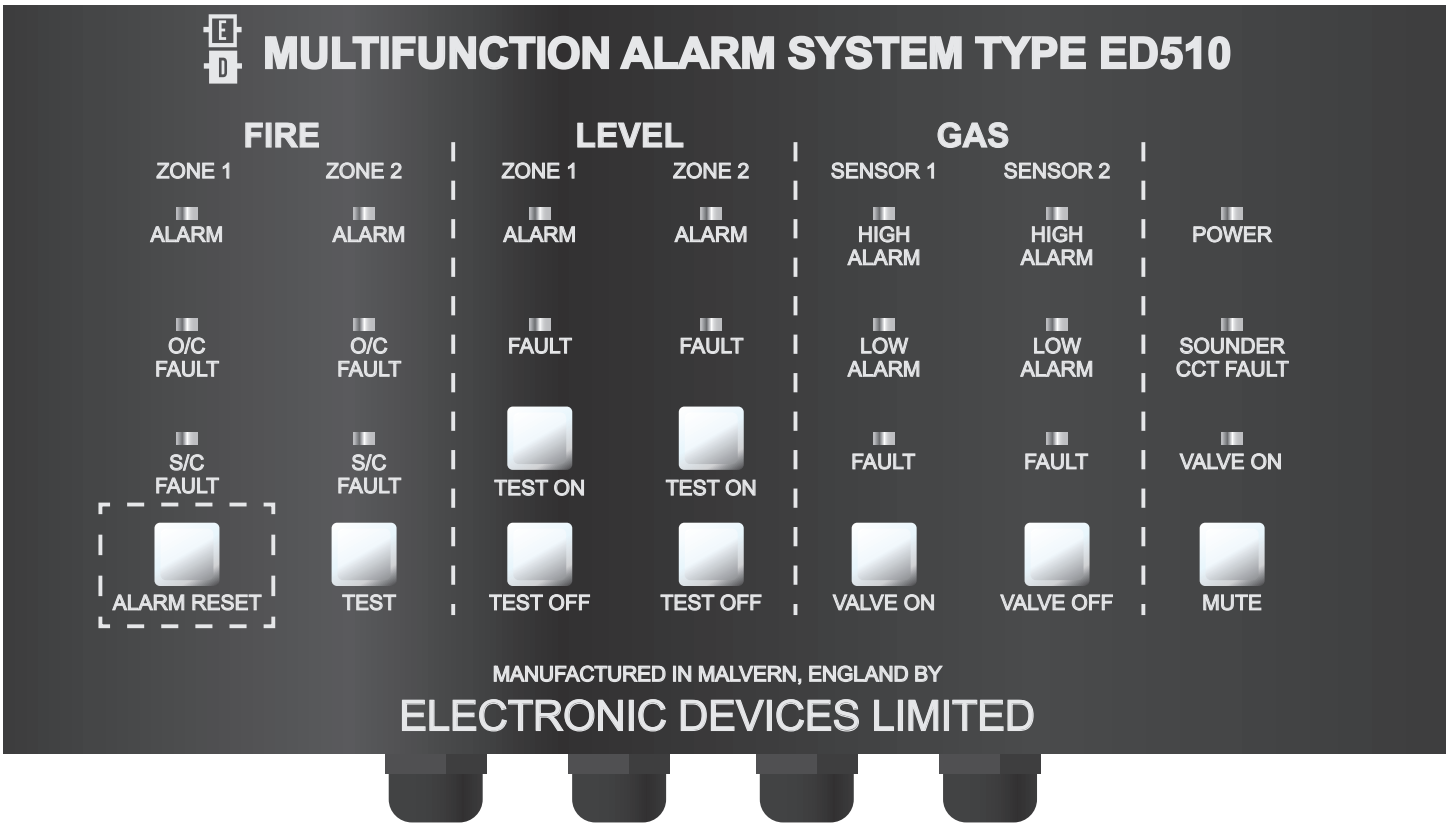
ELECTRONIC DEVICES LTD



ED510

MULTIFUNCTIONAL ALARM SYSTEM

INSTRUCTION MANUAL

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IMPORTANT: THE EQUIPMENT MUST NOT BE MODIFIED IN ANY WAY AND MUST BE INSTALLED AND SERVICED BY COMPETENT PERSONNEL ONLY. IF IN DOUBT CONSULT ELECTRONIC DEVICES LTD (01684) 891500

GENERAL

The ED510 is a fixed installation fire, gas and level detection system operating from a nominal 12 or 24VDC supply depending upon model.

FEATURES

- Two fire detection zones fault monitored
- Two water level detection zones fault monitored
- Two gas detection sensor inputs fault monitored
- Two bilge pump outputs with manual override
- Automatic gas solenoid valve shut off
- Semiconductor,Catalytic or Electrochemical gas sensors may be fitted.
- Sounder / beacon output fault monitored
- Integral alarm / fault buzzer
- Alarm relay output
- Splash proof front panel

USER OPERATION

FIRE DETECTION OPERATION

In the event of a fire being detected the appropriate zone alarm LED will illuminate and the internal buzzer will operate. If external sounders and or beacons are fitted they too will operate. If connected, the gas solenoid valve will close.

Pressing the **MUTE** button will turn off the sounders and beacons, including the internal buzzer. However the zone light will remain on until the smoke, heat etc. has cleared and the **RESET** button is pressed. If the **RESET** button is pressed whilst a detector is still in the presence of sufficient smoke, heat etc. the zone will re-trigger and the sounders and beacons will re-activate. Also if the other fire zone or a gas or bilge alarm occurs the sounders and beacons will re-alarm.

If it is needed to re-trigger the sounders for evacuation, first press **RESET** then press the **TEST** button. The **TEST** button will put fire zone 1 in to alarm and hence operate the sounders.

Once all conditions have been cleared and **RESET** the gas solenoid valve can be operated by pressing the **VALVE ON** button. It is important to check all pilot lights on the gas appliance and ensure they are ignited where necessary. The ED510 has a general alarm output relay which can be used for various purposes including the shutdown of air conditioning, HVAC etc.. Any items connected to these contacts should be checked for correct operation.

WATER LEVEL OPERATION

In the event of bilge water being detected the appropriate level zone alarm LED will illuminate and the internal buzzer will operate. If external sounders and or beacons are fitted they too will operate. If bilge pumps are connected they will be activated to pump out any water.

Pressing the **MUTE** button will turn off the sounders and beacons, including the internal buzzer. However the zone light will remain on until the float switch has deactivated and the **RESET** button is pressed. Also if the other fire zone or a gas or bilge alarm occurs the sounders and beacons will re-alarm.

If you need to manually activate the bilge pumps this can be achieved by pressing the appropriate level zone **TEST** button. To manually turn off pumps press the **TEST OFF** button. There is an **ON DELAY** which determines time to activate the pumps and also **RUN ON** time which determines how longs after the pump should run which is set using the potentiometers on the underside of the top PCB board. (See page 10 for adjustment settings)

GAS DETECTION OPERATION

In the event of a gas being detected the appropriate zone alarm LED will illuminate and the internal buzzer will operate. If external sounders and or beacons are fitted they too will operate. If connected, the gas solenoid valve will close.

Pressing the **MUTE** button will turn off the sounders and beacons, including the internal buzzer. However the zone light will remain on until the gas sensor has cleared and the **RESET** button is pressed. Also if the other fire zone or a gas or bilge alarm occurs the sounders and beacons will re-alarm.

Once all conditions have been cleared and **RESET** the gas solenoid valve can be operated by pressing the **VALVE ON** button. It is important to check all pilot lights on the gas appliance and ensure they are ignited where necessary. The ED510 has a general alarm output relay which can be used for various purposes including the shutdown of air conditioning, HVAC etc.. Any items connected to these contacts should be checked for correct operation.

FAULT CONDITION

In the event of faulty wiring of peripherals the appropriate zone fault LED will illuminate. Action will need to be taken to find the cause of any fault condition and ensure continued functionality of the ED510.

INSTALLATION

CONTROL PANEL

The unit should be mounted in a convenient position for the operator away from possible mechanical damage. Remove the enclosure and use it to mark out the mounting holes and cut out on to the bulkhead. Mount the control panel on to the bulkhead temporarily using the M3 nuts and bolts provided. Once the electrical installation is completed, remove the nuts and screw the M3 bolts directly in to the captive nuts mounted on the enclosure. The control unit has a 3.15A fuse fitted as standard. The current, drawn from the vessels power supply, will depend upon peripheral items connected. The control unit and sensors typically draw no more than 400mA in worst case. When including gas valves, sounders, beacons etc. the overall current consumption will increase and therefore power supply cables, circuit breakers and fuses should be rated accordingly.

With integral batteries and charger the mains driven TYPE 3 power supply provides a battery backed 24VDC supply. Cable entry must be made through the cable glands supplied. The enclosure has 12 x 20mm holes and the cable glands, should be mounted in the most suitable positions. The unused holes should have the 20mm blind grommets (supplied) fitted.

FIRE DETECTION

Fire detection circuits should be wired using cable approved for fire detection installation such as FIRETUF or FP200. Note that cable screens, if used, should only be earthed at one end.

It is good practice to always make the first device on a fire detection zone a call point, enabling manual operation of the alarms when early signs of fire are spotted before any detector has operated. Additionally making a call point the first item on a zone reduces the risk of it being out of circuit due to head removal or wiring faults.

CHOOSING THE CORRECT DETECTORS

The types of detector required varies for each location. Guidance should be sought from classification societies and SOLAS regulations.

For general use, two types of smoke detector are recognised by standards as good, general-purpose fire detectors offering a high level of protection.

1. Ionisation smoke detectors have a high sensitivity to fires that produce small smoke particles ie fast-burning, flame fires that can burn for some time without generating much smoke. (NO LONGER MARINE APPROVED)

2. Optical smoke detectors are particularly well suited to detecting slowburning, smouldering fires which produce smoke with large particles. They are widely used for protection in areas such as accommodation, escape corridors and electrical rooms, as well as for general purposes.

Heat detectors offer protection in areas such as galleys and engine rooms where the environment is dirty or smoky under normal conditions or where there is a high presence of airborne particles such as water vapour or exhaust fumes. However, it must be recognised that any heat detector will respond only when a fire is well-established and generating a high heat output. Therefore, especially for vessels with large engine rooms, flame or smoke detectors should be considered.

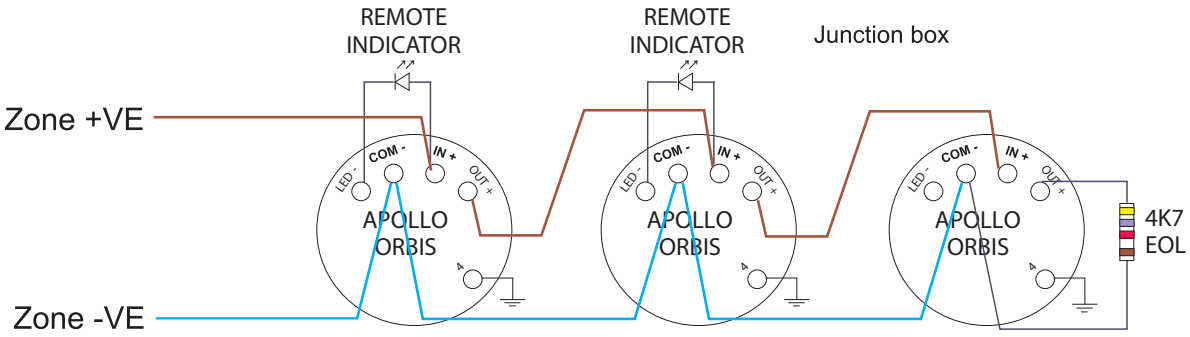
Two types of heat detectors are available:

1. Rate-of-rise heat detectors are designed to sense a rapid increase in the temperature and are useful in environments where the ambient temperature is normal, such as small occasionally used galleys, workshops and stores.

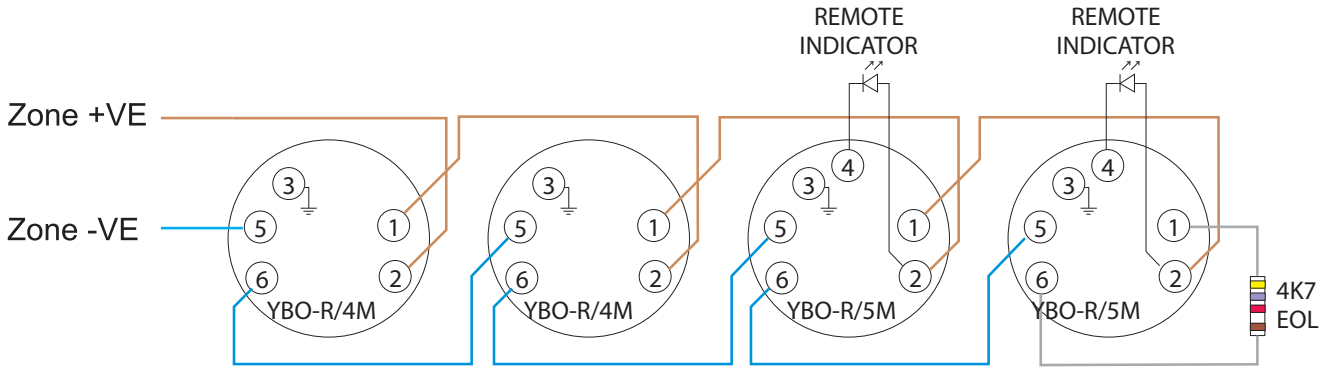
2. Fixed temperature heat detectors will signal an alarm once the temperature exceeds a pre-defined level and are effective in environments with fluctuating temperatures (such as boiler rooms) or where the ambient temperature is unusually high (for example in an engine room).

Wiring typical marine approved detection zones

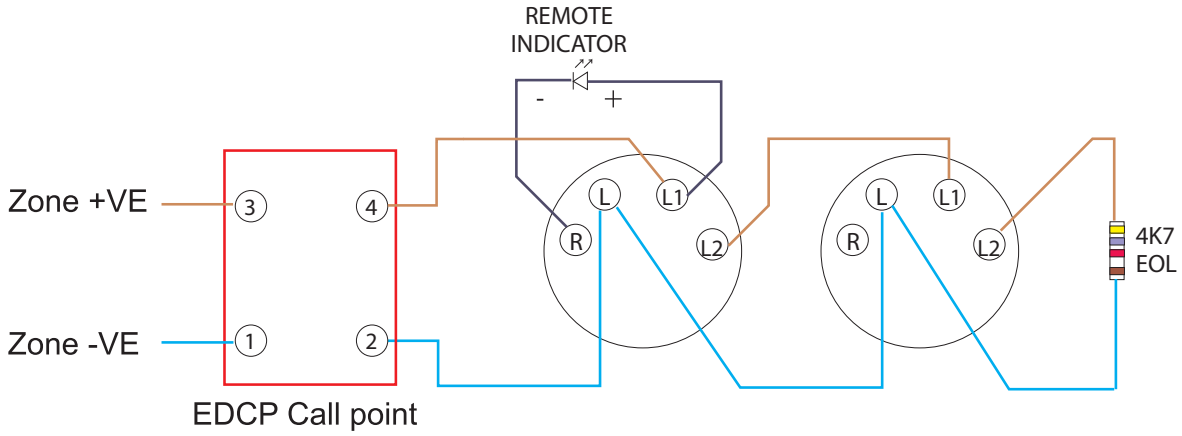
Apollo Orbis connections



Hochiki connections



Tyco 600 series connections



NOTE

1. Never use looped wire always break wire to enable fault monitoring.
2. Always fit call points at the beginning of a zone or on a separate zone.

WATER LEVEL DETECTION

The float switch should be mounted as low as possible in the bilge and requires approx. 5mm. of travel of the float to cause operate.

The ED735 float switches have 1K5 resistors in series with the switch and are potted in epoxy resin to prevent ingress of moisture etc. The switches are provided with 2m. of cable and as far as is practical this cable should run vertically upwards to a junction box (which should be waterproof) well above the possible level of bilge water. The final junction box should have a 4.7Kohm resistor fitted so that the main zone wiring can be monitored. N.B. The wires from the zone line junction box to the switch are not fault monitored and should therefore be tested at regular intervals. Sensors with E.O.L resistor fitted can be used to give fault monitoring of last sensor.

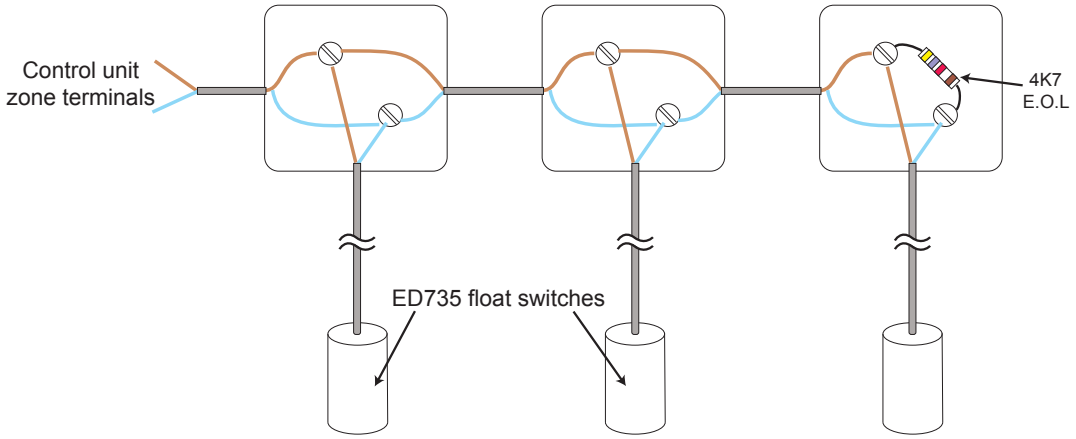
On completion of installation it is important that both short circuit and open circuit faults are simulated and correct alarm operation checked. In addition the float switches should be checked by immersing in water. Lifting the float manually does not check float buoyancy!

The magnetic circuit within the float allows either normally closed or normally open operation. The float has been set during manufacture to give a normally open condition when in the lower position. Thus when the float is raised the circuit will be made and the 1.5Kohm resistance will be connected across the zone line. If necessary for special applications the float switch may be reversed thus giving normally closed operation.

AUTOMATIC BILGE PUMPING

Each zone has voltage free 2A@ 30VDC non inductive load contacts which can be used for the automatic operation of bilge pumps. An external relay suitably rated will be required for bilge pumps taking in excess of 2A. The onboard relay can also be used to operate a Xenon Beacon mounted externally (as high as possible). Alerting other boat users etc. when the vessel is unmanned.

WIRING TYPICAL FLOAT SWITCHES



GAS DETECTION
EDP SEMICONDUCTOR GAS SENSORS

The ED510 is supplied as standard for use with the EDP Semiconductor sensor. However when used with ED Transmitter modules Electrochemical Cell and Catalytic gas sensors can be connected enabling detection of other toxic gases and flammable only detection. Attention is drawn to the need for calibration after the ED510 has been energized for 24 hours. When supplied alarm levels are approximately set for the target gas, if stated with the order, if not 25% and 50% LEL Butane is used. Therefore a measure of immediate protection is obtained once correct operation is assured.

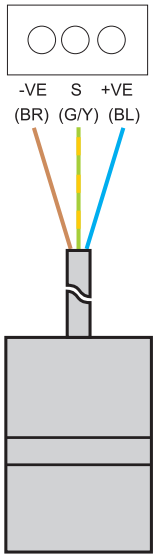
EDP Semiconductor gas sensors:

A) EDP1B is suitable for the detection of flammable gases such as Ammonia, Butane, Propane and some toxic gases, (a list is available).

B) EDP2B suitable for the detection of flammable gases such as Methane and some toxic gases, for more gases see list available.

C) EDP3B suitable for the detection of many Freons such as R22.

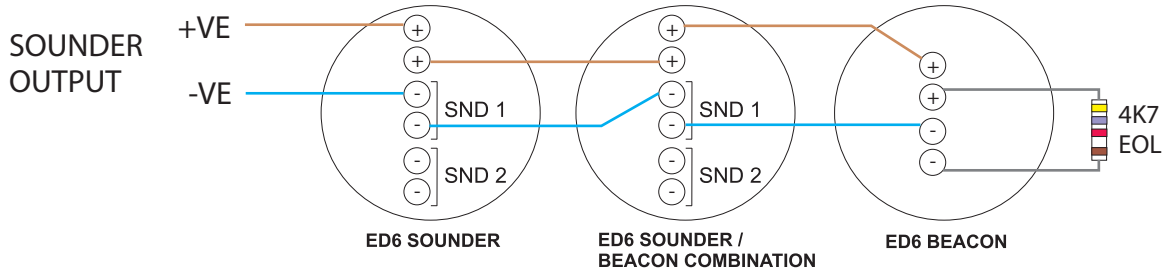
When power is first applied the green power LED should illuminate. If a semiconductor gas sensor is fitted the low alarm and high alarm LEDs will illuminate within a few seconds. Press the MUTE button to silence the sounders. The ED510 will be ready to reset in a few minutes once the gas sensors have reached their correct operating temperature and provided they are in clean air. Provided all connections are correct, the ED510 should have its power light only illuminated. Simple wiring faults can often be found by careful checking of connections. Particular attention should be given to ensuring correct polarity of gas sensors and fire detectors otherwise damage may occur.



Only fit EDP 1B,2B,or 3B type sensors

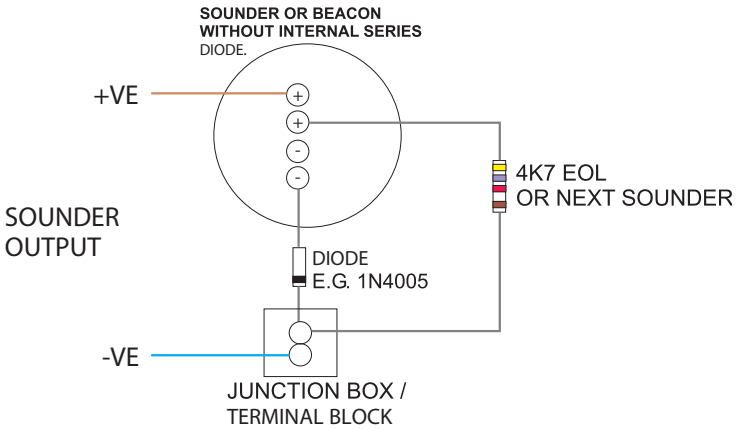
AUDIABLE AND VISUAL ALARMS

The fault monitored sounder circuit can be used to operate several sounders and beacons up to a maximum load of 1A. A 4K7 Ohm end of line resistor should be fitted across the last device to facilitate fault monitoring.



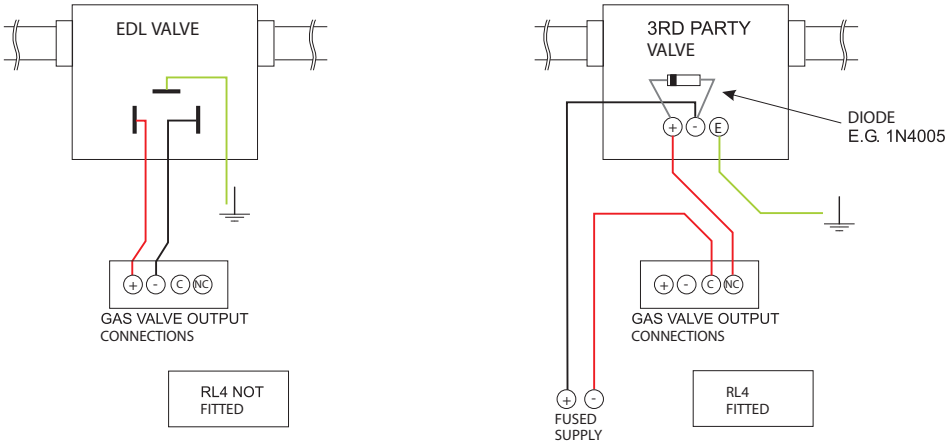
NOTE
1. Never use looped wire always break wire to enable fault monitoring.

IMPORTANT NOTE: If Sounders and Beacons not supplied by EDL are to be used, ensure they have a series polarity protection diode fitted. If not an external diode suitably rated should be used. Please contact EDLfor further information. See diagram below.



CONNECTING A SOLENOID VALVE

The ED510 can be supplied either to take advantage of the EDL low consumption valve or for connection to higher power valves. When supplied with the EDL valve the current is internally limited to 100mA for 12V and 50mA for a 24V saving battery power. Both entry and exit connections are 3/8th in BSP female and are suitable for Propane or Butane bottles at a pressure in the range of 0 - 0.01 Bar. The valve has a 6.7mm orifice. When Relay RL4 is fitted the ED510 is suitable for the connection of other solenoid valves taking a maximum current of 1A. A reverse polarity diode should be fitted to the valve to avoid damage to the ED510 and reduce electrical noise.



TEST & SETUP PROCEEDURES

FIRE EQUIPMENT

All detectors connected to the fire detection zones should be tested for correct operation after installation and then regularly as part of routine maintenance. Additionally its is important to check the correct operation of fault monitoring. An open circuit fault can easily be achieved by removal of a detector. Ensure the appropriate fault light and the internal buzzer operate.

All EDL call points come complete with a test key enabling testing without the need to break the replaceable glass inserts. Aerosols of synthetic smoke can be purchased inexpensively and provide a clean and simple way of testing both ionisation and optical smoke detectors. Professional kits are available for testing heat detectors, however a domestic hair drier can be used provided it is able to reach the necessary temperature and if a mains supply is available. For testing flame detectors an expensive infrared or ultraviolet source is required, therefore it is advisable to contact a fire detection Service engineer with the necessary equipment.

WATER LEVEL EQUIPMENT

WATER LEVEL DETECTION TEST PROCEEDURE

All ED735 level switches should be checked regularly for correct operation.

1. Remove the ED735 from its mounting clip and submerge in a bucket of water. The appropriate zone alarm light will illuminate and the internal buzzer will operate. If external sounders and or beacons are fitted they too will operate.

2. Pressing the **MUTE** button will turn off the sounders and beacons, including the internal buzzer. However the zone light will remain on until the water level has dropped and the **RESET** button pressed. Also if the other level zone or indeed a fire or gas alarm occurs the sounders and beacons will re-alarm.

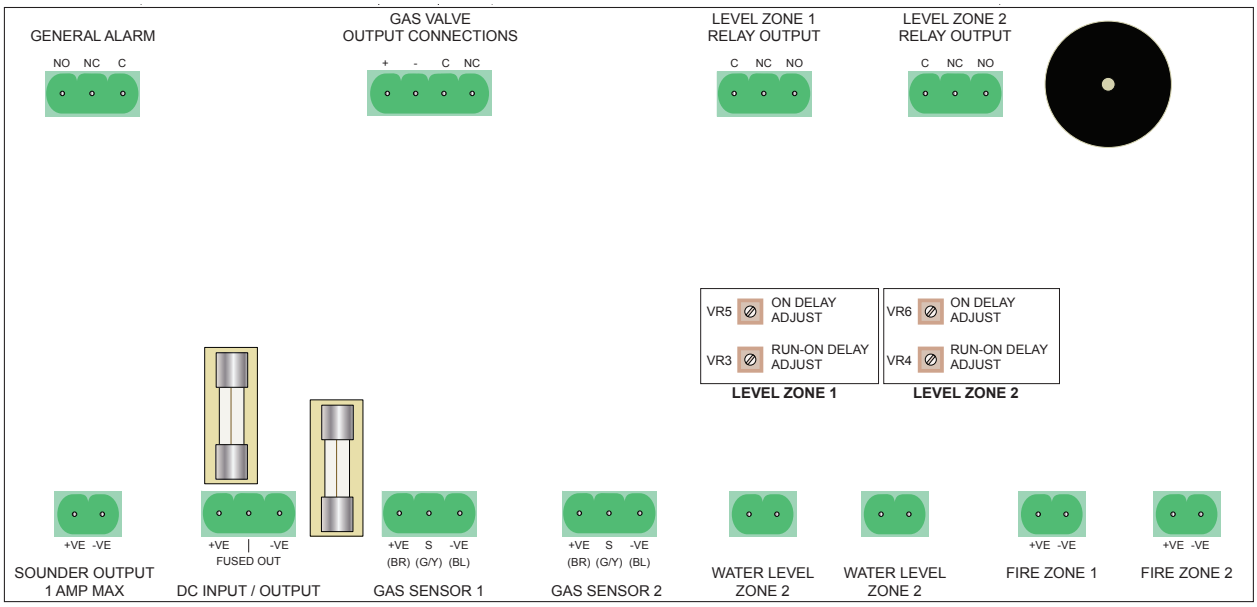
WATER LEVEL ON DELAY & RUN-ON DELAY ADJUSTMENTS

If a bilge pump is connected it will automatically operate in the event of an alarm. It is not latching and will turn off once the water level has dropped. However there is an adjustable **RUN-ON DELAY** potentiometer allowing the pump **RUN-ON DELAY** time to be increased and keep the pump in operation after the float switch is out of alarm. A clockwise turn increases the **RUN-ON DELAY** time. (See printed circuit board diagram below).

The time period between the level switch operating and the alarm being raised can be adjusted for each zone using the adjustable **ON DELAY** potentiometer. A clockwise turn increases the **ON DELAY** (See printed circuit board diagram below).

Each zone can be manually put in to alarm, and therefore operating the bilge pump by pressing the **TEST ON** button. The **TEST OFF** button can be pressed to turn off the bilge pump. The **MUTE** and **RESET** buttons must then both be pressed to return to the normal condition.

The gas solenoid valve is not turned off in the event of a water level alarm.



CALIBRATION OF THE EDP SEMICONDUCTORS AND THE ED510

Before dispatch the alarm levels are approximately set for the target gas (if stated with order) or set to 25% and 50% LEL butane so that a measure of immediate protection is obtained.

Once the sensors and control unit have been in operation for a minimum of 24 hours the gas sensors should be calibrated. Calibration should be repeated at least every twelve months with regular checks in between. Calibration must take place in clean air conditions to ensure accuracy.

EDP SEMICONDUCTOR CALIBRATION PROCEEDURE

1. Unscrew the the front panel and turn it over. The panel PCB should resemble the diagram shown below.

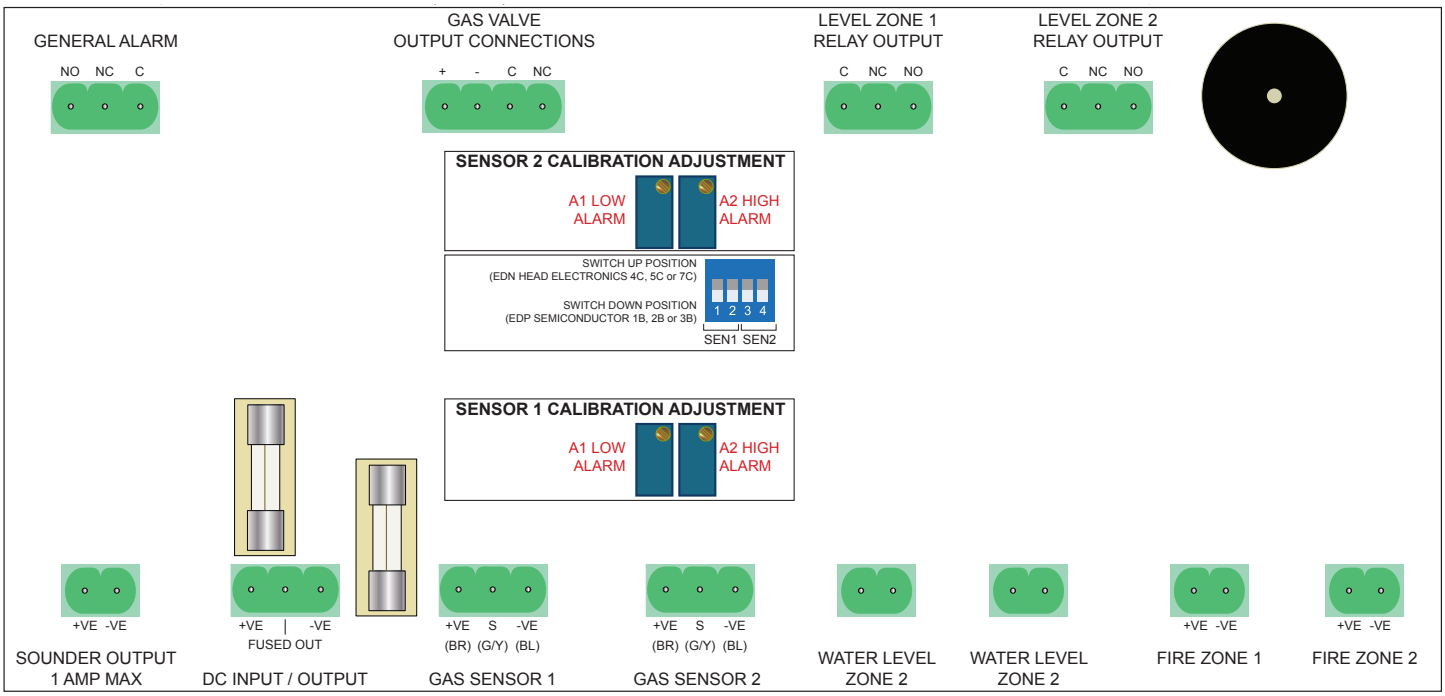
2. Select the correct set of potentiometers for the sensor you are calibrating (Shown in diagram below) the set closer to the top of PCB is for sensor 2 and set nearer bottom of PCB is for Sensor 1.

3. Using correct calibration gas (for your **A1 low level alarm**) immerse the sensor in the gas and after allowing the sensor time to settle (10-20 seconds) adjust the **A1 low alarm potentiometer** (see diagram below) until the **A1 LED** on front of panel just illuminates. If the **A1 LED** on front of ED510 is not illuminated rotate the potentiometer anti-clockwise to increase sensitivity. If the light illuminates prematurely then decrease sensitivity by rotating potentiometer clockwise while repeatedly pressing the **RESET** button on the ED510 front panel until the **A1 LED** goes out then turn slowly anti clockwise again until it just illuminates.

4. Repeat step 4 for the **A2 high alarm** calibration on the same sensor calibration with the following alterations:

i) Use the correct gas for your **A2 high alarm**
ii) Use the **A2 potentiometer** for sensor under gas concentration
iii) Use the **A2 LED** on the front of the ED510 panel to set calibration.

5. Repeat Step 2 to 4 if you have a second EDP sensor to calibrate.



CALIBRATION OF THE EDN TRANSMITTERS AND THE ED510

INITIAL SETUP

It is vitally important that the ED510 and EDN or P transmitters are calibrated together ensuring that the ED510 indicates an alarm at the correct concentration. After installation is complete the following setup procedure should be followed matching the EDN, ED510 and cable run together.

EDN CALIBRATION PROCEEDURE

1. Unscrew the the front panel and turn it over. The panel PCB should resemble the diagram shown below .

2. At EDN transmitter measure between -I/P and +I/P with a digital volt meter (See diagram above), ensure voltage reading is in the range 4.75V and 5.4V.

3. Select the correct set of potentiometers for the sensor you are calibrating (Shown in diagram above) the set closer to the top of PCB is for sensor 2 and set nearer bottom of PCB is for Sensor 1.

4. Using correct calibration gas for your **A1 low level alarm** ensure the calibration of the EDN transmitter using the EDN calibration instructions.

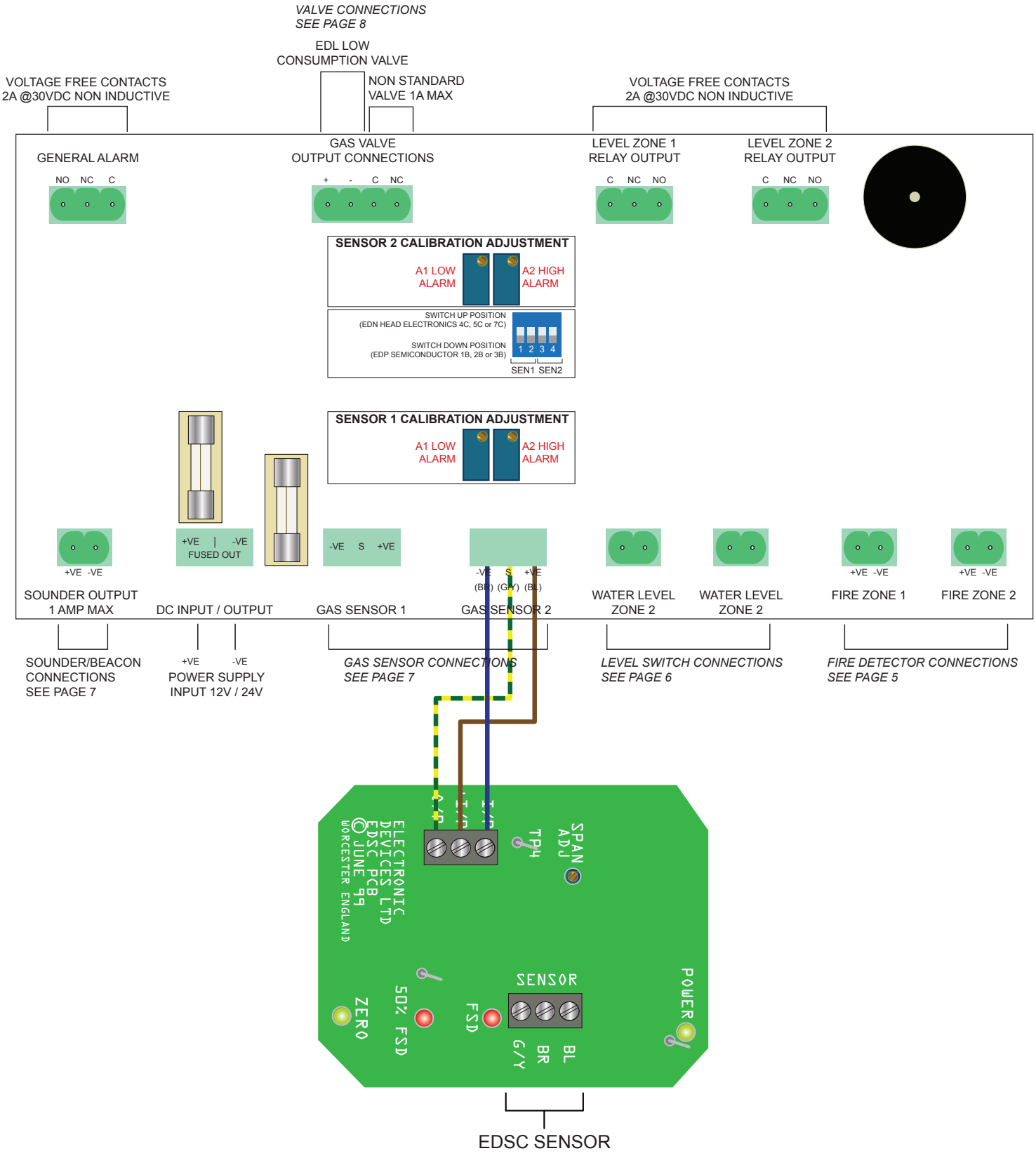
5. Whilst the EDN is giving the correct output go to the ED510 control panel and adjust the **A1 low alarm potentiometer** (see diagram below) until the **A1 LED** on front of panel just illuminates. If the **A1 LED** on front of ED510 is not illuminated rotate the potentiometer anti-clockwise to increase sensitivity. If the light illuminates prematurely then decrease sensitivity by rotating potentiometer clockwise while repeatedly pressing the **RESET** button on the ED510 front panel until the **A1 LED** goes out then turn slowly anti clockwise again until it just illuminates.

6. Repeat step 4 for the **A2 high alarm** calibration on the same sensor calibration with the following alterations:

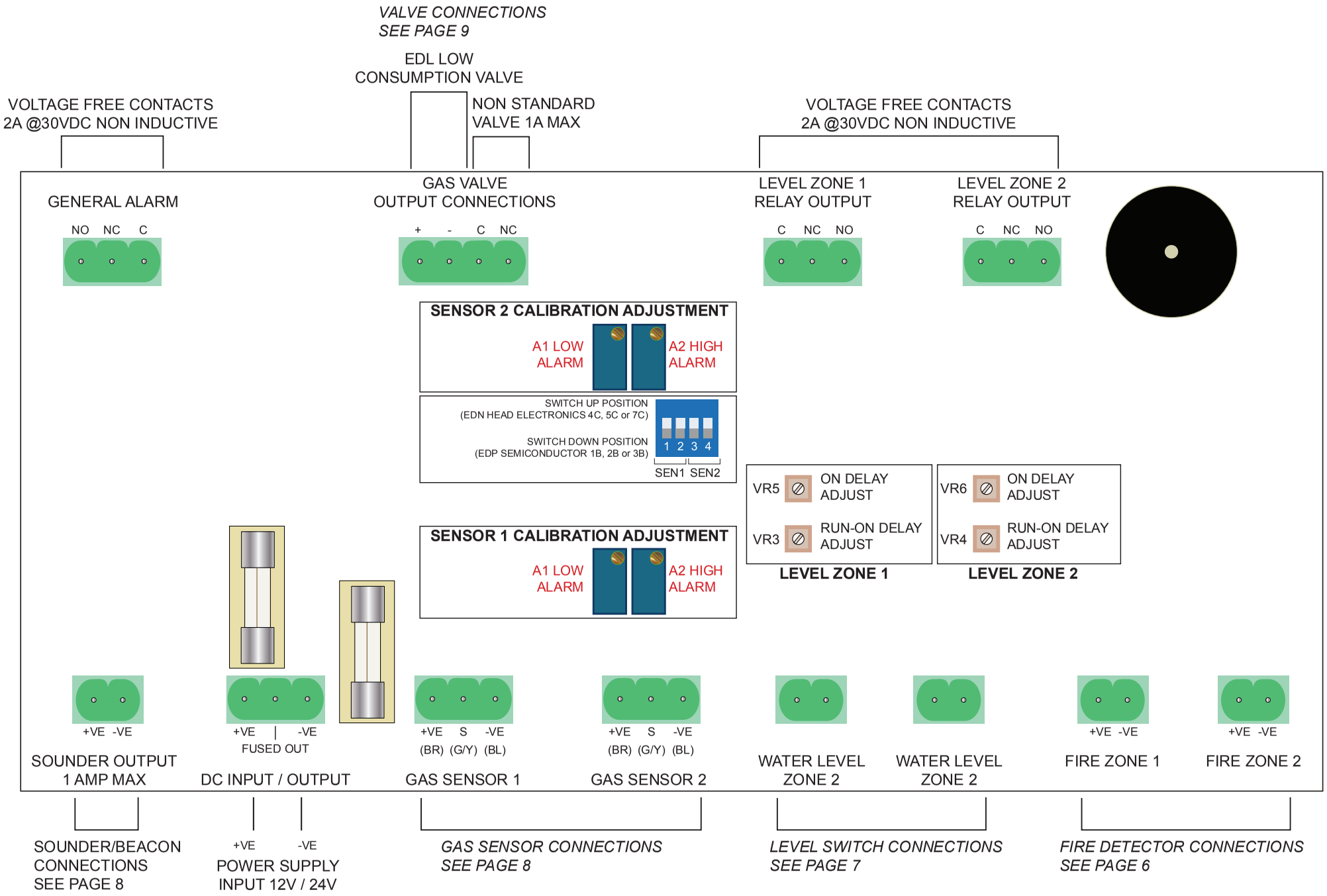
i) Use the correct gas for your **A2 high alarm**
ii) Use the **A2 potentiometer** for sensor under gas concentration
iii) Use the **A2 LED** on the front of the ED510 panel to set calibration.

7. Repeat Step 2 to 6 if you have a second EDN Head Electronics sensor to calibrate.

EDN 5 VDC CONNECTION DIAGRAM



PRINTED CIRCUIT BOARD LAYOUT



CALIBRATION OF THE EDN / IR TRANSMITTERS AND THE ED510

INITIAL SETUP

It is vitally important that the ED510 and EDN or P transmitters are calibrated together ensuring that the ED510 indicates an alarm at the correct concentration. After installation is complete the following setup procedure should be followed matching the EDN, ED510 and cable run together.

EDN / IR CALIBRATION PROCEEDURE

1. Unscrew the the front panel and turn it over. The panel PCB should resemble the diagram shown below .

2. At EDN transmitter measure between -I/P and +I/P with a digital volt meter (See diagram above), ensure voltage reading is in the range 15V and 30V.

3. Select the correct set of potentiometers for the sensor you are calibrating (Shown in diagram above) the set closer to the top of PCB is for sensor 2 and set nearer bottom of PCB is for Sensor 1.

4. Using correct calibration gas for your **A1 low level alarm** ensure the calibration of the EDN transmitter using the EDN calibration instructions.

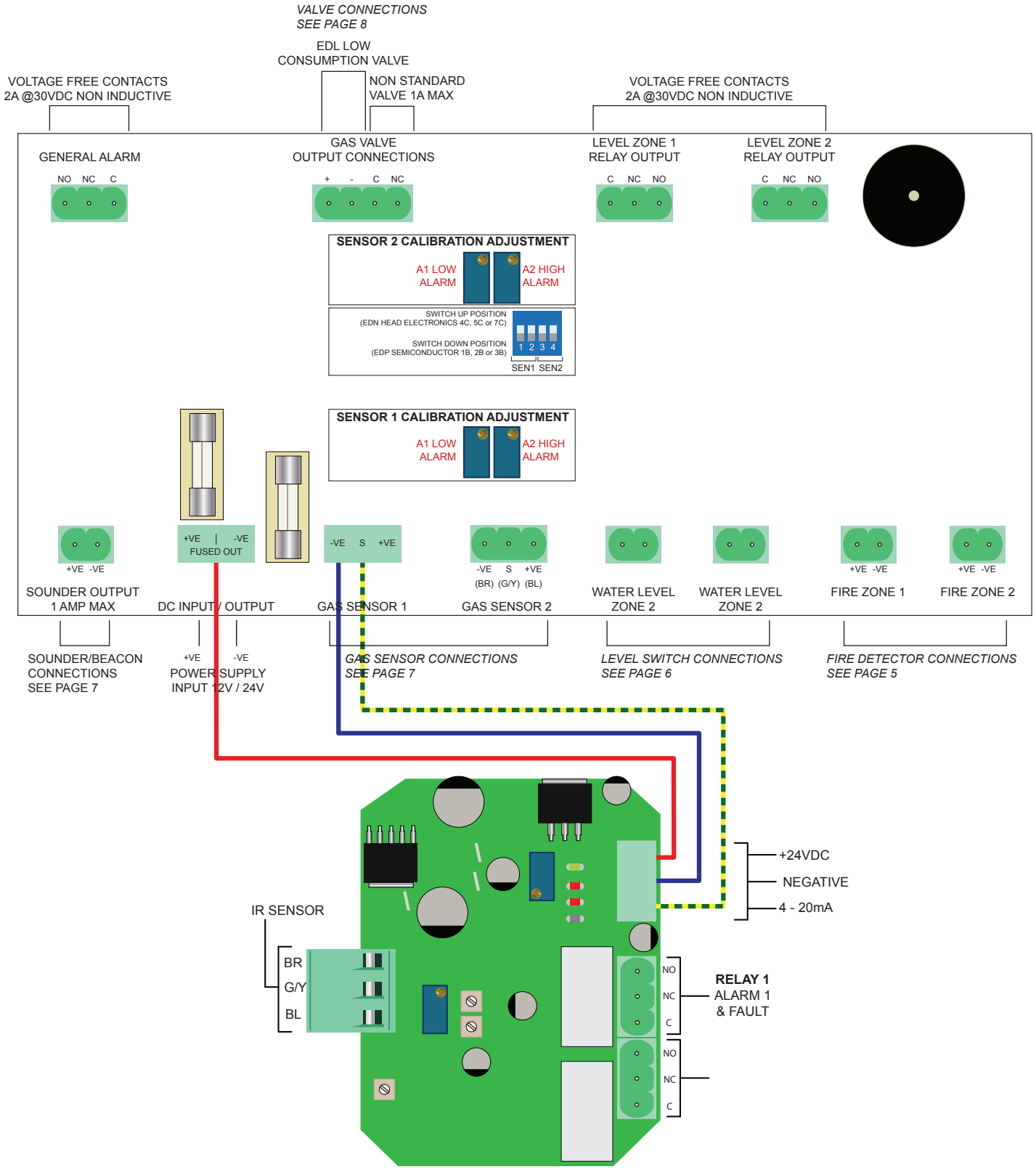
5. Whilst the EDN is giving the correct output go to the ED510 control panel and adjust the **A1 low alarm potentiometer** (see diagram below) until the **A1 LED** on front of panel just illuminates. If the **A1 LED** on front of ED510 is not illuminated rotate the potentiometer anti-clockwise to increase sensitivity. If the light illuminates prematurely then decrease sensitivity by rotating potentiometer clockwise while repeatedly pressing the **RESET** button on the ED510 front panel until the **A1 LED** goes out then turn slowly anti clockwise again until it just illuminates.

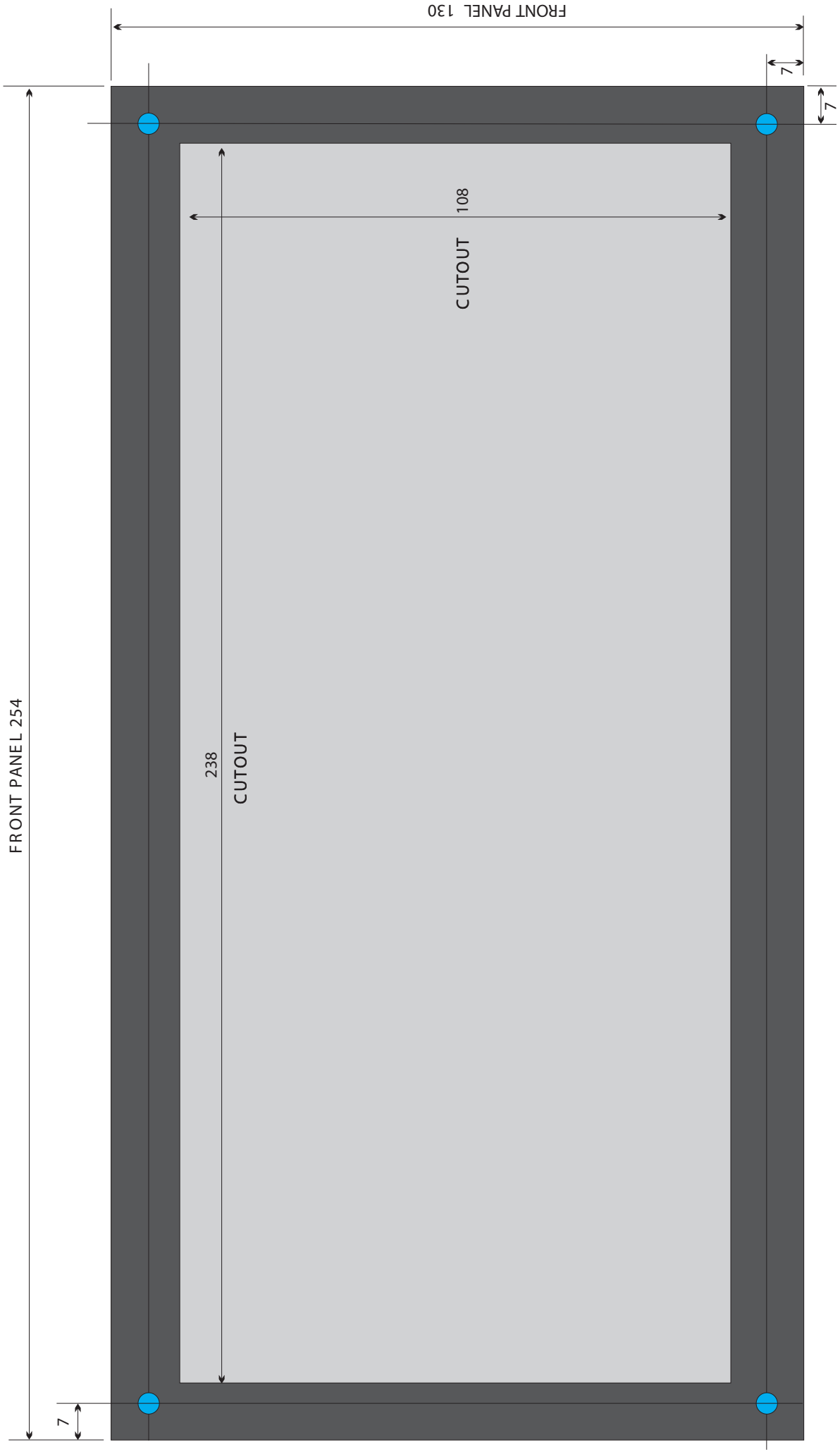
6. Repeat step 4 for the **A2 high alarm** calibration on the same sensor calibration with the following alterations:

i) Use the correct gas for your **A2 high alarm**
ii) Use the **A2 potentiometer** for sensor under gas concentration
iii) Use the **A2 LED** on the front of the ED510 panel to set calibration.

7. Repeat Step 2 to 6 if you have a second EDN Head Electronics sensor to calibrate.

EDN/IR 24 VDC CONNECTION DIAGRAM




FRONT PANEL 130
7
7
108
CUTOUT
238
CUTOUT
FRONT PANEL 254
7