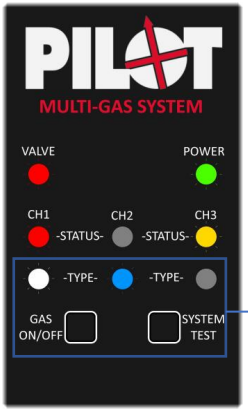


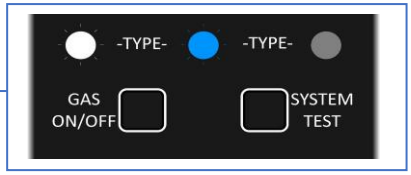


The next 3 LED's on the front panel are the Channel STATUS LED's.

Each of these LED's have 3 states:

State	LPG Sensor Connected	CO Sensor Connected
(off)	An OFF LED shows that the channel is operating correctly.	An OFF LED shows that the channel is operating correctly.
	SOLID yellow indicates a FAULT. Check all sensor wiring connections.	SOLID yellow indicates a FAULT. Check all sensor wiring connections.
	SOLID red indicates the unit is ALARMING	FLASHING red indicates the unit is ALARMING





The next 3 LED's on the front panel are the Channel TYPE LED's. These indicate the type of sensor that is connected to the corresponding channel. These LED's have 3 states:

State	Description
(off)	No Sensor attached. If a sensor is connected, check the wiring.
	Carbon monoxide sensor connected.
	LPG sensor connected.

GAS ON/OFF button: This button open and closes the solenoid if the unit is NOT in an alarming state.

SYSTEM TEST button: This button tests all channel LED's and buzzers.

2.2 Carbon Monoxide Sensor

The new smart CO Sensor has a built in LED and Alarm for additional safety.

Operation:

When power is provided to the unit, the sensor will start its initialisation period. You will see the LED flash yellow for approximately 15-20 seconds. Next, to show the sensor is ready, the LED will flash green 5 times then turn off.

State	Description
(off)	If the LED is in a constant “off” state after the initialisation period, then the sensor is operating correctly.
	When the sensor enters normal operation mode the LED will flash green 5 times.
	Initialisation period, the LED will flash yellow.
	If the sensor is alarming, the LED will become a constant red and the built in alarm will sound.

The Carbon Monoxide sensor conforms to section 5.3.4 (Alarm Conditions) & 5.3.5 (Alarm during warm up time) of BS EN 50291-1:2010, tested by CSA Group Ltd. The Multi-Channel Alarm will be triggered under the conditions laid out in the following table:

CO Volume Ratio	No Alarm Before	Alarms Before
30ppm	120 min	-
50ppm	60 min	90 min
100ppm	10 min	40 min
300ppm	-	3 min

2.3 Liquid Petroleum Gas Sensor

The LPG sensors detect butane/propane and alarm at 25% LEL (lower explosive limit)

2.4 Technical Specification

Specification	Value	Description
Supply Voltage	12/24V	Supply from your system battery
Current Draw (Standby)	≈180mA	When alarm not sounding
Current Draw (Alarming)	≈200mA	When alarm is sounding
Current Draw (With Solenoid)	<700mA	When the solenoid is open
Number of sensors	0-3	Any combination of LPG or Carbon Monoxide
Dimensions	70 x 40 x115	(W) x (D) x (H)

3. Installation

In addition to the main unit, Solenoid (optional) and the sensors in your gas detection system you will need:

- Cable rated up to 1A
- A flat head screwdriver

Power Supply

- The power supply must come from the vessels Master Switch in order to activate the Gas Alarm whenever the power is on.
- The Multi-Channel Gas Alarm will work on a 12V or 24V supply.

Suitable Installation Locations

- The main unit should be in a location where the alarm is audible and the LEDs can be seen. It must be protected from the elements however, ventilation holes should **not** be covered up.
- The LPG sensors should be mounted as low as possible in a position where they will remain dry – near gas appliances at floor level or just underneath floorboards is ideal.

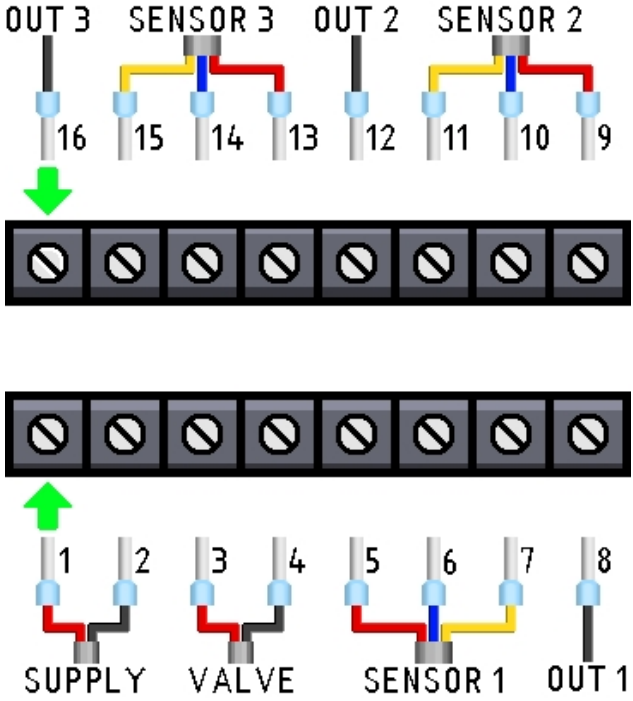
- The CO sensors should be placed high up near any combusting devices, such as gas ovens, hobs, boilers, etc. It is also advisable to have CO sensors in sleeping quarters.
- There are cable routing and mounting holes on the rear and bottom of the unit casing.

3.1 Wiring

WARNING

Disconnect the power supply before proceeding

- Using the wiring diagram on page 12, start from pin 1 and work your way along the terminal block inserting the wires into the block.
- Wires are secured using a flat head screwdriver.
- To avoid confusion, use wire colours that match the colours in the wiring diagram.
- Be sure to wire the cables through the cable routing holes on the bottom of the case before attaching them to the terminal block.



Wiring Diagram

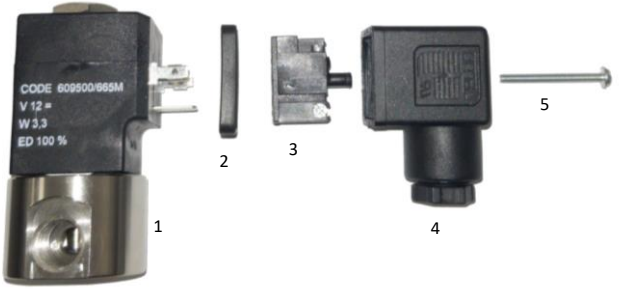
3.2 Pin Definitions

1. Positive power supply
2. Negative power supply (Common Ground)
3. Valve Positive
4. Valve Negative
5. Channel 1 Positive
6. Channel 1 Negative
7. Channel 1 Signal
8. Channel 1 Alarm output
9. Channel 2 Positive
10. Channel 2 Negative
11. Channel 2 Signal
12. Channel 2 Alarm output
13. Channel 3 Positive
14. Channel 3 Negative
15. Channel 3 Signal
16. Channel 3 Alarm output

NOTE: The “Alarm Output” pins are for use with external ventilation systems and are not used in most gas detection system setups. To use, connect the negative pin of your ventilation fan to the channel alarm output pin.

3.3 Solenoid Wiring

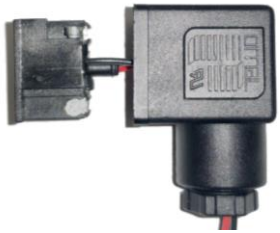
Your solenoid valve comes as one unit but consists of 5 smaller parts as shown in the picture below. This section of the guide will show you how to correctly connect wires to your solenoid.



- First, unscrew the bolt keeping the solenoid together.
- Next, use a flat head screw driver to remove the wire connector (part 3 above) from the connector housing (4).
- The next step is to feed the wires through the wire connector housing (as shown on page 15)

- You will now be able to connect your wires to the wire connector block. The red wire is connected to terminal 1 and the black wire to terminal 2 (shown below). The terminals are also labelled on the front of the connector block. Terminals 3 and ground are not connected.

Wire Connector Block


Wired Connector Housing

- Finally, push the wire connector block back into the housing, place rubber seal on the wire connector housing and screw the housing to the solenoid.

You should now have a fully assembled solenoid valve.
Always test the operation of the solenoid before linking to your gas supply.

4. Initialisation & Testing

This section will explain how the unit functions, what the initialization procedure is and how to test your device.

4.1 Initialisation

The initialisation process will occur every time your Multi-Gas Alarm is powered on.

When the device is first powered on all LED's will flash quickly in sequence to ensure all are operational.

Next the unit will check for attached devices and start the initialisation process. This is indicated by a beep every second. **The initialisation process can take up to 8 minutes**, however the beeping will be silenced after 30 seconds.

When a channel (sensor) has stabilised, there will be one long beep and the LEDs will be displayed as depicted in the tables on pages 6 & 7. The "type" LEDs will show the type of sensor connected and the "status" LEDs will show whether the sensor is in Normal, Faulting or an Alarming state.

4.2 Testing

The alarm may be tested at any time in two ways:

1. By pressing the “Test” button on the front of your unit. This simulates the presence of harmful gases and should immediately sound the alarm and illuminate the red LED.
2. By allowing a small amount of lighter fluid vapour to pass by the LPG sensors. This will test the sensor itself.
3. Carbon monoxide sensors can be tested using a CO sensor testing kit (canned CO). These are available at most DIY stores.

All Multi-Channel Gas Alarms and sensors are fully tested and calibrated before leaving the Envin Scientific. It is wise, however, to regularly test your gas detection system for maximum safety.

5. Alarms

Carbon Monoxide Alarm

- High pitch alarm noise that beeps approximately every second. The sensor AND the main unit will sound the alarm.
- “Status” LED on the main unit will flash RED
- The LED on the sensor will illuminate RED.

Liquid Petroleum Gas Alarm

- Constant, high pitch alarm noise.
- Status” LED will illuminate RED.

ACTION

In the event of an alarm ensure that nothing is used which could ignite gas (matches, engine ignition etc.).
Ventilate the area by opening doors and hatches.
Vacate any interior cabins and remain outside until the alarm stops.
If the alarm continues to sound consult the troubleshooting section.

6. Troubleshooting

Symptom	Possible Cause	Action
Intermittent Alarm	Sensor may have become disconnected	Switch off supply, check connections, restart. Otherwise replace the sensor
Frequent false alarms	Contaminated Sensor or other gases present. Sensor over 2 years old	Replace the sensor
Regular beeping (not while initialising) or Fault light is lit	Low supply voltage	Check boat supply
Alarm after initialisation or failure to initialise	Sensor has become disconnected or has reached end of life	Check connections or replace sensor if necessary

7. Sensor Replacement

The LPG sensors have an approximate lifespan of 2 years, and their sensitivity can change over time.

To replace the LPG sensors:

1. Switch off the power supply
2. Remove the top cap from the sensor housing
3. Remove the sensor from the housing
4. Gently insert the new sensor into the housing and replace the sensor cap.
5. Switch the power on

The CO sensors have an approximate lifespan of 5 years, as their sensitivity is less effected by time.

To Replace the CO sensors:

1. Switch of the power supply
2. Disconnect the sensor from the connector
3. Connect the new sensor to the connector
4. Switch the power on

Replacement sensors are available on the Envin Scientific website – www.envinsci.co.uk/envin-shop/ ,Or through a Pilot supplier.

8. Warnings

DO NOT:

- ✗ Expose sensors to silicone vapours, alkaline metals or a highly corrosive environment
- ✗ Use cleaning products around the sensors
- ✗ Allow the sensors to become damp or wet
- ✗ Expose the sensors to extreme temperatures (below 0°C or above 60°C)
- ✗ Handle sensors or unit internals while powered up
- ✗ Connect more than the max. number of sensors to the unit

DO:

- ✓ Replace the sensors **after the approximate lifespan is over**
- ✓ Test the alarm regularly
- ✓ Place the sensors into a clean sealable bag if the boat is to be out of use for long periods of time or if it is to undergo any maintenance work

9. Contact Details

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