FireClass Addressable Fire Alarm Control Panels

Product Information and Design Application

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Contents

1 Introduction

This section provides an introduction to the guide itself, and to the products covered.

1.1 About this Guide

1.1.1 Who this Guide is For

This guide is aimed at suitably qualified engineers who are experienced in the principles of fire detection and alarm system (FDAS) design, and who have also received training in FireClass based systems.

1.1.2 What this Guide Covers

This guide provides information to support the design of a fire detection system using one/multiple Fire Alarm Control Panels, and associated devices (such as detectors, call points, sounders and ancillaries) of the FireClass range.

The guide includes, for example, guidance notes and unit dimensions.

The guidance notes include information on choosing the particular control panel from the FireClass range.

1.1.3 What this Guide does not Cover

This guide does not provide general information on the principles of fire alarm and control system design.

This guide does not provide information where this is covered by local regulations. These will typically cover cable specifications and panel siting restrictions, and it will be the responsibility of the designer to ensure these are followed.

This guide does not provide detailed information where this is covered by another of the guides available for the FireClass range, such as the user guide or the installation guide. For more details see Section 5.1 “Documentation” on page 38.

1.2 System Overview

The system is based on multiple devices (including detectors, call points and sounders) connected to a common two wire loop. Electrical signalling on the loop allows communication with individual devices, each device having a unique address.

This allows for sophisticated monitoring and alerting across the various areas of a building.

Central to the system will be one of the FireClass range of fire alarm control panels.

The number of possible loops, and the available number of loop addresses, varies between the various FireClass panels in the range.

The systems can be expanded with many additional facilities, such as interfaces to building management and environmental systems. The expansion capability is supported by a range of optional modules.

1.3 Typical System Design Steps

The design process will vary between sites, but will typically involve these steps:

- Specifying the devices (detectors, call points, sounders and so on) required in the various areas of the site.
- Specifying the number of loops required.
- Specifying any required repeaters and other network items, and peripherals such as printers.
- Planning for interfacing to any conventional loops.
- Specifying the signalling requirements - whether fire brigade signalling is required, for example.
- Specifying any interfaces to building services, such as the environmental control system and door control relays.
- Specifying the wiring routing throughout the building.
- Entering the system design parameters into FireClass Designer (a computer aided system design application).

  The FireClass Designer is a sophisticated engineering tool that not only ensures system parameters and design rules are obeyed, but are key to the ordering and documentation processes. It calculates requirements such as the minimum required backup battery capacity and the loop loading calculations. The remote bus parameters, system schematics and parts listed are included in the FireClass Designer.

  At this stage, FireClass Designer can also help you with the following:

  – Establishing the feasibility of your choice of control panel, and if necessary choosing an alternative control panel from the FireClass range. For example, you may find the battery capacity of your first choice is inadequate.

  – Producing a list of parts to be ordered.
- Producing a zone plan, specifying the division of the building into the various zones, and the allocation of devices to these zones.
- Producing a “cause and effect” plan showing the required system responses to various input conditions.
- Entering the system parameters into FireClass Express, to produce a configuration to be downloaded to the control panel.

- Producing an order list of required components, including product codes.
- To network a panel, a TLI800EN module must be added.
- The FireClass network supports a maximum of 24 four loop panels plus one FireClass graphics server.

A typical Network Configuration is as shown in Figure 1.

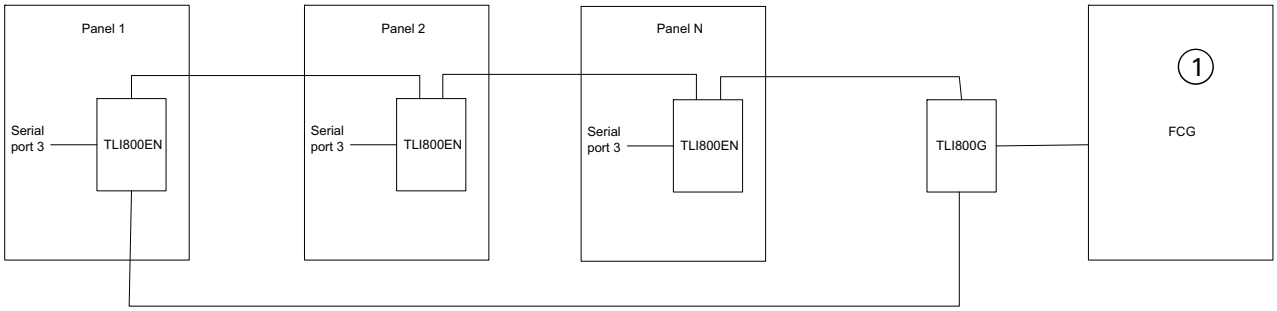

Fig. 1: Typical Network Configuration
1 – FireClass Graphics

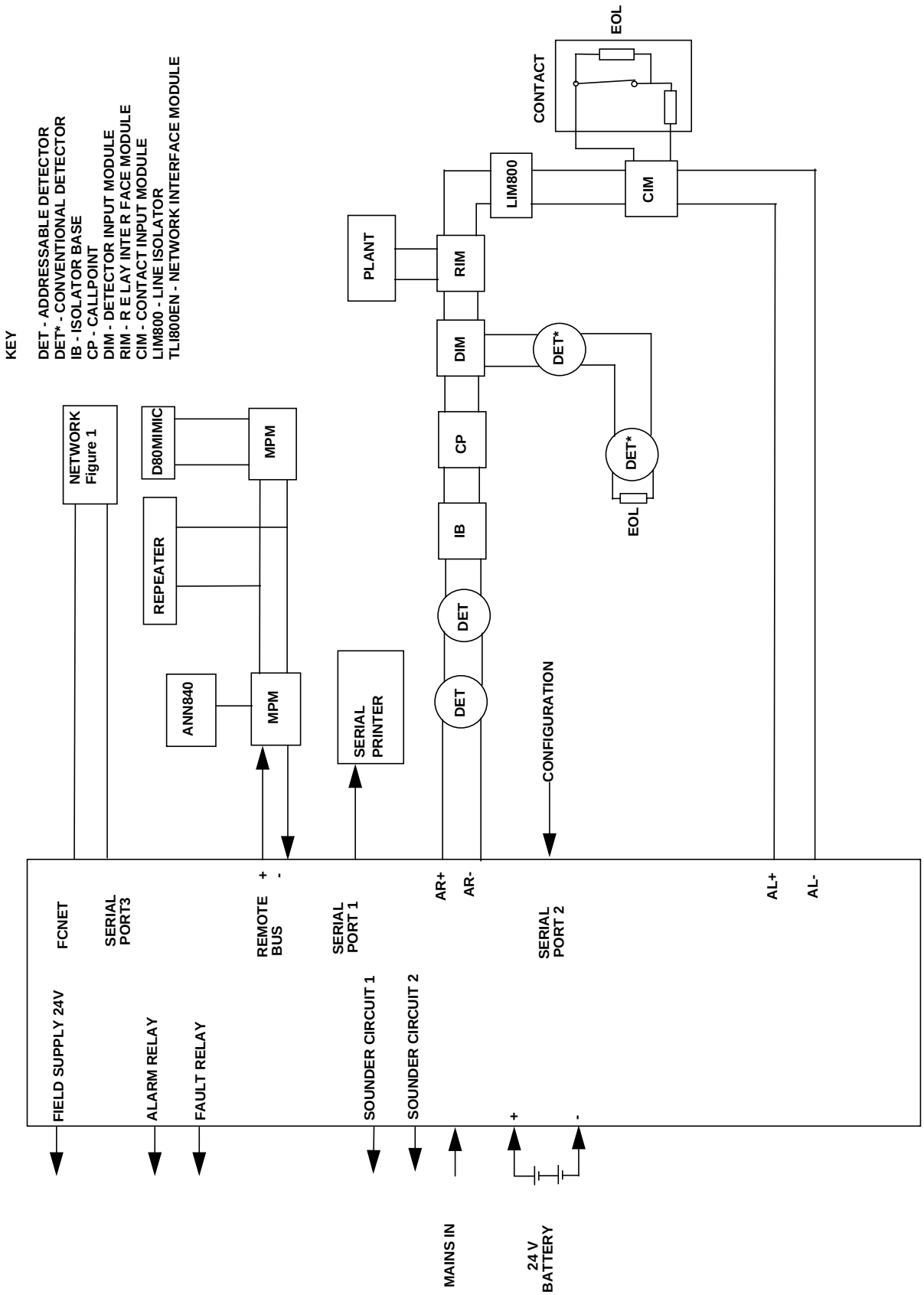

Fig. 2: Typical Fire Detection and Alarm System using FireClass Fire Alarm Control Panel

2 Control Panels and Associated Housings

Central to the system will be one of the FireClass range of fire alarm control panels, as detailed in this section.

2.1 Common Key Functions and Features

All FireClass fire alarm control panels are built around common hardware and software modules, and incorporate the following key features:

- Simple two wire run (loop), supporting many devices in multiple areas:
  - The loop connection format helps with wiring fault tolerance (short and open circuit), and minimises voltage drop.
  - Device addressing scheme allows individual communication with multiple devices on the same two wires (such as detectors, call points and sounders).
  - Multiple loops. The number of loops supported varies between control panels.
- Programmable system configuration:
  - The particular output responses to particular input states can be configured ("cause and effect mapping"). For example a detector alarming in Zone 1 activates sounders in all zones. "Sounder/Visual Processing" helps plan the responses.
  - Outputs can be synchronised, so all sounder patterns are in phase, for example.
- Zone LED indicators (apart from FireClass 240-2 and 240-4).
- Fault monitoring and diagnostics:
  - The panel monitors itself for faults in the background. Faults are signalled and recorded as events. This covers all key components such as, power supplies, batteries, sounder circuits, addressable loops, detectors and addressable devices, monitored input circuits, remote and local communication links.
  - Up to 3000 events can be stored. These can be viewed, selected and printed.
  - Smoke detectors are long term averaged. Dirty smoke detectors can be identified.
  - Extensive diagnostic facilities, such as interrogation of detector temperature levels.
- Comprehensive local (non-loop) input and output options:
  - Relay based (volt free) external signalling of alarm and fault conditions.
  - Terminals for receiving two state (external switch closed/open) input. Monitored for open and short circuit faults on external switch wiring. Also non-monitored versions.
  - Local sounder outputs (sounders can also be connected to the loop).
- Operator functions including the following examples:
  - Functionality override options. These include temporarily disabling detectors (to prevent possible false alarms), and an investigation time delay in the fire brigade signalling.
  - Re-configuration options, such as changing zone descriptions.
  - Switchable detector modes and sensitivities according to changes in occupancy patterns (day mode) and variations in fire risk. (There is also an automatic switching option.)
- Critical operator functions are protected with key-switch, logon and password. "Higher level" engineering functions requiring logon at higher access level.
- User Interface comprising the following items:
  - Large backlit 16 line x 40 character LCD display.
  - Dedicated control keys.
  - "Soft" control keys with varying functions.
- Computer aided (Windows PC) setup:
  - Systems can be quickly set up. For example detector addresses can be quickly assigned with detector types.
  - Starting point configurations (templates) are supplied.
  - Configurations are transferred to the control panel over serial link.
- Networking and ancillary support:
  - Peer to peer networking capability with other control panels.
  - Support for up to 1500 auxiliary inputs/outputs, 7 full function repeaters and local Printers connected to COM 1 port on the panel.
- Comprehensive system expansion and interfacing options, such as additional support and interfacing with conventional detectors.

2.2 General Descriptions – Panels and Repeaters

The control panels consist of a compact mild steel backbox with a hinged lockable front door. The main electronics are mounted on a removable steel chassis plate, which fixes to the rear of the backbox.

There are three main electronics units. These are the power supply, central processor board (CPU) and the Field Interface Module (FIM). The CPU board mounts to the FIM.

The FIM800 is the central connection point. It provides, for example, the loop connections (L+, L-, R+, R-), connections for printers, and hosts the various communications busses (RBus, I/O bus and so on).

The user control panel is mounted onto the front door with power and data provided by a single cable from the FIM800.

Repeaters provide secondary points at which you can control and monitor the fire alarm system. Repeaters are basically identical to actual control panels, except that they do not interface (directly) to the loops (so they do not have a field interface module circuit board). Repeaters are connected over the RBus.

The following ancillaries may also be fitted internally using a mounting plate fitted to the chassis plate:

- FC410LIM Line Isolator modules
- IOB800 8In/8Out Expansion board
- TLI800EN

Note that the FireClass 32-1 panel can accommodate only the TLI800EN. There is no provision in the Fireclass 32-1 enclosure for the LIM and the IOB800 boards.

2.3 Panel Comparison

Table 1 details the key differences between the panels and repeaters in the FireClass range. (There is a similar table to this for repeaters, this is in Section 4.3 “Repeater Details” on page 37.)

See also Section 2.4 “Specifications”.

Panel/ Repeater	Loops	Zone LEDs	Batteries
FireClass 32-1	One	32	2 x 12 Ah
FireClass 64-2	Two	64	2 x 17 Ah
FireClass 64-4	Four	64	2 x 38 Ah
FireClass 240-2	Two	0	2 x17 Ah
FireClass 240-4	Four	0	2 x 38 Ah
FireClass 32R	N/A	32	2 x 7 Ah
FireClass 64R	N/A	64	2 x 7 Ah
FireClass 240R	N/A	0	2 x 7 Ah

Table 1: Panel Differences

2.4 Specifications

2.4.1 Number of Loops, Points and Zones

Table 2 shows the numbers of loops, points and zones for the various FireClass control panels.

Panel	Number of addressable circuits (loops)	Values are shown as default/maximum			
		Points * per loop	Points per CIE	Zones per loop	Zones per panel
FireClass 32-1	1	250	250	32/240**	32 /240**
FireClass 64-2	2	250	500	64/240**	64/240**
FireClass 64-4	4	250	1000	64/240**	64/240**
FireClass 240-2	2	250	500	0/240**	0/240**
FireClass 240-4	4	250	1000	0/240**	0/240**

Table 2: Numbers of loops, zones and points
** Points can be any combination of detectors, call-points, addressable ancillaries and addressable sounders.*
***LED zonal indications/LCD zonal indications.*

2.4.2 Colour

For all panels the colours are as follows:

- Housing colour is RAL7035.
- Control facia colour is Pantone Grey 431C.

2.4.3 Dimensions

Table 11 on page 41 shows a quick overview of the panel dimensions. For full drawings see Section 2.6.3 “Drawings”.

2.5 Power Considerations

The sections below detail the mains power and battery backup considerations.

2.5.1 Mains Power Requirement

The control panel is designed to operate with a mains voltage of 230 V, at 50 Hz.

The current consumption will vary, depending on the loop and ancillary devices designed into the system. However, the approximate current consumption is shown in Table 19 on page 43.

2.5.2 Power Supply Loading

There will be a varying demand placed on the power supply, depending on the system design. The demand will depend on these factors, for example:

- The sounders fitted to the local sounder outputs.
- The number and types of devices fitted to the loops. Loop powered sounders for example represent a high potential power demand, compared to detectors. For more details see Section 3.6 "Loop Loading Calculation" on page 29.

To help you stay within the acceptable power demand limits, use FireClass Designer. This is a Windows PC application that is available for free download from the FireClass Ltd website (www.fireclass.co.uk). One of the functions of FireClass Designer is to show you the proportion of the available power you have used, as you add devices and load the power supply.

2.5.3 Battery Backup

In the event of mains failure a battery backup system maintains the operation of the fire alarm control panel and associated system. Two batteries are connected in series to provide a nominal 24 V.

The sizes of the batteries fitted to the various panels is shown in Table 1.

The required size of the backup batteries depends on the system design and the specified time period for which the the batteries need to maintain system function. The minimum size required is calculated by the FireClass Designer application.

It may be the case that, as a result of the battery calculation, you need to select an alternative control panel from the FireClass range. For details of the battery capacity of the various panels in the range see Table 1 on page 11.

The batteries are charged from the common control panel PSU, and the charging demands are factored into the PSU requirement calculation within FireClass Designer.

2.6 Siting Considerations

The fastenings are not included in the kit, so they will need to be externally sourced. When specifying the fastenings (such as the screw size), take into account the type of wall and the weight of the assembled housing. The size of the batteries will have a large bearing on the weight of the units (see Section 2.4 "Specifications").

The control panel is designed for wall mounting. Typically screws and rawlplugs in drilled holes will be used. The screw hole positions are shown in Fig. 4 to Fig. 6.

2.6.1 Environmental Stipulations

The control panel is not weatherproof. Check that the location is indoors, dry and free from excessive dust.

Also check that location fulfils the temperature and humidity stipulations shown in Table 12 on page 41.

2.6.2 Housing Clearances

Choose a location that will ensure adequate clearance for the cabling.

For glanding cables into the housing, there are various knockout options, as detailed in the panel drawings below. Choose the option appropriate to local regulations and practice.

Note that the control panel doors have their hinges on the left, and swing fully open, through more than 180^{o}.

2.6.3 Drawings

The control panel dimensions and screw hole positions are shown in the following figures:

- FireClass 32-1, : Fig 3.
- FireClass 32RA, : Fig 4.
- FireClass 64-4, FireClass240-4: Fig .5.
- FireClass 64-2, FireClass 240-2, FireClass 64 RA, FireClass 240 RA: Fig .6.

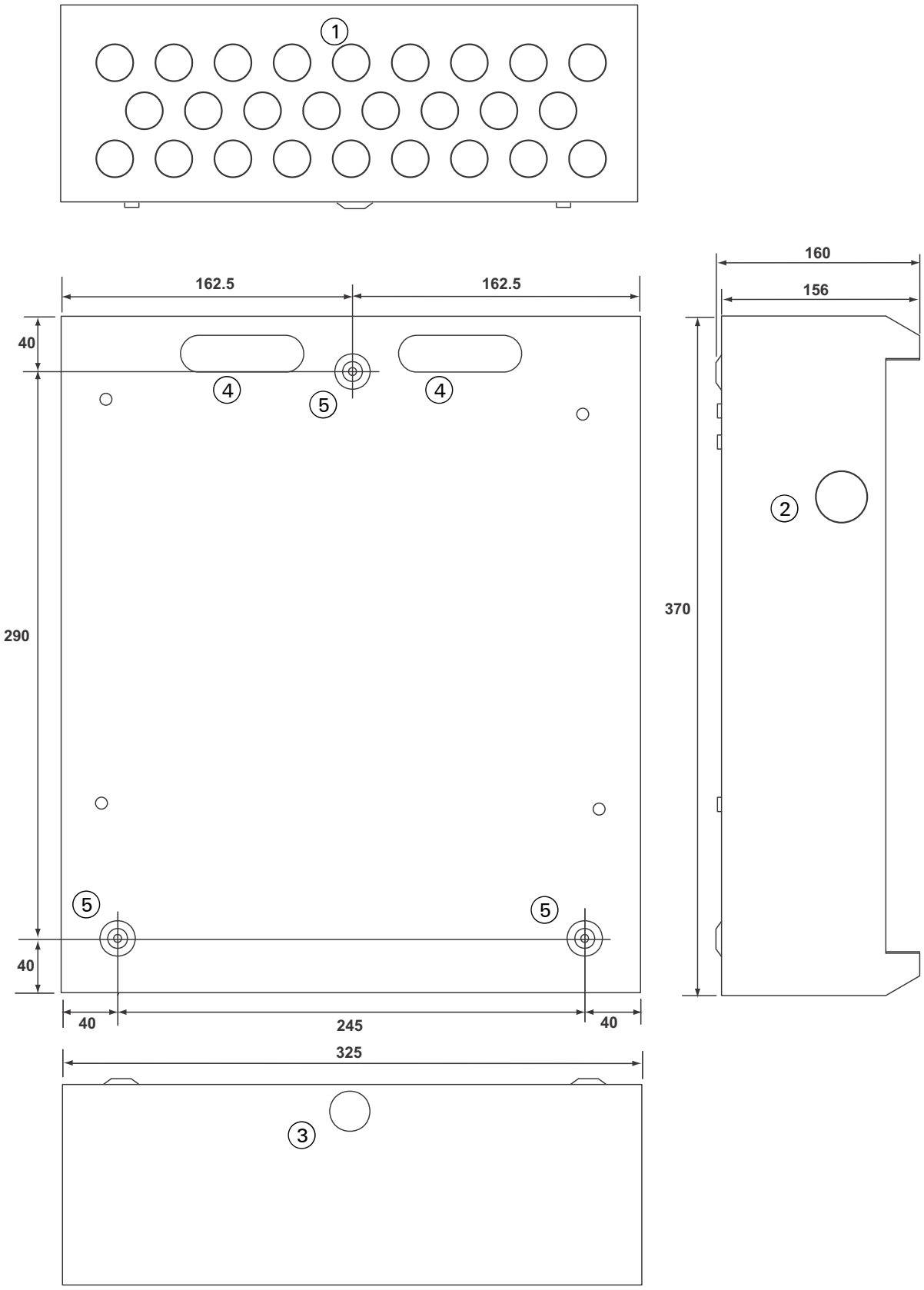

Fig. 3: Overall and Fixing Dimensions – FireClass 32-1
1–Knockouts Ø 20 mm (26x)
2–Knockout Ø 25 mm
3–Knockout Ø 20 mm)
4–Knockouts
5–Mounting hole Ø 5.5 mm (3x)

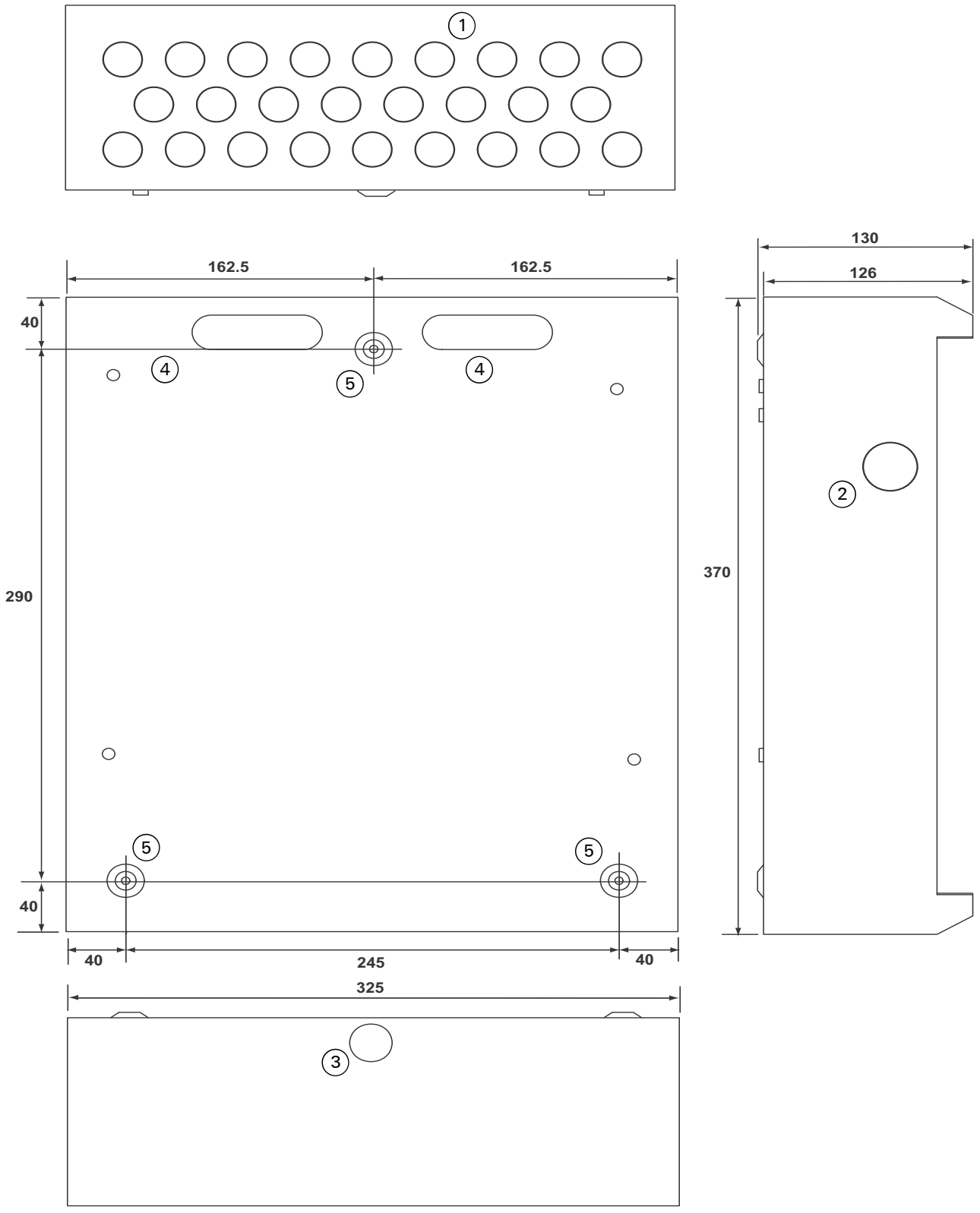

Fig. 4: Overall and Fixing Dimensions – FireClass 32RA Repeater
1–Knockouts Ø 20 mm (26x)
2–Knockout Ø 25 mm
3–Knockout Ø 20 mm)
4–Knockouts
5–Mounting hole Ø 5.5 mm (3x)

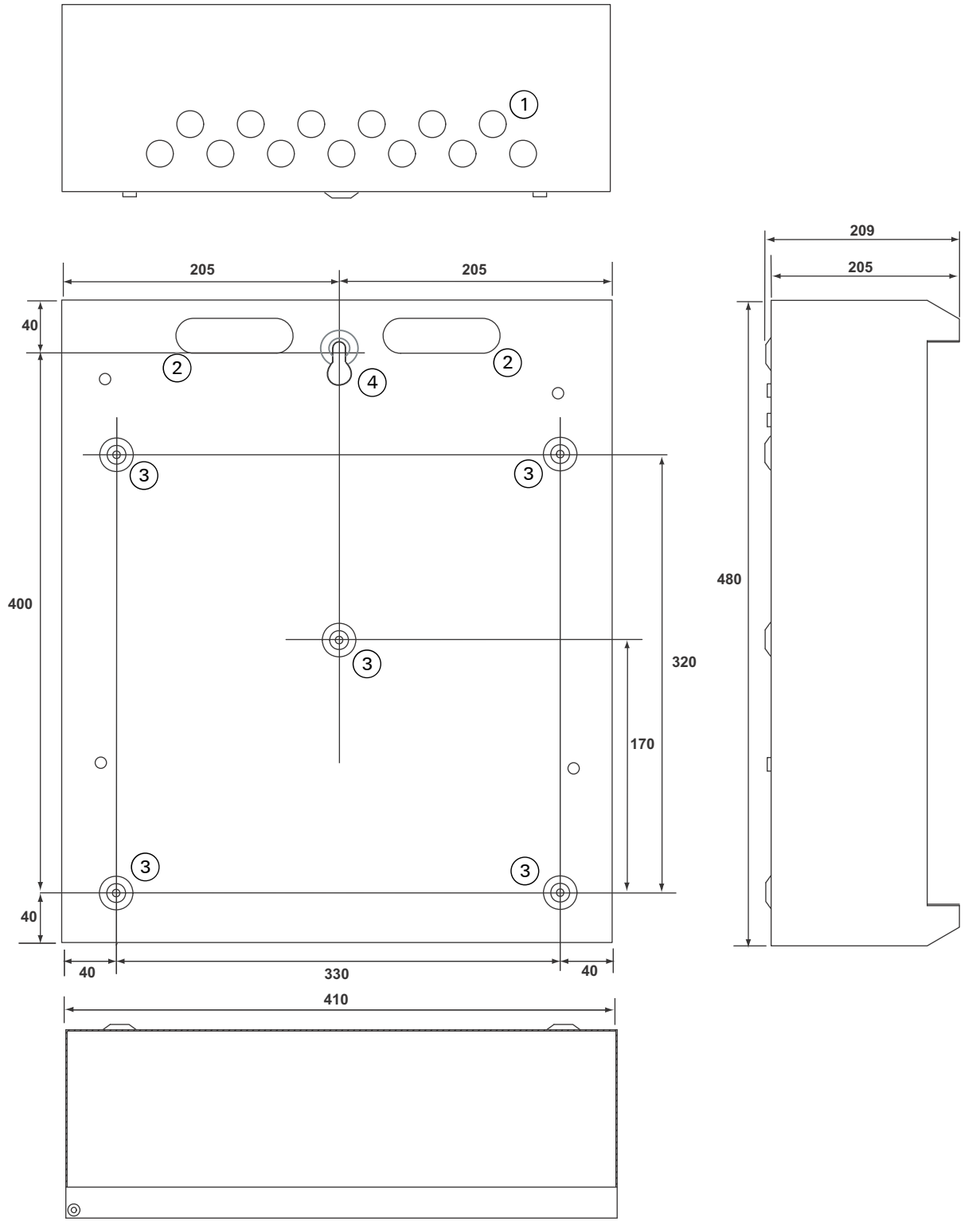

Fig. 5: Overall and Fixing Dimensions – FireClass 64-4and FireClass 240-4
1–Knockouts Ø 20 mm (13x)
2–Knockouts
3–Mounting holes Ø 5.5 mm
4–Mounting hole Ø 7.5 mm

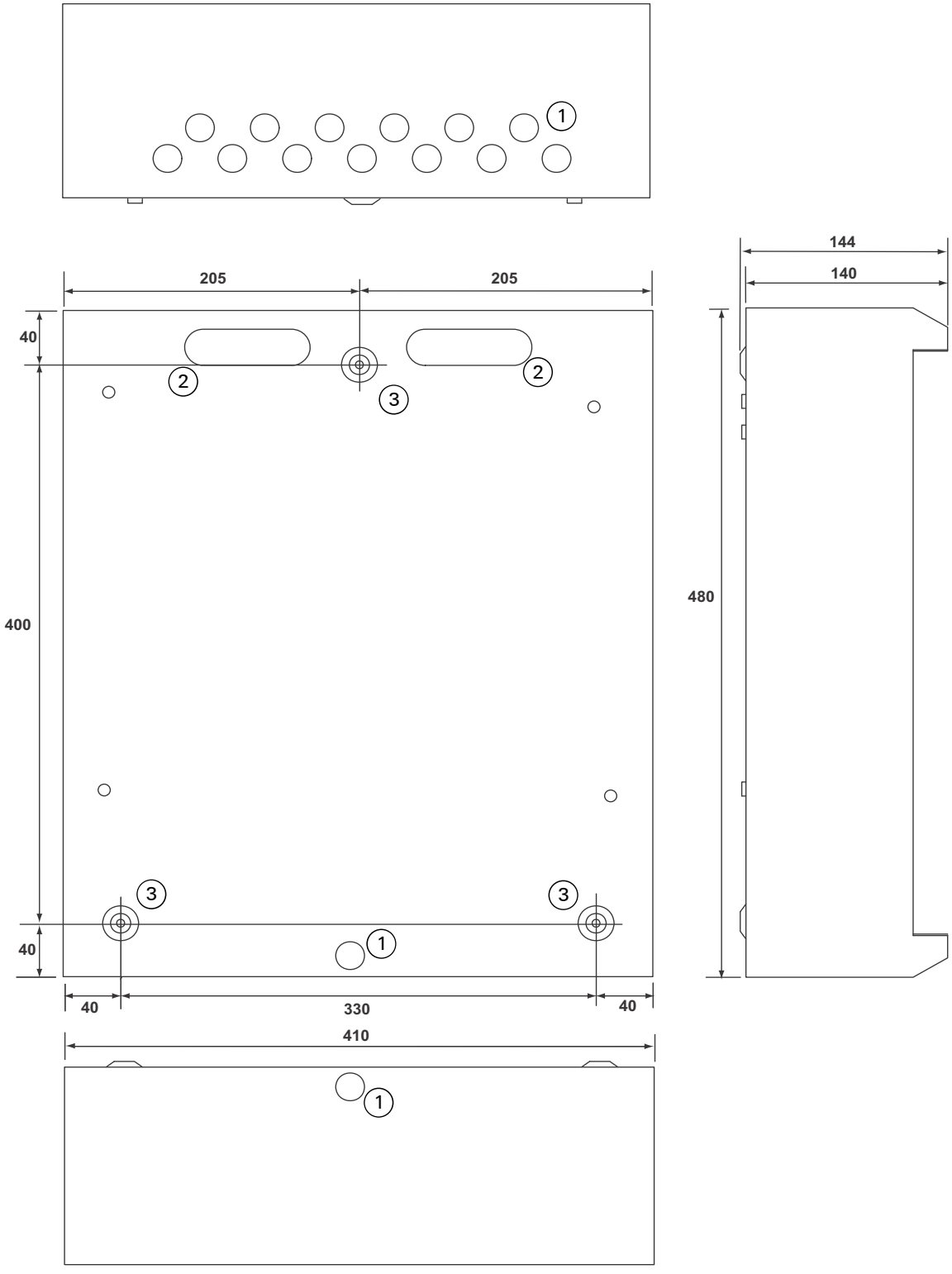

Fig. 6: Overall and Fixing Dimensions – FireClass 64-2, 240-2, Repeaters 64RA and 240RA
1–Knockouts Ø 20 mm
2–Knockouts
3–Mounting hole Ø 5.5 mm

2.7 Component Module Descriptions

The following sections detail the standard modules fitted to an FireClass control panel or repeater.

2.7.1 Power Supply and Monitoring

Each type of PSU is fitted onto a different panel as follows:

PSU Type	Panel
2.5 A and 1xPMM800	■ FireClass 32-1 ■ 32RA and 64RA ■ 240RA
5 A and 1xPMM800	■ FireClass 64-2 ■ FireClass 240-2 The maximum loop current is 1 A.
5 A PSU and 1xPMM800 and 1xPMM840	■ FireClass 64-4 ■ FireClass 240-4 The maximum loop current is 2 A.

Table 3: PSU Fittings on Panels

The power supply is a BAQ60T24 (2.5A), or BAQ140T24 (5 A), depending on the specific control panel or repeater.

Combined with this is the PMM800 power monitoring module. The PMM800 routes power to all the PCBs and other devices fitted. It contains an integral battery charger which continuously charges back-up batteries.

The PMM800 provides the following features:

- Fully compliant with BSEN54-4 (including amendments 1 and 2), EN60950, BSEN50130-4, BSEN61000-6-3, EN61000-3-3 and EN 61000-3-2.

  Utilising the existing BAQ140T24 (5A) and BAQ60T24 (2.5A) EN54-4 approved power supplies with additional circuitry to meet EN54-4 PSU functionality.
- Battery used
  - PowerSonic SLA Batteries - Maximum capacity 38 A-h (5 A PSU), 12 A-h (2.5 A PSU).
- Electrical I/O

The Field wiring connections are screw Terminal Block(s) and may accommodate up to 10 AWG 2.5 mm diameter wire-

- Four 28 V, 1 A Fused outputs. Four 0V outputs.
- Common fault relay volt free contacts 'NC - normally closed' (relay position with PSE powered off).
- FLT relay contact switched to 0V for a common fault.
- Battery in connections (Protected by 8 A ceramic anti-surge T8 AH 250 V 'Battery Fuse'.
- Thermistor connection between PSU and PMM800 board - J4.
- Thermistor temperature sensor connection - J3.

- FIM800 Connector-J2

Table 4 shows the FIM connections to J2.

Serial Number	Description
1	Not Used
2	Not Used
3	OV(DCC)
4	AC Fault
5	+28 V
6	Battery Fault
7	Ground Fault
8	OV(DCC)
9	Battery Monitor
10	+5 V
11	+40 V - Loop Power
12	Charger Fault/Battery Test

Table 4: PMM800-FIM800 Connector-J2

- Battery monitoring and protection
  - Detection of high resistance Batteries (>=0.35 ohms).
  - Battery connections open or short circuit detection/ protection.
  - Reverse polarity battery connection protected by 8 A Battery Fuse.
  - Deep discharge protection.
  - Intelligent battery connect/disconnect circuitry - allows deeply discharged batteries to be recharged.
  - Battery charging voltage is temperature compensated via a 15 K NTC thermistor located close to the Batteries.
- Charger monitoring and protection.

Detection of

- Failure of the AC Supply.
- Failure of the output of the Power Supply Unit (PSU).
- Open circuit of either of the Battery FETs.
- Blown or missing 'Battery fuse'.
- Open or short circuit of the connections from the PCB to the thermistor. Open or short circuit of the thermistor connections between the PSU and the PCB.

Batteries Disconnected

Batteries are disconnected from the charger for a thermistor fault.

- Earth fault monitoring.
  - Detection of low resistance path from earth pad to rail voltages between -6 V and 6.5 V and between 11 V and 42 V. Maximum detected resistance is between 4 K and 252 K dependent on rail voltage.
  - Monitoring may be disabled by removal of earth link LK1.
- LED Indications:
  - Batt Fault
  - Ground Fault
  - AC Fault
  - Charge Fault
- Applications
- The Power Supplies are used on the following Panels and Repeaters:

PSU Type	Panels/Repeaters
5 A PSU	FireClass 64-2, FireClass 240-2, FireClass 64-4, FireClass 240-4
2.5 A PSU	FireClass 32RA, FireClass 64RA, FireClass 240RA

Table 5: PSU Types

The PMM800 has the connections shown in Table 6.

Connection	Function
TB1	2 x BATT+ outputs
TB2	2 x BAT- returns
TB3	2 x 0V returns
TB4	2 x 0V returns
TB5	2 x 24V 1A fused outputs
TB6	2 x 24V 1A fused outputs
TB7	Fault relay, FLT/NC/COM
J2	Connects power to PL2 on the FIM

Table 6: PMM800 Connections

It is recommended that the PMM800 fused outputs (TB5 and TB6) are always used when a 24 VDC supply to equipment outside the control panel is required.

2.7.2 PSU Features

The PSU features for the 4 loop versions (FireClass 64-4 and 240-4) are as follows:

1x5 A BAQ140T24 power block providing DC power to:

- 1xPMM800 (fitted on top of power block) which charges/monitors battery and provides DC power to FIM and its integral 2 loops.
- 1xPMM840 (fitted on top of PMM800) which provides 40 V DC supply to 2 loops on the XLM800.

2.7.3 Central Processing Unit

The Central Processing Unit (CPU800 board) contains the main processor and memory. It is mounted to the FIM800 board.

The board features headers which are used when downloading firmware and configuration data. These are “H1”, “H2” and “H3” shown in Fig. 7.

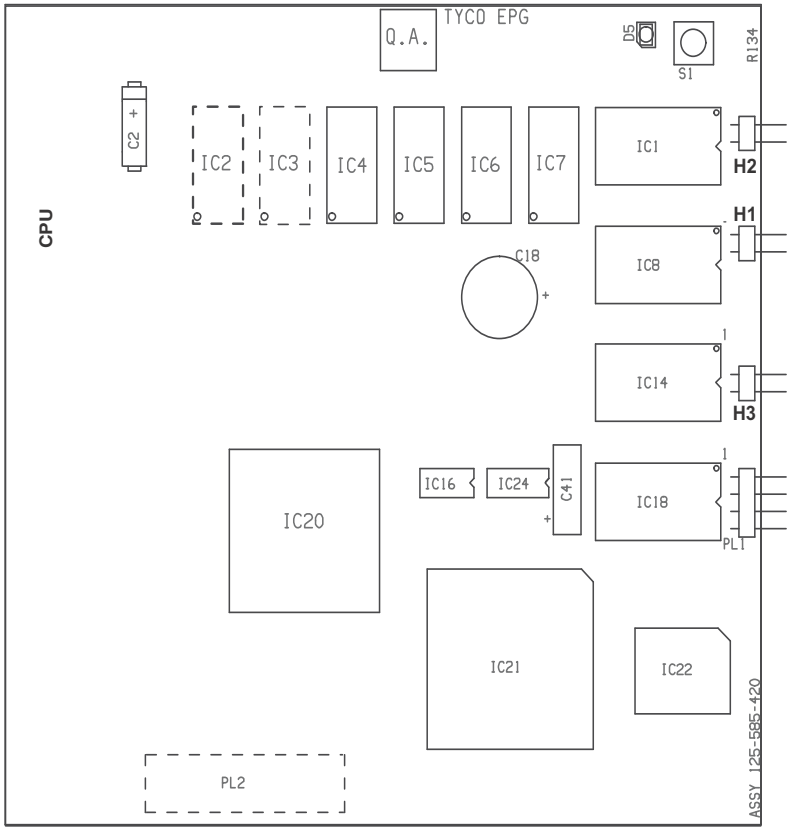

Fig. 7: CPU Layout

2.7.4 Field Interface Module

The Field Interface Module (FIM) provides all the inputs and outputs of the control panel.

There are two FIM variants. FIM801 can drive one FireClass addressable loop, FIM802 can drive two FireClass addressable loops.

For details of the FIM connections, see Section 4.2 “Interconnections” on page 32.

The 4 loop panels (FireClass 64-4 and 240-4) provide 2 loops on the FIM802 and 2 further loops on the XLM800. For additional details, refer to the document “XLM800-FIRECLASS LOOP EXPANSION MODULE”.

2.8 Display and Control Module

The Display and Control Module (DCM) contains the display, indicators and keys, that the operator uses to interact with the panel.

There is one of a variety of DCM types fitted to a control panel, depending on the particular control panel in the range. These types differ mainly in the number of zone LEDs fitted.

2.8.1 DCM832R

The DCM832R is fitted to FireClass 32-1 and Repeater 32RA control panels. It is shown in Fig. 8.

The features provided by the DCM are identical to the DCM 864R, except that there are fewer Zone Status LEDs, and these are positioned differently.

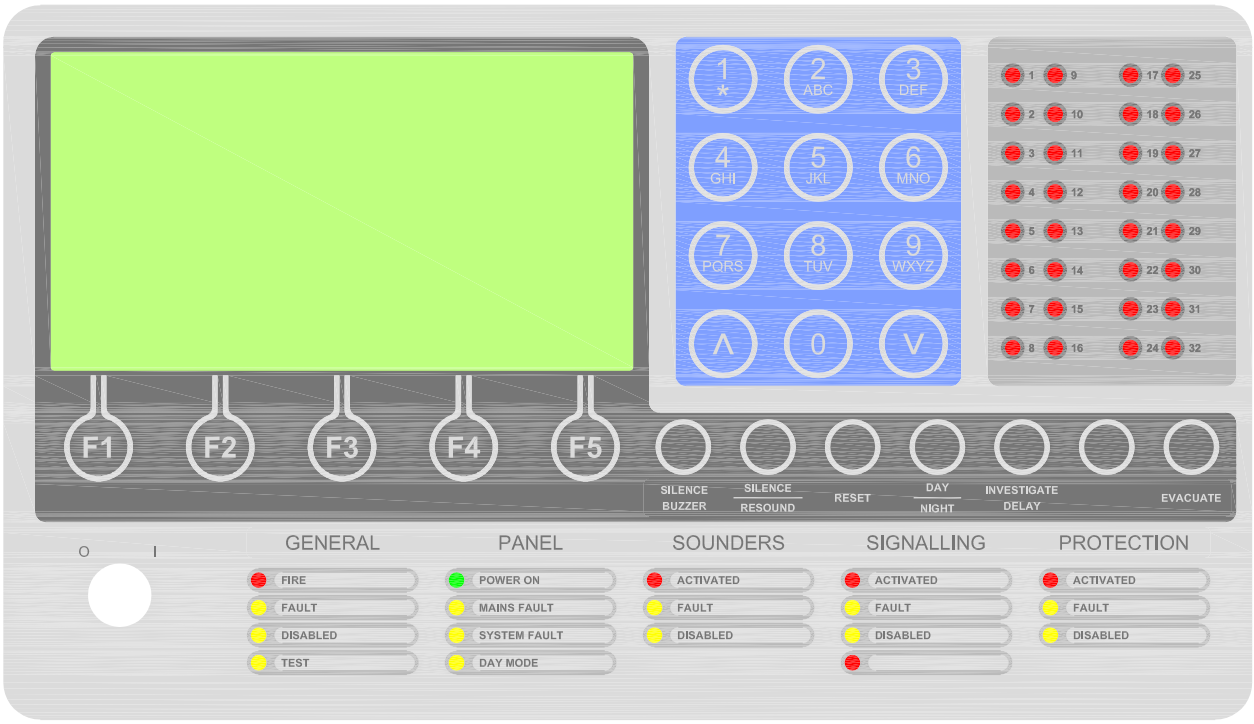

Fig. 8: DCM832R-Display Panel

2.8.2 DCM864R

The DCM864R is fitted to FireClass 64-2, FireClass 64-4 and Repeater FireClass 64RA control panels. It is shown in Fig. 9.

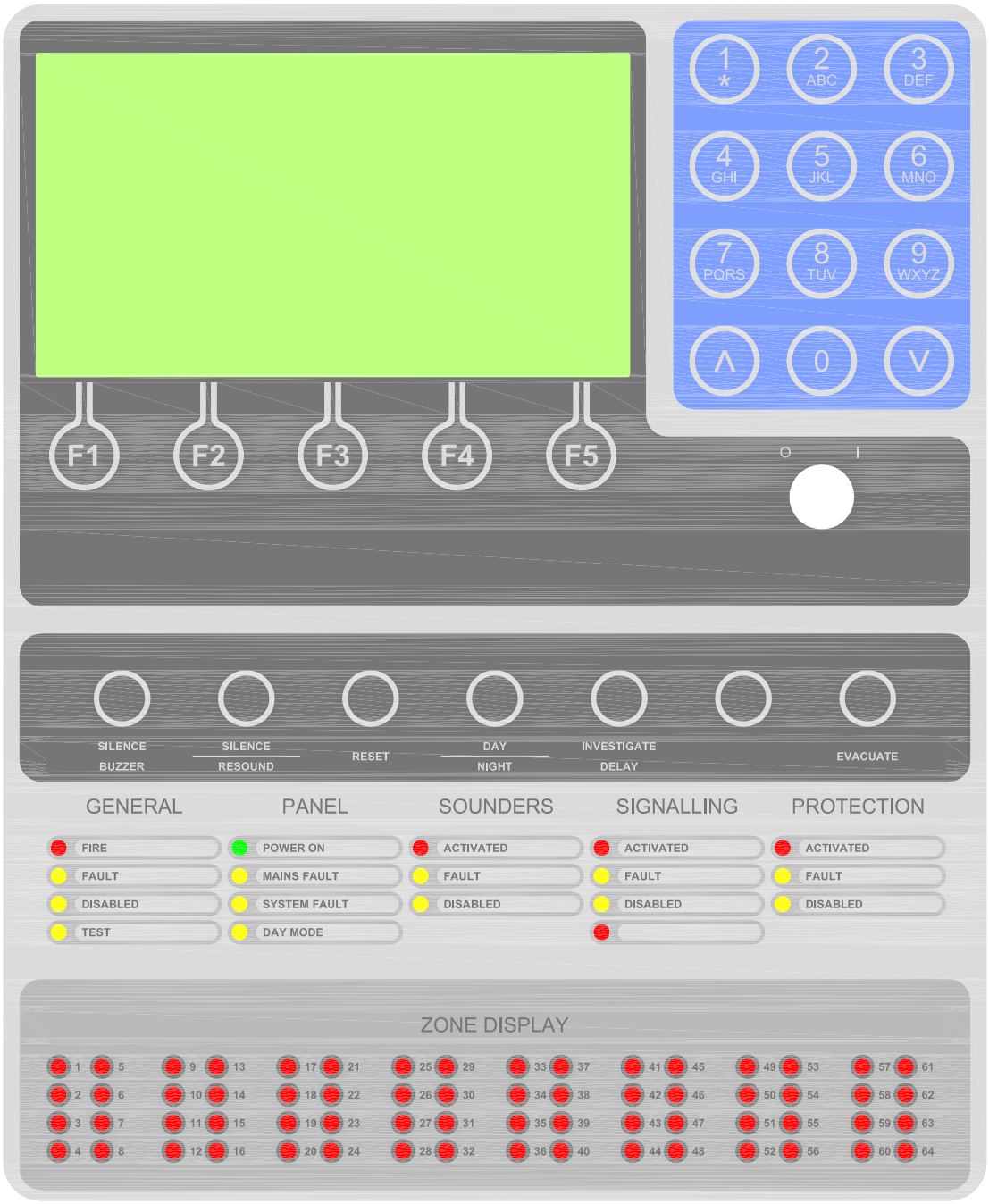

Fig. 9: DCM864R

2.8.3 DCM8240

The DCM8240 is fitted to FireClass 240 - 2, 240-4 and repeater 240R control panels. It is shown in Fig 9.

This is identical to the DCM864R operator panel (FireClass-FireClass 64-2 and 64-4), except that there are no Zone Status LEDs.

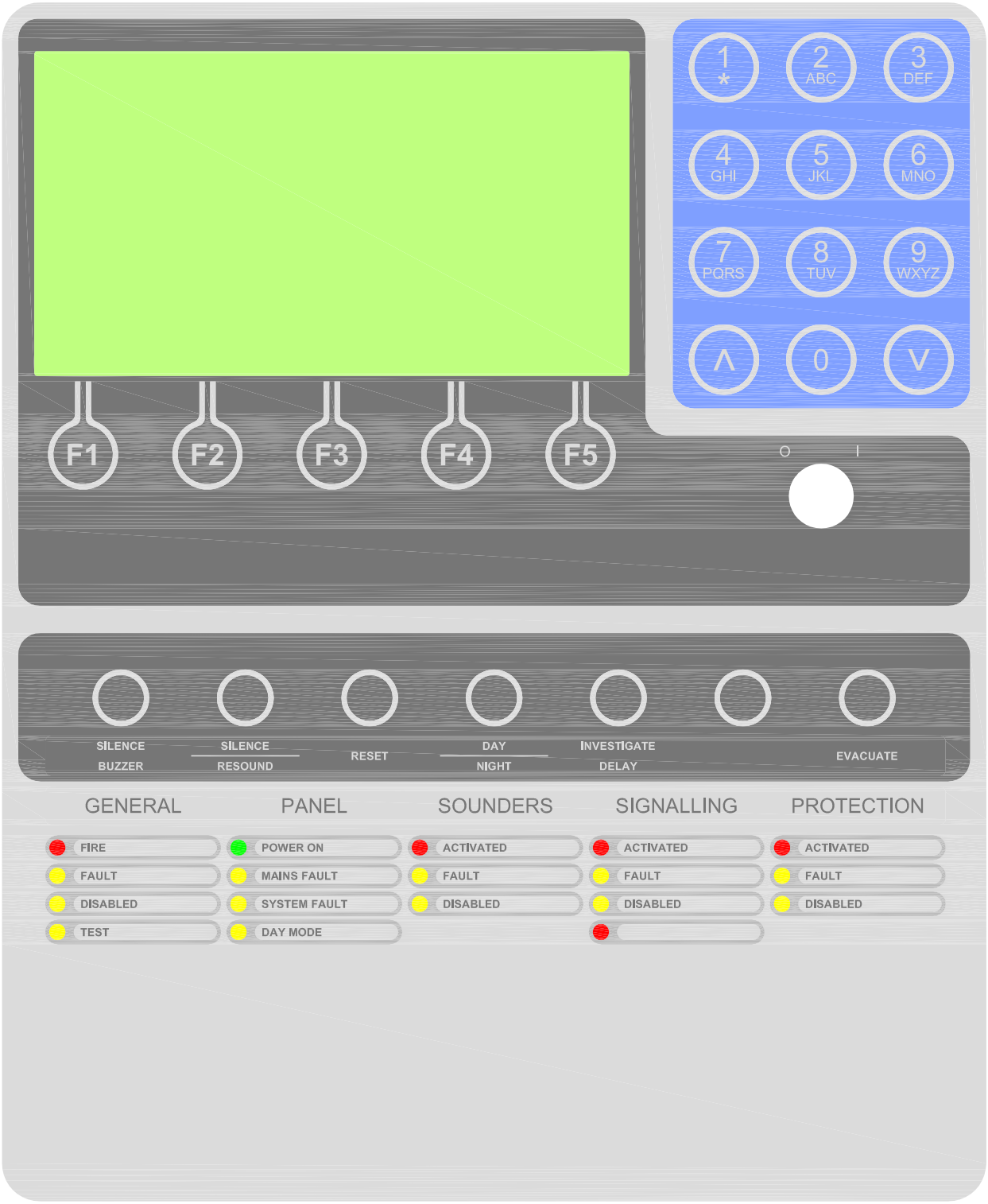

Fig. 10: DCM8240

2.9 Operator Functions

Most of the controls are simple, and explained by their details above.

However the Day/Night key and the INVESTIGATE DELAY key are more involved, as explained in the following sections.

More details are also provided in the panel user guides.

This underlying functionality of these keys is implemented in the control panel configuration, as provided in the standard supplied templates.

2.9.1 Day and Night Modes

The Day mode has the following characteristics, which differentiate it from Night mode:

- The "investigate delay" option is available (see Section 2.9.2 "Investigate Delay").

  The delay option is not available in Night mode on the grounds that there is unlikely to be anyone available to carry out the investigation.
- There may be a higher threshold before detectors alarm. For example smoke detectors may have a higher threshold to allow for daytime activities creating dust (which could be detected as smoke).

Panels can be programmed to automatically switch between Day and Night modes, at set times in the day.

2.9.2 Investigate Delay

In Day mode the fire brigade signalling can be delayed. This allows alarms to be investigated and cancelled if found to be false.

To delay the fire brigade signalling the **INVESTIGATE DELAY** key must be pressed within a certain period after the alarm activation (this period is configurable, it defaults to one minute).

There is then a further delay, during which the control panel can be reset. Resetting the control panel returns the control panel to normal operation, preventing the signalling from activating. If this further delay is allowed to complete (if there is no reset), the fire brigade signalling activates.

There is no delay option, and the signalling immediately actives, in these circumstances:

- Night mode is active (see Section 2.9.1 "Day and Night Modes").
- A call point was activated.
- There is a sounder fault.

2.10 Diagnostics Functions

The operator interaction menu options include diagnostic and test functions. Some example are provided below. For full details refer to the FireClass User guide or Service and Maintenance guide.

2.10.1 Walk Testing

Walk Test is a mode that allows you to check that devices will activate correctly (by physically applying smoke for example), without triggering an actual alarm.

Once in walk test a dynamic screen shows you information about the progress of the test. This screen shows you, for example, the number of devices that have been selected for testing (you can test individual loops, for example), and the number of devices that have activated (as you apply smoke for example).

2.10.2 Disablements

Disablement is a function that you use to effectively tell the control panel to ignore certain specified devices.

For example you might want to disable a detector because you know that some planned activity, such as welding, will produce smoke and trigger a false alarm.

Whenever a device is disabled, this is signalled at the control panel by the **DISABLED** led being activated.

2.10.3 Operator Passcodes and Access Levels

To use the control panel function menus, the user enters a User ID and associated passcode. Each User ID has an access level, which determines the menu items available to the user.

Up to 30 User IDs can be configured in a panel. The User ID is in the form of a two-digit number. Any number from 01 to 99 can be used (subject to the 30 user maximum).

The passcode is in the form of a combination of between 4 to 6 digits. Each digit can be from 0 to 9. The number of digits depends on the access level. The number of digits is enforced when entering the passcode in FireClass Express. Multiple User IDs can have the same passcode (this is not recommended however).

The access levels are as follows:

- User
- Supervisor
- Engineer

An access level in this list can access all the functions of the levels below it in the list.

The minimum access level required to access each function is shown in Table 7.

Function	Access Level	Enable Key
Press **SILENCE BUZZER** key	No logon needed	OFF
View menu (press F1) Contains same items as View/Print Data > By Function (below), and also Test Buzzer LEDs & Display (below)	No logon needed	OFF
Press **DAY/NIGHT** key	No logon needed	ON
Press **Not Clr** key (F4)	No logon needed	OFF
Press **SILENCE/RESOUND** key	No logon needed	ON
Press **RESET** key	No logon needed	ON
Press **INVESTIGATE DELAY** key	No logon needed	ON/OFF
Press EVACUATE key	No logon needed	ON
MAIN MENU	No logon needed	ON
Accept Events	User	ON
View Status	No logon needed	ON
■ Point	No logon needed	ON
■ Point I/P only	No logon needed	ON
■ Point O/P only	No logon needed	ON
■ Zone	No logon needed	ON
■ Zone Maps	No logon needed	ON
■ Network Status	No logon needed	ON
■ Commis. O/View	No logon needed	ON
Disablements	User	ON
■ Point – The User and Supervisor can only disable the Loop points. The Engineer can disable the Loop, RBus and Local points.	User	ON
■ Point I/P Only	User	ON
■ Point O/P Only	User	ON
■ By Function	User	ON
■ By Device Type	User	ON
■ Non-LED Outputs	Engineer	ON
Time/Date	User	ON
■ Set Time/Date	User	ON
■ Summer/Winter	User	ON
Event Log	User	ON
■ View Event Log	User	ON
■ Print Event Log	User	ON
■ Filter	User	ON
View/Print Data	User	ON

Table 7: Functions and required access levels (based on UK control panel functionality)

Function	Access Level	Enable Key
■ Points Disabled	User	ON
■ Points Untested/Failed	User/Supervisor	ON
■ Point Values	User	ON
■ View Faults	User	ON
■ Loop Info	Engineer	ON
■ Forced Points	Engineer	ON
■ Active Points	User	ON
■ By Function	User	ON
– Fire alarm inputs	User	ON
– Non fire alarm inputs	User	ON
– All loop outputs	User	ON
– Sounders	User	ON
– Protection equipment	User	ON
■ Device Dates	Engineer	ON
– All Devices	Engineer	ON
– CO Devices	Engineer	ON
– Ageing CO. Device	Engineer	ON
Service	Supervisor	ON
■ Walk Test	Supervisor	ON
■ Maintenance	Engineer	ON
– Counters	Engineer	ON
– Maintenance Request	Engineer	ON
– Battery Test	Engineer	ON
– S/W Init. Count	Engineer	ON
– Project Numbers	Engineer	ON
– S/W Versions	Engineer	ON
■ Diagnostics	Engineer	ON
– Force Dev.O/P	Engineer	ON
– Force Dev.I/P	Engineer	ON
– Shutdown/Rstart	Engineer	ON
– Single Dev.Poll	Engineer	ON
– Change Address	Engineer	ON
■ Calibrate DDM	Engineer	ON
■ Restart System	Engineer	ON
■ Switches	Engineer	ON
– Fast Fault Mode	Engineer	ON
– Rate of Rise	Engineer	ON
– Noisy Device	Engineer	ON

Table 7: Functions and required access levels (based on UK control panel functionality) (cont.)

Function	Access Level	Enable Key
– Detect.Power Up	Engineer	ON
– RSM Test Mode	Engineer	ON
– Inhibit No Resp	Engineer	ON
Configuration	Engineer	ON
■ Change Text	Engineer	ON
■ Insert Point	Engineer	ON
■ Delete Point	Engineer	ON
■ Modify Point	Engineer	ON
■ Autoconfig. – This option is available for Single and Multi-channel devices.	Engineer	ON
Test Buzzer, LEDs & Display	No logon needed	OFF (using View menu above) or ON

Table 7: Functions and required access levels (based on UK control panel functionality) (cont.)

3 Addressable Loop

This section covers the addressable loops and loop devices.

The information covers, for example:

- Cabling considerations.
- Termination.
- Loading calculation.

Detectors, call points and so on are typically all connected in parallel between two wires. Although this is called the "addressable loop", it would be more accurate to say "addressable circuit", as the Loop configuration need not necessarily be used (see Section 3.2 "Wiring Configurations").

3.1 Cabling Considerations

The sections below provide guidelines on cabling, including routing and selection guidelines.

3.1.1 Cable Routing

Ensure cables are routed to minimise coupling effects.

For example follow these recommendations:

- Try to avoid grouping power and signal cables together in the same conduit or trunking. If this is unavoidable, the minimum recommended separation between cables is shown in Table 8.
- Feed the mains supply into the housing through its own dedicated knockout.

Note that If grommets or bushings are used to secure cabling to the controller, they may need to comply with local regulations (such as having a flammability rating of Class HB or better).

Power Cable Voltage	Separation (m)	Power Cable Current	Separation (m)
115V	0.30	5A	0.30
240V	0.45	15A	0.35
415V	0.58	50A	0.50
3.3kV	1.1	100A	0.60
6.6kV	1.25	300A	0.85
11kV	1.4	600A	1.05

Table 8: Cable Separation Distances

3.1.2 Cable Types

It is impossible to provide specific details on the allowed cable types, and how they should be run, as these are subject to local practices and regulation. You should refer to these for details.

For the addressable loops there is a wide range of cable types that can be used. This includes most cables which comply with BS 5839: Part 1. Also, unscreened and unshielded cable can be used, which may be encountered when upgrading existing installations.

For the addressable loop here is a list of recommended cable types:

- DÄTWYLER: Lifeline
- DELTA: Firetuff
- FABRICA CAVICEL: Firecell
- HUBER&SUHNER: Radox FR
- Prysmian FP Range
- DRAKA CALFLEX: Calflam
- RAYDEX: FG950
- GEC AEI: Firetec
- TRATOS CAVI: Firesafe
- ALCATEL: Pyrolyon
- Continental FD cable 0.6mm: eg, JY(St)Y n x 2 x 0.6
- Continental FD cable 0.8mm: eg, JY(St)Y v x 2 x 0.8

3.1.3 Earthing

The addressable loop conductors must be isolated from earth.

Any current leakage to earth is indicated as a fault.

3.1.4 Screening

If a cable with a conductive screen or metal sheath is used, this must not be connected to the addressable loop conductors.

The recommendation is to join the screens from each section of cable within each loop device to form a continuous cable screen.

3.1.5 Cable Glands

Cables are led through a suitable knockout in the control panel housing wall.

Suitable grommets or glands must be specified. These must be externally sourced, as they are not provided.

3.2 Wiring Configurations

The term "loop" is commonly used for the addressable circuit. This is because the usual configuration is for both ends of the circuit wires to be connected at the control panel, to the "Left" and "Right" connectors.

The Loop configuration is favoured because it can help with the fault tolerance of the system (see Section 3.3.2 "Isolators" on page 28), and also helps limit voltage drops.

This is not the only configuration however. A "spur" is a section of addressable circuit only connected at one end.

There may be a mixture of loops and spurs. For example you can interface the addressable circuit to a conventional detector circuit using a FC410DIM, and this conventional circuit could be wired as a spur.

3.3 Short Circuit Protection

The following sections provide details of the control panel's internal short circuit protection, and the measures you can take to protect against short circuits in the loop.

3.3.1 In-built Panel Protection

To protect the control panel from short circuit damage, the Left and Right connectors of the control panel are shut down on the detection of a short circuit.

With no isolator bases fitted, this would shut down the whole loop and prevent it from functioning.

3.3.2 Isolators

Isolators (or "line isolators" to be more specific) divide the loop into sections, that can be individually shut down in the event of a short circuit.

Isolators are inserted into the loop. They normally allow continuity, but on detecting a short, they open and disconnect the shorted section the loop. There is now a non-functioning section to one side of the isolator, and a functioning section on the other side (that includes the isolator itself).

Isolators are bi-directional, so they can shut down the loop to the left or to the right of themselves.

By using two isolators you can limit the non-functioning section to the section between the isolators (so the non functioning section is only between the two nearest isolators either side of the short).

A number of devices include the functionality to act as isolators. This includes the following devices:

- Dedicated isolators such as the FC410LIM.
- Isolator bases, such as the "4BI" (here the "I" designates the isolator version of the "4B" base)

3.3.3 Isolator Loading

Each device positioned between isolators places a load on the isolators.

There is also a loading that the isolators themselves place on the loop.

These factors are managed by FireClass Designer - see Section 3.6 "Loop Loading Calculation".

No more than 128 isolators can be fitted to an addressable loop.

3.4 Protocol

The protocol used for the communications between the control panel and devices on the addressable loop is "FireClass Digital Protocol".

This protocol is very robust and reliable protocol, and uses a Frequency Shift Keying (FSK) technique.

3.4.1 Loop Addresses

In the protocol there are 250 addresses on each loop.

To use the addresses, you populate them with devices. Any possible combination of addresses can be used. You do not need to use a contiguous block of addresses for example.

Note that there may not be enough power available to fully populate the loops with devices - see Section 3.6 "Loop Loading Calculation" on page 29.

Generally each device occupies one address. There are exceptions, for example:

- The FC410MIO which may use seven consecutive addresses (Three inputs and four outputs are provided.)
- A FC410DDM which may use four addresses.

3.4.2 Detector Address Programming

The control panel communicates with an individual detector by means of the detector's address.

In the system configuration there are 250 available point addresses on a loop. When configuring the system you allocate the point addresses to zones of the building (such as "lobby" or "boiler room"). You also allocate a detector type to the point address (an example detector type is an "FC460PH").

The detector must now also be programmed with an address. To do this, identify the point address in the config-

uration that the detector will occupy. Check that the type of the detector matches the type allocated to the point. Programme the detector with that point address, using a "Loop Service tool", such as the FC490ST.

The detector is now allocated to a zone, through its point address allocation, and can be installed into its base.

DANGER

Possible death, serious injuries or damage to property.

The zone allocation is within the detector, not the detector base. This means that if you remove a detector and re-install it in another zone, in an alarm the zone indication at the panel will be incorrect.

If you do move a detector, check the system configuration, and change this if necessary.

3.5 Intrinsically Safe Design

A range of conventional IS devices are available for adding to the addressable loop via an FC410DDM fire detector module and a compatible intrinsically safe barrier device. These range of devices and modules are also available as an intrinsically safe version, for use in special hazards areas.

As with the other loading units, FireClass Designer shows you the proportion of the allowed units that have been used.

DANGER

Incorrectly installed intrinsically safe systems may lead to possible death, serious injuries or damage to property.

The design of such systems must be in accordance with local regulations.

There are specific installation and design requirements which are essential to correct and safe operation in hazardous areas and are normally part of the approved installation documentation.

The regulations will typically stipulate the following: the designer of the system is suitably qualified; the system design is correctly documented; the nature of the hazard is obtained from the customer; a survey is carried out to determine the proximity of the safe area to establish cable runs.

3.6 Loop Loading Calculation

Each device imposes the following loadings on the loop:

- An attenuation of the communications signals (expressed in "AC Units").
- An operating current demand (expressed in "DC Units").
- A voltage drop due as a product of the current demand and the resistance of the cabling and isolators.

In addition to AC and DC units, there are the following units:

- IB Units. These relate to isolator loading – see Section 3.3.3 "Isolator Loading".

Use FireClass Designer to keep within the acceptable loading limits. FireClass Designer shows you a gauge type indication of the proportion of the allowable units you have used, as you add devices.

3.7 End Of Line Termination

On interfacing devices to the loop, there may be a need to fit EOLRs (End Of Line Resistors).

In general these are for implementing fault detection. The resistor introduces a standing current, and the absence of this is signalled as an open circuit fault.

Examples are as follows:

- On conventional detector circuits, interfaced using a FC410DDM.
- On monitored circuits, interfaced using a FC410CIM.

- On sounder circuits interfaced using an FC410SNM or SNB520.

Terminating resistors are supplied with their units.

3.8 Device Compatibility

To quickly determine the compatible devices, use FireClass Express, which is a Windows PC software application (for more details see Section 5.2 "Software" on page 38).

In this application you start by specifying the type of your panel – you would choose one of the FireClass range. You then move on to populating the loop addresses with devices, by selecting the device type at each address from a list. This list will only include the compatible device types.

To obtain the device product code, you can then refer to Section 6 "Ordering Information" on page 39. Alternatively search for the type of device in the Product Catalogue (see Section 5 "Web Based Resources" on page 38).

3.9 Detectors - Addressable

A full range of detectors are available including:

- Heat detectors
- Smoke detectors
- Flame detectors
- "Combination" detectors, covering smoke, heat and CO, for example.

  These detectors are also called "virtual detectors" as each detection capability can have its own addresses, or they can be combined to communicate over one address.

Below is a brief overview of detectors. For more information see the FC460 Series Addressable Detectors User Manuals, available for download on the FireClass Ltd. website (www.fireclass.co.uk).

Most fire, heat and smoke detection applications can be satisfied using just the "Optical and Heat" and the "CO and Heat" detectors.

The heat only detector carries a wider variety of heat detection approvals than combined detectors.

3.9.1 Detector Modes

Detectors can be operated in several modes, as set up in FireClass Express.

Full details on the modes can be found in the online Help for FireClass Express.

The modes relate to the way the detectors operate, as in the following examples:

- The heat monitoring method, whether fixed threshold or Rate of Rise.
- For a FC460PC Triple Sensing detector as a single point detector:
  - Mode 0: Universal multi-criteria for detecting a wide range of fire conditions.
  - Mode 1: Resilient - This will help to eliminate false alarms from non-fire sources whilst maintaining ability to detect a wide range of fire conditions.

For combination sensors using multiple addresses there may be restrictions on the address/mode combinations.

3.10 Detectors - Conventional

You will probably only specify conventional detectors if you need to upgrade an existing conventional detector circuit or install equipment within a hazardous (flammable) atmosphere.

An interface is required between the conventional circuit. You could use a FC410DDM (recommended).

A wide variety of two wire conventional detectors are available, including the following examples:

- 600Ex series ATEX approved intrinsically safe detectors.
- FV282f+Triple IR Flame Detector
- S232f+ EExd triple IR flame detectors (FM).
- LD40 linear heat detection analysers
- Other manufacturers' conventional detectors (these will require testing before use with the FC410DDM).

3.11 Detector Bases

Detector bases support their detectors with electrical connections and physical mounting points (as a minimum).

Detector bases are typically screwed in place, directly to a ceiling, or attached using a Ceiling Tile Adapter (CTA).

3.11.1 Passive Detector Bases

The 4B base (of 4") is the mainstay detector base.

3.11.2 Isolator Detector Bases

In addition to supporting their detectors, the 4BI isolator base provides short circuit protection points on the loop. For more details see Section 3.6 "Loop Loading Calculation" on page 29.

3.11.3 Functional Detector Bases

In addition to supporting their detectors, functional detector bases provide additional functionality.

A sounder base will operate in line with the Sounder/Visual Processing settings using the zone number associated with its detector.

In FireClass Designer you specify the base type as a property of the detector.

- FC430SB Loop Low Power Sounder Base

Functional bases do not have addresses, they are effectively addressed as a unit, along with the device they are fitted with, this device providing the address.

3.12 Other Loop Devices

Other loop devices include:

- FC410RIM – Allows the loop to interface with relay based systems. Can be used with the HVR800 high voltage relay interface.
- FC410MIM – Mini contact monitor module
- FC410BDM- Beam Detector module
- FC410CIM – Contact monitor input module
- FC410DIM – Detection zone monitor module
- FC410SNM – Sounder circuit output module (24 V DC 2 A)
- FC410MIO Multi Input/Output Module
- FC410SIO Single Input/Output Module
- FC410DDM Universal Fire and Gas Detector Module

  The FC410DDM is offered only to monitor circuits of conventional detectors and not for 4-20 mA gas detection.

3.12.1 Non-addressable devices

Loops can be fitted with devices that do not have an address. These devices include the following:

- SB520 – Sounder Booster module (24 V DC 15 A)
- HVR800 – High voltage (110-260 V) relay interface (normally interfaced to the loop using an FC410RIM, which provides the addressing).
- FC410LI Line isolator module.

Most ancillary input and output devices can be fitted with UK MK style, DIN style or US style mounting plates. Alternatively several ancillaries can be housed in purpose built housings or the CIE housings.

3.13 Callpoints

The callpoints available include the following:

- FC420CP – Indoor callpoint
- FC421CP – Outdoor callpoint
- MCP220Ex Red Callpoint intrinsically safe

3.14 Loop Sounders

The loop sounders available include the following:

- FC410LPSYR LP/FC410LPSYW LP - Red and white Sounders (indoor)
- FC410LPSY LP SOUNDER IP65 - Red Symphoni (outdoor)
- FC410LPAVR LP Sounder/Beacon - Red and white Symphoni Sounder Beacons (indoor)
- FC410LPAV LP Sounder/Beacon IP65 - Red Housing (outdoor)
- FC430LPSB LP Sounder Base (indoor use) - white housing
- FC430LPASB LP Sounder/Beacon Base - white translucent housing

3.15 Duct Probes

"Duct probes" allow detectors to sample the air inside ducts (typically air conditioning ducts).

The probe kit provides a means of inserting a tube into the duct, which channels the air into a separate chamber housing the detector. The detector is not provided.

The duct probes available are:

- DPK4 - Duct probe with 5B
- DPK4I - Duct probe with 5BI
- DPK600 - Duct Probe Tube 600
- DPK1500 - Duct Tube 1500
- DPK2800 - Duct Tube 2800
- DPKM-Duct Probe Mount bracket

4 Interfacing, Networking and Ancillaries

4.1 Expansion Options Summary

The FireClass control panel is supplied as a complete assembly capable of supporting a comprehensive fire alarm control system.

(The control panels are modular, and most of the items can also be ordered as spare parts or field install options under individual product codes.)

There are many options for expanding this basic system, as described below.

The system connections are shown in block diagram form in Fig. 11, and also in Fig. 12 (this shows more details of the RBus).

These units, as with other devices, will need to be configured into the system using FireClass Express.

The expansion options include, for example:

- Repeaters.

  Repeaters provide secondary points at which you can control and monitor the fire alarm system.

  Repeaters are similar to actual control panels. However they do not interface directly to the loops, so they do not have a FIM. Some repeaters do not have mains power, being powered from the main control panel.

  Repeaters are connected over the RBus.

  Also see Section 4.3 “Repeater Details” on page 37.

- Loop Interface modules.

  This category includes, for example:

  – Output relay devices such as the FC410RIM. This sits on the addressable loop and closes contacts when commanded by the control panel. Might be used to control door release mechanisms for example.

  – Input relay devices such as the FC410CIM. This monitors normally open or normally closed switches.

- Loop expansion

  For the FireClass 64-2 and 240-2, the 2 loop panels can be expanded to 4 loops by fitting an XLM800. The power supply is capable of powering the 4 loops at 50% capacity. Upgrading the loop power to provide 100% capacity for 4 loops by adding a PMM840 is not possible due to enclosure limitations. The XLM800 fits “piggy back” over the FIM, within the control panel.

  The FireClass 64-2 and 240-2 enclosures cannot accommodate a PMM840.

  The FireClass 64-4 and 240-4 contain an XLM800 and PMM840 as standard.

- Local (non-loop) connected options.

  These include the IOB800, that provides eight opto-isolated digital inputs and eight volt free relay contacts, maximum voltage 30 VDC.

  Central to the expansion mechanism is the “Rbus”. This is used, for example, when connecting repeaters (see above).

  For more details see Section 2.7.4 “Field Interface Module” on page 19.

- Peer to Peer Networking.

  Several control panels can be networked together using FCNET. Any panel on the network can be used as a remote control and monitoring point for any other panel on the network. The networked panels are not all strictly equivalent, as one panel must be designated as the ‘Date and Time’ controller, for example.

  To network a panel, a TLI800EN module must be added. This is installed piggyback on the CPU.

- FireClass Graphics (FCG).

  This is a Windows PC based system for monitoring and controlling the fire alarm system. It overlays alarm system monitoring on a graphical representation of the building plan. Alarm conditions are indicated with audible and visual warnings, and can be quickly located within the building.

- Printers

  The printer output is in the form of ASCII text, so a standard line printer would be compatible, for example.

  Alternatively, a door mounted printer (PRN800), which fits in the door cutout in the ANC1-D, ANC2-D or ANC3-D ancillary enclosures.

  Printers can be connected to the “COM1” serial port of the control panel.

4.2 Interconnections

This section provides details of the system interconnections.

Fig. 11 focuses mainly on the standard connections.

Fig. 12 shows the options for connecting optional additional modules.

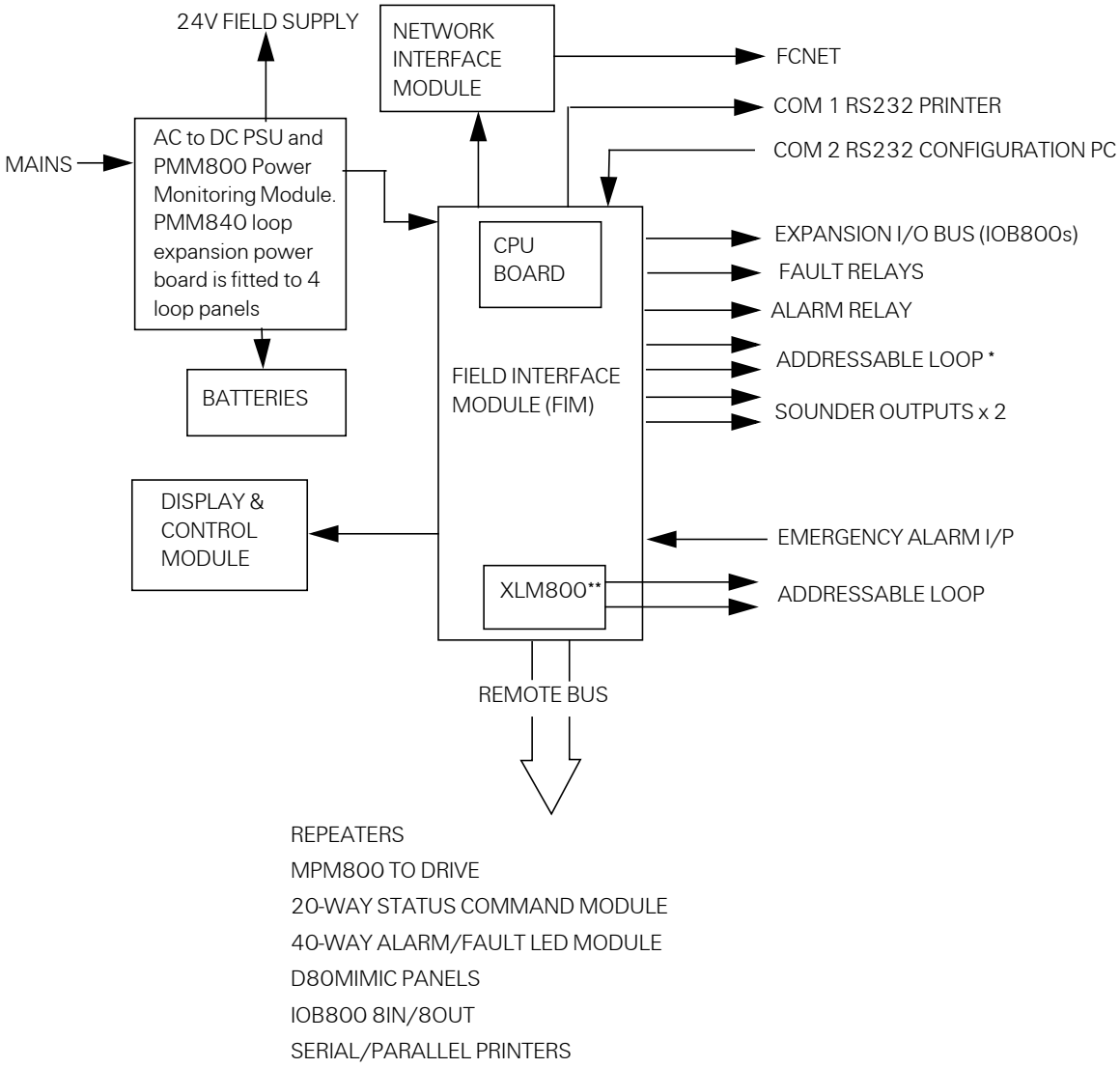

Fig. 11: System Connections
**XLM800 2 loop expansion module fitted in 4 loop panels.*

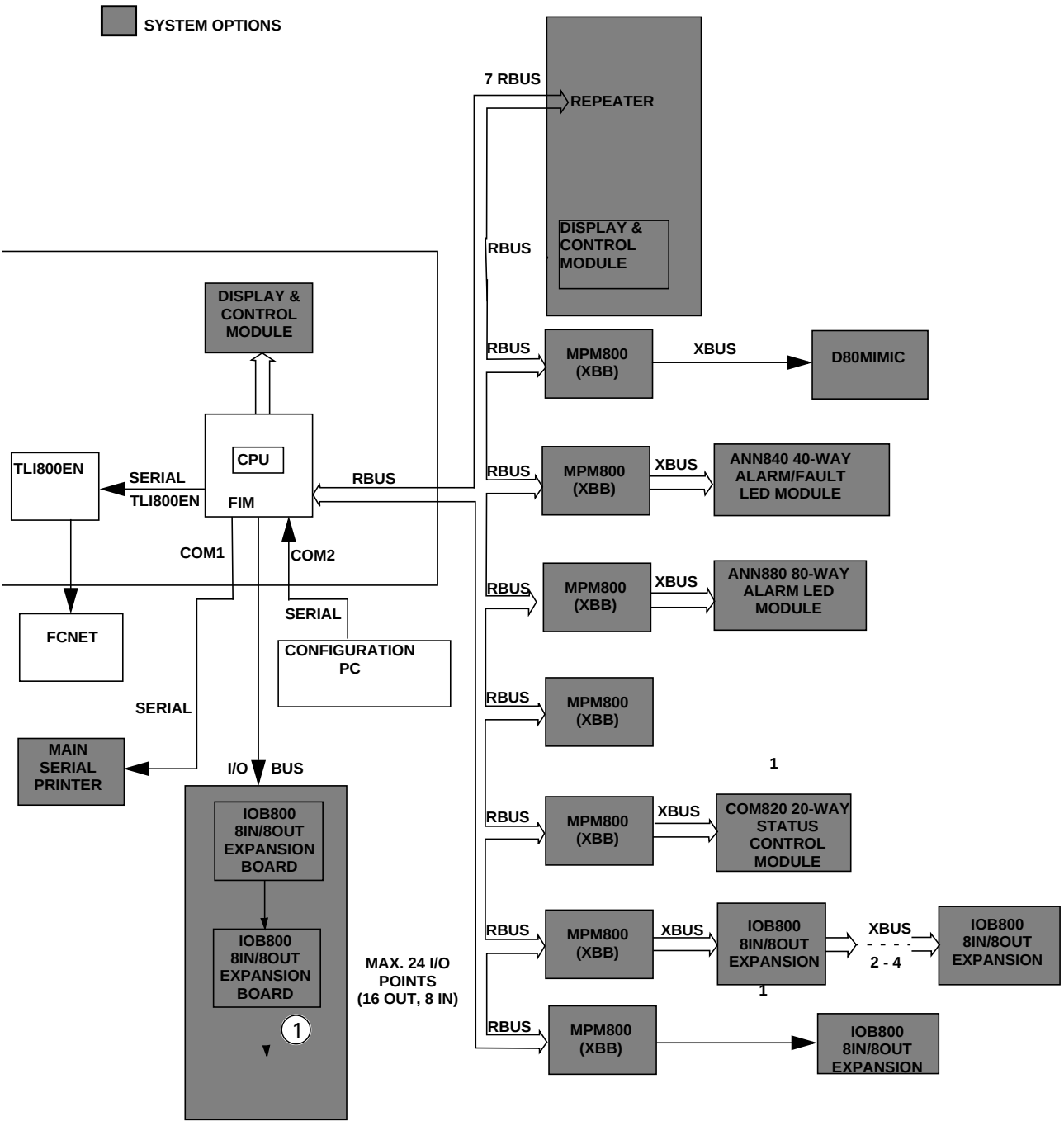

Fig. 12: Remote Bus and Local I/O connections
Maximum number of RBUS nodes = Total number of MPM800 (7) + total repeaters(7) + DCM(1) +panel(1) = 16 max.
1 – Only one IOB800 can be accommodated in the Fireclass 64 or 240 panels. There is no provision in the Fireclass 32-1 enclosure for IOB800 boards.

4.2.1 FIM Connection Details

Fig. 13 shows the FIM board connections. These are explained in more detail below.

All terminals accept solid/stranded conductors from 0.5 to 2.5 mm^2.

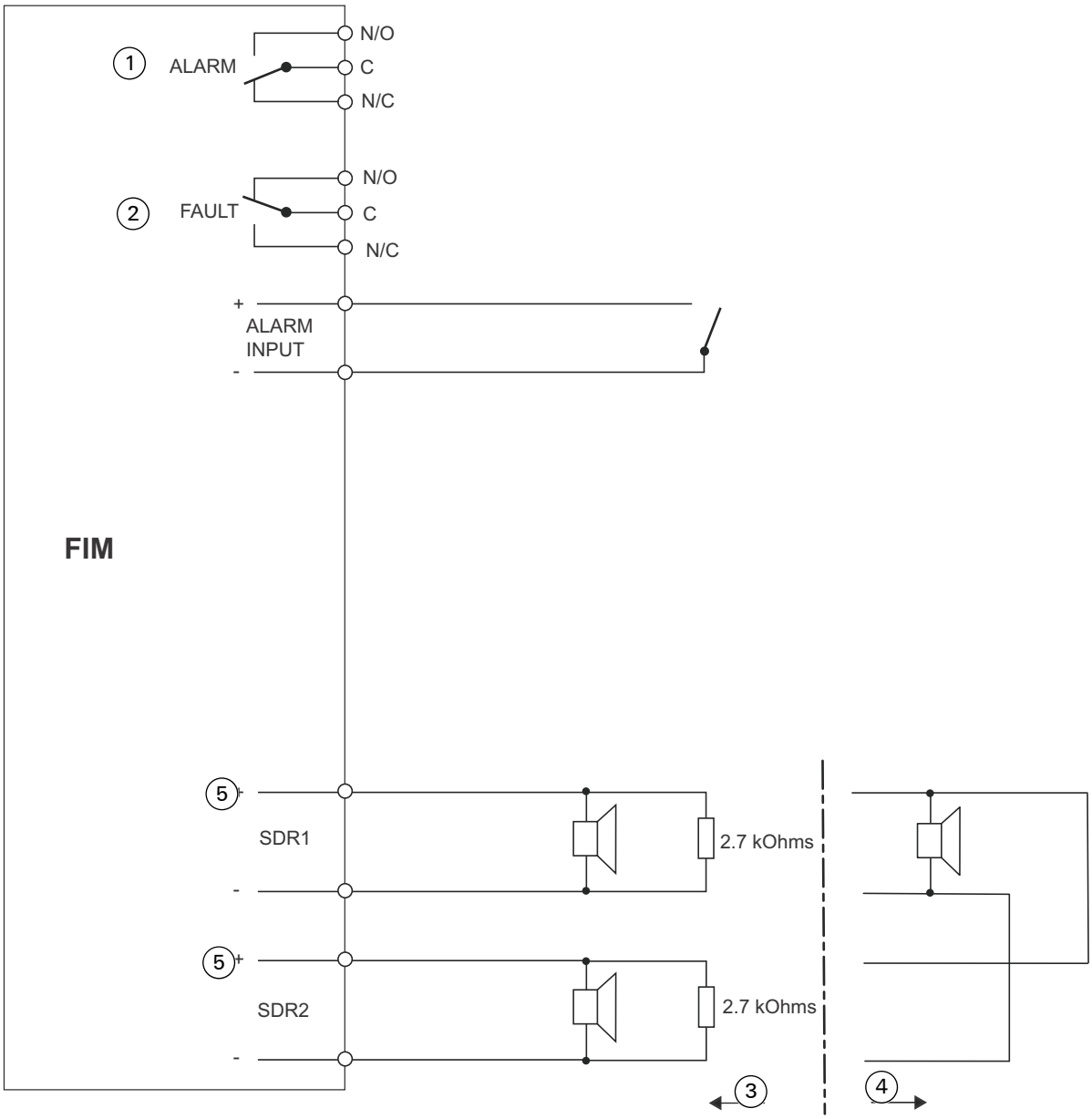

Fig. 13: FIM board connection (the labels match those on the FIM board)
1–Shown in the no alarm position
2–Shown in the no faults position
3–Spur sounder mode
4–Loop sounder mode
5–Note that sounders must be polarised and suppressed

4.2.2 RBus

The RBus (Remote Bus) is used for communication between the control panel and FireClass ancillaries, such as repeaters and MPM800 modules.

Fig. 12 shows the RBus connection options.

The Rbus is an RS485 party-line, differential wire pair, asynchronous, 19.2 Kb bus. The maximum length is 1200 m.

The RBus has 16 available node addresses. These are set, for example, using DIP switches on an MPM800. Note however that the maximum number of RBus devices that can be supported is also affected by other factors, such as MPM "personality".

The Rbus "loops through" the control panel, so there are two pairs of + and - connections. An unused pair must be terminated with a 150 Ohm resistor. Otherwise the bus must be terminated with a 120 Ohm resistor beyond the last device on the bus.

4.2.3 Loops

For each loop there are connections for "Left +", "Left -", "Right +" and "Right -".

The loop wires are connected using screw terminals into a plug, which is then inserted into the FIM board sockets.

There is short circuit protection on the loop interface (see also Section 3.3 "Short Circuit Protection" on page 28).

4.2.4 Alarm and Fault Signalling Relays

These are outputs from the board. The relays change over to indicate fault or alarm conditions.

The Alarm relay, for example, can be used to interface with public signalling systems, such as the British Telecom (BT) system.

The relays change over as shown in Fig. 3.

The Fault relay is energised when there are no faults, and the contact position is as shown in the figure. When there is a fault the relay coil is de-energised and the contact changes over. With no power to the FIM board to energise the coil, the relay is in its "fault" position. The Fault relay coil is not monitored.

The Alarm relay coil is de-energised when there is no alarm. When there is an alarm the coil is energised and the contact changes over. With no power to the FIM board to energise the coil, the Alarm relay is in its "no alarm" position. The Alarm relay coil is monitored, so a faulty coil results in a fault event.

The relay contacts are rated at 1 A @ 30 VDC.

NOTICE

Danger of equipment damage.

Do not use the Alarm or Fault relay to switch voltages above 30 V AC rms.

This means you must not switch mains AC voltages.

Do not use the relays to switch signals below 100 uA at 3 V DC.

4.2.5 Sounder Outputs

There are two local sounder outputs from the FIM. There are two configuration options, as follows:

- Two separate outputs (spur mode). This is the default
- One open circuit tolerant output (loop mode).

The mode is set using jumpers on the FIM board.

If connected in spur mode, the spur must be terminated with a 2.7 KOhm end of line resistor. This is to allow short and open circuit monitoring of the sounder wiring.

In the event of a short circuit being detected so an output is shut down, the other output can still operate.

Each sounder output is rated at 2 A continuous, 3 A peak, resistive load. However the panel cannot support both outputs at full power.

The sounder outputs may be required to drive devices with peaky loads, such as electromechanical bells, strobes and xenons. This must be allowed for in the current calculations.

4.2.6 Emergency Alarm Input

NOTICE

The emergency alarm input is only suitable for use with signals from other FireClass system modules. An example would be a network card mounted inside the panel or an adjacent housing.

This can be used to receive an emergency alarm signal from a network card (for example a TLI800EN). For full connection details refer to the network card instructions.

4.2.7 Serial Ports

There are three RS232 serial ports, which are used for communicating with the following:

- COM1 - Serial printer.
- COM2 - Configuration PC.
- COM3 - FCNET and other communications networks, third party interfaces.

4.2.8 Remote Bus

For details of the RBus see Section 4.2.2 "RBus" on page 35.

4.2.9 FIM – I/O Bus

The I/O bus is used for communication with external (Rbus ancillaries) devices. Typically these will be door or air conditioning control relays.

The I/O bus has 24 addresses for use by input and output devices. It supports up to 16 outputs, for controlling LEDs or relays for example, and can read up to 8 inputs.

Only one IOB800 can be accommodated in the Fireclass 64 or 240 panels. There is no provision in the Fireclass 32-1 enclosure for IOB800 boards.

Note that he maximum length of the Expansion Bus cable is 2 m from the FIM to any of the following circumstances:

- Connection to any other board, or,
- where boards are 'daisy chained' together the total combined cable lengths.

4.3 Repeater Details

A range of repeaters are available with varying numbers of zone LEDs, with their own mains power and batteries. These are summarised in Table 9.

Name	Number Zone LEDs	Mains Power	Batteries
FireClass 32RA	32	Yes	7 Ah
FireClass 64RA	64	Yes	7 Ah
FireClass 240RA	0	Yes	7 Ah

Table 9: Repeaters Summary

Repeaters often use the same housing design as a control panel, so for the dimensions see Section 2.6.3 "Drawings" on page 12.

4.3.1 Repeater Power

RA repeaters have PSUs and batteries.

5 Web Based Resources

5.1 Documentation

This documentation will be supplied as one or both of the following:

- PDF files obtainable from the website www.fireclass.co.uk. This website will provide indexing and search facilities for finding the document.

5.1.1 Documentation Set

At the time of writing, the following guides are provided for the FireClass control panels:

- Installation and Commissioning Guide

  This covers taking a supplied kit of parts delivered to the building, and handing over to the site personnel a tested and operational fire alarm control system.

- User Guide

  This covers the day to day operation of the control panel. It includes, for example, details on what to do if faults are indicated, and how to disable devices to prevent false alarms.

- Service and Maintenance Guide

This covers the steps to be followed for servicing and commissioning the control panel. It includes, for example, details on changing the configuration of the control panel and altering address, type of the devices. Additionally, it covers the list of the fault states possible from a FireClass panel using version 2 1.0 firmware.

- TLI800EN Fixing Instructions

This covers the FireClass network card needed to be configured for FireClass panels.

- Product Information and Design Application

  This guide.

5.2 Software

Also available for download on the FireClass Ltd website (www.fireclass.co.uk) are various supporting PC software applications, as detailed in this section.

(There are also references to these applications as appropriate throughout the rest of the manual.)

For more details on using the applications, use the online help file, as accessed from the **Help** menu.

5.2.1 FireClass Designer

This is an application that helps in the design of systems based on FireClass fire alarm control panels.

This application is referenced as appropriate in other sections of this manual.

One function FireClass Designer is to calculate the required backup battery size, based on your entered system parameters. These parameters include the type of device at each address, for example.

Another function helps you keep to the maximum number of devices between isolator bases.

FireClass Designer can be freely downloaded and used.

5.2.2 FireClass Express

This is the Windows PC application into which you enter the configuration of your system.

The panel needs to be configured with details such as the type of detector at each address, the cause and effect mappings between input and output states, and networking details.

You start with some pre-made settings from a standards-compliant “template”. You then tailor these with the details of your individual system (you are warned if you change to non-compliant settings).

You then transfer the configuration to the control panel over a serial link.

6 Ordering Information

6.1 Product Codes in FireClass Designer

The FireClass Designer indicates product codes. To discover the product code of an item, select the item in the Tree view, and look up the code in the "Quick Properties" window.

For example, in the Tree click on the "+" of Loop A to expand the loop and see its devices, then click on a detector to select it, then switch to the Quick Properties window to see the code.

6.2 Product Code Listings

The tables in this section list the codes under which items can be ordered, covering both complete new panels and accessories, and spares.

Item	Product Code
FireClass 32-1: 1 loop panel with zonal LEDs	557.200.701
FireClass 64-2: 2 loop panel with zonal LEDs	557.200.702
FireClass 64-4: 4 loop panel with zonal LEDs	557.200.703
FireClass 240-2: 2 loop panel, 240 zone, no zonal LEDs	557.200.704
FireClass 240-4: 4 loop panel, 240 zone, no zonal LEDs	557.200.705
FireClass 32 RA: 32 zone repeater, 230V AC with zonal LEDs	557.200.706
FireClass 64 RA: 64 zone repeater, 230V AC with zonal LEDs	557.200.707
FireClass 240 RA: 240 zone repeater, 230V AC with no zonal LEDs	557.200.708
17AH Battery bracket fixing kit	557.201.307
Semi-Flush Bezel for FireClass 64-2, 64-4, 240-2, 240-4, FireClass 64R	557.201.501
Semi-Flush Bezel for FireClass 32-1 /FireClass 32RA	557.201.502
IOB800 mounting plate for standard modules (FireClass 64-2, 64-4, 240-2 and 240-4)	557.201.503
38AH Battery bracket fixing kit	557.201.505
FireClass 64-2/240-2 Rack mount kit	557.201.511
FireClass 64-4/240-4 Rack mount kit	557.201.512
FireClass 32-1 enclosure Rack mount kit	557.201.514
IOB800 I/O exp board	557.202.006
XLM800 - 2 loop expansion module	557.202.007
MPM800 multi purpose I/F module	557.202.012
Serial printer cable for MPM800 or FIM800	557.202.017
COM820 - 20 way status command module	557.202.020
ANN840 - 40way fire/fault LED zone indicator	557.202.021
ANN880 - 80way fire LED zone indicator	557.202.022
PRN800 printer with front cover	557.202.024
TLI 800EN. EN54 approved network card	557.202.080
FB800 Fuse Board	557.202.100
FireClass ANC1 - small, shallow enclosure (blank door)	557.202.701
FireClass ANC2 - large, shallow enclosure (blank door)	557.202.702

Table 10: Control Panel Order Codes

Item	Product Code
FireClass ANC3 - large, deep enclosure (blank door)	557.202.703
FireClass ANC1-D - small, shallow enclosure (door for 1 display ancillary)	557.202.704
FireClass ANC2-D large, shallow enclosure (door for 2 display ancillaries)	557.202.705
FireClass ANC3-D large, deep enclosure (door for 2 display ancillaries)	557.202.706
MIM fixing kit for the above for PSU A17 and A38	557.202.707
MIM fixing kit for FireClass 1.9A/7Ah PSU	557.202.708
FireClass 1.9A PSU (1.9A/7Ah, enclosure dims: 225 x 350 x 105mm)	557.200.731
FireClass PSU A17 (5A/17Ah, large, shallow enclosure)	557.200.732
FireClass PSU A38 (5A/38Ah, large, deep enclosure)	557.200.733

Table 10: Control Panel Order Codes

7 Collected Specifications

7.1 Shock/Vibration

The shock vibration resistance meets EN54-2.

7.2 Dimensions

Table 11 shows the dimensions.

Panel	Height (mm)	Width (mm)	Depth (mm)*	Weight (Kg)**	Input Current***
FireClass 32-1	370	325	156	7	0.9 A
FireClass 64-2/ FireClass 240-2	480	410	140	9.7	1.6 A
FireClass 64-4 and 240-4	480	410	205	10.6	1.6 A
FireClass 32RA	370	325	126	6.6	0.9 A
FireClass 64RA and 240RA	480	410	140	9.3	0.9 A
7 Ah batteries				2.2 each	
12 Ah batteries				4.0 each	
17 Ah batteries				6.1 each	
38 Ah batteries				14.2 each	

Table 11: Dimensions
** To the wall add 4_mm – see the dimension drawings*
*** Excluding batteries*
**** With no power supplied to optional ancillaries*

7.3 EMC

Product family standard EN50130-4 in respect of Conducted Disturbances, Radiated Immunity, Electrostatic Discharge, Fast Transients and Slow High Energy

EN 61000-6-3 for Emissions.

7.4 Environmental

Parameter	Value
Operating Temperature	-5°C to +40°C
Storage Temperature	-20°C to +70°C
Operating and storage maximum Relative Humidity	95% RH non-condensing

Table 12: Temperature and Humidity Stipulations

7.5 Field Wiring Connections (Field Interface Module)

All terminals accept solid/stranded conductors from 0.5 to 2.5 mm^2.

Table 13 shows the FIM outputs.

Item	Details
Sounder	2 circuits rated at 2 A continuous, 3 A peak resistive load. 2.7 kOhm EOL. Protection for short circuit alarm load.
Common alarm relay	1 set of changeover contacts rated for 1 A @30 VDC. Do not use below 100 uA at 3 VDC.
Common fault relay	1 set of changeover contacts rated for 1A @30 VDC. Do not use below 100 uA at 3 VDC.

Table 13: FIM Outputs

Table 14 shows the FIM inputs.

Item	Details
Emergency alarm input	The emergency alarm input is only suitable for use with signals from other FireClass system modules.

Table 14: FIM Outputs

Table 15 shows the 2-Way Circuits.

Item	Details
Addressable loop	Frequency Shift Keying and communications circuit. Up to 250 compatible addressable detectors or addressable ancillaries. 37.5 V DC maximum. Up to 50 type S271+ detectors per loop. Maximum external loop load 500 mA.
Remote Bus	Conforming to RS485 electrical specifications. Half duplex, multi-drop, 19200 baud.
Printer/Configuration PC/ Network ports	Conforming to RS232 electrical specifications. Full duplex, 9600 baud.
I/O Bus	1-bit bi-directional bus capable of addressing up to 24 I/O devices.

Table 15: 2-Way Circuits

Table 16 shows the loops and zone details.

Panel	Loops	Zone LEDs
FireClass32-1	One	32
FireClass 64-2	Two	64
FireClass 64-4	Four	64
FireClass 240-2	Two	0
FireClass 240-4	Four	0

Table 16: Loop and Zone Details

7.6 Battery Details

The backup batteries are pairs of12 V SLA (sealed lead acid) from Power Sonic.

Table 17 shows the battery details.

Panel	Battery Code	Capacity (Ah)	Weight (Kg)
FireClass 32-1 FireClass 32RA	PS-12120 PS12070	12 7	4.0
FireClass 64-2 and 240-2 FireClass 64RA and 240RA	PS-12170 PS-1270	17 7	6.1 2.2
FireClass 64-4 and 240-4	PS-12380	38	14.2

Table 17: Battery Details

The maximum internal resistance of the battery and its associated circuitry is 0.35 ohms.

Table 18 shows the maximum PSE loads.

Panel	Imaxa: Ipse	Imaxb: Ipse
FireClass 32-1, 32RA, 64RA, 240RA	1.9 A	2.5 A
PMM800, FireClass 64-2, 64-4, 240-2 and 240-4	3.1 A	5 A

Table 18: Maximum PSE Loads

7.7 PSU

Table 19 shows the mains requirements.

Item	Unit	Value
Voltage	All units	230 V 50/60 Hz
Current	FireClass 32-1, 32RA, 64RA, FireClass 240RA	0.9 A
Current	FireClass 64-2, 64-4, 240-2 and 240-4	1.6 A

Table 19: Mains Power Requirements

7.8 PMM800 Power Monitoring Module

- Input
  - The 230 V AC mains supply is connected to the input of the power supply unit (BAQ60T24 or BAQ140T24). The 28.6 VDC output from the power supply unit is fed to the input of the PMM800.
- Output

Table 20 shows the 3 DC output rails voltage ranges:

Rail	Voltage Range
28 V	■ Vout(max)=28.6 V (Tamb=—10C, Iout=0). ■ Vout(min)=20 V(Tamb=50 C), Iout=5 A (BAQ140T24), Iout=2.5 A (BAQ60T24). Output ripple: 150 mV p-p maximum at maximum load BAQ140T24: 0-5 A, Imaxb=5 A, Imaxa=3.1 A (38 A-h Battery charging at C/20 rate) BAQ60T24: 0-2.5 A, Imaxb=2.5 A, Imaxa=1.9 A (12A-h Battery charging at C/20 rate) Maximum current available on the 28 V rail (I(28)) in either condition, may be calculated from the following formula:- I(28)=I(max)-0.211*I(5)-1.568*I(40) Where: I(max)=Imaxa or Imaxb i.e. whichever is being considered I(5)=Current drawn from 5 V rail I(40)=Current drawn from 40 V rail
5 V	Output voltage: 4.85 V-5.25 V @ 50m A to 1.5 A. Minimum load=50 mA. Output ripple: 150 mV p-p maximum.

Table 20: PMM800 Output Rail Voltage Ranges

Rail	Voltage Range
40 V	Output voltage: 39.75 V-40.2 V @ 0 to 1.25 A. Output ripple: <40 mV p-p 1-10 KHz acceptable level increasing 6 dB/octave either side.

Table 20: PMM800 Output Rail Voltage Ranges

The PMM800 provides four 24 V outputs. Each output is fitted with fuse. These are F1AL 250VAC 20x5mm fast blow glass fuses.

There is a battery fuse fitted. This is a T8AH 250VAC 20x5mm ceramic anti-surge fuse.

7.9 PMM840 Power Monitoring Module

The PMM840 provides the following features:

- The PMM840 when used with the PMM800 Power Supply Module and BAQ140T24Power Supply, it is fully compliant with BSEN54-4 (including amendments 1 and 2), EN60950, BSEN51030-4, BSEN61000-6-3, EN61000-3-3 and EN 61000-3-2.
- Function
  - Provides a 40V loop power supply to the XLM800 expansion module.
- Input
  - Max 28.6 VDC, min 20 VDC
- Output
  - Output voltage: 39.75 V-40.2 VDC @ 0 to 1.25 A.
  - Output ripple: <40mV p-p 1-10KHz acceptable level increasing 6dB/octave either side.
- Electrical I/O
- FIM800 Connector to J2
- Applications
  - The PMM840 is used to provide the 40V loop supply to the XLM module fitted in the FireClass 64-4 and FireClass 240-4 Panels.

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Company stamp

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FIRECLASS