ELECTRONIC DEVICES LTD

ED816

FIRE DETECTOR

INSTRUCTION MANUAL

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SPECIFICATION

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

The ED816 is a sixteen zone conventional fire detection control unit. It is capable of driving nominal 24Vdc detection heads and call points, such as the Apollo Orbis and Hochiki CDX ranges of marine approved detectors.

Power Supply Requirements

Main Power Input:	20.0 - 32.0 VDC @ 3A
Emergency Power Input:	20.0 - 32.0 VDC @ 3A

Current Consumption

Standby:	170mA
Alarm:	220mA + Output devices

Enclosure

Weight:	7.2Kg.
Dimensions:	365 x 340 x 110mm

Approvals

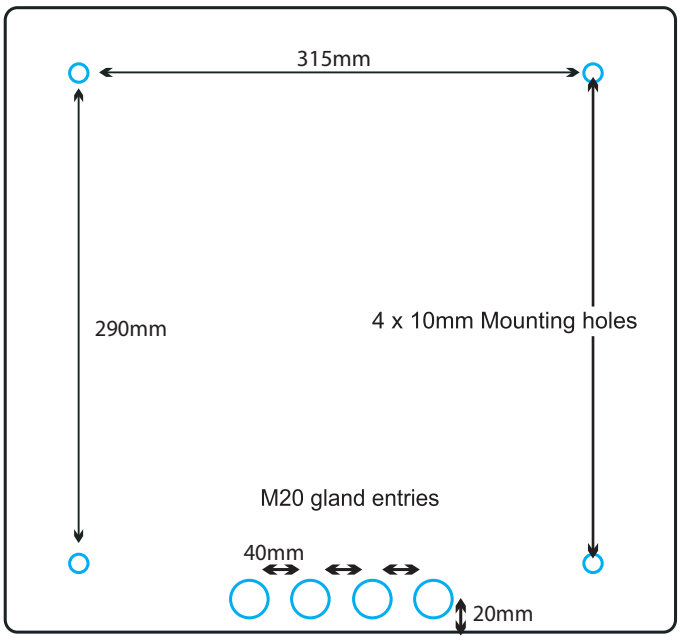
Type Approved by The American Bureau of Shipping (ABS) for Marine and Offshore applications.

Tested to BS EN 54-2:1997+A1:2006

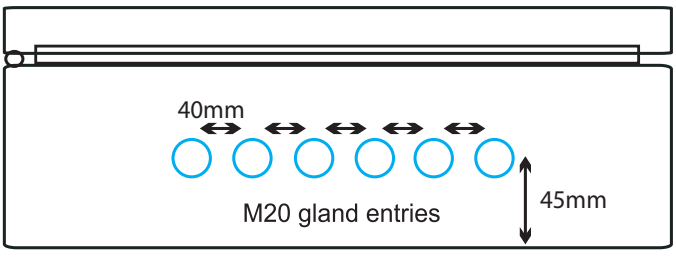
Fuse Ratings

There are 5 fuses inside the ED816 labelled F1 - F5. To access the fuses open the hinged front panel, the fuses are all mounted in holders on the base printed circuit board. F1 is located on the left hand side, through to F5 fitted on the right hand side. The values are as follows:

F1 & F2 = 4A Quick Blow
F3, F4 & F5 = 1A Quick Blow



Rear of enclosure



Underside of enclosure

INSTALLATION

OVERVIEW AND FEATURES

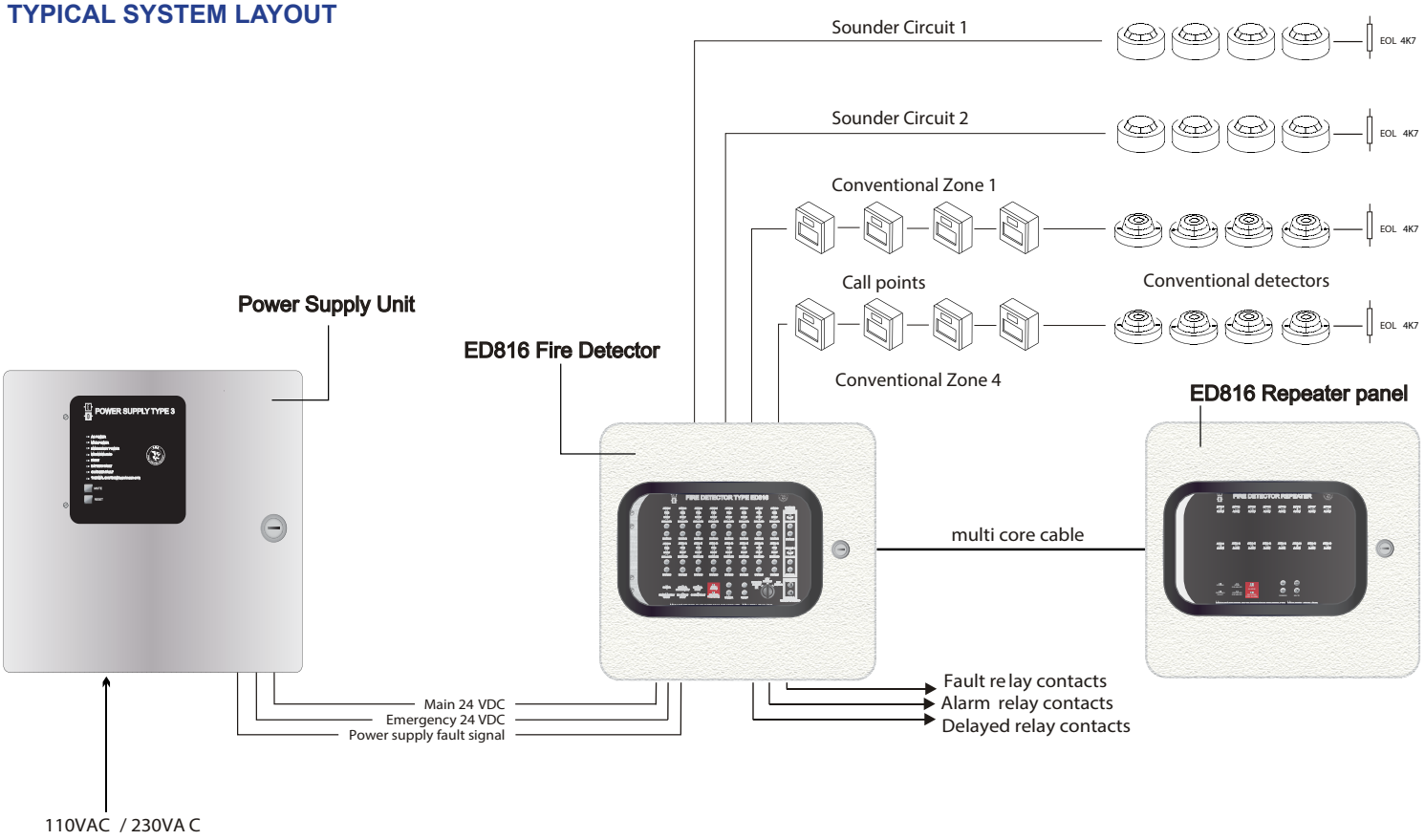
The ED816 fire alarm panel features include the following:

- 16 Zones (detector circuits).
- 2 Monitored sounder circuits.
- Key switch entry to access authorised user controls (access level two).
- Programmable sounder resound option - silenced sounders to resound, or not resound, when new zone in alarm.
- Disablement per zone and per sounder circuit.
- Hazardous Area device compatibility, programmable per zone.
- Fault relay output.
- Fire Alarm relay output.
- Delayed Fire Alarm relay output. Some uses of this function maybe EN54 non-compliant.

IMPORTANT NOTE

This equipment must only be installed and maintained by competent persons. Fire alarm system design is beyond the scope of this document. Understanding of fire alarm systems, components and their use is assumed.

TYPICAL SYSTEM LAYOUT



INSTALLATION - CONTROL UNIT

The control unit should be mounted, in a convenient position for the operator, away from possible mechanical damage and allowing sufficient room for the front panel to swing open, and cables to enter without kinking etc. The location should be considered carefully to limit access to authorised personnel only.

The enclosure is fixed to a bulkhead with four screws through holes in the rear of the enclosure. Cabling should follow Classification Society Regulations e.g. ABS, D.Tp., I.E.E. Regulations for electronic and electrical equipment in ships and be suitable for marine applications, fire detection systems and Hazardous Area applications, where necessary.

INSTALLATION - DETECTORS

Avoid siting near to ventilation shafts etc. to minimise the possibility of false alarms. They should be mounted high on the deck head and not on the underside of beams etc.

Exact fitting instructions are normally supplied with each detector but Figures 1, 2 and 3 detail the connections of some types approved for use with the ED816.

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.

Suitable marine approved detectors include Apollo Orbis, Hochki CDX and manual call points type EDCP and EDCP/W.

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.

2. Optical smoke detectors are particularly well suited to detecting slow-burning, 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:

* 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.

* 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).

DETECTOR CONNECTIONS

NOTES:

1. Connect detector earth connection to cable screen.
2. Always fit call points at the beginning of a zone or on a separate zone. If detectors are fitted between the control unit and call points removal of these detectors would disable the call points.
3. Never use looped wire for connection into and out from the same terminal, always break wire to enable fault monitoring.

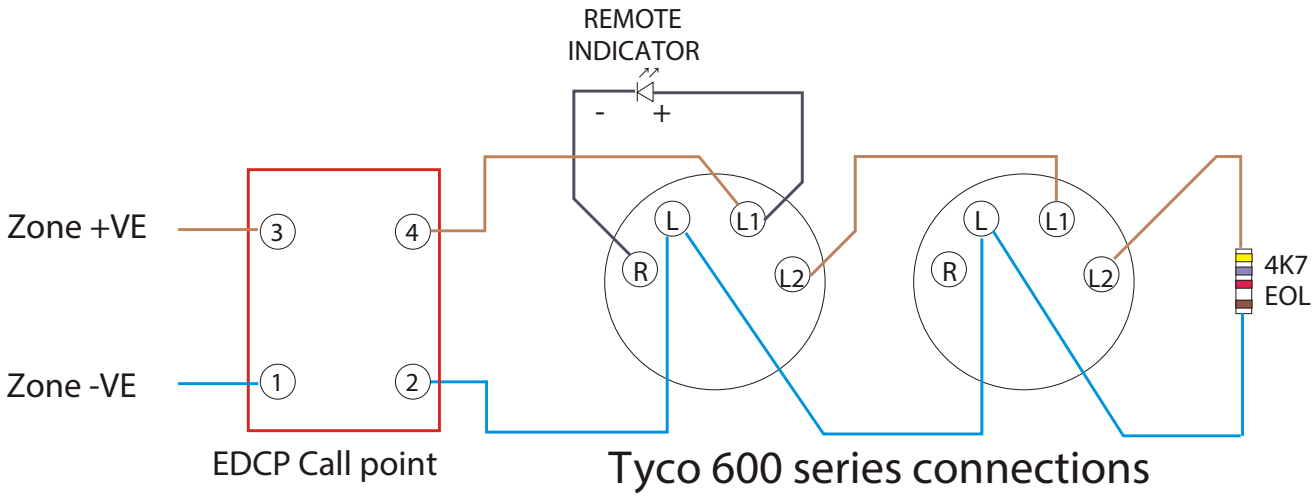


FIG 1

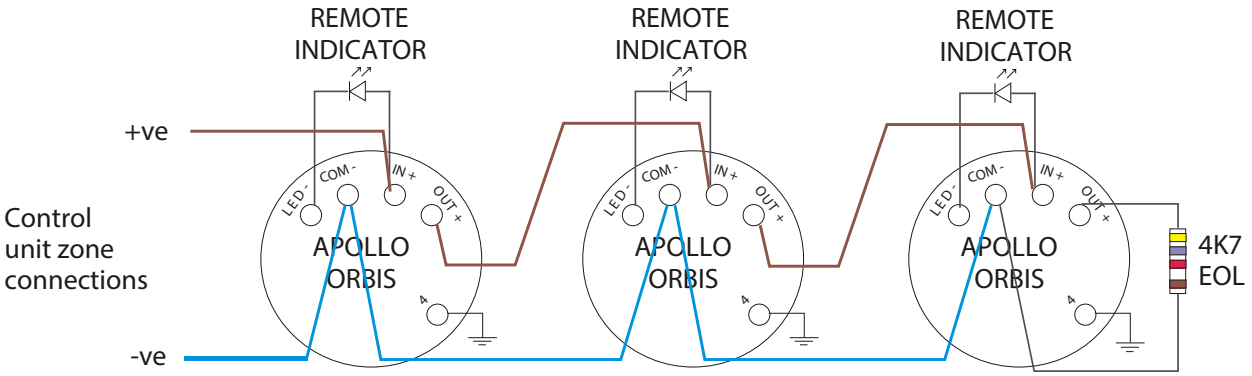


FIG 2

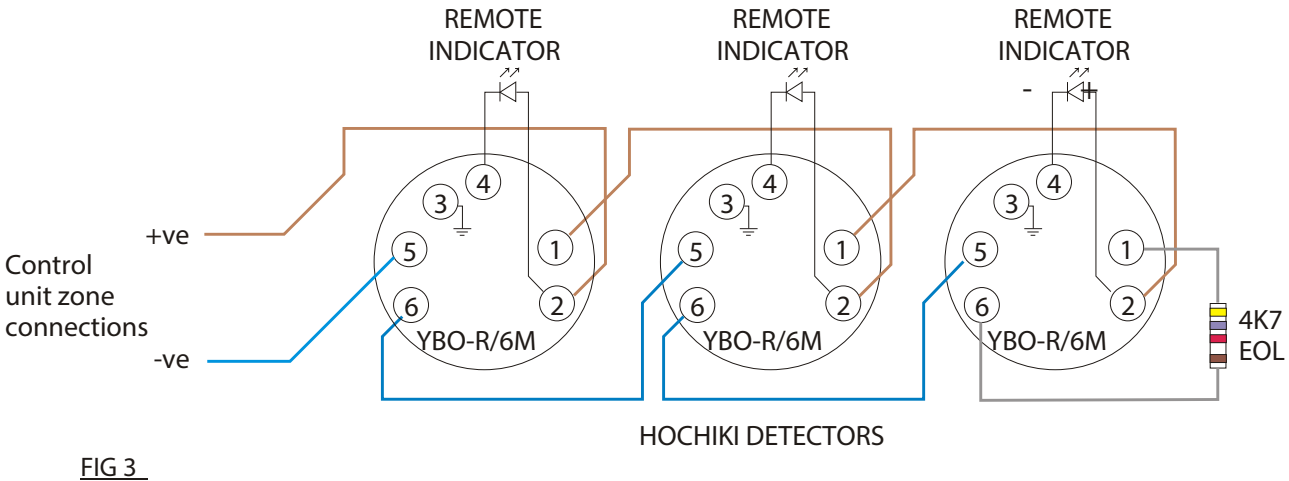
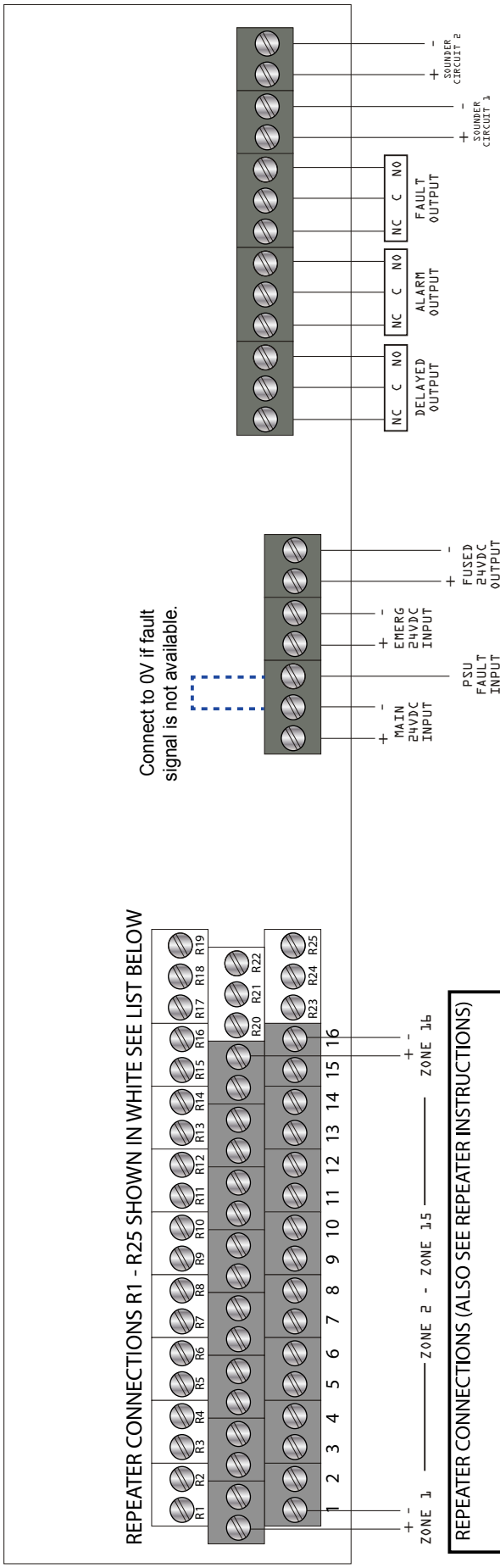


FIG 3

REPEATER CONNECTIONS (ALSO SEE REPEATER INSTRUCTIONS)



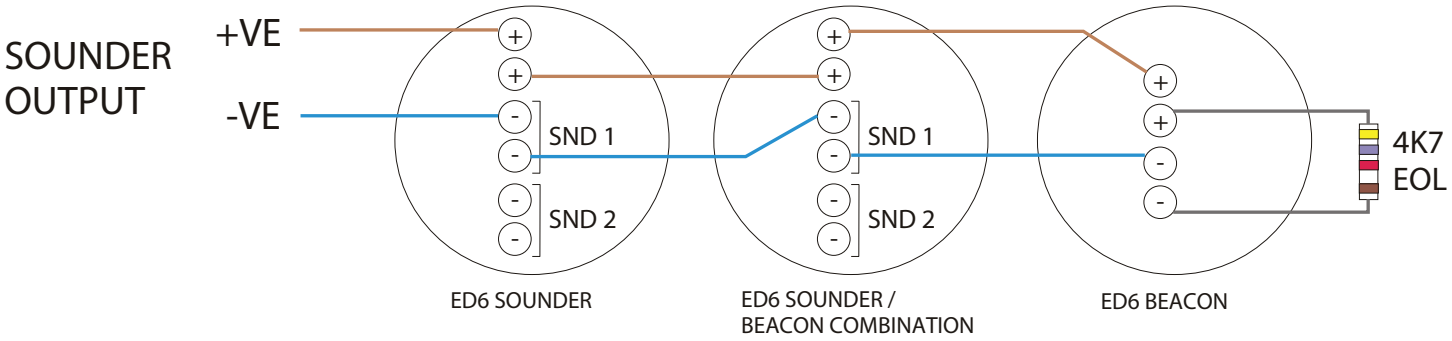
NOTE: The fault relay is wired active on. In the event of a complete power failure this could be used to activate an alarm.

REPEATER CONNECTIONS (ALSO SEE REPEATER INSTRUCTIONS)

ED816 Baseboard Connections	ED816 Repeater Connections
R1- R16	Z1 - Z16
R17	-VE
R18	MAIN IND
R19	EMERG IND
R20	ZONE ISOL
R21	SOUNDER ISOL
R22	DEL IND
R23	FLT IND
R24	ALM IND
R25	+24VDC

SOUNDER AND BEACON CONNECTION

The fault monitored sounder circuits 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.

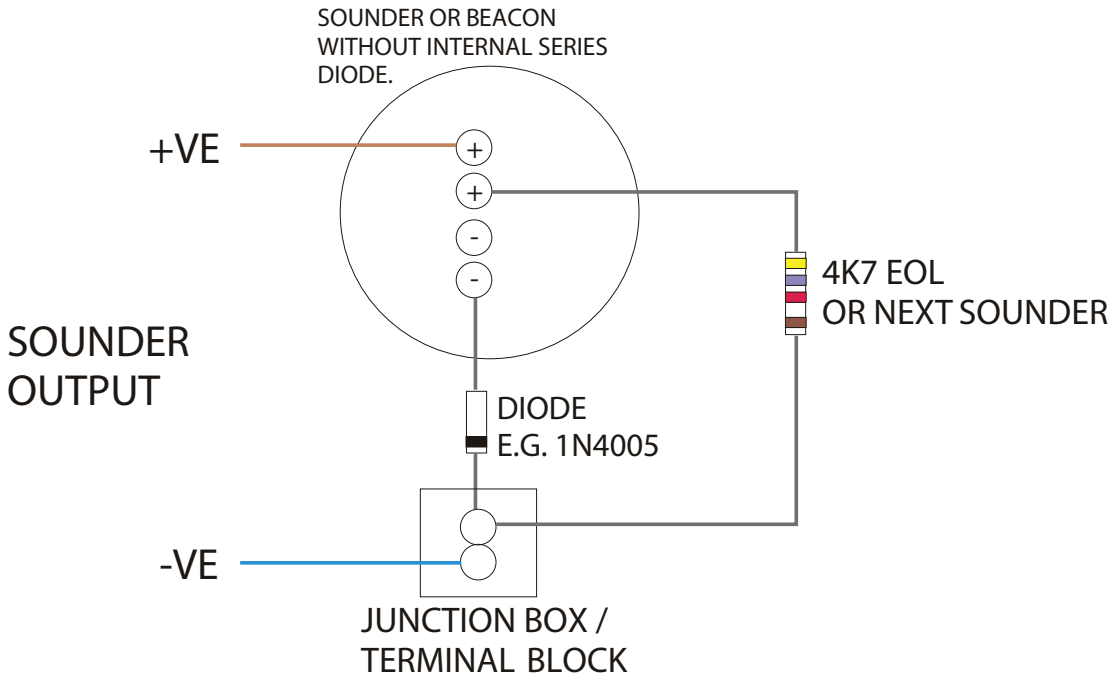


IMPORTANT

Never use looped wire always use separate conductors for input and outputs thus enabling fault monitoring.

If Sounders and Beacons are not supplied by EDL, ensure they have a series polarity protection diode fitted. If not an external diode suitably rated should be used. Please contact EDL for further information.

See diagram below.



OPERATION

In general an audio alarm attracts attention and panel lamps indicate the type of alarm. It is important that personnel recognise the audible alarms so that correct, and prompt, action can be taken. Fire alarm sounds the internal buzzer continuously and a fault condition sounds the internal buzzer intermittently.

In normal operation (quiescent state) only the 'Power' lamp should be illuminated. If either the Main or Emergency power supply fails, or a fault signal is received from the power supply, a general fault will occur and the 'Power Supply fault' will be illuminated. Note: The fault relay is wired active on. This could be used to provide an alarm out in the event of a complete power supply failure.

FRONT PANEL KEY SWITCH

The ED816 is fitted with a key switch, as required by EN54-2, intended to limit access to the following specific functions:

1. Zone / Sounder Disable.
2. Silence internal or external alarms (mute).
3. Reset.
4. Sound alarms.

It is very important that the key, if removed, can be located quickly. In particular the "sound alarms" function maybe required urgently. Locating a call point (MCP) next to the control panel and connecting to a spare zone, one that will never need to be isolated, is good practice as it will allow the operation of the alarms in an emergency even if the key cannot be located. In order to comply with EN54-2 the control panel door must not be locked.

ZONE & SOUNDER DISABLEMENT

With the key switch set to the 'Key Enable' position, any zone or sounder circuit can be disabled by pressing the Disable "ON" button or returned to the normal state by pressing the Disable "OFF" button. When a zone is disabled both faults and alarms, from that zone only, are ignored. When a sounder circuit is disabled all sounders and beacons, connected to that circuit only, are disabled and will not operate in the event of an alarm. The sounder circuits remain fault monitored, any open or short circuit faults detected will operate the general fault condition. If any zone or sounder circuits are disabled the appropriate 'Disable' lamp and the 'General Disablement' lamp will be illuminated.

DIMMER FACILITY

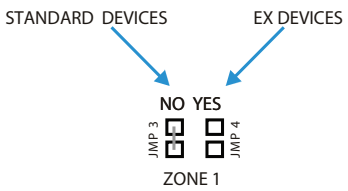
All front panel lamps, with the exception of Alarm & Delayed Alarm, can be dimmed for night time use. The lamps will remain dimmed until the dimmer off button is pressed. It is important to ensure the dimmer is turned off when the ambient light increases, i.e. during the day. It is a requirement of EN54-2 that front panel lamps can be clearly seen therefore the dimmer facility must only be for night time use. If the dimmer facility is not required simply remove the jumper JMP1 located on the display PCB.

EXTERNAL AND INTERNAL SILENCE SOUNDERS BUTTONS

With the key switch set to 'Key Enable', pressing the 'Internal Silence sounders' button will silence the internal alarm / fault buzzers. Pressing the 'External Silence Sounders' button will silence any external sounders and turn off any beacons connected to sounder circuits 1 or 2. The Jumper JMP1, fitted as standard, is located on the base printed circuit board and controls retriggering of external sounders and beacons. When fitted, each new alarm will reactivate the sounder circuits if previously silenced. If removed, once silenced new alarms will not activate the external sounder circuits until the system has been reset to the quiescent non alarm state.

RESET BUTTON

Pressing the 'Reset Button' will return the panel to the normal condition, if any faults or alarms remain these will reactivate the appropriate lamps and output functions.



DELAYED ALARM

The "DELAYED ALARM" relay and lamp will only operate in the event of a fire alarm having been present for approximately two minutes and during this time the 'External Silence Sounders' button has not been pressed.

INTRINSICALLY SAFE ZONES

For use with Intrinsically Safe detectors the following guidelines must be followed:

1. Never mix Ex and non Ex rated devices on the same zone.
2. A suitable Zener or Galvanic Barrier must be used
e.g. The EDL dual channel Zener Barrier type ZBD7+ ATEx certified [EEx ia IIC].

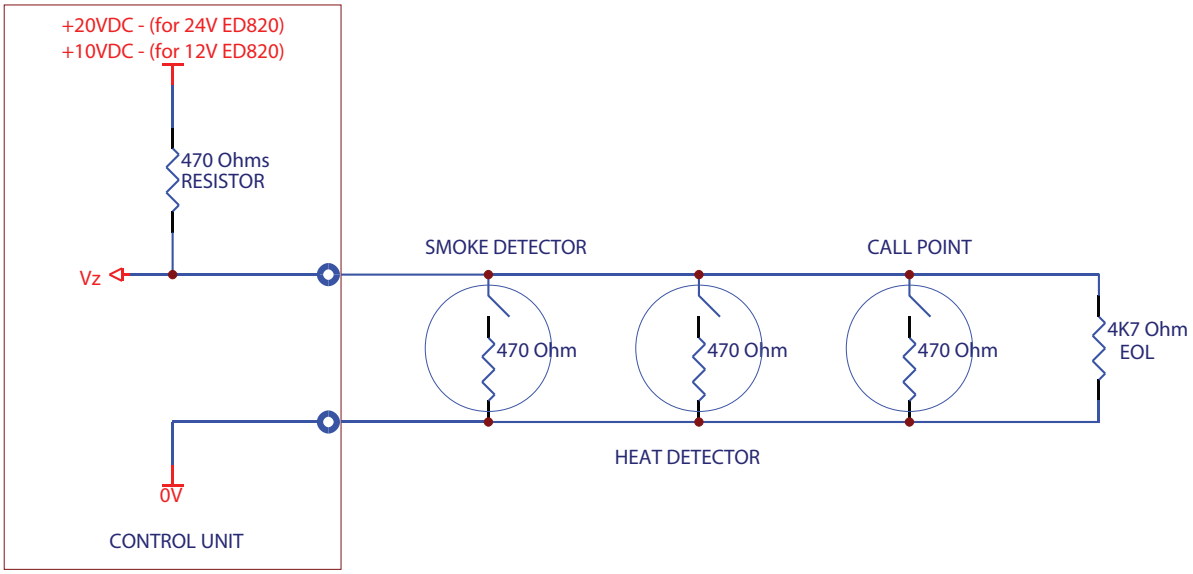
3. Wiring must be in accordance with Hazardous Area regulations.
4. To setup a zone suitable for Intrinsically Safe detectors the appropriate jumper, located on the ED820 Base printed circuit board, must be moved from the 'NO' jumper to the 'YES' jumper:

IN SERVICE TESTING

Tests should be carried out periodically to ensure that both fault and alarm circuits are functioning correctly. Detectors should be operated individually to ensure correct detector and zone operation. Fault circuits may be tested by open circuiting and short circuiting, in turn, each zone pair at the final detector base.

The control unit should be observed during testing to ensure that all panel indicators operate correctly. Aerosols of synthetic smoke which can be purchased from EDL 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.

BASIC FAULT FINDING



CONVENTIONAL FIRE DETECTION BASIC PRINCIPLES

All of Electronic Devices conventional fire detection systems are designed with the same simple and robust method of detection. The diagram below shows the essential principle of a conventional fire detection system. The zone line completes a potential divider chain across a stabilised 20VDC supply. The internal 470 Ohm resistor mounted in the control unit is the top half of the divider and in normal operation the end of line (EOL) resistor, 4K7 Ohms, completes the potential divider so that Vz is at 18.2V

Any detector placed across the zone line will be electrically equivalent to a normally open switch with a series 470 Ohm resistor. If any of the detecting elements operates, the voltage Vz will drop to just below half of the 20V supply which initiates an alarm via the voltage monitoring and logic circuit inside the control unit. If the zone line goes open circuit, Vz becomes 20V and an open circuit fault is given. If the zone line goes short circuit, Vz becomes 0V and a short circuit fault is given. In practice, the effects of line resistance cannot be completely discounted but since the volt drops incurred are normally small, do not present the designer with a problem.

OPEN CIRCUIT ZONE FAULT

The control unit indicates a open circuit fault by illumination of a yellow LED and sounding of the internal buzzer. The most likely cause will be loose or open circuit field wiring on the zone in question. Depending upon the devices fitted an open circuit fault can also be caused by removal of a detector from its wiring base.

The Engineer should measure, using a digital volt meter, the voltage across the zone terminals. The voltage should normally be approximately 18VDC. If this has increased to 20VDC this indicates correct operation of the control unit and that the fault lies in the field wiring. To narrow down the search for an open circuit on zone wiring measure the zone voltage at the detector at roughly the midpoint of the zone. If there is no voltage measured the fault lies between the midpoint and the control unit. If the voltage measured is 20V then the fault lies between the midpoint and the EOL.

SHORT CIRCUIT ZONE FAULT

The control unit indicates a short circuit fault by illumination of a yellow LED and sounding of the internal buzzer.

The Engineer should measure, using a digital volt meter, the voltage across the zone terminals. The voltage should normally be approximately 18VDC. If this has dropped close to 0VDC this indicates correct operation of the control unit and gives a short circuit fault indication. First disconnect the Zone wiring from the terminals if the terminal voltage now rises to 20V DC then the fault lies in the field wiring, If the voltage remains low then the fault is within the control unit. To narrow down the search for a short circuit on zone wiring disconnect the wiring at roughly the midpoint of the zone and check if the short circuit is replaced with an open circuit. If yes, this indicates the short circuit is between here and the EOL. If no, this indicates it is between here and the control unit.

COMMISSIONING

1. All connections, power supplies and peripheral devices should be checked and must conform to the requirements of this manual and the appropriate standards.
2. Ensure there are no earth faults by using a Megger or similar Insulation / resistance tester.
3. Ensure End of Line resistors (4K7 Ohm) are fitted as the last device on all zones and both sounder circuits.
4. In the normal ‘quiescent state’ only the green ‘Power’ lamp is illuminated.
5. Remove each detector in turn and ensure the appropriate fault lamp illuminates and the fault buzzer and relay operate.
6. Repeat 5, above, for both sounder circuits.
7. Test each detector alarms and the appropriate alarm lamps and sounders operate.
8. Test all other features as detailed on pages 9 and 10.