

# NFS3-EXT

997-551-000-1, Issue 1 January 2007

**extinguishant  
control panel  
operation and  
maintenance  
manual**

# Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
<b>2</b>	<b>Safety &amp; Mounting .....</b>	<b>3</b>
2.1	Safety .....	3
2.2	Mounting .....	4
<b>3</b>	<b>Control Panel Fascia .....</b>	<b>5</b>
3.1	Removing the Fascia .....	6
<b>4</b>	<b>Installation .....</b>	<b>7</b>
4.1	Connecting to the Circuit Board .....	7
4.2	Detection Zone Wiring .....	8
4.3	Sounder Circuit Wiring .....	9
4.4	Using Intrinsically Safe Barriers .....	10
4.5	Connection to Monitored Inputs .....	11
4.6	Connection to Extinguishant Output .....	11
4.6.1	Solenoid Wiring .....	11
4.6.1	Igniting Actuator Wiring .....	12
4.6.3	Setting up Extinguishant Circuit Monitoring ..	12
4.7	Connection to Remote Control Terminals .....	14
4.8	Aux 24V DC Supply .....	15
4.9	Connection to Relay Contacts .....	15
4.9.1	Fault Relay .....	15
4.9.2	Local Fire Relay .....	16
4.9.3	Fire Relay .....	16
4.9.4	1 <sup>st</sup> Stage Alarm .....	16
4.9.5	2 <sup>nd</sup> Stage Alarm .....	16
4.9.6	Extract Relay .....	16
4.10	Connection & Configuration of Status Units & Ancillary Boards .....	17
4.10.1	Adding New Status Units/Ancillary Boards ...	17
4.10.2	Removing New Status Units/Ancillary Boards ...	18
<b>5</b>	<b>Panel Operation .....</b>	<b>20</b>
5.1	Normal Condition .....	20
5.2	Single Zone Fire Condition .....	20
5.3	Double Zone Fire Condition .....	20
5.4	Silence/Sound Alarms .....	21
5.5	Reset .....	21
5.6	Zone Fault .....	21
5.7	Sounder Fault .....	21
5.8	Power Fault .....	21
5.9	System Fault .....	22
5.10	General Fault .....	22
5.11	Lamp Test .....	22
5.12	Hold Condition .....	22
5.13	Released Condition .....	22
5.14	Low Pressure Switch .....	23
5.15	Test Mode .....	23

5.16	Change Mode .....	23
5.17	Extract Fan .....	24
5.18	Disabling .....	24
5.19.1	Disable Zones .....	24
5.19.2	Disable Sounders .....	24
5.19.3	Activate Delays .....	24
5.19.4	Disable Fault Contact .....	24
5.19.5	Disable Extinguishant Subsystem .....	25
5.19.6	Disable 1 <sup>st</sup> Stage Contact .....	25
5.19.7	Disable 2 <sup>nd</sup> Stage Contact .....	25
5.19.8	Disable Manual Release .....	25
5.19.9	Disable Extract Fan .....	25
<b>6</b>	<b>Configuration Options .....</b>	<b>26</b>
6.1	Access level 2 Configuration Options .....	26
6.1.1	[t1 - 3] Test Zone .....	26
6.1.2	[d1 -3] Disable Zone .....	26
6.1.3	[db] Disable First Stage Sounders .....	27
6.1.4	[dP] Disable (pre-activated) 1 <sup>st</sup> Stage Relay Contact .....	27
6.1.5	[dA] Disable (activated) 2 <sup>nd</sup> Stage Relay Contact .....	27
6.1.6	Disable Extract Fan Contact .....	27
6.1.7	[dt] Disable Manual Triggering Device (Manual Release) .....	27
6.1.8	[dE] Disable Extinguishant Release .....	27
6.1.9	[Ad] Activate Delays .....	27
6.1.10	[Ac] Operated Extract Fan Output .....	27
6.2	Access Level 3 Configuration Options .....	28
6.3	Table of Configuration Codes .....	29
<b>7</b>	<b>Internal Controls .....</b>	<b>31</b>
7.1	Watchdog Reset .....	31
7.2	Processor Reset .....	31
7.3	Terminate Extinguishant .....	31
7.4	Commissioning .....	31
<b>8</b>	<b>Internal Indications .....</b>	<b>32</b>
8.1	Troubleshooting .....	32
8.1.1	Mains Fail .....	32
8.1.2	Batt Fail .....	32
8.1.3	CPU Fault .....	32
8.1.4	AUX 24V fault .....	32
8.1.5	Batt Low .....	33
8.1.6	Comms Fault .....	33
8.1.7	Earth Fault .....	33
8.1.8	Sys Fuse Fault .....	33
8.1.9	S1, S2 & S3 Fault .....	33
8.1.10	Exting Fault .....	33
8.1.11	Hold Fault .....	33

8.1.12 Manual Release Fault .....	33
8.1.13 Mode Fault .....	33
8.1.14 Release Fault .....	34
8.1.15 Low Pres Fault .....	34
8.1.16 Tell Tale .....	34
<b>9 Power Supply .....</b>	<b>35</b>
<b>10 Commissioning Instructions .....</b>	<b>37</b>
10.1 Applying Power .....	37
10.2 Testing the System .....	37
10.3 Configuration Record .....	37
<b>11 Maintenance .....</b>	<b>38</b>
<b>Appendix 1 - Technical Specification</b>	
System Schematic .....	A1-3
<b>Appendix 2 - Record of Configuration</b>	

## 1 Introduction

The NFS3-EXT control panel is designed in accordance with European standards EN54-2 and EN54-4 Fire Detection and Fire Alarm Systems - Control and Indicating Equipment and EN12094-1 Fixed Firefighting Systems - Components for gas extinguishing systems - Part 1: Requirements and test methods for electrical automatic control and delay devices.

The control equipment is a combined fire alarm control panel and extinguishing system and has three detection zones, any or all of which are capable of contributing to the extinguishant release decision.

Control panels have an integral, mains powered battery charger and power supply designed in accordance with the requirements of EN54-4.

In addition to the requirements of EN54-2 the control panel has the following facilities:

*Test condition* to allow the automatic resetting of zones in alarm for testing purposes. EN54-2 Section 10, Options with Requirements.

*Delay of the actioning* of fire alarm devices (sounders) so that an alarm may be verified before a premises is evacuated. EN54-2 Section 7.11, Options with Requirements.

*Fire alarm devices* to enable an audible warning to be sounded throughout premises upon the detection of a fire condition or the operation of a manual call point. EN54-2 Section 7.8, Options with Requirements.

In addition to the requirements of EN54-2, all control panels have voltage-free relay contacts for fire and local fire which operate upon a fire condition. These are to be used for local control and signalling.

In addition to the requirements of EN12094-1 the control panel has the following facilities:

*Delay of extinguishing signal* of up to 60 seconds. EN12094-1 Section 4.17, Options with Requirements.

*Signal representing the flow of extinguishing agent* to indicate the released condition. EN12094-1 Section 4.18, Options with Requirements.

*Monitoring of the status of components* by way of a low pressure switch input. EN12094-1 Section 4.19, Options with Requirements.

*Emergency hold device* to enable the extinguishant delay time to be extended. EN12094-1 Section 4.20, Options with Requirements.

*Control of flooding time* to deactivate the releasing output after a set period of time. EN12094-1 Section 4.21, Options with Requirements.

*Manual only mode* to disable the release of extinguishant via automatic detection devices. EN12094-1 Section 4.23, Options with Requirements.

*Triggering of equipment outside the system* by way of first and second stage contacts, extract fan output, etc. EN12094-1 Section 4.26, Options with Requirements.

*Activation of alarm devices with different signals* to indicate pre-discharge and released warnings using different sounds. EN12094-1 Section 4.30, Options with Requirements.



## 1.1 CE Marking

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

- Electromagnetic Compatibility Directive 89/336/EEC (and the amending Directives 92/31/EEC, 93/68/EEC)
- Low Voltage Directive 73/23/EEC (and the amending Directive 93/68/EEC).

All control panels have a label affixed to the inside of the lid. This label should not be removed under any circumstances.

## 2 Safety and Mounting

### 2.1 Safety

Suppliers of articles for use at work are required under section 6 of the Health and Safety at Work act 1974 to ensure as reasonably as is practical that the article will be safe and without risk to health when properly used.

An article is not regarded as properly used if it is used 'without regard to any relevant information or advice' relating to its use made available by the supplier.

This product should be installed, commissioned and maintained by trained service personnel in accordance with the following:

- i IEE regulations for electrical equipment in buildings
- ii Codes of practice
- iii Statutory requirements
- iv Any instructions specifically advised by the manufacturer

According to the provisions of the Act you are therefore requested to take such steps as are necessary to ensure that you make any appropriate information about this product available to anyone concerned with its use.

This equipment is designed to operate from 230V 50Hz mains supplies and is of class 1 construction. As such it **must** be connected to a protective earthing conductor in the fixed wiring of the installation and a readily accessible double pole disconnect device meeting the requirements of EN60950/IEC950 which disconnects live and neutral simultaneously shall be incorporated in the fixed wiring.

Switch disconnect devices such as MK Sentry 63A or similar are suitable for this.

Failure to ensure that all conductive accessible parts of this equipment are adequately bonded to the protective earth will render the equipment unsafe.

This control panel is environmental class A and is designed for indoor use only at temperatures between  $-5^{\circ}\text{C}$  (+/- 3) and  $+40^{\circ}\text{C}$  (+/- 2) and with a maximum relative humidity of 95%.

The IP rating for the enclosure is IP30.

Operation outside of these limits may render the equipment unsafe.

## 2.2 Mounting

The control panel should be mounted on a dry, flat surface, at eye height to the display and in a level position such that the enclosure is not distorted.

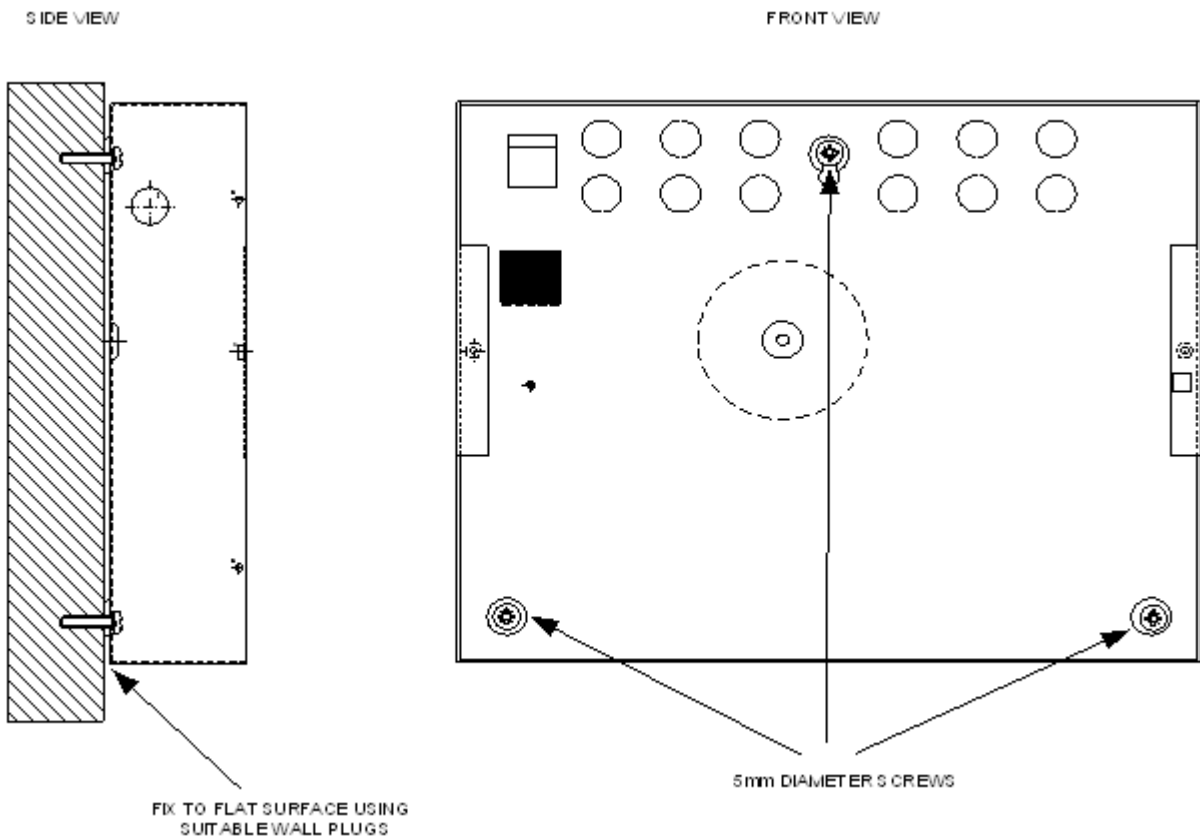
Screws or bolts of a minimum of 5mm diameter must be used to mount the enclosure in all three mounting positions.

It should be positioned in an accessible place as agreed with the end user.

Suitable fixings should be used at all fixing points such that the control panel is securely mounted and is not liable to move once fixed.

The control panel should not be mounted in another enclosure or near sources of excessive heat.

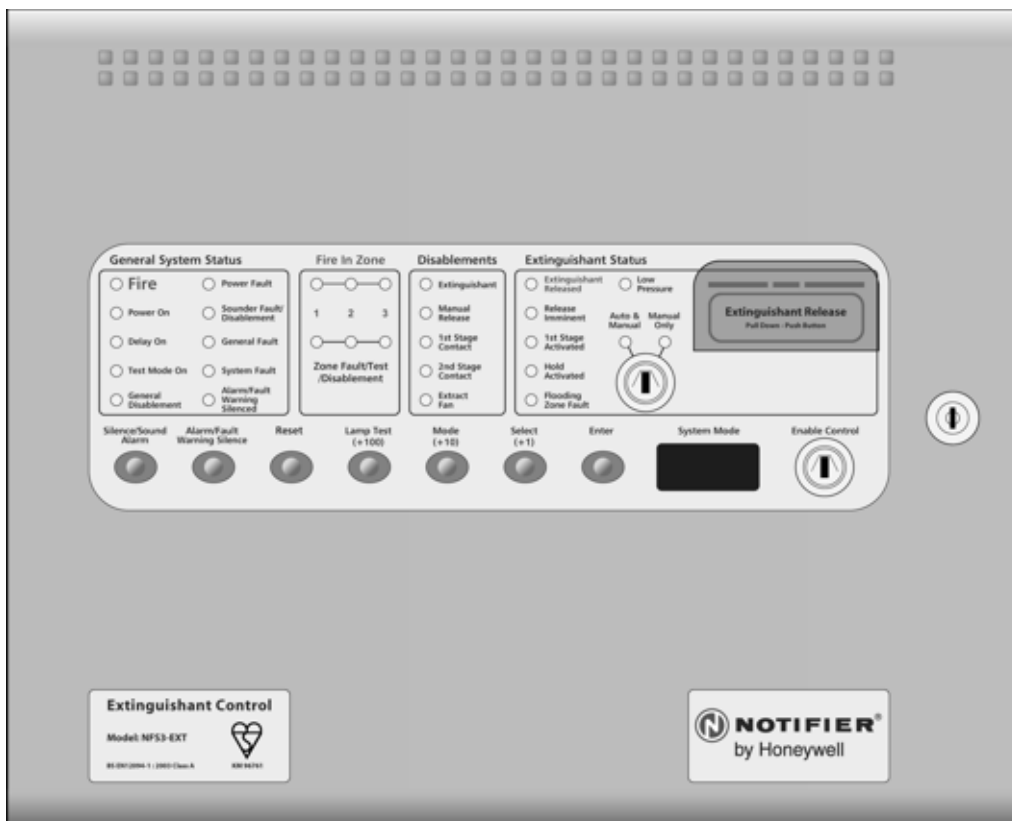
Cables should be connected using suitable cable glands fitted to the knockouts provided. If additional cable entry points are required, all swarf and debris caused by drilling of additional cable entries must be cleared before power is applied to the panel.





### 3 Control Panel Fascia

In addition to the mandatory controls and indications required by the EN54-2 and EN12094-1 standards, three, seven segment LED displays and MODE, SELECT and ENTER buttons are provided to allow easy entry and storage of codes to configure the control panel to suit the requirements of the installation. The Lamp Test, Mode and Select buttons also have a subscript (+100, +10 and +1) that allows easy entry of numbers.



The fascia is divided into two sections. A standard EN54-2 control and indicating equipment section with three zones and an EN12094-1 extinguishant system section with extinguishant status and disarmaments separated for clarity.

The pushbutton controls and programming facilities are common for both sections.

### 3.1 Removing the Fascia

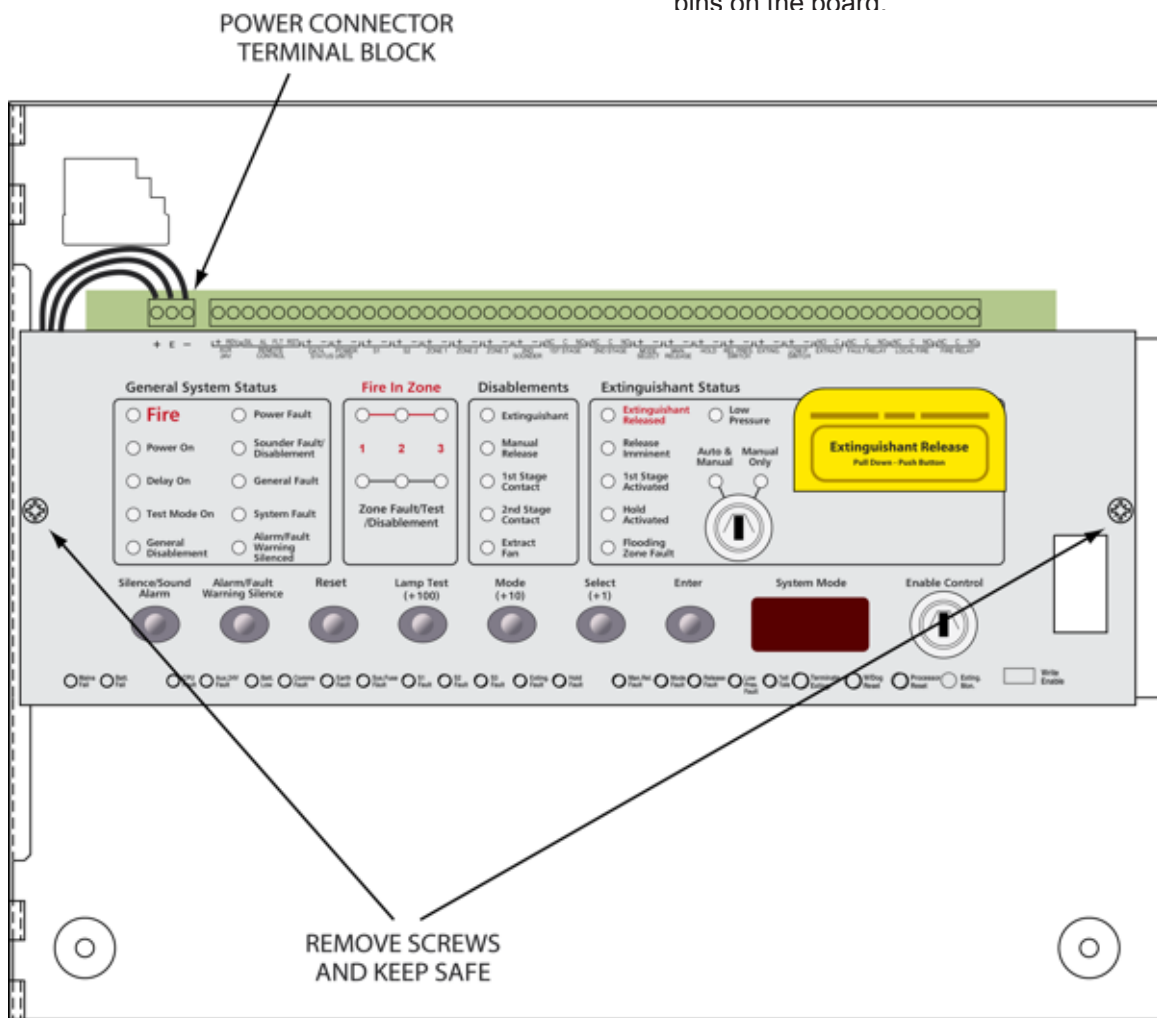
Open the control panel lid using the 801 lock key.

Before the fascia can be removed it will be necessary to disconnect the power connector terminal block on the left-hand side of the PCB. This is fitted on pins and can be pulled towards you to remove it. Do not remove the wires from the terminals.

The fascia of the control panel is held in place by two screws. Undo the two screws and lift the fascia gently away from the box towards you.

With the fascia removed there is much more room inside the panel for making off and dressing cables.

When cabling work is complete the fascia can be re-fitted with the two countersunk screws and the terminal block plugged back onto the pins on the board.



## 4 Installation

### 4.1 Connecting to the Circuit Board

All connections for field wiring are to a single row of terminals along the top of the circuit board.

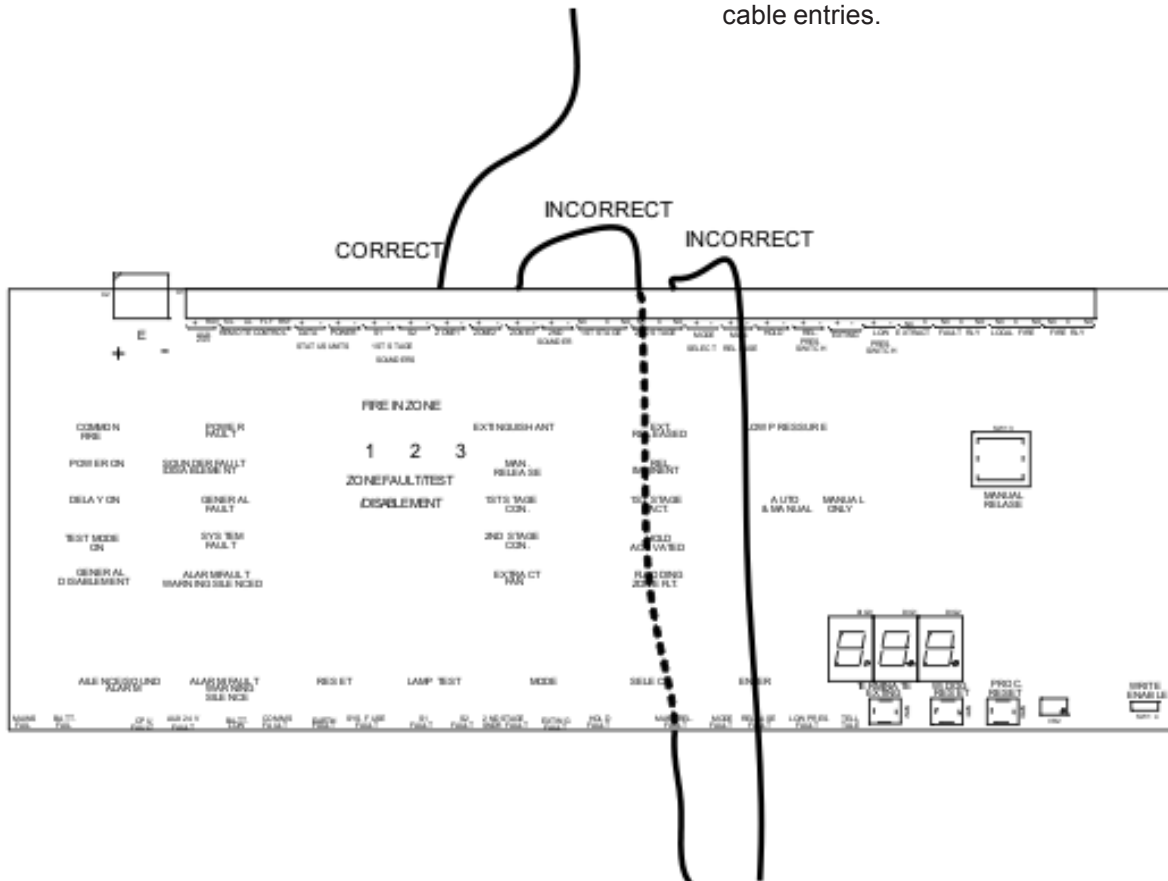
Shielded fire alarm cable, such as FP200, and metal cable glands must be used for all connections to the panel. The resistance of any core of any cable must not exceed 25 ohms. The shield of the cable must be bonded securely to the enclosure via the metal gland.

Wiring should enter the enclosure at the top or back of the panel using the knockouts provided and be formed tidily to the appropriate terminals.

Terminals are capable of accepting wires of up to 2.5mm<sup>2</sup>.

Wiring must not be routed across the front of the circuit board. If cable entries need to be in positions other than at the knockouts provided, wiring must be fed behind and well away from the surface of the circuit board.

The space at the bottom of the enclosure is largely occupied by the standby batteries so this must be borne in mind when considering cable entries.



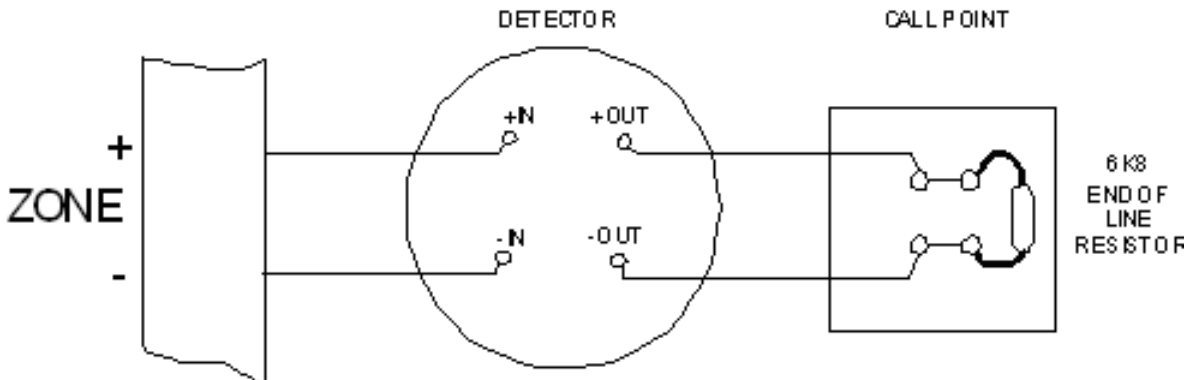
## 4.2 Detection Zone Wiring

The detection zones provide a nominal 20V dc to power conventional detectors and call points as listed in **Appendix 1 - Technical Specification**.

The wiring is monitored for open and short circuit fault conditions by removing the 6K8 end of line monitoring resistors that are supplied fitted to the control panels' terminals and placing them across the last device that is wired to the zone circuit.

Detection zone circuits must be wired as a single, radial circuit with no spurs or T junctions to enable the monitoring circuit to work correctly.

For systems that are required to comply with BS5839 Part1:2002 detector removal requirements, either detector bases fitted with a Schottky diode should be used and the end-of-line resistor replaced with an active-end-of-line (AEOL) monitoring device.



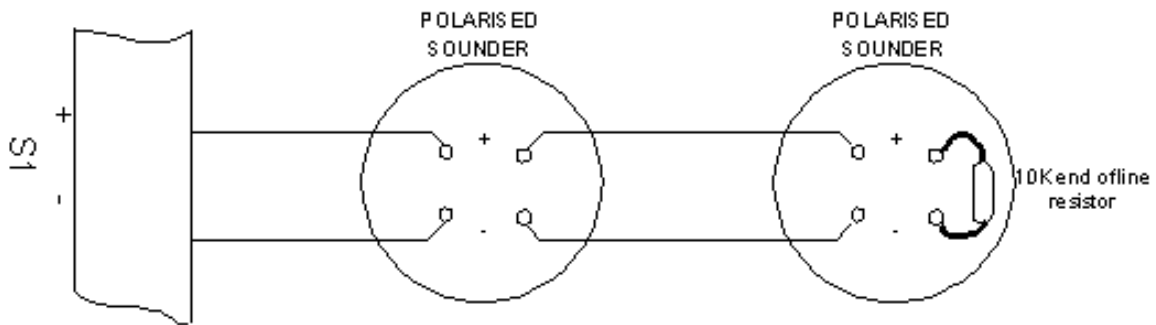
### 4.3 Sounder Circuit Wiring

All sounders must be of the polarised type. If non-polarised sounders are used the control panel will permanently show a fault condition. See table 4 for a list of compatible sounder types.

Sounder circuits are monitored for open and short circuit faults by placing a 10K end of line monitoring resistor across the last device on the circuit.

Sounder circuits must be wired as a single, radial circuit with no spurs or T junctions to enable the monitoring circuit to work correctly.

A maximum of 1.6 Amps is available for powering sounders with a maximum load of 0.5 Amps on any one circuit.



### 4.4 Using Intrinsically Safe Barriers

NFS3-EXT control panels support the use of I.S. barriers for connecting to equipment in hazardous areas.

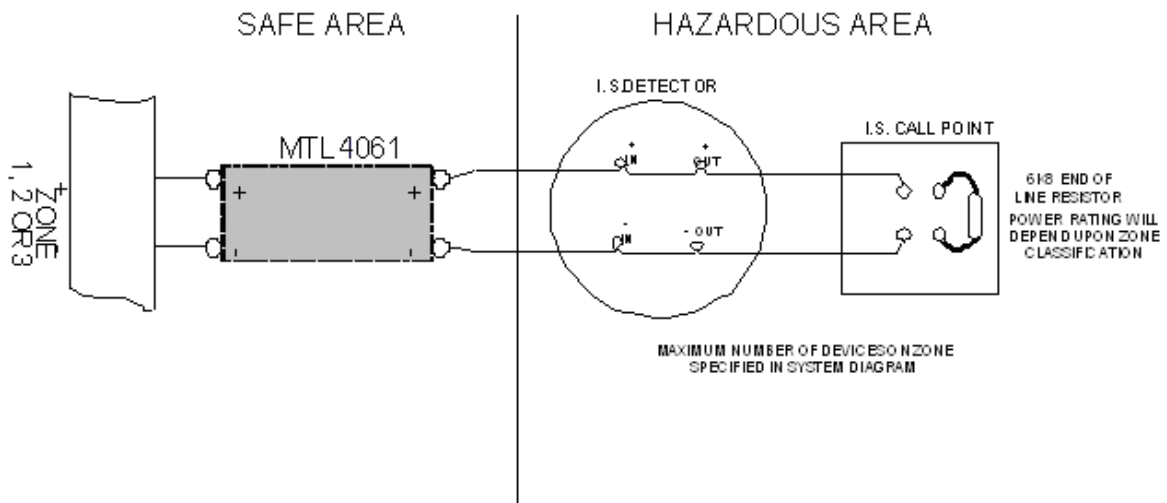
Only certified detectors, call points and sounders may be used in hazardous areas and these must be connected to the control panel via a compatible I.S. barrier as listed in **Appendix 1 - Technical Specification**.

Connection of the I.S. barrier changes the characteristics of the detection circuit so zones that have I.S. barriers connected must be adjusted to work with them.

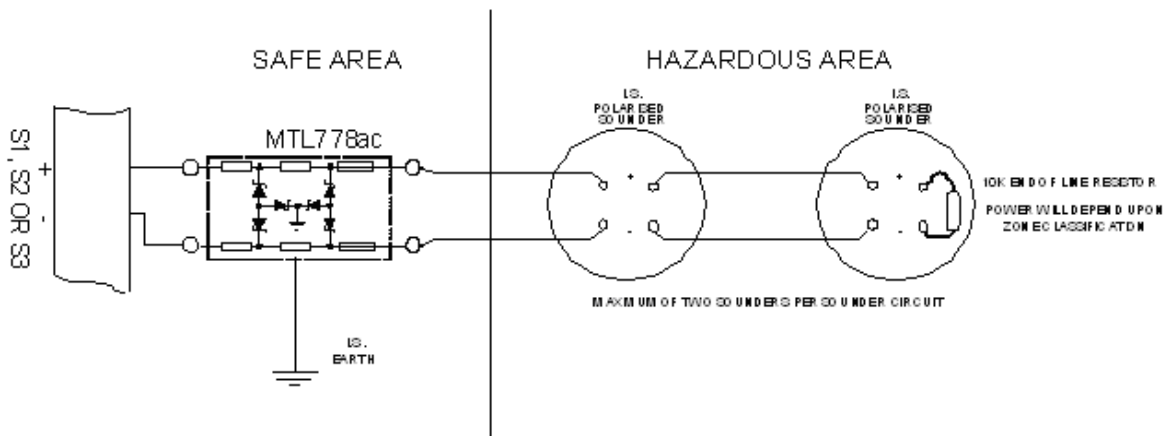
Programmable options C61 to C63 allow each zone to operate with I.S. barriers.

The amount of detectors and call points that can be connected to a zone is limited by the I.S. approval system diagram which should be supplied by the detector manufacturer. The power rating of the end-of-line resistor will be dependent upon the Zone classification rating (Gas class) this will be specified on the system diagram.

Detection zone wiring through an MTL4061 I.S. Barrier

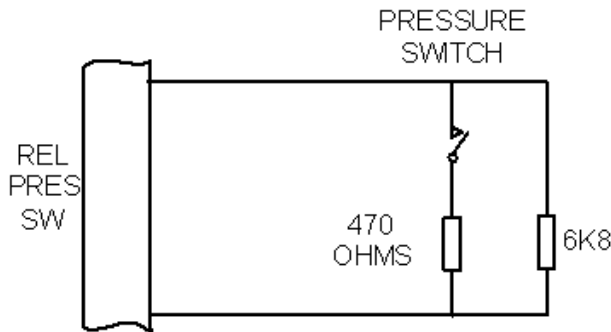


Sounder circuit wiring through an MTL778ac I.S. Barrier



### 4.5 Connection to Monitored Inputs

Monitored inputs (Mode select, manual release, Hold, Released pressure switch and Low pressure switch) have the same characteristics as detection zone inputs and require a 6K8 end-of-line monitoring resistor and a nominal, 470 ohm trigger resistor.



### 4.6 Connection to Extinguishant Output

The extinguishant output is capable of supplying up to 1 Amp for the maximum duration to a solenoid or 3 Amps for 20 milliseconds to an igniting actuator.

The wiring for solenoids and igniting actuators is different as shown below. Igniting actuators of different types or from different manufacturers should not be mixed on the same circuit.

#### 4.6.1 Solenoid Wiring

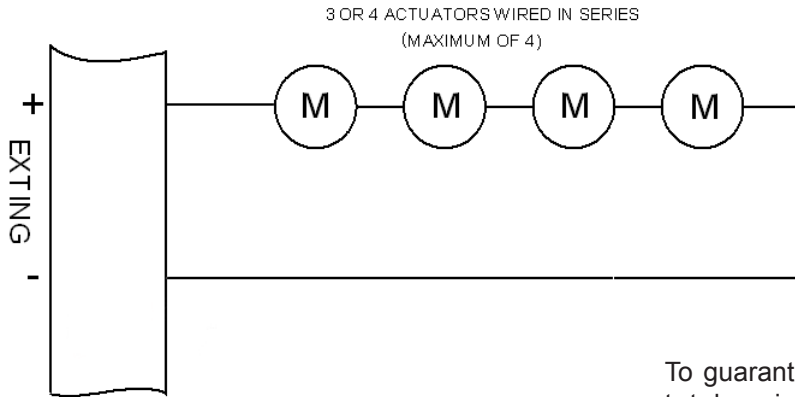
Solenoids must have a resistance of greater than 30 ohms to ensure that the maximum current rating of the extinguishant output is not exceeded.

Solenoids should be fitted with a suppression diode to prevent EMF generated by the solenoid when it de-energises from causing interference to the operation of the control panel. This diode also acts as the end-of-line monitoring device.

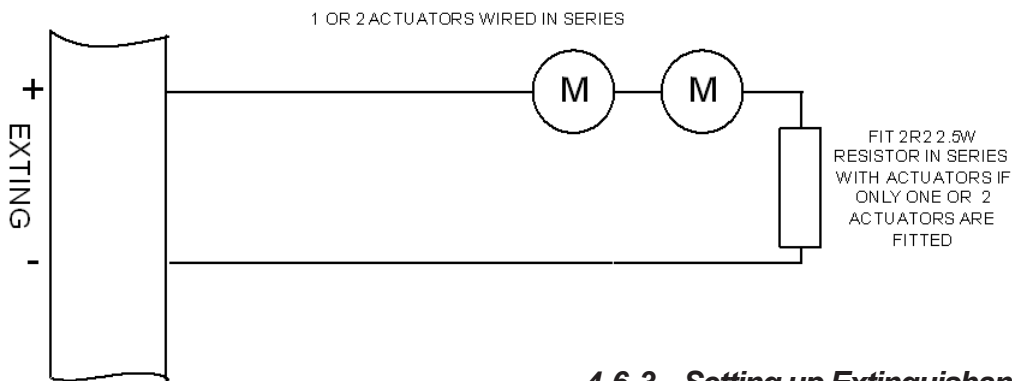


### 4.6.2 Igniting Actuator Wiring

A maximum of four igniting actuators can be wired in series. If only one or two actuators are fitted, a 2R2, 2.5 Watt resistor must be wired in series with them to provide the correct monitoring resistance. The end-of-line diode can be discarded when igniting actuators are used.



To guarantee firing under all conditions, the total resistance of actuators, monitoring resistor and cable should not exceed 7 ohms.



### 4.6.3 Setting up Extinguishant Monitoring Circuit

All control panels are factory set for the connection of solenoids using end of line diode monitoring. If igniting actuators are to be used, then the setup procedure detailed here should be followed.

To enable monitoring of circuits that have a very low resistance which varies according to the number of actuators fitted and cable length, it is necessary to adjust the monitoring level once the actuators have been fitted.

This is done using a variable resistor which is accessible through the front of the control panel.

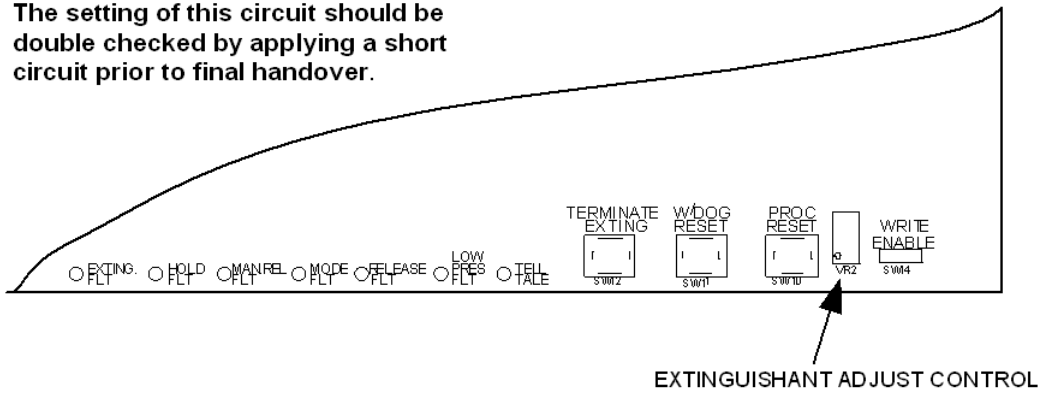
The variable resistor (EXT ADJ) should be adjusted so that when all connections are made, the Exting Fault led is lit.

The variable resistor should then be adjusted to the point where this led is fully off and then turned back 2 more, 360° turns.



A short circuit on the extinguishant output cable should now be indicated as a fault by the Exting Fault LED and should clear when the short is removed. The fault circuit should not be left with too sensitive a setting as this may produce erroneous fault conditions under some circumstances such as extremes of temperature or variations in battery voltage.

The setting of this circuit should be double checked by applying a short circuit prior to final handover.



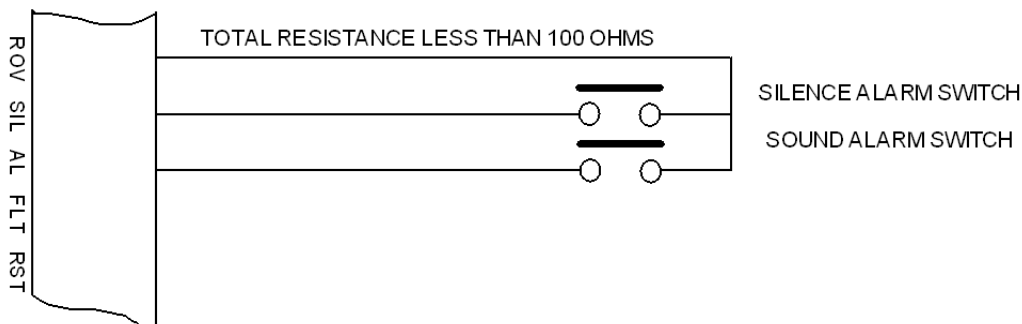
#### 4.7 Connection to Remote Control Terminals

Some functions of the control panel can be controlled externally from the panel if required. The external equipment operating inputs **must be restricted by an access level 2 control** as defined in EN54-2. The functions are abbreviated at the terminals block as follows:

- a) Remote 0 V supply – ROV
- b) Silence Alarm – SIL (Silences sounder outputs S1 & S2 only)
- c) Sound Alarm – AL (Operates sounder outputs S1 & S2 and not S3)
- d) Fault – FLT (Generates a general fault and operates the fault relay)
- e) Reset – RST (Resets the system back to normal condition)

To activate these inputs, the remote 0 Volt (R0V) supply must be connected to the input via a normally open switch or contact and via a resistance of no greater than 100 ohms.

All of the remote control inputs are non-latching.



## 4.8 Aux 24V DC Supply

An auxiliary 24V DC supply is provided to enable local signalling or control of ancillary systems such as door release controllers.

The terminals for the Aux 24V supply are labelled Aux 24V and ROV. The ROV terminal is the negative terminal and is the same terminal that should be used to switch the remote control terminals.

It is possible to make the ROV terminal pulsing so that by connecting it to the AL terminal via a remote, volt-free contact, it can be used to pulse the dedicated sounder circuits in response to a signal from another system, for example to give an alert. See programming code C25.

The supply is fitted with an electronic, self-resetting fuse rated at 0.5 Amps to protect the control panel's 24V dc supply in the event of a wiring fault.

Any standing load on the Aux 24V dc supply must be taken into account when calculating battery standby times as standby time will be significantly affected by even modest standing loads. It is recommended that the Aux24V dc output is **not** used to power standing loads.

Where the Aux 24V dc supply is used to power electromechanical devices such as relays or door retainers it is imperative that a suppression diode is fitted across the coil of the device to prevent the generation of high voltage transients back to the control panel power supply.

## 4.9 Connection to Relay Contacts

Volt free changeover relay contacts are provided for local control and signalling if required. These contacts are rated for switching signalling circuits only and the maximum ratings listed in table 1 should not be exceeded under any circumstances.

Typically, the Aux 24V output of the control panel is switched through these relays and used to control other systems.

### 4.9.1 Fault Relay

The fault relay is normally energised and will de-energise upon any fault condition including total loss of power.

### **4.9.2 Local Fire Relay**

The local fire relay will energise upon activation of a fire condition on any of the zones or pressing of the sound alarm button on the front panel. The relay will remain activated until the alarm is silenced or the panel is reset. This relay will not operate upon activation of the remote AL input or when a fire condition is triggered on a zone that is in test mode. This makes the Local fire relay suitable for inter panel signalling without the panels latching each other.

**Note** The local alarm relay can be re-configured using programmable option C2A to operate upon gas released if required.

### **4.9.3 Fire Relay**

The fire relay will energise upon activation of a fire condition on any of the zones or pressing of the sound alarm button on the front panel. This relay will not operate upon activation of the remote AL input. The relay will remain activated until the panel is reset.

### **4.9.4 1<sup>st</sup> Stage Alarm**

The first stage alarm will operate upon activation of a zone that has been configured to contribute to the extinguishant release decision and will de-activate only when the panel has been reset.

This relay will also operate upon activation of the panel mounted or a remote manual release switch.

### **4.9.5 2<sup>nd</sup> Stage Alarm**

The second stage alarm relay will operate when the panel enters the activated condition (i.e. the release countdown timer has started) and will de-activate only when the panel has been reset from the released condition.

### **4.9.6 Extract Relay**

The extract relay will operate when option Ac is selected at access level 2 after the extinguishant duration timer has elapsed and the panel has not been reset.

This provides a means to vent a room of extinguishant gases but prevents the gases from being vented during a discharge.

## 4.10 Connection and Configuration of Status Units and Ancillary Boards

**The control panel should not be powered during the connection of status units or ancillary boards.**

Status units and ancillary boards require a four-wire connection from the panel, which drops into each unit and connects to the corresponding data and power, in and out terminals. Two of the cables carry power to the units (24V dc) and the other two carry data. A four-core cable suitable for carrying RS485 data should be used. If this is a twisted-pair cable then one twisted pair should be used for the data connections and the second pair used for the power connections

Each status unit has a 3-bit DIL switch and must be allocated a unique address between 1 and 7.

Each ancillary board has a 3-bit DIL switch and must be allocated a unique address between 1 and 7.

The address switch is located on the bottom left hand corner of the status unit or ancillary board PCB.

**Note:** The address is only read when the boards are first powered so address switches should not be altered on a system that has power applied.

If a double address occurs on the system then the system will illuminate the General Fault and Hold indicators and the buzzer will sound.

The panel display will show the status unit or ancillary boards that have the same address.

Status Unit Address	DIL Switch Number		
	1	2	3
1	●	○	○
2	○	●	○
3	●	●	○
4	○	○	●
5	●	○	●
6	○	●	●
7	●	●	●

● = Switch ON/UP

Ancillary Board Address	DIL Switch Number		
	1	2	3
8	●	○	○
9	○	●	○
10	●	●	○
11	○	○	●
12	●	○	●
13	○	●	●
14	●	●	●

● = Switch ON/UP

### 4.10.1 Adding New Status Units/ Ancillary Boards

When the system is powered, it will search for connected status units and/or ancillary boards.

When new or additional status units/ancillary boards are added to the system, these will be shown on the display when the system is first powered.

Status units are shown as **Pux** and ancillary boards are shown as **Pox** (where **x** is the address of the unit found).

The select key can be used to view all of the status units/ancillary boards that the system has found.

These should be checked to ensure that the same number of devices that have been fitted are found by the system.

For the system to accept these into its memory, the procedure below must be followed.

1. Operate the Enable Controls keyswitch.
2. Enable the Write Enable Switch (push to the right) – Access level 3.
3. The display will show **Pux** for status units and **Pox** for ancillary boards that are found (where x is the address of each unit) and the dot in the display will be flashing. Operate the Enter button which will accept the displayed unit and step through to the next unit found.
4. When the Enter button does not step on to any other units, all devices have been accepted.
5. Disable the Write enable switch (push to the left).
6. Disable the Enable controls keyswitch.

The panel should return to the normal, quiescent condition.

#### **4.10.2 Removing Status Units/Ancillary Boards**

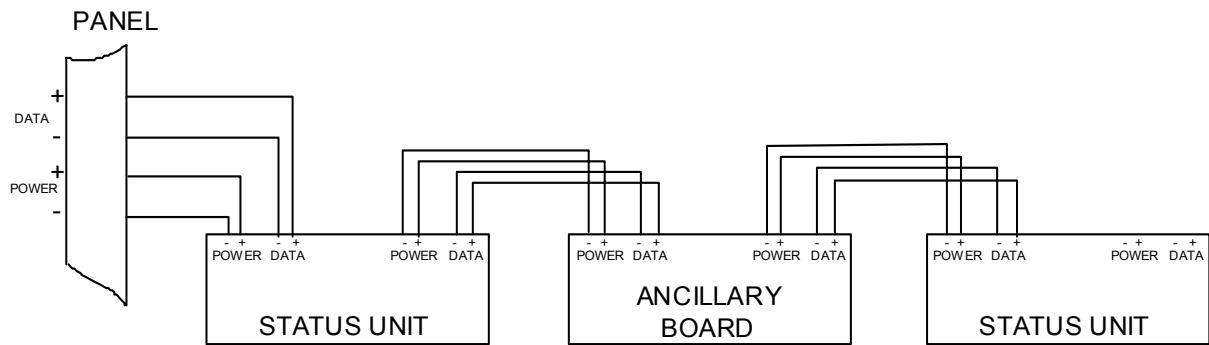
When status units/ancillary boards are to be removed from the system, the system must be powered down first and the status units/ancillary boards removed. The system should then be powered. When the system starts it will be in fault and the units removed will be shown on the display. Status units are shown as **Fux** and ancillary boards are shown as **Fox** (where x is the address of the unit). The Select button can be used to view all of the status units/ancillary boards that the system expects to be found but are now missing.

For the system to accept the removal of these devices from its memory the following procedure must be carried out.

1. Operate the Enable Controls keyswitch.
2. Enable the Write Enable Switch (push to the right) – Access level 3.
3. Wait for the General fault LED to illuminate
4. Disable the Write enable switch (push to the left)
5. Disable the Enable controls keyswitch
6. The panel should return to the normal quiescent condition.

If the panel fails to receive messages from a status unit or ancillary board after it has been stored in the configuration memory, the internal "comms fault" LED will light and a fault condition will be displayed on the panel fascia. The seven segment display on the panel will show the number of the unit that is disconnected and all LEDs on the status unit that is disconnected will flash.

Full details of status units and ancillary boards can be found in the NFS Status Unit and Ancillary Board operation and maintenance manuals.



## 5 Panel Operation

### 5.1 Normal Condition

Under normal conditions, control panels will have only the green, *Power On* LED lit and either the Manual Only or Automatic and Manual LED lit. The display will be blank.

The control panel has 3 access levels. Access level 1 allows unrestricted access, Access level 2 allows access only after operation of the front panel mounted "Enable controls" keyswitch and Access level 3 allows access after operation of the "Write enable" switch behind the front cover.

### 5.2 Single Zone Fire Condition

Upon receipt of a fire condition by activation of a detector or call point, the *Common Fire* indicator will light and the zonal *Fire* indicators will flash at around 2Hz.

The fire and local fire relays will also operate and signal any systems to which they are connected.

Any sounders connected to the sounder circuits S1 & S2 will operate.

If the zone that has activated is contributing to the extinguishant release sequence, the First stage activated LED will light and the first stage relay contact will operate.

### 5.3 Double Zone Fire Condition

Upon receipt of a second fire condition when the control panel is switched to Automatic and Manual mode, the Hold input is not active, and the Disable Extinguishant Sub-system function has not been invoked, the control equipment will respond as above and as listed below:

- a) The second stage alarm output will operate. (Sounder circuit S3)
- b) The second stage contact will operate.
- c) The release imminent indicator will operate
- d) The seven segment LED displays will indicate the time remaining until release in seconds.
- e) The extinguishant output will operate after the configured delay time and for the configured duration after which it shall de-activate.



When detection zones have activated and the activated condition is reached (i.e. the release imminent indicator is lit) it shall not be possible to reset the extinguishant section of the panel until the discharge duration timer has elapsed.

#### **5.4 Silence/Sound Alarms**

The *Silence/Sound alarm* button can only be operated at access level two which means that the *Enable Control* key must be inserted and turned to the right. To silence the sounders, insert the Enable Control key, turn to the right and press the Silence/Sound alarm button. When the sounders have been silenced, the Zone Fire LEDs will change from flashing to a steady state.

Pressing the *Silence/Sound alarm* while the control panel is in this silenced condition, will cause the sounders to operate again.

The sounders can be toggled on and off with the *Silence/Sound alarm* button as required.

#### **5.5 Reset**

To reset the panel, insert the Enable key, turn to the right then press the Reset button. Latched inputs associated with extinguishant section will reset only after the duration timer has elapsed once the activated condition has been established.

#### **5.6 Zone Fault**

Removal of a detector from its base or a fault on any of the zone wiring will cause the *Fault* LED and *Zone Fault* LEDs to flash, indicating the zone in which the fault has occurred.

#### **5.7 Sounder Fault**

A fault on the wiring to sounder circuits will cause the *Fault* and *Sounder Fault* LEDs to flash, indicating a fault on the wiring to the sounder circuits.

#### **5.8 Power Fault**

Failure of the mains power or disconnection of the standby battery will cause the *Fault* and *Power Fault* LEDs to light indicating an abnormality in the power supply to the control panel.

## 5.9 System Fault

The *System Fault* LED will light if the configuration memory has not been set or has become corrupt.

## 5.10 General Fault

The *General Fault* LED will illuminate under any fault condition. This LED will also light if the configuration option jumper (see figure 18) has been left in the access level 3 position and the enable controls key has been removed from the front panel.

## 5.11 Lamp Test

All LED indicators can be tested at any time by pressing the *Lamp Test* button. The *Enable Control* key does not need to be inserted to test the indicators.

The buzzer can be silenced at any time by pressing the *Buzzer Silence* button. The enable key does not need to be inserted to silence the buzzer.

## 5.12 Hold Condition

Activation of the hold input at the connections inside the panel or at a remotely mounted status unit will cause the Hold Activated indicator to light and the buzzer to sound.

If the control panel is in the second stage alarm condition (i.e. it is in Automatic mode and detection circuits are activated or it is in either Automatic or Manual mode and a manual release input is operated) then the extinguishant release sequence shall be halted and the pulsing, second stage sounders shall change to 1 second on, 2 seconds off.

Release of the Hold input shall re-start the countdown release timer from maximum.

## 5.13 Released Condition

The released pressure switch input is connected to a pressure switch mounted on the extinguishant cylinder which operates when the extinguishant has been released. This will activate the released indicator on the control panel. If the extinguishant has been released by mechanical means i.e. the control panel is not in the activated condition, operation of the released pressure switch input will cause the second stage sounders and second stage relay to operate.

### 5.14 Low Pressure Switch

The low pressure switch input on the panel is connected to a pressure switch on the extinguishant cylinder which will operate if the pressure in the cylinder falls below a set point. This will happen after the extinguishant has been released but may happen before release through a leak. The flooding zone fault indicator will light and the buzzer will sound when this input is operated.

### 5.15 Test Mode

Fire alarm systems must be tested regularly to ensure that they are functioning correctly. The system can be tested single handed by using a test mode. When in test mode, activation of a fire alarm will be automatically reset after a few seconds to eliminate the need to return to the control panel to reset after every activation.

Test mode is entered in a similar way to disablements. With the *Enable Control* key inserted, press the *Mode* button until "t" appears in the first of the seven segment displays. Then press the *Select* button until the required zone number appears. Pressing the *Enter* button will cause the *Test* and *Zone Fault* LEDs to illuminate indicating the zones which are in test mode.

Disablements and zone tests are cleared by repeating the sequence that is used to select them, i.e. the "db" function (for example) toggles between sounders disabled and sounders enabled.

### 5.16 Change Mode

The mode of the system can be toggled between Manual Only and Automatic & Manual by operating the keyswitch in the extinguishant status area of the panel.

When the system is in Manual Only mode, the extinguishant cannot be released by the operation of automatic detectors.

**Note:** The mode can also be changed to manual by the external mode select input or the keyswitch on any status unit. Any mode select input to manual mode will override any keyswitches switched to Automatic and Manual mode.

## 5.17 Extract Fan

When the extract function is selected by access level 2 option Ac, the extract contact in the panel and at all ancillary boards will operate for 3 minutes. This output will operate only if the extinguishant output has activated for the set duration and has then turned off. The seven segment display shall show ccc while the extract output is operated. Selecting option Ac at access level 2 while the extract output is operated will turn the extract outputs off.

## 5.18 Disablements

It is possible to disable parts of the system. This may be required if there are works going on in a building which may cause the fire alarm system to operate in error.

### 5.19.1 Disable Zones

To disable zones, the *Enable Control* key should be inserted and the mode button pressed until "d" appears in the first of the two seven segment LED displays. The *Select* button should then be pressed to select the number of the zone which is to be disabled in the second of the two seven segment displays. Once the desired zone is displayed, the enter button should be pressed to confirm the disablement.

The *Disable* LED will light and the *Zone Fault* LED will light for each disabled zone.

### 5.19.2 Disable Sounders

To disable sounder outputs, press the mode button to select "db" on the seven segment display. Pressing enter will disable all sounders and cause the *Disable* and *Sounder Fault* LEDs to light.

### 5.19.3 Activate Delays

To activate delays on zones as set in configuration options 31 to 33 and 41 to 43, press the mode button until *Ad* appears on the seven segment LED display. When the enter button is pressed any zones that are set as delayed will have their alarm outputs delayed by the time set in configuration options C00 to C09.

### 5.19.4 Disable Fault Contact

The fault relay can be disabled by selecting configuration option C23. See Section 16.

### **5.19.5 Disable Extinguishant Subsystem**

The 2nd stage relay, 2<sup>nd</sup> stage alarm output and extinguishant release output can be disabled together by selecting “dE” from the access level 2 options. See Section 16.

### **5.19.6 Disable 1<sup>st</sup> Stage Contact**

The first stage contact can be disabled by selecting configuration option “dP”. See section 16.

### **5.19.7 Disable 2<sup>nd</sup> Stage Contact**

The Second stage contact can be disabled by selecting configuration option “dA”. See Section 16.

### **5.19.8 Disable Manual Release**

The Manual release facility can be disabled by selecting configuration option “dT”. See Section 16.

### **5.19.9 Disable Extract Fan**

The extract fan output can be disabled by selecting configuration option “dc”. See Section 16.

## 6 Configuration Options

### 6.1 Access Level 2 Configuration Options

Turn enable keyswitch to get to access level 2.

#### OPERATION

Press Mode button until the required function as detailed below appears in the 7 segment displays.

For zonal tests or disablements, press the Select button to scroll to the required zone number then press enter. The “select” dot at the bottom of the display will flash to indicate a test or disablement is active.

For sounder disablements and other functions, press the Select button until the required function is displayed then press enter to activate that function. The “select” dot will flash to confirm the setting as above.

[ t1 - 3]	Test Zone 1 – 3
[ d1 - 3]	Disable Zone 1 – 3
[ db]	Disable 1st Stage sounders
[ dP]	Disable Preactivated (1st stage) relay
[ dA]	Disable Activated (2nd stage) relay
[ dc]	Disable Extract Fan output
[ dt]	Disable Manual Release inputs
[dE]	Disable Extinguishant sub-system
[Ac}	Activate extract output
[Ad]	Activate sounder Delays

#### 6.1.1 [ t1 - 3] Test Zone

Selecting [t1], [t2] or [t3] puts zones 1, 2 or 3 respectively into test mode. Zones that are in test mode shall automatically reset 3 seconds after they have operated. The Test Mode On and zonal fault/test disablement indicators will illuminate while any zone is in test mode.

#### 6.1.2 [d1 – 3] Disable Zone

Selecting [d1], [d2] or [d3] disables zones 1, 2 or 3 respectively. Disabled zones will not report fire or fault conditions. The General Disablement and zonal fault/test disablement indicators will illuminate while any zone is disabled.

### **6.1.3 [db] Disable First Stage Sounders**

Selecting [db] will disable the first stage sounder outputs. The General Disablement and Sounder fault/ Disablement indicators will illuminate while the first stage sounders are disabled.

### **6.1.4 [dP] Disable (pre-activated) First Stage Relay Contact**

Selecting [dP] will disable the Preactivated (1<sup>st</sup> stage) relay output) The First Stage Contact disabled and General Disablement indicators will illuminate while the Preactivated relay is disabled.

### **6.1.5 [dA] Disable (activated) Second Stage Relay Contact**

Selecting [dA] will disable the Activated (2<sup>nd</sup> stage) relay output. The Second Stage Contact disabled and General Disablement indicators will illuminate while the Activated relay is disabled.

### **6.1.6 [dc] Disable Extract Fan Relay**

Selecting [dc] will disable the Extract fan output. The Extract Fan Disabled and General Disablement indicators will illuminate while the Extract Fan output is disabled.

### **6.1.7 [dt] Disable Manual Triggering Device (Manual Release)**

Selecting [dt] will disable the Manual Release input. The Manual Release Disabled and General Disablement indicators will illuminate while the Manual Release input is disabled.

### **6.1.8 [dE] Disable Extinguishant Release**

If the extinguishant release is disabled, the pre-release timer is never started and the extinguishant output is never asserted.

**Note:** Extinguishant output faults are ignored while the extinguishant release is disabled.

### **6.1.9 [Ad] Activate Delays**

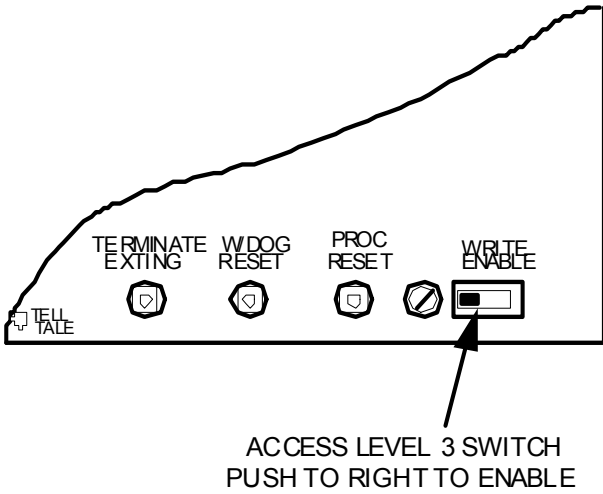
Selecting [Ad] will make delays configured by access level 3 options C00 to C09 active.

### **6.1.10 [Ac] Operate Extract Fan Output**

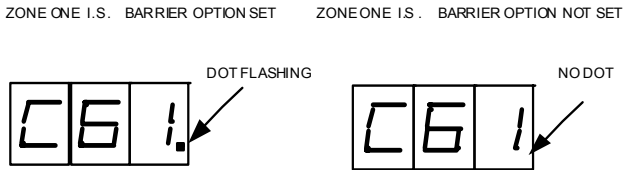
Option Ac can only be selected after the extinguishant output has activated for the set duration and then switched off.

## 6.2 Access Level 3 Configuration Options

The NFS3- control panel has many configuration options which can be set at the time of commissioning to suit the requirements of the installation. These options are normally set once and will rarely need to change. The configuration options are only available at access level 3 which is accessed by operating the Access level 3 switch as shown at left.



Configuration options are simple to enter using the codes in the table below. When the control panel is at access level 3, the sub-text of the *Mode* and *Select* buttons is used to enter a number using hundreds, tens and units. When the required code number is displayed, pressing the ENTER button will cause the dot on the units, seven segment display to flash. This indicates that a configuration option has been set. To review which configuration options have been set previously, simply scroll through numbers 1 to 99, A1 to A8 and those with a flashing dot indicate which options have been set (see example at left).





### 6.3 Table of Configuration Codes

**Note:** Options marked with an asterisk do not comply with EN54-2.

CODE	FUNCTION	COMMENTS
UXX	CONFIGURATION UPDATE COUNT	Number incremented each time access level 3 config changed. Counter resets to 00 when 99 is reached.
C00	SOUNDER DELAY TIME = 30 SECONDS	Introduces a time delay before sounders operate. Note: Only one delay period can be selected.
C01	SOUNDER DELAY TIME = 1 MINUTE	
C02	SOUNDER DELAY TIME = 2 MINUTES	
C03	SOUNDER DELAY TIME = 3 MINUTES	
C04	SOUNDER DELAY TIME = 4 MINUTES	
C05	SOUNDER DELAY TIME = 5 MINUTES	
C06	SOUNDER DELAY TIME = 6 MINUTES	
C07	SOUNDER DELAY TIME = 7 MINUTES	
C08	SOUNDER DELAY TIME = 8 MINUTES	
C09	SOUNDER DELAY TIME = 9 MINUTES	
C11	Z1 & Z2 DETECTORS TRIGGER AUTOMATIC RELEASE	Coincidence detection selection options. Only one option can be selected.
C12	Z2 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C13	Z1 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C14	Z1 & Z2 OR Z2 & Z3 OR Z1 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
*C15	Z1 & Z2 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C16	Z1 OR Z2 OR Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C17	Z1 DETECTORS TRIGGER AUTOMATIC RELEASE	
C18	Z2 DETECTORS TRIGGER AUTOMATIC RELEASE	
C19	Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C21*	DISABLE FIRE BUZZER	
C22*	DISABLE FIRE OUTPUT	Fire relay.
C23	DISABLE FAULT OUTPUT	Fault relay.
C24	DISABLE EARTH FAULT MONITORING	
C25	PULSE ROV OUTPUT	
C26	REMOVE AUX 24V ON SYSTEM RESET	To enable resetting of systems using panels Aux Supply.
C27	INDICATE EXTING RELEASED WHEN EXTING OUTPUT IS ACTIVE	Rather than upon receipt of signal from flow switch.
C28	NO ACTIVATION DELAY UPON MANUAL RELEASE	Delay remains active on automatic detection.
C29	EXTINGUISHANT OUTPUT CAN BE RESET DURING IMMINENT PHASE	Allows extinguishant output to be reset before countdown timer has expired for testing/commissioning
C2A	LOCAL FIRE RELAY OPERATES UPON RELEASED SIGNAL	Local fire relay operates only when extinguishant is released rather than upon a fire condition
C31	ZONE 1 ALARM FROM DETECTOR DELAYED	Sounder outputs will be delayed by time set at options 0-9 when selected zone(s) triggered by detector only Note: Any combination can be selected.
C32	ZONE 2 ALARM FROM DETECTOR DELAYED	
C33	ZONE 3 ALARM FROM DETECTOR DELAYED	
C41	ZONE 1 ALARM FROM CALL POINT DELAYED	Sounder outputs will be delayed by time set at options 0-9 when selected zone(s) triggered by call point only. Note: Any combination can be selected.
C42	ZONE 2 ALARM FROM CALL POINT DELAYED	
C43	ZONE 3 ALARM FROM CALL POINT DELAYED	
C61	ZONE 1 OPERATES THROUGH I.S. BARRIER	Select only when detectors are connected via compatible I.S. barriers. Note: Any combination can be selected.
C62	ZONE 2 OPERATES THROUGH I.S. BARRIER	
C63	ZONE 3 OPERATES THROUGH I.S. BARRIER	
C71*	ZONE 1 SHORT CIRCUIT INDICATES ALARM	Changes the trigger threshold of the zone so that the control panel can be used on older systems that had no short circuit monitoring. Note: Any combination can be selected.
C72*	ZONE 2 SHORT CIRCUIT INDICATES ALARM	
C73*	ZONE 3 SHORT CIRCUIT INDICATES ALARM	
C81*	ZONE 1 NON-LATCHING	Renders the zone self-resetting so that it can be used to receive signals from other systems and will reset when the input is removed. Note: Any combination can be selected.
C82*	ZONE 2 NON-LATCHING	
C83*	ZONE 3 NON-LATCHING	
CA1	Z1 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	Input delay.
CA2	Z2 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	Note: Any combination can be selected.
CA3	Z3 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	
E00	PANEL CAN BE RESET IMMEDIATELY DISCHARGE OUTPUT HAS OPERATED.	To allow reset of the panel to be prohibited before the extinguishant discharge has fully completed.
E01 TO E29	PANEL CAN BE RESET 1 MINUTE TO 29 MINUTES AFTER DISCHARGE OUTPUT HAS OPERATED.	
E30	PANEL CAN BE RESET 30 MINUTES AFTER DISCHARGE OUTPUT HAS OPERATED.	

Configuration Options

-00	NO EXTINGUISHANT DELAY	Time delay between activation and extinguishant release output operating. This menu is accessed using the lamp test (+100) button. The time is adjusted using the Mode button for 10's and the Select button for 5's. Once the time is selected the Enter button is used to store the value.
-05	5 SECONDS EXTINGUISHANT DELAY	
-10 TO -55	INCREMENT EXTINGUISHANT DELAY IN FIVE SECOND STEPS	
-60	60 SECONDS EXTINGUISHANT DELAY	
060	EXTINGUISHANT DURATION TIME IN SECONDS	Time that extinguishant release output is activated Note: Panel can not be reset until this time has expired except by operating the terminate extinguishant switch located under the front cover. This menu is accessed using the lamp test (+100) button. The time is adjusted using the Mode button for 10's and the Select button for 5's. Once the time is selected the Enter button is used to store the value.
060 TO 295	INCREMENT EXTINGUISHANT DURATION IN FIVE SECOND STEPS	
300	EXTINGUISHANT DURATION TIME IN SECONDS	

**Note:** Option C15 (marked with an asterisk) does not comply with EN54-2.

Once the required configuration options have been set, the Access level 3 switch **must** be returned to its normal position. The General Fault indicator will remain lit if the Access Level 3 switch is not turned off.

## 7 Internal Controls

### 7.1 Watchdog Reset

If for any reason the microprocessor in the control panel fails to carry out its operation correctly it will attempt to restart itself. This process is called a “watchdog” and the control panel must record and indicate these events.

If a watchdog event occurs, the control panel will show the FAULT and SYSTEM FAULT LEDs on the front panel, the CPU fault LED inside the panel and the buzzer will sound. This fault can only be cleared by pressing the WATCHDOG RESET button on the PCB inside the control panel. This is a serious failure and the control panel buzzer will continue to sound until the watchdog activation is reset.

### 7.2 Processor Reset

Once started, the microprocessor controlling the panel should continue to run the panel continuously without interruption. If the microprocessor fails to run correctly it can be reset by pressing the PROCESSOR RESET button on the PCB inside the control panel.

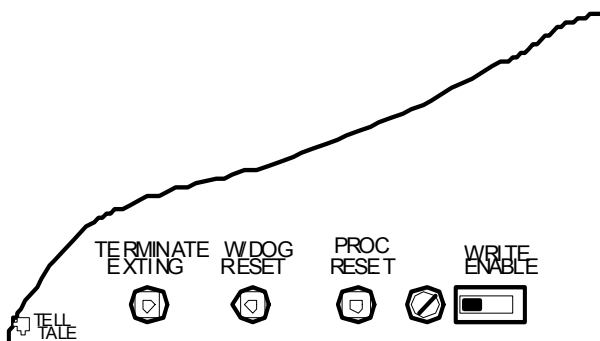
This should not normally be necessary but should be done as a matter of course if the system is behaving abnormally. The system should resume normal operation within a couple of seconds of pressing the processor reset button.

### 7.3 Terminate Extinguishant

Once the release output has been initiated it cannot be stopped using the reset button until after the extinguishant duration timer has elapsed. For test purposes a terminate extinguishant button is provided at access level 3 which will terminate an already running extinguishant flooding and allow the system to be reset to normal.

### 7.4 Commissioning

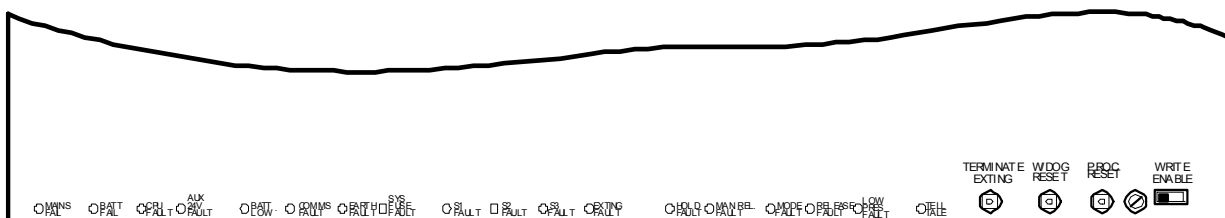
Changes to the configuration, as listed in the table on pp 29 & 30, require that the changes be stored in the control panel memory. To enable the memory to be written to it is necessary to operate the Write Enable slide switch. The illustration at left shows the location of the Write Enable switch.



## 8 Internal Indications

### 8.1 Troubleshooting

To assist in identifying fault conditions which are not detailed on the front of the control panel, a number of internal indicators are visible with the front cover removed as follows:



#### 8.1.1 Mains Fail

Indicates that the 230V AC supply is not present and the system is running on standby batteries.

If there is not a power cut, check the panel's mains fuse.

#### 8.1.2 Batt Fail

Indicates that the standby battery has become disconnected or that the charging circuit of the control panel has failed. Check that both batteries are connected and linked together. Test battery. Disconnect battery and ensure that 28 Volts can be measured on battery charger leads.

#### 8.1.3 CPU Fault

Indicates that the central processor unit has failed to correctly execute code and has been re-started by the system watchdog. The watchdog reset switch must be pressed to clear the CPU fault condition.

Press watchdog reset. If system does not return to normal then the panel is probably damaged and needs the circuit board replacing. (See maintenance section 21).

#### 8.1.4 Aux 24V Fault

The Aux 24V and R0V terminals provide a 500 milliamp, 24V DC power supply for power fire alarm ancillary equipment. This LED indicates that fuse protecting the R0V output has operated and the rating of this output has been exceeded. The fuse is a self resetting type and the supply will resume when the fault condition is removed.

**8.1.5 Batt Low**

Illuminates when the system is running on batteries and the battery voltage is between 21.5 V and 20.5 V (the minimum battery voltage).

**8.1.6 Comms Fault**

Indicates that communication has been lost with a repeater panel or Ancillary board. Check for comms fault at all repeaters and ancillary boards to identify the source of the problem.

**8.1.7 Earth Fault**

Indicates that part of the system wiring is connected to earth. Remove all system wiring and re-connect cables one at a time until the earth fault returns. This will indicate which cable the earth fault is present on.

**8.1.8 Sys Fuse Fault**

Indicates that the total power rating of the power supply has been exceeded and that the system fuse has come into operation. Remove and review all loads and re-connect one at a time until over rated circuit trips fuse to identify troublesome circuit.

**8.1.9 S1, S2 and S3 Fault**

Indicates a short or open circuit on sounder outputs. Remove wiring and refit end of line resistors. Check sounder circuit wiring.

**8.1.10 Exting Fault**

Indicates a short or open circuit on extinguishant output. Remove wiring and refit end-of-line resistors. Check extinguishant circuit wiring.

**8.1.11 Hold Fault**

Indicates a short or open circuit on the hold switch input. Remove wiring and refit end of line. Check hold circuit wiring.

**8.1.12 Manual Release Fault**

Indicates a short or open circuit on the manual release switch input. Remove wiring and refit end of line. Check manual release circuit wiring.

**8.1.13 Mode Fault**

Indicates a short or open circuit on the mode switch input. Remove wiring and refit end of line. Check mode circuit wiring.

#### **8.1.14 Release Fault**

Indicates a short or open circuit on the released pressure switch input. Remove wiring and refit end of line. Check released pressure switch circuit wiring.

#### **8.1.15 Low Pres Fault**

Indicates a short or open circuit on the low pressure switch input. Remove wiring and refit end of line. Check low pressure switch circuit wiring.

#### **8.1.16 Tell Tale**

Indicates that either panel mounted or remote manual release button has been pressed.

Can only be reset by pressing processor reset and W/DOG reset or powering down the control panel.

## 9 Power Supply

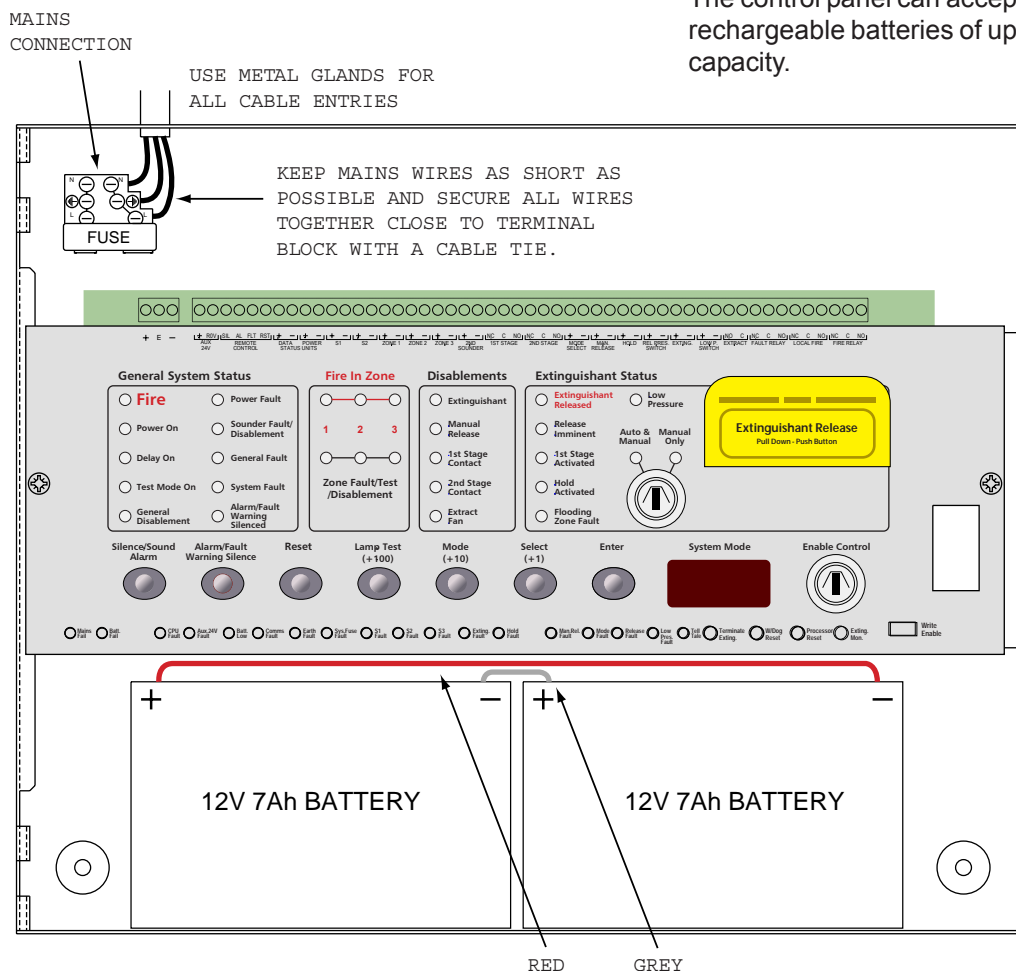
The control panel requires a 230V (+10%/-15%), 50/60Hz, AC mains power supply which connects to the fused terminal block labelled “230V”.

The fused terminal block contains a 20mm, F1.6A L250V fuse which should only be replaced with a similar type.

The output voltage of the power supply is 28V DC +/- 2V and the total current rating including a maximum 0.7A for battery charging is 3 Amps. Fuse F12 mounted on the circuit board is a self-resetting electronic fuse rated at 4 Amps.

The incoming mains cable should be routed well away from other lower voltage wiring by a distance of at least 50mm. Mains wiring should include an earth conductor, which is securely bonded to the building earth and should enter the enclosure as close as possible to the mains terminal block. Mains wires should be kept very short inside the enclosure and secured together close to the mains terminal block with a cable tie.

The control panel can accept sealed lead acid rechargeable batteries of up to 7Ah maximum capacity.



**It is most important that the polarity of the batteries is carefully observed when connecting. Wrongly connected batteries could cause damage to the control panel.**

The maximum current drawn from the batteries when the main power source is disconnected is 3 Amps.

Battery leads are supplied wired to the PCB along with a link to connect the two batteries in the accessory pack.



## 10 Commissioning Instructions

Before applying power to the panel, the extinguishant device (solenoid or igniting actuator must be physically isolated from the system by disconnecting both wires to it. This will prevent any accidental release of extinguishant.

### 10.1 Applying Power

When power is applied, if all connections are correct, only the green Power On and either the Automatic and Manual or Manual Only indicators should be lit.

If any fault indicators are lit the wiring to the appropriate input or output should be checked and all faults cleared before proceeding.

Once the panel is fault free, it can be configured with the desired options as described in **Section 6 Configuration Options**.

### 10.2 Testing the System

Once the panel has been configured the system should be thoroughly tested to ensure that the control panels responds as expected and required.

After satisfactory testing, any final connections should be made (such as to the extinguishant release actuator).

### 10.3 Configuration Record

A record of the configuration options that have been set should be recorded in the table found in Appendix 2 and this manual provided as part of the documentation recommended by BS5839:Part 1:2002 section 40.2 b).

## 11 Maintenance

NFS3-EXT control panels do not require any specific maintenance but should the control panel become dirty it can be wiped over with a barely damp cloth. Detergents or solvents should not be used to clean the panel and care must be taken that water does not enter the enclosure.

The control panel contains sealed lead acid batteries to provide standby power in the event of mains failure.

These batteries have a life expectancy of around 4 years. It is recommended that these batteries be tested in accordance with the battery manufacturer's recommendations annually to determine their suitability for continued standby applications.

Testing of the extinguishant system should only be carried out by trained personnel and must be done with appropriate isolation measures in place to ensure that accidental discharge of the extinguishant agent is avoided.

Should the control panel become faulty the complete electronic assembly and front plate can be replaced.

To do this, any configured options should be noted then both mains and battery power should be removed before the work is started.

The field wiring should be carefully labelled and removed from the terminals. The power terminal block can be unplugged from the PCB by pulling it towards you.

The PCB can now be taken out of the panel by removing the 2 screws.

Fitting the new PCB is the reverse of the procedure for removing the board.

## Appendix 1 - Technical Specification

Table 1 - Electrical Specifications

Item	Electrical Rating	Comment	Communication Parameters
Mains supply	230V AC, 50Hz +10% - 15% (100 Watts maximum)		Standard European mains connection
Mains supply fuse	1.6 Amp ( F1.6A L250V)	Replace only with similar type	
Power supply rating	3 Amps total including battery charge 28V +/- 2V		
Maximum ripple current	200 millivolts		
Battery type (Yuasa NP)	Two 12V sealed lead acid in series	7Ah maximum	
Battery charge voltage	27.6VDC nominal (temperature compensated)	See chart below	Modulated DC
Battery charge current	0.7A maximum		Modulated DC
Battery fuse	20mm, 3.15A glass	Replace only with the same type	
Current draw in mains fail condition	0.095 Amps	With buzzer sounding	
Max. current draw from batteries	3 Amps	With main power source disconnected	
ROV output	Fused at 500mA with electronic fuse	200 milliamp maximum load	
Sounder outputs	21 to 28V DC Fused at 500mA with electronic fuse	1.6 Amp total load over all circuits	Voltage reversing DC
Fault relay contact rating	5 to 30VDC 1A Amp maximum for each	Maximum ratings not to be exceeded	Volt free changeover contact
Fire relay contact rating	5 to 30VDC 1A Amp maximum for each	Maximum ratings not to be exceeded	Volt free changeover contact
Local fire relay contact rating	5 to 30VDC 1A Amp maximum for each	Maximum ratings not to be exceeded	Volt free changeover contact
First stage contact rating	5 to 30VDC 1A Amp maximum for each	Maximum ratings not to be exceeded	Volt free changeover contact
Second stage contact rating	5 to 30VDC 1A Amp maximum for each	Maximum ratings not to be exceeded	Volt free changeover contact
Extract contact rating	5 to 30VDC 1A Amp maximum for each	<i>Maximum ratings not to be exceeded</i>	Volt free changeover contact
Zone quiescent current	0mA minimum, 2mA maximum	See tables 2 and 3 for detector types	
Terminal capacity	0.5mm <sup>2</sup> to 2.5mm <sup>2</sup> solid or stranded wire		
Number of detectors per zone	Dependent on type	See table 2	
Number of sounders per circuit	Dependent on type and current consumption	See table 4 for sounder types	
Detection circuit end of line	6K8 +/- 5% ½ Watt resistor	Supplied in terminals	
Monitored input end of line	6K8 +/- 5% ½ Watt resistor	Supplied in terminals	
Sounder circuit end of line	10K +/- 5% ¼ Watt resistor	Supplied in terminals	
Extinguishant output end of line	1N4004 Diode	Supplied in terminals	
No. of detection circuits	Three. 21 to 28V DC		
No. of sounder circuits	Three. 21 to 28V DC	2 x first stage, 1 x second stage	
Extinguishant release output	21 to 28V DC. Fused at 1 Amp	1 Amp max. load – for 5 mins	Voltage reversing DC
Extinguishant release delay	Adjustable 0 to 60 secs (+/- 10%)	5 second steps	
Extinguishant release duration	Adjustable 60 to 300 seconds	5 second steps	
SIL, AL, FLT, RST inputs	Switched -ve, min resistance 0 ohms, max resistance 100 Ohms	Only to be used with Aux ROV terminal	Switched DC
Zone normal threshold	8K ohm to 1K ohm +/- 5%	<i>Use 6K8 end-of-line resistor</i>	
Detector alarm threshold	999 ohms to 400 ohms +/- 5%	<i>Nominal trigger res. 470 ohms</i>	
Call point alarm threshold	399 ohms to 100 ohms +/- 5%	<i>Nominal trigger res. 270 ohms</i>	
Short circuit threshold	99 ohms to 0 ohms +/- 5%		
Head removal condition	15.5 to 17.5 volts +/- 5%	<i>2-wire detector base or schottky diode base</i>	
Cabling	FP200 or equivalent (max. capacitance 1uF max. inductance 1 millihenry)	<i>Metal cable glands must be used</i>	
Monitored inputs normal threshold	8K ohm to 1K ohm +/- 5%		
Monitored inputs alarm threshold	999 ohms to 400 ohms +/- 5%		
Monitored inputs Short circuit threshold	99 ohms to 0 ohms +/- 5%		
Status unit/Ancillary board connection	Two wire RS485 connection (EIA-485 specification)	<i>Max. of 16 units- RS485 data cable</i>	(EIA-485 specification)
Status unit power output	21 to 28V DC, Fused at 500mA with electronic fuse	<i>300 milliamp max. load</i>	

**Table 2 - Compatible Devices**

Detectors				
Model	Type	Manufacturer	Quiescent Current (µA)	Max. Number per zone
ECO1002	HEAT/PHOTO	System Sensor	75	20
ECO1003	PHOTO	System Sensor	60	26
ECO1005	HEAT	System Sensor	70	22
ECO1005T	HEAT	System Sensor	70	22
2020PT	HEAT/PHOTO	System Sensor	75	20
2020P	PHOTO	System Sensor	60	26
2020R	HEAT	System Sensor	70	22
2020F	HEAT	System Sensor	70	22
2020HF	HEAT	System Sensor	75	20
1151EIS	IONISATION	System Sensor	30	52
5451EIS	HEAT	System Sensor	100	15
6500R	BEAM	System Sensor	17mA*	N/A
SD-851E	PHOTO	Notifier	70	22
SD-851TE	HEAT/PHOTO	Notifier	80	19
FD-851HTE	HEAT	Notifier	80	19
FD-851RE	HEAT	Notifier	75	20
HRZ-1002	HEAT/PHOTO	MorleyIAS	75	20
HRZ-1003	PHOTO	MorleyIAS	60	26
HRZ-1004T	HEAT	MorleyIAS	75	20
HRZ-1005	HEAT	MorleyIAS	70	22
HRZ-1005T	HEAT	MorleyIAS	70	22
Bases & Call Points				
Model	Type	Manufacturer	Comments	
ECO1000R	STANDARD	System Sensor	Must use AEOL	
ECO1000BRSD	DIODE	System Sensor		
2020B	STANDARD	System Sensor		
2020BSD	DIODE	System Sensor		
B401R	STANDARD	System Sensor		
B401RSD	DIODE	System Sensor		
B401	I.S. STANDARD	System Sensor		
HRZ-1000BSD	STANDARD	MorleyIAS	Must use AEOL	
MCP1	470R Call Point Range	KAC		
Sounders / Beacons				
Model	Type	Manufacturer	Comments	
All	ELECTRONIC	KAC		

\* Includes fault relay current.

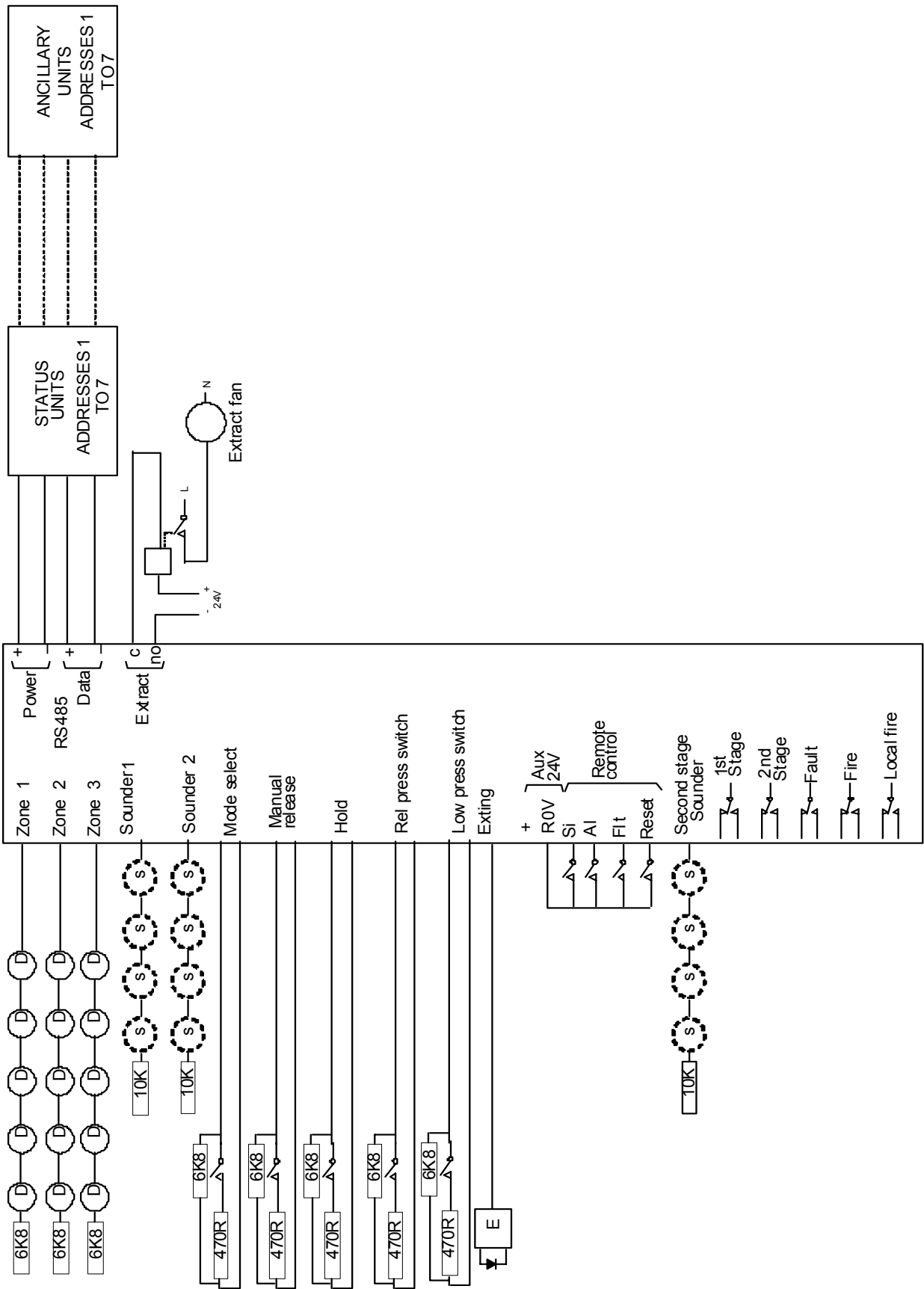
Although the current consumption of many detection devices would allow more than 32 to be connected to a zone, this number should be limited to 32 to ensure that a short or open circuit on the wiring does not prevent the indication of a fire alarm from more than 32 fire detectors and/or call points as required by European standard EN54-2.

**No more than 32 devices (detectors and call points) should be fitted to any one zone.**

**Note:** An AEOL (Active End-of-Line) device allows call points mounted down line of detectors that have been removed from diode bases to continue to operate.

Compatible I.S. Barriers

Model	Type	Manufacturer
MTL4061 MTL778ac	DETECTION ZONE GALVANIC ISOLATOR ALL SOUNDER CIRCUITS	MTL MTL



System Schematic

## Appendix 2 - Record of Configuration

Use the table below to record the configuration codes that have been set on the control panel for future reference. Place a tick in the box for any configuration options that are set.

It is recommended that a copy of this table is left with the control panel under the supervision of the person responsible for the fire protection system.

CODE	FUNCTION	TICK SET OPTIONS
C00	SOUNDER DELAY TIME = 30 SECONDS	
C01	SOUNDER DELAY TIME = 1 MINUTE	
C02	SOUNDER DELAY TIME = 2 MINUTES	
C03	SOUNDER DELAY TIME = 3 MINUTES	
C04	SOUNDER DELAY TIME = 4 MINUTES	
C05	SOUNDER DELAY TIME = 5 MINUTES	
C06	SOUNDER DELAY TIME = 6 MINUTES	
C07	SOUNDER DELAY TIME = 7 MINUTES	
C08	SOUNDER DELAY TIME = 8 MINUTES	
C09	SOUNDER DELAY TIME = 9 MINUTES	
C11	Z1 & Z2 DETECTORS TRIGGER AUTOMATIC RELEASE	
C12	Z2 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C13	Z1 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C14	Z1 & Z2 OR Z2 & Z3 OR Z1 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C15	Z1 & Z2 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C16	Z1 OR Z2 OR Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C17	Z1 DETECTORS TRIGGER AUTOMATIC RELEASE	
C18	Z2 DETECTORS TRIGGER AUTOMATIC RELEASE	
C19	Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
C21*	DISABLE FIRE BUZZER	
C22*	DISABLE FIRE OUTPUT	
C23	DISABLE FAULT OUTPUT	
C24	DISABLE EARTH FAULT MONITORING	
C25	PULSE R0V OUTPUT	
C26	REMOVE AUX 24V ON SYSTEM RESET	
C27	INDICATE EXTING RELEASED WHEN EXTING OUTPUT IS ACTIVE	
C28	NO ACTIVATION DELAY UPON MANUAL RELEASE	
C29	EXTINGUISHANT OUTPUT CAN BE RESET DURING IMMINENT PHASE	
C2A	LOCAL FIRE RELAY OPERATES UPON RELEASED SIGNAL	
C31	ZONE 1 ALARM FROM DETECTOR DELAYED	
C32	ZONE 2 ALARM FROM DETECTOR DELAYED	
C33	ZONE 3 ALARM FROM DETECTOR DELAYED	
C41	ZONE 1 ALARM FROM CALL POINT DELAYED	
C42	ZONE 2 ALARM FROM CALL POINT DELAYED	
C43	ZONE 3 ALARM FROM CALL POINT DELAYED	
C61	ZONE 1 OPERATES THROUGH I.S. BARRIER	
C62	ZONE 2 OPERATES THROUGH I.S. BARRIER	

CODE	FUNCTION	TICK SET OPTIONS
C63	ZONE 3 OPERATES THROUGH I.S. BARRIER	
C71*	ZONE 1 SHORT CIRCUIT INDICATES ALARM	
C72*	ZONE 2 SHORT CIRCUIT INDICATES ALARM	
C73*	ZONE 3 SHORT CIRCUIT INDICATES ALARM	
C81*	ZONE 1 NON-LATCHING	
C82*	ZONE 2 NON-LATCHING	
C83*	ZONE 3 NON-LATCHING	
CA1	Z1 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	
CA2	Z2 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	
CA3	Z3 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	
E00	PANEL CAN BE RESET IMMEDIATELY DISCHARGE OUTPUT HAS OPERATED	
E01 TO E29	PANEL CAN BE RESET 1 MINUTE TO 29 MINUTES AFTER DISCHARGE OUTPUT HAS OPERATED	
E30	PANEL CAN BE RESET 30 MINUTES AFTER DISCHARGE OUTPUT HAS OPERATED	
-00	NO EXTINGUISHANT DELAY	
-05	5 SECONDS EXTINGUISHANT DELAY	
-10 TO -55	INCREMENT EXTINGUISHANT DELAY IN FIVE SECOND STEPS	
-60	60 SECONDS EXTINGUISHANT DELAY	
060	EXTINGUISHANT DURATION TIME IN SECONDS	
060 TO 295	INCREMENT EXTINGUISHANT DURATION IN FIVE SECOND STEPS	
300	EXTINGUISHANT DURATION TIME IN SECONDS	



 **NOTIFIER**<sup>®</sup>  
by Honeywell

Charles Avenue  
Burgess Hill  
West Sussex  
RH15 9UF

T: +44 (0) 1444 230 300  
F: +44 (0) 1444 230 888  
E: [sales@notifierfiresystems.co.uk](mailto:sales@notifierfiresystems.co.uk)  
[www.notifierfiresystems.co.uk](http://www.notifierfiresystems.co.uk)

local distributor



Every care has been taken in the preparation of this document but no liability can be accepted for the use of the information therein. Design features may be changed or amended without prior notice.

