

Specifications

Supply voltage	12 Volts or 24 Volts DC
Sensor voltage	2.2 Volts DC nominal.
Alarm loudness	95 dBA
Dimensions	117W x 77H x 80D (mm)
Depth behind panel	55 mm from front face
Buzzer terminal maximum draw	10 mA
LED terminal maximum draw	10 mA

Current Consumption

12 Volt Model	Solenoid	Solenoid
	On	Off
Single sensor	170 mA	50 mA
Dual sensor	270 mA	90 mA

24 Volt Model	Solenoid	Solenoid
	On	Off
Single sensor	135 mA	30 mA
Dual sensor	150 mA	50 mA



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INSTALLATION and OPERATION manual for the **GM3S**

COMBUSTIBLE GAS AND VAPOUR MONITOR

The SENTINEL SYSTEMS **GM3S** is a highly sensitive micro-processor controlled gas monitor which will detect and warn of the presence of combustible gases (such as methane, ethane, propane, iso-butane (LPG), petrol vapour, alcohol, etc) in concentrations above 20% of the Lower Explosive Limit (LEL).

By applying up-to-the-minute power management technology and the use of energy efficient sensors, an extremely low battery drain has been achieved. For example, power consumption of the GM3S is less than a quarter of that of most other detectors currently available.

In use, the monitor displays a green "safe" light and holds the LPG solenoid valve open (if fitted) as long as no gas has been detected.

As soon as gas at a concentration greater than 20% of the LEL is detected, the gas supply solenoid is turned off, an alarm buzzer sounds and a red warning light illuminates.

If this occurs, all naked lights and cigarettes should be extinguished and no attempt be made to switch on any electrical equipment.

IMPORTANT WARNING

To ensure continued protection against gas leaks, regularly check the system for proper operation by testing each sensor with gas (refer to the Sensor Test Procedure on page 7).

INSTALLATION

Mounting

The GM3S is designed to be mounted onto a bulkhead or control panel. It can also be flush mounted into a fascia or switchboard by separating the face panel from the mounting block.

The control module should be located away from radio equipment in order to reduce the likelihood of interference or spurious operation.

After separating the face panel from the mounting block, fix the mounting block to the mounting surface using appropriate screws. The wiring can be run through a hole in the bulkhead or through the side of the mounting block using microduct.

All associated wiring should then be connected according to the connection diagram on page 5 and the face panel screwed to the mounting block (**do not overtighten terminal screws or face panel mounting screws**).

The terminals marked “IC” should be connected together with a length of wire

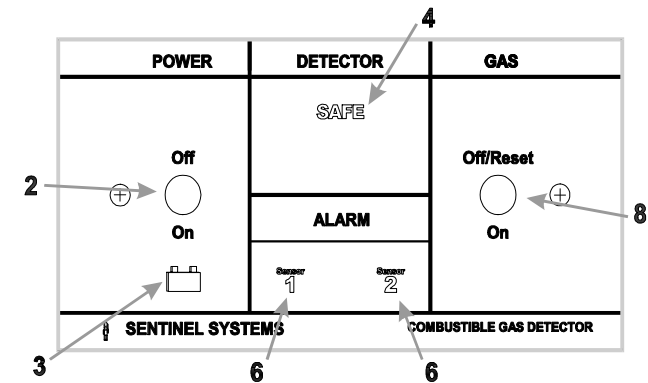
The wiring shown by dashed lines is only required if the relevant item is fitted.

The gas solenoid should be installed between the gas bottle and the regulator by a licensed gas fitter. The direction of flow of the gas is moulded on the inlet port (marked “IN”). The waterproof DIN plug can be removed from the coil by undoing the central fixing screw. The brown terminal base can then be prised out of the plug housing with a small flat bladed screwdriver only after pulling the screw completely out of the housing. The solenoid supply should be connected to the terminals marked “1” and “2”

Sensor Installation

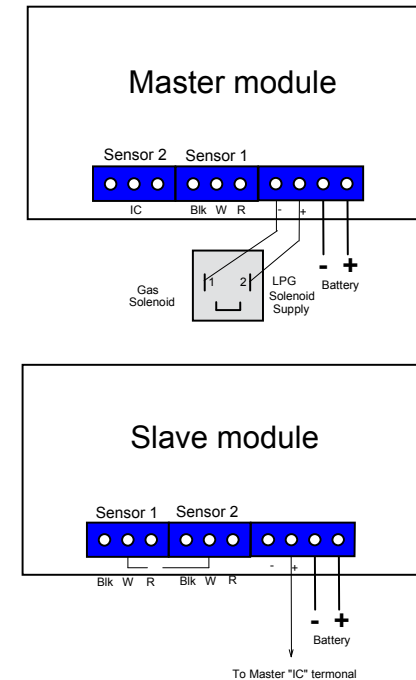
The location of the sensors should be carefully chosen. Because LPG gas and petrol vapour are both heavier than air, it is important that one sensor be installed in the lowest part of the vessel, but out of reach of damaging bilge water. Sensors should preferably be mounted horizontally in a location protected from knocks, either using the mounting saddle provided, or by inserting from behind into a bulkhead or panel hole of 14.5mm (9/16”) diameter. To ensure the sensor is gripped firmly by the saddle clamp, stick the supplied self-adhesive foam pad to the mounting surface under the sensor. If it is necessary to lengthen the sensor cable, **do not lengthen it to more than 10 metres**. Connections should be soldered or screwed tightly using cable joiners. For longer runs, contact the manufacturer.

If only one sensor is fitted, it should be connected to the sensor 1 terminals. To prevent the sensor 2 channel from causing an alarm condition, the sensor 2 input should be paralleled to that of sensor 1 by fitting a wire link between the “WHITE” terminals of sensor 1 and sensor 2 as shown by a dashed line opposite.



Front Panel

Rear Panel



OPERATION

Power Switch

After switching on power switch (2), there is a wait period of approximately 20 seconds to allow the sensor(s) to stabilise.

During this time, the detector goes through a self-test routine where all the LEDs are illuminated and the buzzer sounds, before sequentially lighting each LED in turn, until the wait period has ended. In addition, the gas solenoid is held off.

At the end of this initialisation period, the "SAFE" indicator (4) will illuminate if no gas is present.

The gas detector is now ready to detect combustible gases.

If gas is present, the red indicator (6) marked "Sensor 1" or "Sensor 2" as appropriate, will light up, a buzzer will sound and the gas solenoid will be turned off, removing the risk of further leakage.

When the gas or vapour has dispersed, and the concentration is below 20% of the LEL, the indicator (6) will go off, the buzzer will stop, and the "Sensor 1" or "Sensor 2" indicator will change from continuously on to flashing on-and-off to indicate past danger. The gas solenoid valve is held off to allow the leak to be investigated. No attempt should be made to reset the detector until the cause of the alarm has been checked.

Fault conditions

If there is damage to a sensor or its cable, this will be indicated by the appropriate LED.

For example, if the red supply wire in the sensor 2 cable breaks or gets pulled out of its terminal, then the LED marked "Sensor 2" will flash on and off continuously, while the buzzer sounds intermittently. This alarm condition also indicates when a filament in the sensor goes open circuit.

If the black cable or its associated filament goes open circuit, the LED and buzzer stay on continuously

Stability

The long term stability of the sensor is shown in fig. 2.

This indicates that over the long term, sensitivity does not change significantly even under conditions of high temperature and humidity.

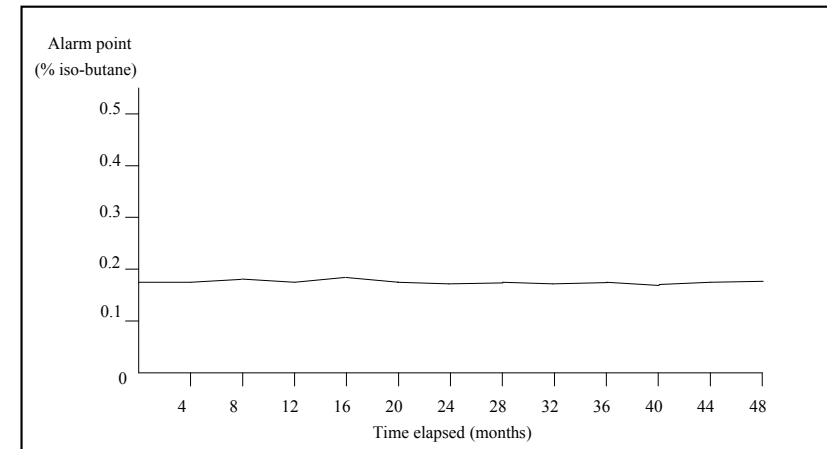


fig. 2

This resistance to corrosion and level of stability is essential in a marine environment.

SENSOR

Description

The gas sensor used consists of two platinum resistance wires. One of the wires has a catalytic bead, and the other wire acts as a reference.

The elements are housed in a double layer of #316 stainless steel fine mesh.

Resistance to contaminants

The sensor is virtually unaffected by short-term immersion in water, including sea water. As shown in figure 1, salt contamination has very little effect on the sensitivity of the sensor, which will still trip at or below the required gas concentration threshold. This exposure, however, may make the sensor more susceptible to long-term corrosion problems. If the sensor element has come into contact with contaminants such as oil or fuel, it may have been damaged, and should be checked by a qualified technician.

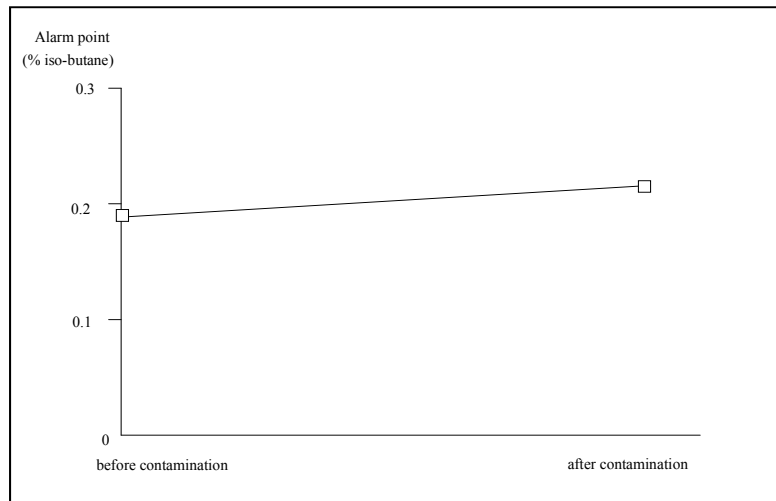


fig. 1

Gas On/Off / Reset Switch

The right-hand switch (8) allows the gas solenoid to be turned on and off manually if necessary. If an alarm condition exists, the gas solenoid cannot be turned on.

Once the danger has passed, an alarm condition can be cleared by moving the switch (8) to the "Off/Reset" position, leaving it there for a second and then, if desired, to the "On" position to allow gas to flow.

Low Battery Alarm

If the voltage of the battery connected to the monitor drops below approximately 10.5 Volts (21 Volts for the 24 Volt Model), the buzzer will sound for about 10 seconds and the "Low Battery" LED (3) will remain alight until the battery is recharged.

Sensor Test Procedure

The sensors and monitor can be tested by holding a cigarette lighter near the sensor with the gas flowing but not ignited. Do not point the stream of gas directly into the sensor, as it may be damaged. The alarm should operate within 10 seconds. This test can also be carried out with methylated spirit, petrol or alcohol vapour.