

MURCO GAS LEAK MONITORS AND ALARMS

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THESE INSTALLATION AND USER INSTRUCTIONS MUST BE ADHERED TO
OR THE CORRECT OPERATION OF THIS PRODUCT MAY BE IMPAIRED
RESULTING IN DANGER FROM UNOBSERVED GAS LEAKS.

INSTALLATION INSTRUCTIONS

(Technician Use Only)

The main alarm unit and its sensor(s) should be positioned carefully to avoid mechanical damage (from moving machinery, doors, etc.) or thermal extremes (close to heaters) and should not be placed unprotected in direct strong drafts / airflows and areas where water or moisture is present.

Avoid routing sensor cabling outside of premises or between buildings via overhead cables. Also, sensor wiring should be kept a minimum of 500mm from mains and telephone cables. (See section 6 - "Location of Sensors")

The unit must be installed in accordance with these instructions to avoid any impairment of the equipment's protection or performance.

When power to the unit is switched on, there is a 3 minute delay before the system activates. This allows the sensors to warm up to the correct temperature for gas detection. On a two level unit, the green light on the alarm panel comes on after the delay, indicating that the system is ready. On a one level system the green light comes on immediately. When a unit has been off or stored for a long time the normalising period will be longer than 3 minutes. After the 3 minutes has expired alarms may activate. You may deactivate the siren until normalisation is complete. (Key switch on 2 level units, remove link on jumper JP1 in the case of a 1 level unit)

1. Remove the front cover. Mount the control unit in a convenient position (observing the above note).

2. Wiring Remote Sensors:

Connect sensor cable lead (standard 4 wire alarm cable as specified below) to sensor terminal block CN1 on control unit positions 1,2,3 & 4. Route cable through the gland to remote sensor No.1.

Standard Sensors:

Remove lid of sensor 1 and connect the other end of the sensor cable to the terminal block CN1 positions 1,2,3 & 4. Mount sensor box. Replace lid. Repeat above sequence for sensors 2 to 6 depending on supplied system configuration.

(Please ensure that connections 1 to 4 on the sensor connect to their corresponding numbers on the terminal block in the main alarm unit, otherwise the system will not function correctly.)

Maximum Sensor Wiring Length: 230V Systems
1, 2 Sensor Standard Units: 40 Meters 7/0.2mm Alarm Cable (Max. 3.52 Ohms / Core)
4, 6 Sensor Standard Units: 100 Meters 7/0.2mm Alarm Cable (Max. 8.8 Ohms / Core)
Exe Rated units: 20 Meters 7/0.02mm Alarm Cable (Max. 1.76 Ohms / Core)

Maximum Sensor Wiring Length: 120V Systems
1, 2 Sensor Units: 60.9Meters (200 feet) 22 gauge, stranded 4 wire Alarm Cable (Max 3.52 Ohms/Wire)
4, 6 Sensor Units: 152.25 Meters (500 feet) 22 gauge, stranded 4 wire Alarm Cable (Max 8.8 Ohms/Wire)
Exe Rated Units: 32.2 Meters (104 feet) 22 gauge, stranded 4 wire Alarm Cable (Max 1.76 Ohms/Wire)

3. External Sounder and uncommitted 12 Volt DC output.

(Applies to 4, 6 Sensor systems only)

12 volt DC Sounder - connect positive lead to CN9 / CN11 (1L / 2L models) terminal marked +12V, negative to centre terminal marked 'BUZZ'.

For uncommitted 12 V DC @100mA output connect to CN9 / CN11 terminals, '+12V' and '0V' This output may be wired via the volt free relays to obtain a switching 12 volt DC output to drive an external relay or solenoid as follows:

Connect terminal '+12V' on CN9 / CN11 to the 'COM' terminal of the volt free relay, and output from the 0V terminal of CN9 / CN11 and either the N/O or N/C terminals of the volt free relay, depending on whether a 12 volt output is required during an alarm condition or while the system is on standby.

4. Voltage Free Relays.

10A @120 / 230 VAC

Dual Level Unit: Single Level Unit:
1, 2 Sensor Systems: CN5: Low Level Alarm CN4
CN4: High Level Alarm
4, 6 Sensor Systems: CN10: Low Level Alarm CN10
CN9: High Level Alarm
CN12: Fault Reporting Relays

Notes: N/O and N/C refer to contact status in standby mode. On a two level system a high level alarm condition on any sensor will override a low level alarm condition on another sensor.

On 4, 6 Sensor two level units the high level relays may be set for normal or Fail-Safe operation by setting jumper JP1 on the control unit printed circuit board. (Refer to Installation diagram)

Connect leads to terminal block for Common (COM) and N/O and / or N/C connections.

5. Mains Connection

Connect mains supply (using 3-core 0.75 mm, Mains Flex for 230V systems or 3 wire, 18 gauge 0.823mm sq mains flex for 120V Systems) to terminal block CN3 (on 1, 2 sensor systems), or fused terminal block mounted on base of control unit (4, 6 sensor systems), Connections L, N and E. Ensure that earth connections to the lid and base of the enclosure are maintained.

NOTE: Connection to mains supply must be via an approved and readily accessible, switched and fused (2 or 5 Amp Fuse) plug and socket, or as per local wiring regulations, which should be within 3 meters (10 feet) of the control unit.

The mains cable used should be of an approved type HAR or Cenelec approved (UL in USA) or locally approved equivalent.

If replacement of the mains fuse is required use only the appropriate type from the table below:

Control Unit Type: 230 V Systems Fuse Rating:
1, 2 Sensor unit 20mm T50mA 230 V Fuse
4, 6 Sensor unit 20mm T160mA 230 V Fuse

Control Unit Type: 120 V Systems Fuse Rating:
1, 2 Sensor unit 20mm T100mA 120 V Fuse
4, 6 Sensor unit 20mm T315mA 120 V Fuse

The blanking plugs for cable entries should be used to blank any entries not fitted with cable glands.

Ensure that the live and neutral conductors take the strain before the earth conductor.

LOCATION OF SENSORS

Sensors cable length must not exceed recommendations for the type of monitor if the unit is to operate correctly.

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

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 gas given off by the process (bananas - ethylene, apples - carbon dioxide)
- Heavy localised exhaust fumes (carbon monoxide, dioxide, hydrocarbons) 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.

It is sometimes difficult to determine the number and location of sensors, as there is no absolute rule. However, there are a number of simple guidelines which help to make the decision easier. Most standards normally recommend some degree of 'overkill' to ensure adequate protection.

The two methods of locating sensors are "Point" Detection, where sensors are located near the most likely sources of leakage, and "Perimeter" Detection, where sensors completely surround the hazardous area. The size and nature of the site will help to decide which of these methods is the most appropriate to use, but the factors to bear in mind are :-

Any sensor which is to be used for detecting a gas with vapour density greater than 1 (i.e. heavier than air) should be located near ground level. Some examples of such gases would be butane, LPG (Calor gas) and xylene.

Conversely, for any lighter than air gases, such as hydrogen, methane, ammonia etc., the sensor needs to be located higher up, perhaps in the roof space or on the ceiling for a location indoors. (NB At very low temperatures, such as in a refrigerated cold store, ammonia gas becomes heavier than air).

For equal density gas mount the sensor at face level.

In high temperature rooms hot air gets trapped under the ceiling and may act as a buffer keeping gases away from the ceiling mounted sensors. In this case mount on the walls below ceiling height.

In the open, environmental conditions take on more importance. Sensors need to be located downstream of the prevailing winds and weather shields fitted to protect against rain and snow. Tropical rain can splash more than 30cms off the ground so sensors for heavy gases like LPG should be raised accordingly. Take into account the wind effects of buildings, tanks and other obstructions and remember that gas can collect in roof voids, pits and trenches.

Locations requiring the most protection in an industrial plant would be around gas boilers, compressors, pressurized storage tanks, cylinders or pipelines, vent pipes and pressure relief valves. Most vulnerable are valves, gauges, flanges, T-joints, filling or draining connections etc. 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.

We can supply sensors in a special housing for use in vent pipes or air ducts or where pressure or moisture may be a problem. (Refer to vent pipe sensor housing or sensor protective housing data sheet)

For refrigerants the UK standard BS4434 : 1995 contains the underlisted helpful guidelines:

Area of coverage A detector can normally cover an area of about 36m² provided it is mounted near ceiling level or near floor level depending on the refrigerant density.

Machinery rooms It is recommended that detectors are sited above or to both sides of compressors or other non-static parts of the system or down wind of such equipment in the direction of continuously operating ventilation extractors. Where there are deep beams and lighter than air refrigerants it is recommended that the detectors are mounted between pairs of beams and also on the underside of the beams.

Perhaps the most important point of all is not to try to economise by using the minimum number of sensors possible. A few extra sensors could make all the difference if a gas leak occurs !

CALIBRATION

All units purchased with the correct sensors are fully set up during manufacture and do not require re-calibration. However, when local regulations require calibration on site a replacement calibrated sensor or a calibration kit can be supplied. (Contact our technical department for detailed calibration instructions)

COMMISSIONING

When the sensors and controller have been installed, switch on mains power. There is a power up delay of approximately three minutes while the sensors stabilise. After this period, the green power-on LED will light. The unit is now ready to detect gas leaks.

When power to the unit is switched on, there is a 3 minute delay before the system activates. This allows the sensors to warm up to the correct temperature for gas detection. On a two level unit, the green light on the alarm panel comes on after the delay, indicating that the system is ready. On a one level system the green light comes on immediately. When a unit has been off or stored for a long time the normalising period will be longer than 3 minutes. After the 3 minutes has expired alarms may activate. You may deactivate the siren until normalisation is complete. (Key switch on 2 level units, remove link on jumper JP1 in the case of a 1 level unit)

You may check the operation of each sensor by introducing a small amount of the relevant gas to it. The appropriate LED will light and alarm or sounder will activate. This condition will continue until all traces of the gas have disappeared, when the unit will automatically return to standby condition with only the green power LED showing and will again be ready to detect the presence of the gas.

No user intervention is required on a unit with automatic reset. If an alarm condition occurs clearing the gas from around the sensors will reset the unit.

In the case of a unit with manual reset, the unit will have to be reset by pressing the "Reset" button (gas must first be cleared from around the sensors, then after about 30 seconds the alarm can be reset manually).

USER INSTRUCTIONS

The Murco Gas Monitor when installed in accordance with the installation instructions is ready to monitor the chosen air space and detect gas leaks at the pre-set level.

IMPORTANT: The monitor must be installed in accordance with the equipment instructions to ensure that the unit functions correctly.

When power to the unit is switched on, there is a 3 minute delay before the system activates. This allows the sensors to warm up to the correct temperature for gas detection. On a two level unit, the green light on the alarm panel comes on after the delay, indicating that the system is ready. On a one level system the green light comes on immediately. When a unit has been off or stored for a long time the normalising period may be longer than 3 minutes. After the 3 minutes has expired alarms may activate. You should deactivate the siren until normalisation is complete. (Key switch on 2 level units, remove link on jumper JP1 in the case of a 1 level unit)

Each of the sensors also has a green light to indicate that power is present.

To minimise false alarms, the system has a built in delay between the arrival of gas at the sensor unit and an alarm occurring. For one level units this delay is approximately 3 minutes. For two level units, this delay is 10-15 seconds before a low level alarm, and 25-30 seconds on a high level alarm. This delay can be deactivated in a single level controller by moving the link at position JP1 to the off position. (See technical installation drawing).

SYSTEM CHECKING

It is advisable to check operation of the Alarm regularly by exposing the sensor(s) to a test concentration of the appropriate gas.

RE-CALIBRATION

The system is long term stable and routine re-calibration is not necessary unless required by local regulation. (For procedure contact our technical department)

UNIT OPERATION

Idle: Only the green light on the panel is on. No gas is present.

If the green light is off, power to the unit has been interrupted. Refer to the fault finding guide.

ALARM CONDITION

One level system:

One or more red lights on the panel turn on. The siren and the volt free relays operate. This indicates gas at one or more sensors at a level higher than the preset alarm point.

Two level system:

Low Alarm: One or more Yellow lights on the panel turn on. The sounder operates intermittently, and the low alarm volt free relay operates. This indicates presence of a low level of gas on one or more sensors.

High Alarm: One or more Red Lights on the panel turn on. The sounder operates continuously, and the High alarm volt free relay operates. This indicates presence of a High level of gas on one or more of the sensors.

For the purpose of system maintenance, the siren may be disabled temporarily, on two level units, by turning off the key switch on the unit. On one level units move the jumper on the control unit printed circuit board. The location of this is shown on the Installation Drawing (Separate drawing for 1, 2 and 4, 6 Sensor units) position JP1. Remove the link to disable the alarm.

RESETTING AN ALARM CONDITION

On one level units all of which have automatic reset no user intervention is required. The unit will reset shortly after the gas dissipates. (All one level systems reset automatically)

On two level units, low level alarm conditions will reset automatically when the gas dissipates. High level alarm conditions require a manual reset (by pressing the reset button). Please note that a high alarm condition can only be reset 30-60 seconds after the gas clears from around the sensors.

FAULT FINDING GUIDE

(Technician Use Only)

Alarm Panel:

Symptom: No lights displayed on panel.

Cause:

1. Power failure (check supply).
2. Tripped circuit breaker or blown fuse on electrical supply.
3. Blown fuse at the electrical supply on the controller PCB board.
4. Two level controller only: Has unit warmed up? (This takes 3-4 minutes after power is switched on.)

Symptom: Red Light is on, but no alarm condition is active: i.e. no siren and no relay operation after 3 minutes.

Cause:

1. Make sure the siren has not been deactivated (key switch on 2 level controllers, link on jumper JP1 on 1 level controllers removed)
2. This indicates a wiring or sensor fault (Call service provider). If these are in order the calibration pot may have been adjusted and may need to be reset. Check with us for instructions.\

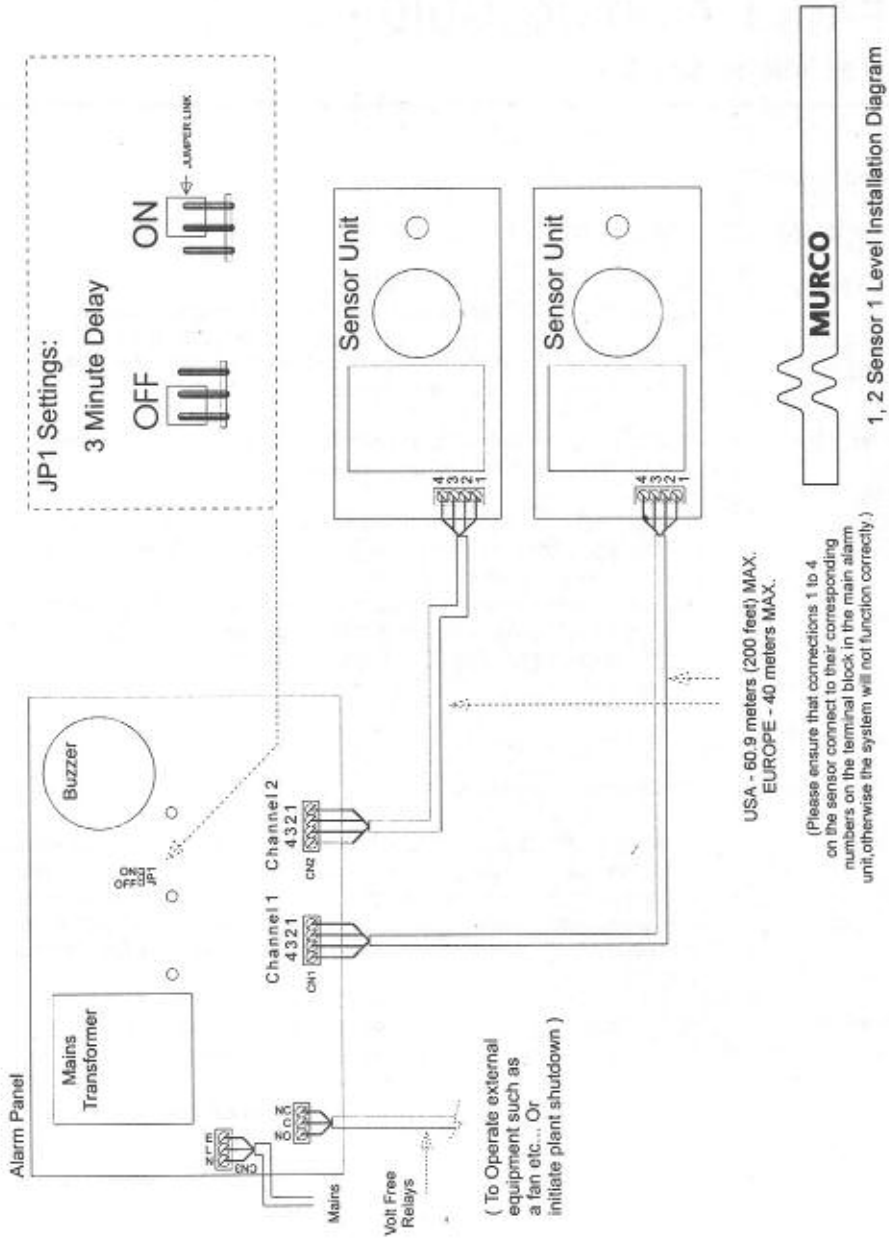
Sensor:

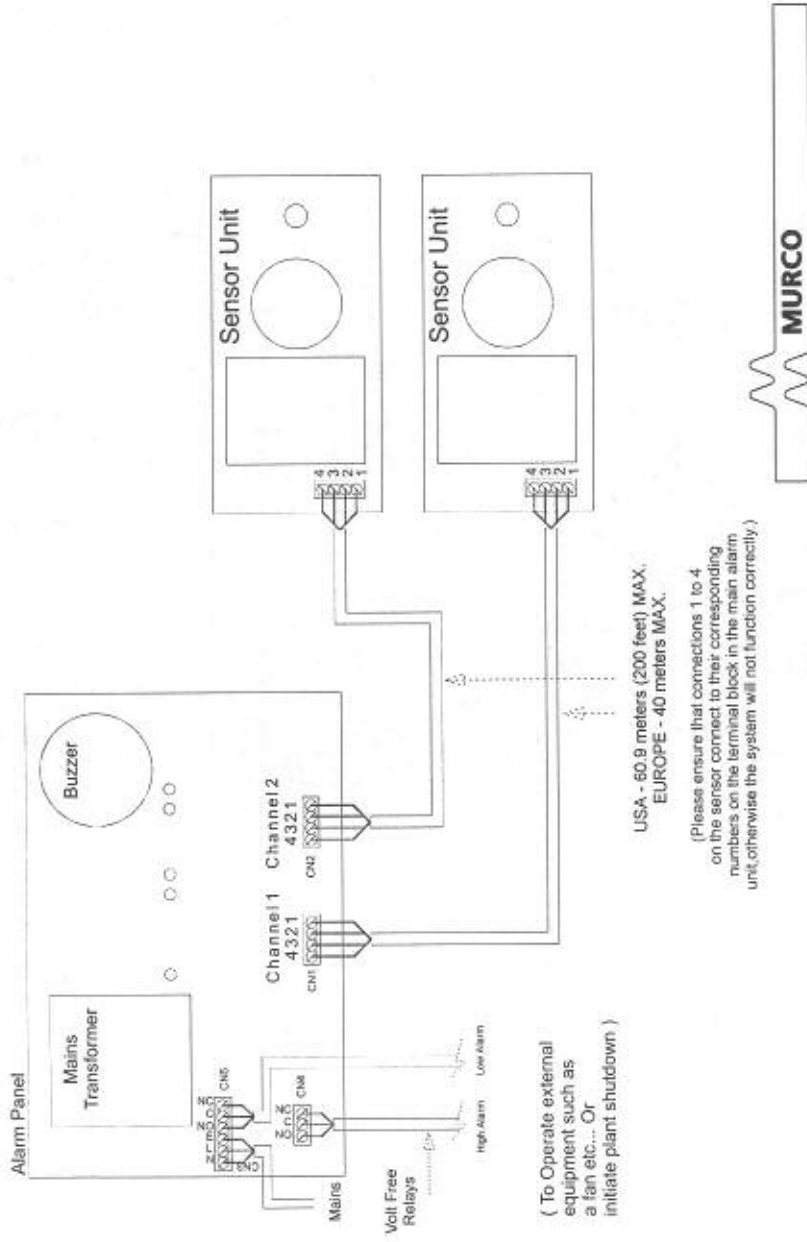
Symptom: Green light on sensor is off.

Cause: This may indicate a wiring fault between the controller and sensor or a sensor fault. Check power supply to the controller. Check connections between the controller and the sensor to ensure that the wires from positions 1 to 4 on the sensor connect to the corresponding 1 to 4 on the the controller. (See "Wiring Remote Sensors).

On a 4 & 6 sensor unit check that the sensor fuse on the particular sensor connection position in the controller is not blown.

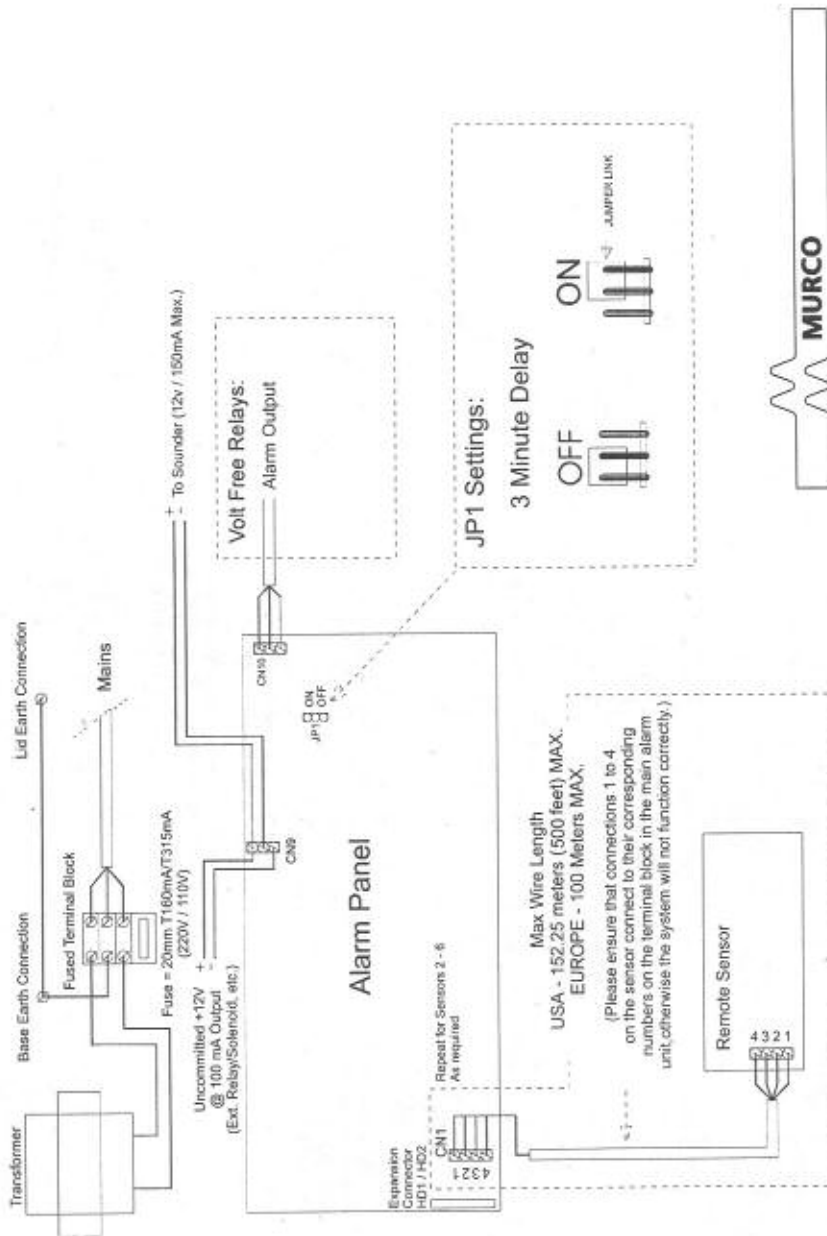
If the fault is not cleared then the sensor has been damaged.



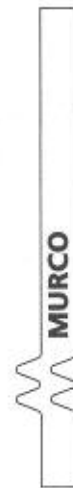
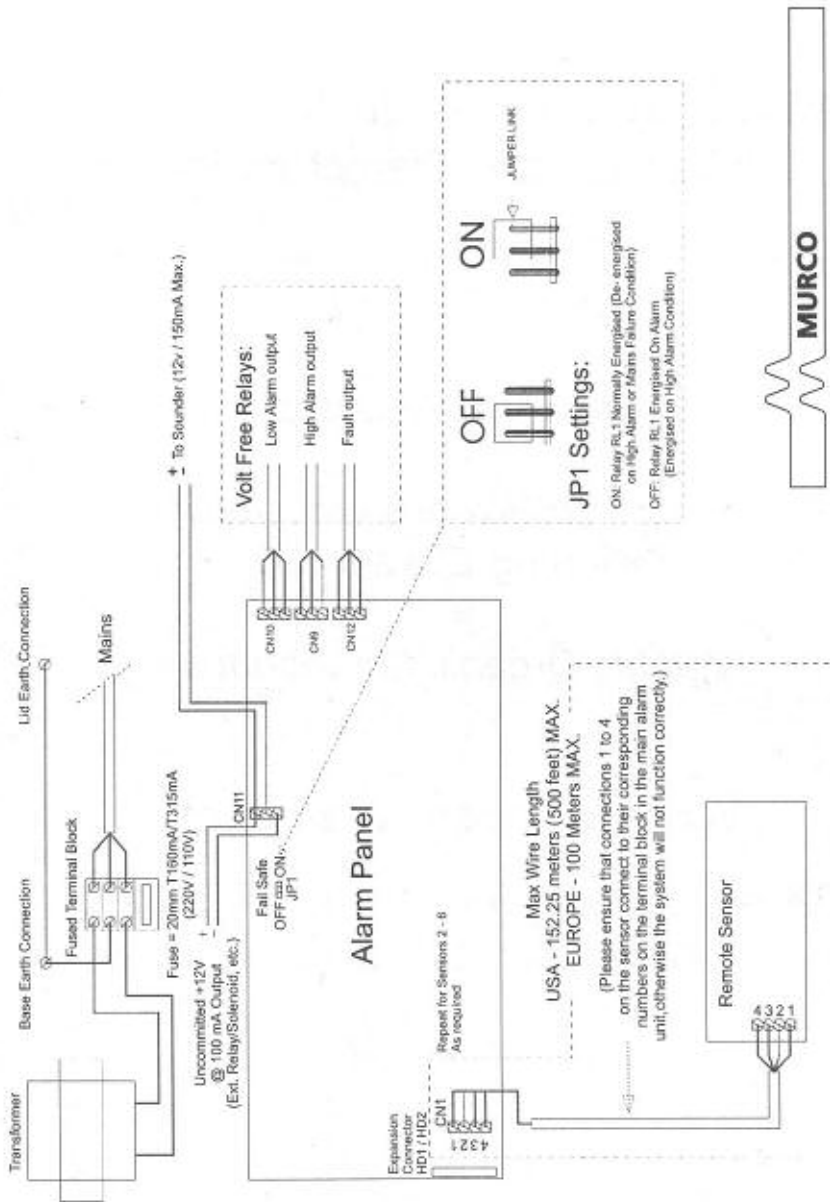


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1, 2 Sensor 2 Level Installation Diagram



4, 6 Sensor 1 Level Installation Diagram



4, 6 Sensor 2 Level Installation Diagram