FCP7003

Fire Extinguishant Control Equipment

Installation, Commissioning and Operating Manual

MASTER MANUAL

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Contents

Section 1 - Introduction

About this Manual

This manual describes the Surveyor FCP 7003-1DK Extinguishant Control Panel. The first section gives a general overview of the control panel and explains some of the features. Subsequent sections describe the operation from the user's point of view and provide more detailed information to enable the control panel and ancillary units to be installed and commissioned. Drawings are included for clarification, and basic fault finding techniques are described.

The gaseous extinguishing system associated with the control panel is not covered by this manual and to obtain information regarding the agent type, operating and maintenance procedures, etc., the relevant manual should be consulted.

General Overview

It is assumed that the total extinguishing system, of which this control panel forms a part, has been designed by a competent fire alarm system engineer to the relevant standards, and that the correct type and quantity of extinguishing agent has been specified.

The control panel provides an electrical output to an extinguishing system, either automatically via the activation of the smoke detection system, or manually via the operation of a manual release unit. The type of agent depends on the application, and the appropriate manual should be consulted for safety precautions to be observed during normal operation and in a discharge situation.

The control panel is a composite microprocessor controlled unit, incorporating all the necessary monitoring and control circuits required for the extinguishing system. On receipt of certain input signals, the control panel provides outputs to warn personnel audibly and visually of an alarm condition or an imminent agent discharge, and initiates the activation of the extinguishing system. The status of the system is monitored at all times and is displayed on the panel fascia and on remote units, if fitted. A break or short-circuit in the wiring to any system device is indicated as a fault condition on the control panel.

Three detection zones are provided, two of which are dedicated to the extinguishing system, and the third being a 'peripheral' zone for general detection in the surrounding areas. Most makes of detectors may be used with the system. There is a common alarm output for sounder operation and, in addition, a first stage alarm output and a separate second stage alarm output. There are voltfree contacts available that operate at different stages for remote signalling and indication, or control functions.

The extinguishant release output can be used to activate a solenoid actuator or a number of 'Metron' devices, and the wiring is fully monitored for open or short circuit conditions. There is an input for the connection of a pressure switch activated by the extinguishant when it is discharging, and there are options on the mode of operation.

For periods when the protected area is occupied, or the automatic release of agent is not required, the system can be set to manual mode. This function is achieved by operating switches on the panel fascia, or on remote status units. The system status can also be controlled by a switch within a door lock so that the action of locking or unlocking the door to the protected area causes the status to change.

In addition to the user controls, there are extensive test and configuration functions accessible to an engineer allowing the system to be tailored to the specific application, and providing the facility to test the system with the minimum disruption to normal activities.

The control panel requires a 240V AC mains supply, and operates at 24V DC derived from an integral power supply and battery charger unit. A maintenance-free sealed lead-acid battery maintains the system in operation during a mains failed condition for at least 24 hours, and up to 72 hours depending on the application requirements. In the normal operating mode the green **Supply Healthy** LED is illuminated on the panel fascia. Failure of either the mains or battery supply is indicated as a fault condition and an audible alarm is given.

Manufactured to meet the latest standards, the control panel complies with BS 5839 Part 1 (Fire Alarm System design, installation and service), BS 5839 Part 4 (Specification for control and indicating equipment), and BS 7273 Part 1 (Electrical actuation of gaseous total flooding extinguishing systems).

Section 2 - Procedures

General

In accordance with BS 5839 Part 1: 1988, written procedures should be laid down for dealing with alarms of fire, fault warnings, and the isolation of parts of the system.

The responsible person should ensure that users of the system are instructed in its proper use and are familiar with the procedures.

On hearing the fire alarm:

CARRY OUT THE PRESCRIBED PROCEDURE

This procedure should as a minimum ensure that personnel are evacuated from the protected area. If the second stage sounder operates it indicates that the extinguishing agent will be released after a pre-determined time delay (typically 30 seconds). If required, the extinguishant release can be postponed by operating the **hold-off** pushbutton, or a remote button (if fitted).

Alternatively, if a fire is noticed but the smoke detectors have not activated, the extinguishing system can be discharged manually by operating a manual release unit.

Subsequent actions will depend on the circumstances and may include silencing the audible alarms and resetting the system as described in section 4.

To evacuate the area:

Open the front door of the control panel and press the **Sound Alarms** button.

Fault Indication:

If the control panel indicates a fault condition, press the **Silence Tone** button to mute the internal buzzer, and make a note of all illuminated indicators. Refer to the chart on page 12 and call the engineer.

Normal hours:

Telephone no. .....

Contact .....

Out of hours:

Telephone no. .....

Contact .....

Routine Attention

In order to ensure that the system is fully operational, and to comply with the requirements of BS 5839 Part 1, the following routine attention is recommended:

Daily Check the control panel to confirm that it indicates normal operation. If any fault is indicated check that it has been recorded in the log book and that the appropriate actions have been taken, e.g. informing the service company.

Weekly Test at least one detector or call point to confirm the operation of the control panel and the audible alarms (after first ensuring that the system is set to manual mode). Try to test a different device each week and keep a record of the devices tested. Record and report any malfunction.

In accordance with BS 7273 Part 1, carry out a visual inspection of the extinguishing system, including an examination of all pressure gauges and a general check that all operating controls are properly set and are accessible. Check nozzles and pipework for damage or obstructions.

Quarterly The responsible should ensure that every three months the system is checked by a competent person who shall:

Check the log book entries and any action taken.

Check the standby batteries and charger voltage.

Test at least one device in each zone to check the panel functions.

Check the operation the audible alarms and any link to a remote panel or manned centre.

Carry out a visual inspection of the installation to check for alterations or obstructions, and issue a certificate of testing.

Annually The responsible person should ensure that, in addition to the quarterly checks, each device on the system is tested, and that a visual inspection is made of the cable and fittings.

The control panel case should be cleaned periodically by wiping with a soft, damp cloth. **Do not** use any solvents.

In addition to the routine testing described above, the user has a responsibility for ensuring certain actions are taken following a fire or fault, and for implementing remedial action following a specified incidence of false alarms.

As a minimum, the user shall record any incident in the log book and inform the service organisation, who may be required to retest the system.

The user's responsibilities are described fully in BS 5839 Part 1: 1988 available from:

BSI Customer Services, BSI Standards
389 Chiswick High Road, London W4 4AL

Section 3 - Controls and Indicators

User Controls

User controls and indicators are located on the control panel fascia beneath the outer glazed door. Access to the control switches is achieved by unlocking the front door and allowing it to hinge down. Opening the door reveals a number of fault indicators which identify specific fault conditions and are primarily intended for engineer's use.

Several of the control switches incorporate LEDs to indicate operation of the switch.

Supply Healthy

A green LED which is normally illuminated to indicate the system is operating correctly.

Common Fire

A red LED which flashes when any zone is activated and goes steady when the Stop Alarms switch is operated.

System Fault

An amber LED which flashes when **any** fault is detected on the system and goes steady when the Silence Tone pushbutton is pressed.

Note. Most fault indications clear automatically when the fault clears.

Zone Fire

Twin red LEDs associated with each zone which flash when the relevant zone is activated and go steady when the Stop Alarms switch is operated.

Zone Fault

An amber LED associated with each zone which illuminates when a fault on the relevant zone is detected (steady for open circuit and pulsing for short circuit).

Zone Isolated

An amber LED which indicates that one or more zones are isolated.

Auto

Twin amber LEDs that indicate the extinguishing system is set to automatic mode, selected by pressing the associated pushbutton or a remote control pushbutton.

Manual

Twin green LEDs that indicate the extinguishing system is set to manual mode, selected by pressing the associated pushbutton or a remote control pushbutton.

Release Imminent

Twin red LEDs which indicate that the discharge sequence is in progress and that the extinguishant will be released when the time delay expires.

Released

Twin red LEDs which indicate that the extinguishant has been released, illuminated via a signal from the extinguishant pressure switch (optional).

Hold Off

Twin amber LEDs which indicate that the associated Hold Off pushbutton is depressed.

Stage 1 Isolated

An amber LED that indicates that the associated pushbutton has been pressed to isolate the first stage auxiliary output contacts. A further operation of the pushbutton is required to reinstate the output.

Stage 2 Isolated

An amber LED that indicates that the associated pushbutton has been pressed to isolate the second stage auxiliary output contacts. A further operation of the pushbutton is required to reinstate the output.

Stop Alarms

A momentary pushbutton which silences the external alarm sounders in an alarm condition.

Note. This control is only effective when an alarm is active or the Sound Alarms (evacuate) is operated, and cannot be used to isolate or prevent the alarm sounders from operating.

Sound Alarms

A momentary pushbutton which causes the sounders connected to the common and first stage outputs to operate (evacuate signal). Cancelled by pressing Stop Alarms and System Reset.

System Reset

A momentary pushbutton which restores the system to normal operation following an alarm condition. Also tests all the panel indicators.

Note. If the fire alarm condition still exists, the sounders are re-energised and the alarm is indicated as a new event.

Silence Tone

A momentary pushbutton which silences the internal buzzer in a fault situation.

Note. The buzzer cannot be silenced in an alarm condition.

Section 4 - System Operation

System Normal

In the normal operating mode the green Supply Healthy LED, and either the green Manual or amber Auto status LEDs are illuminated.

Selection of the system mode is by operation of the relevant pushbutton on the panel fascia or on a remote status unit, or by the action of locking/unlocking the door to the protected area.

It is normal for the system to be set to Manual when the area is occupied, and to Auto when the area is unoccupied. However, with some types of agent it is acceptable to leave the system permanently set to Auto mode, providing there is the means to warn occupants of an impending discharge and personnel can evacuate the area within the delay period.

Consult the supplier of the extinguishing system for more information.

System Configuration

The control panel is equipped with three zones. Zones 1 and 2 are dedicated to the extinguishing system operation, and zone 3 is used for protecting the surrounding areas such as offices, stores, plant rooms, etc. Zones 1 and 2 are coincidence linked, i.e. if a detector on **both** zones is activated, and the system is set to Auto mode, the agent discharge sequence is initiated. This is a 'second stage' alarm. If a single zone, either 1 or 2, is activated, the relevant zone is indicated and alarm sounders are energised, but there is no discharge sequence. This is a 'first stage' alarm.

Alarm sounders are also arranged on three separate circuits, i.e. common, first stage and second stage. Alarm circuits are energised in accordance with the current alarm status (see below). The second stage sounder is usually a different type, or has a different, distinct tone to indicate the impending agent release.

Various auxiliary contacts are available for remote signalling of alarm and fault conditions, and for interfacing with items of plant associated with the protected area, e.g. air conditioning, dampers, power, etc. There is a common fire output with voltfree contacts that operate with any fire condition, and there are voltfree contacts associated with first stage operation and second stage operation.

Certain panels may have a Control Enable keyswitch instead of, or in addition to, the protective front panel door. This switch, if fitted, must be operated to the On position before any of the control switches are operable.

Note. Pushbuttons should be operated for 1-2 seconds to ensure the command is accepted.

Fire Alarm

Zone 3 (Peripheral)

The activation of a detector or call point on zone 3 causes the Fire LEDs to pulse, the sounders connected to the 'common' output to energise, and the common fire contacts to operate.

Zones 1 or 2

The activation of a detector on either zone 1 or 2 causes the relevant Fire LEDs to pulse, the common sounder output and the first stage sounder output to energise steadily. The common fire and first stage auxiliary contacts operate.

Silence Alarms

The alarm sounders are silenced by pressing the Stop Alarms pushbutton momentarily. The sounders are silenced and the internal buzzer emits a steady tone which cannot be muted. The flashing Fire LEDs go steady.

Note. Alarm sounders must be silenced before the system can be reset.

Reset System

Do not attempt to reset the system until the cause of the alarm has been investigated and cleared. It is not possible to reset the system until the cause of the alarm has been removed, e.g. broken glass in a call point replaced, or smoke/agent cleared from the vicinity of a detector. Also, the system cannot be reset until the alarm sounders have been silenced.

When the cause of the alarm has been established and removed, press the Reset System pushbutton momentarily. All the panel LEDs illuminate, the buzzer tone changes, and the system returns to normal operation.

If the cause of the alarm still exists, the panel is re-energised as before and the alarm sounders operate. Silence the alarm sounders and investigate the cause.

System Mode

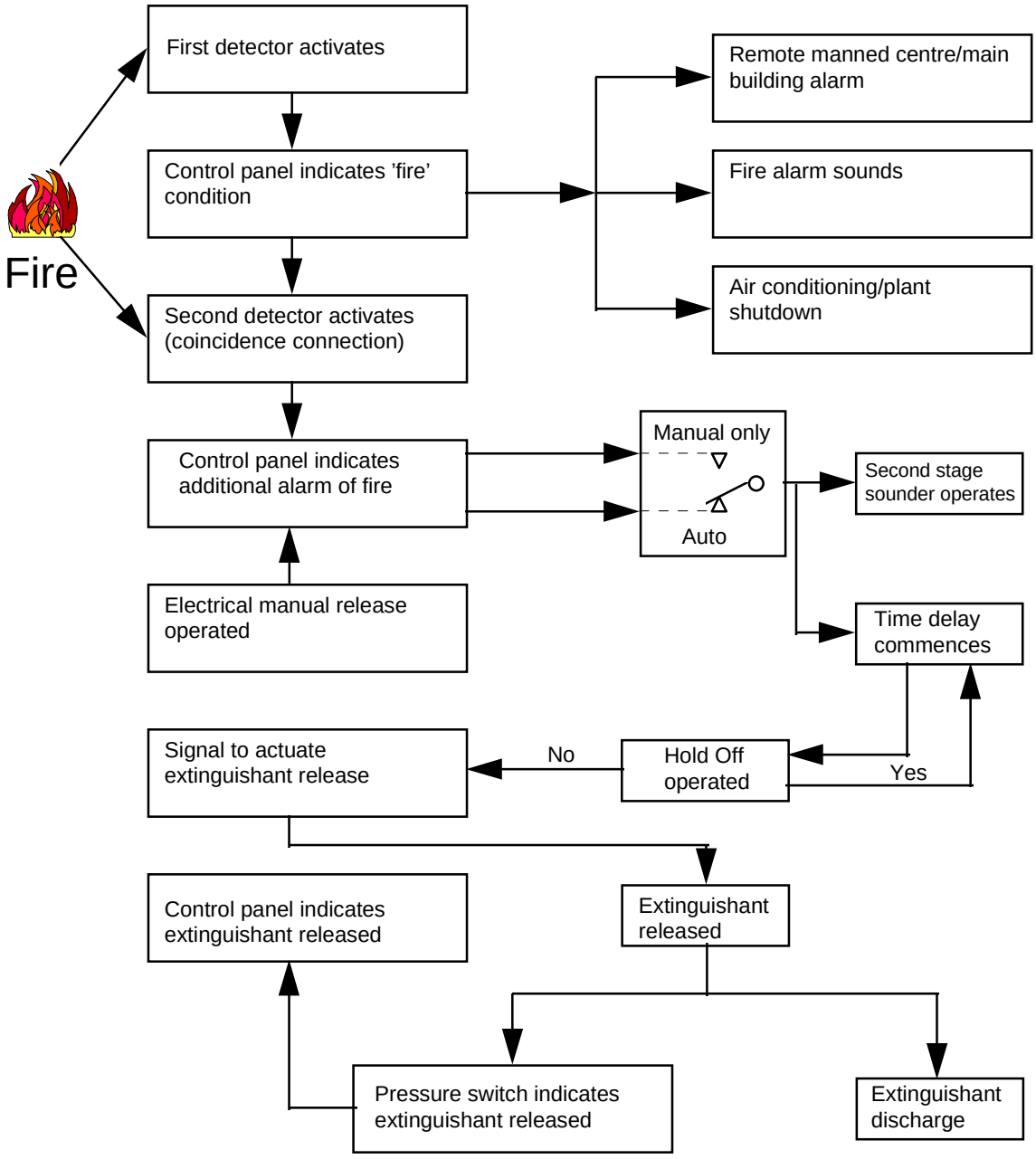
The extinguishing system has two operational modes, Auto and Manual. In the Auto mode the activation of a detector on zones 1 **and** 2 starts the agent discharge sequence (second stage alarm), causing the agent to be released at the expiry of the pre-set time delay, unless prevented (see Hold Off).

In the Manual mode the activation of one or more detectors on zones 1 and 2 causes a first stage alarm only.

The current mode is indicated by the LEDs on the panel fascia and any remote status units on the system. To change the mode, press the relevant pushbutton (Auto or Manual), either on the control panel or any remote unit.

Note. If the mode is controlled by a door lock, this setting cannot be overridden by the panel or remote control pushbuttons.

Typical sequence of actions leading to extinguishant release



This diagram is reproduced from BS 7273 Part 1: 1990. Full copies of the standard can be obtained from:

BSI Customer Services
BSI Standards
389 Chiswick High Road
London W4 4AL.

Discharge Sequence

The discharge sequence is initiated either by the activation of detectors in zones 1 and 2, with the system set to Auto mode, or the operation of a Manual Release unit (second stage alarm).

The second stage alarm is indicated by the second stage sounder/s pulsing in addition to the common and first stage sounders.

If the second stage alarm is initiated by the operation of detectors, the zone 1 and 2 Fire LEDs, the common Fire LED and the Release Imminent LEDs all flash.

If a Manual Release unit is operated, the common Fire LED and the Release Imminent LEDs flash.

The second stage auxiliary contacts operate.

On entering the second stage alarm condition, a timer is started which has a pre-set delay period (typically 30 seconds). On the expiry of the delay a signal is transmitted to the release solenoid or actuators causing the agent to be discharged.

The Released LEDs flash via a signal from the extinguishing system pressure switch (optional).

The alarm sounders may be silenced by operating the Stop Alarms pushbutton.

The system is restored to normal by operating the System Reset pushbutton, however, the following should be noted:

1 The agent may cause many detectors to operate which will not reset until the area has been thoroughly ventilated.

2 The pressure switch will probably need to be manually reset in order to clear the signal to the control panel.

3 It is necessary to reinstate the Manual Release unit before resetting if used to activate the discharge.

Note. There are several ways to prevent the agent discharging following the activation of the second stage alarm and before the expiry of the delay timer. If triggered automatically, resetting the system or switching to Manual mode will inhibit the sequence. (See also Manual Release and Hold Off).

Manual Release

A Manual Release unit is mounted on the control panel fascia. Other units may be located at remote locations outside the protected area. A Manual Release can be operated at any time, irrespective of the system status, to initiate the discharge sequence.

The operation of a Manual Release unit requires two separate actions, to prevent inadvertant or malicious activation. To operate the unit, lift the protective cover and press the glass pane to break it.

Note 1. The cover may be secured by a seal which must be broken to allow the

cover to be raised.

Note 2. The Manual Release input to the control panel is non-latching. If the unit is reinstated, i.e. the glass is replaced, before the timer has expired, the discharge sequence is cancelled.

Hold Off

The Hold Off facility enables the discharge sequence to be halted if, for instance, personnel are still within the protected area. There is a Hold Off pushbutton on the control panel fascia and there may be other units within the protected area.

Pressing **and holding** the pushbutton operated halts the sequence for as long as the button is held operated. Once released, the time delay is re-applied and the discharge will occur when it expires.

System Faults

The system is comprehensively monitored for abnormal conditions both within the control panel circuitry and on the external wiring to field devices. The majority of fault conditions have an associated LED which indicates the precise cause.

Some conditions can be rectified by the user and others will require the attendance of a service engineer. The following text and the chart on page 12 explains the various indications, the probable cause, and the recommended action.

Whenever the system detects a fault condition the System Fault LED flashes. This is invariably accompanied by one or more additional fault LEDs that indicate the specific fault. All external circuits are monitored for open and short circuit condition and either condition is indicated separately by the relevant LED. The power supply is monitored for mains and battery faults, voltage variations and earth conditions.

The following fault indications are provided:

Zone circuits	Open/short (or device removed)
Extinguishant release circuit	Open/short
Pressure switch circuit	Open/short
Remote manual release circuit	Open/short
Remote status indication circuit	Open/short
Remote hold-off circuit	Open/short
Stage 1 sounder circuit	Open/short
Stage 2 sounder circuit	Open/short
Common sounder circuit	Open/short
Power Supply	Mains failed
	Battery disconnected
	Voltage high/low
	Earth condition
Auto Reset Warning (AWR)	CPU Failure/power removed (Must be reset)

Fault Location

Warning. High voltages are present within the panel which could cause fatal shock. The front cover should only be removed by a competent engineer with the necessary tools. There are no user serviceable parts inside the panel.

If in doubt - call engineer.

Indication	Possible Cause	Action
No indication on panel - no buzzer sounding	No power to panel	Check mains supply and call engineer
Mains failed - Supply Healthy extinguished	AC mains supply failed - system operating on batteries	Check mains supply - if OK call engineer
Battery fault - Supply Healthy extinguished	Battery failed or disconnected - fuse blown	Call engineer
Voltage fault	System voltage high or low	Call engineer
Earth fault	24V DC supply connected to earth	Call engineer immediately - switch system to Manual mode
Zone fault (1, 2 or 3) All zone LEDs	Zone circuit fault - check for removed devices Zone power fuse blown	Call engineer
Auto Reset Warning	CPU failed/all power removed from panel	Reset system. If unable to reset - call engineer
Ist, 2nd stage or common sounder fault	Open or short condition on wiring - fuse blown	Call engineer
Manual release, hold-off, status unit fault	Open or short condition on wiring	Call engineer
Extinguishant release fault	Open or short condition on wiring - fuse blown	Call engineer
Zone Isolated	Engineer's isolate switch operated	Check log book for reason - call engineer
Engineer Test	System in test mode	Engineer working on system - no action required

Section 5 - Installation

Important notice

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, or under the supervision of, competent persons according to good engineering practice and:

(i) IEE regulations for the 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 any appropriate information about this product is made available by you to anyone concerned with its use.

This equipment is designed to be operated from 220-240V AC mains supplies and is of class I construction. As such it **must** be connected to a protective earthing conductor in the fixed wiring of the installation.

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

General

Installation of the panel should only be carried out by qualified personnel. The electronic components within the panel can be damaged by static charge. Suitable precautions must be taken when handling circuit boards. **Never** insert or remove boards or components with power on.

Mounting the Cabinet

The site chosen for the location of the panel should be clean and dry, and not subject to shock or vibration. The temperature should be in the range 5 to 35^{O}c, and the humidity should not exceed 95%.

Before mounting the cabinet, the main circuit board should be removed and stored in a safe location. Open the panel door and remove the fascia and the battery

cover (each held with two screws). Disconnect the AC input wires, the earth wire and the manual release wires from the main circuit board. Remove the seven retaining screws and gently lift the board and turn it over; pull off the regulator connector at the edge of the board and remove the board completely.

Using the cabinet as a template, mark the position of the two upper keyhole fixings, ensuring that the wall is flat at the chosen location. Drill and plug the wall and insert suitable screws. Hang the cabinet on the screws and mark the position of the lower two fixing holes. Remove the cabinet again and drill and plug the lower fixing holes. Finally, re-hang the panel and secure with all four fixings.

Cabling

Suitable cables should be brought into the cabinet using the knockouts provided, or the cut-outs in the rear, making sure that tails are long enough to reach the relevant terminals.

Terminals will accept one single or stranded conductor up to 2.5mm^2.

Power Supply

The panel requires a 220-240V AC supply which should be derived from a suitably labelled, dedicated isolator.

Field Devices

Detectors, call points, sounders, etc. should be supplied with full installation instructions. High voltage testing of the wiring must be carried out **before** any devices are connected.

Section 6 - Commissioning

General

It is recommended that the control panel is powered-up and tested prior to connecting the external circuits, to prove the operation of the panel.

Clear any debris from the cabinet and refit the main circuit board remembering to reconnect the flying lead to the back of the board. Reconnect the AC input wires, the earth lead, and the fascia mounted manual release wires.

All monitored circuits require a 4K7 end-of-line resistor. All switching contacts require 470 ohm resistor wired in series with the contact to generate an alarm condition (see drawings). All approved ancillary units are fitted with the appropriate resistors.

Check that a 4K7 resistor is fitted to each of the following output terminals:

ZONE 1	+ and -
ZONE 2	+ and -
ZONE 3	+ and -
MAN REL	+ and -
PRESS SW	+ and -
EXT	+ and -
HOLD OFF	+ and -
A/MAN	C and A
"	C and M
STAGE 1 SOUNDER	+ and -
STAGE 2 SOUNDER	+ and -
COMMON SOUNDER	+ and -

Powering the Panel

Mains Supply

Remove the mains fuse by pulling it from the fuse holder. Connect the L, E and N terminals to a suitably labelled 240V AC mains supply and switch the supply on.

Check that the mains fuse is rated at 3A maximum and then replace the mains fuse in its holder. Initially, all LEDs are momentarily illuminated, reverting to Supply Healthy, Manual, System Fault, Battery Fault and ARW LEDs being lit. Press the Silence Tone pushbutton if required to mute the buzzer.

Connect the 24V DC standby battery to the BATTS + and - terminals, observing

polarity. After approximately 20 seconds the System Fault and Battery Fault LEDs should extinguish. Press the System Reset pushbutton to clear the ARW indication.

Assuming there are no faults on the panel, the only LEDs now illuminated are Supply Healthy and Manual. Investigate and clear any panel faults before proceeding with the external wiring.

Battery Power

If a mains supply is not currently available and the panel is required to be temporarily powered from the battery supply, proceed as follows:

Connect the 24V DC battery to the BATTS + and - terminals observing polarity. Momentarily operate the BATTERY START pushbutton on the left-hand side of the PCB within the panel.

Initially all LEDs are momentarily illuminated, reverting to System Fault, Mains Fail, ARW and Manual indication. Press System Reset to clear the ARW indication, and Silence Tone to mute the buzzer.

The fault LEDs will remain illuminated until the mains supply is applied, however, the system may be operated and tested.

Voltage Adjustment

The panel voltage is checked, with the batteries disconnected, by measuring the voltage at the battery terminals. The voltage should be between 27.3 and 27.7 volts. If necessary adjust with the VOLTAGE ADJUST potentiometer on the PCB.

Connecting the External Circuits

When connecting or disconnecting any circuit or component to the panel ensure that both mains and battery supplies are **off**.

It is assumed that field devices have been installed and connected in accordance with supplied instructions, and that the wiring has been high-voltage tested, and checked for earth conditions and continuity. Inputs and outputs are generally polarity conscious, therefore check polarity before connecting circuits.

Do not use auxiliary contacts to switch high voltages such as 240V AC or 3-phase supplies.

It is recommended that the panel is checked after each circuit is connected so that any fault conditions can be swiftly identified and rectified.

Smoke Detection (Zones 1 and 2)

Zones 1 and 2 are coincidence linked and should be wired such that a device from each zone is positioned in the optimum location for the detection of smoke in all parts of the protected area, without causing unwanted alarms.

Note. In accordance with BS 7273, call points should not form part of the extinguishant release mechanism and should not therefore be included on zones 1 or 2.

Remove the 4K7 resistor from the ZONE + and - terminals in the panel and connect to the last device in the circuit. Connect the zone wires to the + and - terminals in the panel observing polarity (see figure 1).

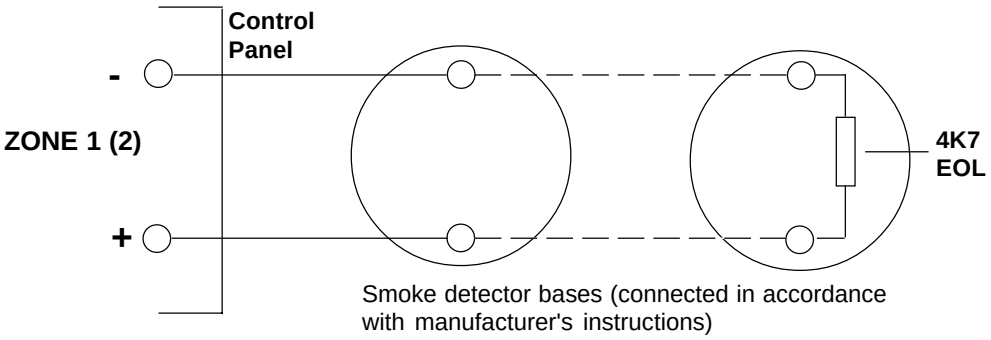


Figure 1 - Detection zones connection detail

Peripheral Zone (3)

Zone 3 can be used for the general protection of peripheral areas.

It is a requirement of BS 5839 that the removal of a detector from its base should not prevent the operation of a call point on the same circuit, therefore, to comply with this requirement, call points on the circuit should be wired before smoke detectors.

Remove the 4K7 resistor from the ZONE 3 terminals in the panel and connect it to the last device in the circuit. Connect the wires into the + and - terminals observing polarity (see figure 1).

Reapply power to the panel and check the operation of the smoke detectors before proceeding.

Sounder Circuits

Sounders must be polarised and suppressed, and should not exceed the maximum load per circuit of 1.5A. All three available sounder circuits are similarly wired.

Remove the 4K7 resistor from the relevant panel terminals and connect to the last sounder on the circuit. Connect the sounder circuit wires in to the + and - terminals in the panel, observing polarity (see figure 2).

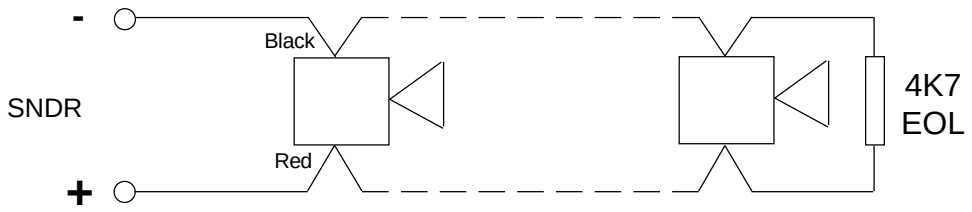


Figure 2 - Sounder connection detail

Remote Manual Release Unit

If required, additional manual release units can be connected to the panel and will operate in parallel with the fascia mounted unit. Remote manual release units should be identical in operation to the panel unit to avoid any confusion in the method of activation. (See also Status Units).

If not already fitted in the unit, a 470R resistor must be connected in series with the normally open contact in the device.

Remove the 4K7 resistor from the panel terminals and connect the manual release circuit to the MAN REL + and - terminals in the panel. Connect the 4K7 resistor to the last device in the circuit (see figure 3).

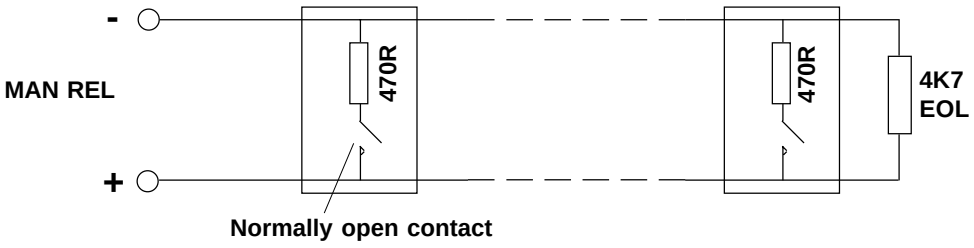


Figure 3 - Remote manual release connection detail

Status Units

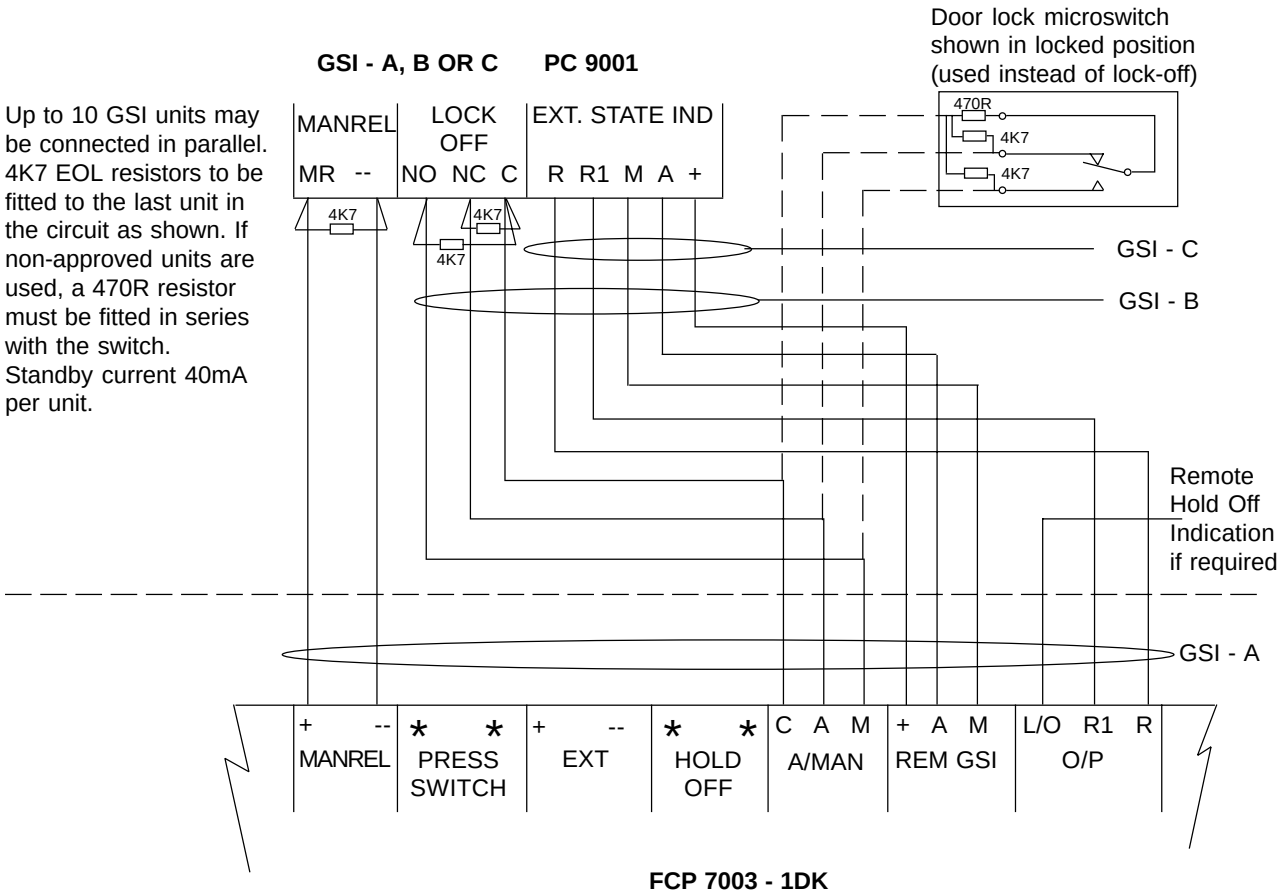
Status units can be added to the system to provide remote control and indication of the system status. Three approved types are available, i.e.

GSI - A Status indication, Mode select and Manual release

GSI - B Status indication and Mode select

GSI - C Status indication only

The wiring to remote status units is fully monitored and a 4K7 resistor must be fitted to the last unit as shown in figure 4. 470R resistors are incorporated in the GSI unit circuitry and **do not** have to be fitted.



Auto and Manual inputs require a momentary signal to activate. If connected to a Chubb type door lock with integral microswitch, the system is set to the door switch position and cannot be overridden.

Figure 4 - Remote GSI connection detail

Hold Off Unit

If required, additional remote Hold Off units can be connected to the panel.

Hold Off units are connected to the + and - HOLD OFF terminals in the panel and are wired in parallel. A 4K7 resistor must be fitted to the last unit on the circuit, and a 470R resistor fitted in series with each switch contact as in figure 3.

Pressure Switch

To provide positive indication that the agent is released a Pressure Switch input is provided.

The pressure switch is connected to the PRESS SWITCH terminals in the panel and requires a 4K7 resistor to be fitted to the last unit (if more than one). A 470R resistor must be fitted in series with the normally open contact of the switch as in figure 3.

The operation of a pressure switch can produce alternative actions by the control panel depending on the setting - see Engineer Options.

Auxiliary Outputs

Voltfree contacts are provided for remote control and indication purposes and are activated at different stages of the system operation as follows:

Common Fire	Operates on any first stage fire alarm
Stage 1 Aux	Two sets of changeover contacts which operate when either zone 1 or 2 is active, or a manual release is operated
Stage 2 Aux	Two sets of changeover contacts which operate when both zones 1 and 2 are active, or a manual release is operated.

The common fire contact is typically used to provide a remote indication of a fire alarm condition, e.g. to a remote manned centre or to a main building alarm system.

The stage 1 and 2 auxiliary contacts can be used to, for instance, shutdown air conditioning on a first stage alarm, and a computer PDU on second stage alarm.

Auxiliary contacts must not be used to switch high voltages. For voltages greater than 24 V DC a remote relay unit should be used. Remote relays are energised by switching the auxiliary 24V supply in the panel via the contacts as shown in figure 5. Remote relays should be suppressed to avoid possible damage to the panel.

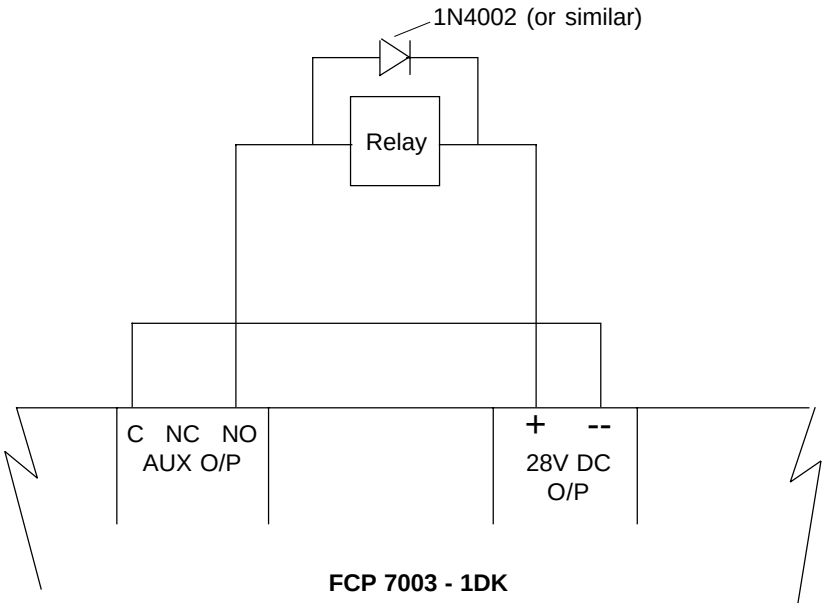


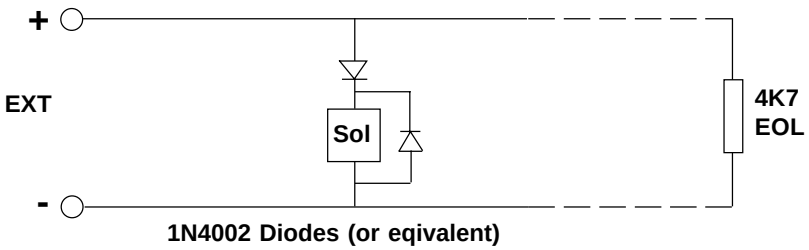
Figure 5 - Auxilary relay connection detail

Extinguishant Release

The extinguishant release device should be positively the last connection to be made after the system has been thoroughly checked and tested.

The panel can accept solenoid actuators with a total load not exceeding 2A, and up to four 'metron' actuators wired in series.

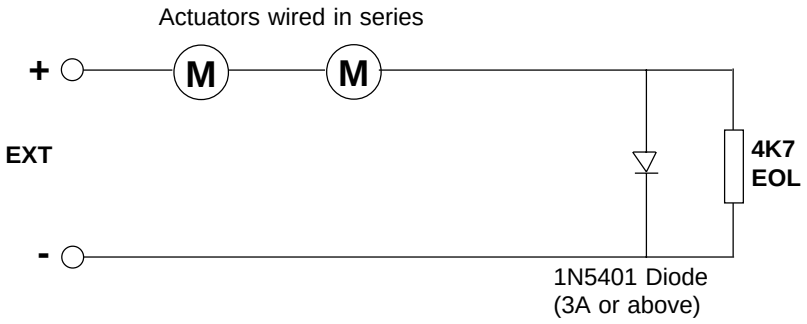
Solenoid Actuators



Solenoids must be polarised and suppressed as shown
Maximum solenoid load must not exceed 2A
Loop resistance should be below 10R

Figure 6 - Solenoid connection detail

Metron Actuators



Note

1 Check polarity of end-of-line diode (1N5401)

2 A maximum of four actuators may be fitted in series

3 The loop resistance of an actuator circuit is critical and should be measured to ensure the maximum allowable resistance is not exceeded.
Link out the end-of-line device and check that the circuit loop resistance is within the following limits:

1	actuator	5 ohms
2	actuators	4 ohms
3	actuators	2 ohms
4	actuators	1 ohm

Figure 7 - Metron connection detail

Remote Inputs/Outputs

There are a number of useful input/output options to enable remote signalling of panel conditions and/or the remote operation of panel controls, as follows:

Repeater Output

There is a common fire (FR) and a common fault (FL) output, and also an output from each zone which follows the fire LED, i.e. flashing on activation going steady when silenced. A positive supply output is available (see figure 8).

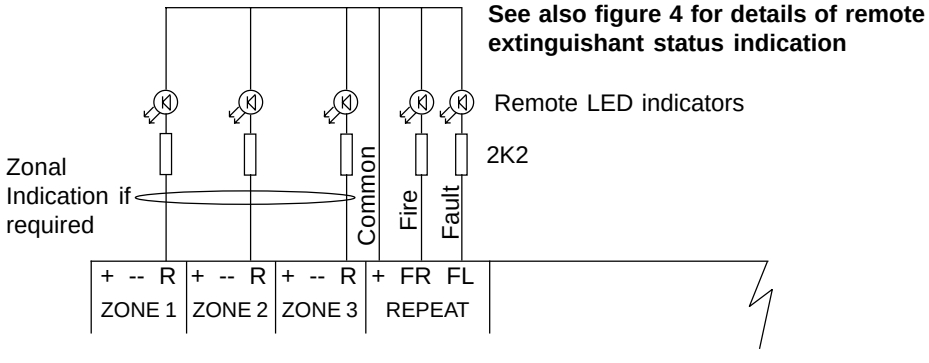


Figure 8 - Typical repeater output connection detail

Remote Control Inputs

If required, the Silence, Reset and Mute functions can be performed remotely by a connecting a normally open momentary switch contact to the relevant input terminals, see figure 9.

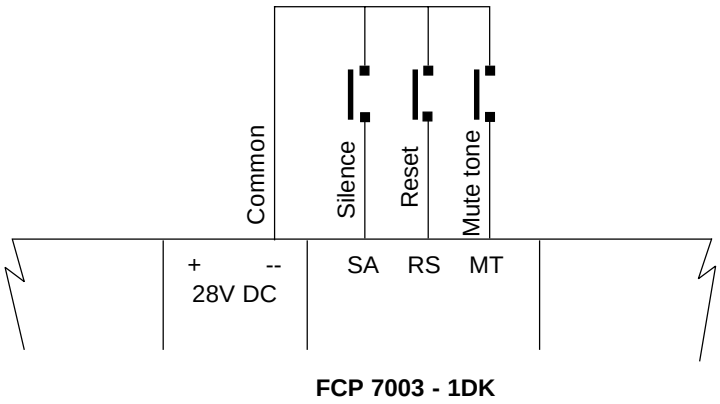
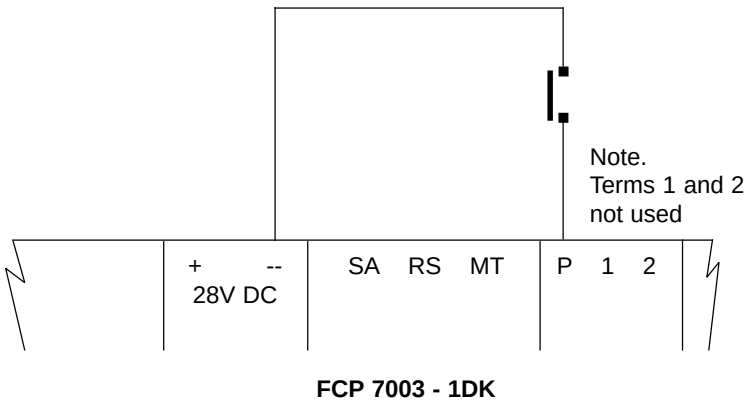


Figure 9 - Remote control connection detail

Remote Sounder Operation

The common sounder circuit can be operated remotely via suitable switch or relay contact, e.g. when connecting to another alarm system to provide a local warning of a fire condition elsewhere, see figure 10.



Fgure 10 - Remote sounder control connection detail

Remote Power Supply

If required, the panel can be powered from a remote 28V DC (nominal 24V) battery charger unit (BCU). Input terminals are provided for the 24V input, and mains and battery fault conditions, see figure 11.

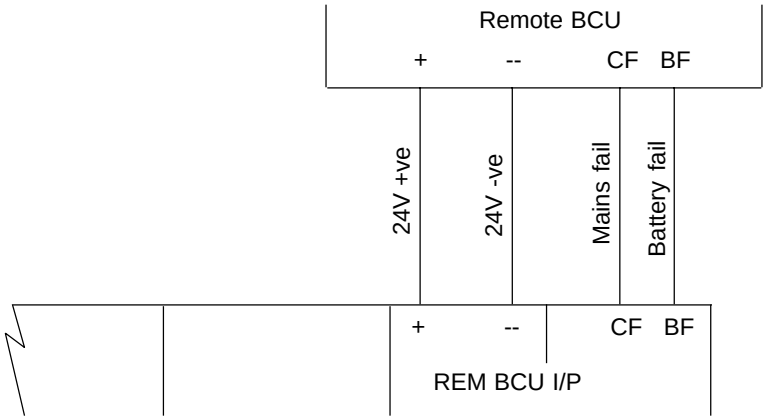


Figure 11 - Remote power supply connection detail

Engineer's Options

There are a number of engineer's options available which enable the system to be tested, and which provide alternative operating parameters for certain functions.

Time Delay

The period following the activation of the second coincidence zone (in Auto mode), or a manual release unit, before the extinguishant output is energised, is adjustable.

The delay can be adjusted with a small screwdriver between 0 and 45 seconds in 5 second steps via the switch on the PCB. The normal setting is 30 seconds.

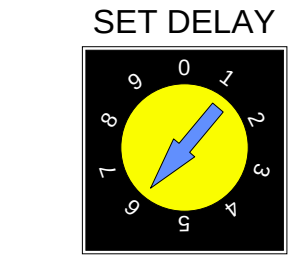


Figure 12 - Time delay adjustment

DIL Switch Options

A 4-way dil switch mounted on the PCB provides the following facilities:

SW1 Pressure Switch functions

Function A - switch in ON position

Activation of the pressure switch input causes a second stage alarm and illuminates the Released LEDs, but does not start the timer or discharge the extinguishant. Can be used where the extinguishant system has a mechanical manual release mechanism, to indicate a discharge.

Function B - switch in OFF position

Activation of the pressure switch input illuminates the Released LEDs, and causes the System Fault LEDs to pulse and the buzzer to sound. Can be used in conjunction with a low pressure switch to monitor the extinguishant cylinder contents.

SW2 Short as Fire (Peripheral zone)

In the OFF position the peripheral zone is in normal open and short circuit monitoring mode. In the ON position a short circuit causes an alarm condition on the peripheral zone only. Can be used for retrofit systems or for linking to another alarm panel or contact.

SW3 Latch or Non-latch zone

In the ON position the peripheral zone is latching (normal). In the OFF position the peripheral zone only is non-latching. Can be used for linking panels or accepting a remote alarm input.

SW4 Released LEDs function

In the ON position the Released LEDs are operated by an input to the pressure switch terminals as required by BS 7273 Part 1: 1990. In the OFF position the Released LEDs are operated by the panel on second stage alarm. Can be used where no pressure switch is fitted.

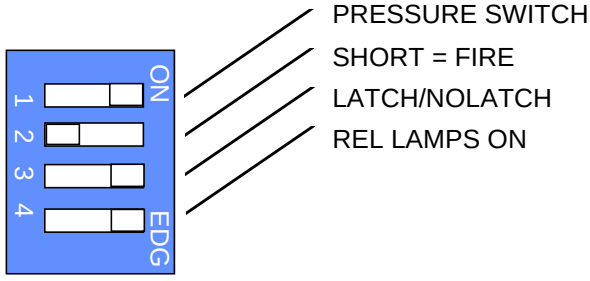


Figure 13 - DIL Switch setting

Fault Latch

If required, fault indications can be made to latch instead of clearing automatically when the fault condition clears (normal).

To make faults latching, insert a wire link into the FAULT LATCH terminals at the bottom of the PCB.

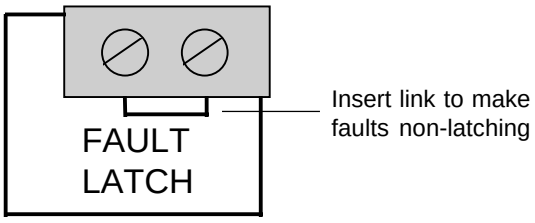


Figure 14 - Fault Latch connection detail

Activate Control

If required, a keyswitch can be fitted to disable the control switches to prevent unauthorised operation, in addition to or in place of the glazed outer door.

A keyswitch with a normally open contact is wired to the CONT ACT terminals in place of the existing wire link.

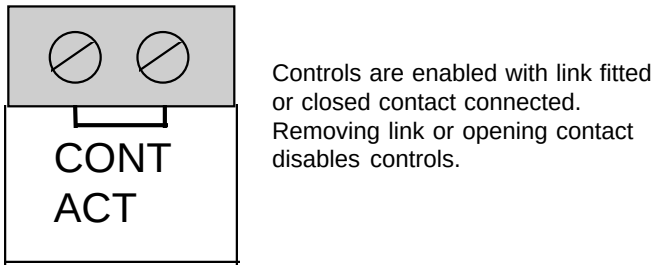


Figure 15 - Control Enable connection detail

Isolate Zones

The three fire zones can be individually isolated via the 3-way dil switch on the PCB. Zones are isolated with the switch in the ON position. The relevant zone fault and the Isolated LEDs are illuminated and the buzzer pulses (can be muted).

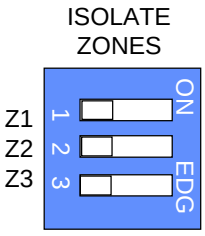


Figure 16 - Zone Isolate switch setting

Engineer Test

The Engineer Test (Walktest) mode enables zone devices to be tested without operating the auxiliary outputs, and without the necessity to reset the system each time a device is activated. The sounder outputs are activated for 1 - 2 seconds, following which the system is automatically reset.

The Engineer Test mode is selected by momentarily operating the TEST pushbutton at the bottom of the PCB. The Eng Test Selected LED illuminates to indicate the mode.

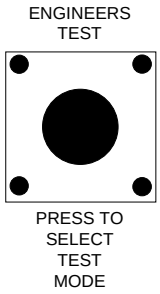


Figure 17 - Engineer's Test Mode switch

Activated devices on the peripheral zone energise the common sounder output and reset automatically after a few seconds.

When a device from zone 1 or 2 is activated, the delay before resetting is extended to approximately 20 seconds to allow a device on the other coincidence zone to be activated. When the second zone is activated, the reset follows almost immediately if the system is in Auto mode. If the system is in Manual mode, the delay before reset is 20-25 seconds from activation of the second device.

First and second stage sounder outputs are briefly energised. The extinguishant output is **not** energised when the panel is in test mode.

To revert to normal operation, operate the Reset System pushbutton.

Internal Buzzer Volume Control

The volume of the internal buzzer can be adjusted via the VOLUME ADJUST potentiometer on the PCB.

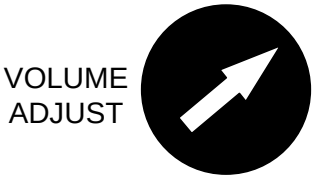


Figure 18 - Buzzer volume adjustment

Testing the System

When all the external circuits have been connected to the panel (with the possible exception of the release solenoid/actuators), the operation of the system should be thoroughly tested. At this stage there should be no faults present on the system.

As a minimum, the following checks should be carried out:

Check the operation of each smoke detector and confirm the correct zone indication and sounder operation.

Check the operation of detectors and call points on the peripheral zone.

With the system in manual mode, check that the activation of detectors on **both** zones causes a first stage alarm only.

With the system in automatic mode, check that the activation of a detector on zone 1 **or** 2 causes a first stage alarm only, and that the activation of detectors on both zones causes a second stage alarm.

Check, and if necessary adjust, the delay between initiation of a second stage alarm and the extinguishant output being energised.

Check the operation of all manual release units.

Check the status indication on each remote GSI unit, and the action of the mode select switch (if fitted).

Check the operation of all hold off pushbuttons and confirm that the time delay is re-applied when released.

Check that all remote control functions operate and occur at the relevant stage.

Simulate fault conditions on monitored circuits by open and short circuiting the wiring and checking the panel indication.

Check the battery charging voltage.

Check the output at the extinguishant terminals

Check that all remote signals are correctly transmitted and any interfaces with other systems are operational.

If necessary, leave the system 'on soak' for a settling down period before connecting the extinguishant.

Finally, issue a test and commissioning certificate and ensure that the client has all relevant documentation required under BS 5839 and BS 7273 if appropriate.

Section 7 - Technical Data

Power Supply

Mains voltage	220 - 240V AC 50 - 60 Hz
System voltage	28V DC (24V DC nominal)
Charger	Constant voltage type 3 amp integral
Charging current	Limited to 2 amp (maximum battery size 7Ah)

System Indicators

Supply Healthy	Green LED
Common Fire	Red LEDs
Zone Fire	Twin red LEDs
Zone Fault	Amber LED
System Fault	Amber LED
Zone Isolated	Amber LED
Stage 1 Isolated	Amber LED
Stage 2 Isolated	Amber LED
Auto	Twin amber LEDs
Manual	Twin green LEDs
Hold Off	Twin amber LEDs
Released	Twin red LEDs
Release Imminent	Twin red LEDs

Engineer's Fault Indicators

All amber LEDs
Extinguishant open and short circuit
Pressure switch open and short circuit
Manual release open and short circuit
Auto/Manual select open and short circuit
Stage 1 sounders open and short circuit
Stage 2 sounders open and short circuit
Common sounders open and short circuit
Mains fail
Battery fault
Voltage fault
Earth fault
ARW - Automatic reset warning
Engineers Test switch activated

System Controls

Stop Alarms	Pushbutton
Sound Alarms	Pushbutton
Reset System	Pushbutton
Silence Tone	Pushbutton
Stage 1 Isolate	Pushbutton
Stage 2 Isolate	Pushbutton
Auto	Pushbutton
Manual	Pushbutton
Hold Off	Pushbutton
Zone Isolate	DIL switch
Engineers Test	Pushbutton

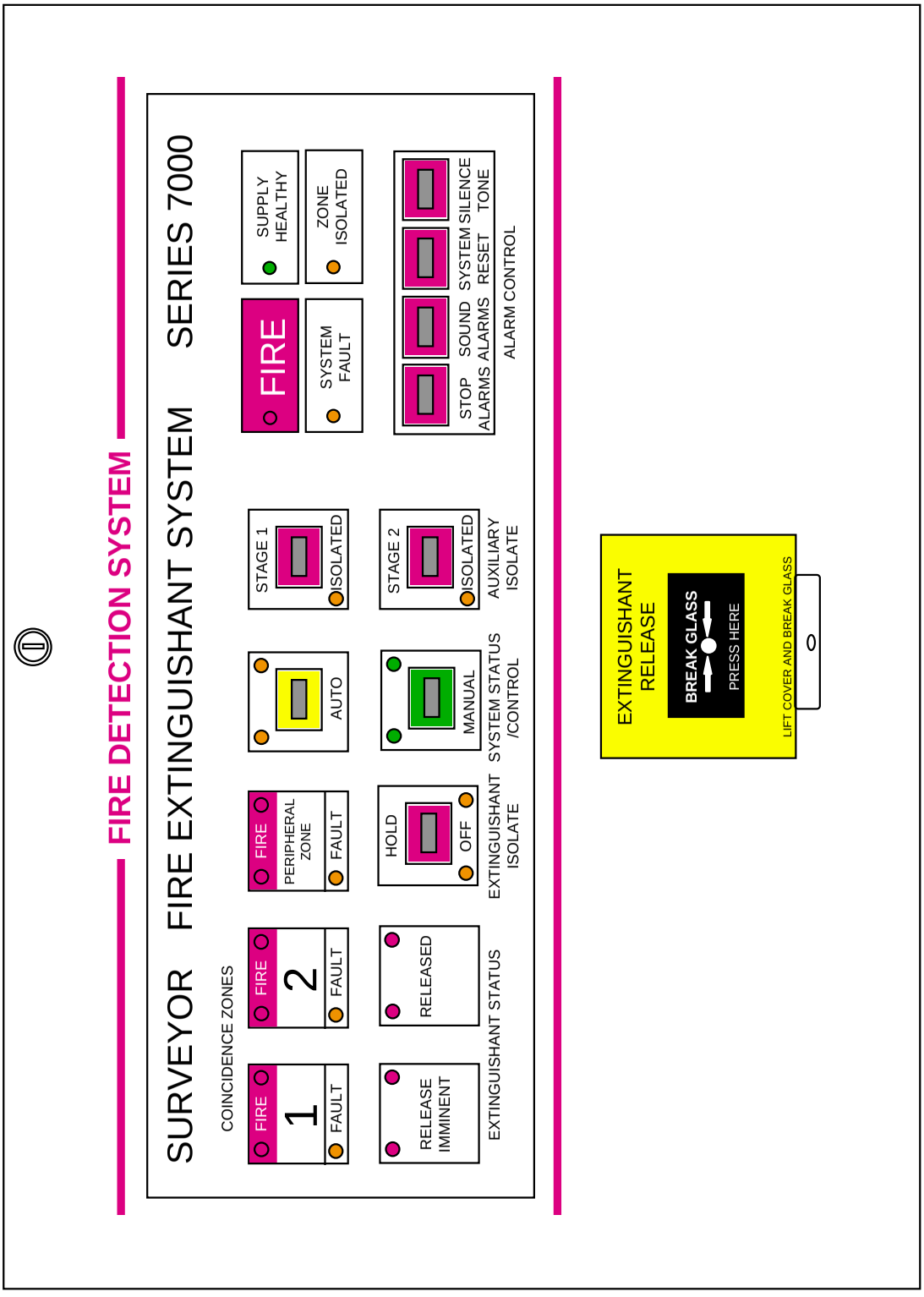
Fuses

Mains	2A	1" ceramic
Zone Power	0.5A	20mm glass
Extinguishant	3A	20mm glass
Common Fire	1A	20mm glass
Stage 1 Auxiliary 1	1A	20mm glass
Stage 1 Auxiliary 2	1A	20mm glass
Stage 2 Auxiliary 1	1A	20mm glass
Stage 2 Auxiliary 2	1A	20mm glass
Stage 1 Sounder	1.5A	20mm glass
Stage 2 Sounder	1.5A	20mm glass
Common Sounder	1.5A	20mm glass
Auxiliary 24V	1A	20mm glass
Supply	3A	20mm glass
Battery	3A	20mm glass

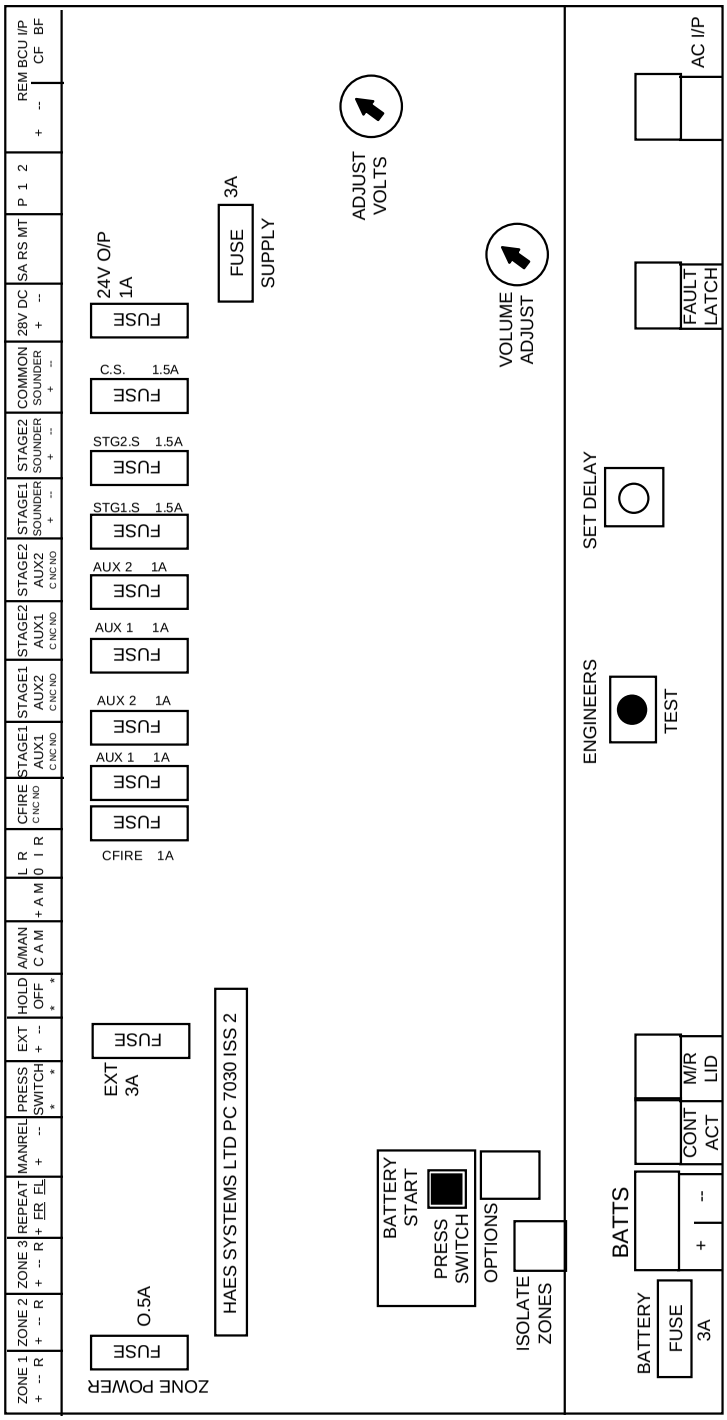
Dimensions

Weight: 8.5kg approximately (excluding batteries)

Appendix A - Fascia Layout



Appendix B - PCB Layout



Appendix C - Wiring Schematic