



Digital Gas Detector

OPERATOR'S MANUAL



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C-Guard™

Intelligent Gas Detector

Part Number 65-1020

Manual Revision v1.09 (updated 18 Feb 2011)



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SERVICE POLICY

GasTech Australia maintains an instrument service facility at the factory as well as authorised service facilities around the world. Should your instrument require service, you may contact us toll free at 1800 999 902 within Australia only or 61-8-6108-0000, or visit our website www.gastech.com.au for authorised service locations.

For non-warranty repairs, you will need to provide a purchase order number. If you need to set a limit to the repairs costs, state a "Not to Exceed" figure. If you need a quotation before you can authorise repair costs, so state, but understand this will incur additional costs and may delay processing of the repair.

If you wish to set a limit to the authorised repair cost, state a "not to exceed" figure. GasTech Australia's policy is to perform all needed repairs to restore the instrument to full operating condition, including reactivation or replacement of all out-of-warranty electrochemical cells.

You may send the unit, freight prepaid, to: GasTech Australia Pty Ltd, 24 Baretta Rd, Wangara 6065, Western Australia. Attn.: Service Department. Enclose the copy of your contact details. Pack the instrument and all its accessories (preferably in its original packing) and any special instructions. Repairs are warranted for 90 days from the date of shipment. Sensors have individual warranties.

Always include your address, purchase order number, shipping and billing information, and a description of the defect as you perceive it. If this is the first time you are dealing directly with the factory, you will be asked to provide credit references, prepay, or authorise COD shipment.

 **NOTE: GasTech Australia assumes no liability for work performed by unauthorised service facilities.**


WARRANTY STATEMENT

1. Consumers have the benefit of conditions and warranties implied by the Trade Practices Act 1974 (TPA) and similar provisions of State and Territory enactments and nothing in these conditions is intended to exclude, restrict or modify any statutory obligation of GASTECH AUSTRALIA PTY LTD (Company) if that cannot lawfully be effected.
2. This warranty relates only to Equipment manufactured and services supplied by the Company, its related corporations and subsidiaries. Equipment or any part thereof which is returned to the Company, transportation prepaid, within 27 months from the date of dispatch from the Company's premises or 24 months from the date of shipment to the ultimate user (whichever occurs first) and is found by the Company, after examination, to be defective in workmanship or materials, will be either repaired or replaced as determined by the Company, free of charge. The terms of this paragraph apply unless stated otherwise in this instruction manual.
3. This warranty does not apply to:
 - a) replacement or repairs which are required as a results of improper installation, misuse, maladjustment modification or lack of routine maintenance by others;
 - b) items subject to deterioration or consumption in normal service, that is, those which must be cleaned, repaired or replaced routinely such as (but not limited to) lamps, bulbs and fuses, pump diaphragms and valves, absorbent cartridges, filter elements and batteries; or
 - c) goods, materials or parts supplied or manufactured by unrelated third parties and provided to the Purchaser at the specific request of the Purchaser and such goods, materials or parts will be repaired or replaced only to the extent of the original suppliers warranty.
4. Should the Company be liable for breach of a condition or warranty (other than the pursuant to section 69 of the TPA) implied by Division 2 of Part V of the Act (other than that implied by section 69 of the TPA) the liability of the Company for such breach shall, subject to section 68A(2) of the TPA, be limited to one of the following as determined by the Company.
 - a) the replacement of the Equipment or the supply of equivalent Equipment-,
 - b) the payment of the cost of replacing the Equipment or of acquiring equivalent Equipment.
5. Subject to Clauses 2 and 4 and any legislation to the contrary:
 - a) representatives and agreements not expressly contained herein shall not be binding upon the Company as conditions, warranties or representations; all such conditions, warranties, and representations on the part of the Company, whether express or implied, statutory or otherwise, whether collateral or antecedent or otherwise are hereby expressly negated and excluded;
 - b) the Company shall be under no liability to the Purchaser for any loss (including but not limited to loss of profits and consequential loss) or for damage to persons or property or for death or injury caused by any act or omission (including negligent acts or omissions) of the Company or the Company's agents, wherever occurring, arising from the subject matter of this agreement;
 - c) the Purchaser shall indemnify the Company against any claims made against the Company by any third party in respect of any such loss, damage, death or injury as is set out in sub-paragraph b) hereof; the Purchaser further agrees to indemnify the Company against all losses and expenses which the Company may suffer or incur due to the failure of the Purchaser fully to observe its obligations under this contract; and
 - d) no warranty is given and no responsibility is accepted by the Company to ensure the Equipment supplied complies with any statutory requirements relating to the marketing of goods. Compliance with such legislation shall be the sole responsibility of the Purchaser.
 - e) the Company specifically denies any liability for the overall performance of any plant or the results of any process with which the Equipment is integrated.

MANUAL CONVENTIONS

This instrument is designed to detect toxic gases and to give warning before they reach harmful levels. In order to ensure that it will warn of dangerous concentrations, it is essential that the instructions in this manual, particularly those concerning start up, operation, calibration, and maintenance, be read, understood, and followed.

Notices are used in this operator's manual to alert you to hazardous conditions to person or instrument and to notify you of additional information. This operator's manual uses the following notices.

 **NOTE:** Notifies you of additional information.

 **CAUTION:** Notifies you of potential damage to equipment.

 **WARNING:** Notifies you of potential danger that can result in personal injury or death.

1. Introduction

GasTech Australia is proud to introduce the next step in fixed gas detection equipment. The C-Guard™ is an intelligent gas detector which is designed around the operators requirements. It is an easy to calibrate and setup, highly stable, fixed-point toxic.

The C-Guard™ is an industry standard two wire 24VDC 4-20mA device.

1.1 Features

- Non-intrusive calibration
- No alarms during calibration
- One PCB card for all gases detected
- No tool calibration
- Sensor drift elimination program
- Long-term sensor deterioration drift elimination program
- Automatic zero suppression
- Fail-safe mode
- Non corrosive housing
- High impact housing
- IP65 design



2. Installation

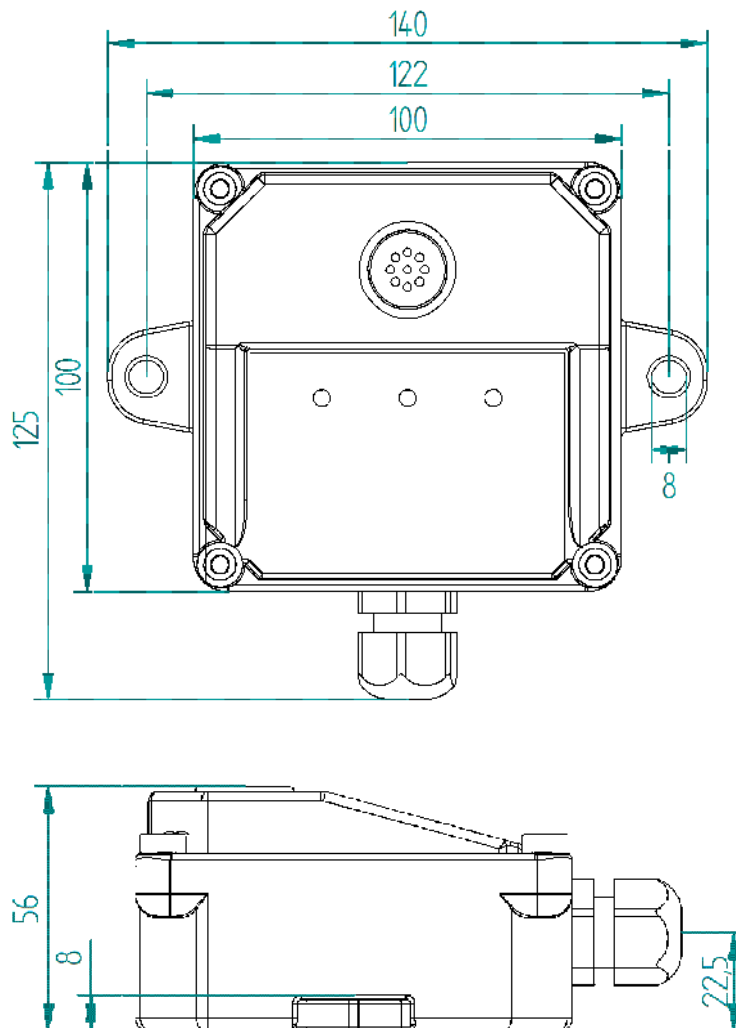
⚠ WARNING: Perform all installation procedures in a fresh air environment (known to be free of combustible and toxic gas and having normal oxygen content). The C-Guard™ is not in operation as a system until the start-up procedure is complete.

2.1 Mounting

📄 NOTE: The packing slip indicates the serial number of your C-Guard™. The serial number is also on a label on the side of the C-Guard™. Please record the serial number on the front of this manual.

The installation should be in the area with most potential to detect the gas as quickly as possible. Take note of the gas density as this will help in finding the best location for the C-Guard™. For example, heavier gases like Hydrogen Sulphide (H₂S) would have the sensor mounted lower than for Carbon Monoxide (CO) which is a lighter gas.

Securely mount the unit to the wall using wall plugs and screws. Dimensions of the two mounting holes on the C-Guard enclosure are shown below.



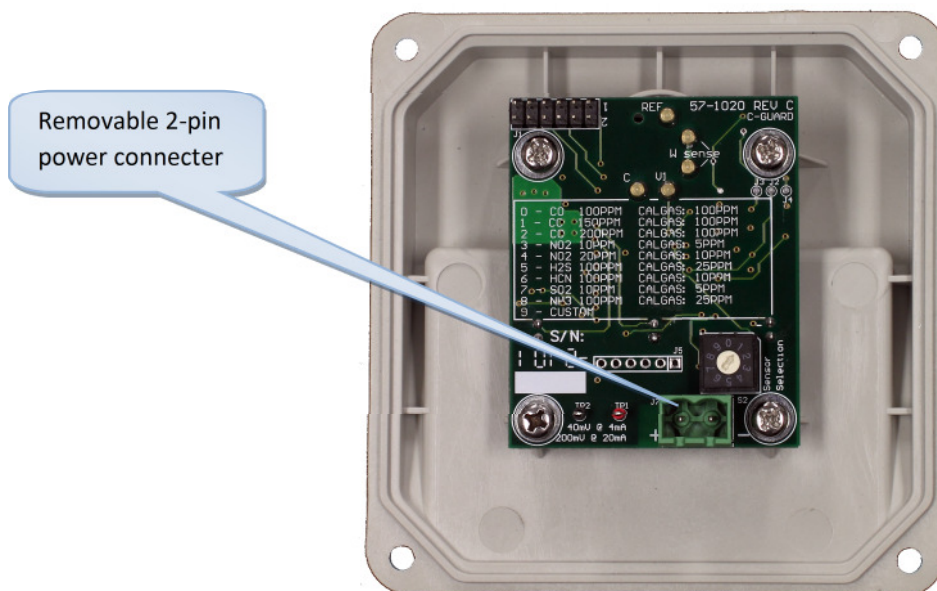
2.2 Opening the Enclosure

Tasks such as wiring power into the unit require the enclosure to be opened.

1. Remove the 4 housing lid screws using a Phillips screwdriver and gently remove the lid.



2. Turn over the lid to find the green power connector.

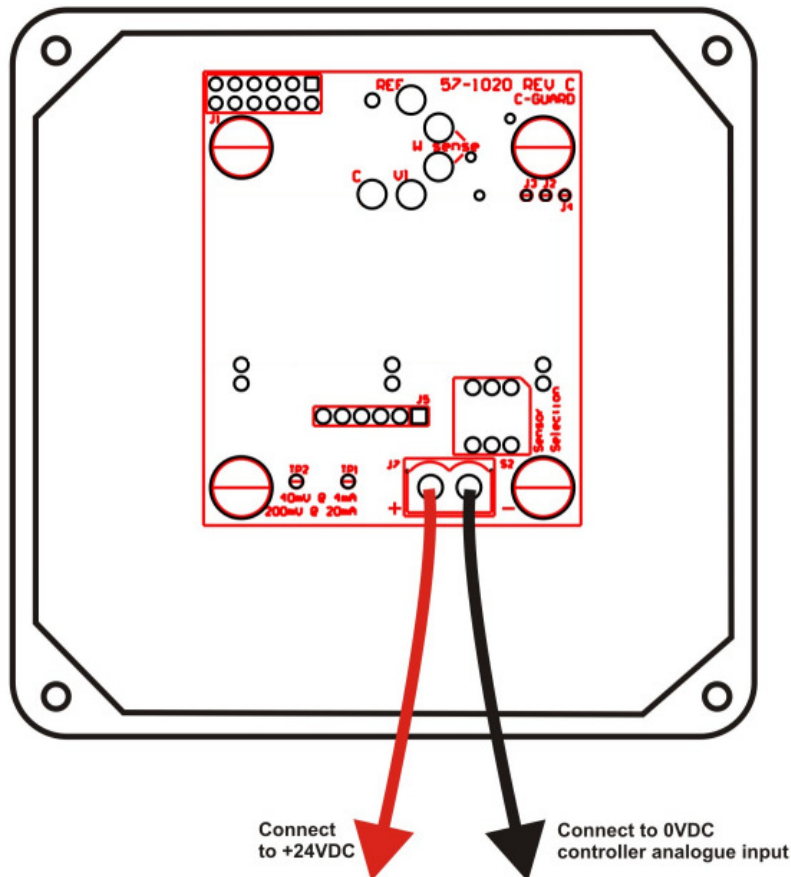


3. Perform the required tasks such as adjusting settings or wiring power into the unit. These tasks are described in more detail in the following sections.
4. When finished, fit the lid and tighten the 4 screws using a Phillips screwdriver tightening the housing evenly.

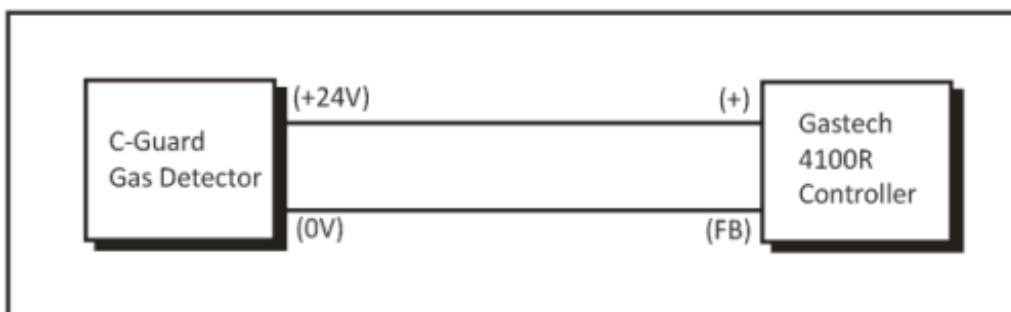
2.3 Wiring

The C-Guard™ sensor can be used with any standard 2 wire, 4 to 20 mA 24VDC controller. Typical controllers include the GasTech Australia Micro Rack™.

1. Open the enclosure as outlined in the previous section.
2. Run the power cables via the cable gland to the green two pin removable plug located on the bottom right corner of the PCB as shown below.
3. Ensure the positive and negative wires are terminated with the correct polarity, which is marked on the PCB.



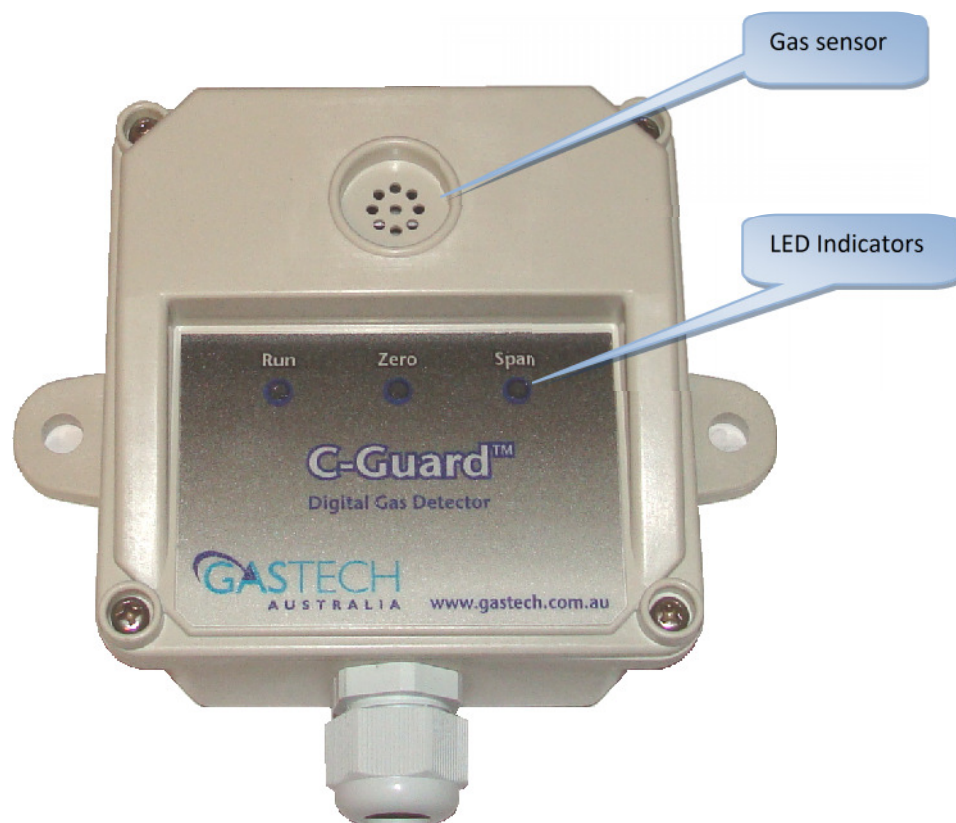
When connecting a C-Guard™ unit to a controller such as the GasTech 4100R controller, follow the pin-outs as outlined below. Other third party controllers are also connected in the same manner.



2.4 Installation

Complete the following procedures to place the C-Guard™ into normal operation.

1. Complete the mounting and wiring procedures described in the previous sections.
2. Complete all installation procedures described in this manual.
3. Verify that all wiring connections are correct and secure.
4. Check power being supplied to the unit is correct (24VDC).
5. Turn on the incoming power at the power source.



3. Operation

The C-Guard™ contains no user interface or external switches. However the PCB contains a magnetic sensitive switch (reed switch) which responds to a magnet being swiped over the top panel of the device. This allows the unit to be put into various modes for calibration and testing.

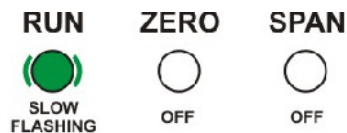
The following modes of operation exist for the C-Guard™ which will be described in the following section:

1. **Normal Running Mode**
2. **Calibration Required Mode**
3. **Running Mode with No Span Gas Detected Warning Mode**
4. **Zero Cal / Clean Air Adjustment Mode**
5. **Span Calibration Mode**
6. **Test Mode**

3.1 Normal Running Mode

On power-up the C-Guard™ will attempt to enter **Normal Running Mode**. It performs the following:

1. The C-Guard™ starts up in a warm-up Isolated mode with the mA locked at 3mA for 20 seconds while the sensor stabilises and the software initialises and completes a series of functional tests. The C-Guard™ loads settings and calibration information from non-volatile memory. The green "Run" LED will flash slowly during this time.



2. If the C-Guard™ has already been calibrated, it will enter **Normal Running Mode** at the expiry of the 20 second warm-up timer. The green "Run" LED will stay constantly on, the mA will be released and the system will then be functioning.



3. At the expiry of the 20 second warm-up timer, if the C-Guard™ has not been calibrated it will enter **Calibration Required Mode**. The C-Guard™ also compares the last recorded position of the internal rotary switch setting with its current position. If the setting switch has changed position, the defaults are loaded for the current setting and the C-Guard™ is also forced into **Calibration Required Mode**.

3.2 Calibration Required Mode

The unit will enter **Calibration Required Mode** if any of the following occurs:

- If the C-Guard™ has not been calibrated at the expiry of the 20 second warm-up timer.
- If the internal rotary switch setting has changed position compared to the units last recorded position.
- If the C-Guard™ detects calibration gas during calibration mode, but then fails calibration because the final sensor response is unacceptable.

The yellow “Zero” and red “Span” LED’s will flash quickly in this mode. The C-Guard™ will remain in this mode until a service person successfully calibrates the detector (see **Span Calibration Mode**).

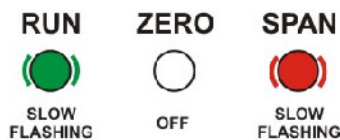


3.3 Running Mode with No Span Gas Detected Warning Mode

This is a feature of **Normal Running Mode** that warns the user that the C-Guard™ was not successfully calibrated on the last attempt. An incomplete Span Calibration can be the result of attempting a calibration when:

- A sensor is not present.
- A sensor is expired or has insufficient output.
- The wrong type or concentration of calibration gas is used.

In this mode, the C-Guard™ slowly flashes the green “Run” and red “Span” LED’s for a period of 5 minutes.



After 5 minutes, the C-Guard™ will return to **Normal Running Mode** with the green “Run” LED turned constantly on.



3.4 Zero Calibration Mode (Clean Air Adjustment Mode)

This mode is used to set the baseline for the C-Guard™.

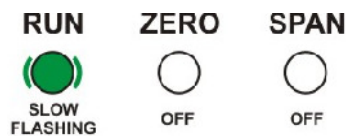
1. The C-Guard™ should initially be in **Normal Running Mode** with the green “Run” LED turned constantly on.
2. The C-Guard™ must be in a clean air environment or have a Zero gas applied before continuing.



3. Using a magnet, swipe the front of the C-Guard™ from left to right in the area shown below to enter **Zero Calibration Mode**.



4. The green “Run” LED will flash slowly for 5 seconds.



5. After the 5 second timer has expired and the green “Run” LED stops flashing, the yellow “Zero” LED will begin to flash for up to 6 seconds while the C-Guard™ waits for the sensor to stabilize. The yellow “Zero” LED will flash slowly if the sensor detects the air is clean. The yellow “Zero” LED will flash fast if it detects the air is not clean.



6. During the 6 second timer whilst the yellow “Zero” LED is flashing, the C-Guard™ will check that the sensor output is acceptable within +/- 20% of the expected maximum full scale output.
7. If the sensor output is not acceptable and the C-Guard™ has not previously passed calibration, the unit will enter **Calibration Required Mode**.
8. If the sensor output is acceptable and passes Zero Calibration, the C-Guard™ will record the output of the sensor as its Zero-point and save the value in memory.
9. The C-Guard™ will turn on the yellow “Zero” LED and wait for the user to swipe the unit with a magnet in order to optionally enter **Span Calibration Mode**.



10. If the user swipes the C-Guard™ once with a magnet at this point, the unit will enter **Span Calibration Mode**. See the next section for details on this.
11. If the user does not swipe the C-Guard™ with a magnet and the detector has previously passed calibration, the C-Guard™ will return to **Normal Running Mode** with the green “Run” LED turned on constantly.



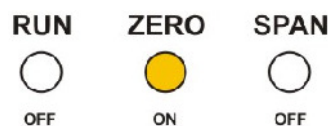
3.5 Span Calibration Mode

To calibrate the C-Guard™ you will need certified calibration gas, which is in date and is the same gas and concentration as specified on the specification label on the side of the detector being calibrated.

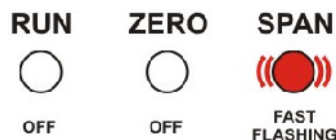
Calibration intervals are completely site and local regulation dependant. They will vary widely between different countries, states and sites safety regulations for fixed gas detection systems. The type of sensor will also have an effect on the calibration intervals. An industry recommendation on calibration interval is 4 times a year. The C-Guard™ design has been made to extend the calibration intervals by monitoring and adjusting the sensor outputs. We recommend following regulatory guidelines over manufacture recommendations when regulatory guidelines recommend shorter intervals. Manufactures recommendation on the C-Guard™ for calibration is twice a year with only extending to once a year on low risk gases. Shorter intervals might be recommended depending on selected sensor.

⚠ WARNING: The gas detection equipment is a safety system designed to protect your life and the plant operations. Not calibrating or extending the calibration intervals to save costs, could have a detrimental effect on the accuracy of the system as sensors might not respond.

1. To enter **Span Calibration Mode**, you will need to follow the directions in the **Zero Calibration Mode** section above and successfully pass a Zero Calibration. After the C-Guard™ has passed Zero Calibration, the yellow “Zero” LED will be on constantly.



2. Swipe the C-Guard™ with a magnet to enter **Span Calibration Mode**. The red “Span” LED will flash quickly for 60 seconds. This indicates that the C-Guard™ is waiting for the calibration gas to be applied.

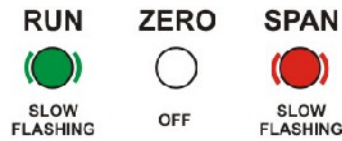


3. You must apply calibration gas before the 60 second timer expires. A calibration plug (Part Number: 81-1125) will be required to apply the calibration gas directly to the sensor.
4. Press the calibration plug into the socket and connect the calibration gas to one of the pipes.

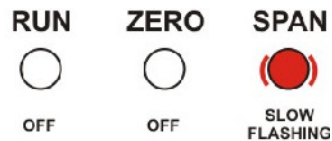


5. Apply the gas at a flow rate of 500cc to 1000cc per minute (1/2Lpm to 1Lpm) to the sensor using the calibration plug.

6. At the expiration of the 60 second timeout, if no gas is detected and the C-Guard™ was previously calibrated, the C-Guard™ will enter **Running Mode with No Span Gas Detected Warning Mode** for 5 minutes. This allows for continued operation after a situation where **Span Calibration Mode** was unintentionally entered.



7. If the sensor output rises above the minimum expected output for the expected concentration of gas, the red "Span" LED will start flashing slowly and a timer is started with a duration equal to the T90 time of the sensor.



8. At the expiration of the T90 timer the red "Span" LED will turn on for 5 seconds.

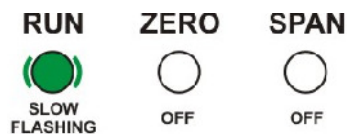


9. The C-Guard™ then checks if the sensor output is within the allowable range for the given concentration of calibration gas.

10. If the sensor output is not within the allowed range, the C-Guard™ is forced into **Calibration Required Mode**. The yellow "Zero" and red "Span" LED's will flash quickly in this mode.



11. If the sensor output is within the allowed range, the C-Guard™ will enter an isolated mode while the sensor stabilises for a time dependent on the sensors T90 time. This allows the user to remove the Span calibration gas and for the sensor to return to its zero point. The green "Run" LED will flash slowly during this time.



12. After the T90 timeout expires, the C-Guard™ will return to **Normal Running Mode** with the green "Run" LED turned constantly on.



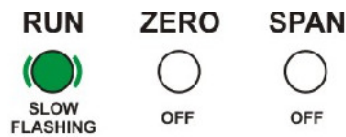
3.6 Test Mode

Test mode is used to test the gas monitoring system to ensure the controller activates when the C-Guard™ indicates a high reading. When in this mode the C-Guard™ sets the loop output to 12mA to indicate 50% of full scale. To activate **Test Mode**:

1. The C-Guard™ should initially be in **Normal Running Mode** with the green “Run” LED turned on constantly.



2. Using a magnet, swipe the front of the unit to enter **Zero Calibration Mode**. The green “Run” LED will flash slowly for 5 seconds.



3. Swipe the unit with a magnet again 3 times during these 5 seconds and the detector will enter **Test Mode**. The green “Run”, yellow “Zero” and red “Span” LED’s will all flash quickly in this mode.



4. If you do not swipe the unit 3 times within the 5 seconds, the detector will automatically enter **Zero Calibration Mode**.
5. The detector will remain in **Test Mode** for 5 minutes, or until the user swipes the C-Guard™ once again with a magnet. It will then return to **Normal Running Mode** with the green “Run” LED on constantly.



4. Advanced Setup

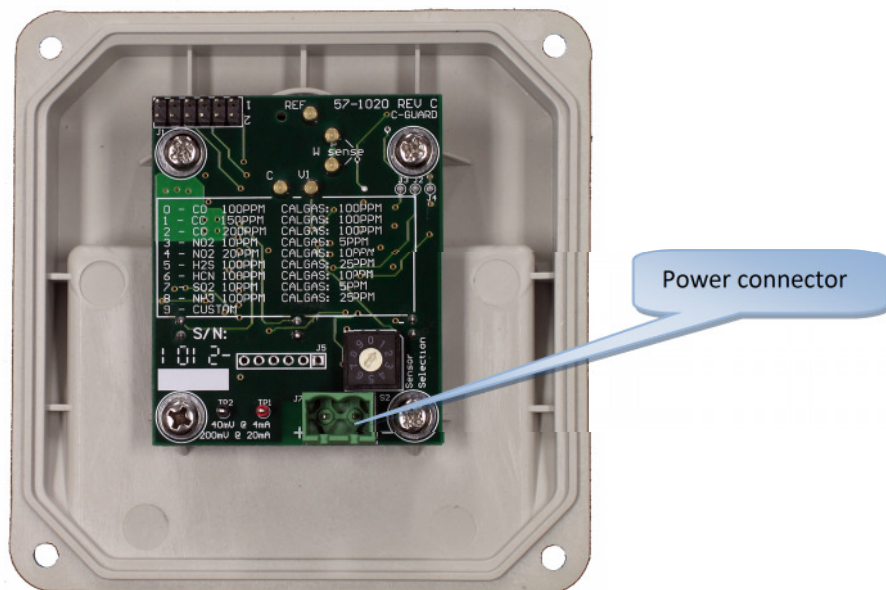
One of the key features of the C-Guard™ is its ability to be easily serviced and calibrated in the field. The unit will need to be calibrated and/or reconfigured if you are performing any of the following tasks:

- Replacing a PCB
- Replacing a sensor
- Changing to a different sensor
- Scheduled calibration or maintenance
- Reactivation after prolonged shutdown

All of the C-Guard™ calibration values are stored in the non-volatile memory, but as no monitoring of the sensor operation is performed during the shutdown period, the sensor might have been poisoned and might not respond as expected.

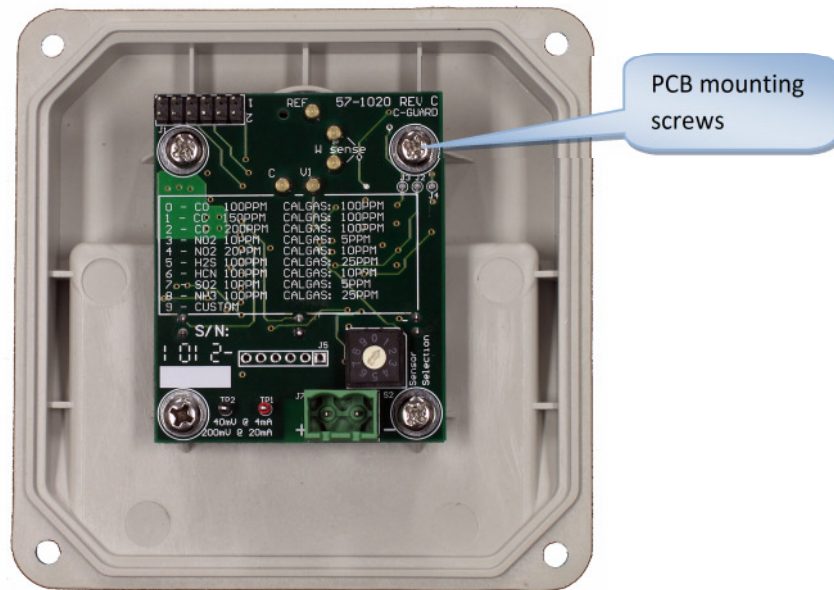
4.1 Changing the PCB or Sensor

1. Isolate the sensor back at the control panel so an open circuit fault will not trip or create any alarms.
2. Open the enclosure as outlined earlier in the manual.
3. Turn over the lid and remove the green power connector and the C-Guard™ will power down.

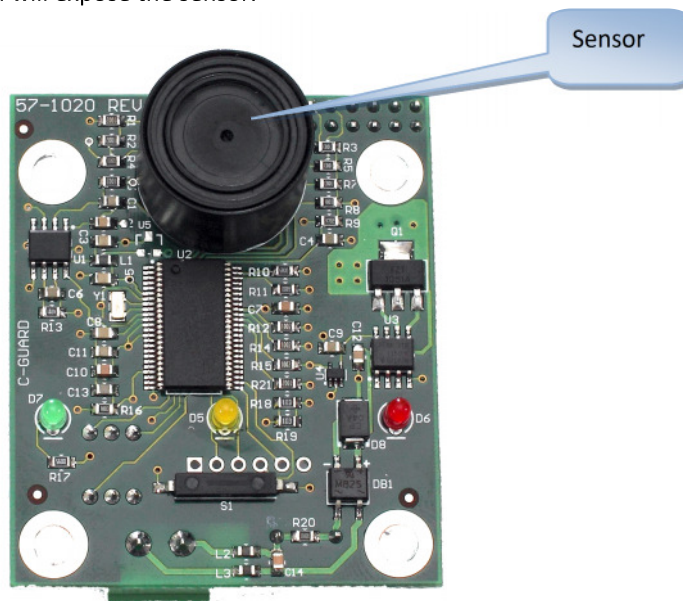


4. Move to a clean location

- Gently remove the 4 Phillips head screws holding the PCB in place

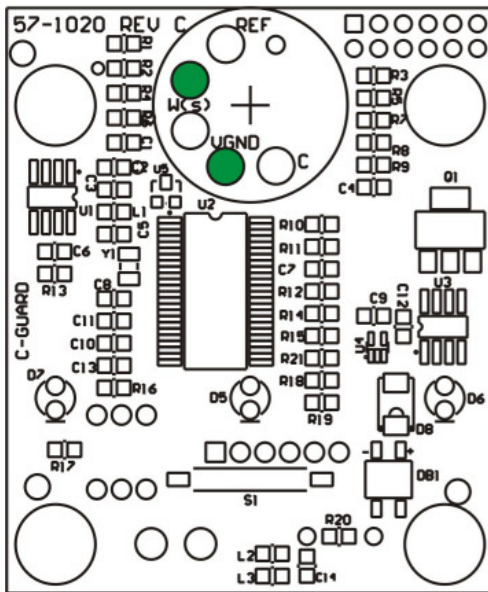


- Gently remove the PCB which will expose the sensor.

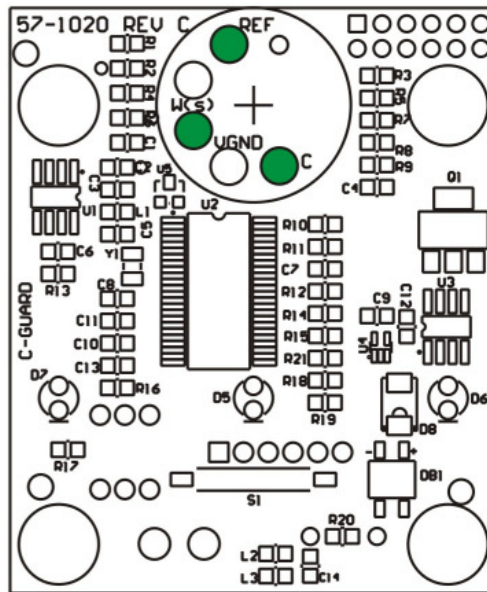


- If you are replacing the PCB, gently remove the sensor and install it into the new PCB. The sensor will pull apart from the PCB. (Take note of orientation of pins to help on the reinstallation of new sensor – it must go in the correct way to work)
- If you are replacing the sensor, remove the old sensor and plug in the new one. Confirm the new sensor is the same as the old sensor.
- The C-Guard™ supports 2 pin sensors such as part number 65-8001-ECO as well as 3 pin sensors. The diagram below shows how the different sensors are plugged into the PCB.

2 PIN Sensors




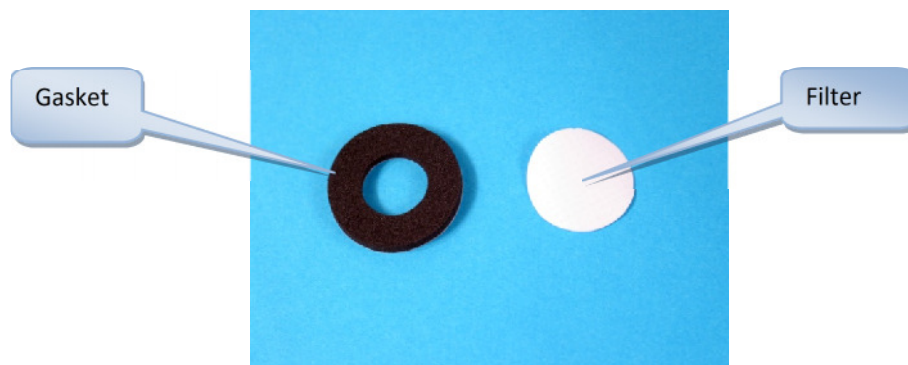
3 PIN Sensors



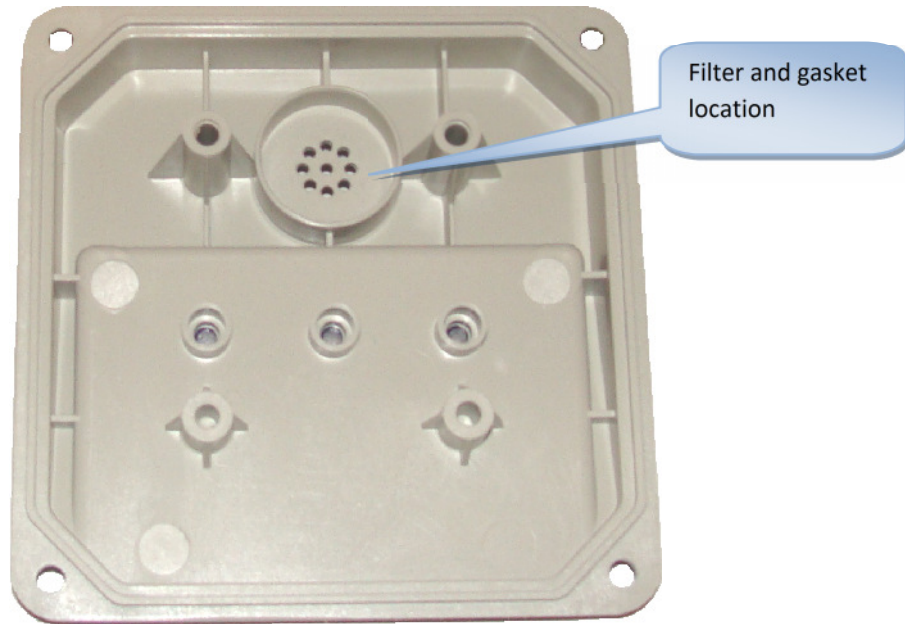
TOP View of C-Guard PCB

10. Gently press the new sensor back into place.
11. If replacing a sensor, you should also replace the sensor filter and gasket at the same time.
12. The sensor filter and gasket need to be ordered separately to the sensor.

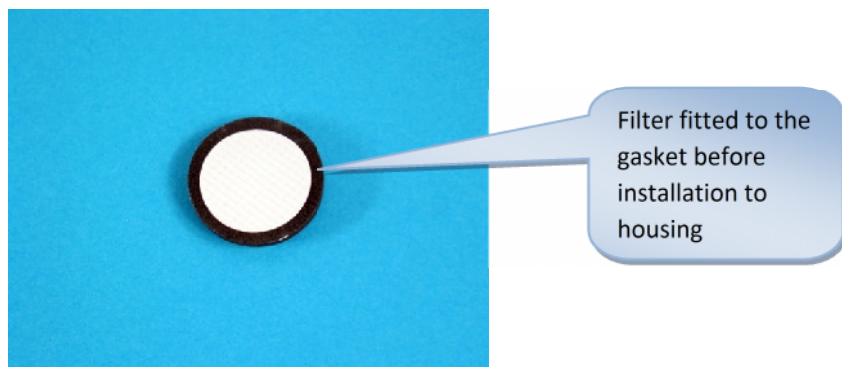
 **NOTE:** The sensor filter part number is 33-1020 and the gasket part number is 07-1020



13. Remove the old gasket with a small screw driver. The gasket has double-sided tape holding the filter and gasket in place.



14. Fit new gasket and filter the same way as previously fitted. Use the sticky side to stick to the plastic enclosure.

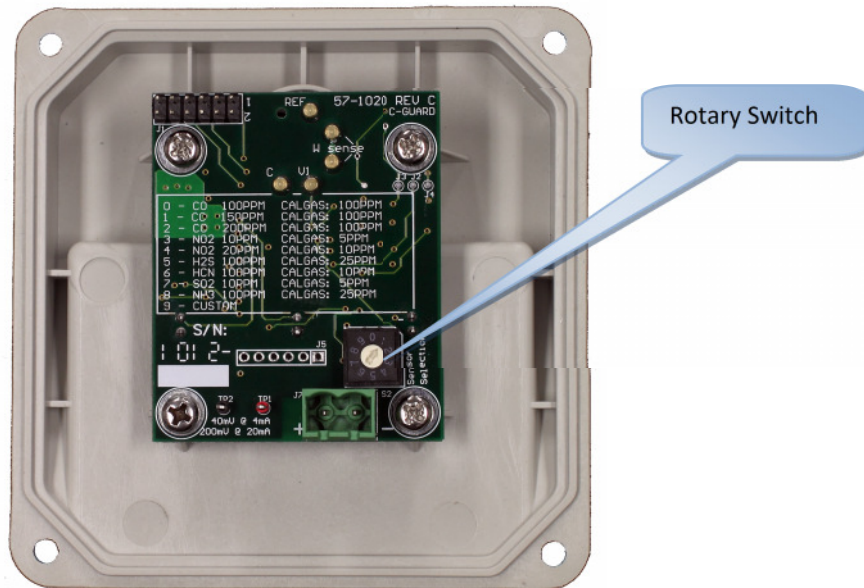


15. Gently fit the PCB with new sensor back onto the lid and gently tighten the 4 Phillips head screws until the PCB comes flush with the mounting posts.
16. If you have just replaced the PCB, or have replaced the sensor with a different model, skip to the next section as the PCB may need some rotary switch settings changed.
17. If you are replacing the sensor with the exact same model as previous, the enclosure can be screwed back together as follows.
18. Reconnect the power socket to the PCB and ensure the unit powers up.
19. Fit the lid and tighten the 4 Phillips head screws tightening the housing evenly.
20. Recalibrate the sensor as described earlier in this manual.

4.2 Sensor Selection Rotary Switch

If fitting a replacement PCB or changing the sensor to a different model, there is a rotary switch that may need adjustment.

1. Isolate the sensor back at the control panel so an open circuit fault will not trip or create any alarms.
2. Open the enclosure as outlined earlier in the manual.



3. Using a small flat blade screwdriver, make sure the rotary switch is pointing to the correct position as outlined in the following table:

























Rotary Position	Gas	Range	Calibration Gas
0	CO	100ppm	100ppm
1	CO	150ppm	100ppm
2	CO	200ppm	100ppm
3	NO ₂	10ppm	5ppm
4	NO ₂	20ppm	10ppm
5	H ₂ S	100ppm	25ppm
6	HCN	100ppm	10ppm
7	SO ₂	10ppm	5ppm
8	NH ₃	100ppm	25ppm
9	-	-	-



















4. The following sensors are supported in the C-Guard™:

Part number	Description	Maximum Range
65-8001-ECO	CO Sensor 0-500ppm cell ECO-SURE 2 pin	1000ppm
65-8001-4CF	CO Sensor 0-500ppm cell 3 pin	1000ppm
65-8004-4ND	NO2 Sensor 0-20ppm cell	200ppm
65-8008-4HS	H2S Sensor 0-100ppm cell	500ppm
65-9094-HCN-4	HCN Sensor 0-100ppm cell	200ppm
65-8003-4S	SO2 Sensor 0-10ppm cell	50ppm
65-9094-NH3-5	NH3 Sensor 0-100ppm cell	500ppm

APPENDIX I. LED Indicator Summary

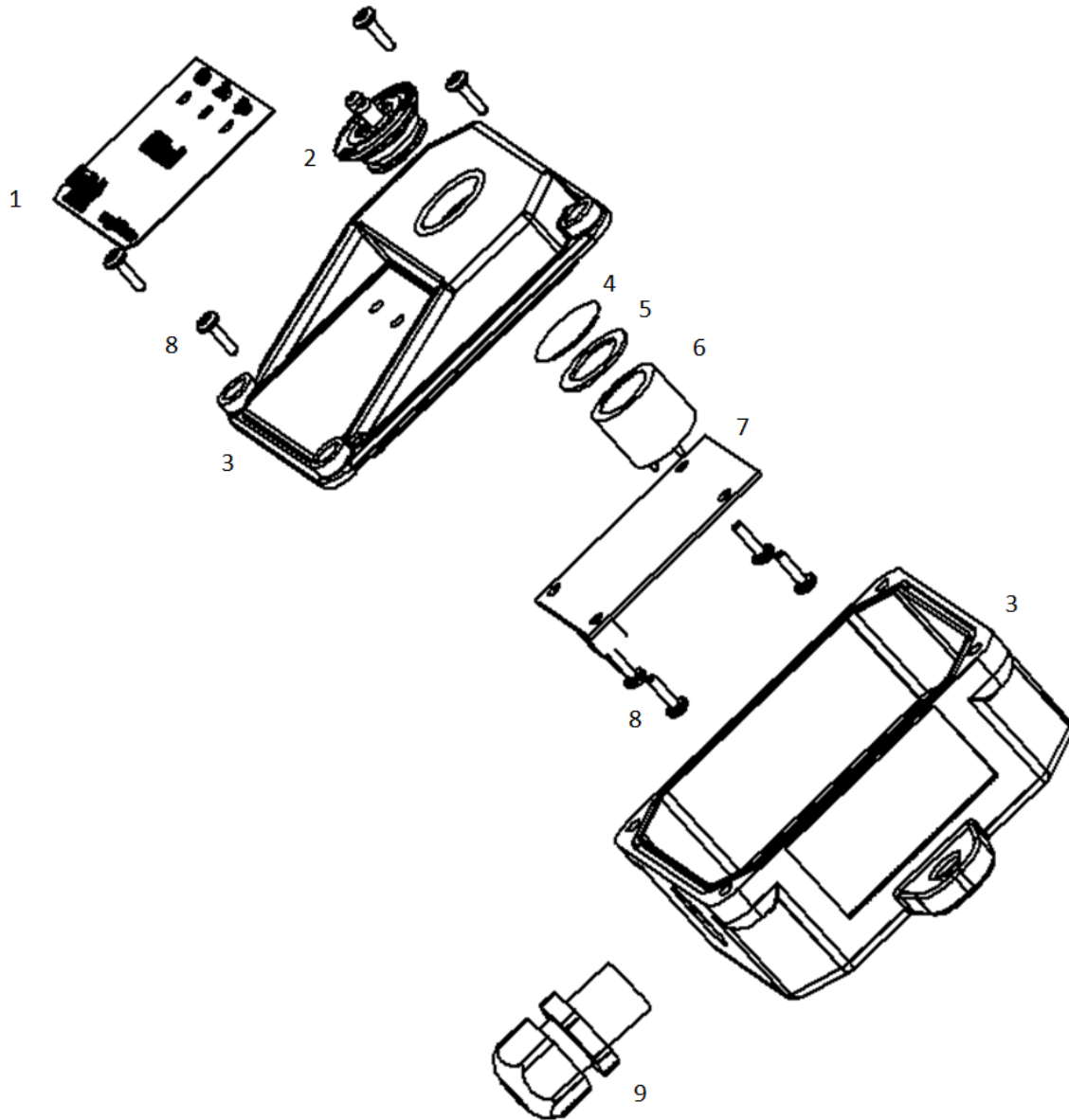
The front panel contains three LED indicators which show the status of the unit as follows:

LED State	Detector State			Loop Current	State Duration
Green LED Flashing Slowly	RUN  SLOW FLASHING	ZERO  OFF	SPAN  OFF	Warm-up mode 3mA	20 seconds
Green LED On	RUN  ON	ZERO  OFF	SPAN  OFF	Running mode (normal operation). To start fresh air adjustment swipe faceplate below LED's with a strong magnet to start fresh air adjustment. 4 to 20mA 3.5 to 3.9mA (under-range)	Continuous
Green LED Flashing Slowly	RUN  SLOW FLASHING	ZERO  OFF	SPAN  OFF	After swiping the faceplate when in running mode, Test mode can be selected by swiping the faceplate again 3-times, otherwise after 5 seconds the detector will automatically enter zero calibration mode. 4mA	5 seconds
All LED's On	RUN  ON	ZERO  ON	SPAN  ON	Gas reading is at 100% of full scale or higher 20.1 to 24mA	Continuous
Yellow LED Flashing Slowly	RUN  OFF	ZERO  SLOW FLASHING	SPAN  OFF	Waiting for sensor to stabilise on either nitrogen or clean air. Fast flash indicates air is not clean. Slow flash indicates air is ok 4mA	5 seconds
Yellow LED On	RUN  OFF	ZERO  ON	SPAN  OFF	The detector has successfully performed Fresh Air adjustment. To start calibration, swipe faceplate below LED's with a strong magnet. 4mA	Up to 6 seconds
Red LED Flashing Fast	RUN  OFF	ZERO  OFF	SPAN  FAST FLASHING	Waiting for span calibration gas to be applied or the current gas reading is too high or too low for calibration. 4mA	Up to 15 seconds
Red LED Flashing Slowly	RUN  OFF	ZERO  OFF	SPAN  SLOW FLASHING	Waiting for the sensor reading to reach full measurement and become stable. The time required depends on the sensor type & calibration gas must be continuously applied. 4mA	20 to 200 seconds

Red LED On	RUN  OFF	ZERO  OFF	SPAN  ON	Adjusting the calibration parameters after a successful calibration.	4mA	2 seconds
Green & Red LED's Flashing Slowly	RUN  SLOW FLASHING	ZERO  OFF	SPAN  SLOW FLASHING	No calibration gas or sensor response was detected during the last attempted Span Calibration		
Green LED Flashing Slowly	RUN  SLOW FLASHING	ZERO  OFF	SPAN  OFF	Waiting for sensor to come back online after span calibration, the time required depends on the sensor type.	4mA	20 to 200 seconds
Red & Yellow LED's Flashing Fast	RUN  OFF	ZERO  FAST FLASHING	SPAN  FAST FLASHING	Fault condition: Calibration required or the detector failed to calibrate during the last attempt to calibrate.	3.5mA	Continuous
Green, Yellow & Red LED's Flashing Fast	RUN  FAST FLASHING	ZERO  FAST FLASHING	SPAN  FAST FLASHING	System Test Mode, the loop output is locked to 12mA to test the controller as if gas is present. Swipe faceplate to return to running mode.	12mA	5 mins
No LED's On	RUN  OFF	ZERO  OFF	SPAN  OFF	Power failure or PCB failure	0mA	Continuous


APPENDIX II. Spare Parts List

A variety of spare parts are available for the C-Guard™ unit.



Number	Qty	Part Number	Description
1	1	29-1020	Lexan C-Guard
2	0	81-1125	Cal Plug D-Guard, C-Guard (Not included in supply)
3	1	21-1020	C-Guard housing set Lid and Base
4	1	33-1020	Filter 21mm Polypropylene Disc each MyGuard +C-Guard
5	1	07-1020	Gasket, Sensor 21mm MyGuard, C-Guard
6	1	65-8001-ECO	CO Sensor 0-500ppm cell ECO-SURE (CO versions only)
7	1	57-1020	C-Guard PCB fully populated
8	2	10-1020	Screw 10mm x 3mm coarse thread C-Guard pack of 4
9	1	18-7000-16	Cable Gland non EXD M16 white C-Guard

APPENDIX III. Specifications

 **Note: Specifications subject to change without any notice.**

Feature	Description
Gases	Carbon Monoxide (CO), Hydrogen Sulphide (H₂S), Nitrogen Dioxide (NO₂), Oxygen (O₂)
Response time	90% full response time as determined by the sensor T90 specification plus the time delay as a result of the averaging sensor output typically, less than 30 seconds.
Signal	4 to 20 mA
Voltage input	24 VDC nominal (10-30 VDC)
Operating temperature	-20° to +55°C
Operating humidity	0 to 95% RH non-condensing
Enclosure IP rating	IP65
Dimensions	140mm x 125 x 55mm Including standard cable gland and mounting lugs
Weight	250g