1. AT-GU Installation Instructions

To open the standard sensor enclosure, turn the cable gland ½ turn anticlockwise to loosen the internal gland nut, depress the clip on top of the enclosure and open. Reverse to close.

Power: 12-24V AC/DC, connect at positions 0V and +V at connector block CN1. For AC – Jumper A is on, D is off. (See diagram 1/2.) For DC – Jumper A is off, D is on. (Default Factory Setting is DC). Use 2 cores of a 4-core cable, low voltage alarm type, typically 7/0.2mm sq.

Output: You can select the V or mA analogue output at JP1 and JP3. **(Default factory setting is mA.)** Connect the other two cores of the cable to terminal block CN2 positions 0V and V or I for voltage or current as per jumper selection. You can common the two zeroes and use 3 core cable if preferred.

Connect 4-20mA at CN2 positions 0V and I
Connect voltage output at CN2 positions 0V and V.

Relay Set Point: P1 sets the trip point for the relay and sounder using the 0-5V scale (measure at test points 0V and REF1, 2.5V would be equivalent to half the range – (500ppm on a scale of 0-1000ppm.) **Default factory setting is 50% of the range.**

Time Delay: A time delay for the operation of the relay and sounder can be selected using jumpers JP5 and JP6. **Default factory setting is zero.**

Sounder: The sounder can be disabled using jumper JP2. Default **factory setting is enabled.**

There is a 5 minute power up delay to allow the sensor to stabilize. This can be cancelled by shorting the pads of SW1 or SW2 – the switches are not fitted in this version.

2. Location Of Sensors

Sensors must be located within the appropriate wire lengths from the central control unit.

In all cases the sensor supplied is designed for maximum sensitivity to a particular gas.

However, in certain circumstances false alarms may be caused by the occasional presence of sufficiently high concentrations of other gaseous impurities. If such a situation is likely to arise installers should check with our Technical Department so that sensor(s) of suitable cross sensitivity can be supplied. Examples of situations where such abnormalities may arise include -

- Plant room maintenance activity involving solvent or paint fumes or refrigerant leaks.
- Plant rooms in fruit ripening/storage facilities because of accidental gas migration (bananas - ethylene, apples - carbon dioxide)
- Heavy localised exhaust fumes (carbon monoxide, dioxide) from engine driven forklifts in confined spaces or close to sensors.

A response delay is built in to the system to minimise the possibilities of false alarms.

Machinery Rooms
There is NO ABSOLUTE RULE in determining the number of sensors and their location. However a number of simple guidelines will help to make a decision. Sensors monitor a point as opposed to an area. If the gas leak does not reach the sensor then no alarm will be raised. Therefore, it is extremely important to carefully select the sensor location. Also consider ease of access for maintenance.

The size and nature of the site will help to decide which method is the most appropriate to use. Locations requiring the most protection in a machinery or plant room would be around compressors, pressurized storage vessels, refrigerant cylinders or storage rooms or pipelines. Most vulnerable are valves, gauges, flanges, joints (brazed or mechanical), filling or draining connections etc.

When mechanical or natural ventilation is present mount a sensor in the airflow. In machinery rooms where there is no discernable or strong airflow then options are:

- Point Detection, where sensors are located as near as possible to the most likely sources of leakage, such as the compressor, expansion valves, mechanical joints or cable duct trenches.
- Perimeter Detection, where sensors completely surround the area or equipment.
- With heavier than air gases such as halocarbon and hydrocarbon refrigerants such as R404A, propane and butane , sensors should be located near ground level.
- With lighter than air e.g. ammonia, the sensor needs to be located above the equipment to be monitored e.g. on a bracket or high on a wall within 300mm of, or on the ceiling provided there is no possibility of a thermal layer trapped under the ceiling preventing gas reaching the sensor. (NB. At very low temperatures, such as in a refrigerated cold store, ammonia gas becomes heavier than air).
- With similar density or miscible gases, such as CO or CO2, sensors should be mounted about head height – 1.5m.
- Sensors should be positioned a little way back from any high-pressure parts to allow gas clouds to form. Otherwise any leakage of gas is likely to pass by in a high-speed jet and not be detected by the sensor.
- Make sure that pits, stairwells and trenches are monitored since they may fill with stagnant pockets of gas.
- If a pressure relief vent pipe is fitted to the system, it may be a requirement to mount a sensor to monitor this vent pipe. It should be positioned about 2m above the PRV to allow gas clouds to form.
- With racks or chillers pre-fitted with refrigerant sensors, these should be mounted so as to monitor the compressors or if extract ducts are fitted the airflow in the duct may be monitored.

Refrigerated Spaces
In refrigerated spaces sensors should be located in the return airflow to the evaporators on a sidewall, below head height preferred, or on the ceiling, not directly in front of an evaporator. In large rooms with multiple evaporators, sensors should be mounted on the central line between 2 adjacent evaporators, as turbulence will result in airflows mixing.

Chillers
In the case of small water or air-cooled enclosed chiller units mount the sensor so as to monitor airflow to the extract fans. With larger models also place a sensor inside the enclosure under or adjacent to the compressors.

In the case of outdoor units:

- Such as enclosed air-cooled chillers or the outdoor unit for VRV/VRF systems mount the sensors so as to monitor airflow to the extract fan. With large units also place a sensor inside the enclosure under or adjacent to the compressors.

In the case of non-enclosed outdoor units:

- If there is an enclosed machinery section then locate a sensor there.
- In the case of the units with enclosed compressors, mount sensors in the enclosures.
- Where you have protective or acoustic panels mount the sensors low down under the compressors where it is protected by the panels.
- With air-cooled chillers or air-cooled condensers with non-enclosed condenser sections it is difficult to effectively monitor leaks in the coil sections. With some designs it will be possible using an airflow sensor to monitor airflow to the start-up fans in the front or rear sections.
- If there is a possibility of refrigerant leaks into a duct or air-handling unit, install a sensor to monitor the airflow.

Weatherproof sensors should be used for unprotected outdoor applications.

Air Conditioning – Direct systems VRV/VRF
EN378 states that detectors to ensure safety have their sensors located in such positions that they monitor the concentration at heights of the occupants of a human occupied space taking into account the characteristics of the refrigerant used e.g. at less than bed height with heavier than air gases in a hotel room. It also states that ceiling voids are regarded as part of the human occupied space.

In a hotel room monitoring in ceiling voids would not strictly comply with EN378

Do's
- Mount the in-room sensor at less than the normal heights of the occupants e.g. in a hotel room this is less than bed height – between 200-500mm off the floor.
- Keep away from draughts and heat sources like radiators etc.
- Avoid sources of steam.

Don'ts
- Do not mount sensors under mirrors, at vanity units or in or near bathrooms.

3. Typical Settings

Gas: Refrigerant R404A **Range:** 0-1000ppm **Alarm Set Point:** 500ppm

For a particular unit please refer to the gas settings shown on the rating plate.

4. Installation and Wiring Diagram

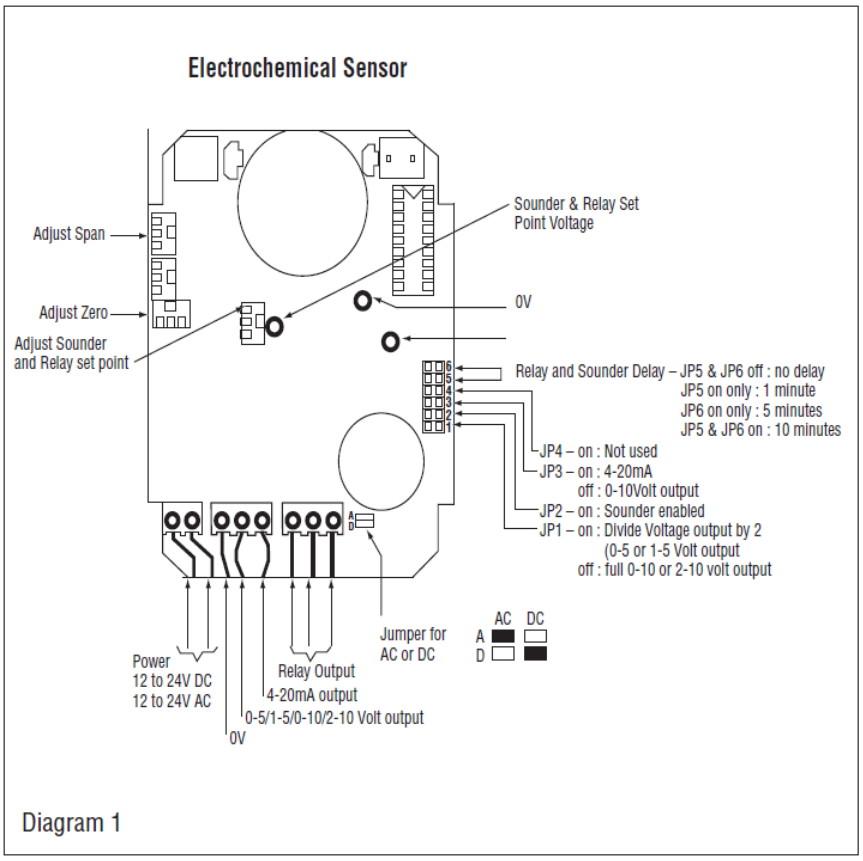


Diagram 1

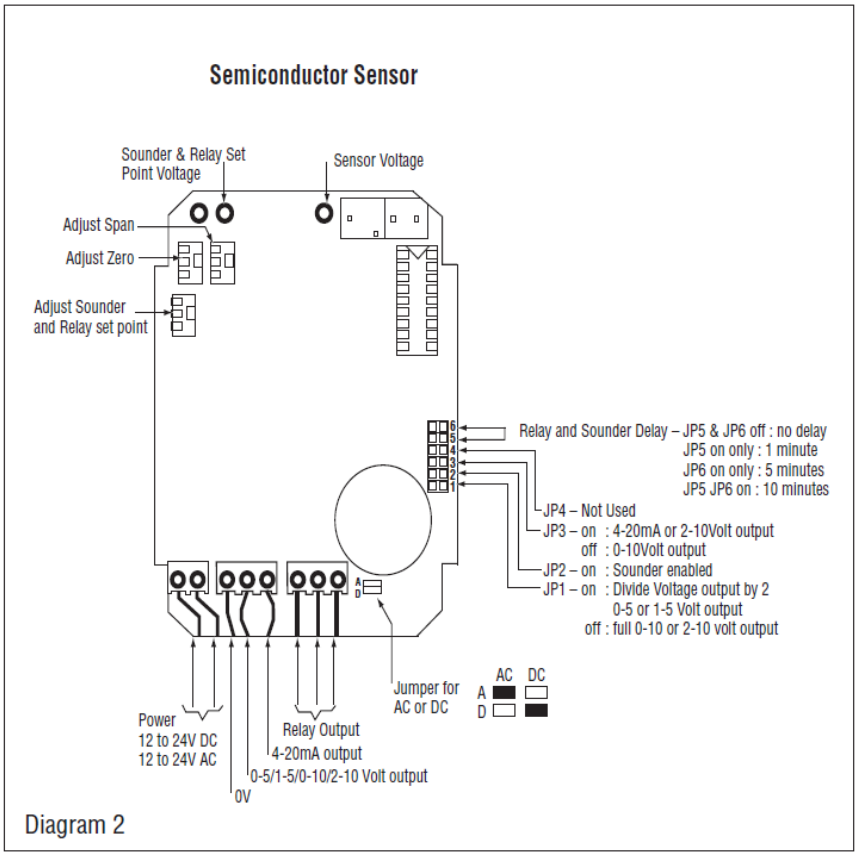


Diagram 2

5. AT-GU - Operating Instructions

1. On powering up it will sense the presence of gas after an initial warm-up delay of 5 minutes, the green LED will flash at one second intervals during the warm-up.

2. In an alarm condition:

- The green LED stays on
- The red LED will be on
- The siren operates (if it has not been disabled and after a delay if this option has been selected).
- The relay output activates (after a delay if this option has been selected)
- The voltage or current output changes proportional to gas concentration..

3. Fault Condition:

- The green LED will be off
- The red LED will be on
- A voltage or current fault output will activate.

6. AT-GU – Test / Function Instructions

The AT-GU is calibrated in the factory and does not require calibrations on installation. After installation, the units should be bump tested. Expose the sensors to test gas (appropriate to the installation) or crack open the valve of a cigarette lighter without igniting it and hold it over the vent holes on the upper side of the AT-GU. The gas is heavier than air and should fall into the AT-GU. This will put the system into alarm. The red LED will light showing the system is in alarm. The delay will prevent the siren sounding and relay switching for the preset delay, if delay is set.

With a bump test you can see the functions of the sensor – the red led will light, the relay and sounder will function, the output selected, say 0-10V, will show the gas level.

To test the siren and or relay function, check the delay is set at zero using the header as shown on the installation diagram and expose to gas as above. You can mute the siren by removing the jumper JP2.

After the gas has cleared and the red LED, siren and relay will automatically reset.

Before testing the sensors on site the AT-GU must be powered up and allowed to stabilize.

7. AT-GU – Remote Sensor Head Installation

If you do not wish to surface mount the AT-GU or need to match room decor, we can supply a remote sensor with a decorative faceplate (standard is brushed stainless steel). The remote sensor is mounted in an electrical back box 44mm deep to which the vented face plate is fitted.

1. Remove the connector from the sensor PCB to feed the cable through the trunking.
2. Immediately refit the connector to the sensor board in the backbox. The AT-GU and remote sensor must be kept together as they are calibrated together and are a matched pair

Do not remove the sensor boards from a number of units at the same time in case they get mixed up. If doing so, label them or ensure you check the serial number on the main PCB and the remote sensor PCB are the same when re-installing.

3. If construction / decoration is still going on, fit a standard plastic blanking plate immediately you install the sensor in the back box to avoid dust or damage to the in-room sensor. You can fit the decorative fascia when decoration is completed.

8. AT-GU – Annual Test

To comply with the requirements of EN378 and the F Gas regulations, sensors must be tested annually. However local regulations may specify the nature and frequency of this test. If not the recommended procedure should be followed. Contact us for details.

Check local regulations on calibration or testing requirements.

Agree selectable functions with end-users:

You should agree these important functions with the customer so that the system will operate as he/she requires:

1. **Time Delay Response:** Available on the sounder and relays to avoid false alarms, which is set with jumpers. **The default delay is 0 minutes.** You may wish to set to 15 minutes during start up and construction as you may have VOC's (volatile organic compounds) fumes, paint etc in the rooms. They should be reset as required.

2. **Siren**: The units have an internal siren. You can disable this by jumper, **but the default setting is "enabled".** The customer may not want local alarms especially if you are connecting to a remote monitoring system. Check the customer's preference.

3. **Output:** Agree the output required – 4-20mA or 0-10V etc.

4. **Connectivity:** Decide how the outputs are to be used. AT-GU sensors can activate external systems such as fans or shut down and activate sirens, warning lights, activate dial out systems or connect to most BMS, SCADA or other control systems using one or more outputs

9 – AT-GU - Troubleshooting

All AT-GU units are checked and calibrated before shipping.

1. **Symptom:** Green/Red light on sensor is not lit. **Possible cause:** Power supply. Possible wiring fault. Check power supply, check wiring.

2. **Symptom:** Red light on, green LED off – indicates a fault

   2.1 Sensor element may be disconnected from the printed circuit board. Check to see sensor element is properly inserted into board.
   2.2 If the sensor element is properly inserted, then it may be damaged or has reached its end of life and needs to be exchanged.

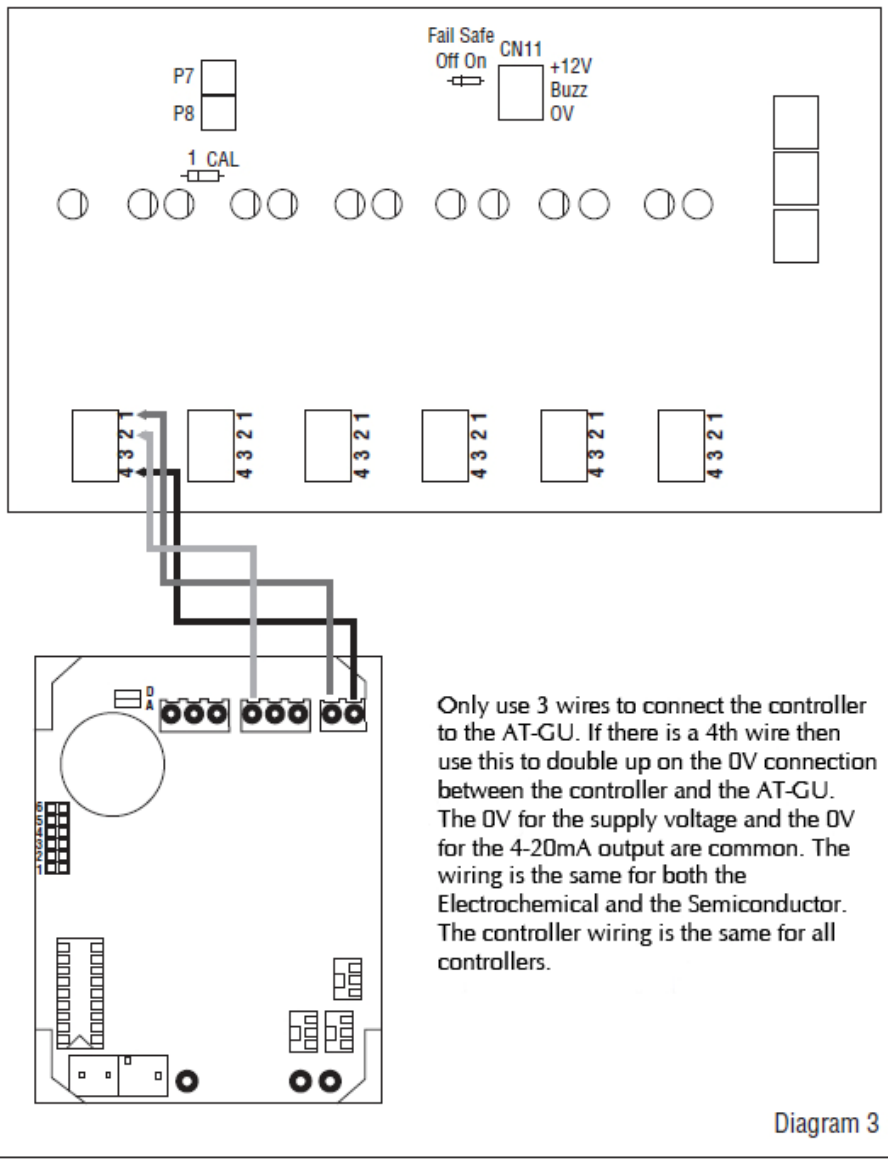
3. If you experience spurious alarms in the absence of a leak, contact us for instructions and support.

During operation record any alarms. Establish the cause or likely cause if no obvious leak has occurred. Report these occurrences to your supplier or Aquilar Ltd and we will advise on corrective measures.

10. Connecting To Control Panels

The connection diagram for connecting to an AT-G-DETECT is shown in diagram 3. If connecting to an AT-G-MON-C please refer to the AT-G-MON manual.

AT-GU to AT-G-DETECT Controller Wiring Diagram



Only use 3 wires to connect the controller to the AT-GU. If there is a 4th wire then use this to double up on the 0V connection between the controller and the AT-GU. The 0V for the supply voltage and the 0V for the 4-20mA output are common. The wiring is the same for both the Electrochemical and the Semiconductor. The controller wiring is the same for all controllers.

Diagram 3

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