AquiTron

AT-G-ALERT
Refrigerant Sensor

INSTALLATION & OPERATION INSTRUCTIONS

aquilar
leak detection solutions

AT-G-ALERT

Refrigerant Gas Sensor For Occupied Spaces

Please read these instructions carefully and keep them in a safe place (preferably close to the module) for future reference. These instructions must be followed carefully to ensure proper operation.

A. GENERAL INFORMATION

The AquiTron AT-G-Alert continuously checks the ambient air of occupied spaces for refrigerant leaks. The detector is for indoor applications. It is housed in an ABS enclosure that fits into 2-gang electrical back boxes (not included) with a minimum depth of 47mm.

Gas alarms and status messages are indicated visually by a 3-colored LED and audibly by a buzzer. In case of an alarm and/or fault, relays switch (for example, to shut-off valves or to activate alarm devices).

INTENDED USE

- Checks ambient air of occupied spaces for refrigerant leaks
- Intended for indoor applications
- ABS enclosure fits into most deep 2-gang electrical back boxes (not included)
- Can be operated as a stand-alone detector or connected to a BMS/BAS (Building Management/Building Automation System)
- Designed to be installed in non-classified, non-hazardous, permanent locations.

DESIGN FEATURES

- Powered by 100 to 240 VAC, 50/60 Hz
- Gas alarms and status messages are indicated visually by a 3-colored LED and audibly by a buzzer
- In case of an alarm and/or fault, relays can switch shut-off valves, alarm devices, or indicators at a BMS/BAS
- Measured gas concentration, status signals and configuration information are accessible via the Modbus RTU interface (see Section 8.9 on page 35)
- Can be calibrated and maintained non-intrusively using a magnetic wand
- Fully compatible with AquiNet and AT-G-Alert-C central monitoring panels.

INSTALLATION ITEMS (NOT SUPPLIED)

- 47mm Back Box

TOOLS REQUIRED

- Drill or hole punch for electrical conduit entries
- Phillips (cross-head) screwdriver
- Small flat-head screwdriver

STORAGE

Keep the module in a dry place prior to installation to avoid possible damage to internal components.

Figure 1. AT-G-ALERT with examples of available fascia plates.

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AT-G-ALERT
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Refrigerant Gas Sensor
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1. SAFETY

1.1 DEFINITION OF ALERT ICONS

The following alert icons are used in this document to highlight areas of the associated text that require a greater awareness by the user.

Alert	Icon	Description
DANGER		Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING		Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
WARNING		Indicates a potential electrical shock hazard which, if not avoided, could result in death or serious injury.
CAUTION		Indicates a potentially hazardous situation which, if not avoided, could result in physical injury or damage to the product or environment. It may also be used to alert against unsafe practices.
NOTICE		Indicates additional information on how to use the product.

1.2 GENERAL SAFETY STATEMENTS

- Before using this product, carefully read and strictly follow the instructions in the manual.
- Use the product only for the purposes specified in this document and under the conditions listed.
- Ensure that product documentation is retained, made available, and appropriately used by anyone operating the product.
- Comply with all local and national laws, rules, and regulations associated with this product.
- Only trained and competent personnel may use this product.
- Only trained and competent personnel may inspect, repair and maintain the product as detailed in this manual. Maintenance that is not detailed in this manual must be completed by Aquilar or personnel qualified by Aquilar.
- Use only genuine spare parts and accessories. Otherwise, operation may be impaired.
- Only operate the product within the framework of a risk-based alarm signaling concept.

REFRIGERANT SUFFOCATION RISK: Large refrigerant leaks into occupied spaces can reach concentrations that pose a suffocation risk to the occupants. While the AT-G-Alert can be used to detect refrigerant leaks well below those concentrations, it is not designed as a stand-alone safety device. Safety of the occupants must take a system design approach including ventilation, detection, early warning, mitigation, and design redundancy among other considerations.

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

1.3 SAFE CONNECTION OF ELECTRICAL DEVICES

Before connecting this detector to electrical devices not mentioned in this manual, consult the manufacturer or a qualified professional.

The sensor must be connected by a marked, suitably located and easily reached switch or circuit-breaker as means of disconnection.

If replacement of either main power fuse is required, use only a TR5 Radial 3.15A 250V slow fuse (Little fuse 372 1315 0001 or equivalent).

TR5 Radial 3.15A 250V

Wiring must be in compliance with national and local wiring codes.

RS-485 signal cable must be insulated to the highest voltage level in the system. Protect the RS-485 signal cable by using the supplied installation kit.

↑ CONTENTS

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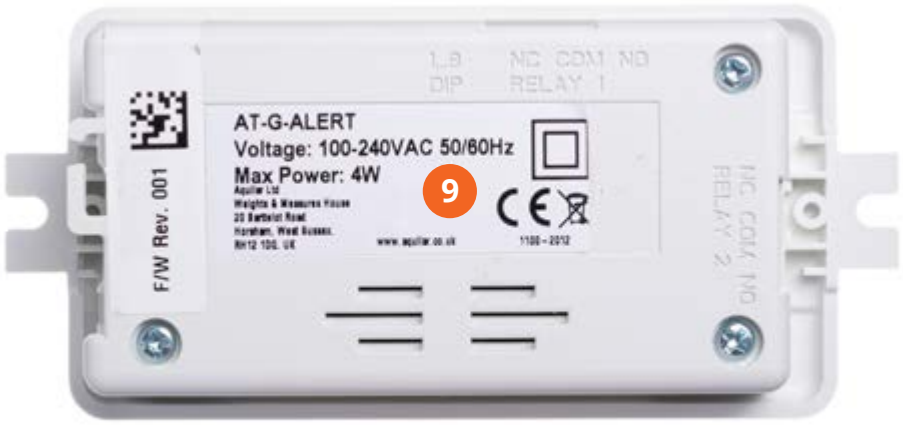
AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

2. COMPONENTS OVERVIEW

Figure 2. AT-G-ALERT Components (Front)



1. Magnetic switch positions 1 (● on top) and 2 (●● on bottom)
2. Multi-colour status LED
3. Sensor type/calibration and ID/serial number labels
4. Mounting slots
5. Testing points - access holes x 2
6. Sensor alignment ribs
7. Replacement sensor module
8. Direction arrows x2 for proper mounting
9. Firmware version and part number/ calibration labels

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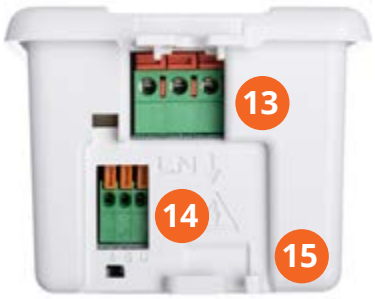
Refrigerant Gas Sensor for occupied spaces



10. Configuration DIP switches (1-8)
11. Relay 1 output connectors (low gas alarm)
12. Relay 2 output connectors (high gas alarm or fault)
13. Power connectors
14. Modbus serial communications connectors
15. Wiring harness

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

3. INSTALLATION

3.1 GENERAL INFORMATION FOR INSTALLATION

Every detail of installation location is critical to ensure overall system performance and effectiveness. Strict compliance and considerable thought must be given to every detail of the installation process, including, but not limited to the following:

- Regulations as well as local, state, and national codes that govern the installation of gas detection equipment
- Electrical codes that govern the routing and connection of electrical power and signal cables to gas detection equipment
- The full range of environmental conditions to which the detectors will be exposed (refer to section 6: Sensor Principle on page 28 for more information on ambient conditions and cross-sensitivity)
- The physical characteristics of the gas or vapour to be detected
- The specifics of the application (e.g., possible leaks, air movement/draft, etc.)
- The degree of accessibility required for maintenance purposes
- The types of optional equipment and accessories that will be used with the system
- Any limiting factors or regulations that would affect system performance or installations
- Wiring details, including the following:
  - Wiring must be connected as indicated in this manual.
  - The wiring for power and relays must be selected and fused according to the rated voltages, currents, and environmental conditions.
  - If stranded conductors are used, a ferrule should be used.
  - A switch or circuit breaker must be included in the installation.
  - The switch or circuit breaker must be suitably located and easily reached.
  - The switch or circuit breaker must be marked as the disconnect device for the equipment.

3.2 MECHANICAL INSTALLATION

- The detector fits in 47mm deep 2-gang electrical back boxes (not included)
- The detector must be accessible for maintenance (e.g., adjustment)
- The access pathway of the refrigerant gas to the sensor must not be obstructed
- The detector should be installed about 4 to 6 inches (100 to 150 mm) above the floor level

Figure 4. Typical AT-G-ALERT supported backboxes

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

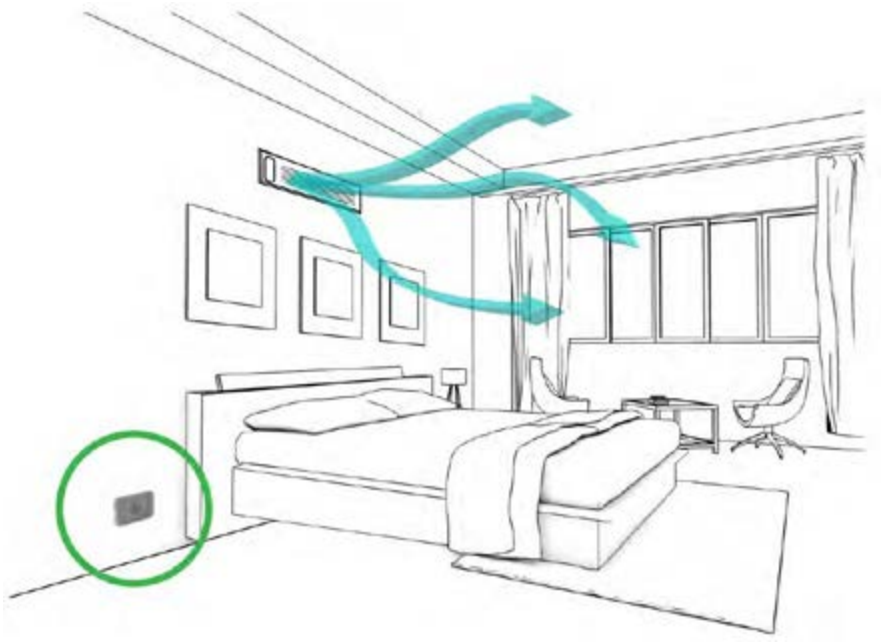

Figure 5. Typical AT-G-ALERT Installation in an Occupied Space Application

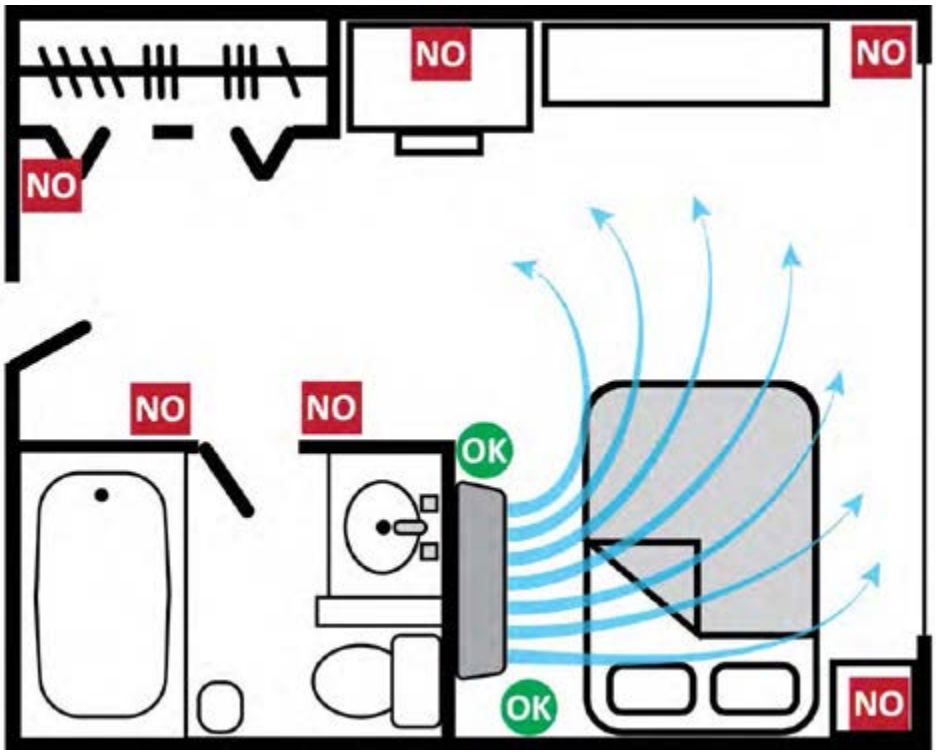

Figure 6. Recommended Installation Locations

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

3.3 CONFIGURATION

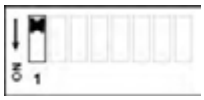
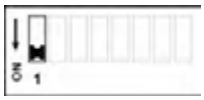
Configuration is accomplished via switches or from a Remote Terminal Unit (RTU) on a Modbus serial communications network. Review the default settings to determine if they are suitable for your particular application. If default values are not suitable, change the configuration using the DIP switches, or via the Modbus interface. A summary of switches is shown below. For details on Modbus communications registers, refer to Section 8.9: Modbus Register.

By default, switch configurations supersede Modbus configurations. Use Modbus register 2007 (Modbus Precedence over DIP Switch Settings) to change this precedence.

Changes of configurations will not take effect until the detector is restarted (i.e., toggling switch 1 or cycling power).

For a proper reset, switch 1 must be toggled (ON then OFF). If it is left ON, the detector is held in reset mode and will not function correctly until the switch is returned to the OFF position.

Figure 7. Switches for Configuring the AT-G-Alert

Switch	Function	Options and Description	Positions
1	Restart	Off = Normal Operation (default)	
		On = Restart AT-G-ALERT (must return switch to OFF position)	
2, 3	Alarm ON Delay	Off, Off = No delay (default)	
		Off, On = 5 minute delay	
		On, Off = 10 minute delay	
		On, On = 15 minute delay	

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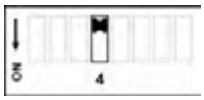
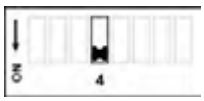
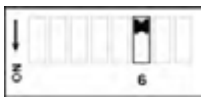
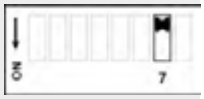
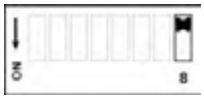
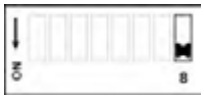
AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

4	Failsafe Relay Selection	Off = Normal Relay Operation (default)	
		On = Failsafe Relay Operation	
5	Relay 2 Fault Indication	Off = High Alarm or Fault (default)	
		On = High Alarm Only	
6	Alarm Latching	Off = Alarms automatically reset (default)	
		On = Alarms latch and require manual reset	
7	Buzzer Disable	Off = Buzzer enabled (default)	
		On = Buzzer disabled	
8	Reset Detector Settings to Factory Default Values	Off = Normal operation	
		On = Used in reset procedure for resetting Modbus registers to their factory default values (see section 4.3.2 on page 21 for reset information and section 8.9 on page 36 for Modbus registers and default values).	

3.4 ELECTRICAL INSTALLATION

Caution: A switch or circuit breaker must be included in the installation. The switch or circuit breaker must be suitably located and easily reached, and it must be marked as the disconnect device for the equipment.

Caution: Ensure all wiring connections are made before applying power.

Caution: This product uses semiconductors which can be damaged by electrostatic discharge (ESD). When handling the printed circuit boards (PCBs), observe proper ESD precautions so that the electronics are not damaged.

↑ CONTENTS

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Refrigerant Gas Sensor for occupied spaces

Caution: RS-485 signal cable must be insulated to the highest voltage level in the system. Protect the RS-485 signal cable by using the supplied installation kit.

Caution: Wiring must be in compliance with national and local wiring codes.

Notice: When inserting wire into the terminal, release the spring clamp by pushing the release latch back.

Description of ELECTRICAL Installation

1. Remove fascia by loosening the set screw.
2. Observing proper polarity, connect wires for power to the appropriate terminals.

Power:
100Vac-240Vac
Earth / Ground
Label:
L - Vac Line
N - Vac Neutral
G - Vac earth ground

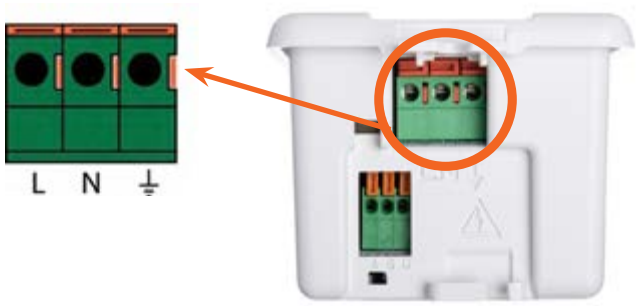

Figure 8. Wiring Power

4. Observing proper polarity, connect normally closed (NC) common (COM), and normally open (NO) wires for relays to the appropriate terminals.

Figure 9. Wiring Relay 1 (Low Gas Alarm) and Relay 2 (High Gas Alarm or Fault)

↑ CONTENTS

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Refrigerant Gas Sensor for occupied spaces

5. Observing proper polarity, make the Modbus connections as follows, using the figures below for reference.

Label:
A - RS-485 "A" (non-inverted)
B - RS-485 "B" (inverted)
G - RS-485 shield

Figure 10. Modbus Wiring Terminals

Figure 11. Details for Connecting Modbus Communications Wiring

1. Prepare signal cable and put boot over the signal cable (**1**).
2. Add ferules if required (**2**).
3. Apply 10 cm piece of shrink wrap as close to the wire ends/ferules as possible while leaving some free wire to allow connection to the detector (**3**).
4. Heat the shrink wrap (**4**).
5. Connect signal wires/ferules to the detector (**5**).
6. Slide rubber boot along the wire and shrink wrap assembly and connect it to the detector (**6**).

6. Confirm configuration of switches. Refer to Section 3.3 on page 9.
7. Place detector into electrical back box (not included).
8. Put cover plate on and secure through mounting screws.

↑ CONTENTS

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4. OPERATION

4.1 STARTUP

1. Switch power on.
2. Observe start-up sequence and warm-up phase.
   - Green LED will blink at 0.5 Hz for about 5 minutes
   - Modbus flag for warm-up is set
   - Buzzer is off
   - Relay state is “no alarm”
3. Observe normal operation
   - Green LED is steady on
   - Buzzer is off
   - Relay state is “no alarm”
4. A bump test is required following installation to verify instrument functionality. (See section 5.2.5)

4.2 ALARM MANAGEMENT FUNCTION AND CONFIGURATION

The AT-G-Alert offers several different ways how the detector behaves in case of a refrigerant alarm. The alarm manager can either be configured through the switches or the Modbus interface.

4.2.1 Default Alarm Function

If the refrigerant concentration raises above the alarm 1 set-point:

- The LED flashes red with 0.5 Hz
- The buzzer beeps at 0.5 Hz
- The alarm 1 relay changes state
- The Modbus alarm 1 flag is set.

Once the alarm 1 condition is no longer present and below the hysteresis value (imposed to avoid relay chatter), the detector returns to normal operation.

If the refrigerant concentration raises above the alarm 2 set-point:

- The LED flashes red with 2 Hz.
- The buzzer beeps at 2 Hz
- The alarm 2 relay changes state
- The Modbus alarm 2 flag is set.

Once the alarm 2 condition is no longer present and below the hysteresis value (avoiding relay chatter), the detector returns to alarm 1 state.

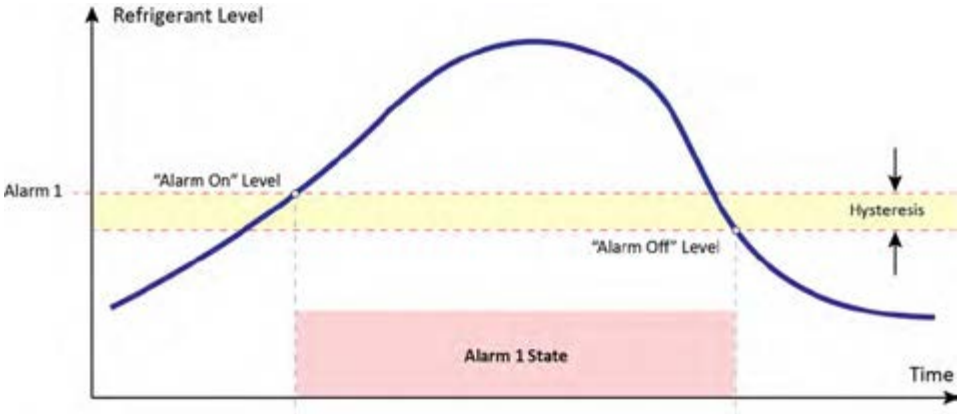

Figure 15. Default Alarm Generation

↑ CONTENTS

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Refrigerant Gas Sensor
for occupied spaces

4.2.2 Alarm Delay – Switches 2 and 3

To avoid premature alarms, ensuring the presence of refrigerant for a certain amount of time, the triggering of the alarm can be delayed for a short period of time. Unless the alarm condition is present for at least the delay time, the alarm will not be triggered.

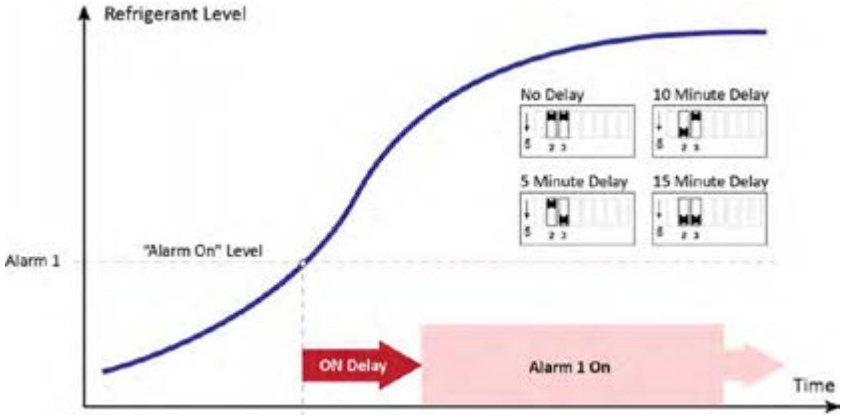

Figure 16. Alarm ON Delay (Alarm Condition Must Be Present for at Least the Programmed Time)

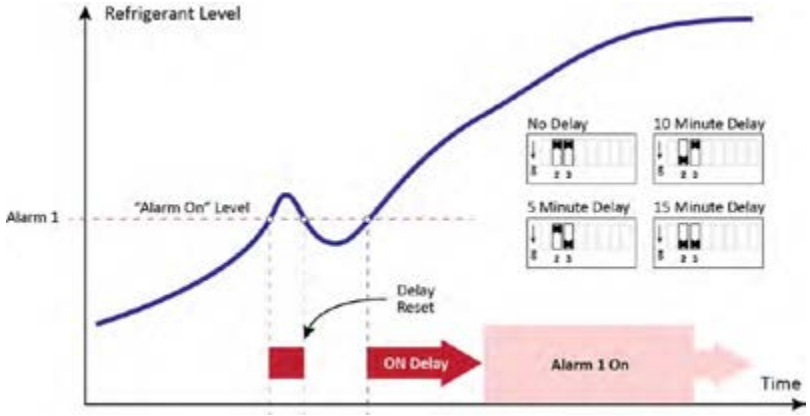

Figure 17. Alarm ON Delay (A Shorter Delay Time Is Disregarded)

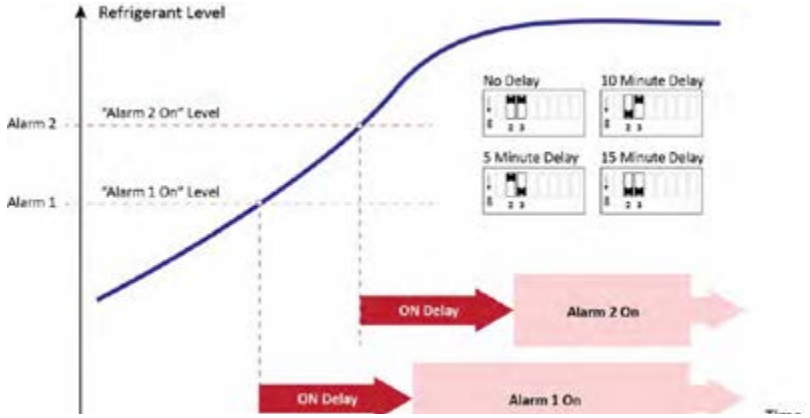

Figure 18. Alarm ON Delay for Multiple Alarm Levels

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

4.2.3 Failsafe – Switch 4

If ON, the relays will change state whenever either of the following occurs.

- Power loss
- Alarm condition.

4.2.4 Alarm 2 Relay – Switch 5

If ON, the relay will **only** change state as a result of an alarm condition. In the default configuration, Relay 2 will also indicate critical faults.

4.2.5 Latching Alarm State – Switch 6

If ON, the relay and Modbus flag will not change state until the concentration is below the alarm level and it is acknowledged. The acknowledgement can either happen by tapping and holding the magnetic wand for 5 seconds to the switch indicated as (• •) or by changing the respective Modbus flag to 0.

In the default configuration the alarms will automatically reset when the gas level is below the alarm thresholds.

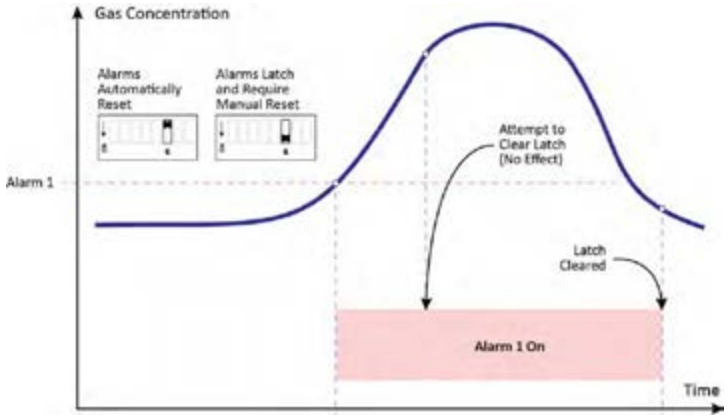

Figure 19. Latched Alarm Requiring Acknowledgement and Gas Concentration below Alarm Level

4.2.6 Buzzer Disable – Switch 7

If ON, the buzzer is disabled and will not sound.

4.3 OTHER SWITCH CONFIGURATIONS

4.3.1 Reset (Cycle Power) - Switch 1

Use the following procedure to cycle power to the AT-G-Alert.

1. Move switch 1 to the ON position.
2. Move switch 1 to the OFF position.
3. Power is cycled to the AT-G-Alert.

↑ CONTENTS

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Refrigerant Gas Sensor
for occupied spaces

4.3.2 Reset to Factory Default Values - Switch 8

Use the following procedure to reset all configurable Modbus registers to their factory default values.

1. Ensure that the detector is off. If the detector is on, turn off power.
2. Set switch 8 to ON.
3. Turn on the detector. The buzzer will be ON and the LED will be OFF.
4. Set switch 8 to OFF. The buzzer will be OFF and the LED will be OFF.
5. Using the magnetic wand, hold magnetic switch 1 (•) for 60 seconds. LED is GREEN during this period.
6. Wait for the LED to changes to ORANGE.
7. Reset the detector by cycling power (by toggling switch 1).
8. Detector will start-up as normal and re-read all switch settings.

4.4 OPERATION OF MAGNETIC SWITCHES, BUZZER AND LED

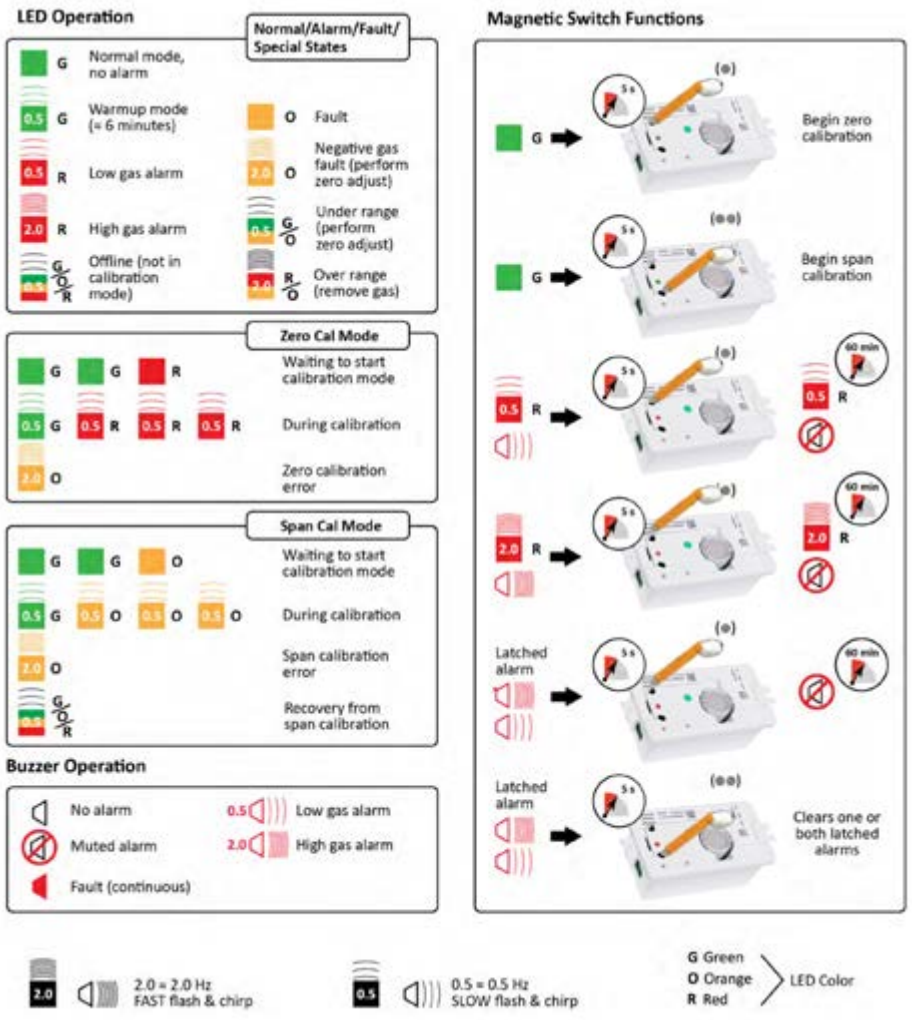

Figure 20. Operation of Magnetic Switches, Buzzer, and LED

↑ CONTENTS

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Refrigerant Gas Sensor
for occupied spaces

5.0 MAINTENANCE

5.1 MAINTENANCE INTERVALS

During Commissioning:
- Check calibration.
- Check LEDs for proper operation.*
- Check for proper buzzer and relay operation.*
- Check signal transmission to the BMS/BAS (central controller) if connected.*

During Commissioning:
- Inspection by trained service personnel.
- Check LEDs for proper operation.*
- Check for proper buzzer and relay operation.*
- Calibrate the sensor or contact Aquilar for sensor exchange with factory-calibrated sensor.

As Required:
- Replace sensor module(s) (see page 27).

*These can be activated via Modbus commands.

5.2 ADJUSTMENTS

5.2.1 Introduction

Warning: Breathing Hazard: Calibration gas must not be inhaled See appropriate Safety Data Sheets. Calibration gas should be vented into a fume hood or to the outside of the building.

Warning: Zero First, Then Span: For proper operation, never adjust the span before completing a zero adjustment. Performing these operations out of order will cause faulty calibration.

Warning: Aquilar recommends calibrating detectors within the application-specific conditions and with target gas. This method of zeroing the detector in the application environment and performing a target gas calibration is more accurate. A surrogate gas calibration may only be performed as an

Notice: The sensor should be fully warmed-up (at least 2 hours, 24 hours recommended).

Notice: When entering the functions for zero or span adjustment, the detector will automatically enter OFFLINE mode, and will remain OFFLINE until either the OFFLINE mode is canceled by tapping the respective magnetic switch, or the OFFLINE mode times out within 6 minutes (typical) after the adjustment has ended.

↑ CONTENTS

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5.2.2 General Procedure

1. Verify that the detector is NOT in alarm and does not have a fault condition (i.e., it must not have a continuous orange LED).
2. Verify that the calibration gas is in a balance of air, not Nitrogen (N2).
3. Fit testing hood to the fascia plate (7) or base plate (6) (see below).
4. Check switch 8 to OFF. The buzzer is OFF and the LED is OFF.
5. Connect the tubing to the barbed fittings of the pressure regulator and testing hood.
6. Verify that gas flow is approximately 0.3 to 1.0 L/min.
7. If operation is intended to be at higher altitudes, the factory calibration will result in a reading lower than the reading at sea level (reduced partial pressure). A new span adjustment is recommended if the altitude or the ambient pressure is changed. The factory calibration is set to sea level.
8. Always perform a zero adjustment before a span adjustment.

1. Testing hood
2. Flow meter
3. Pressure regulator
4. Calibration gas
5. Tubing
6. Calibration from base plate (with test point access)
7. Calibration from fascia plate

Figure 21. Calibration Assembly

Warning: Ambient air can be used to zero the sensor instead of synthetic air only if the area is known to be free of the target gas or any gas to which the sensor may be cross- sensitive. In this case, no cylinder or testing hood is needed for the zero adjustment.

↑ CONTENTS

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5.2.3 Zero Adjustment (... continued for General Procedure)

9. Tap and hold (•) for more than 5 seconds. The LED will blink green-green-red to indicate the detector is ready. Verify that the calibration gas is in a balance of air, not Nitrogen (N2).
10. Apply synthetic air (or use ambient air per the warning above).Set switch 8 to OFF. The buzzer will be OFF and the LED will be OFF.
11. Tap (•) within 30 seconds to confirm start of calibration. Otherwise the detector will time-out and return to normal operation.
12. As the process progresses, the LED will blink green-red, green-red-red, green-red-red-red, etc.
    - To abort calibration, tap and hold (•) for >5 seconds, turn off gas flow and remove the testing hood. The detector will return to normal operation.
    - If calibration is successful (green LED), skip to step 15.
    - If calibration is unsuccessful (orange LED blinks @ 2 Hz), then tap (•) to discard the calibration attempt, and see Section 5.3 on page 26 for troubleshooting.
13. Turn off gas flow from synthetic air
14. Replace synthetic air tank with calibration gas tank in preparation for span adjustment.

5.2.4 Span Adjustment

15. Tap and hold (• •) for >5 seconds. The LED will blink green-green-orange when the detector is ready.
16. Apply span gas in the concentration listed on the cal gas concentration label (beneath the detector's cover plate). This may require the temporary removal of the bezel and cover plate to see the label.
17. Tap (• •) within 30 seconds to confirm initiation of the calibration. Otherwise the detector will time-out and return to normal operation.Turn off gas flow from synthetic air
18. As the calibration process progresses, the LED will blink green-orange, green-orange-orange, green-orange-orange-orange, etc.
    - To abort calibration, tap and hold (• •) for >5 seconds, turn off gas flow and remove the testing hood. The detector will return to normal operation.
    - If calibration is successful, the LED will blink green-orange-red indicating 'offline'. Turn off gas flow and remove the testing hood. After 6 minutes the detector will return to normal operation.
    - If calibration is unsuccessful (orange LED blinks @ 2 Hz), then tap (• •) to discard the calibration attempt, and see Section 5.3 on page 21 for troubleshooting. Turn off gas flow and remove the testing hood. After 6 minutes the detector will return to normal operation.

5.2.5 Bump Test

A bump test is a live test of a system to verify that the detector responds to gas and all connected alarm devices, BMS, etc. are operating accordingly. In this case it is necessary that all involved persons are informed about the test and certain alarms might have to be inhibited (e.g., shutdown valves, notification of authorities, etc.).

1. Inform building personnel of test so that certain alarms may be inhibited (e.g., shutdown valves, notification of authorities, etc.).

↑ CONTENTS

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Refrigerant Gas Sensor
for occupied spaces

2. Connect adapter and target gas according to instructions in Section 5.2.2: General Calibration Procedure on page 19.
3. Apply a sufficiently high concentration of target gas to trigger alarms, but not pure refrigerant or hydrocarbons (e.g., do not use a butane lighter), as this might damage the sensor.
4. Once the alarm thresholds are exceeded, all designated gas alarm relays will be activated and the digital outputs will transmit the corresponding gas concentrations.
5. Turn off gas flow and remove testing hood.

5.3 TROUBLESHOOTING

5.3.1 Failed Span Adjustment

1. Remove bezel and face plate.
2. Attach testing hood.
3. Configure voltmeter to measure 0 to 5 VDC.
4. Insert voltmeter probes into the marked test points.
5. Tap and hold (• •) for more than 5 seconds.
6. The LED will blink green-green-orange to indicate the detector is ready.
7. Apply span gas in the concentration listed on the cal gas concentration label on the detector base.
8. Tap (• •) within 30 seconds confirm to initiate calibration. Otherwise the detector will time-out and return to normal operation.
9. While gas is being applied the analog output will generate a voltage proportional to the measured gas concentration. For example, for a 5,000 ppm span detector, applying 2,500 ppm cal gas should, once stable, result in a 2.5 VDC reading.

$$\text{Reading} = 5 \times \frac{2500}{5000} = 2.5\text{Vdc}$$

10. As the process progresses, the LED will blink green-orange, green-orange-orange, green-orange-orange-orange, etc.
11. To abort the calibration tap and hold (• •) for more than 5 seconds.
12. The LED will blink green-orange-red indicating “offline”.
13. Turn off gas flow and remove the testing hood from the detector.
14. The detector will return after 6 minutes (typical) to normal operation.
15. If the calibration was successful, skip the next step.
16. If the calibration was not successful, the orange LED will blink at 2 Hz.
17. Tap (• •) to discard the calibration attempt.
18. The voltage reading is an indicator of the sensitivity of the sensor. If the voltage reading is significantly lower than the expected value, the sensor module must be replaced.
19. The LED will blink green-orange-red indicating “offline”.
20. Turn off gas flow and remove the testing hood from the detector.
21. Put cover plate back on and tighten set screw.
22. Put bezel back on.
23. The detector will return to normal operation after 6 minutes (typical).

↑ CONTENTS

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for occupied spaces

1. Magnetic switch position 1 (•)
2. Magnetic switch position 2 (••)
3. Multi-color status LED
4. 0-5 V test point access hole (-)
5. 0-5 V test point access hole (+)
6. Testing hood

Figure 22. Test Point Access with Testing hood in Place

5.3.2 Hexidecimal Format

All fault codes can be retrieved through the Modbus interface and are shown in hexadecimal (hex) format. A hex digit can represent multiple codes as shown below.

Hex Code	Equivalent Error Code(s)	Hex Code	Equivalent Error Code(s)	Hex Code	Equivalent Error Code(s)
0	0	5	1 + 4	A	2 + 8
1	1	6	1 + 2 + 3	B	1 + 2 + 8
2	2	7	1 + 2 + 4	C	4 + 8
3	1 + 2	8	8	D	1 + 4 + 8
4	4	9	1 + 8	R	2 + 4 + 8
				F	1 + 2 + 4 + 8

↑ CONTENTS

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5.3.3 Fault Conditions

Bit Mask (Hex): All bits cleared
Fault: No Fault
Description: N/A
Faulty State: N/A
Priority: N/A
Clearing Action: N/A
Required Actions During Fault: N/A

Bit Mask (Hex): 0x0001
Fault: Software fault
Description: Firmware error (e.g., unexpected switch state)
Faulty State: Fatal fault
Priority: 1
Clearing Action: Acknowledge (reset firmware)
Required Actions During Fault: Wait for switch 2 hold

Bit Mask (Hex): 0x0002
Fault: Sensor out
Description: Cannot detect sensor
Faulty State: Critical fault
Priority: 2
Clearing Action: Sensor Detected
Required Actions During Fault: Check sensor

Bit Mask (Hex): 0x0004
Fault: Input voltage fault
Description: Power supply voltage out of range.
Faulty State: Critical fault
Priority: 2
Clearing Action: Input voltage within specification
Required Actions During Fault: Check Input voltage

Bit Mask (Hex): 0x0008
Fault: Memory fault
Description: Error in reading/writing to RAM, flash or internal (PIC) EEPROM
Faulty State: Critical fault
Priority: 2
Clearing Action: Memory test passed
Required Actions During Fault: Test memory Check Input voltage

Bit Mask (Hex): 0x0010
Fault: DAC fault
Description: Error updating DAC value
Faulty State: Non critical fault
Priority: 4
Clearing Action: DAC can be written to
Required Actions During Fault: Write to DAC

Bit Mask (Hex): 0x0020
Fault: Stuck magnetic switch
Description: Magnetic switch activated for > 1 minute
Faulty State: Non critical fault
Priority: 4
Clearing Action: Switch released
Required Actions During Fault: Check switch state

Bit Mask (Hex): 0x0040
Fault: Negative gas concentration fault
Description: Sensor output has drifted too negative
Faulty State: Non critical fault
Priority: 3
Clearing Action: Gas concentration exceeds negative gas limit
Required Actions During Fault: Check gas concentration

Bit Mask (Hex): 0x0080
Fault: Invalid calibration
Description: Error in calibration configuration
Faulty State: Critical fault
Priority: 2
Clearing Action: Load valid calibration
Required Actions During Fault: Read from external EEPROM

... continues next page

↑ CONTENTS

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Bit Mask (Hex): 0x0100
Fault: Zero calibration failure
Description: Zero calibration failed
Faulty State: Calibration failure
Priority: 5
Clearing Action: Acknowledgement of failed calibration
Required Actions During Fault: Wait for switch 2 hold

Bit Mask (Hex): 0x0200
Fault: Sensor read EEPROM fault
Description: Error in reading from external EEPROM
Faulty State: Critical fault
Priority: 2
Clearing Action: External EEPROM read success
Required Actions During Fault: Read from external EEPROM

Bit Mask (Hex): 0x0400
Fault: Sensor write EEPROM fault
Description: Error in reading writing to external EEPROM
Faulty State: Critical fault
Priority: 2
Clearing Action: External EEPROM write success
Required Actions During Fault: Wait for write

Bit Mask (Hex): 0x0800
Fault: Sensor configuration fault
Description: Error in external EEPROM data
Faulty State: Critical fault
Priority: 2
Clearing Action: External EEPROM write valid data
Required Actions During Fault: Wait for write

Bit Mask (Hex): 0x1000
Fault: Span calibration failure
Description: Span calibration failed
Fauly State: Calibra- tion failure
Priority: 5
Clearing Action: Acknowledgement of failed calibration
Required Actions During Fault: Wait for switch 2 hold

Bit Mask (Hex): 0x2000
Fault: System read EEPROM fault
Description: Error in reading from internal EEPROM
Faulty State: Critical fault
Priority: 2
Clearing Action: Internal EEPROM read/write success
Required Actions During Fault: Read from internal EEPROM

Bit Mask (Hex): 0x4000
Fault: System write EEPROM fault
Description: Error in reading writing to internal EEPROM
Faulty State: Critical fault
Priority: 2
Clearing Action: Internal EEPROM read/write success
Required Actions During Fault: Wait for write

Bit Mask (Hex): 0x8000
Fault: System configuration fault
Description: Error in internal EEPROM data
Faulty State: Critical fault
Priority: 2
Clearing Action: Internal EEPROM write valid data
Required Actions During Fault: Wait for write

↑ CONTENTS

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5.3.4 Fatal Faults

- Orange LED is on.
- Relay 2 indicates fault, if configured
- Buzzer is on
- Modbus flag is set to fault
- Gas reading is invalid

Fatal faults can only be recovered by rebooting the system. To reboot the system do the following.

1. Tap and hold (• •) for more than 5 seconds or set the Modbus flag.
2. If the reboot was successful, the detector will return to normal operation. Otherwise exchange detector.

5.3.5 Critical Faults

- Orange LED is on.
- Relay 2 indicates fault, if configured
- Buzzer is on
- Modbus flag is set to fault
- Gas reading is invalid

1. If the remedy suggestions are successful or the detector can resolve the issue, the critical fault is cancelled and the detector returns to normal operation.
2. If the detector is set to latching, tap and hold (• •) to acknowledge the latch mode or set the Modbus flag.

5.3.6 Negative Gas Faults

- Orange LED blinks at frequency of 2 Hz
- Relay 2 indicates fault, if configured
- Buzzer is on
- Modbus flag is set to fault
- Gas reading is invalid

The zero point of the sensor has drifted below the acceptable limit. This could be intermittent if the zero reading is chattering around the limit.

1. Hold (• •) for 5 seconds to acknowledge a negative gas fault.
2. If the fault is still active the detector begins the Zero Calibration process; otherwise the fault may clear.
3. If a zero calibration is not possible exchange the sensor.

↑ CONTENTS

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5.3.7 Non-Critical Faults

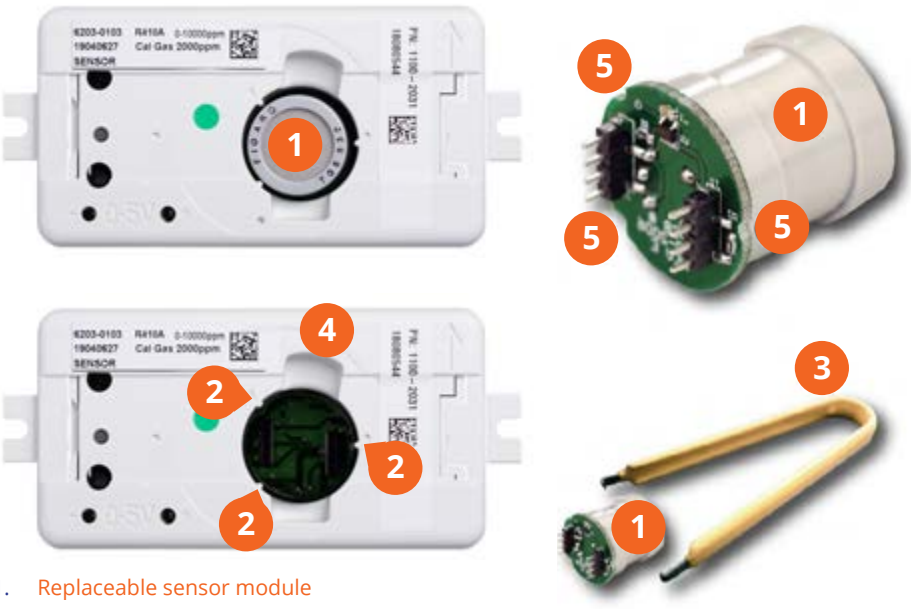
- Orange LED blinks at frequency of 2 Hz
- Modbus flag is set to fault
- Gas reading and alarm management is valid

The detector is fully functional, however, this condition needs to be resolved.

5.4 REPLACING THE SENSOR MODULE

Caution: This product uses semiconductors which can be damaged by electrostatic discharge (ESD). When handling the PCB, care must be taken so that the electronics is not damaged.

1. Power-down detector.
2. Remove bezel and cover plate.
3. Pull out sensor module. It is recommended to use extractor tool part number 1100-2022.
4. Plug new sensor module into sensor control PCB. Ensure that the three notches of the sensor module align with the 3 ribs of the detector base. Use the small triangles printed on the sensor module as a guide. **Warning : If inserted incorrectly the sensor will be damaged beyond repair.**
5. Put cover plate back on and tighten set screw.
6. Put bezel back on and power-up detector.
7. Wait until the start-up sequence is finished.
8. Check sensor response.



1. Replaceable sensor module
2. Sensor alignment ribs (x3)
3. Sensor extractor tool (colour may vary)
4. Recesses (x2) for extracting sensor
5. Alignment notches (x3) on sensor module

Figure 23. Sensor Replacement Showing Sensor Extractor Tool

↑ CONTENTS

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5.5 CLEANING THE DETECTOR

Clean the detector with a soft cloth using water and a mild detergent. Rinse with water. Do not use any alcohols, cleaning agents, sprays, polishes, detergents, etc.

6.0 SENSOR PRINCIPLE

Semiconductor or metallic oxide sensors (MOSs) are among the most versatile of all broad-range sensors. They are heated to a temperature between 150° and 300° C depending on the gas(es) to be detected. The temperature of operation as well as the "recipe" of mixed oxides determines the sensor selectivity to various refrigerants. Electrical conductivity greatly increases as soon as a diffusion process allows the refrigerant molecules to come in contact with the sensor surface. Water vapour, high ambient humidity, temperature fluctuations, alcohols, cleaning agents, sprays, polishes, detergents, and low oxygen levels can result in higher readings.

Notice: Certain substances in the environment may impair the sensitivity of the sensors:

1. Materials containing silicone or silicone rubber/putty
2. Corrosive gases such as hydrogen sulfide, sulfur oxide, chlorine, hydrogen chloride, etc.
3. Alkaline metals, salt water spray.

7.0 DISPOSING OF THE DETECTOR

U-wide regulations governing the disposal of electrical and electronic appliances which have been defined in the EU Directive 2012/19/EU and in national laws have been effective since August 2012 and apply to this device.

Common household appliances can be disposed of using special collecting and recycling facilities. However, this device has not been registered for household usage. Therefore it must not be disposed of through these channels. The device can be returned to Aquilar for disposal. Contact Aquilar if you have any questions.

↑ CONTENTS

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8.0 TECHNICAL DATA

8.1 APPROVALS

EN 50270:2015: Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
CE: Approval Pending
UL/CSA/IEC/EN 61010-1: Approval Pending

8.2 SPECIFICATIONS FOR MODBUS RTU DIGITAL COMMUNICATION OVER RS-485

Baud Rate: 9,600[1] or 19,200 (selectable)
Start Bits: 1
Data Bits: 8
Parity: None[1], odd, even (selectable)
Stop Bits: 1[1] or 2 (selectable)
Retry Time: 500 ms, min time between retries
End of Message: Silent 3.5 characters

[1] - Default Values

8.3 POWER SUPPLY AND RELAY SPECIFICATION

Operating Voltage: 100 to 240 VAC, 50/60 Hz(selectable)
Operating Power: 4 W max
Power Monitoring: Green LED
Relay Rating: 2 SPDT; 1 A at 30 VDC, 1 A at 125 and 250 VAC, resistive load
Audible Alarm: Internal Buzzer; open enclosure
85 dBA at 10 cm (4 in); 80 dBA @ 30 cm (12 in)
Alarm Delay: 0 to 15 minutes (selectable 0, 5, 10, 15)

8.4 WIRING SPECIFICATIONS

Power: 3-core cable, 14 to 20 AWG (0.5 to 2.0 mm^2)
Relay: 3-core cable, 18 to 20 AWG (0.5 to 1.0 mm^2)
Modbus Network: 2-core twisted pair shielded cable 18 to 24 AWG (0.2 to 1.0 mm2) with 120 Ohm characteristic impedance; Use Belden 8761 or similar; Max diameter of cable plus heat shrink must be ≤ 5 mm (0.2 in) (to fit boot)

8.5 PHYSICAL SPECIFICATIONS

Enclosure Material: ABS
Enclosure Protection: IP40, NEMA 1
Size L x W x D (Approximate): 6" x 4.1" x 1.75" (150 x 105 x 45 mm) including bezel Depth of bezel 0.39" (10 mm)
Weight (Approximate): 8 oz (230 g)

8.6 ENVIRONMENTAL SPECIFICATIONS

Temperature: 32° to 122° F (0° to 50° C)
Storage Temperature: -40° to 122° F (-40° to 50° C)
Humidity: 5 to 90% RH, non-condensing
Pressure: 23.6 to 32.5 in. of Hg (800 to 1100 hPa)
Elevation: 0 to 6,560 ft. (2000 m) altitude

8.7 SENSOR SPECIFICATIONS

Detectable Gases: R-22, R-32, R-404a, R-407c, R-410a
Measuring Ranges: 0 to 2,500 ppm; 0 to 5,000 ppm; 0 to 10,000 ppm

8.8 DEFAULT ALARM LEVELS

	ALARM RANGES		
	0 to 2,500 ppm	**0 to 5,000 ppm**	**0 to 10,000 ppm**
ALARM 1	500 ppm	1,000 ppm	2,000 ppm
ALARM 2	2,000 ppm	4,000 ppm	8,000 ppm

↑ CONTENTS

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for occupied spaces

8.9 MODBUS REGISTERS

Notice: If items span two registers (e.g., 1005 and 1006), then the registers are “long” or “float” data types. Otherwise the registers are integer data types or ASCII.

8.9.1 Read Device Identification

The following Object IDs are used with function code 43/14 to read ASCII device identification objects.

Object ID	Name	Description	Def Val
0x00	Read Device Identification	Vendor name	"Bacharach"
0x01	Read Device Identification	Product code	“MVR-300”
0x02	Read Device Identification	Revision (Major/minor/“bug fix”)	“NN.nn.bb”

8.9.2 analog input registers

Analog input registers are read only and use function code 04.

Reg Addr	Name	Description	Data Type	Def Val
1000	16 bit Current Fault Code	Active or latched faults	Hex	0
1001	16 bit Last Fault Code	All faults which have occurred since startup or fault register reset	Hex	0
1002	Gas Concentration PPM	Current gas concentration in PPM	Unsigned Integer	
1003	Gas Concentration % FS (0-100)	Current gas concentration as percentage of full scale	Unsigned Integer	
1004	Hours since last calibration	Can be reset by a calibration operation	Unsigned Integer	
1005 1006	PPM Hours	Sensor gas exposure clock. Cannot be reset	32-bit long	
1012	Software Version Sensor Major	Software Version in the format NN.nn.bb.	Unsigned Integer	
1013	Software Version Sensor Minor	Software Version in the format NN.nn.bb.	Unsigned Integer	
1014	Software Version Sensor Bug Fix	Software Version in the format NN.nn.bb.	Unsigned Integer	
1015	Sensor Type Code	Hex code indicating the sensor type, gas and range	Hex	

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

1016	Full Scale in PPM	Limit of measurement of the sensor	Unsigned Integer
1017	Gas Low Alarm PPM	Low alarm threshold in PPM	Unsigned Integer
1018	Gas High Alarm PPM	High alarm threshold in PPM	Unsigned Integer
1019	Gas Low Alarm % FS (0-100)	Low alarm threshold as percentage of full scale	Unsigned Integer
1020	Gas High Alarm % FS (0-100)	High alarm threshold as percentage of full scale	Unsigned Integer
1021	Minimum Alarm Setting PPM	Lowest allowable alarm setting	Unsigned integer
1022	Sensor Gas Type Text Char 1,2	Text string indicating the target gas e.g., “R410a”	ASCII
1023	Sensor Gas Type Text Char 3,4	Text string indicating the target gas e.g., “R410a”	ASCII
1024	Sensor Gas Type Text Char 5,NULL	Text string indicating the target gas e.g., “R410a”	ASCII
1025	Main Electronics UID Char 1,2	Text string indicating the detector serial number e.g., “U1234567”	ASCII
1026	Main Electronics UID Char 3,4	Text string indicating the detector serial number e.g., “U1234567”	ASCII
1027	Main Electronics UID Char 5,6	Text string indicating the detector serial number e.g., “U1234567”	ASCII
1028	Main Electronics UID Char 7,8	Text string indicating the detector serial number e.g., “U1234567”	ASCII
1029	Sensor Module SID Char 1,2	Text string indicating the sensor serial number e.g., “S7654321”	ASCII
1030	Sensor Module SID Char 3,4	Text string indicating the sensor serial number e.g., “S7654321”	ASCII
1031	Sensor Module SID Char 5,6	Text string indicating the sensor serial number e.g., “S7654321”	ASCII

↑ CONTENTS

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1032	Sensor Module SID Char 7,8	Text string indicating the sensor serial number e.g., “S7654321”	ASCII	
1036	Signed Raw Gas Concentration PPM - no thresholding	Raw gas concentration used for calibration procedure	Signed integer	
1037 1038	Rate of change of sensor resistance	Rate of change of semiconductor sensor resistance. Used to determine stability of gas response in calibration	Float	
1039	Sensor cal gas lower limit PPM	Lower limit of the gas for calibration	Unsigned Integer	
1040	Sensor cal gas upper limit PPM	Upper limit of the gas for calibration	Unsigned Integer	
1041	Auto Cal Zero Time Remaining Float	Seconds remaining in auto zero calibration procedure	Unsigned Integer	0
1042	Auto Cal Span Time Remaining	Seconds remaining in auto span calibration procedure	Unsigned Integer	0
1043	Auto Cal Recovery Time Remaining	Seconds remaining in span recovery	Unsigned Integer	0

8.9.3 analog output registers

Analog output registers are readable (using function code 03) and writable (using function code 06).

Notice: Before writing to any “locked” registers, be sure to use the Parameter Unlock register (2000) first to unlock the registers and (if desired) to re-lock those registers afterwards.

Reg Addr	Name	Description	Data Type	Def Val	R/W
2000	Parameter Unlock	Writing the correct unlock code (0x6388) to this register allows an external controller to change system parameters. Writing any other value (or cycling power thereby restoring the default value of zero) re-locks the lockable system parameters.	Unsigned integer	0	R/W

↑ CONTENTS

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2001	RS-485 Node Address	Modbus address 1-247	Unsigned integer	1	R/W
2002	Baud Rate	0 = 9600 Baud; 1 = 19200 Baud	Unsigned integer	0 (9600 baud)	R/W
2003	Stop Bits	Number of stop bits	Unsigned integer	1	R/W
2004	Parity	Parity (0=none, 1=odd, 2=even)	Unsigned integer	None	R/W
2005	Gas Low Alarm PPM	Low gas alarm in PPM	Unsigned integer	Unit dependent	R. W if un-locked
2006	Gas High Alarm PPM	High gas alarm in PPM	Unsigned integer	Unit dependent	R. W if un-locked
2007	Modbus Precedence over DIP Switch Settings	f set then the values programmed over Modbus take precedence over the values set by DIP switch	Unsigned integer	0	R. W if un-locked
2008	Alarm On Delay Value	Alarm On delay in minutes. Range 0-15.		0	R. W if un-locked
2009	Relay Contact Behaviour / Failsafe	Note: Setting only has an effect if the Modbus priority flag is set	Unsigned integer	0	R. W if un-locked
2010	Relay 2 Fault Indication	0 = Relay 2 indicates high alarm only 1 = Relay 2 indicates high alarm and fault condition Note: Setting only has an effect if the Modbus priority flag is set	Unsigned integer	0	R. W if un-locked
2011	Alarm Latching Behaviour	0 = Alarms automatically reset 1 = Alarms must be acknowledged Note: Setting only has an effect if the Modbus priority flag is set	Unsigned integer	0	R. W if un-locked

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

2012	Buzzer disable	0 = Buzzer normal operation 1 = Buzzer disabled Note: Setting only has an effect if the Modbus priority flag is set	Unsigned integer	0	R. W if un-locked
2017	Calibration Gas Level PPM	Level of gas being applied during calibration	Unsigned integer	Unit dependent	R. W if un-locked

8.9.4 Input Status Flags

Input status flags are readable (using function code 02).

Reg Addr	Name	Description	Data Type	Def Val
3000	Gas Low Alarm Flag	0 = No low alarm state 1 = Low alarm active or latched	Boolean	0
3001	Gas High Alarm Flag	0 = No high alarm state 1 = Low alarm active or latched	Boolean	0
3002	Saturation Overflow	0 = Gas level less than or equal to full scale range 1 = Gas level exceeds full scale range	Boolean	0
3003	Saturation Underflow	0 = Gas level greater than or equal to 0 ppm 1 = Gas level underflow condition	Boolean	0
3004	Startup	Detector is in startup. No valid gas level or outputs	Boolean	0
3005	Detector Offline	Detector not reporting gas level or generating alarm conditions	Boolean	0
3006	Detector Fault	The detector is reporting a fault which prevents valid gas level or output generation	Boolean	0
3007	Relay 1 State	0 = Relay de-energized 1 = Relay energized	Boolean	0
3008	Relay 2 State	0 = Relay de-energized 1 = Relay energized	Boolean	0

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Refrigerant Gas Sensor for occupied spaces

8.9.5 Output Status Flags

Output status flags are readable (using function code 01) and writeable (using function code 05).

Notice: Before writing to any "locked" registers, be sure to use the Parameter Unlock register (2000) first to unlock the registers and (if desired) to re-lock those registers afterwards.

Reg Addr	Name	Description	Data Type	Def Val	R/W
4000	Offline mode	Setting this flag places the detector into offline mode. When offline the detector will not respond to gas events or generate alarm conditions. The flag will remain asserted for the duration of offline mode. Offline mode will end after expiry of the offline mode timeout or by clearing this flag.	Boolean	0	R. W if un-locked
4001	Calibration expired	1 => The sensor requires calibration Can be cleared by performing a calibration or by resetting this flag.	Boolean	0	R. W if un-locked
4002	Start Zero Calibration Procedure	Setting this flag triggers the automatic zero calibration procedure. The flag will remain asserted during the procedure. Writing a zero to the flag during the procedure will cancel the procedure and the detector will return to normal operation.	Boolean	0	R. W if un-locked

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

4003	Start Span Calibration Procedure	Setting this flag places the detector offline and triggers the automatic span calibration procedure. The flag will remain asserted during the procedure. Writing a zero to the flag during the procedure will cancel the procedure and the detector will remain offline for the duration of the span calibration recovery time.	Boolean	0	R. W if un-locked
4004	Perform Immediate Zero Calibration Procedure	Setting this flag performs an immediate zero calibration. The detector will return to normal operation on completion.	Boolean	0	R. W if un-locked
4005	Perform Immediate Span Calibration Procedure	Setting this flag performs an immediate span calibration as long as the detector is already in offline mode. The detector will remain offline for the duration of the span calibration recovery time after completion of the procedure	Boolean		
4005	Perform Immediate Span Calibration Procedure	Setting this flag performs an immediate span calibration as long as the detector is already in offline mode. The detector will remain offline for the duration of the span calibration recovery time after completion of the procedure	Boolean	0	R. W if un-locked
4006	Alarm Flag	If asserted then a gas alarm state exists. Clearing this flag will clear any latched alarm states.	Boolean	0	R. W if un-locked

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

4007	Clear last fault	Clear non-active faults from LAST FAULT register. If any current faults are still active then these will be held in LAST FAULT register.	Boolean	0	R. W if un-locked
4013	Manual Override	Setting this flag places the detector into manual override mode to allow for testing of outputs. During manual override mode the relays, analog output and LEDs will not respond to gas events, alarm conditions or faults. Manual override mode may be terminated by clearing this flag. Alternatively the mode will timeout after a set period after which normal operation will resume.	Boolean	0	R. W if un-locked
4014	Relay 1 Manual Control	If the detector is in manual override mode, setting this flag energizes relay 1; clearing this flag de-energizes relay 1. Relay failsafe configuration has no effect on this test.	Boolean	0	R. W if un-locked

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

4007	Clear last fault	Clear non-active faults from LAST FAULT register. If any current faults are still active then these will be held in LAST FAULT register.	Boolean	0	R. W if un-locked
4013	Manual Override	Setting this flag places the detector into manual override mode to allow for testing of outputs. During manual override mode the relays, analog output and LEDs will not respond to gas events, alarm conditions or faults. Manual override mode may be terminated by clearing this flag. Alternatively the mode will timeout after a set period after which normal operation will resume.	Boolean	0	R. W if un-locked
4014	Relay 1 Manual Control	If the detector is in manual override mode, setting this flag energizes relay 1; clearing this flag de-energizes relay 1. Relay failsafe configuration has no effect on this test.	Boolean	0	R. W if un-locked
4015	Relay 2 Manual Control	If the detector is in manual override mode, setting this flag energizes relay 2; clearing this flag de-energizes relay 2. Relay failsafe configuration has no effect on this test.	Boolean	0	R. W if un-locked

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

4016	Buzzer Test Mode	If the detector is in manual override mode, setting this flag activates the buzzer; clearing this flag deactivates the buzzer. Buzzer mute control has no effect on this test.	Boolean	0	R. W if un-locked
4017	Red LED Manual Control	If the detector is in manual override mode, setting this flag turns on the red LED; clearing this flag turns off the red LED.	Boolean	0	R. W if un-locked
4018	Green LED Manual Control	If the detector is in manual override mode, setting this flag turns on the green LED; clearing this flag turns off the green LED.	Boolean	0	R. W if un-locked
4019	Analog Output Manual Control	If the detector is in manual override mode, setting this flag sets the analog output to full scale; clearing this flag sets the analog output to zero.	Boolean	0	R. W if un-locked

9.0 ORDERING INFORMATION

9.1 AT-G-ALERT REFRIGERANT LEAK DETECTOR CONFIGURATIONS

P/N	Detection Range	Refrigerant
4675	0 to 10000ppm	R-410A
4680	0 to 10000ppm	R-407C
4685	0 to 10000ppm	R-404A
4690	0 to 10000ppm	R-32

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

9.2 ACCESSORIES

P/N	Description
4528	Pressure Regulator (0.3 l/min, 5/8”-18 UNF)
	Magnetic Wand
4566	Calibration Kit , includes: • AT-G-Alert Testing hood • Tubing for Calibrating Kit, Reactive Gases
4691	Calibrated Sensor Assembly 0 to 10000 ppm R-410A
4692	Calibrated Sensor Assembly 0 to 10000 ppm R-407C
4693	Calibrated Sensor Assembly 0 to 10000 ppm R-404A
4694	Calibrated Sensor Assembly 0 to 10000 ppm R-32
On Request	Calibration Gas Cylinder

9.3 LEAK MONITOR PANELS

P/N	Description
	AquiNet Fieldbus Monitoring System
6250	AT-G-ALERT-C Refrigerant Leak Monitor

AquiNet Fieldbus Monitoring System

AT-G-ALERT-C Refrigerant Leak Monitor

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

10.0 BACK BOXES AND FACEPLATES

10.1 INTRODUCTION

Figure 24. AT-G-ALERT and Representative Back Box

10.2 HARDWARE OVERVIEW

Most UK back boxes have mounting tabs of two different heights. The AT-G-Alert accommodates both through the use of thicker, moulded plastic mounting tabs, and optional thinner metal tabs. In applications requiring the thinner metal tabs, the standard plastic tabs must first be removed.
If the tabs of your back box are too high, the AT-G-Alert may protrude too far from wall. In this case, you will need to remove the plastic tabs from the AT-G-Alert base plate and replace them with thinner metal tabs (provided) to permit proper flush mounting. This procedure is explained in detail in the next section.

⚠ **Caution:** Extreme care must be exercised when removing the plastic tabs to avoid damaging the base plate. Before permanently removing the thicker plastic tabs, be sure to dry fit the assembly using the plastic tabs first in order to verify that your UK back box requires the thinner metal tabs for proper flush mounting. Only then should the plastic tabs be removed from the base plate. Refer to the next section for detailed instructions.

Figure 25. AT-G-ALERT with Plastic Tabs and Optional Thinner Metal Tabs

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

10.3 USING OPTIONAL METAL TABS

Caution: Follow the instructions in this section ONLY after (1) dry fitting the AT-G-Alert using the plastic tabs, and (2) determining that the plastic tabs are too thick for the back box you are using (resulting in a gap between the wall and the custom faceplate.

After you determine that the plastic tabs on your base plate need to be replaced with the thinner metal tabs for proper flush mounting in your application, then follow the steps below.

Installation of Optional Metal Tab on AT-G-ALERT

1. Dry fit all components to verify that the plastic tabs are too thick for proper flush mounting to wall. If a gap exists between custom cover plate and wall, the plastic tabs are too thick for your back box, therefore proceed to the next step. Otherwise (if no gap exists), no modification is required. Skip this section and use the plastic tabs as is.
2. Carefully remove plastic tabs from the base plate using nippers, wire snips, or similar.

Figure 26. Examples of Tool Needed to Remove Plastic Tabs

Caution: Examples of Tool Needed to Remove Plastic Tabs DO NOT attempt to "snap" off the plastic tabs. Damage to the base plate may result. Removal of the plastic tabs must be done ONLY with an appropriate cutting tool.

Figure 27. AT-G-ALERT Retrofit of Thinner Metal Mounting Tabs

3. Attach the metal tabs from the underside of the base plate using the screws provided.
4. Dry fit the new base plate with metal tabs into the back box, then add the custom cover plate to assure proper fit and to verify flush mounting.
5. Remove the base unit and prepare for electrical wiring.

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

10.4 ELECTRICAL INSTALLATION

Wiring installation of the UK version of the AT-G-Alert includes earth grounding to the metal back box and custom metal cover plate, and the box to earth ground. Refer to local codes, laws, guidelines, and best practices for wiring instructions. For remaining wiring installation details (power, communications, relays, etc.), refer to Section 3.4 on page 10.

10.5 FACE PLATES

The AT-G-Alert requires a faceplate (supplied with the sensor) that provides proper access holes for airflow to the sensor module and visual access to the LED indicator at a minimum. These are available in three standard finishes – Brushed Aluminium Effect, Mirror Aluminium Effect and Gloss White. Other finishes are available to special order.

Figure 29. Sample Faceplate with LED and Sensor Cut-outs

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

10.6 CALIBRATION

Use the testing hood to calibrate (zero or span) the AT-G-Alert. The testing hood is a rubber boot that fits down over the Sensor Module. Unlike the standard Testing hood, the Testing hood has three vertical slits to accommodate the sensor module alignment ribs as the adapter is fitted down onto the Sensor Module.

Figure 30. Testing hood with Tubing

Figure 31. AT-G-ALERT Calibration Components

1. Flow meter
2. Pressure regulator
3. Calibration gas
4. Tubing
5. Testing hood (UK version)

Notice: Calibration must be done using the rubber testing hood with the custom faceplate removed.

↑ CONTENTS

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AT-G-ALERT
Refrigerant Gas Sensor
for occupied spaces

11. DECLARATION OF CONFORMITY

BACHARACH

EU DECLARATION OF CONFORMITY

Product(s):	Gas Detector
Model(s):	MVR-300, also referred to as 1100-2012, and derivatives
The manufacturer of the products covered by this declaration:	Murco, a Bacharach Company 114a George's Street Lower Dun Laoghaire Ireland
Year(s) conformity is declared:	2016
Directive(s)	2014/30/EU Electromagnetic Compatibility (EMC) 2014/35/EU Low Voltage Directive (LVD) 2011/65/EU RoHS Directive

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration	

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation.

Harmonised Standard(s)

EN 50270:2015	Electromagnetic compatibility - electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 55011:2009/A1:2010 Group 1, Class B	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
EN 61010-1:2010	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use

↑ CONTENTS

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www.aquilar.co.uk

AquiTron

AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

WARRANTY POLICY

Aquilar Ltd warrants this detector, excluding sensors, to be free from defects in materials and workmanship for a period of 36 months from the date of purchase by the original owner. The sensor has a pro-rated warranty period of 12 months. If the product should become defective within this warranty period, we will repair or replace it at our discretion.

The warranty status may be affected if the detector has not been used and maintained per the instructions in this manual or has been abused, damaged, or modified in any way. This detector is only to be used for purposes stated herein. The manufacturer is not liable for auxiliary interfaced equipment or consequential damage.

Due to ongoing research, development, and product testing, the manufacturer reserves the right to change specifications without notice. The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data.

All goods must be shipped to the manufacturer by prepaid freight. All returned goods must be pre-authorized by obtaining a return merchandise authorization (RMA) number. Visit www.aquilar.co.uk for an RMA number and procedures required for product return.

SERVICE POLICY

Always include your RMA #, address, telephone number, contact name, shipping/billing information and a description of the defect as you perceive it. You will be contacted with a cost estimate for expected repairs prior to the performance of any service work. For liability reasons, Aquilar has a policy of performing all needed repairs to restore the detector to full operating condition.

Prior to returning equipment to Aquilar, visit: www.aquilar.co.uk for an RMA # (returned merchandise authorization). All returned goods must be accompanied with an RMA number. Pack the equipment well (in its original packing, if possible), as Aquilar cannot be held responsible for any damage incurred during shipping to our facility.

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TECHNICIAN USE ONLY

This unit must be installed by a suitably qualified technician who will install this unit in accordance with these instructions and the standards in their particular industry/country. Operators of the unit should be aware of the regulations and standards in their industry/country for the operation of this unit. These notes are only intended as a guide and the manufacturer bears no responsibility for the installation or operation of this unit.

↑ CONTENTS

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www.aquilar.co.uk

AquiTron

AT-G-ALERT
Refrigerant Gas Sensor for occupied spaces

Failure to install and operate the unit in accordance with these instructions and with industry guidelines may cause serious injury including death and the manufacturer will not be held responsible in this regard.

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