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Fire Alarm Control Panel
NFS2-8
Installation, Commissioning & Configuration Manual
Australian Edition

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NFS 2-8 Installation and Commissioning Manual

Addendum

Section 8, Page 32

The stated manufacturers environmental Operating environment of -5^{o}C to 45^{o}C has been reduced to -5^{o}C to 40^{o}C for use in Australia.

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EN 54 & ISO 7240 2- 8 Zone Conventional Fire Control Panel

Installation, Commissioning & Configuration Manual

997-492-000-6, Issue 6.0

For use with NFS 2-8 and FLS 2-8 Fire Control Panels

The following markings are used either on the panel hardware or in the documentation. They have the following meaning:

WARNING: Risk of electric shock. Before working on mains connections, ensure mains power supply to the panel is disconnected.



CAUTION: Refer to the accompanying documentation. (When used in the documentation, this marking is normally associated with additional instructions).



CAUTION: Failure to comply with the requirements of EN54 (and ISO 7240) is possible if warning is ignored. The relevant clause reference is stated.



CAUTION: Heat Hazard

Under certain fault conditions PCB areas identified by this symbol may reach high temperatures.



Contents

1 Introduction

1.1 Manual Purpose 1
1.2 System Design & Planning 1
1.2.1 Personel 1
1.3 General 1
1.4 CE Marking 2
1.5 EN54 Functions 3
1.6 ISO 7240 Functions 3
1.7 Ancillary Functions 4
1.8 Related Documents 4
1.9 Warnings & Cautions 4

2 Installation Guide

2.1 How to Use this Guide 5
2.2 Pre-installation Check List 5
2.2.1 Some Panel DO's and DON'Ts 5
2.3 Transient Protection 6
2.4 Product Inspection 7
2.4.1 Checking Your Panel for Damage 7
2.4.2 What to do if Your Panel is Damaged 7
2.5 Installation Preparation 8
2.5.1 Removing the Cover 8
2.5.2 Back Box Fixing 8
2.6 Optional Equipment 9
2.6.1 2-Way Relay PCB 9
2.6.2 8-Way Relay PCB 9
2.6.3 4-Way Sounder PCB 9

3 Cabling

3.1 Cabling Instructions 10
3.1.1 Cable Terminations 11
3.2 Quality of Cable and of Cable Installation 11
3.3 EMC Considerations 12
3.4 Cables for Sounder Circuits 12

4 Field Devices

4.1 End-of -Line Devices 13

5 Panel Electronics

5.1 Main PCB 14
5.2 PSU PCB 15
5.3 Label Inserts 15

6 Commissioning

6.1 Introduction 16
6.2 Preliminary Checks 16
6.3 External Wiring 16
6.3.1 Zone Wiring - New Installation 16
6.3.2 Zone Wiring - Retrofit Installation 16
6.3.3 Sounder Circuits 16

6.3.4 2-Way Relay PCB (Optional) 16
6.3.5 8-Way Relay PCB (Optional) 16
6.3.6 4-Way Sounder PCB 16
6.4 Powering the Panel 17
6.4.1 Standby Batteries 17
6.5 Configuration and Handover 20
6.6 Commissioning Tests 20
6.7 Zone Wiring 20
6.8 Sounder Circuits 22
6.9 Digital Inputs 23
6.10 Fault Finding Chart 24

7 Configuration

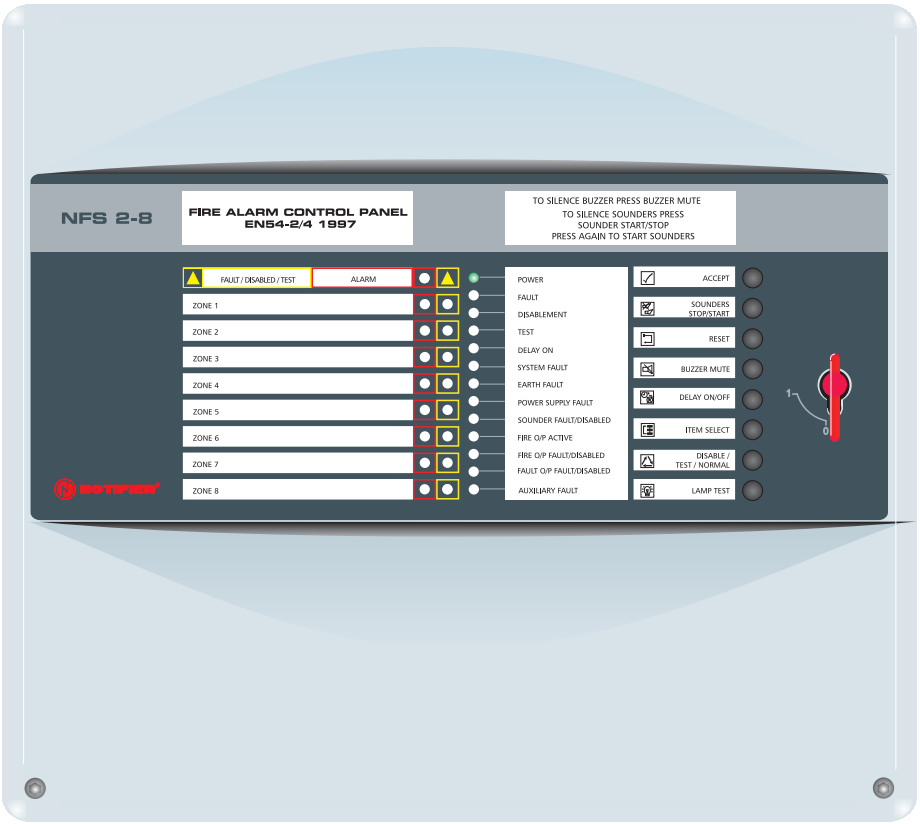
7.1 Procedure 25
7.2 Panel Options - A 26
7.2.1 Engineering Mute 26
7.2.2 Commissioning Mode 26
7.2.3 ACCEPT Pushbutton Access Level 26
7.2.4 LAMP TEST Access Level 26
7.3 Panel Options - B 26
7.3.1 Non-latched Faults 26
7.3.2 Pulse Fire Routing outputs 26
7.3.3 FBF Fire Routing disable - forces off 26
7.3.4 Re-sound - new zone in alarm 26
7.3.5 Mains Fault delay 27
7.4 Configuration 27
7.4.1 Checksum 27
7.4.2 Select Default Configuration 27
7.5 Fire Zone Input Type 28
7.5.1 Latching/ Non-latching Alarms 28
7.5.2 Short-circuit Input Operation 28
7.5.3 Auto/ Manual Zones 28
7.5.4 Coincident Detection 28
7.5.5 Sprinkler Verification Time 29
7.5.6 EOL Device Type 29
7.6 Sounder Output Type/ Delay 29
7.6.1 Select Output 30
7.6.2 Select Type 30
7.6.3 Select Delay 30
7.7 Digital Inputs 30
7.7.1 Select Input 31
7.7.2 Set Type 31
7.8 Primary and Secondary Delays 32
7.8.1 Select Primary Delay Time 32
7.8.2 Select Secondary Delay Time 32
7.8.3 Two-zone Override Delay 32
7.9 Configuration Examples 33

8 Specification

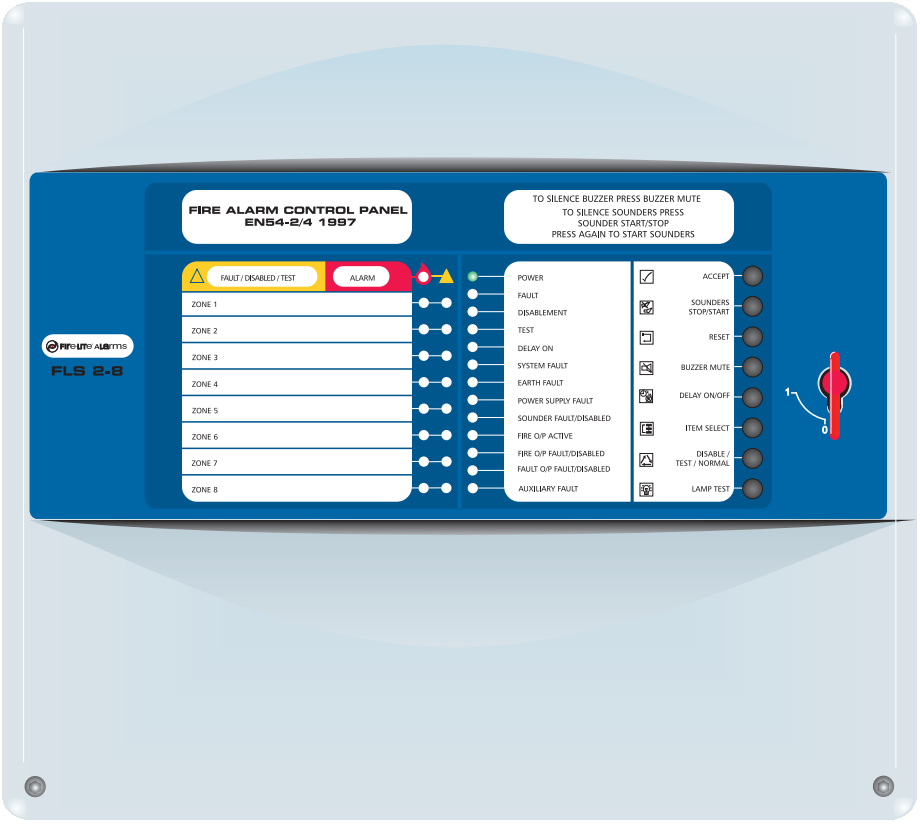
9 Battery Calculation

Configuration Map ..... Back Page

NFS 2-8 Fire Control Panel



FireLite FLS 2-8 Fire Control Panel



1 Introduction

1.1 Manual Purpose

The purpose of this manual is to provide the user with all recommended procedures and full technical details for the successful installation, commissioning and configuration of the EN 54 (and ISO 7240) 2-8 Zone Conventional Fire Control Panel.

The descriptions and procedures apply to the NFS 2-8 and FLS 2-8 fire control panels.

Procedures described in this manual include appropriate warnings and cautions to guide the user towards adopting safe and methodical work practices during the installation, commissioning and configuration phases.

Important Note

This manual must be read, and its contents clearly understood, before proceeding with any work relating to the control panel. Damage to the control panel may result from NOT following the recommended procedures described in this manual.

If there are any areas of doubt, consult your supplier before continuing with the system installation, commissioning and configuration.

1.2 System Design and Planning

It is assumed that the system, of which this control panel is a part, has been designed by a competent fire alarm system designer in accordance with the requirements of EN 54 Part 14 and any other local codes of practice, such as BS5839-1, that are applicable. The design drawings should clearly show the positions of the field devices and the control equipment.

1.2.1 Personnel

Installation of this product must be carried out only by suitably-qualified electrical engineers.

1.3 General

The control panels are factory-configured either as 2, 4 or 8 zones. The panel has been tested and manufacturer-approved for use with the following devices:

Apollo: Series 60 Wide Voltage, Series 65 & Orbis.

System Sensor: ECO1000, PhD/Series 800 & Vision.

The panel is self-contained with integral power supply and space provision for two sealed, lead-acid standby batteries and complies with the requirements of EN 54 Parts 2 and 4.

The panel functions are microprocessor controlled and test and disable functions are included. Provision is made for activating up to a maximum of four (with 2-way Relay PCB fitted) sounder outputs and day/night mode working.

Provision is also made for up to 2 optional 8-way Relay or 4-way Sounder PCBs which can provide a further 4, 8, 12 or 16 configurable outputs.

The panel can accept an unlimited number of manual call points and a limited number of automatic detectors per zone. Refer to **Section 8 Specification** for zone current limits.

As a default, the panel is configured without delays to outputs. If delays are to be configured, refer to **Section 7.8 Primary & Secondary Delays** for details.

While every effort is made to ensure the accuracy of the content of this manual, the manufacturer reserves the right to change the information without notice.

Installation

The control panel is easy to install providing the recommended procedures described in this manual are followed. Once the back box is installed, use something suitable, such as an anti-static bag, to protect the PCBs from being damaged. Do not re-fit the front cover until after all other trades have completed their tasks.

Commissioning

Section 6, **Commissioning** describes the recommended commissioning procedure for the fire control panel.

Configuration

Section 7, **Configuration** describes all panel configuration procedures. Configuration is only possible with the control panel at access Level 3. This requires the front cover to be removed and a code-entry process to make the panel ready for site-specific configuration.

Specification

Section 8, Specification defines all panel operating parameters.

1.4 CE Marking

CE

This panel is CE Marked to show that it conforms to the requirements of the following European Community Directives:

The EMC Directive 2004/108/EEC, by the application of the following EMC Standards:

- EN 61000-6-3: Electromagnetic Compatibility (EMC) Generic emission standard for Residential, Commercial and Light industrial environments
- EN 50130-4: EMC Product family standard: Immunity requirements for components of fire, intruder and social alarm systems.

Low Voltage Directive 2006/95/EEC, by the application of the safety standard:.

- EN 60950-1: Safety of information technology equipment.

The Construction Products Directive 89/106/EEC, by the application of the following standards:

- EN 54-2: Fire detection and fire alarm systems - Control and indicating equipment.
- EN 54-4: Fire detection and fire alarm systems - Power supply equipment.

1.5 EN 54 Functions

This fire control panel is designed to comply with the requirements of EN 54 Part 2/4. In addition to the basic requirements of EN 54-2, the panel may be configured to conform with the following optional functions - the applicable clauses of these standards are referenced as follows:

Options	Clause
Indications:	
Fault signal from fire protection equipment	7.10.4
Controls:	
Delay to Outputs	7.11.1
Manual or automatic switching of delays to outputs	7.11.2
Dependency on more than one alarm signal, Type B	7.12.2
Test condition	10
Outputs:	
Fire alarm device(s)	7.8
Fire alarm routing equipment	7.9.1[1]
Fire alarm routing equipment with alarm confirmation	7.9.2[1]
Automatic fire protection equipment: Type A	7.10.1[1]
Automatic fire protection equipment: Type C	7.10.3[1]
Fault warning routing equipment	8.9

[1] Only available when using the optional 4-way sounder PCB to allow monitoring of the transmission path.

1.6 ISO 7240 Functions

This fire control panel is designed to comply with the requirements of ISO 7240 Part 2/4. In addition to the basic requirements of ISO 7240-2, the panel may be configured to conform with the following optional functions - the applicable clauses of these standards are referenced as follows:

Options	Clause
Controls:	
Delay to Outputs	7.11
Dependency on more than one alarm signal, Type B	7.12.2
Test condition	10
Outputs:	
Fire alarm device(s) (Sounders)	7.8
Fire alarm routing equipment	7.9.1[1]
Fire alarm routing equipment with alarm confirmation	7.9.2[1]
Fault warning routing equipment	8.9

[1] Only available when using the optional 4-way sounder PCB to allow monitoring of the transmission path.

The following features are provided by the Power Supply Unit (PSU) of the NFS 2-8 and FLS 2-8 fire control panels to comply with EN 54-4 and ISO 7240-4.

Features of the NFS 2-8 & FLS 2-8 Power Supply Unit (PSU)	Clause
Derive power from the mains supply	5.1
Derive power from a standby battery source	5.2
Charge and monitor the standby battery/batteries	5.3
Detect and signal various PSU faults	5.4

1.7 Ancillary Functions

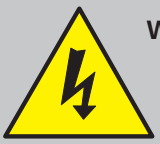
The following is a list of ancillary functions that are provided by the control panel in addition to those required by EN 54-2/4. These functions are described in the section of this manual as referenced.

Ancillary Functions	Manual Section Refs.
Site specific Setup options	7
Extend delay timer	7.8
Sounder Volt-free contact options	7.6
Relay drive output option	7.6

1.8 Related Documents

This manual only describes the installation, commissioning and configuration of the control panel. All user functions are covered by the EN 54 2-8 Zone Conventional Fire Control Panel User Manual (ref. 997-493-00X).

1.9 Warnings and Cautions



WARNING High Voltage! Take suitable precautions to avoid electric shock.





EN 54-2 (and ISO 7240-2): Section Ref.

Brief explanation of non-compliance here.

Where appropriate, this guide and the remainder of the manual include advisory warnings and cautions to remind you to consider safety at all times, especially when following the procedures described in this manual.

You are alerted to any areas where hazardous voltages are present, or where there may be a risk of damage to static-sensitive devices if the recommended procedures described in this manual are not followed. An example of a high voltage warning and anti-static caution is provided to the left of this paragraph.

The caution at left indicates that it is possible to configure a panel in a way that would make it non-compliant with the requirements of EN 54 or ISO 7240. This should only be done under exceptional circumstances and with the authority of the local fire officer.

2 Installation Guide

2.1 How to Use this Guide

This Installation Guide provides you with simple guidelines to install a fire control panel system, quickly and safely. The guide does not describe panel configuration procedures as it is covered by the relevant section of this manual.

For each stage in the panel installation and commissioning procedures a brief description is given of its purpose, complete with detail drawings, flow diagrams and/or other graphics, wherever possible, to make the instructions easy to follow.

2.2 Pre-installation Check List

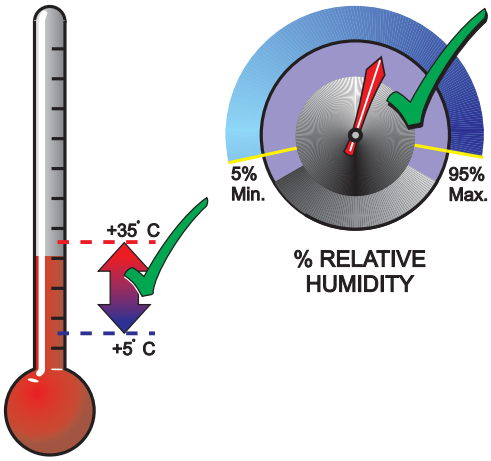
Before installing your control panel or fitting detectors, you must first ensure that the following criteria have been met. Failure to do this may not only result in damage to the equipment, but may also cause problems when commissioning the equipment or adversely affect its performance.

2.2.1 Some Panel DO's and DON'T's

Before selecting a location for the panel and detectors, DO make sure that:

a) The ambient temperature is in the range:

+5˚C to 35˚C and



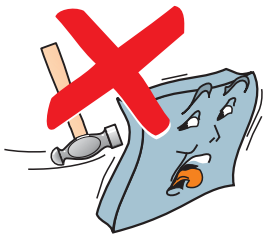
b) The relative humidity is between:

5% and 95% (non-condensing)

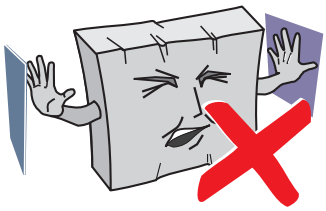
c. The panel is wall mounted in a position which allows clear visibility of displays and easy access to operating controls. The height above floor level should be chosen such that the middle of the panel is just above normal eye level (approximately 1.5 metres).



d) DO NOT locate the panel where it is exposed to high levels of moisture

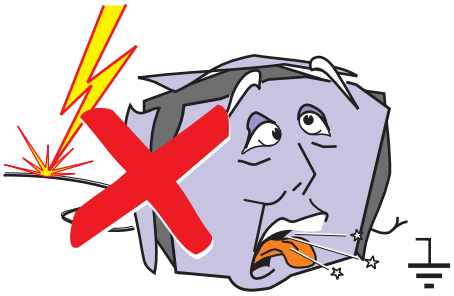


e) DO NOT locate the panel where there are high levels of vibration or shock



f) DO NOT site the panel where there would be restricted access to the internal equipment and cabling/wiring connections.

2.3 Transient Protection



This equipment contains transient-protection devices. Although no system is completely immune from lightning transients and interference, for these devices to function correctly, and to reduce susceptibility, this equipment must be earthed correctly.

As with all solid state devices, this system may operate erratically or can be damaged if subjected to lightning-induced transients.

The use of outside aerial wiring is not recommended due to the increased susceptibility to nearby lightning strikes.

2.4 Product Inspection

Check for damage before proceeding with the installation!

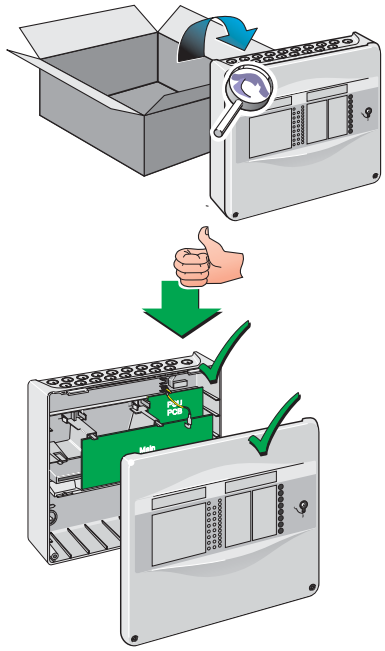
The 2-8 Zone Fire control panel is simple to install and commission if the recommended procedures described in this Installation Guide, and the Installation and Commissioning sections of this manual, are followed.

Follow all installation instructions described in this manual. These instructions must be understood and followed to avoid damage to the control panel and associated equipment.

2.4.1 Checking Your Panel for Damage

Before attempting to install your panel you should do the following:

1

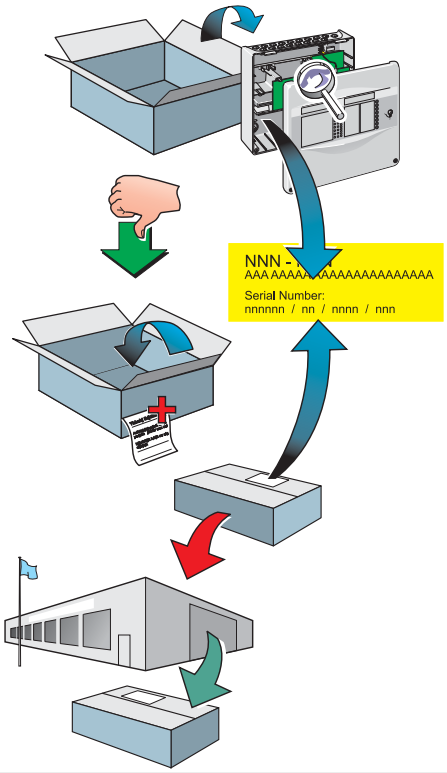


2

1 After removing the control panel from its packaging, and before you proceed with installing in its chosen location, check for any damage that may have been caused during transit.

Note: In the unlikely event that the panel has been damaged in transit, you MUST NOT install it but contact your supplier for their returns procedure.

2.4.2 What to do if You Suspect Your Panel is Damaged



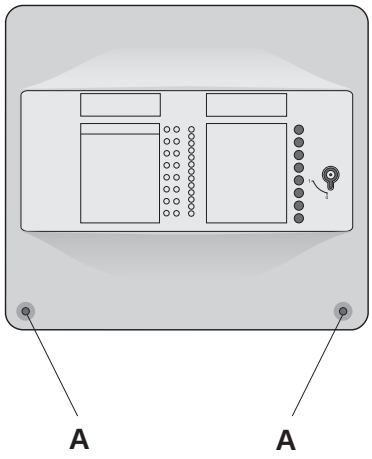
The procedure described below tells you what to do in the unlikely event that the supplied equipment has been damaged after leaving the factory. However, if you have problems regarding the quality of any supplied order items including the control panel, its ancillaries or this manual, or items are missing, follow the procedure below.

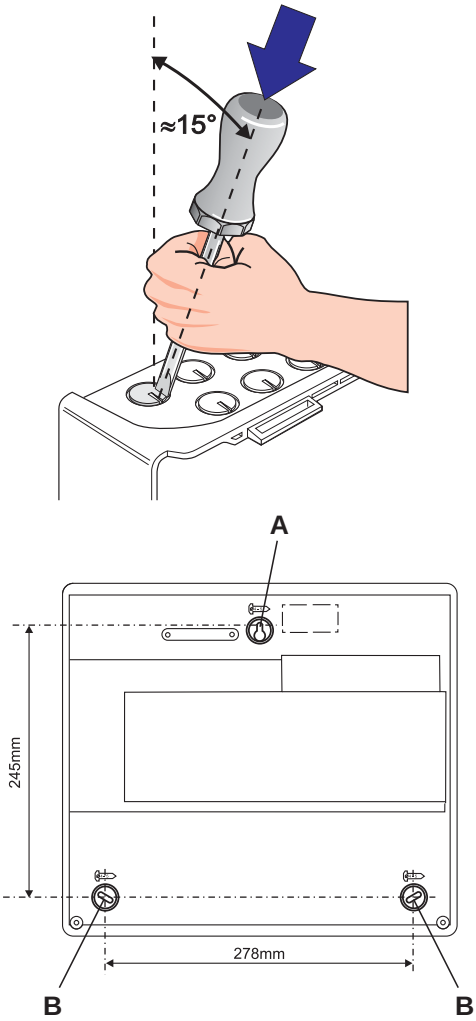
1 If, after removing the panel from its packaging, a visual inspection reveals that it has been damaged, you MUST NOT continue with the installation but contact your supplier for advice on what to do next.

Similarly, if the product is found to be faulty during installation contact your supplier immediately.

2 To aid your supplier you are requested to note all the details relevant to your complaint, clearly stating details of any technical problems, date of receipt, packaging condition, etc. and forward this to your supplier.

3 Where the product needs to be returned to your supplier, you are requested to use the original packaging wherever possible.





Overall Dimensions of panel in millimetres:

318(h) x 355.5(w) x 96(d).

(Distance between fixing holes marked on rear face of back box).

2.5 Installation Preparation

This section describes making the panel ready for installation.

2.5.1 Removing the Cover

Remove the front cover as follows:

Use the supplied 4mm hexagonal socket wrench to release the two recessed, socket-headed screws located in position 'A' - the screws are captive and do not need to be removed from the cover moulding. Once the screws have disengaged the back box, remove the cover as follows:

i Gently pull the bottom edge of the cover clear of the back box.

ii Carefully lift the top edge of the cover up and away from the back box to disengage the locating lugs.

iii Store the cover safely until required for re-fitting.

2.5.2 Back Box Fixing

The back box must be fixed to the wall with screws at three fixing locations (see drawing) following the procedure described below.

Wall Flatness

To prevent distortion, the back box must be installed on the wall as flat as possible, i.e. with a maximum flatness deviation between any two points of 3mm. Where the wall is out of tolerance, use appropriate packing pieces when installing the back box to meet the above requirements.

Failure to comply with this requirement may result in the misalignment and consequent difficulty in fitting the front cover or malfunction of control pushbuttons.

When a suitable location has been found for installing the control panel, proceed as described below:

1 Prepare apertures (20mm knockouts) required for cable access as follows:

With the cover removed position the back box so the interior is towards you. Using a No. 5, slot-ended screwdriver, position its end in the recess (A) of the 20mm knockout and incline the screwdriver towards you at about 15° from the vertical (see illustration at left). Support the screwdriver as illustrated to minimize penetration of the back box. While in this position use something suitable, such as a mallet, to strike the top of the screwdriver to achieve a clean break of the knockout.

2 Hold the back box assembly in the required position against the wall and mark the position of the keyhole (A).

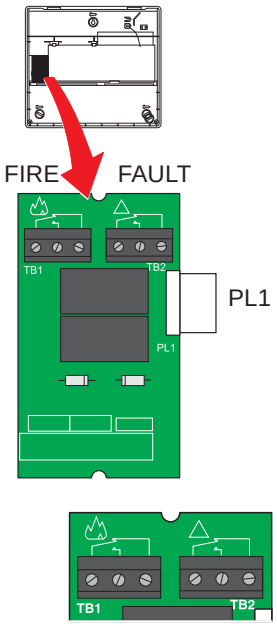
3 Drill and plug the wall to take size 4 to 5mm screws.

4 With the panel supported by the top screw, and ensuring that it is level, mark the other two screw positions (B). Drill holes and plug.

5 Screw the panel back box to the wall using all three fixing holes and 4 to 5mm steel, flat-underside-headed screws. **DO NOT use countersunk-headed screws**. Use washers with 4mm-sized screws.

2.6 Optional Equipment

2.6.1 2-Way Relay PCB



An optional PCB supporting Fire and Fault condition, volt-free, status outputs may be fitted. When fitted, the PCB is connected to the Main PCB via connector, PL1.

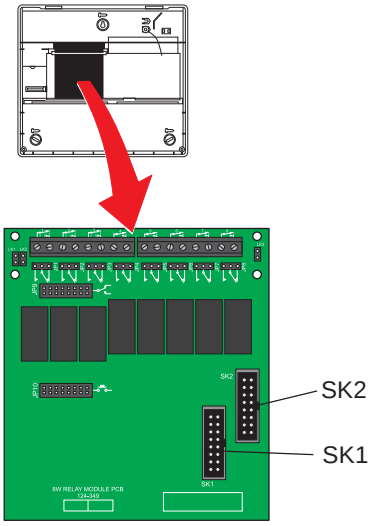
Note: These relays are only intended to switch SELV. See **Section 8 Specifications**.

The PCB is fitted immediately to the left of the Main PCB.

Full instructions for installation are provided with the 2-way Relay PCB kit (PN: 020-713).

The artwork provided above the wiring termination blocks shows the Fire and Fault relay contacts with the relays in a non-energised state. With the panel in its normal quiescent state, i.e. with no fire or fault conditions present, the Fire relay is not energised and the Fault relay is energised. Terminate external wiring as appropriate.

2.6.2 8-Way Relay PCB

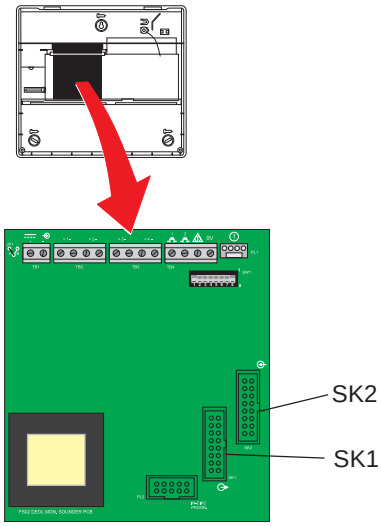


The panel has provision for fitting up to two optional 8-way Relay PCBs. A 16-way ribbon cable connects SK2 on the 8-way Relay PCB to the PSU PCB. When two 8-way Relay PCBs are fitted, a short 16-way ribbon cable is used to link the two PCBs together: connector SK2 on the second PCB to SK1 on the first PCB.

The Main PCB must be removed to allow the PCB(s) to be fitted and for the correct termination of the ribbon cable at the PSU and 8-way Relay PCB and between the 8-way Relay PCBs, when two PCBs are fitted.

Full installation instructions (PN: 997-512-000-1) are provided with the 8-way Relay PCB kit (PN: 020-747).

2.6.3 4-Way Sounder PCB



The panel has provision for fitting up to two optional 4-way Sounder PCBs. A 16-way ribbon cable connects SK2 on the 4-way Sounder PCB to the PSU PCB. When two 4-way Sounder PCBs are fitted, a short 16-way ribbon cable is used to link the two PCBs together: connector SK2 on the second PCB to SK1 on the first PCB.

The Main PCB must be removed to allow the PCB(s) to be fitted and for the correct termination of the ribbon cable at the PSU and 4-way Sounder PCB and between the 4-way Sounder PCBs, when two PCBs are fitted.

Full installation instructions (PN: 997-536-000-1) are provided with the 4-way Sounder PCB kit (PN: 020-772).

3 Cabling

3.1 Cabling Instructions

WARNING Risk of electric shock. Before working on mains connections, ensure mains power supply to the panel is disconnected.

Ensure incoming earth is connected to the post provided and NOT at the PSU PCB.

All wiring should comply with current IEE wiring regulations (BS7671) or the applicable local wiring regulations. Note also the requirements of EN 54-14 for cabling and interconnection of a fire detection and alarm system.

EMC Requirements: To meet the EMC requirements of the European Directives, it is necessary to ensure that a screened or metal sheathed cable is used.

Cable conductor size should be a minimum of 0.5mm^2. Terminals accept one 0.5 to 2.5mm^2 stranded or solid conductor.

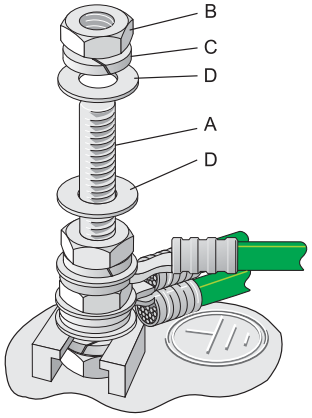
Cables should be brought into the back box through the 20mm knockouts provided on the top face. Refer to **Section 2.5.2** for details on preparing the knockouts. Ensure that all openings in the back box are closed off before connecting power to the panel.

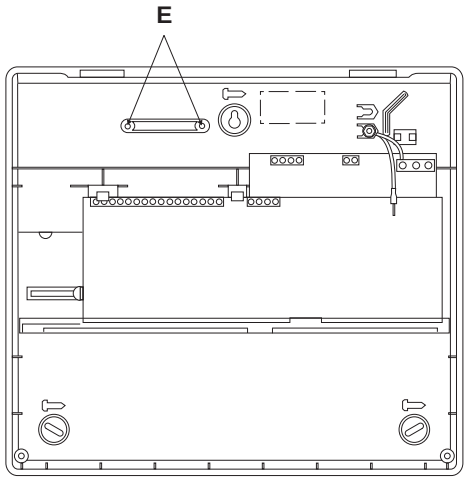
Mains Supply

The supply to the panel must be provided with a suitable and readily-accessible, double-pole, **mains-disconnect device**. The mains supply must be suitably fused and rated according to the specifications.

Always ensure that the mains cables are brought into the back box separately to the low-voltage wiring (refer to **Section 6.4 Powering the Panel**). All low-voltage cables should have a minimum 300VAC rating.

The termination of earth mains wiring must be done before the termination of any external cable screens.





Cable Screen Wires

Cables should be screened. Screen wires should be terminated inside the back box as follows:

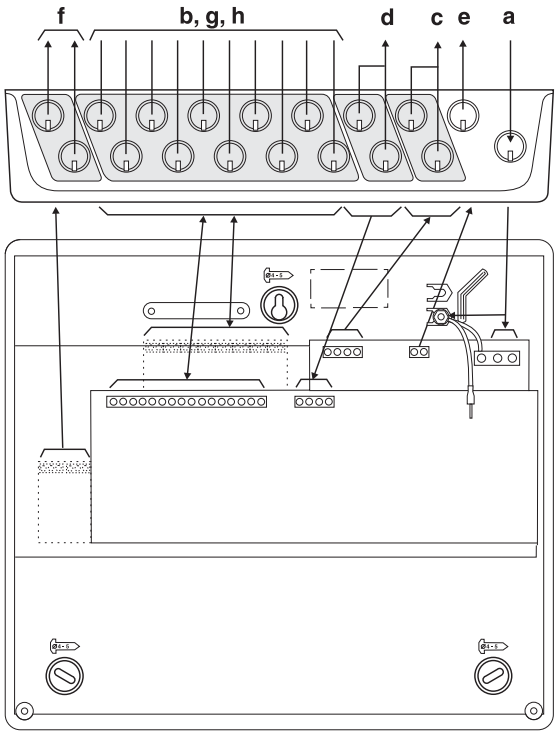
a. Screen tails should be of sufficient length to connect to the earth post (A) at the commissioning stage. Once all screen wires have been terminated at the earth post (A), use the M4 nut (B), spring washer (C) and two plain washers (D) either side of the screen wires to make sure a good earthing bond is created.

b. Use insulation sleeving on the tails between the cable entry position and the earth post. Run the tails close to the rear wall of the back box.

Note: In cases where all 8 zones are to be configured and there is a need to reduce the number of cable screen tails being routed through the panel, an alternative method is to fit a suitable earth block (not provided). The fixing points (E) may be used to mount the block. Provide a suitable cable between this block and the earth post. Using insulation sleeving, terminate all cable screen tails at the earth block.

3.1.1 Cable Terminations

This section provides guidance on where to bring cables into the back box for ease of termination.



a. The mains supply should be brought into the control panel such that the live (L) and neutral (N) cable path to the mains termination block (MTB) is kept as short as possible. Refer to **Section 6.4 Powering the Panel** for the recommended method of terminating the mains wiring and safety earth. This must be done before terminating all other panel wiring.

b. All zone and ancillary cable terminations should be brought into the panel at suitable positions and routed tidily between entry and termination points.

The drawing below shows recommended points of entry so that the following cabling can meet these requirements.

a. Mains supply cable
b. Zone circuits: 1- 2, 1- 4 or 1- 8
c. Sounder circuits
d. Digital input circuits
e. Auxiliary output circuit (to meet the requirements of EMC compatibility, cable length must not exceed 30m)
f. 2-way relay PCB outputs (optional)
g. 8-way relay PCB(s) outputs* (optional)
h. 4-way sounder PCB(s) outputs (optional)

* With 8 Zone panels it may be necessary to use multi-core cables for these relay outputs.

3.2 Quality of Cable and of Cable Installation

It is important that good quality cable is used, and that correct installation techniques are followed. In general, the following cable installation requirements must be met:

a. All cable sections must be circular to allow effective cable clamping using the cable glands.
b. The cable must be screened (sheathed) to provide protection against Radio Frequency Interference (RFI) and the screen must be connected to the earthing point in the back box (refer to **Section 3.1**).
c. The screen must be continuous.
d. Cable recommended for use is MICC with a LSF PVC overcovering, a fire resilient cable to BS7629 or PVC/SWA/PVC to BS6387.

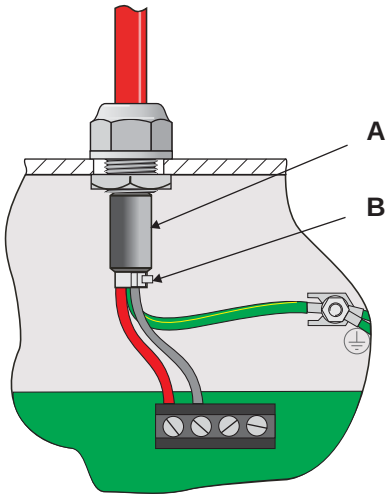
Recommended Cables:

Cables should not exceed 40R resistance per core and 300nF core-to-core capacitance. This will correspond to approximately 1km cable length. The following is a list of recommended cables:

Manufacturer	Product Name	Part Number	Type[1]
AEI	MICC	2L1.5	Enhanced
AEI	Firetec	298-052	Standard
Draka	FiretufPlus	FTPLUS2E1.5RD	Enhanced
Draka	Firetuf	FTZ 2E1.5	Standard
Pirelli	FP Plus	FP Plus 2x1.5 Red	Enhanced
Pirelli	FP200 Gold	FP200 Gold 2x1.5 Red	Standard

[1] For a definition of 'Standard' and 'Enhanced' cable requirements and their different applications, refer to BS 5839-1, Section 26.

Enhanced cable is typically required for spur sounder outputs while standard cables may be adequate for other fire-related I/O, provided there is diverse cable routing.



3.3 EMC Considerations

Following the above instructions and by using suitable screened cables EMC problems will be avoided.

In particularly difficult EMC environments, or where non-preferred cabling is used, it is possible to fit ferrite sleeves to cables entering the panel, in particular the power supply input, sounder and auxiliary output cables.

The ferrite sleeves (A) should be fitted over all the conductor(s) and as close as possible to the entry point of the cable. If required, use a cable tie (B) - not supplied - to hold the ferrite in position.

If additional ferrites are required these can be purchased from your supplier (quote part no. 538-143).

3.4 Cables for Sounder Circuits

When designing the sounder circuits, check that you are using an adequate cable diameter, considering the cable length, to ensure sounders operate within specification.

Example:

Sounder circuit output:	20.0V (min); 0.5A (max)
Sounder device spec.:	15Vdc (min); 20mA (depends on tone used)
Cable type spec.:	Pirelli FP200 Gold, 1.5mm^2 core resistance:12.1R/km (per core at 20°C).

Maximum number of sounders per sounder output circuit:

= 0.5A / 0.020A = 25

Assuming worst case loading with all sounders at the end of the cable:

Maximum cable resistance to ensure 15V:

= (20-15) / 0.5 = 10R

Maximum cable length that will ensure 15V minimum:

= 10 / (12.1+ 12.1) = 0.413km

If the sounders are more evenly distributed along the length of the cable, then calculations will show that longer cable lengths are permissable. After installation, the following tests will confirm that your installation is functional:

a. Activate the sounders and measure the voltage drop along the cable:

   V_{drop} = Panel Terminal Voltage - End-of-line Voltage

b. Subtract this from the mimimum terminal voltage when on battery back up to give the minimum end-of-line voltage (V_{eolmin}):

   $V_{eolmin} = 20 - V_{drop}$

The voltage must exceed the minimum specification of the sounders, i.e. 15V for the Notifier NS14.

4 Field Devices

The Fire Control Panel is capable of working with various manucturer's field devices (for compatible field devices refer to **Section 1 Introduction**).

Each of these devices is supplied with an instruction leaflet showing the correct interconnections for various applications. Before connecting the panel or devices, the wiring should be tested for insulation and continuity. Once any components are connected, do not use a high-voltage tester, such as a Megger, on the circuitry. Low-voltage multimeters may be used.



CAUTION
DO NOT use a Megger on zone wiring with diodes in circuit.

CAUTION - DO NOT use a Megger on zone wiring with detector heads removed (or fitted) as this will damage the Schottky diodes fitted to the bases and/or detectors. Some manufacturers fit a spring in the detector base which can be used to manually short-circuit the diode for wiring testing prior to fitting detectors. Where a spring is not provided, use a link[1] to short out the diode. Refer to the manuafacturer's instructions provided.

[1] **DO NOT forget to remove these links at the completion of wiring testing**.

4.1 End-of-Line Devices

The panel is designed to work with the following zone circuit end-of-line (EOL) devices:

- A 0.47µF capacitor, or
- A 4k7 resistor*

* This EOL device is not recommended for new installations where the latest field devices are to be used. The 4k7 resistor should only be used where the control panel is being installed as a fire control panel replacement and the existing field devices are to be retained.

Using the 0.47µF capacitor will reduce the size of the standby batteries. Refer to **Section 6.4.1 Batteries** for more information on recommended battery sizes. Where zones are to use a mix of detectors and MCPs a 0.47µF capacitor EOL device must be used.

Retrofit Installations



CAUTION
Replace AEOLs on existing installations with a 0.47µF capacitor or use Additional kit (PN: 020-417).



CAUTION
AEOL must be configured or the panel may report an alarm at power up.

The 4k7 resistor EOL devices may be retained on existing installations. However, existing Active End-of-Line (AEOL) devices must be replaced with a 0.47µF capacitor or the additional kit (PN: 020-417) must be fitted (refer to Section 6.3 External Wiring for EOL device compatibility issues).

Caution: To avoid inadvertant activation of the sounders the panel must be re-configured to work with resistor EOL devices - Refer to Section 7.5.6 EOL Device Type.

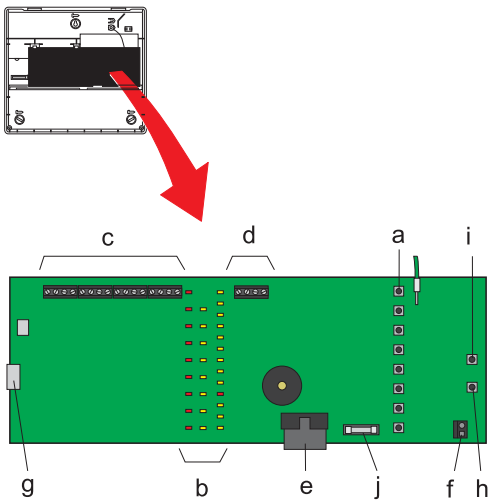
5 Panel Electronics

The Fire Control Panel is supplied with the following factory-fitted electronic equipment:

- Main PCB
- PSU PCB

These PCBs do not need to be removed to install the back box.

5.1 Main PCB



The Main PCB is pre-fitted in the panel and does not require removal for panel installation.

Multi-mode pushbuttons and status indicators on the Main PCB are used for all panel setup and configuration actions.

The Main PCB is provided with the following features:

a. Function pushbuttons

b. Panel status indicators

c. Wiring connectors for zone wiring

d. Wiring connectors for digital inputs

e. 16-way ribbon cable connection to PSU PCB

f. Power connector to backup batteries

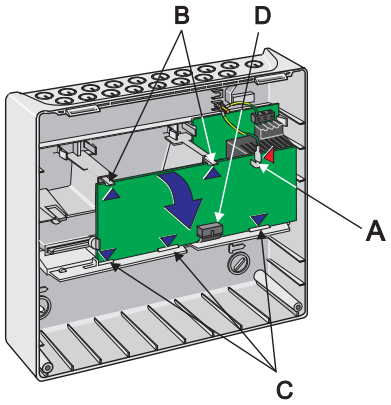
g. Socket SK1 connector for optional 2-way relay PCB.

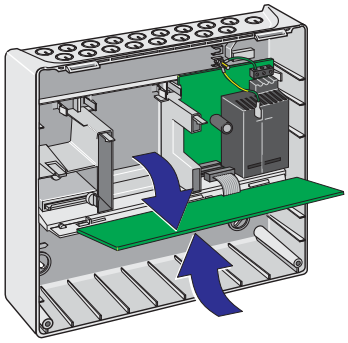
h. Cover-off detection switch

i. Access Level control switch

j. Standby battery/ charger fuse.







Removing the Main PCB

Ensure ALL power is disconnected from panel and that suitable anti-static precautions have been taken.

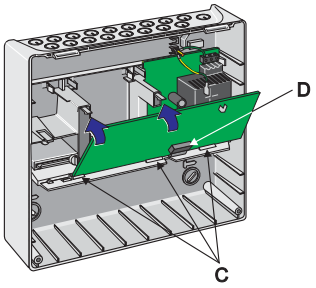
1 Disconnect the earth lead connection to the right-angled, blade connector (A) located at the top, right-hand corner of the Main PCB.

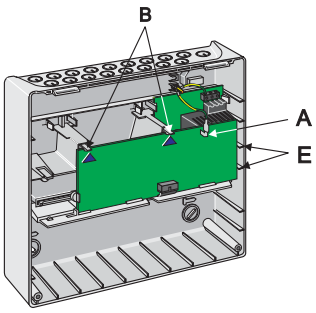
2 Carefully push up the two PCB-retaining clips (B) until the top edge of the Main PCB is free to move (the bottom edge of the PCB is still held in place by the three tabs (C).

3 Gently pull the top of the Main PCB away from the back box.

4 Disconnect the ribbon cable at socket connector SK4 (D) on the Main PCB.

Note: If the Main PCB is removed ensure the plug remains seated in the socket on the PSU PCB.





Refitting the Main PCB

The procedure for refitting the Main PCB is the reverse of the removal procedure but note the following points:

When offering the Main PCB to the three locating tabs (C) make sure that:

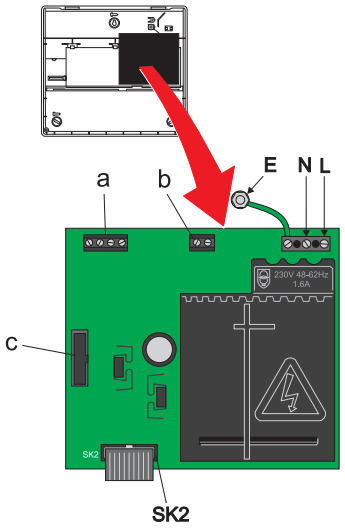
i Make the ribbon cable connection at socket connector SK4 (D) and re-connect the earth lead to the blade connector (A).

ii The ribbon cable is correctly located within the rebate on the bottom edge of the Main PCB.

iii The PCB is correctly aligned with the rebates in the side wall ribs (E) before gently pushing it home - confirmed by audible clicks from the PCB-retaining clips (B).

Note: For simplicity, the lettering of key items remains the same as for the removal process.

5.2 PSU PCB



The PSU PCB provides all power requirements for the panel when in quiescent and alarm conditions.

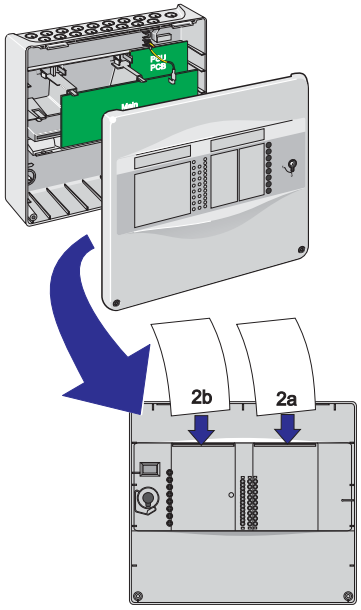
The mains supply live (L) and neutral (N) wiring is brought into the panel and terminated at the Mains Termination Block (MTB) located in the top right-hand corner of the PCB. Refer to **Section 6.4 Powering the Panel** for details on terminating the mains wiring at the MTB and the mains safety earth at the earth post (E) in the back box.

The PCB is fitted with wiring connectors for:

a. Two sounder output circuits
b. One 24Vdc auxiliary output circuit.
c. Up to two, optional-fit 8-way Relay PCB(s)
d. Up to two, optional-fit 4-way Sounder PCB(s).

Power and signal connection to the Main PCB is via the 16-way ribbon cable connector (SK2).

5.3 Label Inserts



The following paper text inserts are supplied for:

- Zonal Fire/Fault information
- Panel status.

To fit the text inserts proceed as follows:

1 Carefully remove all text inserts from the kit and select the appropriate language. Discard the rest.

2 Make sure the moulded cover is removed from the back box. With the rear face of the cover towards you:

a. The zonal text insert should be fed into the right-hand (viewed from the back) entry slot and pushed all the way down until all text is correctly displayed in the window.

b. To fit the panel status indication text insert use the left-hand entry slot (viewed from the back) and push it down until all the text is correctly displayed.

6 Commissioning

6.1 Introduction

It is recommended that the control panel is powered up and tested before connecting the field devices.

6.2 Preliminary Checks

Before connecting the mains power to the panel, check:

1. The earth lead from the safety earth post is connected to the earth tag on the Main PCB.
2. That the EOL devices are correctly terminated in the zone input and sounder output terminals and no external wiring terminations have been made.

6.3 External Wiring

6.3.1 Zone Wiring - New Installation

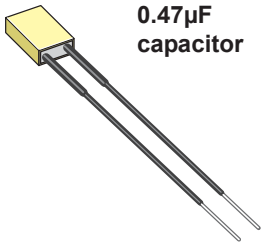
Zone wiring should not be connected to the panel at this stage.

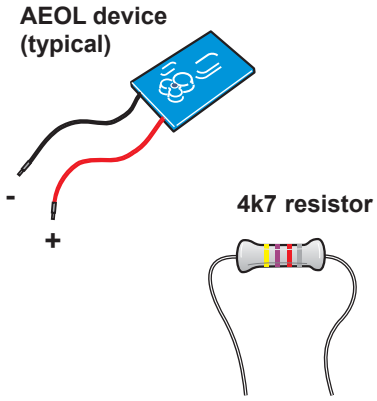
6.3.2 Zone Wiring - Retrofit Installation

Zone wiring should not be connected to the panel at this stage.

Refer to Section 7.5.6 EOL Device Type for details on how to change the configuration of the panel, as necessary, to support 4k7 resistor EOL devices.

Note: Where Active-End-of-Line (AEOL) devices exist on zone wiring these may need to be replaced with 0.47µF capacitor EOL devices. EOL device type options are described in **Section 6.7 Zone Wiring**.





6.3.3 Sounder Circuits

Sounder output circuit wiring should not be connected at this stage.

6.3.4 2-Way Relay PCB (Optional)

If the 2-way Relay PCB (PN: 020-713) is to be fitted, refer to the installation instructions supplied with it. Refer to **Section 7 Configuration** for details on configuring the two relay output circuits.

6.3.5 8-Way Relay PCB (Optional)

If fitting 8-Way Relay PCB(s) (PN: 020-747) refer to the instructions supplied with it.

6.3.6 4-Way Sounder PCB (Optional)

If fitting 4-Way Sounder PCB(s) (PN: 020-772) refer to the instructions supplied with it.

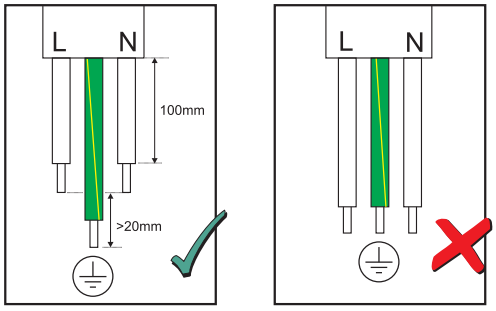
6.4 Powering the Panel

Before applying mains power to the control panel make sure that you carry out the following checks and procedures:

1 Check that you carried out all the instructions described in **Section 6.2 Preliminary Checks**.

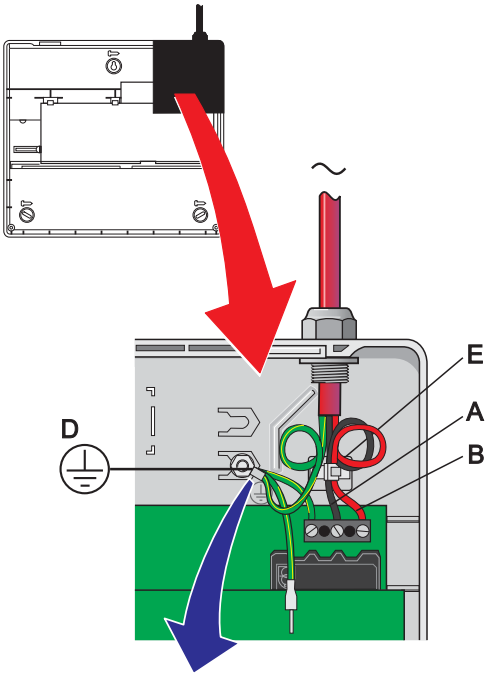
2 Prepare the mains supply wiring for connection as follows:

i Remove the outer cable sheath to provide sufficient slack, approximately 100mm, in the wiring to assist termination. Cut the Live (L) and Neutral (N) wires about 20mm shorter than the safety earth. See drawing at left.



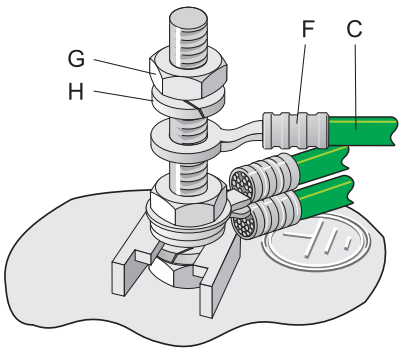
ii Form each wire in a 'pigtail' before taking it to its termination point. Route the L and N wires such that there is separation from the safety earth. See drawing at below left. Secure the L and N wiring with the supplied cable tie before terminating the L and N wiring. The safety earth should not be secured by the cable tie.

iii Connect the L and N wires (A) directly to the MTB (B). The safety earth wire (C) MUST NOT be terminated at the MTB but at the safety earthing post (D) provided. See drawing at left.



Note: The post (D) is located to the left of the mains cable tie anchor (E). A 4mm, crimp-on, ring terminal is provided for the connection of the mains safety earth wiring to the post. This crimp will accept cable conductor sizes between 0.5 to 1.5 mm^2.

iv Terminate the safety earth wire using the supplied 4mm crimp-on, ring terminal (F), 4mm nut (G) and spring washer (H) provided (see drawing at left).



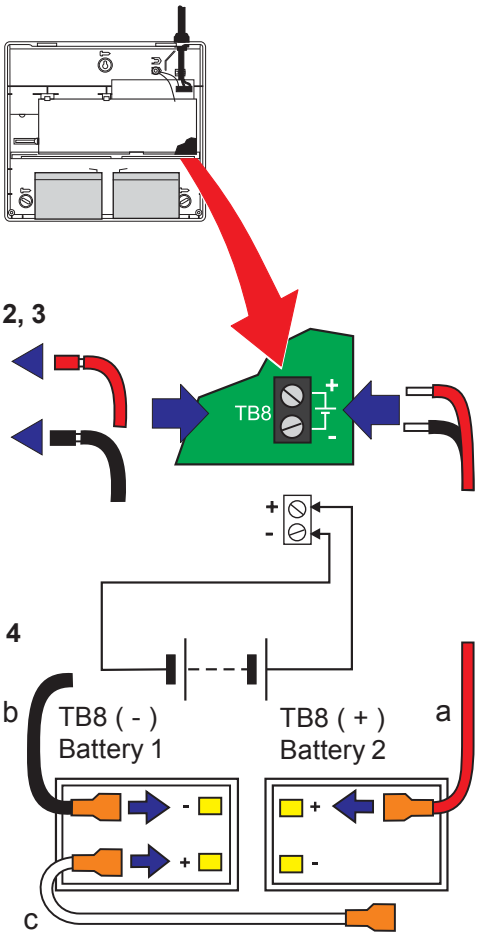
6.4.1 Standby Batteries

The panel back box can hold up to two 12V, 7Ah standby batteries. The batteries are not supplied with the panel. Refer to **Section 8 Specification** for details of recommended batteries.

Note: The panel can function satisfactorily on batteries only, if required, when mains power is not available. However, this should only be done for short periods to avoid inadvertant discharge of the batteries.

To install the batteries:

1 Install the batteries in the back box. The batteries should be positioned so that their terminals are close enough to allow connection of the short interlink cable. An air gap of at least 10mm should be maintained between the batteries to assist cooling.



Layout of battery terminals may vary from that shown above.

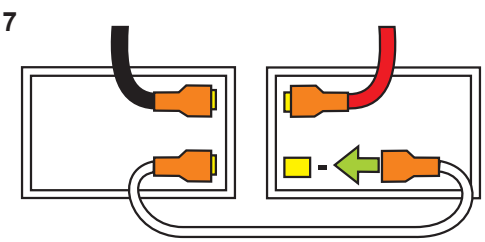
CAUTION - ENERGY HAZARD! NEVER short the battery terminals.

Battery Load Test

With the batteries connected the panel performs a regular battery wiring integrity test. A failure occurs if the measured resistance is out of range on two succesive tests.

A test failure is indicated by a PSU fault. Check for poor battery wiring connections and remedy.

If the batteries require charging the test is suspended for up to12 hours, to allow time for the batteries to recover, and re-applied.



2 Connect the batteries using the provided items:

a. Red battery lead (1 off)

b. Black battery lead (1 off)

c. Short battery interlink lead (1 off).

One end of each battery lead is fitted with a connector. The other end of the red and black battery leads should be connected to the battery charger termination block (TB8) located in the bottom, right-hand corner of the Main PCB.

Note: The insulation on the end of the red and black battery leads has been semi-stripped to facilitate connection to the termination block TB8.

3 Remove the semi-stripped insulation from the end of each battery lead. Terminate the end of each battery lead to the appropriate terminal on termination block TB8: the red lead to the **+ve** connection and black lead to the **-ve** connection.

4 Connect the other end of the red lead to the **+ve** terminal of one battery and the black lead to the **-ve** terminal of the other. Connect one end of the short interlink lead to the **+ve** connector of one battery (refer to drawing at left).

Note: The order of connecting mains and batteries to the panel is not important.

5 Turn on the AC mains supply, or connect the battery interlink lead, and verify that after power up the following indications occur:

i The POWER LED lights.

ii The buzzer sounds.

Note: This is true for both mains and batteries only. If using batteries only, ensure that they are kept charged. If the batteries are in a poor state of charge they will fail the battery load test and a PSU fault will be indicated. See the note at left regarding battery load testing.

6 When the panel is powered up the Fault and Power Supply Fault LEDs will light and the buzzer will operate intermittently.

7 Press the RESET pushbutton to extinguish the Fault and Power Supply Fault LEDs and mute the buzzer.

Note: If the panel indicates that fault(s) are still present DO NOT continue with panel commissioning until ALL such faults have been cleared. Refer to **Section 6.10 Fault Finding Chart**.

8 With no fault indications the panel is now ready for the commissioning tests to be carried out.

Recommended Battery Size

The recommended battery sizes are given in the table below. The table is in two parts: the top part recommends battery sizes when 0.47µF capacitor EOL devices are used with 2, 4 or 8 zone panels and with 24hr or 72hr battery backup. The second part recommends battery sizes when 4k7 resistor EOL devices are used with 2, 4 or 8 zone panels and with 24hr or 72hr battery backup.

The table below gives a quick guide to the battery size required, provided that no load is connected to the auxiliary output on the PSU PCB. If you need more detail, or have connected an auxiliary load, please refer to the full calculation table in **Section 9 Battery Calculation**.

Note that the table below may specifiy slightly larger batteries than using the calculation in Section 9.

EOL	Alarm Current	Standby Time	2 Zone	4 Zone	8 Zone
0.47µF Capacitor	Up to 1A	24hrs	2.8	2.8	2.8
	Up to 1A	72hrs	7	7	7
4k7 Resistor	Up to 1A	24hrs	2.8	7	7
	Up to 1A	72hrs	7	7	7*

* Maximum of 2 zones with 4k7 EOL



CAUTION
Batteries less than 2.8Ah should not be used.

Using Larger Battery Sizes

The largest battery size that can be installed in the back box is 7Ah. **Batteries less than 2.8Ah should not be used**.

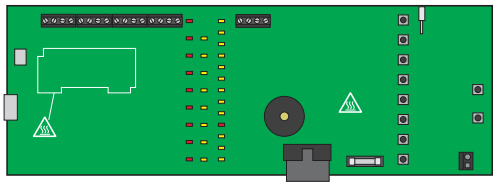
Battery Disposal

As a mimimum, replace batteries every four years.

Always dispose of batteries in accordance with the battery manufacturer's recommendations and local regulations.



CAUTION - Heat Hazard! Under certain fault conditions PCB areas identified by this symbol may reach high temperatures.



6.5 Configuration and Handover

After all external wiring has been connected to the panel and with no faults existing, the panel can be configured for the particular system requirements.

After configuration has been completed and after any faults revealed have been rectified, the system will be ready for commissioning tests.

The configuration process is only possible with the panel at access Level 3. Access Level 3 can only be achieved when the front cover is **not** fitted (refer to Section 2.5.1 Removing the Cover). With the cover removed, while holding down the → 3 pushbutton, press the following pushbuttons in the order given - [1], [5] and [1]. Access Level 3 state is confirmed by the rapid flashing of the FIRE LED.

6.6 Commissioning Tests

The following tests should be carried out after panel configuration is complete. Refer to the User Manual (997-493-00X-X) sections as listed below:

Test LEDs - refer to Section 6.1
Test zones - refer to Section 6.2
Test buzzer - refer to Section 6.1
Test outputs - refer to Section 6.2.

6.7 Zone Wiring



EN 54-2 & ISO 7240-2: Annex D

Not more than 32 fire detectors and or MCP's may be connected to one zone.

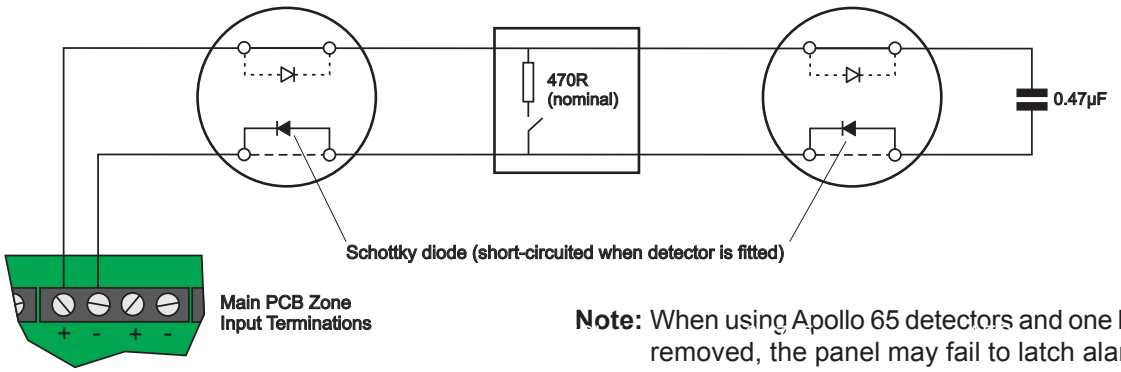
All methods support installations where detectors and MCPs are segregated into different zones with separate wiring. This is necessary to comply with local standards in some areas and also if a delay strategy is used.

Methods 1 and 2 support connection of MCPs and detectors in any order and require the use of Schottky diode bases.

Method 3 requires MCPs to be connected electrically nearer to the panel ahead of any detectors. Either standard or Schottky bases may be used.

Method 1: Recommended

This method is recommended for all new systems. The capacitor EOL allows the panel to provide enhanced fault detection with lower power consumption than methods described below.

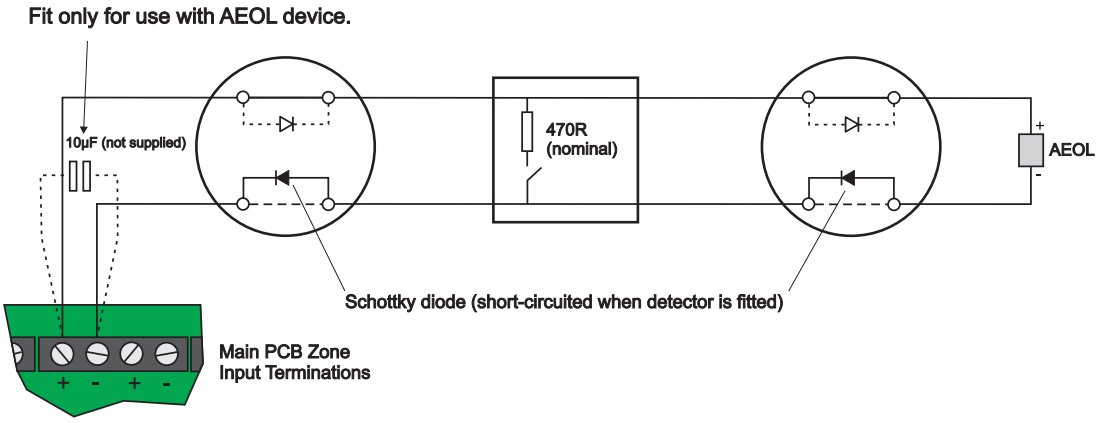


Note: When using Apollo 65 detectors and one has been removed, the panel may fail to latch alarms from

all detectors located between the removed device and the panel. Although the use of a capacitor EOL device meets the requirements of the standards, method 2 should be used when alarm latching of all detectors is required with one removed.

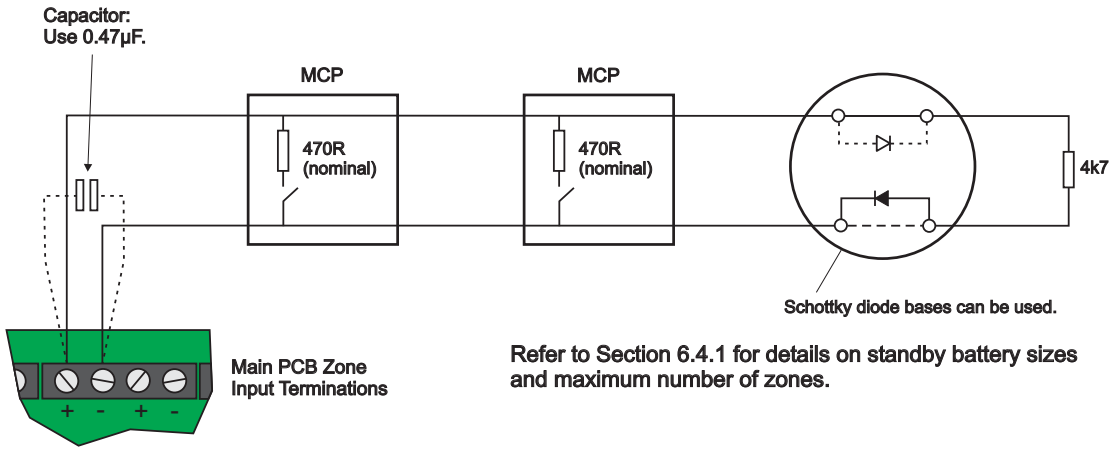
Method 2:

Supports new and existing installations using Active End-of-Line (AEOL) - PN: 020-417. For the AEOL to function correctly an additional 10µF stabilising capacitor must be fitted across the zone terminals (not supplied - order PN: 020-743).



Method 3

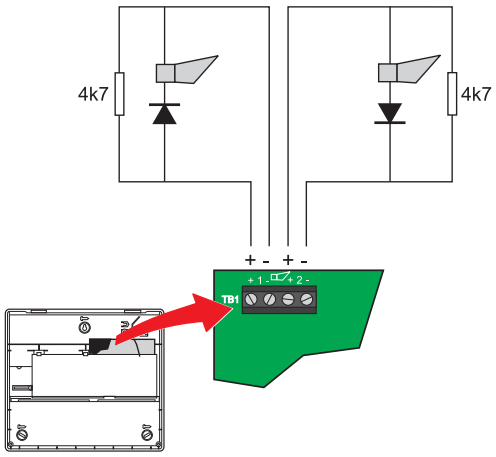
Supports existing installations where there is a 4K7 resistor EOL fitted already and it is preferable to install the panel without modifying the existing wiring. Call points must be wired nearer to the panel than detectors.



Refer to Section 6.4.1 for details on standby battery sizes and maximum number of zones.

6.8 Sounder Circuits

Two sounder output circuits are provided. The termination block, TB1, for the sounder circuits is located at the top left-hand corner of the PSU PCB.



DO NOT CONNECT UNTIL ALL ZONES HAVE BEEN CONFIGURED AND TESTED.

Before the sounder circuits are connected it is recommended that all detection circuits are checked to prevent the possibility of spurious alarm conditions being generated. The sounders should be polarized and suppressed using IN4002 (or similar) diodes and the circuits should be fitted with 4k7 end-of-line resistors.

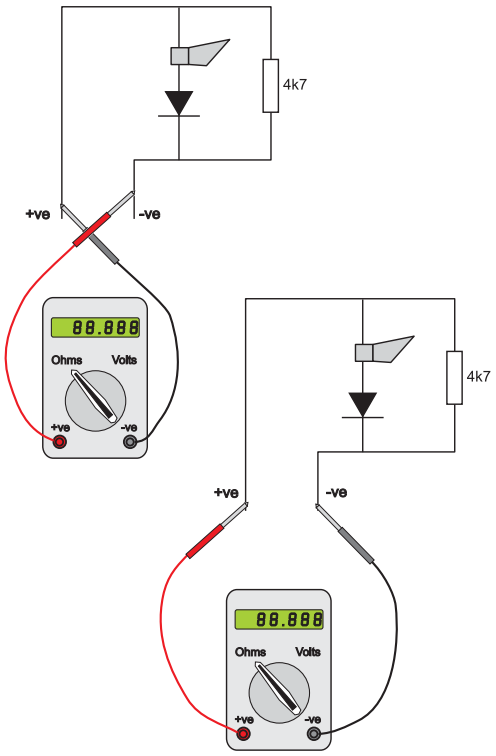
Each of the two circuits can be configured as a Sounder output, a Fire routing output or a Fault output. Refer to **Section 7 Configuration** for details.

Refer to **Section 7.6 Sounder Output Type/Delay** for restriction on the application of these sounder circuits.

EN 54-2 & ISO 7240-2 7.7.1
One output on the panel must be configured as a fire output.

EN 54-2: 8.8 & ISO 7240-2: 9.8
One output on the panel must be configured as a fault output.

EN 54-13: 5.3.4
Installations designed to meet EN 54-13 require partial short and partial open fault warning.



1 Use a low-voltage, digital multimeter to check the resistance across each of the sounder circuits:

i With the meter connected in reverse polarity (+ve to -ve and -ve to +ve) the reading should be 4k7.

ii With the multimeter connected to the circuit in normal polarity (+ve to +ve and -ve to -ve) the meter may indicate a lower value. This is because of the forward-biased diodes in series with the sounders.

2 If electronic sounders are used this test will not reveal reversed devices. It is, therefore, recommended that if the circuit appears correct the following is done:

i Remove the 4k7 resistors from the panel outputs.

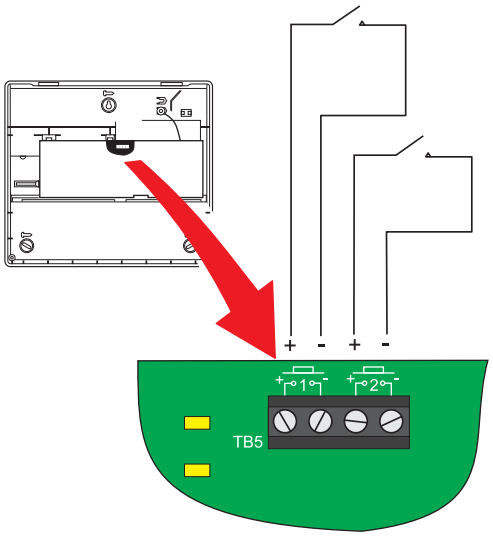
ii Connect the circuit to the panel output while observing correct polarity.

iii If there are any reversed devices the panel will indicate a fault. Re-check circuit. Locate reversed sounder wiring and correct. Panel fault indication will clear.

3 When the output circuits have been connected, they may be tested by using the SOUNDERS START/ STOP pushbutton.

i Press the SOUNDERS START/ STOP pushbutton to activate the sounders.

ii Press the SOUNDERS START/ STOP pushbutton again to stop the activation of the sounders.



6.9 Digital Inputs

Two digital input circuits are provided. Terminal block, TB5, is provided on the Main PCB for these input circuits. Each circuit is configurable, at access Level 3, as a dedicated input function - refer to **Section 7.7 Digital Inputs** for details.

6.10 Fault Finding Chart

Use this chart to identify the cause of possible problems when commissioning your system.

Indication	Possible Cause	Action
No indication on panel - buzzer not sounding	No power to panel.	Check mains supply; Check total battery voltage is >21V.
Panel in Fire state.	Incorrect EOL device.	Change EOL configuration type. Change EOL device(s)
Common Fault Indication plus:		
System Fault indication plus intermittent buzzer.	Expansion PCB(s) missing or disconnected.	Re-fit / re-connect Expansion PCB(s).
Power Supply Fault indication plus intermittent buzzer.	AC mains failed - panel operating on batteries; Batteries - poor connection/ disconnection; Battery charger fuse blown; Batteries reversed; Batteries - deep discharge state (mains supply on).	Check mains supply to panel; Check battery connections Carry out visual check; if problems persist replace units/batteries until fault clears.
Auxiliary Fault indication plus intermittent buzzer.	Auxiliary output - short circuit or overload	Check cables.
Sounder Fault/ Disabled flashing plus intermittent buzzer.	Sounder circuit fault - open or short circuit.	Carry out visual check.
Zone Fault/ Disabled/ Test flashing plus intermittent buzzer.	Zone circuit fault - open or short circuit.	Carry out visual check.
	Zone circuit fault - partial open or short circuit; excess capacitance/ cable length; dual or no EOL device; incorrect configuration of EOL.	Carry out visual check.
Earth Fault indication plus intermittent buzzer.	Unwanted connection of external cabling to earth.	Carry out visual check.
System Fault indication plus continuous buzzer.	Processor failed.	Reset system. If unable to reset or problem re-occurs - replace panel.
System Fault indication plus Common Fault indication plus intermittent buzzer.	Expansion PCB(s) missing or disconnected..	Re-fit / re-connect Expansion PCB(s).
Zone Fault/ Disable/ Test plus Disablement steady indications.	Relevant zone disabled.	Go into Test/ Disable Options and re-enable zone.
Zone Fault/ Disable/ Test plus Test steady indications.	Relevant zone in Test mode.	Go into Test/ Disable Options and take zone out of Test mode.
External sounders operating, no buzzer activation.	Class Change input operated.	Remove input.
Unable to reset.	Key in Access Level 1 position (cover on only); Alarm condition stills exist.	Turn key (cover on only); check cause of alarm - ensure broken glass replaced/ smoke cleared, etc.

7 Configuration

Access Level 3 allows input, output and control functions to be configured.

The following sections describe how to configure the panel. Each procedure requires the panel status to be at access Level 3. The state of the configurable options is indicated by the panel LEDs.

The table at left shows the functions of each pushbutton at access Level 1/ 2 and Level 3.

The Configuration menus are as follows:

1 Miscellaneous: Panel Options; System
2 Zones: either 1- 2, 1- 4 or 1- 8
3 Output circuits: 1- 4*
4 Digital Inputs: 1 and/ or 2
5 Delays: first stage; second stage.

* Each output can be configured as a monitored or volt-free relay output. Output circuits 3 and 4 can be provided using the optional 2-way Relay PCB (kit PN: 020-713).

Manual Zones

The odd-numbered zones are configured as manual, i.e. MCP-only, zones. Manual zones can be changed so they can form part of a day-time delay strategy.



ISO 7240-2 : 14.5.3e), f) Installers must make a record of the configuration details of the panel and store the information at access level 3.

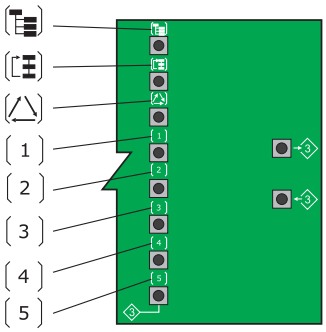
A copy of the configuration map (see the back page) marked up and dated would make a suitable record. Any change of configuration will require a new configuration record.

Level 1/ 2	Level 3
ACCEPT	Return to Top Level menu
Stop/Start Sounders	Toggle menu
RESET	Zones select
BUZZER MUTE	Numeric key '1' [1]
DELAY ON/OFF	Numeric key '2' [2]
ITEM SELECT	Numeric key '3' [3]
DISABLE TEST/ NORMAL	Numeric key '4' [4]
LAMP TEST	Numeric key '5' [5]

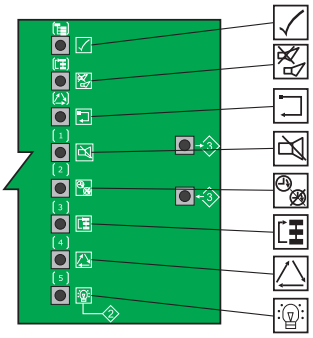
Access Levels are indicated by symbols on PCB:

◇3 = Level 3 controls
◇2 = Level 2 controls
→◇3 = enter access Level 3
←◇3 = exit access Level 3

location of Access Level 3 Functions



location of Access Level 1/ 2 Functions



7.1 Entering Access Level 3

To enter access Level 3: hold down the →◇3 pushbutton and press the following pushbuttons in the order given - [1], [5] and [1]. **Rapid flashing of the FIRE LED confirms that the panel is at access Level 3**. You can now access the configuration options in any order.

The Level 3 function of each pushbutton is indicated using an icon within brackets immediately above each pushbutton.

Press the following pushbuttons to select menu options:

[1] - Panel/ System Options
[2] - Zone Input/ EOL Type
[3] - Output Type/ Delay
[4] - Digital Inputs
[5] - Delays.

Press [ ] to cycle through the sub-menu. Press [ ] at anytime to return to the Top Level menu.

See the configuration map on the back cover of this manual for a quick reference guide.

7.2 Panel Options - A

Four user-configurable panel options are available:

a. Enable/Disable Engineering Mute

b. Enable/Disable Commissioning Mode

c. ACCEPT pushbutton access level

d. LAMP TEST pushbutton access level.

e. Delay Lights DISABLEMENT LED

7.2.1 Engineering Mute

The operation of the panel's buzzer can be changed so that it operates only occasionally with a Fire state, fault condition or during any active configured first stage delays. This can be selected independently of Commissioning Mode.

The default is Engineering Mute disabled.

7.2.2 Commissioning Mode

The panel can be put in Commissioning Mode to assist the commissioning process.

In this mode, most faults are indicated after 4 secs instead of the normal 20 secs delay to aid fault finding. Commissioning Mode times-out automatically 60 secs after the cover is replaced. Selection of commissioning Mode automatically selects the Engineering Mute function.

7.2.3 ACCEPT Pushbutton Access Level

The ACCEPT pushbutton can be configured to operate at access Level 1 or 2. The default operation is access Level 2.

7.2.4 LAMP TEST Access Level

The LAMP TEST pushbutton can be configured to operate at access Level 1 or 2. The default operation is access Level 2.

7.2.5 Delay Lights DISABLEMENT LED

EN 54-2 and ISO 7240 Annex E acknowledges that delays may be permanently configured in the normal mode of operation of the equipment, (e.g. day mode) and in such cases there is no need for a disablement indication. Use this option when the DISABLEMENT LED is required to indicate any configured delays.



EN 54-2 & ISO 7240-2: Annex E Does not require delay indicated as a disablement.

7.3 Panel Options - B

The following options are selectable:

a. Non-latched faults

b. Pulse Fire Routing outputs

c. FBF Fire Routing disable - forces off

d. Re-sound - new zone in alarm

e. Mains fault delay.

7.3.1 Non-latched Faults

When enabled, this option allows faults and fault indications to clear automatically. The buzzer can still be silenced while a fault is shown on the panel (it will resound if the fault reoccurs). By default the option is disabled and fault indications require manual intervention to clear.

Non-latching only affects the following fault conditions:

a. Zone Faults
b. Earth Fault
c. Power Supply Fault
d. Sounder Fault
e. Fire Output Fault
f. Fault Output Fault
g. Auxiliary Supply Fault.

Note: System Fault remains latching at all times.

7.3.2 Pulse Fire Routing Outputs

When this option is selected the fire routing ouput is activated for a period of 5 secs only (pulsed). Continuous activation of the routing output is the default.

7.3.3 FBF Fire Routing Disable - Forces Off

VdS requirement only.

7.3.4 Re-sound - New Zone in Alarm

By default, after the panel has received a fire event and the sounders have been silenced using the SOUNDERS START/STOP pushbutton, a new fire event, but in another zone, will activate the sounder outputs again. This option allows the configuration of sounder outputs to ignore any new zones in fire after the sounders have been silenced.

7.3.5 Mains Fault Delay



EN 54-4: 5.4
A mains fault MUST be indicated within 30 minutes.



ISO 7240-4 : 5.4
A mains fault MUST be indicated within 100 seconds.

By default, a mains fault is indicated within 10 seconds. This option allows the delay to be extended to 30, 60 or 90 minutes. The 60 minute and 90 minute options do not comply with EN 54 (see information at left).

Note: The Non-latched faults and Mains fault delay options can be used together. For example, if the delay is set to 30 minutes then the fault is indicated after this time. The indication is removed automatically 10 seconds after the fault is cleared.

7.4 System Options

The following options are selectable:

a. Clear Checksum
b. Select Default Configuration

7.4.1 Clear Checksum

Use this selection to clear user configuration checksum faults.

7.4.2 Select Default Configuration

This enables the panel to be returned to the factory-configured state. When System LED 2 is lit the panel is in the factory-configured state.

7.5 Fire Zone Input Type

Fire input zones can be configured as follows:

a. Latching/non-latching alarms
b. Alarm or for short-circuit operation
c. Auto or manual operation mode
d. Coincident-alarm or separate-alarm detection
e. Setting a Sprinkler Verification Time.
f. EOL Device Type.

EN 54-2: & ISO 7240-2: 7.6
1. Configuring a local detection zone as non-latching contravenes the requirements of EN54 and ISO 7240.

2. Reset from an alarm state must be a manual operation at access Level 2.

7.5.1 Latching/Non-latching Alarms

A detection zone can be configured as latching or non-latching. When selected as latching, if the panel enters the fire (or fault) state this condition will remain active until the panel is reset. When selected as non-latching, the panel state returns to normal once the input condition has been cleared. The default is latching.

EN 54-2 : 8.2.4a) & ISO 7240-2 : 9.2.4a) The panel must indicate a fault condition for a short circuit.

7.5.2 Alarm or Short-circuit Operation

The panel can be configured to respond to a short-circuit input on a zone as a fire or fault condition. The default is fault indication.

Caution: You will contravene the requirements of EN 54-2 if you configure short-circuit as a fire condition. For guidance, refer to appropriate local fire standards.

7.5.3 Auto/ Manual Zones

The panel has the following factory-configured default:

a. Odd-numbered zones - manual zone, i.e. no delay to activation of outputs, used with MCPs. Manual zones will always cause immediate entry into the Fire state.
b. Even-numbered zones - auto. detection, i.e. if configured for day-time delay strategy, outputs will be delayed as per the delay strategy.

Note: If no delay strategy is being used (default panel setting) this operation has no effect.

Any zone can be configured as manual or auto action.

7.5.4 Coincidence Detection

The panel will, by default, indicate a fire condition when a single device on a single zone goes into alarm.

The panel can be configured so that to enter a full fire condition, two zones must be in the fire state. Coincidence detection is only supported for pairs of zones, i.e. zone 1 concident with 2, zone 3 coincident with 4, etc. When configured, upon the first zone going into fire the respective zonal fire indicator illuminates, the panel enters the alert state but the general fire LED does not light.

Note: Zone pairs set for coincidence detection are forced to function as auto zones.

On the second fire alarm zone the standard fire sequence will be followed for both input zones.



EN 54-2: & ISO 7240-2: 7.1.3
The panel must respond to an input within 10 secs.

7.5.5 Sprinkler Verification Time

A 2 sec. verification time is applied to all inputs to reduce the occurrence of false indications of alarm due to transient phenomena. When monitoring an input from a sprinkler system it may be necessary to configure a sprinkler verification delay. This is an exceptional situation and will require the approval of a fire officer.

7.5.6 EOL Device Type

Use this option to change the default EOL device type from a capacitor to a resistor when the panel is used for retrofit installations.

Note: Failure to do this on retrofit installations may cause the panel to enter the Fire state, with consequent operation of the sounders.

7.6 Sounder Output Type/ Delay



EN 54-2: & ISO 7240-2 7.7.1
One output on the panel must be configured as a fire output.



EN 54-2: 8.8 & ISO 7240-2: 9.8
One output on the panel must be configured as a fault output.

The two sounder circuits and two optional relay circuits, if fitted, are each configurable as one of the following:

a. Sounder output
b. Fire routing output
c. Fault output.
d. Local Alarm Output.

Up to two optional, 8-way Relay PCB(s) can be fitted. Each PCB can be independently configured to provide one of the following functions:

e. Repeat Zonal Output
f. Coincident Zonal Output
g. Repeat Zonal Output (zones 1-4) and Shop Interface Outputs
h. Inputs and Shop Interface Outputs.

Up to two optional, 4-way Sounder PCB(s) can be fitted. Each PCB can be independently configured to provide monitored sounder, fire or fault routing output.

EN 54 and ISO 7240-2 and local installation guidelines impose requirements on the application of outputs. Please consider the following when configuring the different output types available on this CIE:

i One output on the panel must be configured as a fire output, (EN 54-2 & ISO 7240-2: 7.7.1).
This may be an unmonitored relay output.

ii One output on the panel must be configured as a fault output. (EN 54-2: 8.8 and ISO 7240-2: 9.8).
This may be an unmonitored relay output.

iii If an EN 54-2 or ISO 7240-2, 7.8 monitored sounder output is required an unmonitored relay is not suitable, use a monitored sounder output (either PSU PCB or 4-way sounder output PCB).

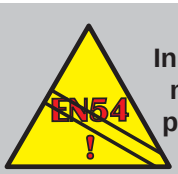
iv If an EN 54-2 or ISO 7240-2, 7.9 monitored fire alarm routing output is required an unmonitored relay is not suitable, use a monitored sounder output (either PSU PCB or 4-way sounder output PCB).

v) If an EN54-2 or ISO 7240-2, 7.10 monitored fire protection output is required use the optional 4-way

sounder output PCB, NFS-SST(English PN: 020-769-001) or NFS8V-SST (German PN: 020-769) Display Boxes and Routing Termination kit (020-773).

vi If an EN 54-2 or ISO 7240-2, 8.9 monitored fault routing output is required both relay and PSU PCB sounder outputs are unmonitored in this mode. For this application use the optional 4-way sounder output PCB.

vii Note: PSU PCB sounder circuits do not comply with EN 54-13 partial-open-, partial-short-circuit requirements. For this application use the optional 4-way sounder output PCB.



EN 54-13: 5.3.4 Installations designed to meet EN 54-13 require partial short and partial open fault warning.

7.6.1 Select Output

Select Sounder 1, Sounder 2, or if the 2-way Relay PCB is fitted, Relay 1 or Relay 2. The default selection is Sounder 1. Press [1] to select another output.

7.6.2 Select Type



Sounder output types 'sounder' and 'pulsed' must not be mixed on the same installation to avoid confusion of the evacuation signal.

Having selected the appropriate output circuit now select one of the following: Sounder, Fire Routing Output, Fault output, Local Alarm Output or Pulsing Sounder Output. The default type for Sounder circuits 1 and 2 is Sounder.

Press [2] to select an alternative type.

Notes:

1 The Local Alarm Output does not activate with non-latched zones (assumes non-latched zones are from external panels).

2 The pulsing option will activate the selected sounder/relay outputs as follows: one second ON / one second OFF.

7.6.3 Select Delay

These outputs can be configured as part of a strategy to delay the operation of sounder and/ or fire routing outputs during daytime operation.

Each sounder/ fire routing/ fault routing/ local alarm output can be configured with a two-stage delay (see **Section 7.8 Primary and Secondary Delays**). Once configured the DELAY ON/OFF pushbutton or a Digital Input are used to enable the delay to outputs. This panel state is confirmed by the illumination of the DELAY ON LED (default configuration). If required, the panel may also be configured to light the DISABLEMENT LED when the delay mode is active (refer to 'Panel Options - A' of the configuration menu located at the back of this manual).

7.7 Digital Inputs



EN 54-2 & ISO 7240-2 Level 2 Keyswitch access MUST be used with these inputs.

Two digital input circuits are provided for connection to ancillary equipment, if required. Each circuit can be configured to provide one of the following input actions:

a. Class change (default)
b. Alert
c. Evacuate
d. Delay Mode (default)
e. Reset
f. Fire transmission confirmed return signal (latched or non-latched)

g. Fault transmission failed return signal.

Class Change: When a class change digital input is activated, all outputs configured as sounders will be activated until the input condition is removed.

Alert: When an alert digital input is activated, all outputs configured as sounders and the internal buzzer start pulsing. The sounders and internal buzzer remain pulsing until the digital input is deactivated. Alert operation will override class change and fault conditions, but not the alarm condition.

Note: If the sounder output is configured as type 'pulsed' then an alert input will cause the sounder outputs and internal buzzer to turn on with a steady tone.

Evacuate: When an evacuate digital input is activated, a general evacuate is initiated, i.e. all the bells activate, until the input condition is removed.

Note: If the sounder output is configured as type 'pulsed' then an evacuate input will cause the sounder outputs and internal buzzer to pulse.

Delay Mode: This allows external control of delays to outputs. It can be used to delay activation of outputs during the day and so this use is commonly known as Day Mode. When this input is active, delays can still be cancelled using the 'Delays On/Off' button.

Reset: This digital input can be used to return the panel to normal operation after the occurrence of an event, such as an alarm or fault. Faults are latching and a reset cannot return the panel to normal until the condition causing the fault has been remedied.

Fire Transmission confirmed return signal: This type of digital input provides the ability to confirm the activation of the Fire Routing Output. Selection of either a latched or non-latched activation signal is available.

Fault Transmission failed return signal: This type of digital input provides the ability to route Fault Routing Output faults back to the panel. It is assumed that the external equipment will provide the necessary fault monitoring of the routing output and provide feedback to the panel.

7.7.1 Select Input

Select Digital Input circuit 1 or 2. The default selection is input 1. Press ⟨ 1 ⟩ push-button to select the other output.

7.7.2 Set Type

Digital input 1 is configured, by default, as a Delay Mode input. Digital input 2 is configured, by default, as a Class Change input. Press ⟨ 2 ⟩ push-button to select another type.

7.8 Primary and Secondary Delays

A day-time delay strategy can be implemented, if required, which comprises two user-configurable delay periods to allow a fire search to take place. These delay periods are referred to as primary and secondary. On an auto detection zone, every fire state places the panel in a full alarm, hold-off state until the indicated fire event has either:

a. Been verified as true after the search and then manually-terminated (at the panel or by operating an MCP), or

b. The primary delay period expires, thereby automatically operating the configured outputs (e.g. sounders).

If the ACCEPT pushbutton is pressed during the primary delay period the delay to outputs is extended by the length of the configured secondary delay. The maximum total duration of a configured delay to outputs is 10 minutes, even if the sum of the configured primary and secondary delays exceeds this limit. Once the ten-minute delay period has expired the outputs will be activated automatically.

7.8.1 Select Primary Delay Time

Specify the first stage of the delay to outputs. The default is 30 secs. Press the ⟨ 1 ⟩ push-button to specify another primary delay period up to 120 secs in 30 sec increments.

7.8.2 Delay toTransmission Device

Activation of the transmission device output may be subject to a delay. Press the ⟨ 2 ⟩ push-button to toggle the delayed/immediate action. The default condition is ‘delayed’.

7.8.3 Select Secondary Delay Time

Specify the second stage of the delay to outputs. The default is 1 minute. Press the ⟨ 2 ⟩ push-button to specify another secondary delay period up to 10 minutes in 1 min increments.

7.8.4 Two-zone Override Delay

Delays to outputs are overridden when a second zone goes into fire. This default can be changed so that a second zone going into fire does not override an active delay.

7.9 Configuration Examples

The following examples are provided to offer guidance when navigating through some of the menu options.

Note: If you lose your way at any time, simply press the 'main menu' pushbutton (menu) to return to the menu select position.

Example 1

How do I configure the panel back to the factory default state?

Ensuring that the panel is at access Level 3 (refer to earlier in this section). Use the icons in brackets (located above each pushbutton) when proceeding:

Press the following pushbuttons in the order shown:

(1) - Selects Miscellaneous option

(menu) - Press twice to select 'System' sub-item menu

(2) (hold for 5 seconds) - System LED 2 lights to indicate the factory default condition has been restored.

Press the (menu) pushbutton to return to the top level and select another configuration menu option. To take the panel out of access level 3, press the ◇3 pushbutton.

Note: The panel remains at access Level 2 until the cover is relaced when access level is dependent on key position.

Example 2

How do I set a delay of 1 min for sounder output circuit 2?

With the panel at access level 3, press the following pushbuttons in the order shown:

(3) Selects Sounder Outputs option

(1) Use to select sounder circuit 2

(3) Use to select delay to output - LED 12 illuminates to confirm selection of sounder circuit delay.

To enable the configured output delay for sounder circuit 2, and with the panel at access Level 2, the (delay) pushbutton must be pressed and the DELAY ON and DISABLEMENT LEDs illuminate to confirm the panel has a delay to outputs configured.

Press the (menu) pushbutton to return to the top level and select another configuration menu option. To take the panel out of access level 3, press the ◇3 pushbutton.

8 Specification

General

The Fire Control Panel meets the requirements of EN 54-2/4 and ISO 7240-2/4. See Section 1.4 CE Marking for further details.

Mechanical:

Construction: Fire-resistant, ABS plastic moulded front cover and back box. Cover contains all user interface controls and visual indicators.

Dimensions (mm): 318(h) x 356(w) x 96(d)

Approx. Weight: 2kg (no batteries)

Environmental:

Climatic classification: 3K5, (IEC 721-2-3)

Operating temperature: -5°C to +45°C, (recommended +5°C to 35°C)

Humidity: 5% to 95% R.H.

Height above sea level: Maximum, 2000m

Panel sealing: IP 30, (EN 60529)

Vibration: EN 60068-2-6, 10-150Hz at 0.981ms^{-2}, 0.1g_n (Meets the requirements of EN 54-2/4)

EMC: Emissions: EN 61000-6-3

Immunity: EN 50130-4

Safety: EN 60950

Indicators and Controls:

LED Status indicators: Alarm, Zonal Fire, Zonal Fault, Power, General Fault, General Disablement, Test, Delay On (active), System Fault, Earth Fault, Power Supply Fault, Sounder Fault/Disabled, Fire Routing Active, Fire Routing OutputFault/Disabled, Fault Output Fault/Disabled, Auxiliary Fault.

Controls:

Two-position keyswitch:

Level 1 (key removed or in ‘remove’ position)

Level 2 access (key turned 90° clockwise).

Dedicated push-buttons are provided for the following functions:

ACCEPT, SOUNDERS STOP/START, RESET, BUZZER MUTE, DELAY ON/OFF, ITEM SELECT, DISABLE/TEST/NORMAL, LAMP TEST.

External Connections:

Cable entry: 18 x 20mm knock-outs on top face of back box. One 25mm x 50mm knock-out on rear wall of back box.

Electrical:

Classification: A combination of Installation Class 1 and Class 2 (panel must be earthed).

Conductor size: Compatible with cable conductor sizes: 0.5mm^2 to 2.5mm^2 .

Supply Rating:

Mains supply to the panel is to be provided via an external, double-pole, mains-isolation unit. The supply rating is:

230V~ (ac) ±15%, 50/ 60Hz, 1.6A.

Power Supply Specification:

Input Fuse rating: T 1.6A H 250V

Output ratings:

Output voltage: 18.5 - 28.5Vdc

Output current: 1.8A (includes charger current - charger disabled during alarm)

Ripple voltage: 200mV (peak-to-peak)

Output Ratings - Charger:

Charger voltage: 27.3Vdc at 20°C (temperature-compensated at -3mV/°C/cell)

Charger current: 0.4A

EN54 Battery Wiring Test Impedance: 0.8 Ohm

EN54-4 PSU Loadings:

$I_{max(a)}$ = 350mA @ 27Vdc

$I_{max(b)}$ = 1.8A @ 27Vdc

Range of battery size charged to 80% in 24hrs:

2.8Ah - 7Ah

Recommended Standby Battery Sizes:

24 hour standby period - 2.8, 3.3 or 7Ah

72 hour standby period - 2.8, 3.3 or 7Ah.

Note 1: Internal batteries - sealed lead-acid types are recommended. The following manufacturers/ type are recommended: Yuasa-NP, Fiamm FG and Jackyl.

Note 2: To ensure compatibility with the battery wiring test batteries are to be 2.8Ah or greater. However, smaller Ah sizes will be compatible if the manufacturer's stated initial charged internal resistance per battery is less than 80mOhms.

Note 3: The batteries should be replaced at intervals not exceeding four years. Their lifetime is dependent upon the ambient temperature; refer to manufacturer's technical specification for guidance.

EN 54-13 : 5.3.4.1, 5.3.4.2



PSU PCB circuits do not comply with the requirement for partial-open and -short circuit fault monitoring on fire alarm device, fire routing and fault routing outputs.

Outputs:

Sounder Circuits:

Two outputs configurable as sounder, fire routing output or fault output and each rated at 0.5A. The sounder and fire routing outputs are monitored.

18.0 - 28.5Vdc, (24Vdc nominal) rated at 0.5A.

Note: If the total alarm current (sounders + fire + Auxiliary output) exceeds a total load of 1A, you must check the total alarm load using the Battery Calculation in Section 9.

Zone Circuits:

Factory-supplied two, four or eight detector zones.

The quantity of detectors per zone equals 2.0mA divided by the individual detector's quiescent current rating - see manufacturer's data sheets - e.g. for a detector quiescent rating of 75µA; the quantity of detectors:

= 2.0mA ÷ 75µA = 26 detectors.

Auxiliary DC Output:

18.0V - 28.5Vdc (24Vdc nominal) rated at 0.5A

Note: The length of any cables connected to the auxiliary output must not exceed 30m.

EN 54-2: &
ISO 7240-2 7.7.1



One output on the panel must be configured as a fire output.

Optional 2-Way Relay PCB providing:

A Fire Relay Output
A Fault Relay Output

Each relay is rated at 30Vdc, 1A.

Note: To comply with the requirements of EN 54-2: 8.8, if the 2-way Relay PCB is not fitted one of the sounder circuits must be configured as a fault output.

Optional 8-Way Relay PCB providing up to 8 outputs per PCB (two PCBs may be fitted). Relay contact functions are configurable using jumper links to provide the following:

Repeat Zonal Output or

Coincident Zonal Output or

Repeat Zonal Output (zones 1-4) and Shop Interface Outputs or

Inputs and Shop Interface Outputs

Max current (per PCB):

Quiescent - 0.1mA

Alarm/ all active - 80.1mA

Each relay is rated at 30Vdc, 1A

Fire resistor: Nominal 470R ±5%

Optional 4-way sounder PCB supporting four configurable monitored outputs and two configurable input circuits. Various preset combinations of input and output functions are selected via a DIP switch. By using the supplied end-of-line termination the 4-way sounder PCB is able to provide sounder, fire routing and fault routing outputs as required by EN 54-2 and ISO 7240-2. These outputs are all monitored for partial-short and partial-open circuit faults as required

by EN 54-13. A fault of the 4-way sounder PCB is indicated by the Auxiliary fault indicator. The following output options are configurable:

- Sounder output
- ÜE transmission circuit
- Fire protection output (SST)
- Fire routing output
- Fault routing output

The following input options are configurable:

- Fire transmission confirmed
- Fault transmission confirmed
- Class change
- Day Mode

Maximum ouput current (per PCB):

For two or more ouputs (if DIP switch 6 set to >250mA): 1.5A

For each output (if DIP switch 6 set to <250mA): 250mA

Digital Inputs: 2 x 32Vdc.

Digital Inputs:

0- 32Vdc or contact closure.

Low = 0 - 1.35Vdc
High = 3.15 - 32Vdc.

9 Battery Calculation

The table in Section 6.4.1 Standby Batteries can be used to select the correct battery size. If full calculations are required use the procedure below.

General Data

The values given at right are for a basic panel fit, i.e. with the internal PSU but without any optional PCBs fitted.

PSU size	Maximum No. of sounder Circuits	Maximum External Alarm Load	Internal Battery Size Range
1.8A	2	1A	2.8 - 7Ah

Standby Load (Amps)

Standby Load in Amps	No.	Current	Total
Basic panel	1	0.034	0.034
Device quiescent current (max 2mA per zone)			
EOL Current (per zone) - fitted with Resistor EOL		0.0056	
Optional 4-way Sounder PCB(s)	0/ 1/ 2	0.047	
Auxiliary equipment *			
Total Standby Load (L1)			

Peak/ Alarm Load (Amps)

*** Ensure that any current taken from the Auxiliary output through the relay circuits are included in the 'Auxiliary equipment' boxes for alarm and quiescent.**

**** If an external PSU is not being used for the Sounder PCB(s) ensure that the battery calculations cover the loading of these circuits, including the quiescent current(s). If using an external PSU for the 4-way sounder PCB(s) enter a value of '0' in the last column.**

Alarm Load in Amps	Qty	Current	Total
Basic panel	1	0.034	0.034
Zones alarm current	2/ 4/ 8	0.03	
Optional 2-way Relay PCB	0/ 1	0.04	
Optional 8-way Relay PCB(s)	0/ 1/ 2	0.08	
Sounder output 1			
Sounder output 2			
4-way Sounder PCB outputs **			
Auxiliary equipment *			
Total Alarm Current (L2)			

Total <1.8A

Calculation

C_{min} = 1.25 {(L1 x T_1) + (2 x L2 x T_2)}

= 1.25 x ..... A

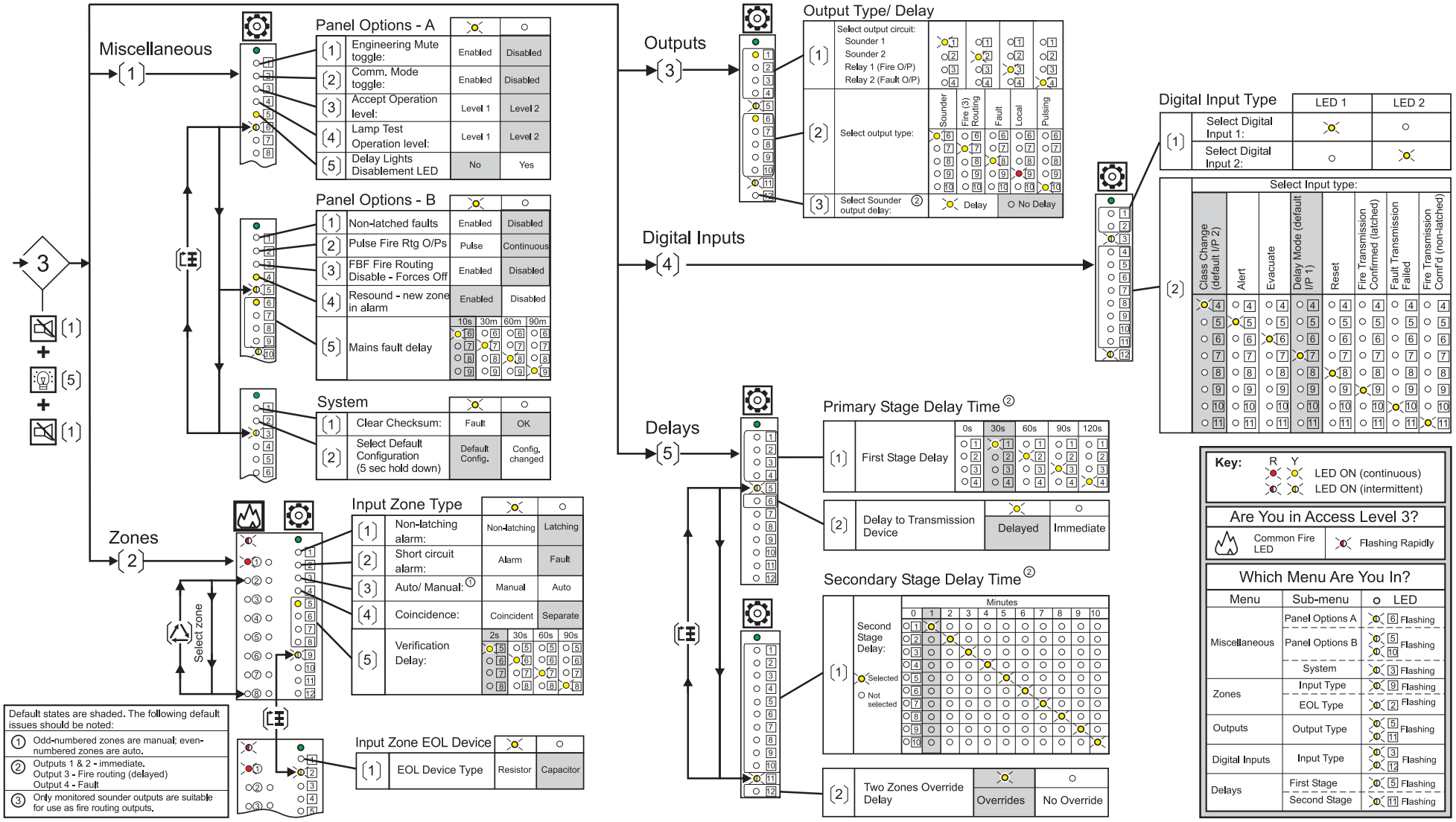
= ..... Ah

Next available battery ..... Ah

T_1 = Standby time in hours, e.g. 24, 72, etc.

T_2 = Alarm time in hours.

This formula calculates the battery capacity required to provide the specified standby period plus half-hour alarm load in accordance with BS5839 Part 1 and LPS1014.


Miscellaneous
Panel Options - A
(1) Engineering Mute toggle: Enabled Disabled
(2) Comm. Mode toggle: Enabled Disabled
(3) Accept Operation level: Level 1 Level 2
(4) Lamp Test Operation level: Level 1 Level 2
(5) Delay Lights Disablement LED No Yes
Panel Options - B
(1) Non-latched faults Enabled Disabled
(2) Pulse Fire Rtg O/Ps Pulse Continuous
(3) FBF Fire Routing Disable - Forces Off Enabled Disabled
(4) Resound - new zone in alarm Enabled Disabled
(5) Mains fault delay 10s 30m 60m 90m
System
(1) Clear Checksum: Fault OK
(2) Select Default Configuration (5 sec hold down) Default Config. Config. changed
Zones
Select zone
Input Zone Type
(1) Non-latching alarm: Non-latching Latching
(2) Short circuit alarm: Alarm Fault
(3) Auto/ Manual: ① Manual Auto
(4) Coincidence: Coincident Separate
(5) Verification Delay: 2s 30s 60s 90s
Input Zone EOL Device
(1) EOL Device Type Resistor Capacitor
Default states are shaded. The following default issues should be noted:
① Odd-numbered zones are manual; even-numbered zones are auto.
② Outputs 1 & 2 - immediate. Output 3 - Fire routing (delayed) Output 4 - Fault
③ Only monitored sounder outputs are suitable for use as fire routing outputs.
Outputs
Output Type/ Delay
(1) Select output circuit: Sounder 1 Sounder 2 Relay 1 (Fire O/P) Relay 2 (Fault O/P)
(2) Select output type: Sounder Fire (3) Routing Fault Local Pulsing
(3) Select Sounder output delay: ② Delay No Delay
Digital Inputs
Digital Input Type LED 1 LED 2
(1) Select Digital Input 1:
Select Digital Input 2:
(2) Select Input type:
Class Change (default I/P 2)
Alert
Evacuate
Delay Mode (default I/P 1)
Reset
Fire Transmission Confirmed (latched)
Fault Transmission Failed
Fire Transmission Comf'd (non-latched)
Delays
Primary Stage Delay Time ②
(1) First Stage Delay 0s 30s 60s 90s 120s
(2) Delay to Transmission Device Delayed Immediate
Secondary Stage Delay Time ②
(1) Second Stage Delay: Selected Not selected Minutes 0 1 2 3 4 5 6 7 8 9 10
(2) Two Zones Override Delay Overrides No Override
Key: R Y LED ON (continuous) LED ON (intermittent)
Are You in Access Level 3?
Common Fire LED Flashing Rapidly
Which Menu Are You In?
Menu Sub-menu LED
Miscellaneous Panel Options A 6 Flashing
Panel Options B 5 10 Flashing
System 3 Flashing
Zones Input Type 9 Flashing
EOL Type 2 Flashing
Outputs Output Type 5 11 Flashing
Digital Inputs Input Type 3 12 Flashing
Delays First Stage 5 Flashing
Second Stage 11 Flashing

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