



ADVANCED WARNING

SYSTEMS

# LoopSense



## Fire Alarm Control Panel (AS4428 & AS7240. 2 & 4)

### Installation and Commissioning

MAN 1560-3

WORLD LEADER OF INNOVATIVE SOLUTIONS  
IN FIRE DETECTION AND ALARM SYSTEMS



## Responding to a Fire

### Access Level 2 (Default Access Level)

The  and  indicators will be illuminated

The  Button is pressed to silence the buzzer

The  key is pressed to silence any silence-able outputs that have been activated.

The  LED will be illuminated to indicate that the silence-able outputs have been silenced and resound is available. The operation of the SILENCE key will be logged.

The  key is pressed to disable the Displayed Device / Zone.

The  LED will be illuminated to indicate that the selected Devices / Zones have been Disabled

The  key is pressed to reset the fire condition. All outputs activated in response to the fire will deactivate and the panel will revert to the normal condition providing there are no other abnormal conditions present. The operation of the RESET key will be logged.

## Disabling a Zone / Device

The following example outlines how to disable a ZONE/DEVICE.



Press



Then to open the "Control" menu.

```

CONTROL MENU
1▶ZONE                3|PANEL
2|DEVICE              4|GLOBAL CONTROL
```



Once in the "Control" menu press to open the "Zone" or to open the "Device" menu. By following the screen prompts select the type of control, once selected simply step through the menu again to implement.

```

Select Zone:
<zone descriptor>
Z1      Z2      Z3      Z4      Z5
X6      X7      X8      X9      X10
X11     X12     X13     X14     X15
X16     X17     X18     X19     X20
X21     X22     X23     X24     X25
X26     X27     X28     X29     X30
```

Once selected the following screen will be displayed

```

Zzzz                <status>
<zone descriptor>
1:DISABLE INPUTS    2:DISABLE SOUNDERS
3:SILENT WALK TEST  4:WALK TEST DEVICE▶
```



The key is pressed to disable the Zone / Device



**Note:** *Sounder access is available at Level 3 only*



The will illuminate and the Status will change to DISABLED

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## 1 About This Manual

### 1.1 Introduction

This manual contains all the information required to install and commission the **LoopSense** series Fire Alarm Control Panel (FACP) and is only available to and for the use of personnel engaged in its installation, commissioning and operation.

### 1.2 General Requirements

The **LoopSense** FACP has been designed and manufactured from high quality commercial components so as to comply with major world standards. To ensure these standards are not compromised in any way installation staff and operators should;

- Be qualified and trained for the task they undertake;
- Be familiar with the contents of this manual prior to the installation, commissioning or operation of a **LoopSense** control system;
- Observe anti-static pre-cautions at all times; and
- Be aware that if a problem is encountered or there is any doubt with respect to the operational parameters of the installation the supplier should be contacted.

### 1.3 References

**LoopSense** Operation & On Site Programming Manual

**Apollo** Detector / Device Manuals

**Ampac** Product Data Sheets

**Australian Standard** AS4428-2 and AS7240-2&4

### 1.4 Symbols



Important operational information



**Note:** Configuration considerations



Observe antistatic precautions



Mains supply earth



DANGER mains supply present

## 2 Introduction

### 2.1 System Overview

The purpose of the **LoopSense** Fire Alarm Control Panel (FACP) is to monitor changes in inputs, report those changes and update selected outputs as programmed.

The FACP processes changes in inputs such as fire, fault, pre-alarm, emergency, security, user, transparent and system and has a built-in menu structure to view its status, perform operational tests, and modify the panel's configuration and programming.

The LoopSense consists of

- The front panel 40 x 8 line LCD, navigation keys ◀ ▶ ▲ ▼, alpha numeric keypad and the Menu/Enter keys allow the **LoopSense** to be programmed on site. The same LCD and keys are also used for panel operation and interrogation
- 4 X supervised input and outputs connections
- 3 X relay outputs
- Password entry
- 1 models available metal cabinet with 3Amp supply.
- Flush or surface mountable enclosure. A surround is required for the metal cabinet
- Controls have tactile and audible feedback of operation
- All terminals cater for 2.5mm cables

### 2.2 System Components

The following illustrates the main components of the system and the connectivity between them.

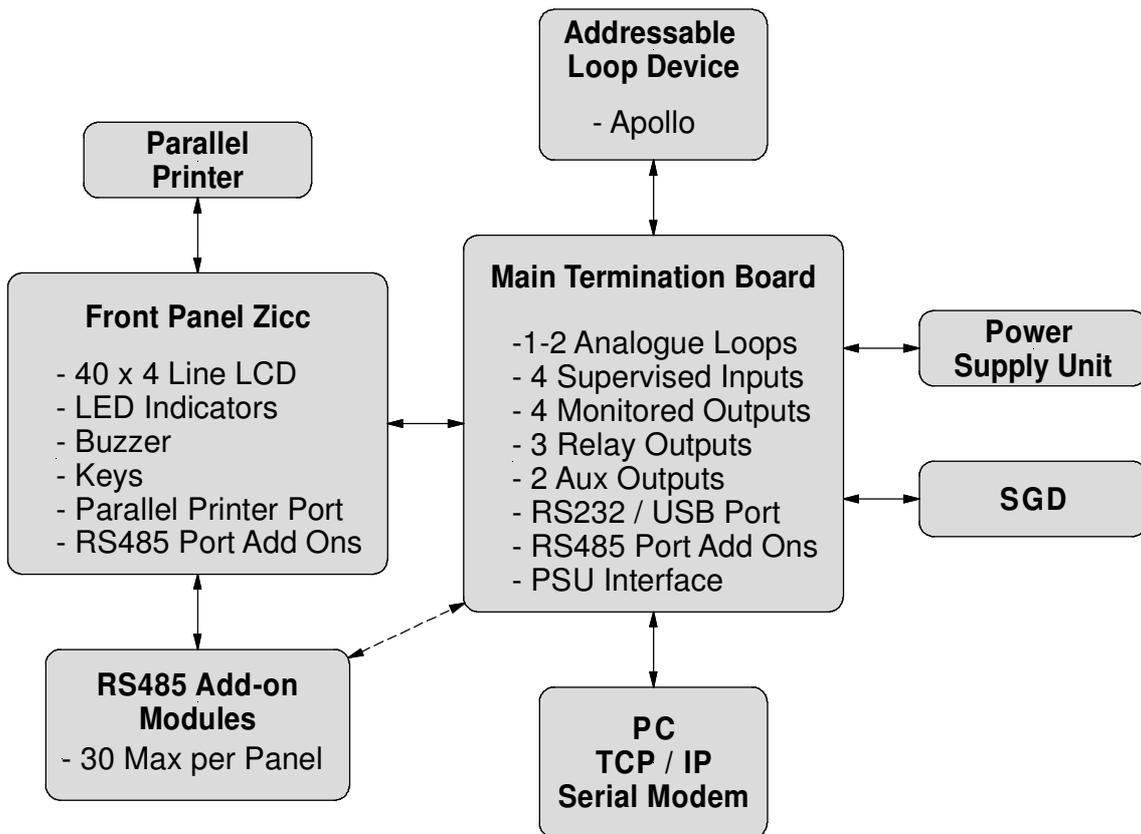


Figure 1: The LoopSense Concept

## 2.3 Features

**LoopSense** is a 1 - 2 loop Intelligent Analogue / Addressable FACP capable of supporting the following modules:

- Apollo protocol - 126 detectors / devices per loop
- SmartTerminal
- 8 Way Relay
- 8 Way Sounder
- 32 Zone Indicator
- Fan Control and Termination
- Switch & Indicator
- 8 Zone Conventional
- Agent Release
- 2nd. Loop enablement by way of a "Loop Activation Key" and programming
- Printer



**Note:** *Only devices compatible with **LoopSense** should be used in an installation.*

## 2.4 Options with requirements

The **LoopSense** FACP includes with the following 'Options with requirements' (as required by AS7240-2:2004):

- 7.8 Output to fire alarm devices
- 7.9.1 Output to fire alarm routing equipment
- 7.9.2 Input from fire alarm routing equipment
- 7.10.1 Output type A to fire protection equipment
- 7.11.1 Delays to outputs – configuration of delays (for item C)
- 7.11.2 Delays to outputs – control of delays (for item C)
- 7.12.1 Dependency Type A
- 7.12.2 Dependency Type B
- 7.12.3 Dependency Type C
- 9.3 Fault signals from points
- 9.9 Output to fault warning routing equipment
- 10 Disable condition
- 10.5 Disablement of addressable points
- 11 Test condition
- ZD Ancillary Control function

The **LoopSense** PSE includes the following 'Options with requirements' (as required by AS7240-4:2004):

- 5.5 Battery function check

### 3 **Placing the Basic System into Operation**

#### 3.1 **Unpacking**

The basic LoopSense FACP consists of:

- Main PCB
- Front Panel control and indicator board
- 3 Amp or 6 Amp switch-mode power supply
- 2 X 12 Volt batteries connected in series.
- Access keys
- Loop activation key for 2 Loop version.

#### 3.2 **Anti-Static Precautions**

To prevent damage to components, modules and boards, anti-static precautions **MUST** be observed while performing any task within the FACP. The same applies to those situated in the field

#### 3.3 **Working On The System**

Prior to unplugging any connector, connecting or disconnecting any wiring, removing or replacing any module or board, ensure that both the Mains and Batteries have been isolated to prevent damage to panel components.

#### 3.4 **The Cabinet**

**Features:**

- The cabinet is available in two different styles. Each style has the capability of being either surface or flush mounted. When flush mounted a separate surround is required.
- Normally painted Arch White Ripple. Other colours are available on request.
- The inner and outer door hinges are mounted on the left-hand side of the cabinet which allow the doors open to an angle of 100°. Locking is normally keyless though keyed entry is available on request.
- Knockouts are positioned at the top and rear of the cabinet to simplify cable entry. The larger range of cabinets use a removable gland plate to allow for the greater amount of cabling

### 3.5 Mounting the Cabinet

**Note:** *It is recommended the cabinet should be installed in a clean, dry, vibration-free area.*

Open the front door. Use the keyhole mounting holes in the top corners and in the lower middle of the unit to mount it on the wall. Cables to connect the system to its external actuating devices are brought in through the knockouts on the top or bottom of the cabinet.

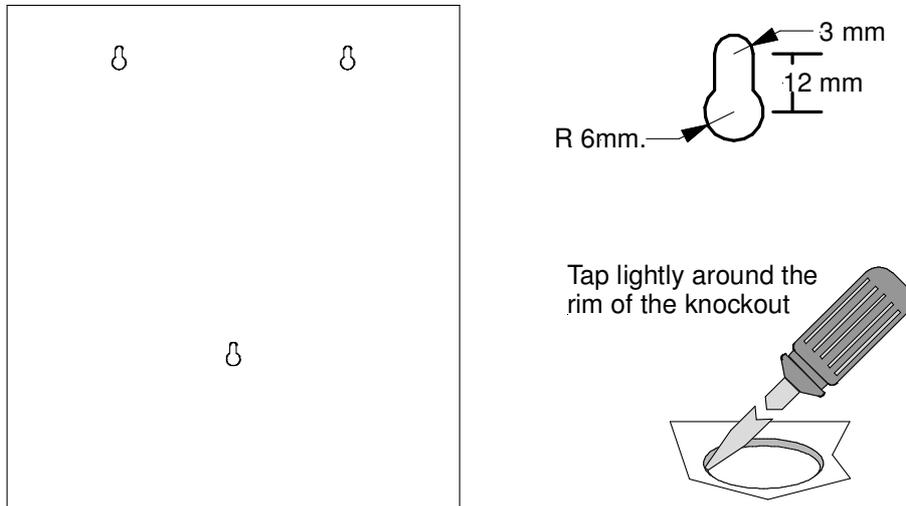


Figure 2: Example SP1X Back Pan Mounting Hole & Removing Knockouts

### 3.6 PCB Removal / Replacement

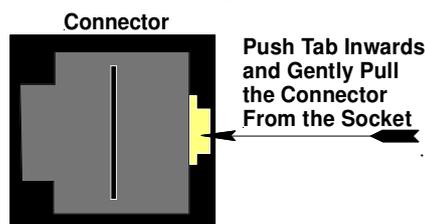


If the PCB's have to be removed the following precautions should be observed;

- Removing the door will provide better access to the boards and ensure the hinges are not accidentally stressed.
- Personal anti- static procedures must be followed.
- When disconnecting the 20 way connecting cable from the PCB, make sure that the cable remains connected to at least one board to prevent it being misplaced.

**Note:** *Care should be taken when detaching this connector as it is necessary to depress the small locking tab to unlock the connector from its base. To reconnect the cable the connector must first be correctly aligned then pushed into the socket so it locks into position.*

- Carefully remove the retaining screws at each corner of the board taking care not to damage any of the components.
- Place each board into anti- static storage once removed.





### 3.7 Power Supply and AC Mains

#### 3.7.1 Primary Power Supply

The **LoopSense** Power Supply PCB combines the functions of;

A mains to D.C. switched mode power supply unit that operates from a supply of; 204 - 264VAC @ 47 – 63Hz supplying the system while all zones are in alarm

A battery charging and monitoring unit

A mains fail is detected when the PSU voltage drops below 24V.

#### 3.7.2 Mains wiring

The requirement for the mains supply to the FACP is fixed wiring, using three core cable (no less than 0.75mm<sup>2</sup> and no more than 2.5mm<sup>2</sup> ) or a suitable three conductor system, fed from an isolating switch fuse spur, fused at 3A. This should be secured from unauthorised operation and be marked 'FIRE ALARM: DO NOT SWITCH OFF. The Mains supply must be exclusive to the FACP.

#### 3.7.3 Connecting the Panel

Connecting **LoopSense** internal connections and PCBs is best undertaken immediately prior to commissioning. Before beginning ensure all devices on the circuits are correctly connected and that cable integrity is verified throughout the installation.

**ⓘ Important:** DO NOT use an insulation tester ('Megger') with any electronic devices connected. Faults occurring in the wiring which are not picked up at this stage will almost certainly result in spurious and intermittent faults when the equipment is energised.

**ⓘ Important:** Under no circumstances should the **LoopSense** panel be operated without the Power Supply PCB correctly mounted in the enclosure and the retaining screws securely tightened.

#### 3.7.4 Connecting the Earth



The technician should NOT attempt to connect Mains to the Panel until fully conversant with the layout and features of the Power Supply PCB.

The incoming Mains cable should be brought into the Panel at the top right hand side of the enclosure, fed through the ferrite core and correctly terminated on the Chassis Earth Terminal and then to the Power Supply connector block.



**Note:** Fuse F1 (2Amp (3A supply) or 5Amp (6A supply) / 250VAC M205) is field replaceable

Before switching on the Power Supply the Earth **MUST** be connected to the chassis earth terminal.

- All earth cabling must be terminated to the Panel Chassis Earth Terminal in a Star configuration.
- The earth cable closest to the cabinet body must have an M4 SPW beneath the lug then an M4 SPW and M4 nut.
- Each additional earth cable must be terminated with an M4 SPW and M4 nut.
- An additional M4 nut and M4SPW are fitted to the earth terminal for installers to connect the mains earth

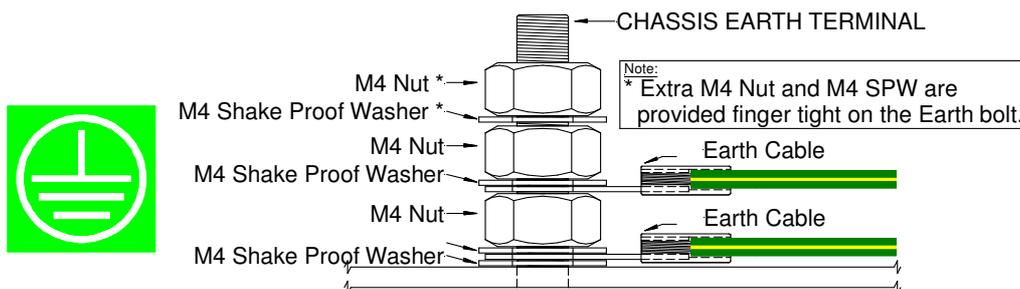


Figure 4: Chassis Earth Terminal Connection

3.7.5 Connecting the Mains Power to the 3 Amp Power Supply

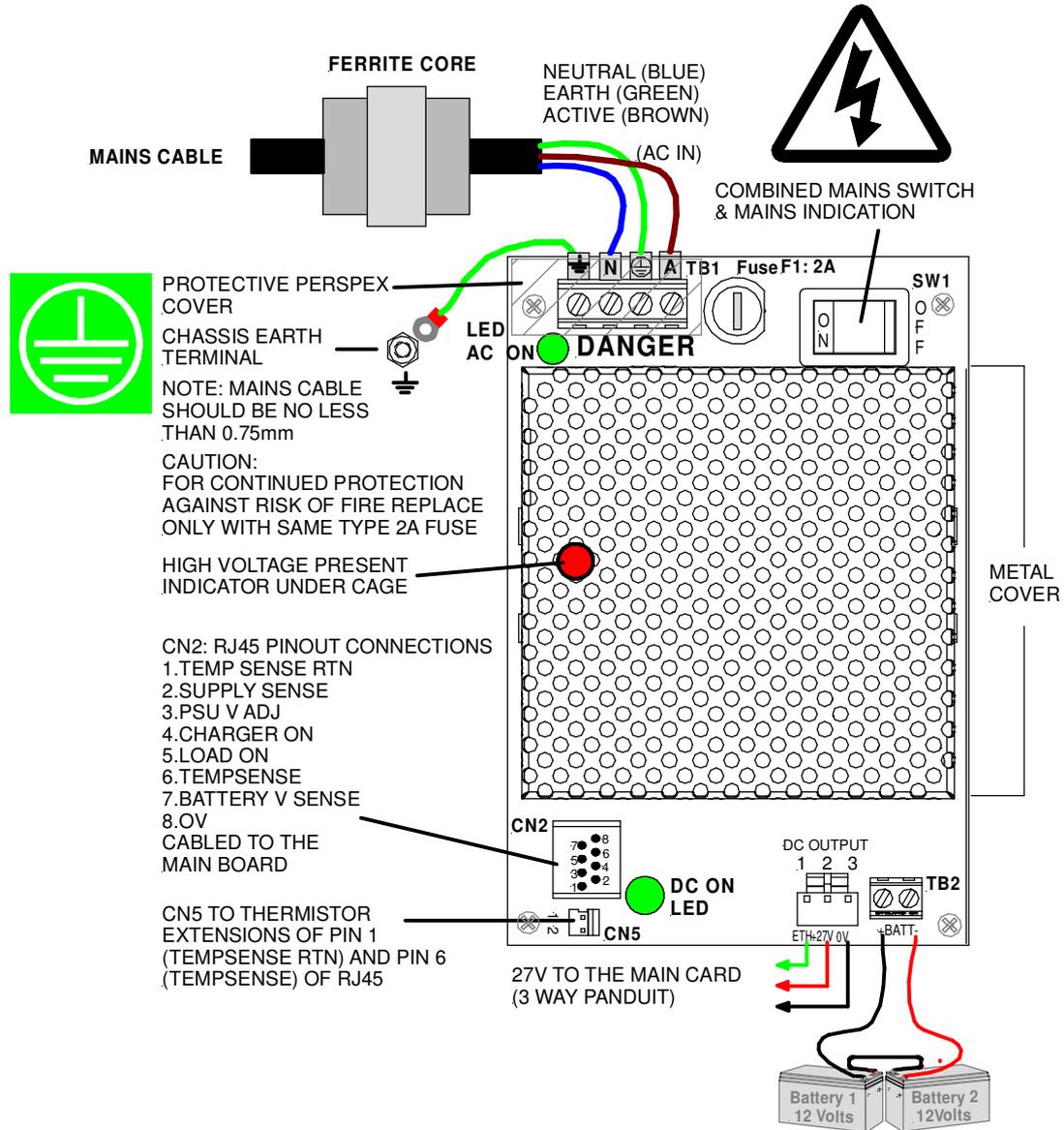


Figure 5: Power Supply Battery Charger Wiring (3A PSU SHOWN)



### 3.8 Battery Charger

The battery charger is an integral part of the Power Supply and is capable of

- Recharging standard sized system batteries within 24 hours
- Detecting a missing, damaged or undercharged battery
- Protecting the battery against reverse or a short circuit condition
- Charging batteries in line with Sealed Lead Acid battery manufacturers circuit temperature compensation guidelines

The following table contains the thresholds for the corresponding battery faults:

Battery Voltage	Battery Fault Condition
VBATT < 23.5V	BATTERY LOW
*VBATT < 22V	BATTERY DAMAGED
VBATT < 20V	BATTERY MISSING



**Note:** Battery disconnect has been incorporated to prevent the battery from discharging through the battery charger should the charging voltage be less than the battery voltage.

#### 3.8.1 Connecting the Stand-By Batteries

The capacity of the batteries to be installed depends on the panel configuration and required stand-by time. To calculate the required AH capacity of the batteries, refer to the calculation guide located in the rear of this manual.

Two new, good quality and fully charged 12V Sealed Lead Acid batteries are required as the emergency stand-by power supply for the Panel. They are to be mounted in the bottom of the cabinet. In the ABS version a protective tray is supplied in the packaging.

The batteries should be connected in series using the series link wire provided and located within the panel enclosure. The red and black battery leads from the Power Supply (see Figures 4 & 5) should be run to the batteries in such a way that there is no risk of them being damaged, and then connect the red wire to the positive terminal and the black wire to the negative terminal.

The panel's sophisticated battery monitoring protects the batteries against deep discharge by activating a cut off circuit when the stand-by supply voltage reaches approx 21 volts. If batteries are not fitted, are discharged or in poor condition, the "FAULT" LED will be illuminated.

#### 3.8.2 Battery Cable Test

Battery cable fault detection is only available when using the PSU 2397 3 Ampere power supply.

A "BATTERY CABLE FAULT" is registered when the combined internal resistance of the battery and the resistance of the battery leads exceed approximately 1.2Ω. This test is conducted every 8 seconds in conjunction with the check for battery missing.

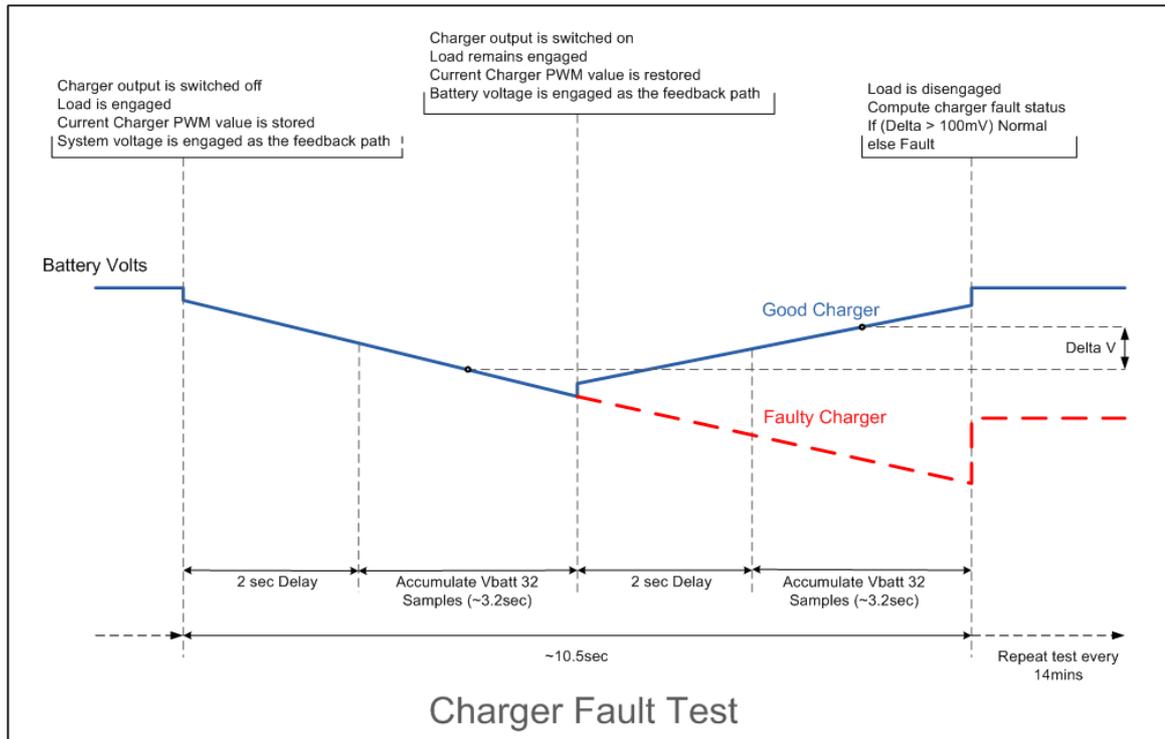
### 3.8.3 Charger Voltage Test

A charger low condition is recognized when the charger voltage drops less than 0.8V below the optimal charger voltage for a given temperature. A charger high condition is recognized when the charger voltage is more than 0.8V above the optimal charger voltage for a given temperature.

Temperature (°C)	Optimal Voltage (VC)	Charger Low (VC - 0.8V)	Charger High (VC + 0.8V)
-8	28.2	27.4	29.0
-4	28.1	27.3	28.9
0	28.0	27.2	28.8
4	27.8	27.0	28.6
8	27.7	26.9	28.5
12	27.5	26.7	28.3
16	27.4	26.6	28.2
20	27.3	26.5	28.1
24	27.2	26.4	28.0
28	27.0	26.2	27.8
32	26.9	26.1	27.7
36	26.7	25.9	27.5
40	26.6	25.8	27.4
44	26.5	25.7	27.3
48	26.4	25.6	27.2

### 3.8.4 Charger Fault Test

A Charger fault test is performed every 14 minutes for duration of approximately 10.5 seconds. It effectively confirms if the charger is able to recharge the battery by discharging the battery slightly using the PSU dummy load then attempting to recharge the battery. If the charger has successfully recharged the battery ( $\Delta V > 100\text{mV}$ ) then no fault is reported, otherwise a charger fault is reported.



### 3.9 Cable Types and Limitations

All System wiring should be installed in accordance with the national wiring regulations where the panel is being installed.

To comply with EMC (Electro Magnetic Compatibility) regulations and to reduce the risk of electrical interference in the system wiring, we recommend the use of Fire-resistant screened cables throughout the installation

### 3.10 Main Control Card

The Main Control Card and its front display panel combined with the Power Supply / Battery Charger / batteries forms the basis for the LoopSense FACP.

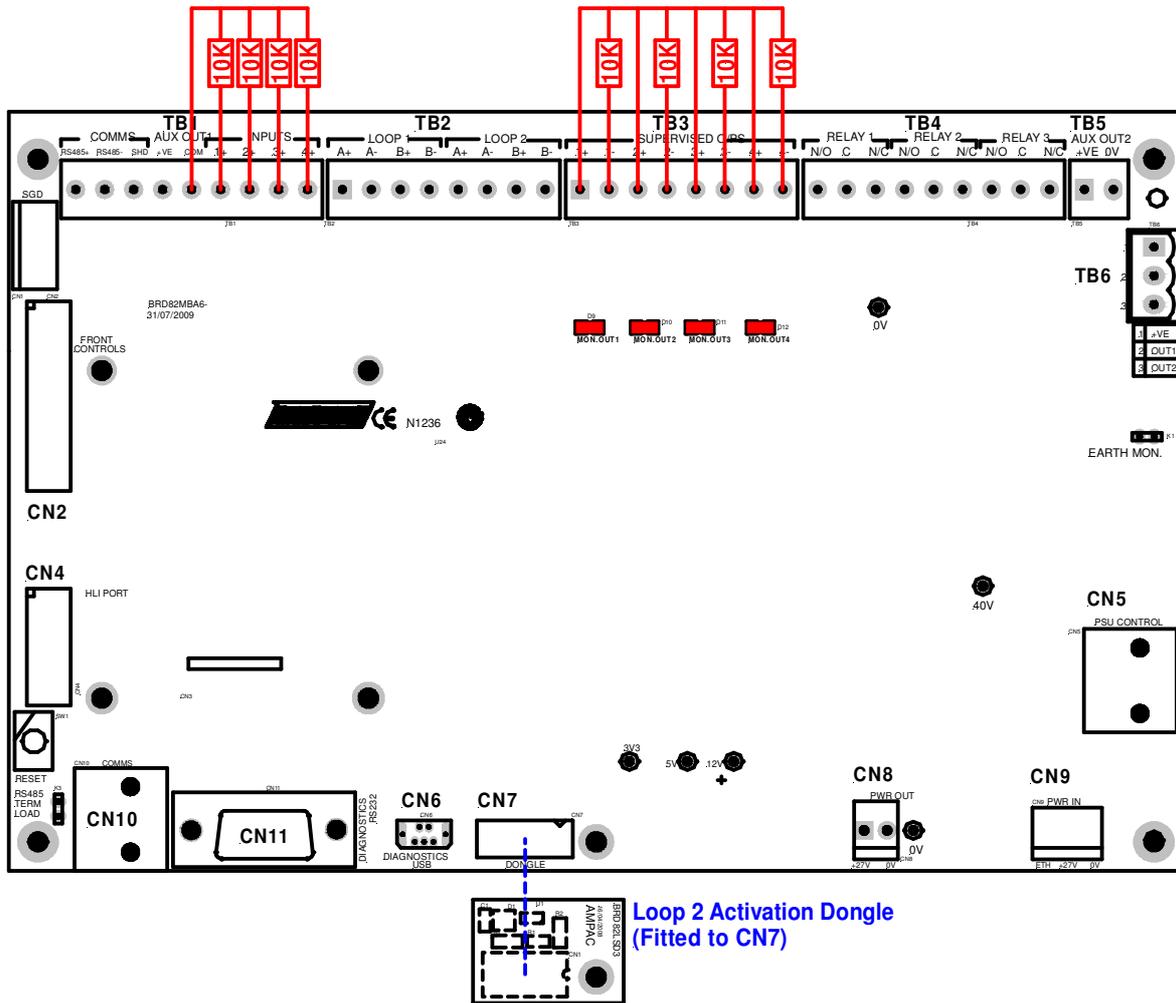


Figure 7: Main Control Card showing Loop 2 Activation Dongle



## 3.12 Wiring to the Main Card

### 3.12.1 Introduction

The system is microcontroller based, with the main processor situated on the Main Board. A secondary microcontroller is used on the front panel card to control the user interface functions such as the display and keyboard. System program and configuration memory is “flash” EEPROM in design. Common interfaces are built onto the main board while other interfaces are provided via Add-On boards.

### 3.12.2 Communication Interfaces

- *RS485 Add-On Module Port* – RJ-45 (CN10) and terminal block connectors (TB1 1, 2, 3), switchable for internal and external communications, connect to Ampac designed Add-Ons.
- *PC Interface port* – USB Device CN6 and RS232 DB9 connectors (CN11). If the USB port is connected it will disable the RS232 port. This port is for panel diagnostics, firmware and configuration download, remote FACP control, TCP/IP and serial modem interfacing.
- *JTAG Interface* – 14-way IDC connector (CN2) for panel firmware development
- *Power Supply Interface* – RJ-45 connector (CN5) - monitoring and battery charger control.
- *Printer Ports* – 26-way IDC connector on the front panel ICC (CN7) used for standard Centronics parallel printer communications.

### 3.12.3 External RS485 Communications Port

An RS485 9600 baud communications port (TB1) is provided to allow connection of remote Add-Ons.

#### Remote Cards

The number of and type of Add-Ons that can be installed on the external communications bus are:

- SmartTerminal
- 8 Way Relay
- 8 Way Sounder
- Zone Alarm Module Card
- Fan Control and Termination
- Switch & Indicator
- 8 Zone Conventional
- Agent Release

This port;

- Must always be terminated
- Has a nominal cabling impedance of 100Ω
- Termination impedance is AC coupled to reduce the systems quiescent current
- The cable to the port is terminated into a screw terminal block
- A fault on lines to external add-ons does not impede communications to any internal modules

The RS 485 output drives the remote cards and mimics up to a distance of 1.2km from the panel itself. The external cabling (2x2 shielded pair plus power) is wired to TB2 +, - and earth.



**Note:** *If a fault occurs on the communications bus the common FAULT and SYSTEM FAULT LED'S are illuminated. The fault details can be displayed on the LCD by selecting the Faults Menu.*

### 3.12.4 Main Card Comms Link

LK3 **MUST** be inserted when only the Main Card is used as an FACP. If this is not the case and any RS485 add-ons are connected a link is inserted in the last board to complete the communication circuit.

**3.12.5 Internal Communications Port**

The 9600 baud internal communications port (CN10) is provided to permit the connection of Add-Ons within the FACP. The port also provides the 27VDC (up to 400mA) to power the modules. The port conforms to AMPAC's standard RJ45 8 pinned design.

Pin	Function
1	Power +VE
2	Power -VE
3	Direction (future use)
4	RS 485 communications A
5	RS 485 communications B
6	NC
7	Power -VE
8	Power +VE

**3.13 Input Interfaces**

**3.13.1 Supervised Digital Inputs**

Four supervised inputs (TB3) are provided. Each input is supervised independently and designed to operate with a 10K end-of-line resistor. Termination is via a 5mm pitch screw terminal block.

	INPUT 1	INPUT 2	INPUT 3	INPUT 4
<b>Common usage configuration settings of inputs 1 – 4. The defaults are listed below</b>	General Purpose Fire (MCP/DBA) Fault/Defect Class Change Evacuate Alert (C&E) Sounder Silence (C&E) Master Reset Door Switch FARE			
<b>AS7240 DEFAULT</b>	I/P 1 Fire (MCP)	I/P 2 Door Switch	I/P 3 FAULT	I/P4 RESET

**Resistance and Operational Criteria**

Line resistance	Sensed condition
0Ω – 325Ω	Short circuit
325Ω – 6KΩ	Active condition
6KΩ – 17.5KΩ	Normal condition
Above 17.5 KΩ	Open circuit

### 3.14 Fire Detector Analogue Loop Interface

Each FACP supports up to 2 loops (TB2). The standard configuration is one loop, enabling the second loop involves obtaining and plugging in the “Loop Activation Key” into CN7 on the main termination board and activating it within **LoopMaster**. The number of loops enabled and the protocol used is selectable in the configuration software and is site configurable.

Two loop driver circuits capable of sourcing a maximum of 500mA of current for loop devices are provided. The connection to the analogue loop is capable of communication with devices using Apollo Discovery/XP95 protocols. Termination is via a 5mm pitch screw terminal block.

The loop is capable of being driven and sensed from either side or both sides of the loop simultaneously. To reduce heating effects the driver is based on D-class switching topology and can be operated in single-ended or redundant modes

The return signal of the loop is sensed using analogue to digital converters which allows analysis of total loop current and improves rejection of incorrect signals. A noise reduction technique utilizing common mode noise rejection has also been employed

#### 3.14.1 Device Alarm LED activation

Due to the limited current available from the analogue loop, the number of alarm LED’s allowed to be illuminated simultaneously is limited to the first 10 devices in fire on each loop; after this limit is reached any new devices in fire will not have its alarm LED’s illuminated until the original fires have been cleared on that loop.

#### 3.14.2 Detector loop Isolator Installation

In applications where it is not necessary to use an isolating base for each detector, up to 20 detectors may be installed between isolating bases.

**Note:** Refer to Apollo Isolating specifications and guidelines for further details.

If a short circuit or abnormally low impedance occurs, the base isolates the negative supply in the direction of the fault. When the short circuit is removed the power will automatically be restored.

**Note:** Isolating base is polarity sensitive.

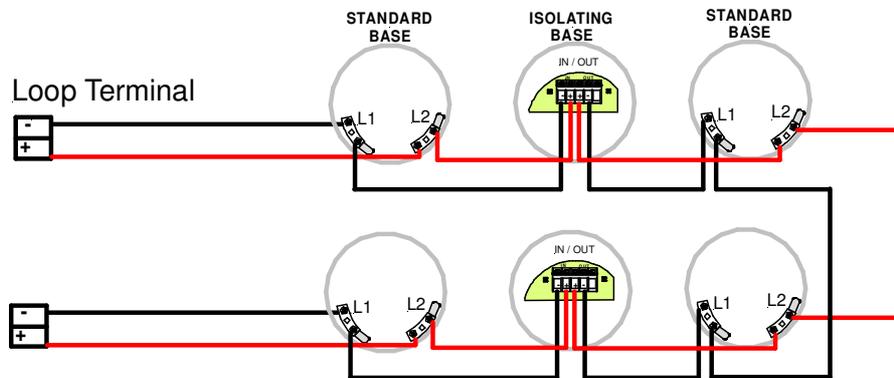


Figure 9: Typical Loop Arrangement

**3.14.3 Loop Isolator calculator**

The number of isolating devices on the loop can limit the maximum loop cable length depending on the type of cable used and the total loop current. Refer to the tables below for reference.

Number of Isolators	0	5	10	15	20	25	30	35	40	45	50
Loop Current Total(mA)	MAX CABLE LENGTH using 1.5mm <sup>2</sup>										
50	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
100	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
150	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
200	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	960
250	1000	1000	1000	1000	973	933	893	853	813	773	733
300	971	931	891	851	811	771	731	691	651	611	571
350	850	810	770	730	690	650	610	570	530	490	450
400	756	716	676	636	596	556	516	476	436	396	356
450	680	640	600	560	520	480	440	400	360	320	280
500	618	578	538	498	458	418	378	338	298	258	218

Number of Isolators	0	5	10	15	20	25	30	35	40	45	50
Loop Current Total(mA)	MAX CABLE LENGTH using 2.5mm <sup>2</sup>										
50	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
100	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
150	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
200	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
250	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
300	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	952
350	1000	1000	1000	1000	1000	1000	1000	950	883	817	750
400	1000	1000	1000	1000	993	926	859	793	726	659	593
450	1000	1000	1000	933	867	800	733	667	600	533	467
500	1000	964	897	830	764	697	630	564	497	430	364

### 3.15 Outputs

#### 3.15.1 Supervised Outputs

Four supervised output are provided on the Main Board (TB3). These supervised switched outputs supply a nominal 24VDC, at up to 750mA. Outputs are independently controlled and supervised. Supervision of the outputs for short, open and earth faults applies in both the ON and OFF state.

The supervised outputs use a 10K resistor as an end-of-line device. Line conditions are supervised as outlined below. Dependant on the usage of the input some conditions may be ignored.

Line impedance	Reported condition
0 – 1.5K $\Omega$	Short Circuit fault
1.5K – *12K $\Omega$	Normal
*12K $\Omega$ to $\infty$	Open Circuit fault
I $\geq$ 650mA when Output is ON	Over Current

\*The open circuit threshold in the ON condition may vary significantly with tolerance and temperature approximately ranging between 11K and 20K. Termination is via a 5mm pitch screw terminal block.

#### 3.15.2 Relay Outputs

Three relay outputs are provided (TB4). These outputs are designed to be able to switch loads considered to be predominately resistive as listed below.

Switching voltage	Maximum switching current
24 V DC	1 A
24 V AC	1 A
50 V DC	250 mA
40 V AC	250 mA

The relay contacts are “voltage free” and have some degree of protection in reference to the system voltage. Termination is via a 5mm pitch screw terminal block.

#### 3.15.3 Auxiliary 24VDC Outputs

Programmable Continuous / Re-settable (11 seconds) independently switched 24V DC (nominal) 1A output (TB1 & 5).

Each auxiliary output is supervised for continuity of power output hence a short circuit on the output terminal will register as a fault. Overload circuit protection is also included to prevent a short circuit on the output from damaging the system. Termination is via 5mm pitch screw terminal block.

#### 3.15.4 Low current outputs

Two low current open collector outputs suitable for driving the coil of a relay are provided (TB6).

The outputs are capable of supplying a minimum of 30mA but no more than 300mA when an overload is applied for more than 5 seconds.

Debug Connection CN6 & 11

The main board provides a debug connection with only one connection being operational.

#### 3.15.5 Universal Serial Bus Connection

A Universal Serial Bus connection is provided (CN6). Generally this will be for connection to a laptop. Compatibility will be to USB standard V2.0 minimum. Termination is via a USB Type B connector or USB Type B connector.

### 3.15.6 RS 232 Connection

A serial connection compatible with RS232 standard is provided (CN11). The serial port is DTE style (Device Terminal Equipment) which enables connection to a MODEM communicating at up to 115,200 bps.

The communication lines are

- TXD - Transmitted data from system.
- RXD - Data received by system.

The following lines can also be provided.

- RI - Ring indication
- DSR - Data Set Ready
- DTR - Data Terminal Ready
- CD - Carrier detect.

Termination is via a 9 pin 'D' canon connector designed to be compatible with the IBM PC pin configuration for serial communication interfacing.

### 3.15.7 Printer Connection ICC

Two printer connections (parallel and serial) are provided on the front panel board (CN7)

The parallel printer conforms to the IBM PC specification, with the exception of the termination which is a 26 pin, 2.54mm pitch dual row header. The pin out is such that an Insulation displacement connection header may be used to connect the output to a 25 pin 'D' canon connector. The serial printer connector is a 5 way Panduit style connector

Only signals required by basic printing operation are provided. Bi-directional is not supported.

This port is designed for the printer to be either installed internally or within 1-2m of the FACP.

### 3.15.8 Second Loop Activation Key Mounting

A Loop Activation key needs to be fitted to access Loop 2 (CN7)

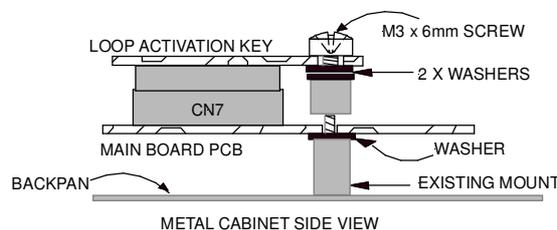


Figure 10: Loop Activation Key Mounting

The loops consist of a positive and common and are able to source up to 500mA of current. The loops;

- Operate in single ended and redundant configurations
- Are monitored for over current and short circuit in single ended mode
- Monitored for over current, short circuit and open circuit in the redundant mode.



**Note:** A loop test function is available via the FACP user interface.

**3.15.9 Earth Monitoring**

The system provides earth monitoring to detect a short circuit from system cabling to the building earth.

**Earth Detection Limits**

If a resistance of  $< 50\Omega$  exists between 0V and the building earth a fault indication will be indicated.

Resistance to Earth	Status
$< 50\Omega$	Earth Fault
$50 \leq \text{to} \leq 500 \text{ K}\Omega$	Indeterminate
$> 500 \text{ K}\Omega$	Normal

Earth monitoring can be disabled either by removing the link LK1 or through software

**3.15.10 Cabling**

Connector	Purpose /Pins								
CN1	Not used.								
CN2	Front panel Control / LCD Interface								
CN3	Network Connection (Future)								
CN4	High Level Interface (Future)								
CN5	Monitoring / Comms from the Power Supply.								
Pins	<table border="1"> <tr> <td>① &amp; ③ 0V</td> <td>② PSU Sense</td> <td>③ PSU Adjust</td> <td>④ Charger ON</td> </tr> <tr> <td>⑤ Batt Load</td> <td>⑥ Temp sense</td> <td>⑦ Batt V Sense.</td> <td></td> </tr> </table>	① & ③ 0V	② PSU Sense	③ PSU Adjust	④ Charger ON	⑤ Batt Load	⑥ Temp sense	⑦ Batt V Sense.	
	① & ③ 0V	② PSU Sense	③ PSU Adjust	④ Charger ON					
⑤ Batt Load	⑥ Temp sense	⑦ Batt V Sense.							
CN6	USB Diagnostics								
CN7	Loop Activation Key for second loop								
CN8	+/- 27VDC Out								
Pins	<table border="1"> <tr> <td>① +27VDC</td> <td>② 0V</td> </tr> </table>	① +27VDC	② 0V						
① +27VDC	② 0V								
CN9	+/- 27VDC and earth from the Power Supply / Charger.								
Pins	<table border="1"> <tr> <td>① Earth</td> <td>② +27VDC</td> <td>③ 0V</td> </tr> </table>	① Earth	② +27VDC	③ 0V					
① Earth	② +27VDC	③ 0V							
CN10	Comms and +/- 27VDC and earth to internal Add-Ons.								
Pins	<table border="1"> <tr> <td>① &amp; ③ 27VDC</td> <td>② &amp; ⑦ + 0V,</td> <td>③ &amp; ④ RS 485 Bus,</td> <td>⑤ Tx. Enable</td> </tr> </table>	① & ③ 27VDC	② & ⑦ + 0V,	③ & ④ RS 485 Bus,	⑤ Tx. Enable				
① & ③ 27VDC	② & ⑦ + 0V,	③ & ④ RS 485 Bus,	⑤ Tx. Enable						
CN11	Diagnostics RS232								
	① CD, ② RXD, ③ TXD, ④ DTR, ⑤ 0V, ⑥ DSR, ⑦ RTS, ⑧ CTS, ⑨ RI								

#### 4 Front Panel Control Card

The Front Panel Control Card interfaces to the Main Control Board by way of CN5, and supports;

- all the controls and functional indicators
- the FACP Reset
- the Configuration (CONFIG) control
- Serial or Parallel Printer port

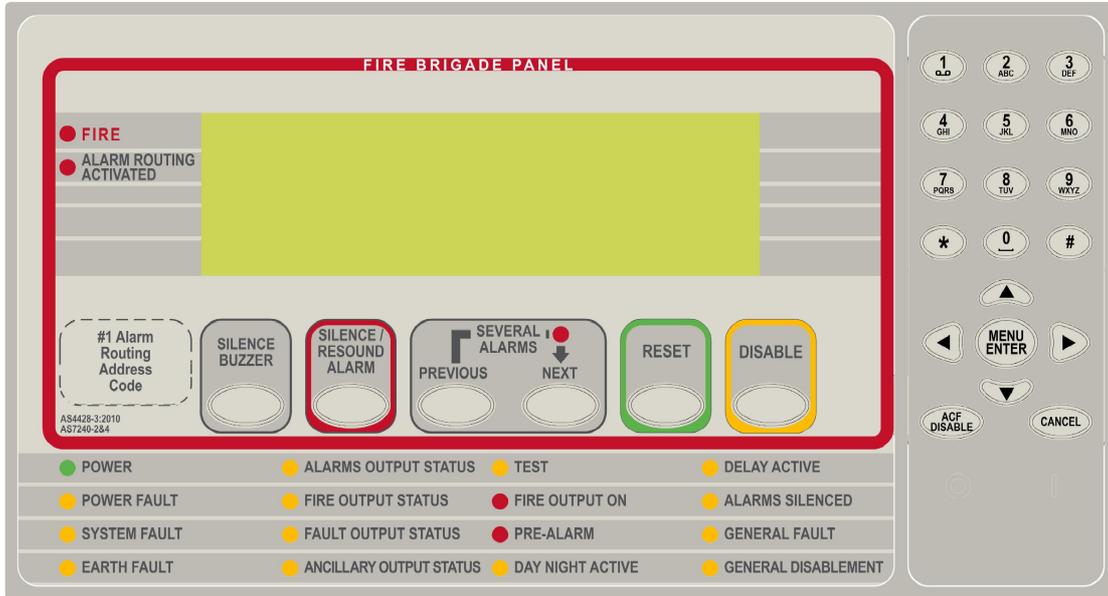


Figure 11: Front Panel Layout. #1 denotes intended area for Alarm Routing Address Code

The LCD is used to display abnormal conditions and for interrogation, control and programming activities. When the FACP is in its normal state a default screen is displayed.

Backlight (refer to AS7240:2004: 13.8.6):

In access level 2 or higher the backlight shall always be ON. Alarm, Fault and Disable information is accessed through the Main Menu.

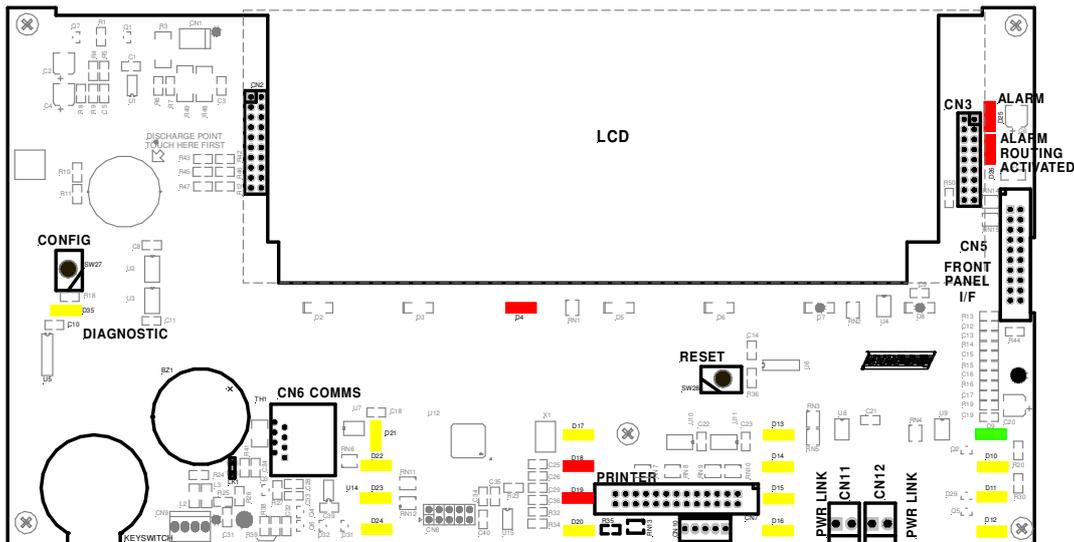


Figure 12: Control Card PCB Layout

## 4.1 Levels of Access

The FACP supports three levels of access.

### Access Level 1 (Untrained User):

The FACP is in Access Level 1 by default.

Only the OVERRIDE, PREVIOUS, NEXT, SILENCE BUZZER and LAMP TEST controls are active.

### Access Level 2 (Authorised User):

To enter Access Level 2 the user has to enter a password using the alpha numeric keys. The password entry screen will be presented if any higher access level key is pressed. Alternatively turning the Keyswitch to the ON position will force the panel into access level 2. The user is able to navigate through the menu system in access level 2 however the ENTER PASSWORD menu item will be displayed in place of the PROGRAMMING and SETUP menus.



**Note:** *PROGRAMMING and SETUP menus are not accessible during a Fire condition*

If ENTER PASSWORD is selected, the password entry screen will be presented allowing the user to enter the access level 3 password. The user is able to enter the password when the password screen is presented.

The access level 1 controls are active as well as SILENCE RESOUND, RESET, EVACUATE and MENU ENTER controls. All menu items are active apart from the programming menu.

### Access Level 3 (Authorised Service Technician/Engineer):

All access level 1 and 2 controls, PROGRAMMING, SETUP menus and individual sounder output disable options are active.

If ENTER PASSWORD is selected, the password entry screen will be presented allowing the user to enter the access level 3 passwords.

### Access Level 4 (Authorised Installer/Engineer):

Access level 4 can only be achieved by the use of the **Loopsense** configuration software, **Loopmaster** and a PC/Laptop (refer to MAN1571).

### 4.1.1 Passwords

The FACP will support 99 user programmable passwords. Each password includes an access level which can be either 2 or 3 corresponding to the access levels and a unique ID which ranges from 1 to 99. There is also a facility in the access level 3 SETUP menu to add, edit or delete passwords.



**Note:** *Onsite programming only allows for the editing of ID1 and ID2 all other ID's need to be set using the **LoopMaster** configuration tool*

All passwords are a 4 digit numeric entry and the system default passwords are as follows:

ID	Password	Access Level
1	3333	3
2	User Defined	User Defined

#### Password Conditions

1. All password IDs that have not been assigned a password are set to access level 1 to prevent false entries.
2. The entering of a password will be logged using the ID.
3. If no key is pressed for 5 minutes the access level will timeout to the default access level being 2 or 1 depending on the key-switch position.
4. The access level timeout and key-switch operations will also be logged.
5. The intervals between key presses when entering the password must not exceed 30 seconds otherwise the password entry screen will timeout returning the panel to the default access level.

6. The FACP can also be forced to the default access level by pressing the CANCEL key 4 times while default screen is displayed.

#### 4.1.2 Misplaced Password

In the situation, where access to the panel is required, and the passwords are not available, there is a facility for the appropriate service personnel to gain access to the panel.

The procedure is as follows:

1. The password “ ,  ,  ,  ,  ,  ” is entered.
2. The panel responds by displaying a unique 10 digit key
3. Contact the local Ampac Service Centre and they will issue a temporary password
4. The temporary password is entered, and access is gained to the panel. The operator can now access the password menu and set the passwords up as appropriate for the installation

The temporary password will be deleted, the next time a password is successfully entered into the FACP.

## 4.2 System Controls & Indicators

The normal Access State of the panel is level 2 if a locked door is fitted  
 The front panel has 13 push button controls and an alpha numeric keypad.

**Note:** Keys, when pressed, will present an audible feedback “beep” to the user.

**The Following are all accessible at access level 2 and above**

### SILENCE BUZZER



Silences the panel buzzer. Buzzer is activated under the following conditions:

#### Alarm Buzzer -

- Fire condition

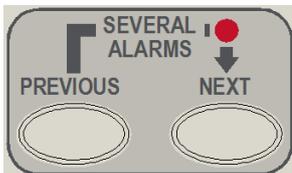
#### Fault Buzzer -

- Fault with loop devices
- Fault with the loops
- Fault with the fire alarm routing equipment or fault warning routing equipment
- Fault with alarm devices or circuit
- Fault with connected modules, cards and boards
- Fault with secondary power supply
- Fault with main power supply

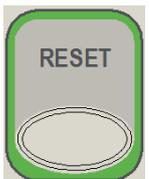
**Available at access level 2 and above**



Used to silence the alarm devices. Toggle function to resound any silenced alarm devices, if the ALARMS SILENCED indicator is lit. Only alarm devices configured with the silence-able attribute set shall respond to silence/resound.



Momentary push buttons, used to scroll thru the LCD display to view the previous / next available entry. The Several Alarms LED will illuminate when there is more than one zone is in fire or fire/disabled



Returns the FACP to its normal default state, by clearing all fire alarm conditions, updating the relevant indicators and outputs and clearing the system fault indicator. If fault conditions are cleared they must be re-established within 20 seconds.



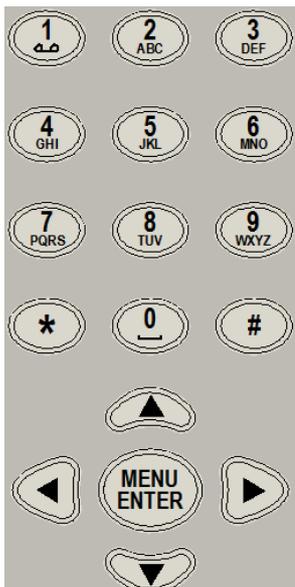
Context sensitive toggle function to disable/enable point displayed on active status screen



Toggle function to disable/enable the designated ancillary output.



Used to cancel a navigation step or entry in the MENU function



Provides a means for entering the menu system, and carrying out interrogation, control and programming activities



**FIRE** Illuminated when one or more devices are reporting the FIRE condition or the evacuate control has been activated.



**ALARM ROUTING ACTIVATED** Illuminated when the designated FARE input is active. The indication shall remain until the fire alarm condition is reset



**POWER** Illuminated to show the presence of mains power and flashes when the mains have failed



**POWER FAULT** Illuminated when there is a fault with the power supply. Fault can be no mains, high charger voltage, low battery voltage or missing/damaged battery



**SYSTEM FAULT** Illuminated when the FACP is unable to provide mandatory functions. Indicator is latched, until cleared by the RESET control



**EARTH FAULT** Illuminated when there is an earth fault detected on the panel



**ALARMS OUTPUT STATUS** Illuminated steady if any of the alarm devices (sounders and/or strobes) have been disabled and flashes if any of the alarm devices (sounders and/or strobes) are in fault. Disable has priority over fault

**● FIRE OUTPUT STATUS**

Illuminated steady if the fire output has been disabled and flashes if the fire output is in fault (open or short circuit condition). Disable has priority over fault

**● FAULT OUTPUT STATUS**

Illuminated steady if the fault output has been disabled and flashes if the fault output is in fault (open or short circuit condition). Disable has priority over fault.

**● ANCILLARY OUTPUT STATUS**

Illuminated steady if the ancillary output has been disabled and flashes if the ancillary output is in fault (open or short circuit condition). Disable has priority over fault

**● TEST**

Illuminated when the panel is in the "Walk Test" mode.

**● FIRE OUTPUT ON**

Illuminated when the designated Fire Output is active. The indication remains illuminated until the alarm condition is reset

**● PRE-ALARM**

Illuminated when one or more devices are in the pre-alarm condition and not disabled

**● DAY NIGHT ACTIVE**

Illuminated when day / night facility has been enabled

**● DELAY ACTIVE**

Indicator is illuminated steady when one or more zones are configured with Investigation delays and Delay Mode is active. The indicator shall flash if any Investigation delay timer is running. If the override control or evacuate control is activated while the investigation delay timer is running, then the indicator shall go steady and the investigation zone shall enter the fire condition.

The indicator shall only be OFF if:

- The Delay Mode is OFF
- No investigation delays are configured
- The panel has switched to day or night mode where no delays have been configured

**● ALARMS SILENCED**

The indicator is illuminated when the sounders configured to be silence-able have been silenced in response to any activation sources, indicating the resound function is active.

**● GENERAL FAULT**

Illuminated when there are one or more faults on the system. Faults can be from the following sources

- Fault with loop devices
- Fault with the loops
- Fault with the fire alarm routing equipment or fault warning routing equipment
- Fault with alarm devices or circuit
- Fault with connected modules, cards and boards
- Fault with secondary power supply
- Fault with main power supply

**● GENERAL DISABLEMENT**

Indicator is illuminated when one or more zone detectors, loop devices or panel outputs are disabled.

**Buzzer** - To meet sound level requirements of AS7240-2:2004:85dB(A).

The Buzzer will be activated for the following conditions

- Fire – Continuous On
- Fault – 1sec On / 4.5sec Off

- Key press – Single beep
- Extended Key Press – Double Beep

### KEYSWITCH (Optional)

 **Note:** A key switch can be fitted for panels without a front door

Controls, Normal – Enabled (Key Switch)

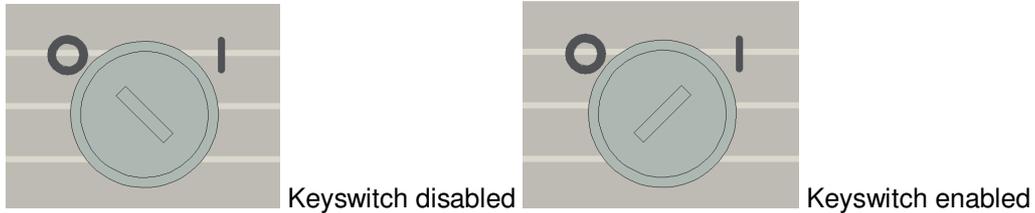


Figure 13: Keyswitch in the Disabled / Enabled Positions

If the key switch is in the OFF position (access level 1), then the PREVIOUS, NEXT and SILENCE BUZZER controls are active.

If the key switch is in the ON position (access level 2), then the SILENCE RESOUND, RESET and MENU ENTER controls are also active.

The key switch is optional. If the key switch is not used, then a pass-code is entered (using the alpha numeric keys) to gain access to level 2 or 3.

## 5 Expanding the FACP with compatible Ancillary Boards

The internal communications connector CN10 provides RS485 serial communications to internal Add-Ons. CN10 on the Main Card cables to CN1 or 2 on the internal Add-Ons and TB1/1, 2, 3 cables to CN1 or 2 on the remote cards.

### 5.1 Ancillary Services

The FACP has been designed such that detectors and/or call points, in addition to giving an alarm and calling the fire brigade, will close or open circuits of ancillary services by means of relays or similar devices.

Examples of these services are:

- Actuation of fixed fire-extinguishing systems;
- Closing of windows, smoke and fire doors,
- Control of ventilating systems;
- Covering of tanks containing flammable liquids and controlling their valves to isolate the contents from direct contact with the fire, etc.

To facilitate safe maintenance of these services an option is available that allows for the isolation and visual indication of the disablement of ancillary services that does not affect the normal operation of the fire alarm system.

To ensure power to the fire alarm system is not prejudiced in any way, power for the ancillary services must be included in the calculation of the power supply and battery capacity.

### 5.2 Compatible LoopSense Boards

Module / Board	Max No
8 Zone Conventional Card	15 per FACP
32 Zone Alarm Mimic Card	15 per FACP
8 way Switch and Indicator Card	15 per FACP
16 Way Input Board	15 per FACP
8 Way Relay Board	15 per FACP
8 Way Sounder Board	15 per FACP
4 way Fire Fan Module with Reset	15 per FACP
4 way Fan Control (loop driven)	15 per FACP
Agent Release Module	15 per FACP
Fire Brigade Board	1 per FACP
Printer	1 per FACP
Occupant Warning System EV20	Limited by PSU
Occupant Warning System EV40, EV60	Limited by PSU



**Note:** Max Numbers of boards depends on the configuration and the number of Panels in the System.



**Note:** See Product Data Sheets for complete details.

### 5.3 Eight Zone Conventional Board

This board has 8 conventional zones. Up to 32 zones max may be configured.

The zones may be used in panel programming and cause and effects.

The end of line type used for the board is configurable to be any one of the following:

- 10uF bipolar capacitor
- 4K7 resistor
- 6K8 resistor
- 10K resistor
- 3K3 resistor (AS7240 Default)

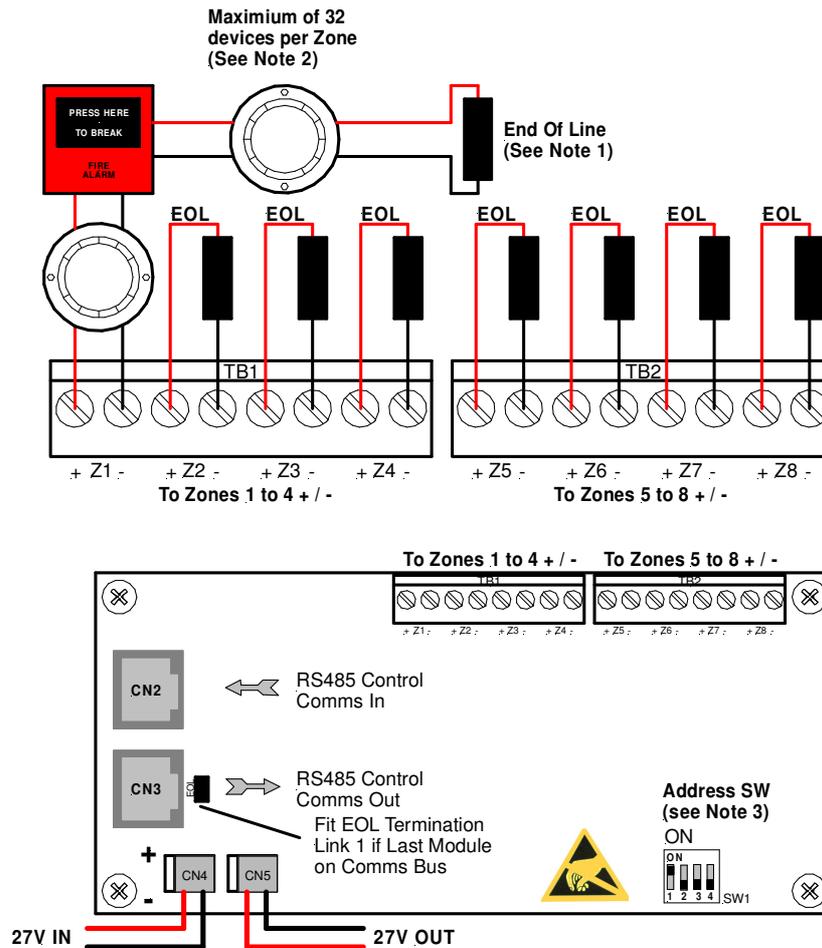


Figure 14: 8 Zone Conventional Board

#### Connections

Terminal/s	Function
TB1 to 2	ZONE + ZONE -
	Zones1 to 8

**Note 1:** Each Zone circuit **MUST** be terminated with either a 3K3, 4K7, 6K8, 10K Ohm resistor or 10uF 50V Bi-Polar Capacitor EOL

**Note 2:** If Diode Bases are used **ONLY** the 10uF CAP can be used.

**Note 3:** See Section 10 for Addressing Details (SW1)

5.4 32 Zone Alarm Mimic Card

This card has 32 bi-coloured LED's which can be used to display the status of up to 32 Zones. The zone numbers assigned to each LED are configurable and the LED's will operate in the following manner for the respective zone statuses:

ZONE STATUS	LED STATE	LED COLOUR
FIRE	ON STEADY	RED
DEPENDENCY B	FLASH	RED
DISABLED	ON STEADY	YELLOW
FAULT	FLASH	YELLOW
ALL OTHER	OFF	N/A

The card will also respond to a lamp test when instigated on the panel to which it is connected.

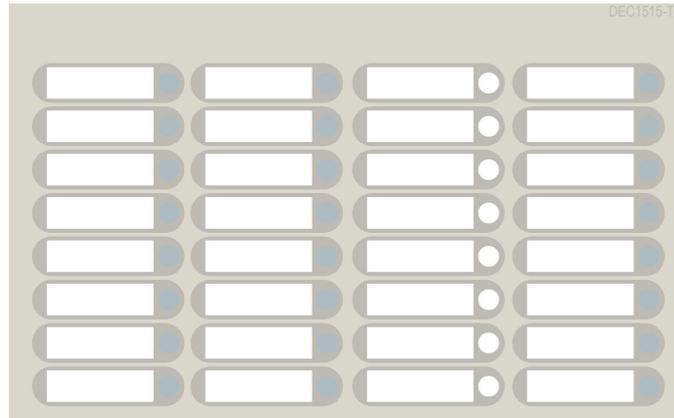


Figure 15: DEC1515-T2 Zone Indicator Decal (See LAB1516.doc for Slip in Label)

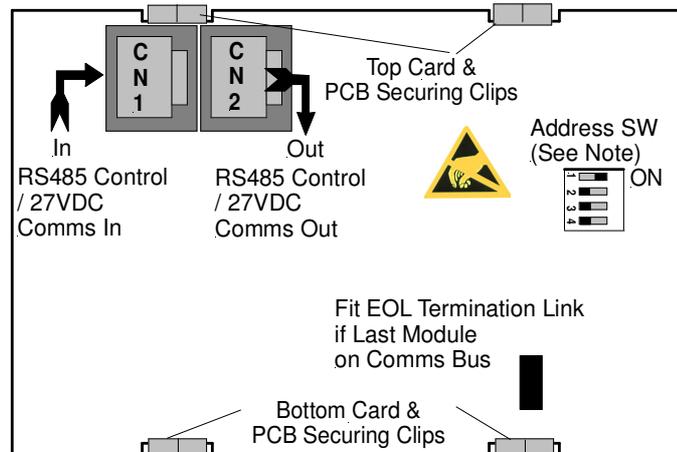


Figure 16: Zone Alarm Mimic Card Rear View showing connectors and Address Switch

**Note:** See Section 10 for Addressing Details (SW1)

### 5.5 8 Way Switch and Indicator Card

This card has 8 switch inputs and 8 LED indicator outputs.

The switch inputs and LED outputs may be used in Cause and Effects.

The switches are configurable as either momentary or toggle switches. When configured as momentary pressing the button once will cause an event to occur as programmed in C&E and the LED's can be programmed to operate as an output C&E effect.

When configured as toggle, pressing the button once will cause a condition to be held until the button is pressed again. The associated LED is not available as an output in C&E and shall always be illuminated when the toggle condition is active. Also, when configured as a toggle, there shall be an option for a timer override. If the toggle switch is activated it shall be de-activated automatically after the timeout period.

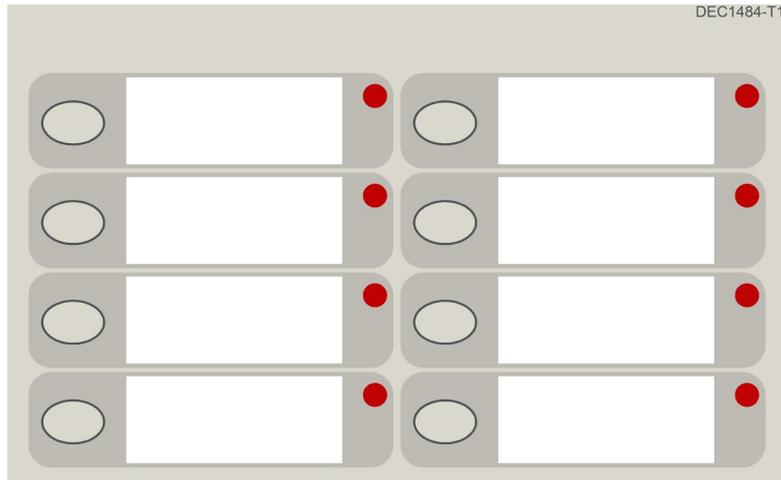


Figure 17: DEC1484-T1 8 Way Switch and Indicator Card Decal (See LAB1483.doc for Slip in Label)

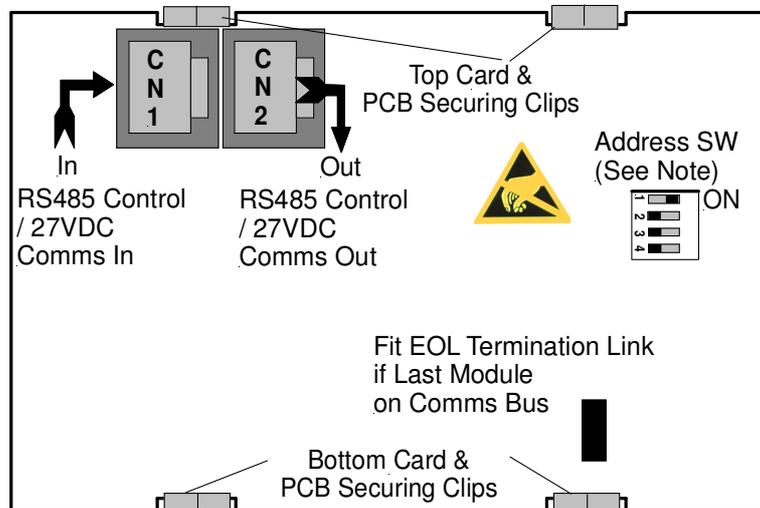


Figure 18: 8 Way Switch and Indicator Card Rear View showing connectors and Address Switch

**Note:** See Section 10 for Addressing Details (SW1)

### 5.6 16 Way Input Board

The Input Board makes provision for 16 voltage free contacts to be terminated to 16 optically coupled inputs. Its application is primarily for the monitoring of controlled ancillary equipment or to initiate an action / event due to a change of state from what is accepted as the norm.

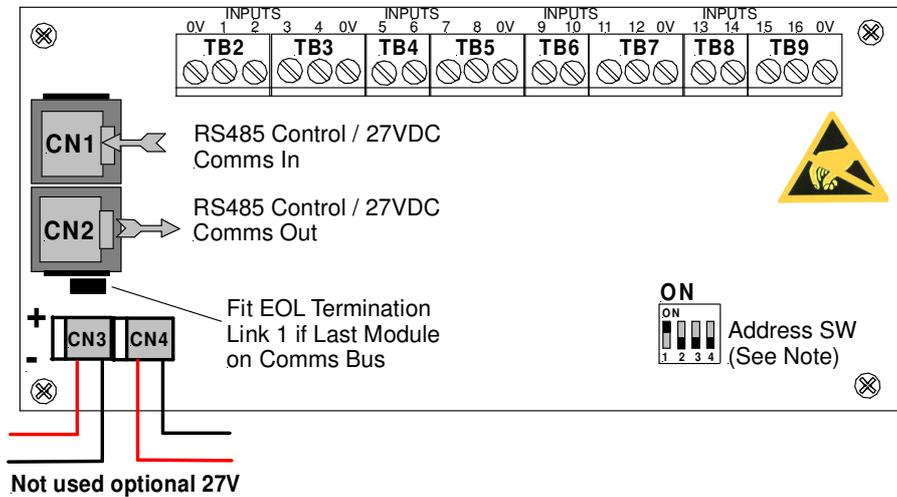
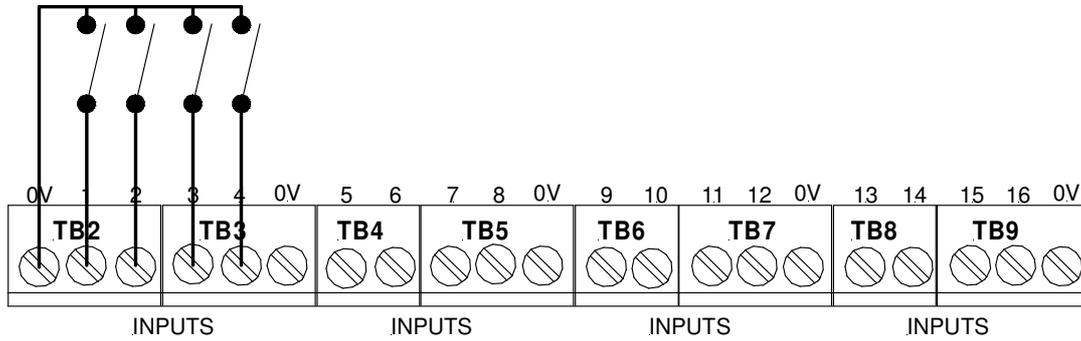


Figure 19: Typical Input Wiring and Board Layout Front View showing connectors and Address Switch

**Connections**

Terminal/s	Function
TB2 to 9	Taking note of the Common 0v terminals connect the voltage free contacts as shown above. Inputs 1 to 16

**Note:** See Section 10 for Addressing Details (SW1)

### 5.7 8-Way Relay Board

The Relay Board provides 8 programmable relays with 30VDC 1 Amp voltage free change over contacts for control or monitoring purposes and comes fitted for internal or external FACP use.

The functionality and programming of the relays is similar to the relays on the main board of the FACP. By default the relays default to Common Alarm functionality.

#### Protection

All terminal points are protected.

The board switches the relays as determined by the panel. The relays can be controlled by:

- Zones going to alarm
- Zones going to fault
- Zones Disabled
- Reset – relay is activated for 3 seconds when reset depressed
- Programmable I/O

#### 5.7.1 Internal Relay Board

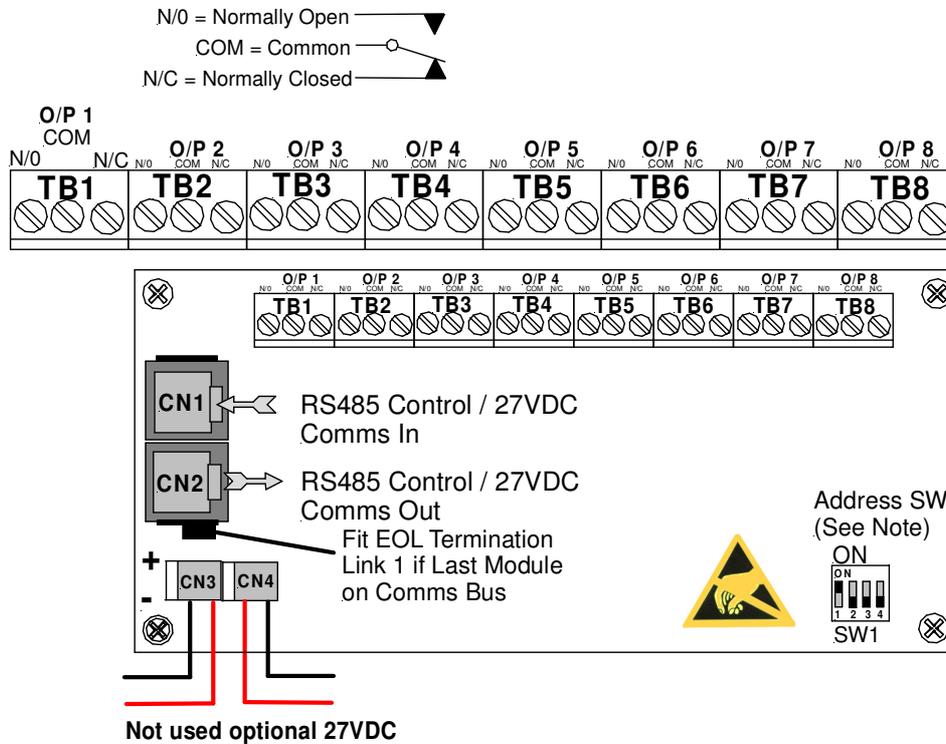


Figure 20: Internal 8 Way Relay Board Front View showing connectors and Address Switch

#### Relay Connections

Terminal/s	Function
TB1 to 8	N/O = Normally Open, C = Common N/C = Normally Closed
	Relay 1 to 8

**Note:** See Section 10 for Addressing Details (SW1)

5.7.2 Remote Relay Board

In the remote version the Comms In and Out Terminal Block TB9 is cabled to the RS485 Comms terminal block TB1/1, 2, 3 on the Main Board and can be installed up to 1.2kms from the FACP.

**Note:** Can be powered from the panel or an external 27 volt source.

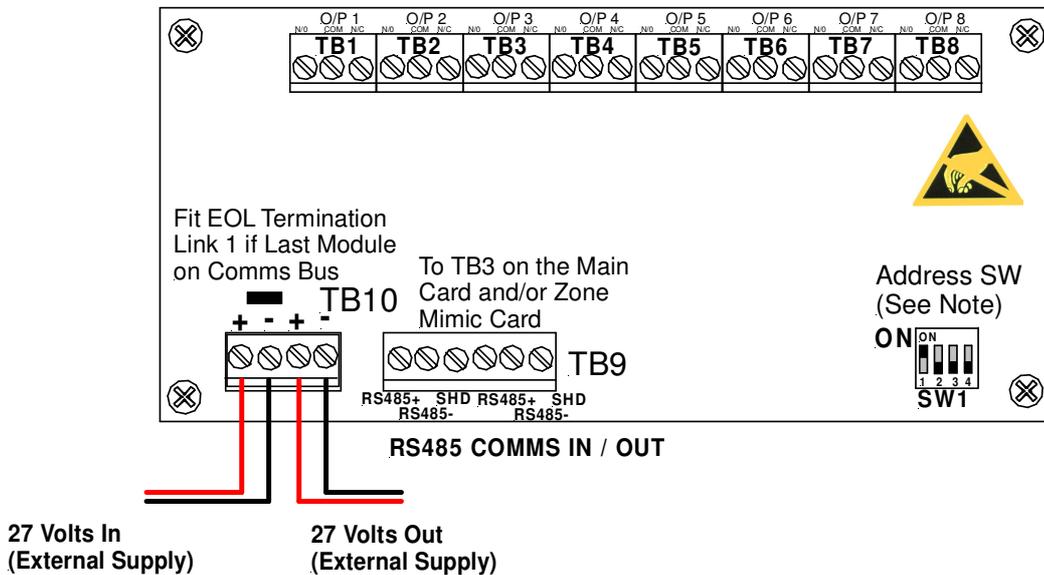
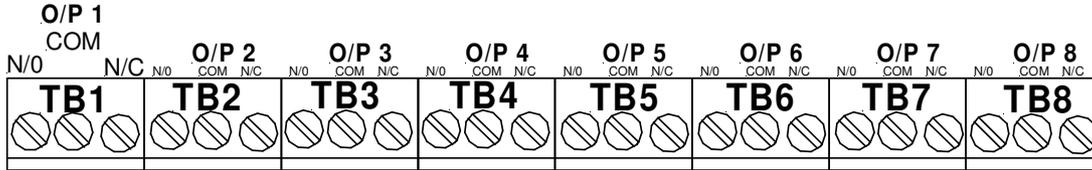
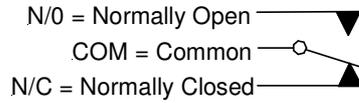


Figure 21: Remote 8 Way Relay Board Front View showing connectors and Address Switch

Relay Connections

Terminal/s	Function	
TB1 to 8	N/O = Normally Open, C = Common N/C = Normally Closed	Relay 1 to 8

Communications Connections

Terminal	Function	
TB9	RS485+ RS485- Shield	Communications In
TB9	RS485+ RS485- Shield	Communications Out

**Note:** See Section 10 for Addressing Details (SW1)

### 5.8 8-Way Sounder Board

The Sounder Board expands the number of sounders that can be used on an FACP by 8. Each output is of a solid state design, rated at 27VDC / 500mA and requires a 10KΩ End of Line (EOL) resistor regardless of whether or not a sounder is wired to the circuit.

The sounder board will switch ON the sounders as configured (output off, continuous or pulsed) at the FACP and supervise the sounders for their open circuit, short circuit & line fault conditions.

**Note:** *Sounder polarity MUST be observed.*

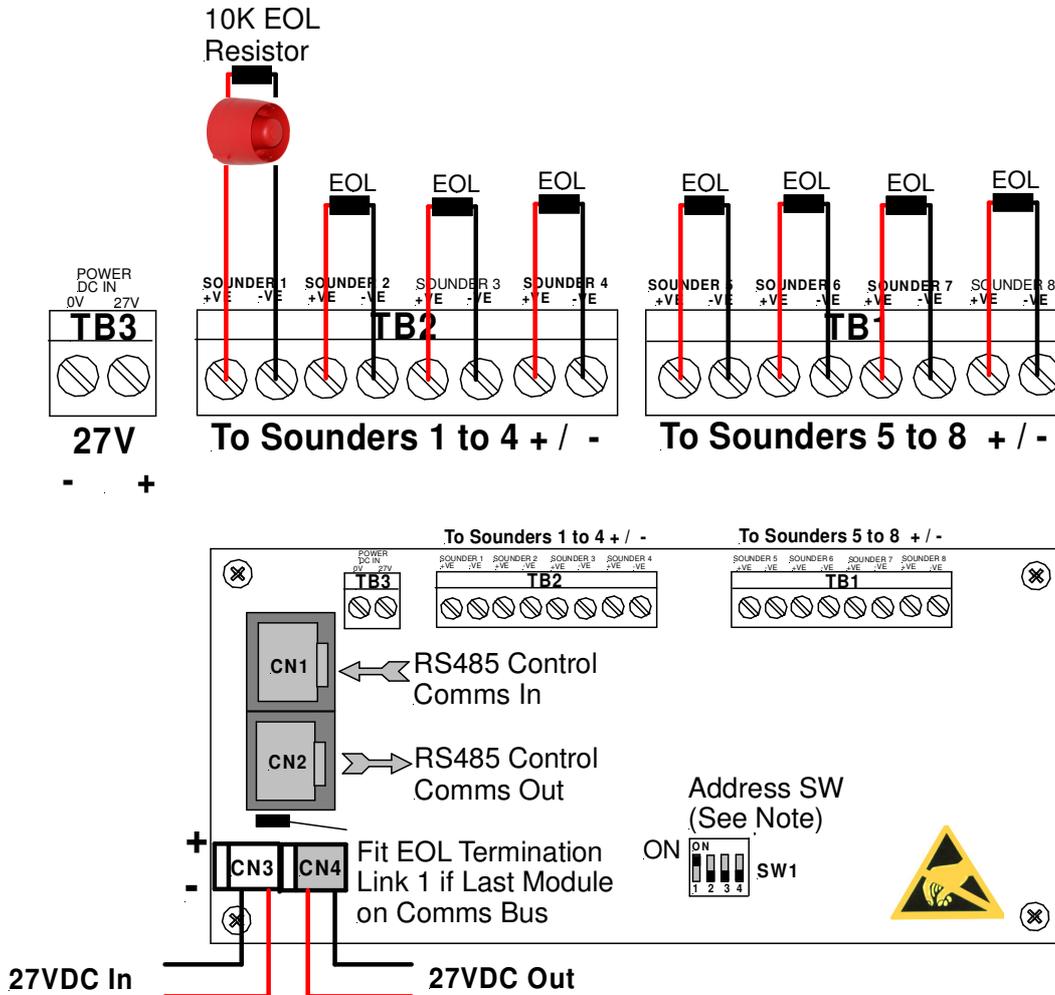


Figure 22: 8 Way Sounder Board Front View showing connectors and Address Switch

Maximum Current per Output: 750mA.

A +27VDC external power supply feed is required

In addition filtering and protection devices are used to reject transients.

**Connections**

Terminal/s	Function	
TB1 to 2	+ve -ve	Sounder 1 to 8
TB3	0V 27V	Power DC IN

**Note:** *See Section 10 for Addressing Details (SW1)*

### 5.9 4 Way Fire Fan Module

The Fire Fan Module has four (4) separate fan controls each having an On, Auto and Off function switch and a set of three (3) monitoring LED's. The LED's indicate the status of the equipment e.g. Run, Fault or Stop. The two (2) arrow head keys are used to step up and / or down through the three (3) conditions. A slip in label can also be inserted into the hinged cover for identification purposes.

The "Plant Trip" Reset is used to locally restart plant and equipment that has been automatically shut down because the FACP has initiated an alarm once that alarm has been cleared.

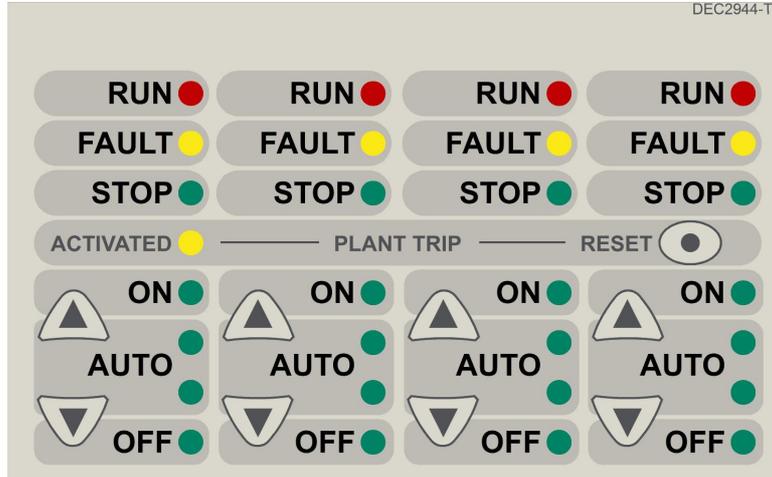


Figure 23: DEC2944-T1 4 Way Fire Fan Module (Slip in label fitted see LAB1486.doc)

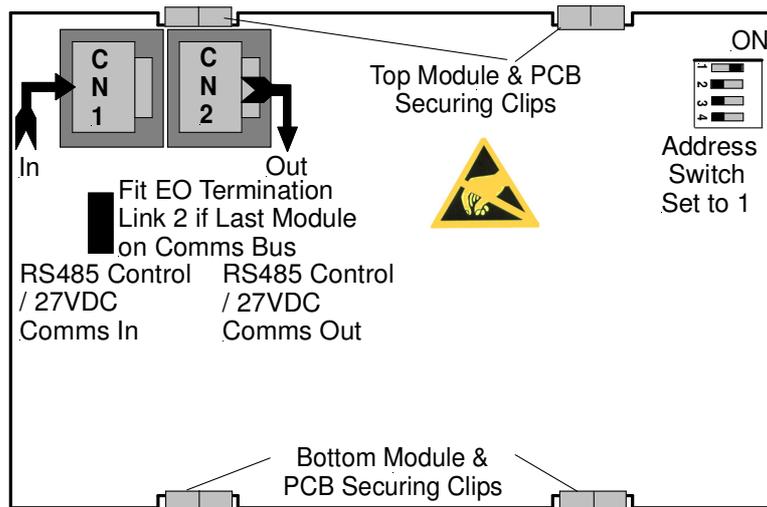


Figure 24: 4 Way Fire Fan Module Rear View showing connectors and Address Switch

**Note:** See Section 10 for Addressing Details (SW1)

### 5.10 4 Way Fan Termination Board

The Fan Termination Board interfaces between the Fire Fan Module and the plant/equipment it controls via the 24 volt 250mA Start, Stop, current limited, relay outputs and monitor inputs. Programmable monitoring of the field equipment is achieved using 0 volts as an input level to indicate run, fault and stop conditions of that equipment. Monitoring is programmed in the Function Menu for a 3, 4 or 5 Wire Start / Stop, Run, Fault, Stop & Common functions. The inputs are protected by way of resettable transorbs and resistive / capacitive networks.

#### Connections

Terminals	Function	
TB2 to TB5	START STOP RUN FLT STOP COM	FANS 1 to 4

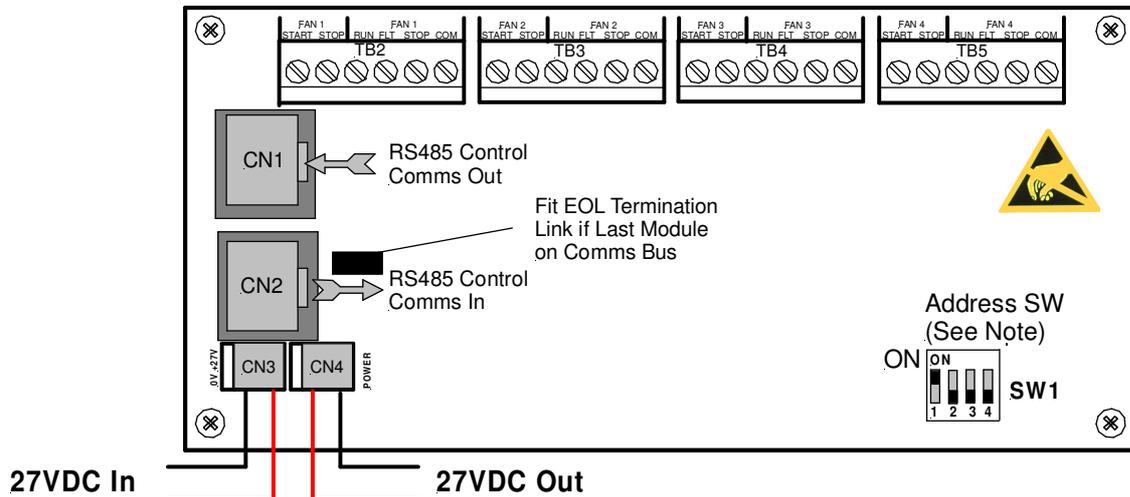
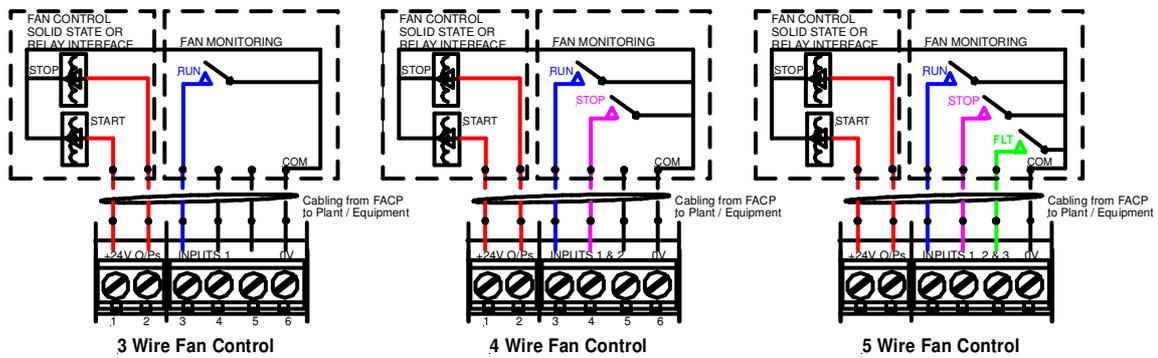


Figure 25: Fan Termination Board Layout and Typical I/O Wiring

**Note:** See Section 10 for Addressing Details (SW1)

## 5.11 Agent Release Control

Agent Release control consists of an Agent Release Module, Termination Board and an optional Local Control Station.

### 5.11.1 Operation

#### Introduction

The Agent Release Module and Termination Board communicate with the FACP via the RS485 multi-drop bus.

The Local Control Station communicates only with the Termination Board via a separate RS485 bus. Up to 4 Local Control Stations can be connected to one termination board.

Agent discharge operates in two modes – automatic and manual. The manual mode is selected by pressing the Inhibit switch on any Local Control Station. To indicate the system is in manual the Inhibit LED will be illuminated. Pressing Inhibit again will toggle or return the mode to automatic and extinguish the Inhibit LED.

The “Agent Released” Pressure Switch (PSW) is wired to the PSW input on the Termination Board and is used to confirm that the agent has been released. The circuitry involved in this process can be configured to accept a normally open contact, normally closed contact, normally open mechanically operated (manual) or is ignored (not fitted) and is selected via FACP on-site programming. If the mechanical (manually operated) option is selected the module monitors the pressure switch input and provides notification the agent has been released manually, initiates an alarm and illuminates the “Agent Released “ indicator.

#### Manual Mode

When the system is in manual mode, then;

- The Local Control Station Inhibit indicator is lit at the FACP and all Local Control Station's.
- The buzzer at all Local Control Stations will sound until the inhibit button is released.
- The System Inoperative output is turned on.
- The Automatic discharge sequences are prevented from starting.
- If an automatic discharge sequence was underway and the inhibit switch is activated (switched to manual mode) the discharge sequence is aborted and the sequence is reset. This means the Stage 1 and Stage 2 outputs are switched off.

To manually discharge the agent the “ Lock Off Valve “ must be open and the Manual Release switch on the Local Control Station pressed. The manual discharge sequence is;

- Manual Activation indicator is lit on the FACP and Local Control Station.
- The FACP activates its brigade alarm output.
- Stage 1 outputs are switched to +24VDC. (FIRE ALARM sign illuminated, aural alarm sounds)
- Stage 2 outputs are switched to +24VDC. (FIRE ALARM, EVACUATE & DO NOT ENTER signs illuminated, aural alarm sounds).
- The optional pre-release start delay is activated (Selected via FACP on-site programming); time out and an ON Interlock signal will then operate the selected release circuitry.
- The Agent Discharge LED on the Agent Release Module and Local Control Station will illuminate when the Pressure Switch input on the Termination Board is activated.
- Activate gas-fired output.



**Note:** The Interlock Input can be defaulted to the on position by placing a 10K $\Omega$  EOL termination resistor across the terminals TB2. 7 / 8 of the Agent Release Module and Local Control Station.

#### Auto Mode

Automatic discharge is when one or two zones going into alarm initiate the agent discharge sequence.

 **Note:** A “manual release” can still be initiated in “auto mode” but the LCS “Inhibit” control **WILL NOT** inhibit / abort the agent release sequence.

**Single Zone Activation**, the following discharge sequence is executed;

- Automatic Activation LED is illuminated on the Agent Release Module and Local Control Station.
- Stage 1 outputs are switched to +24VDC. (FIRE ALARM sign illuminated, aural alarm sounds).
- Stage 2 outputs are switched to +24VDC. (FIRE ALARM, EVACUATE & DO NOT ENTER signs illuminated, aural alarm sounds).
- Optional pre-release delay is started (Selected via FACP on-site programming).
- The delay times out and if the Interlock signal is ON, the selected circuit will activate.
- The Pressure Switch field input on the Termination Board is activated and the Agent Discharge LED on the Agent Release Module and Local Control Station will be illuminated.
- Activate gas-fired output.

**Dual Zone Activation**, if the first zone goes into alarm the following steps are initiated;

- The automatic activation LED on the Agent Release Module and Local Control Station will flash.
- Stage 1 outputs are switch to –24VDC. [FIRE ALARM sign illuminated, aural alarm sounds].

When the second zone goes into alarm, then the following steps occur;

- Automatic activation LED goes steady.
- Stage 1 outputs are switched to +24VDC. (FIRE ALARM & EVACUATE signs illuminated, aural alarm sounds)
- Stage 2 outputs are switched to +24VDC. (DO NOT ENTER sign illuminated)
- Optional pre-release delay commences (Selected via FACP on-site programming).
- The delay times out and if the Interlock signal is on the selected circuit will activate.
- The Pressure Switch field input on the Termination Board is activated and the Agent discharge LED on the Agent Release Module and Local Control Station will be illuminated.
- Activate gas-fired relay output.

### Service Switch

The service switch is situated on the Agent Release Module when activated causes the following;

- Electrically isolates the activation circuitry from the agent release device.
- Operates the System Inoperative output.

 **Note:** The service switch is **NOT** overridden by a manual discharge.

### Lock-Off Valve

When the manual lock-off valve is operated;

- The agent is blocked from reaching the release valve.
- The lock-off valve inhibit indicator LED's on the Agent Release Module and Local Control Station are illuminated.
- The system inoperative output operates.

### Fault Monitoring

Fault conditions are initiated by:

- The Pressure Switch monitoring circuit.
- The Low Pressure Switch monitoring circuit.

- The Lock-off Valve monitoring circuit.
- Activation circuitry.
- Stage 1 outputs. (Aural & visual discharge alarms).
- Stage 2 outputs. (Aural & visual discharge alarms).
- A Zone Fault.
- A Fault on the interlock input.
- A Fault with a LCS.

 **Note #1:** The common fault indicator on the Agent Release Module and Local Control Station is illuminated for any Fault condition.

 **Note #2:** For a pressure switch fault, low pressure switch fault, lock-off valve fault, stage 1 output fault, stage 2 output fault and interlock fault, the FACP will signal the brigade.

 **Note #3:** When there is a fault in the activation circuit or in the trigger zones, in addition to the above, the system inoperative output is operated.

 **Note #4:** The FACP fault buzzer will sound for all faults.

 **Note #5:** The FACP will report the type of fault on the LCD.

### Isolation

If a trigger zone is isolated at the FACP the trigger zone isolated indicator at the Agent Release Module and Local Control Station is illuminated, and the system inoperative output is operated.

### System Inoperative Output

The system inoperative output is switched to +24VDC under the following conditions;

- Operation of the Service Switch.
- A Fault in the selected trigger circuit.
- Operation of the Lock-off valve.
- Operation of the Inhibit at an Local Control Station.
- A Fault in any of the activation zones.
- If any of the activation zones are isolated.

### Manual Mechanical Release of the Agent

With agent release systems, a manual mechanical means can be provided to release the agent.

If the pressure switch is activated (indicating that the agent has been released), and the agent release module has not activated the selected activation circuit, then the following will occur:

- Stage 1 output is switched to +24VDC and stage 1 relay is output closed
- Stage 2 output is switched to +24VDC and stage 2 relay output is closed
- Light the agent release led on the ACC and LCS's
- Activate gas-fired relay output

### Monitoring of the Pressure Switch

Due to the requirements of Manual Mechanical Release of the Agent, the pressure switch input conveys two pieces of information:

When the pressure switch input is active, it signals that the agent has been released. The release can be as a result of the agent release module or due to a manual mechanical release.

When the pressure switch is not active, it signals that there is a full bottle of agent available to be discharged.

In order for the agent release module to respond to a manual mechanical release, the pressure switch must have been previously not active, to signify that a full bottle of agent is available

**5.11.2 Agent Release Module**

The Agent Release Module controls and monitors all the requirements for agent release.

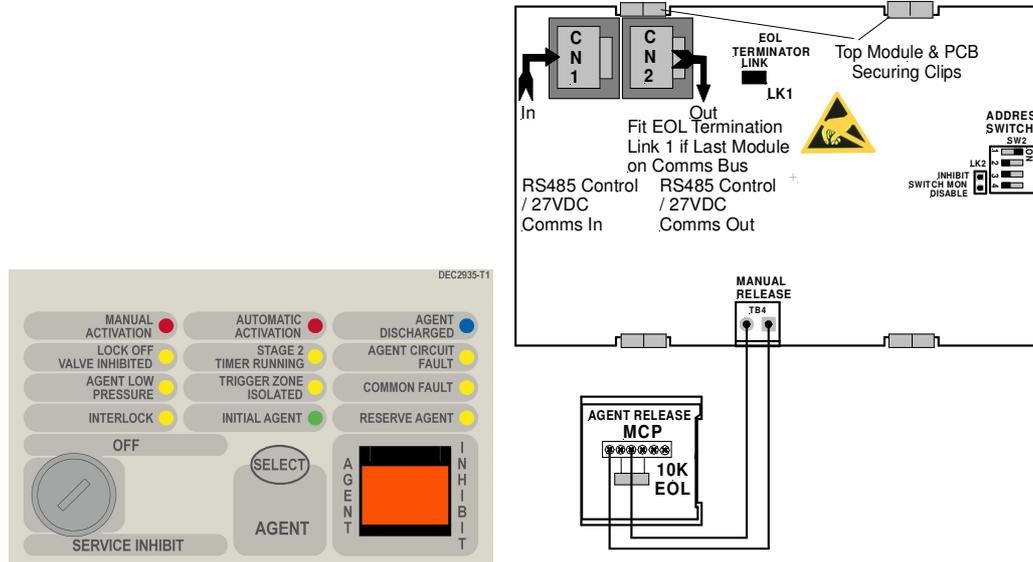


Figure 26: Exploded View of Module and Front Panel Layout

The PCB is fitted with two 2 x RJ45 connectors CN6 & 7 for power (27VDC) and communications (RS485) for communications between the Agent Release Module and the FACP Main Control Board.

**Controlled Access**



It is a requirement that control be secured from unauthorised use. A keyswitch has therefore been included in the control process.

The FCP goes into service mode when the keyswitch is switched to SERVICE INHIBIT. This results in the selected agent activation circuit being electrically isolated and a Common Isolate condition being indicated at the FACP. This condition can also be confirmed through the Status Menu. To remove the key it is necessary for the switch to be in the **OFF** position.



Pressing Select toggles the selection of either the Main or Reserve release agent. Selection is indicated by the Main and Reserve Agent LED's



Pressing the Agent Inhibit switch will inhibit the gas from release in either the Manual or Automatic mode. The Agent Inhibit switch has an internal lamp fitted with yellow lens and is illuminated when the Inhibit switch is activated at the FACP or any of the LCS's. To prevent accidental operation this switch has a hinged clear plastic cover that has to be raised to access the switch.

**5.11.3 Local Control Station**

The Local Control Station is supplied fitted into an IP40 rated enclosure and has the same indicators and Manual Release switch as the Agent Release Module within the Fire Alarm Control Panel (FACP) but no Agent Select button or Service Inhibit keyswitch.

The Comms line is RS485 and is cabled to the Agent Termination Board.

The Interlock is a monitored input with 10KΩ EOL. This input is used to determine if air conditioning dampers and doors are closed but can be defaulted to the “ON” condition by terminating the input with a 2K2Ω EOL.

Double action switching is achieved by way of protective lift up covers seen here and manual operation of the MCP or Inhibit switch.

To ensure correct operation and prevent accidental release of the agent these covers **should not** be disabled for any reason



Figure 27: Local Control Station

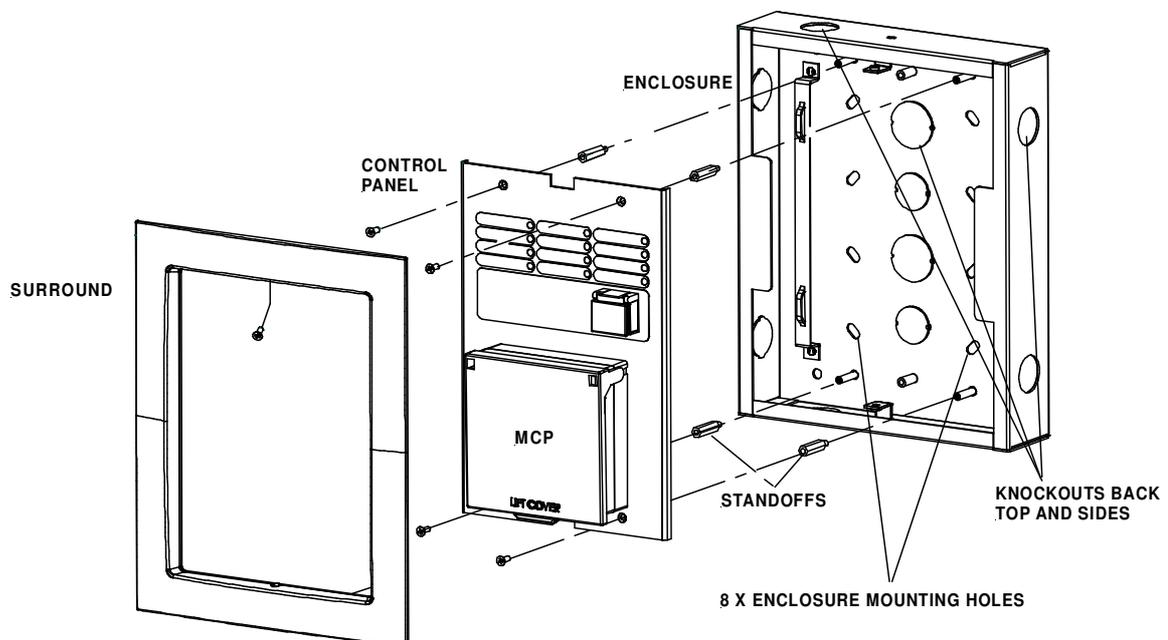


Figure 28: Local Control Station Layout

**LCS Operation & Controls**

Lifting the cover and pressing the MCP starts the manual agent release sequence. This two action safety feature prevents any accidental operation of the control and should not be disabled.

## Agent Release / LCS Indicators

There are 12 indicators on both the Agent Release Module and Local Control Station. They are;

**MANUAL ACTIVATION**  **(Red)** Illuminated when a manual release sequence has commenced. A Manual release sequence can only be started by activating the manual release at the FACP or LCS.

The indicator is extinguished by activating RESET on the FACP.

**MANUAL ACTIVATION**  **(Red)** Illuminated when a manual release sequence has commenced. This occurs when the selected zone(s) on the FACP have gone into alarm. For dual zones, the indicator should flash when the first zone goes into alarm, and steady when the second zone goes into alarm.

Indicator is extinguished by activating RESET on the FACP.

**AGENT DISCHARGED**  **(Blue)** Illuminated when the pressure switch indicates the agent has been released. For Pyrogen, feedback is from the thermal switch. If there is no pressure switch fitted, the indicator shall be illuminated immediately the agent release signal is activated (Selected via FACP on-site programming – refer to relevant FACP Manual)

The indicator is extinguished by activating RESET on the FACP.

**LOCK OFF VALVE INHIBITED**  **(Yellow)** Illuminated when the lock-off valve has been activated.

**STAGE 2 TIMER RUNNING**  **(Yellow)** Illuminated when the pre-discharge delay timer is running.

The indicator is extinguished by activating the RESET control on the FACP.

**AGENT CIRCUIT FAULT**  **(Yellow)** Illuminated when there is a fault on the monitored Main or Reserve activation circuits e.g. S/C or O/C.

**AGENT LOW PRESSURE**  **(Yellow)** Illuminated when the low pressure switch is activated. This indicates a leakage at the agent cylinder. The low pressure switch is a separate switch.

**TRIGGER ZONE ISOLATED**  **(Yellow)** Illuminated when any of the programmed trigger zones on the FACP are isolated.

**COMMON FAULT**  **(Yellow)** Illuminated under the following fault conditions;

- pressure switch monitoring fault,
- low pressure switch monitoring fault,
- lock-off valve monitoring fault,
- activation circuit fault,
- stage 1 output fault,
- stage 2 output fault,
- LCS fault (missing or extra),
- trigger zone(s) fault,
- low agent pressure and interlock fault.

**INTERLOCK**  **(Yellow)** Illuminated when the interlock input (e.g. from dampers, doors etc) is off during the discharge sequence – meaning the dampers, doors etc are not closed as they should be or a fault exists. The “Interlock” is overridden after 10 seconds and the agent is released

 **Note:** The Interlock is a Monitored Input and can be defaulted to the ON position by terminating the input (TB2 7 & 8) into a 2K2Ω resistor.

**INITIAL AGENT**  **(Yellow)** Illuminated when the “Initial Agent” is selected.

RESERVE AGENT

(Yellow) Illuminated when the "Reserve Agent" is selected.

**Local Control Panel Inhibit**



The agent inhibit switch has an internal lamp fitted with yellow lens. Illuminated when the inhibit switch is activated at the FACP or any of the LCS's.

**Buzzer (located at the FACP)**

The Buzzer sounds;

- Under all fault conditions and can be silenced by using the appropriate FACP buzzer silence control.
- When the LCS Inhibit control is activated – after 8 hours – treated as an isolate condition.
- When the service inhibit is activated - after 8 hours – treated as an isolate condition

**Connecting the LCS to the Agent Termination Board**

**ISOLATE THE AGENT**

Check the FACP is functioning correctly then power down

Connect the LCS to the Agent Termination Board within the Fire Alarm Control Panel and Interlock as shown below. If applicable take into consideration warning signs at this point

Insert the link LK1 onto the last LCS in the chain. If un-used place the link onto one of the LK1 pins

Set the address of the LCS,

Power up the system and program the FACP for the addition of the LCS

Check the FACP is functioning correctly and test

De-isolate the Agent

**ⓘ CAUTION - TO PREVENT ACCIDENTAL AGENT RELEASE DO NOT DE-ISOLATE THE AGENT UNDER ANY CIRCUMSTANCES UNTIL THE SYSTEM AS A WHOLE IS FUNCTIONING CORRECTLY**

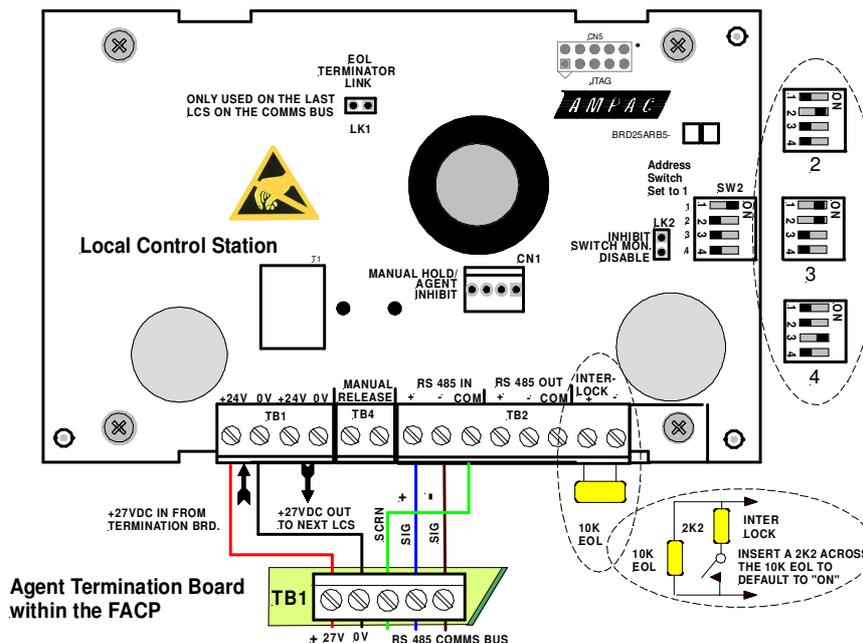


Figure 29: PCB Layout & Cabling Details

5.11.4 Agent Release Termination Board

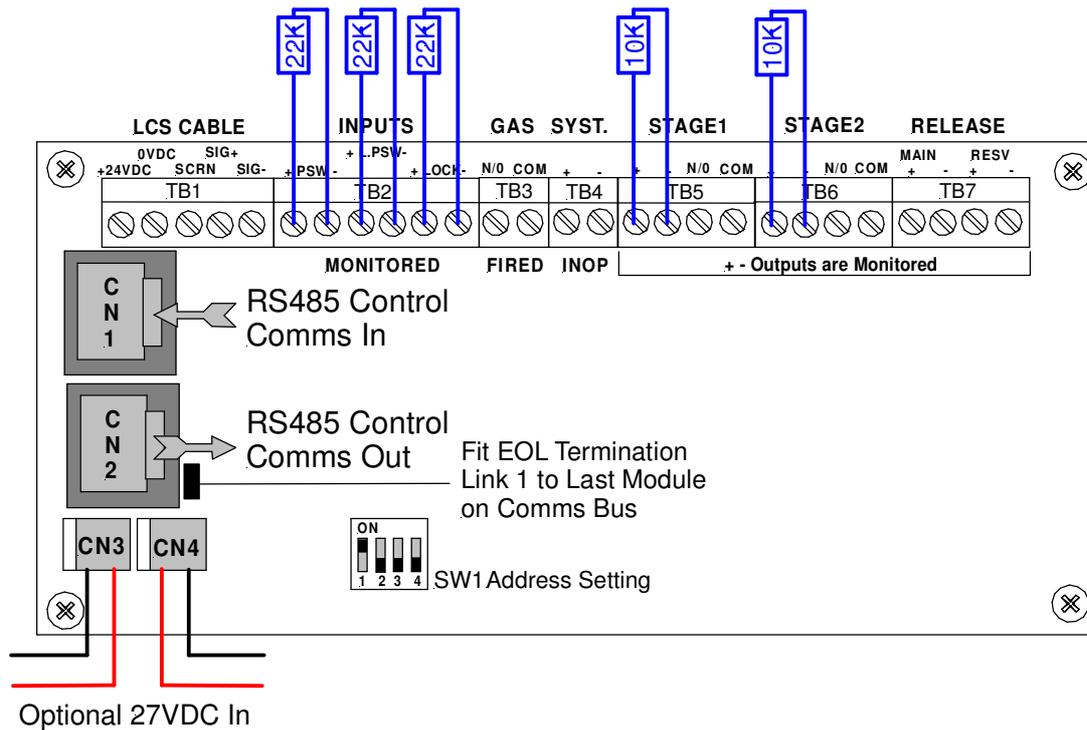


Figure 30: Agent Termination Board PCB Layout

**The Agent Termination Board interfaces to;**

1. The FACP via CN1, CN2 continuing the RS485 communications bus if required. LK1 is inserted if this is the last backpan board on the bus.
2. LCS's (up to 4) via TB1. LK1 is inserted in the last board in the RS485 Bus
3. Monitored Inputs: via TB2. (EOL Resistance 22KΩ, Series Resistance 4K7Ω)
  - Pressure Switch (PSW) agent released
  - Low Pressure Switch (LPSW) agent storage cylinder pressure has dropped to a pre-determined level; and
  - Interlock, the manual lock-off valve has been operated.
4. Gas Fired: Output via RL2 N/O contacts rated at 1A @ 24VDC wired to TB3. Used to indicate to other monitoring devices the agent has been released.
5. System Inoperative: via RL1 N/O contacts rated at 1A @ 24VDC wired to TB4. Used to warn by way of signage / audible alarm and/or monitoring that the system is inoperative.
6. Stage 1: Output; initiates the visual and audible Fire Alarm and Evacuate warnings.
  - Monitored; via RL4 C/O contacts wired to TB5 1 & 2 (EOL required 10KΩ) and
  - Un-monitored; via RL5 N/O contacts wired to TB5 3 & 4.
7. Stage 2: output; initiates the visual and audible Fire Alarm and Do No Enter warnings.
  - Monitored; via RL6 C/O contacts wired to TB6 1 & 2; (EOL required is 10KΩ) and
  - Un-monitored; via RL3 N/O contacts wired to TB6 3 & 4
8. Release: Main actuating circuit, monitored (10KΩ EOL required) via TB7 1 & 2 (2A current limited),
9. Release: Reserve actuating circuit, monitored (10KΩ EOL required) via TB7 3 & 4 (2A current limited)

Metron Igniters (max of 10 – a series 2watt 18Ω resistor must be added to the circuit)

Solenoid valve (max current of 2 amps & 27VDC)

5.11.5 Interface Wiring

Monitored Inputs TB2 1 & 2

Solenoid & Metron

This input relies on N/O or N/C relay contacts used in conjunction with 22KΩ EOL and 4K7Ω series resistors. The type of agent release mechanism and contacts used has to be set in the Programming Menu for the input to function as per the manufacturers specifications and be in accordance with the relevant Standard.

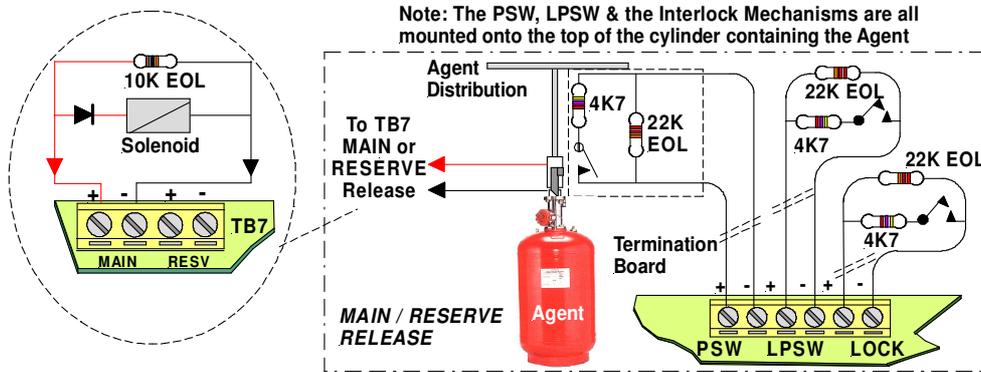


Figure 31: Solenoid, Metron PSW, LPSW and "LOCK" Wiring

LPSW & Lock

These inputs are also monitored and should be wired as shown above

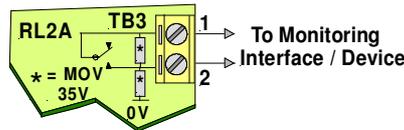


Figure 32 Gas Fired Wiring

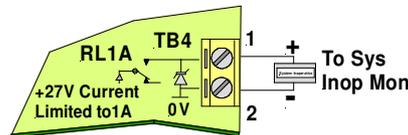


Figure 33: System Inoperative Wiring

As can be seen from above the;

Gas Fired Output can be wired to any interfacing or 1A monitoring circuit that requires a closed relay contact to indicate a change of state. This could be a relay or a solid state device.

System Inoperative Outputs 27V @ 1A to supply interfacing, signage and aural alarms to indicate the system has been taken out of service or has developed a fault.

Stage 1, Stage 2

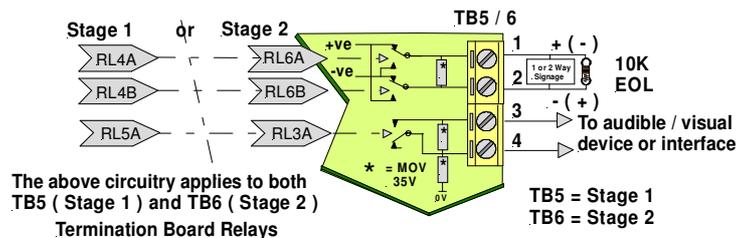


Figure 34: Stage 1 & 2 Wiring

**5.11.6 Warning Signs**

**Description**

The warning signs are driven by a 2 wire system and may be configured for single or dual stage operation.

An on-board buzzer provides an audible warning which may be disabled by removing JP4.

External evacuation devices, e.g. sounders may be connected to TB4 of the input termination board. An external mute push-button (N/O contacts) may also be connected to Term 6 on the warning sign PCB to enable the user to silence the internal buzzer and evacuation device. Inserting JP5 disables this function.

**Enclosures**

The **IP50** is a metal enclosure. The fascia surround is fitted by removing the screw on the left hand side of the enclosure and pulling it away to the left. The fascia sign is fitted in place and the tabs bent over to hold it in place. Two holes in the backpan of the chassis allow for mounting.

The **IP65** ABS enclosure has 10 screws, tightened evenly but not over tightened, hold the fascia in place. Do not over tighten. 4 holes in the backpan allow for mounting.

**Specifications:**

Operational Voltage	27VDC
Power Consumption Continuous	At 24VDC 55mA Stage 1 At 24VDC 140mA Stage 2 (100mA Muted)
IP Ratings	IP50 190mm (H) x 315mm (W) x 73mm (D) IP65 200mm (H) x 295mm (W) x 65mm (D)
Environmental	-10°C to +55°C Dry heat +40°C @ 0 to 93% Relative Humidity

**Installation**

- Remove the backpan from the enclosure to ensure it is not damaged while mounting the enclosure.
- Bring the cabling into the enclosure by removing the knockouts most appropriate for the installation.
- Mount the enclosure, remount the back pan, set the configuration and then cable as per the following diagram.
- ENSURE THE AGENT IS ISOLATED and test from the Agent Release Module.

**Cabling**

**Term 6** (Buzzer Mute)

BUZZER MUTE Normally Open (N/O) Push Button Switch (Optional)

**INPUT**

Term 2 ( Single pair polarity reversing / 2 Stage Input )	
Stage 1	0V – 24VDC
Stage 2	24VDC – 0V

**Configuration – Jumper Settings**

Jumper No.	Description
<b>JP-1</b>  1 2 3 JUMPER NUMBERING	1 - 2 Dual Level Top row LED's will be ON at Level 1 Alarm All LED's will be ON at Level 2 Alarm 2 - 3 Single Level All LED's will be ON at both Level 1 and 2 Alarm
<b>JP-2</b>  1 2 3 JUMPER NUMBERING	1 - 2 Continuous LED's permanently ON Internal Buzzer outputs continuous tone 2 - 3 Flashing LED's flash at approximate rate of 2.3Hz Internal Buzzer outputs tone matching the flashing LED's
<b>JP-3</b>  1 2 JUMPER NUMBERING	1 - 2 Enable Sounder External Sounder will active at both Level 1 and 2 Alarm
<b>JP-4</b>  1 2 JUMPER NUMBERING	1 - 2 Enable Buzzer Internal Buzzer will active at both Level 1 and 2 Alarm
<b>JP-5</b>  1 2 JUMPER NUMBERING	1 - 2 Disable EXT-Mute Disable External Mute for both Internal Buzzer and External Sounder

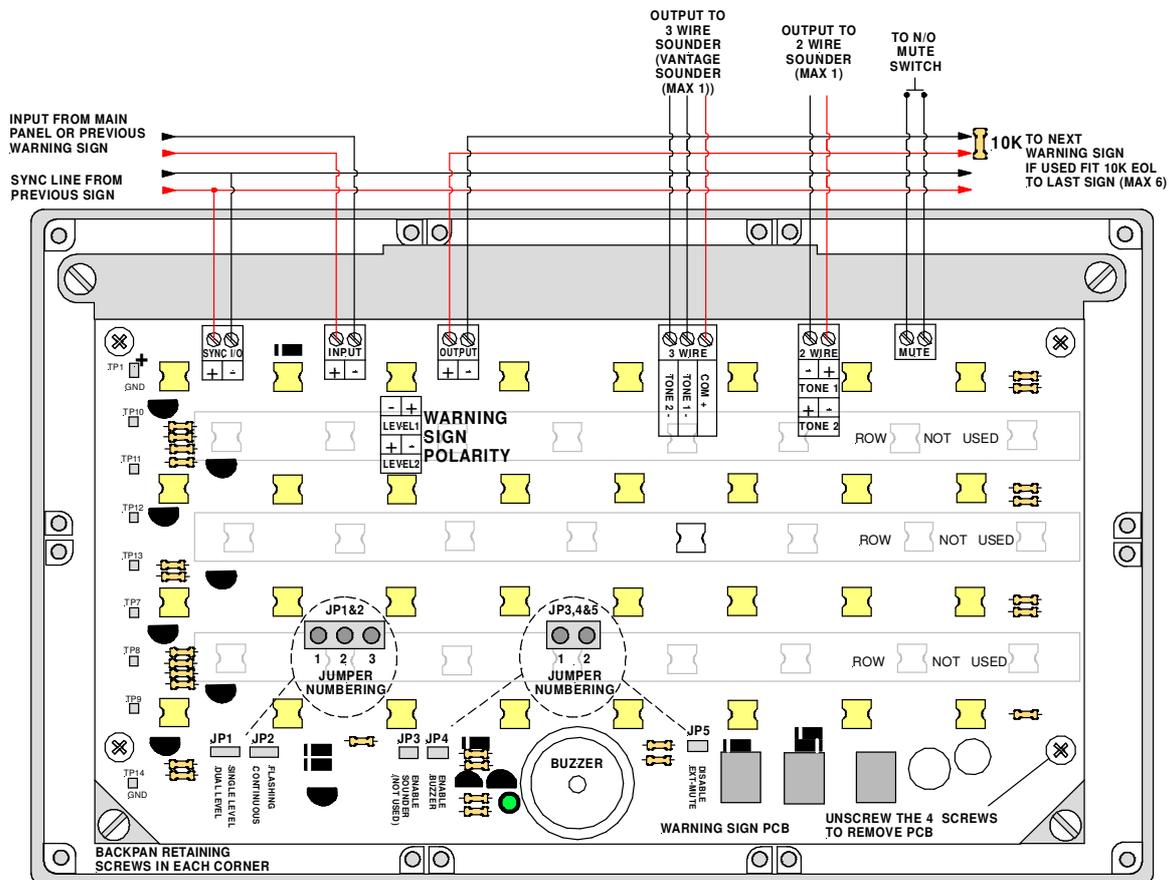


Figure 35: Warning Sign PCB Layout and Cabling

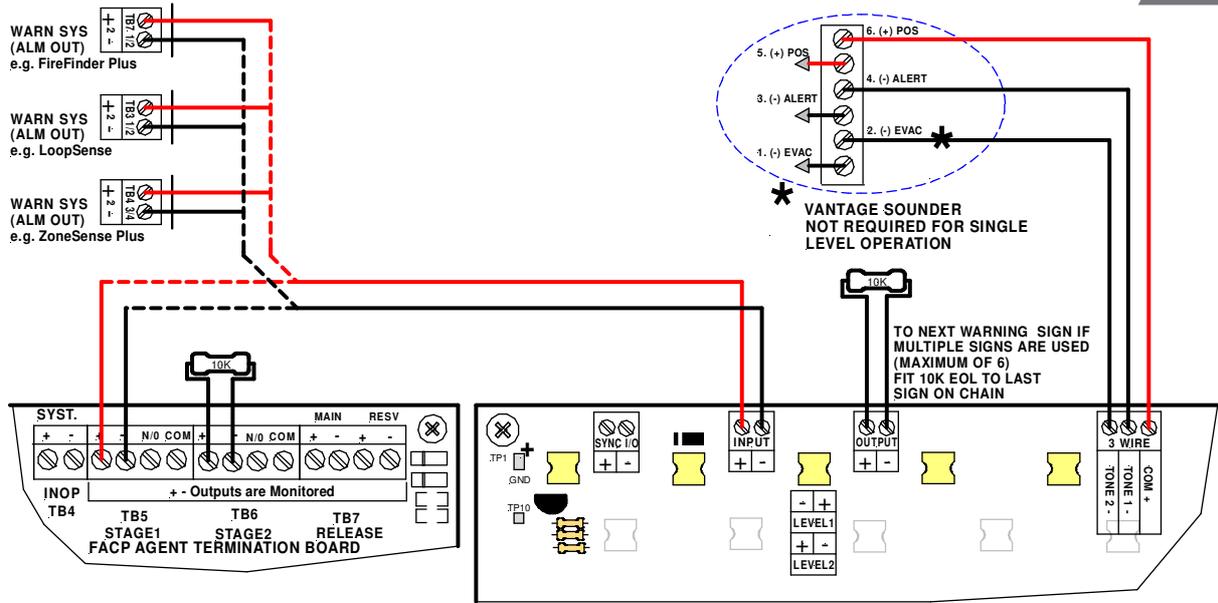


Figure 36: 2 Wire Cabling from the Agent Termination Board to the Warning Sign/s & Evacuation Device/s

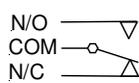
### 5.12 Brigade Board

The Brigade Interface Board acts as the driving interface to monitoring facilities external to the FACP. These facilities could be the Fire Brigade itself or an approved monitoring service.

Through the normal **LoopSense** communication process the Brigade Board will be instructed to activate the appropriate relay to alert the monitoring service. The relay contacts N/O, N/C and COM are 1A voltage free contacts.

#### Connectors

Terminals	Function
TB1 – TB5	N/O = Normally Open, C = Common N/C = Normally Closed  Alarm, Fault , Isolate , Batt Fail and Alarm 2



N/O = Normally Open  
COM = Common  
N/C = Normally Closed

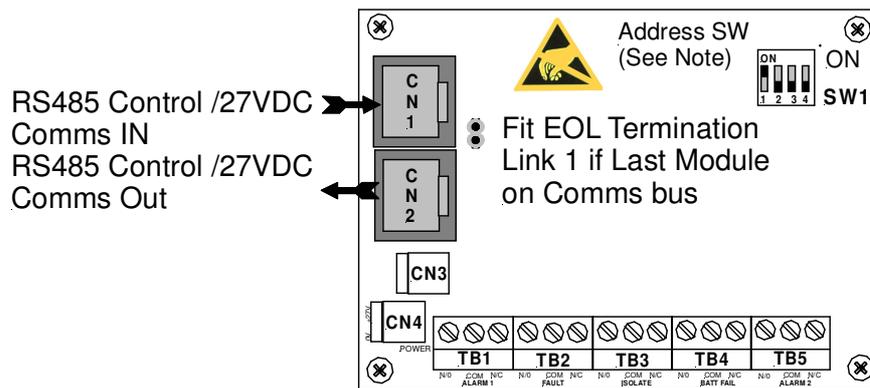
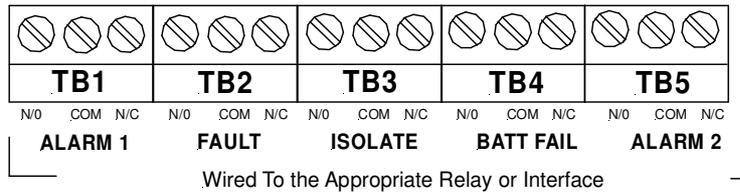


Figure 37 Brigade Board Front View showing connectors and Address Switch

**Note:** See Section 10 for Addressing Details (SW1)

5.12.1 Brigade Connections

The ASE Brigade Box interfaces the Victorian Fire Brigade into the **LoopSense** series of FACP's.

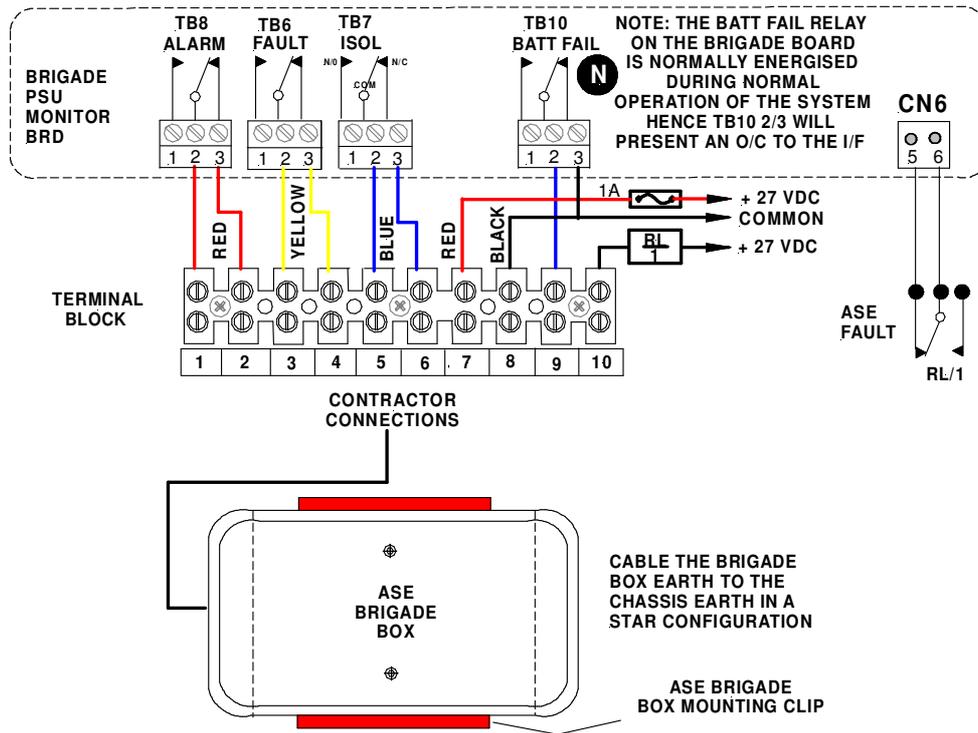


Figure 38: ASE FACP Internal Wiring

The Brigade Box interfaces the Fire Brigade to the **LoopSense** series of FACP's.

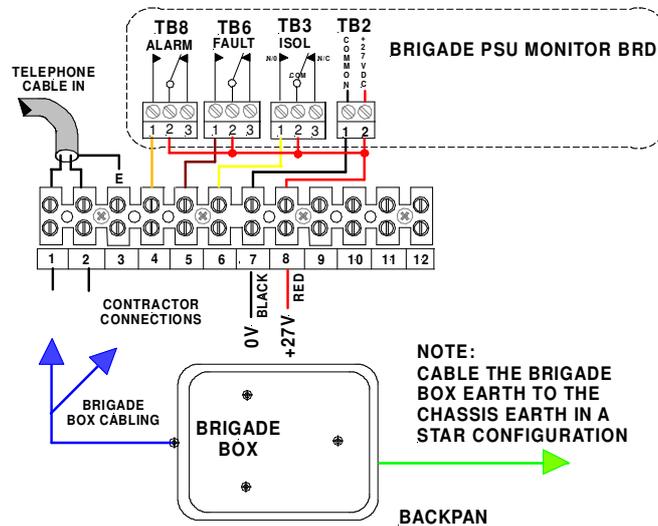


Figure 39: Brigade Box FACP Internal Wiring

## 5.13 Occupant Warning Systems

The EV20, EV40 and EV60 are compact single zone occupant warning devices that when triggered produce *Alert* and *Evacuation* signals to meet the requirements of AS1670.4.

### EV20

At the heart of an EV20 single zone occupant warning system is a microprocessor that generates the alert and evacuation signals, controls timing and the input / output.

If an FACP warning system input is received when the rotary switch is in the AUTO position the EV20 will begin to output the "Alert" signal for a duration determined by the setting of the 4 way DIL switch SW1. The set duration is termed the changeover timeout and ranges from 0 seconds to a maximum of 300 seconds. If the time out is set to 0 seconds then the alert signal is bypassed and the evacuation signal commences immediately. The operator can manually stop the sequence by turning the rotary switch to the ISOLATE position.

IC4 performs the task of an audio amplifier with TX1 providing the impedance matching to a 100 volt speaker line. The alert and evacuation signal output Stages are set by adjusting RV1 and RV2 respectively.

Short or open circuit speaker faults are detected by the fault monitoring circuitry and will result in the illumination of the FAULT indicator mounted on the front panel control module.

### Public Address

A microphone and pre-amplifier (Order Code 222-0007) is used to provide the public address capabilities.

### EV20 Verbal Messaging

An optional verbal messaging PCB (Order Code 222-0026) is available and is mounted directly onto the main board.

### EV40

At the heart of an EV40 single zone occupant warning system is a microprocessor that generates the alert and evacuation signals, controls timing and the input / output.

If an FACP warning system input is received when the rotary switch is in the AUTO position the EV40 will begin to output the "Alert" signal for a duration determined by the setting of the 4 way DIL switch. The set duration is termed the changeover timeout and ranges from 0 seconds to a maximum of 540 seconds. If the time out is set to 0 seconds then the alert signal is bypassed and the evacuation signal commences immediately. The operator can manually stop the signal sequence by turning the rotary switch to the ISOLATE position.

Amplifier 1 & 2 provides 40watts of audio output at 8 ohms which feeds TX1 to provide the impedance matching to a 100 volt speaker line. The "ALERT" and "EVAC" Stage controls adjust the output Stage of each set of signals.

Short or open circuit speaker faults are detected by the fault monitoring circuitry and will result in the illumination of the FAULT indicator mounted on the front panel control module and "SPEAKER SHORT" (red) or "SPEAKER OPEN" (yellow) LEDs on the main board.

### Public Address

A microphone (Order Code 294-0001) is used to provide the public address capabilities.

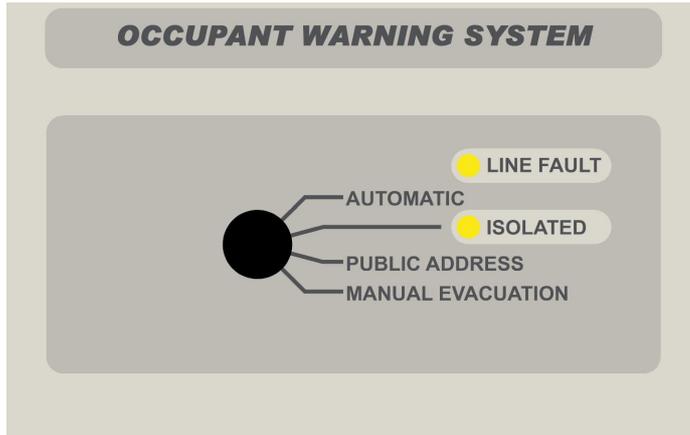
### EV40 Verbal Messaging

An optional verbal messaging PCB (Order Code 222-0013) is available and is mounted directly onto the main board.

### EV20 / 40 Verbal Message

Alert / Evacuation – *"Emergency Evacuate Now"*

**Control Module**



When the control switch is in;

**AUTOMATIC** - occupant warning signals and if applicable verbal messaging is under the control of the microprocessor and outputted to the speaker system when it receives a “warning system” signal from the FACP.

**ISOLATE** – the occupant warning system is isolated from the FACP “warning system” signal and even if the signal is present there will be no output.

**PUBLIC ADDRESS** – the occupant warning system can be used locally as a PA system.

**MANUAL EVACUATION** – the occupant warning signal/s will be transmitted over the system.

**Indicators**



In the event of an open or short circuit speaker line the LINE FAULT indicator (yellow) will be illuminated



the LED will be illuminated (yellow) when the warning system is isolated

**Signal Structures**

<p><b>ALERT SIGNAL</b></p>	<p>AS1670.4: 420Hz pulsed on for 0.625 seconds at 1.25 second intervals</p>
<p><b>EVACUATION SIGNAL</b></p>	<p>AS1670.4: 0.5 second sweep signal 500-1200 Hz for 2.5 seconds at 4 second intervals</p>
<p><b>EVACUATE SIGNAL WITH VERBAL MESSAGE</b></p>	

Figure 40: Alert & Evacuation Signal Structures

EV20 Cabling

**Note:** "WARNING SYSTEM" is a monitored O/P. The EOL is on board the EV20 and is effectively made to be O/C (at TB1) during an EV20 fault condition. This produces the fault condition at the FACP.

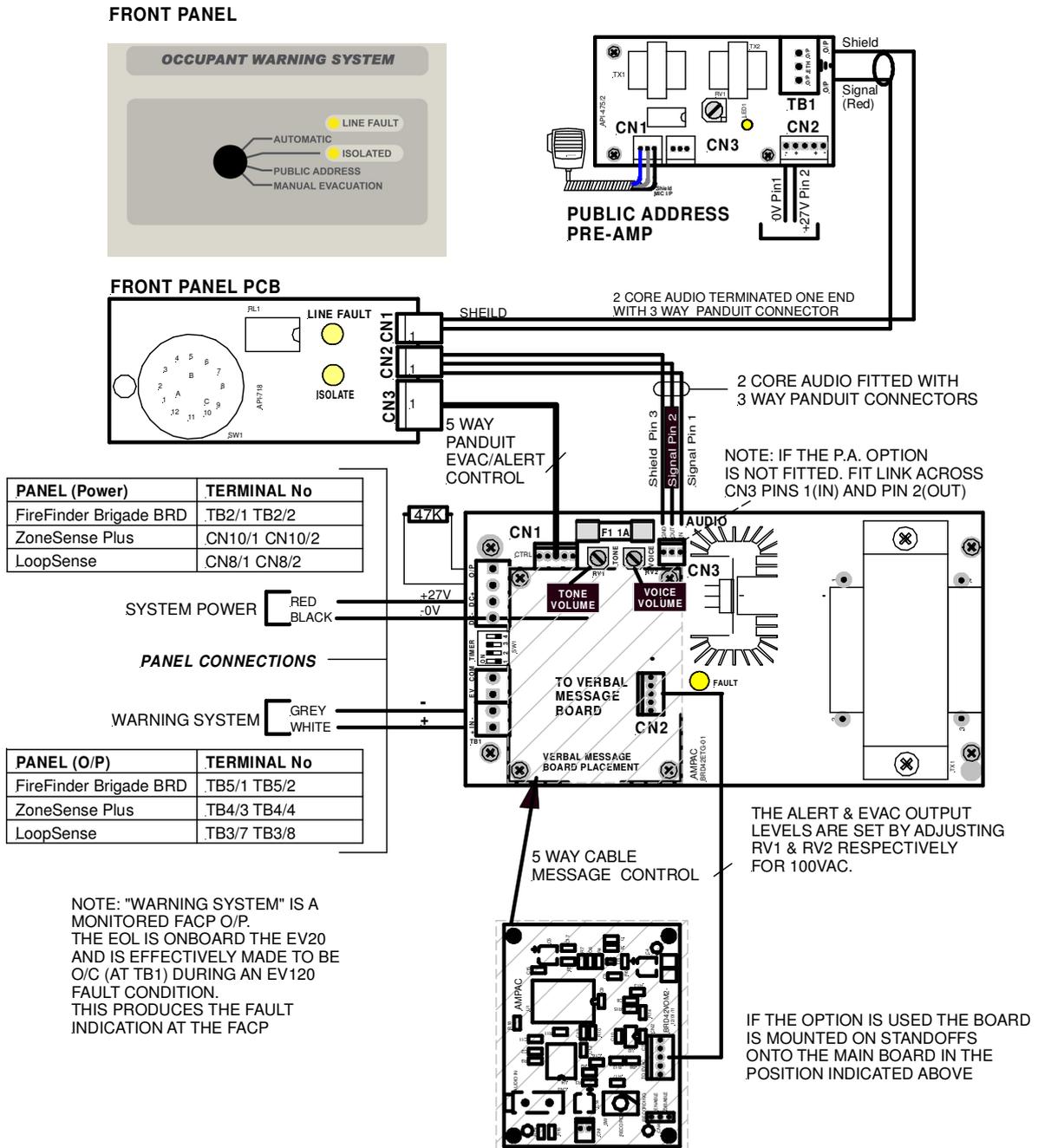


Figure 41 EV20 Wiring to Control Module, FACP Cabling and Time Out Table

EV40 Cabling

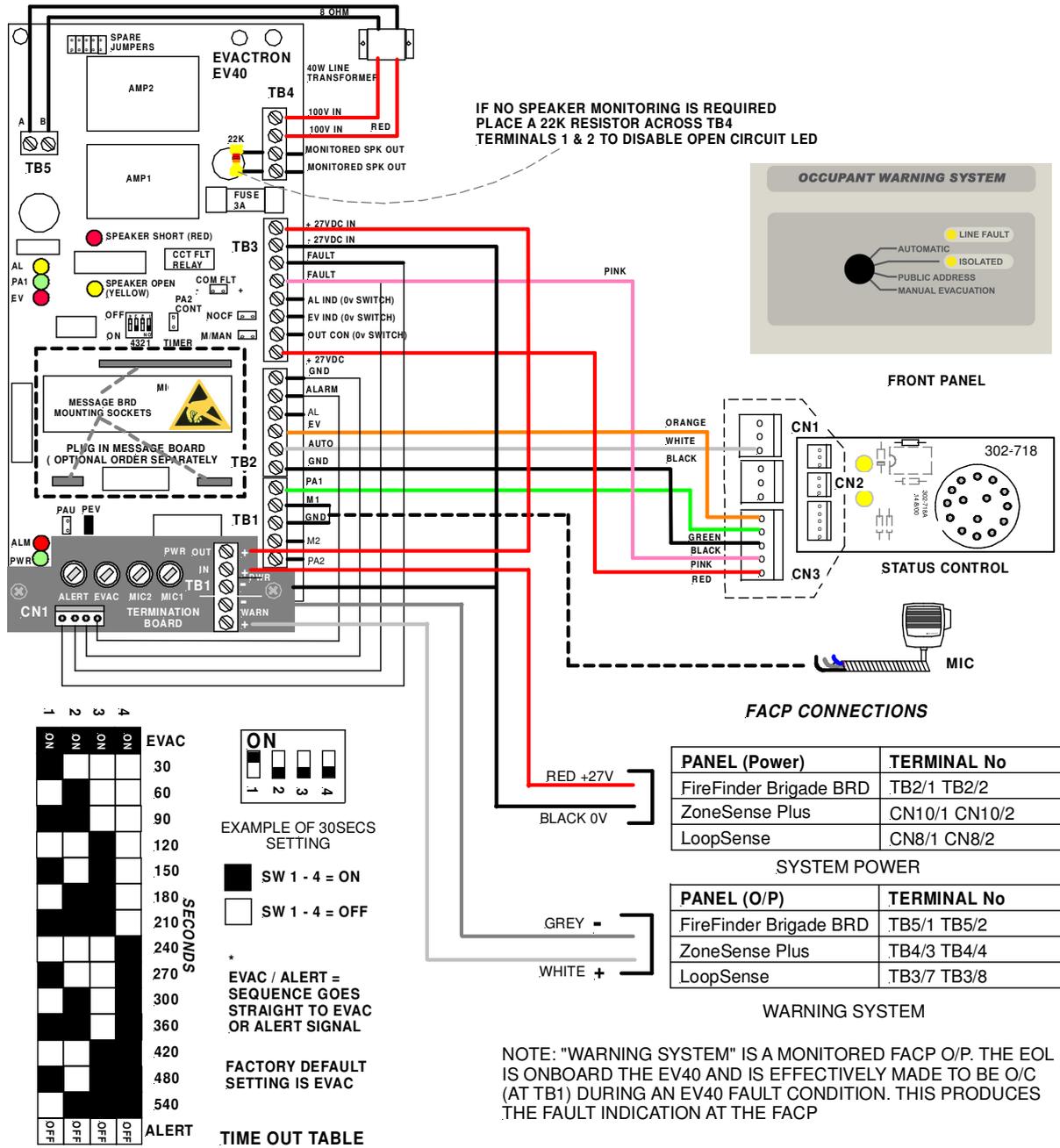


Figure 42 Typical EV40 Wiring to Control Module and FACP

**Jumper settings**

**PEV:** - PA + Evac – must be inserted when a selector switch is connected.

**PAU:** - PA in Auto – if inserted allows Mic 1 input (hand held microphone) to be used in “Auto” (with no FACP alarm ) and paging in “Evac” mode.

**PA2 CONT:** - PA2 Control – if inserted allows the PA2 input to also switch the Control Output.

**M2 1milli volt:** - if inserted enables a 1mV microphone input for Mic 2, not inserted enables the input for 100mV line level ( background music etc.)

**EV60**

The EV60 is essentially an EV20 MPU and driver but with 60 watt output amplifiers powered from a Current Limit Fuse Board.



Figure 43: EV60

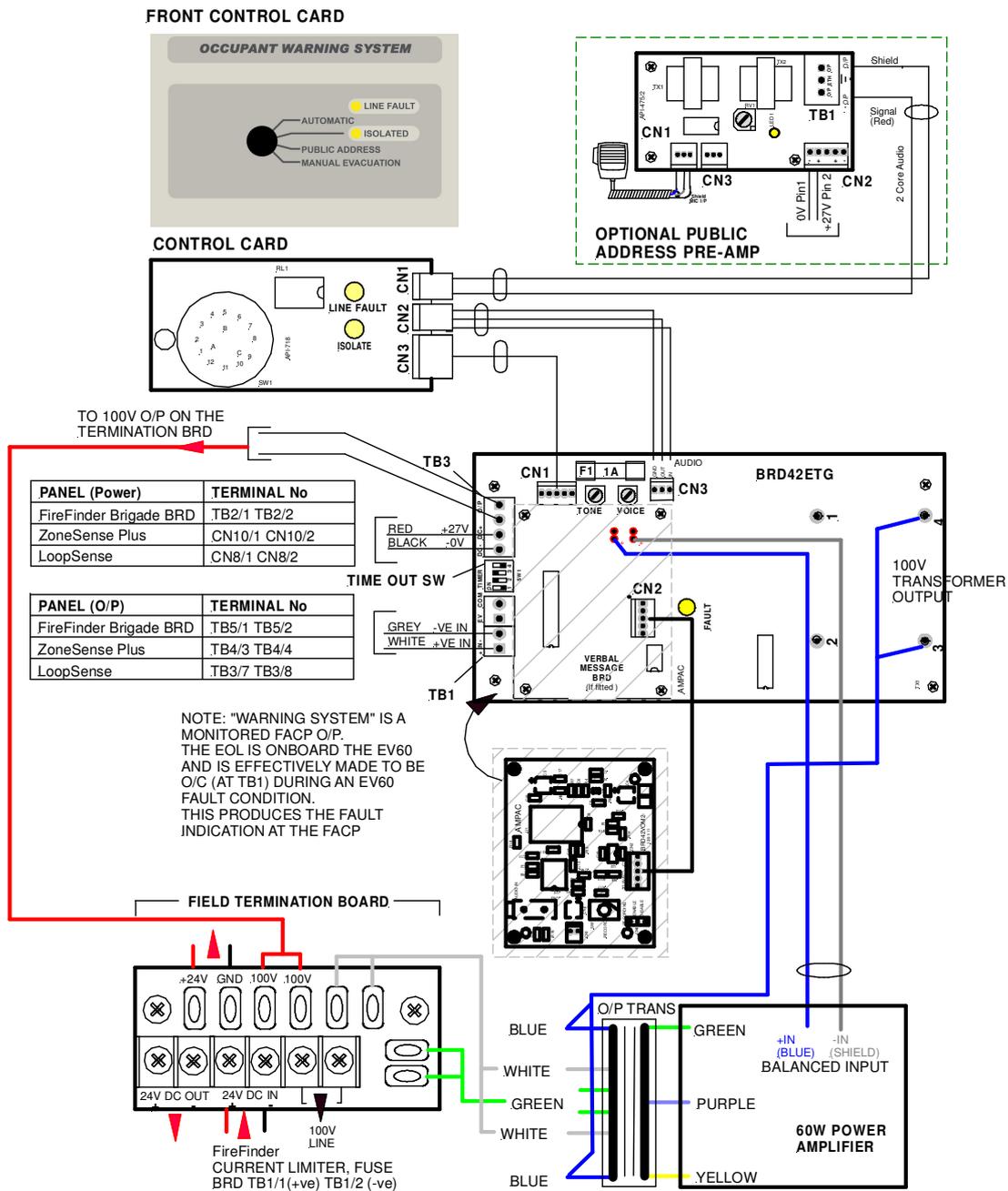


Figure 44: Wiring of an EV60 single zone OWS with both P.A and Verbal Message Boards Fitted

## 5.14 SmartTerminal

**SmartTerminal** connects to the **LoopSense** Fire Alarm Control Panel (FACP) via the RS485 multidrop communication port. Generally it is designed to be used anywhere where the status of the FACP is required to be monitored by local personnel and limited control is required.

**SmartTerminal** complies with AS4428 and designed for use with the **LoopSense** series of FACP's.

- 4 line by 40 character LCD with backlight and navigation keys ▲ ▼ keys allow the SmartTerminal to be used for FACP operation and interrogation. Note the backlight is only energised when alarms are present, a key has been pressed or controls enable key switch is enabled
- Buzzer and system Reset.
- System expansion capabilities / options:
- A wide range of secure user functions. This includes the ability to isolate / de-isolate a large number of system functions.
- Flush or surface mountable enclosure.
- Controls have tactile and audible feedback of operation.
- All terminals cater for 2.5mm cables.
- Reports events from devices that are accessible to the host FACP. For example if the host FACP is configured with global access then the connected **SmartTerminal** reports events from all devices. If the host FACP is configured as local then the connected **SmartTerminal** reports events from devices that are directly connected to the host FACP.

### 5.14.1 Overview

**SmartTerminal** essentially consists of two PCBs;

1. SmartTerminal Termination Board. A Termination Board is mounted in each SmartTerminal to protect and interface the RS485 communications and 27VDC supply to the LCD Board
2. BRD82ICC2 – Control, LCD Communications and LCD Driver Board

 **Note:** A maximum of 30 **SmartTerminal's** may be connected to the communications bus over a distance of approximately 1.2Kms

5.14.2 Mechanical

**SmartTerminal** can be supplied in three variants Slim Line ABS (externally powered) BX1 ABS (externally powered) and BX1 ABS (internally powered) and consists of;

The Main Card, with all controls and indicators mounted directly onto it

- 1 X Termination Board
- 2 X ABS door keys
- 2 X 003 Enable / Disable keys
- 2 X Jumper links
- 2A Power Supply only if internally powered

**Note:** A Communications Extender Board will be required if the Comms Bus in the FACP is fully utilised and / or if one is not fitted.

The front door of the ABS version is locked by way of two clips on the right hand side of the cabinet. A special locating key which has two raised pins that are inserted into the side of the cabinet unlocks the door.

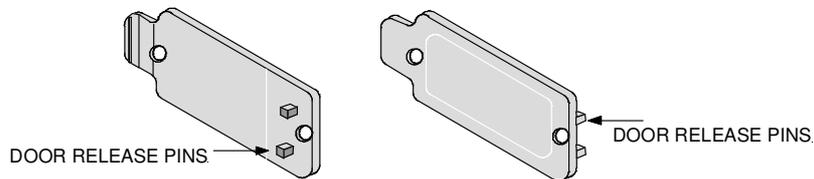


Figure 45: ABS Door Key and Front Panel Add On Card Surround Release Clip

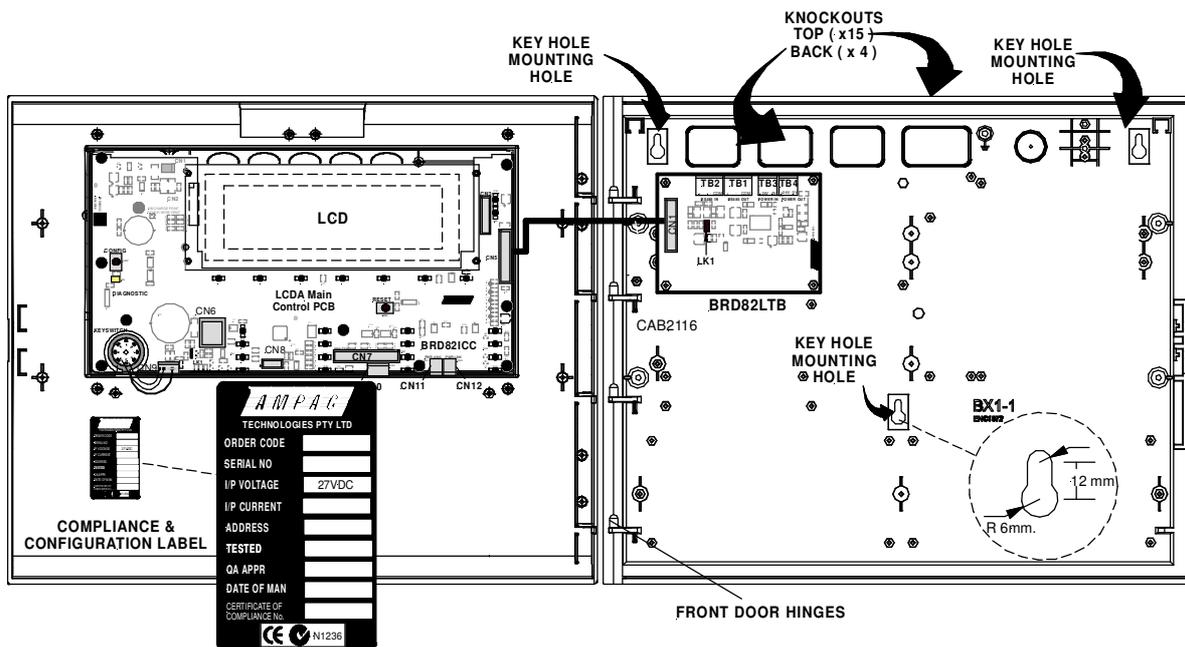


Figure 46: Typical Layout (Externally Powered) and Location of Keyholes

5.14.3 Installation & Cabling

*SmartTerminal* is connected to the FACP as shown below.

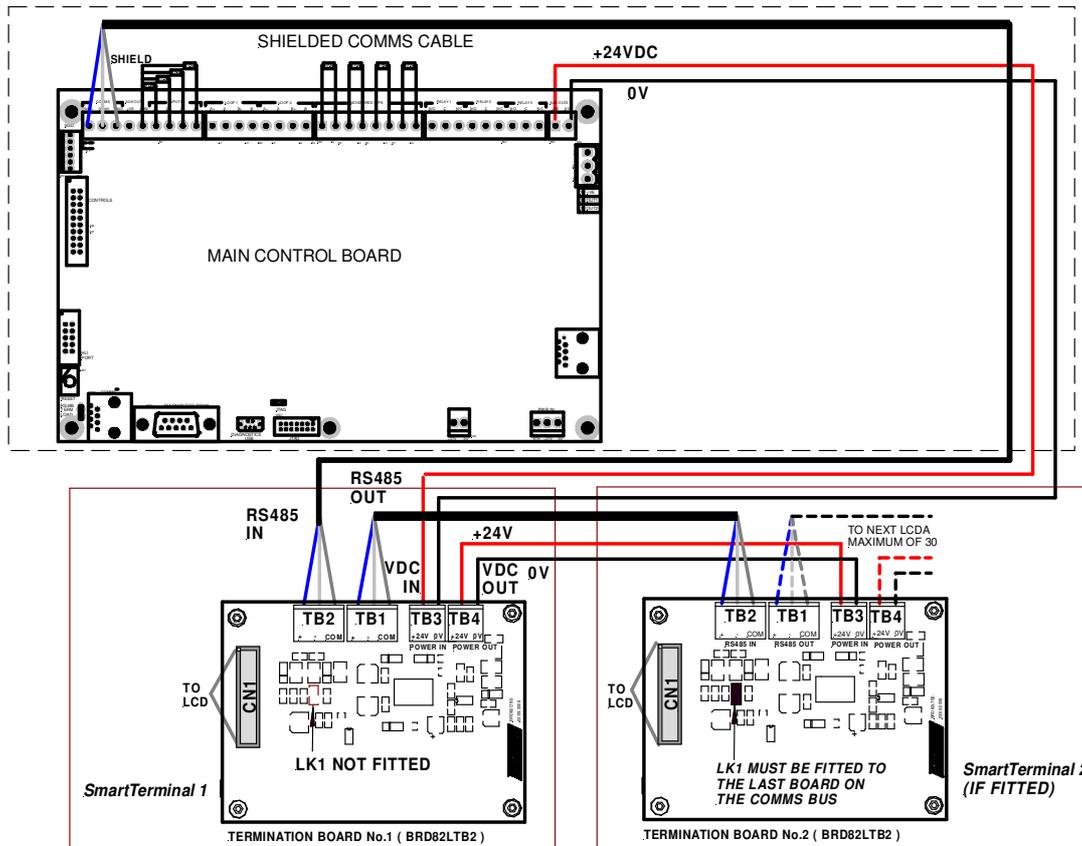


Figure 47: Connecting *SmartTerminal*'s to the FACP

5.14.4 Setting the Address

Open the front door; locate the “CONFIG” button situated on the left hand side of the PCB and press for 3 seconds. The buzzer and “Config” LED will double beep and flash respectively to indicate that the Configuration mode has been entered. The LCD will now display the Configuration screen. This screen consists of the code version number, current address and four adjustment markers. These markers A-, A+, C-, and C+ are used to indicate the keys that adjust the address and LCD contrast.

Use the “PREVIOUS (A-) and NEXT” (A+) keys to select the desired address. The default value for this address is 255 which is not a valid *SmartTerminal* address. The user must then select an address value from 1 to 30, i.e. the same address as that set in the FACP. The keys corresponding to C- (ACK) and C+ (RESET) are used in a similar manner to decrease and increase the LCD contrast level. There is audible feedback for all key presses.

Once the address has been set press the “CONFIG” button again for 3 seconds and the screen will return to its default and the “DIANOSTIC” LED will return to a slow flash. This slow flash indicates *SmartTerminal* and the FACP are communicating normally i.e. the LED flashes if communications data is being received from the FACP.

**Note:** If the address is not set within the time out period of approximately 75 seconds *SmartTerminal* will return to its normal state.

### 5.14.5 Operation

The operation of **SmartTerminal** can be considered to be in one of three states, these are;

1. Power up - when the SmartTerminal is initialising
2. Normal - when the SmartTerminal address has been set and is communicating with the FACP, reporting normal / abnormal conditions and controlling the FACP via the front panel controls
3. Fault where the SmartTerminal is in fault and/or is unable to communicate with the FACP.

#### Power Up

The LCD displays a message telling the operator **SmartTerminal** is being powered up and that the hardware is being initialised. Once the hardware has been successfully initialised set the address and **SmartTerminal** should automatically transition to the normal state. Should a failure occur on power up press the “RESET” button located on the LCD PCB and check the address is correct.

#### Normal

The Normal state is entered from the “Power-up” or a return from the “Fault” state and is displayed on the LCD if the **SmartTerminal** is communicating with the FACP and operating correctly. In this state the front panel Power indicator is illuminated.

#### Fault

**SmartTerminal** enters the Fault state upon;

- A hardware failure
- LCD module failure or
- A loss of communications with the FACP (indicated by the “DIAGNOSTIC” LED – not flashing and the “no communications “ message being displayed)

In a Fault condition the front panel NORMAL indicator is extinguished and the details of the fault are displayed on the LCD. The FACP will also indicate a fault in a similar manner.

#### Access levels

There are two levels of access.

**Access level 1** only the Acknowledge, Previous and Next front panel controls are operative. All other controls operate in access level two.

**Access level 2** is entered when the key-switch is in the ENABLED position.

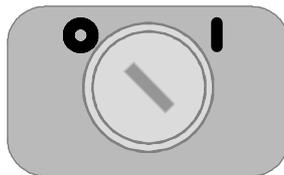


Figure 48: Keyswitch in the Disabled Position



Figure 49: Keyswitch in the Enabled Position

5.14.6 *SmartTerminal* Controls and Indicators

All controls, except for the Enable / Disable keyswitch, are of a momentary push button style.

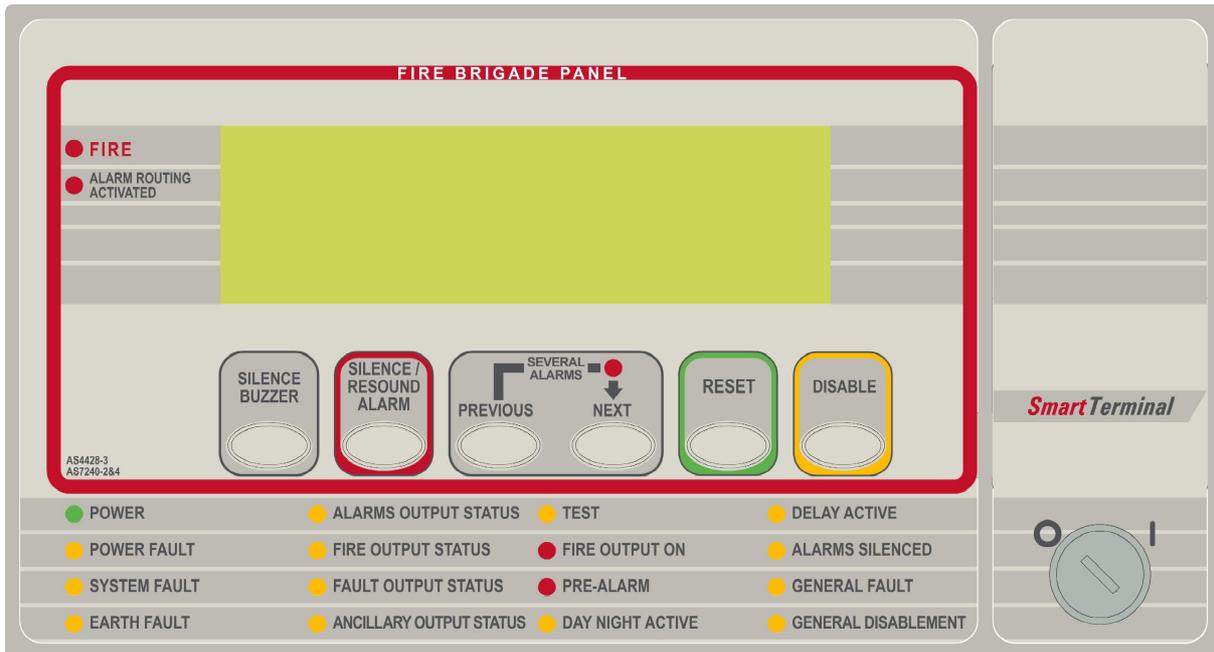


Figure 50: *SmartTerminal* Front Panel Layout

5.14.7 LCD Screen Format

There are 3 events that can be reported and displayed by *SmartTerminal*. The types of event are;

- Fire
- Faults and
- Disables.

The types of events are only associated with sensors and detectors hence faults associated with modules, loops O/C – S/C, power supplies and so forth are not reported on the LCD.

The *SmartTerminal* has front panel indicators for each type of event. When *SmartTerminal* is configured not to report a type of event and that event type is present (and the corresponding front panel indicator is illuminated on the *SmartTerminal*), then a standard information screen is displayed on the LCD stating the system is not normal and the operator should see the FACP.

**Alarm:** If configured the screen format for reporting loop / sensor / zone fire condition is:

```

FIRE - ORIGIN:Zzzz RECENT:Zzzz TOTAL:XXX
-----
Zzzz                FIRE
<zone descriptor>
<date> <time>                CONTROL*
ZONE FIRE XXX OF XXX                DEVICE▶
-----
```

**Fault:** If configured the screen format for reporting loop / sensor / zone fault condition is:

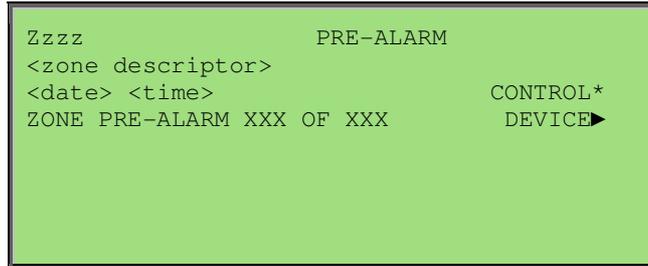
```

Zzzz                FAULT
<zone descriptor>
<date> <time>                CONTROL*
FAULT XXX OF XXX                DEVICE▶
```

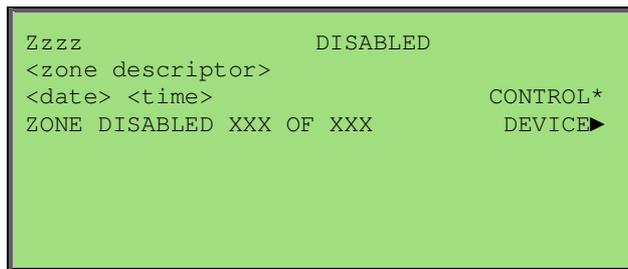
In the event of a loss of communications, for a period of greater than 15 seconds the **SmartTerminal** will default to the No Communications screen. The format for this screen is:



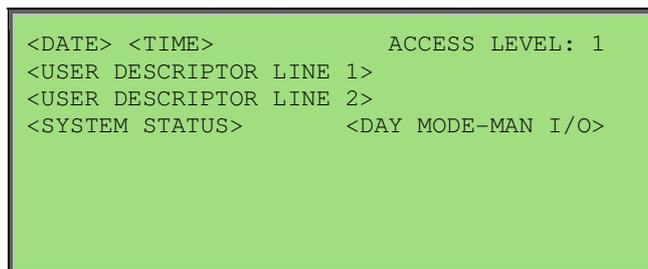
**Device Isolate / Disables:** If configured the screen format for reporting loop / sensor / zone disable condition is:



**Pre-alarm:** If configured the screen format for reporting loop / sensor / zone Pre-alarm condition is:



**Normal / Default:** The format for reporting that everything is normal is:

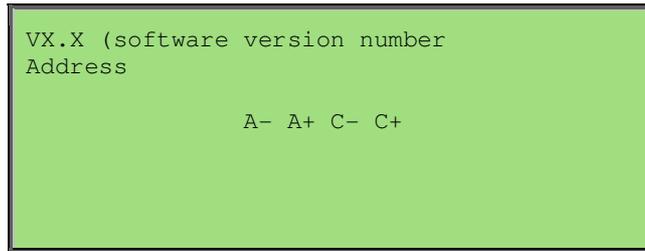


The screen is only displayed when there are no alarms, fault or disables on the panel.

The default screen is only displayed when there are no device alarms, device faults or device disables present on the system. The highest priority current system status will be displayed and can be one of the following listed in order of highest to lowest priority:

- “SYSTEM ALARM”
- “SYSTEM PRE-ALARM”
- “SYSTEM FAULT”
- “SYSTEM ISOLATE”
- “SYSTEM NORMAL”

**Config:** The Config screen displays the following



A - A +: adjusts the address 1 to 30, 30 being the maximum number of **SmartTerminal's** that can be connected to the FACP, (default is 255 which is not a valid address).

The function keys perform the following;

A – Press “Previous”                      A+ press “Next”

C - C+: decreases [-] and increases [+] the LCD contrast level.

The function keys perform the following;

C – Press “Silence Buzzer”                      C+ press “Reset”

## 5.15 Printer

### 5.15.1 Indicators and Buttons

The front panel has an LED indicator and two buttons SEL (SELECT), LF (LINE FEED).

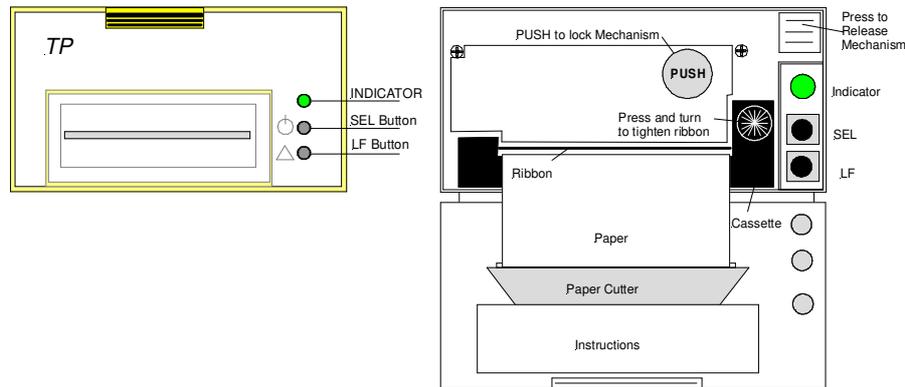


Figure 51: Printer Front Panel Layout (Front Cover Closed / Open)

#### Indicator

When the 3 colour LED indicator is illuminated;

- Red it indicates the printer is offline with no paper;
- Green it indicates the printer is On Line;
- Yellow it indicates the printer is On Line with no paper; or if it is
- Off indicates the printer is Off Line or printer is busy.

#### SEL Button

##### a) On Line / Off Line State

The printer enters the On Line state automatically when power is applied or on exiting from the Self-Test mode. (LED is green).

Press the SEL button, the LED is turned off and the printer goes Off Line.

Press the SEL button again, the LED turns on and the printer is On Line again.



**Note:** The printer will not receipt data when the printer is off line.

##### b) Pausing the Printer While It Is Printing.

Press the SEL button while the printer is printing, the printer will pause and enter the Off Line mode after it finishes printing the row it was currently printing. The printer will continue to print when the SEL button is pressed again.

##### c) Enter the HEX-DUMP mode

Remove power from the printer, press the SEL button, then reconnect the printer to the power supply. The printer will enter the HEX-DUMP mode. In this mode any programs sent from the host CPU will be printed out in Hexadecimal.

#### LF Button

While the printer is Off Line press the LF button, paper feed will be initiated press again to cancel.

#### Self-Test Mode

With power applied (green LED illuminated) push the SEL button. This will turn off the LED, press and hold in the LF button then press the SEL button again and the printer will enter the Self Test mode. Self-test will print out all the valid characters in the character sets.

#### Exit the Self-Test Mode:

After printing out the complete Self-Test list the printer will exit the mode automatically; or

Press the SEL button and the printer will immediately exit the Self-Test mode.

5.15.2 Maintenance

**Installing the Ribbon Cassette**

The printer has a factory loaded ink ribbon cassette. Remove the power from the printer.

Unlock the front cover by pushing down on the tab at the top of the front panel.

Push the mechanism release button in the top right corner to release the print head.

To remove the ribbon cassette gently pull out the left end then the right.

Replace the cassette by putting the right end of the new cassette slightly onto the drive axle then gentle pushing the left end into the clips.

The left end of the cassette can only be pressed in after the right end has been correctly seated onto the drive axle. If alignment is difficult it may be necessary to turn the knob on the cassette slightly. Now check that the ribbon is tight across the face of the cassette and is on the inside of the cassette and across the paper. Turn the knob clockwise again if the ribbon is on the outside of the cassette.

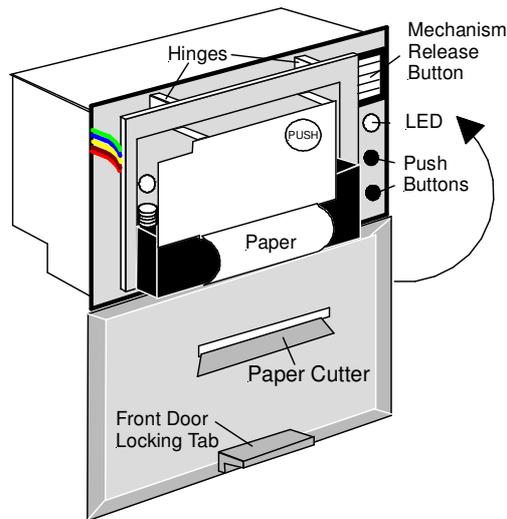


Figure 52: Paper Access

**Ribbon Replacement;**

Push back the mechanism head and lock it, close the cover of the printer and reconnect the power.

**Loading the Paper Roll**

Disconnect the power, unlock and open the front cover.

Push down on the mechanism release button in the top right corner to release the head.

Lift the mechanism as shown below.

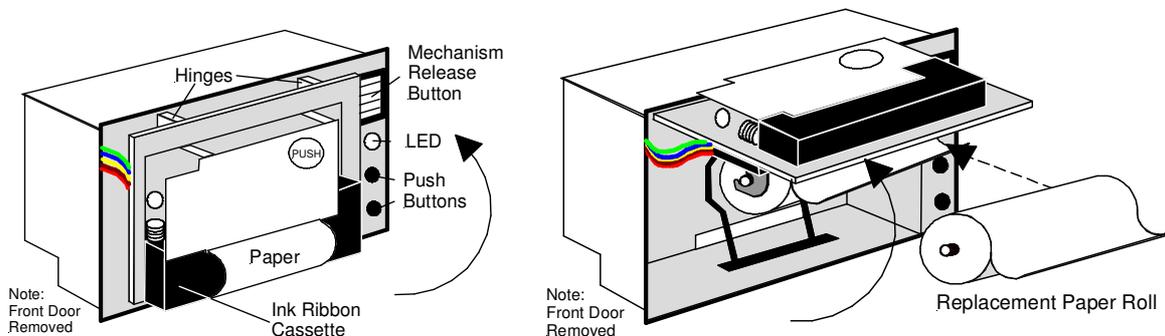


Figure 53: Head Mechanism Rotation and Paper Roll Removal / Insertion

Take out the empty paper roll and roller

Put the new paper roll onto the paper roller and replace as shown above.

Connect to the power supply.

Press the SEL button to take the printer Off Line, (LED is off).

Press the LF button, (paper feed).

Feed the edge of the paper into the mechanism and allow it to feed through.

Once it established the paper is feeding through the head mechanism correctly press the SEL button to stop the paper feed.

Return the printer head to its original position.

Pushing on the affixed label PUSH the head mechanism back into position.

Close the front cover.



**Note:** *Press only on the **PUSH** label to return the head mechanism back into position.*



**Note:** *The above instructions are graphically displayed on the inside of the front cover.*

**5.15.3 Printer Connections and Jumper Link Settings**

Mounted on the back of the printer mechanism is the PCB that carries the;

- Connectors for interconnection to the BRD82ICC,
- Jumper links required to set the programmed print modes; and
- Printer 5 volt DC Power Supply.

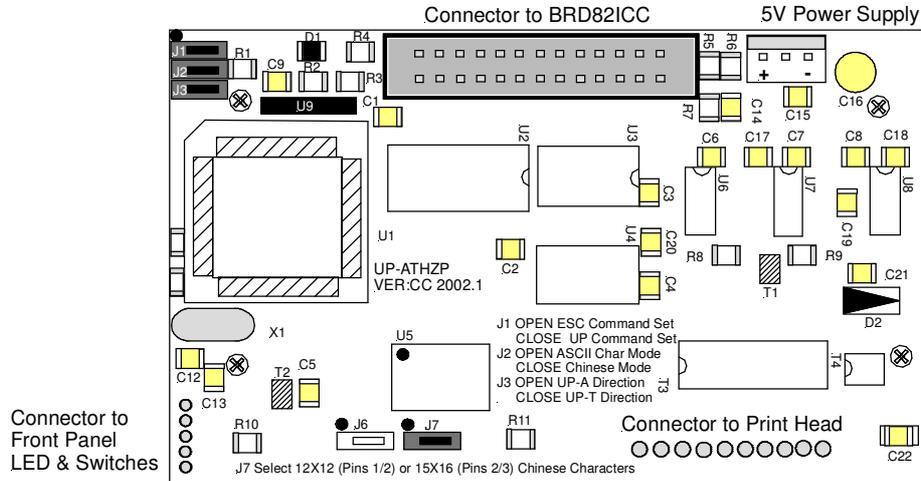


Figure 54: PCB Layout

**Jumper Settings**

Designator	Jumper State	Function
<b>J1</b>	NOT Inserted	Selects ESC Commands
	Inserted	Selects UP Commands
<b>J2</b> Set as Default	NOT Inserted	Selects ASCII Character Printing Mode
	Inserted	Selects Chinese Character Printing Mode
<b>J3</b>	NOT Inserted	Select Printing by Contrary Direction
	Inserted	Select printing in the Normal Direction
<b>J7</b> Set as Default	Insert the Shorting Clip Between Pins 1 and 2	Selects the 12 X 12 Font
	Insert the Shorting Clip Between Pin 2 and 3	Selects the 15 X 16 Font

**5.15.4 Printer 5 Volt Power Supply**

27 volts DC is taken from BR82ICC Board and fed to CN1 of the 5volt Printer Power Supply Board. It is this board that drops this voltage from 27volts to 5volts for use by the Printer.

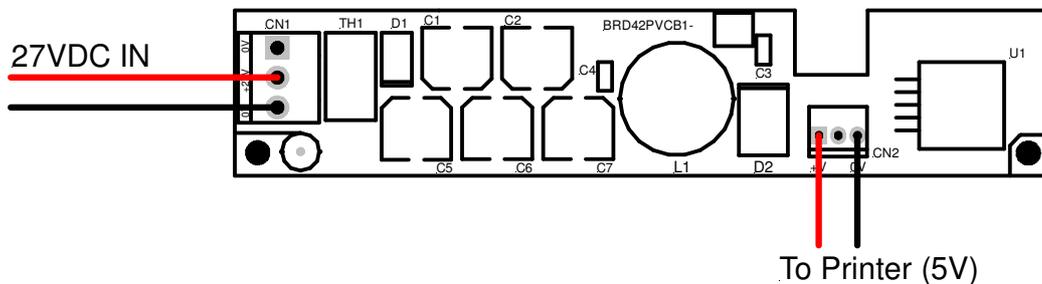


Figure 55: Printer Power Supply Board Layout

## 6 Maintenance and Trouble Shooting Chart

### 6.1 Maintenance

The **LoopSense** FACP should be maintained so as to comply with all standards / regulations applicable to the country and location it has been installed. Failure to do so could put at risk compliance and the integrity of the system. As a minimum it is recommended the following be used as a guide to periodic maintenance especially if there is an absence of standards regulations.

#### General

To implement a site maintenance regime, responsibilities should be established by responsible persons, training implemented if required, maintenance delegates appointed and all outcomes clearly communicated to all parties.

#### Daily Operations (operator level)

- The delegated operator checks for normal operation
- If any faults are detected, record them in an established "Site Log Book" and report them to the assigned body.
- Ensure all faults are signed off as they are resolved and follow up on those that are still outstanding.

#### Monthly Operations (operator level)

- In addition to Daily Operational checks
- Visually inspect in and around the panel for any signs of pests, moisture or general damage
- Ensure any non FACP standby power facilities are in a state of operational readiness
- Force a suitable device, such as an MCP or detector, into an alarm state so that it generates a know alarm outcome. This process should be controlled and established in consultation with all interested parties (installing engineers include) so that maximum benefit is obtained from the test.
- Ensure the Site Log Book" is up to date, faults have been attended to and the latest test are recorded

#### Quarterly Operations (service contractor)

- In addition to Monthly Operational checks
- Check all internal connections and perform "alarm", "fault" and site specific tests
- Perform a "walk around" of the site to determine if the system integrity is free of possible faults
- Ensure the Site Log Book" is up to date, faults have been attended to and the latest test are recorded

#### Annual Operations (service contractor)

- In addition to Monthly Operational checks
- Initiate both a "lamp" and "walk" test and any other tests as determined necessary for the site
- Inspect and test ( as per the manufacturers specifications ) batteries
- Ensure the Site Log Book" is up to date, faults have been attended to and the latest test are recorded

#### Replacement Components (service contractor)

Batteries and fuses are seen as the only field replaceable components.

If a board field change is required all necessary anti-static precautions must be taken.



**Note:** *If the Main Board is changed the power supply may require re-calibration.*

**6.2 Trouble Shooting *LoopSense***

**i** Resolution of all suspected faults **MUST** only be carried out by suitably qualified technical operatives.

<b>Problem</b>	<b>Solution</b>
No Mains Power	Check mains Fuse
Power LED flashing	Check output voltage it should be set to 27.2V. Low = (less than 26.5V ) High = (greater than 28V ) Check the battery has been connected properly
Earth Fault LED illuminated	Check all input and output cabling and wiring assemblies for short to ground
System Fault LED illuminated	Ensure correct panel configuration Check all connections for loose wiring
RS485 Communication Loop not working	Refer to LCD. This may identify where there is a break in the communication line
Can not access a menu	Incorrect Password entered
Forgotten Password	Ring AMPAC
Alarms Status	Make sure you have a 10KΩ EOL resistor fitted and a diode (1N4004) in series with any sounders

## 7 Certification Information

The *LoopSense* is designed and manufactured by:

AMPAC TECHNOLOGIES PTY LTD

7 Ledger Rd

Balcatta

WA 6021

Western Australia

PH: 61-8-9242 3333

FAX: 61-8-9242 3334



Manufactured to: \_\_\_\_\_

Certificate of Compliance Number: \_\_\_\_\_

Equipment Serial Number: \_\_\_\_\_

Date of Manufacture: \_\_\_\_\_

**8 Glossary of Terms**

ACKD :	ACKNOWLEDGED
AH:	AMP HOUR
ALM :	ALARM
COM :	RELAY COMMON CONTACT (WIPER)
CN :	CONNECTOR
C/O :	CHANGE OVER CONTACTS
CPU :	COMMON PROCESSOR UNIT
EOL :	END OF LINE
FACP :	FIRE ALARM CONTROL PANEL
FLT :	FAULT
GND :	GROUND (0 VOLTS) NOT EARTH
I/O :	INPUT/OUTPUT
LCD :	LIQUID CRYSTAL DISPLAY
LED :	LIGHT EMITTING DIODE
MCP :	MANUAL CALL POINT
N/C :	NORMALLY CLOSED RELAY CONTACTS
N/O :	NORMALLY OPEN RELAY CONTACTS
PCB :	PRINTED CIRCUIT BOARDS
P/S :	POWER SUPPLY
TB :	TERMINAL BLOCK

**9 Specifications**

<b>Standard</b>	As4428.3 and AS7240.2&4	
<b>Mechanical</b>		
Dimensions Cabinet: (mm) SP1X SP8X	500(H) x 405(W) x 150(D) 840(H) x 515(W) x 170(D)	
<b>Environmental</b>		
Temperature:	0°C to + 40°C	
Humidity:	25% to 95% non condensing	
<b>Power Supply Mains Input</b>	<b>3 Amp</b>	<b>6 Amp</b>
Input Voltage:	204 - 264VAC	204 - 264VAC
Protection (Quick Acting Fuse):	2 Amp M205	5 Amp M205
Minimum Cable Requirements:	Not less than 0.75mm <sup>2</sup>	Not less than 0.75mm <sup>2</sup>
<b>Power Supply</b>		
Voltage with Mains connected:	25 – 29VDC	25 – 29VDC
Power Supply Ripple Voltage:	<100mV	<100mV
Power Supply Fault Indication		
Volts High (at room temperature )	28VDC	28VDC
Volts Low	26.5VDC	26.5VDC
Power Supply Output Current:	3Amps	6 Amps
Imax A	3Amps	6 Amps
Protection	Current Limiting	Current Limiting
<b>Batteries / Battery Charger</b>		
Charger O/P Voltage (Temp compensated):	26.6-28.1VDC (27.3VDC nom)	26.6-28.1VDC (27.3VDC nom)
Battery Type:	2x12V Sealed Lead Acid	2x12V Sealed Lead Acid
Max Charger Current Limited:	600mA	1A
Battery Supply Current Limited:	3A and 2A PTC	3A and 2A PTC
Battery Low:	<23.5VDC	<23.5VDC
Battery Discharged Cut-off Voltage:	<21VDC	<21VDC
Battery Damaged:	<22VDC	<22VDC
Max Battery Resistance	1.2Ω	1.2Ω
<b>Main Card</b>		
Quiescent Current ( QI ) 1 Loop	115mA	
1 Loop in Alarm (Min)	155mA	
Quiescent Current ( QI ) 2 Loop	135mA	
2 Loop in Alarm (Min)	180mA	
<b>Loop</b>		
Maximum Number of Zones:	40 in total (for 1 or 2 loop panel)	
Maximum Number of Devices:	126 / loop	
Loop Current	500mA / loop	
Cabling Requirements:	2 core 1.5 -2.5mm <sup>2</sup> Max length 1km	
Fault supervision:	O/C, S/C , over current	
<b>Outputs</b>		
Supervised Alarm (Current Limited)	24VDC @ 750mA Max O/C, S/C, 10K EOL	
Alarm / Fault Relay Contacts	24VDC @ 1A	
Auxiliary VDC – Protected	24VDC @ 1A	
Cabling Requirements:	2 core 1 -2.5mm <sup>2</sup> Max length 1km	
<b>Inputs</b>		
Supervised	O/C, S/C, 10K EOL	
Cabling Requirements:	2 core 1 -2.5mm <sup>2</sup> Max length 1km	
<b>Communications</b>		
Internal to FACP	RS485	
External to FACP	RS485	

# 10 Address Setting

## BINARY ADDRESS SETTING (APOLLO)

### SERIES XP95 - ADDRESS DATA

DIL SWITCH: ON = 1 OFF = 0 ADDRESS TAG FOR DETECTORS (I/O DEVICES)

DIL switch setting									
Address	1234567								
1	1000000	26	0101100	51	1100110	76	0011001	101	1010011
2	0100000	27	1101100	52	0010110	77	1011001	102	0110011
3	1100000	28	0011100	53	1010110	78	0111001	103	1110011
4	0010000	29	1011100	54	0110110	79	1111001	104	0001011
5	1010000	30	0111100	55	1110110	80	0000101	105	1001011
6	0110000	31	1111100	56	0001110	81	1000101	106	0101011
7	1110000	32	0000010	57	1001110	82	0100101	107	1101011
8	0001000	33	1000010	58	0101110	83	1100101	108	0011011
9	1001000	34	0100010	59	1101110	84	0010101	109	1011011
10	0101000	35	1100010	60	0011110	85	1010101	110	0111011
11	1101000	36	0010010	61	1011110	86	0110101	111	1111011
12	0011000	37	1010010	62	0111110	87	1110101	112	0000111
13	1011000	38	0110010	63	1111110	88	0001101	113	1000111
14	0111000	39	1110010	64	0000001	89	1001101	114	0100111
15	1111000	40	0001010	65	1000001	90	0101101	115	1100111
16	0000100	41	1001010	66	0100001	91	1101101	116	0010111
17	1000100	42	0101010	67	1100001	92	0011101	117	1010111
18	0100100	43	1101010	68	0010001	93	1011101	118	0110111
19	1100100	44	0011010	69	1010001	94	0111101	119	1110111
20	0010100	45	1011010	70	0110001	95	1111101	120	0001111
21	1010100	46	0111010	71	1110001	96	0000011	121	1001111
22	0110100	47	1111010	72	0001001	97	1000011	122	0101111
23	1110100	48	0000110	73	1001001	98	0100011	123	1101111
24	0001100	49	1000110	74	0101001	99	1100011	124	0011111
25	1001100	50	0100110	75	1101001	100	0010011	125	1011111
								126	0111111

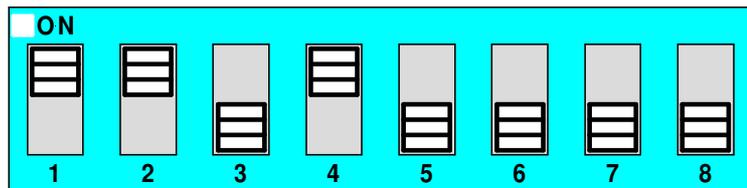
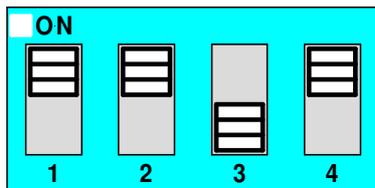
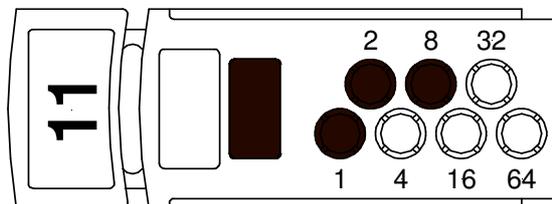


Figure 56: 4 and 8 way Switch addressing set to Address 11



● = PUNCH OUT

Figure 57: Xpert Card addressing set to Address 11

**11 Statement of Compliance**

Please PRINT

1. Name of Building: \_\_\_\_\_
2. Address: \_\_\_\_\_
3. I/We have installed in the above building an alteration to the system manufactured by, OR a system manufactured by. (*Name of Service Provider*) \_\_\_\_\_
4. The system is connected to monitoring service provider by a Permanent , Non-Permanent  connection
5. Date of connection \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_
6. Ancillary equipment installed / connected to the control and indicating equipment.  
(*See Commissioning Of Cards and Boards*) Yes  No
7. Current drain of ancillary loads powered from the FACP power supply \_\_\_\_\_
8. Primary power source voltage \_\_\_\_\_
9. Battery type and capacity Manufacturer \_\_\_\_\_ AH
10. Is maintenance agreement held for the system? Yes  No
11. Operator's handbook supplied? Yes  No
12. Logbook supplied? Yes  No
13. 'As-installed' drawings supplied? Yes  No
14. Portions of the building not protected by this system are; (*Please PRINT*)
 

1 _____	6 _____
2 _____	7 _____
3 _____	8 _____
4 _____	9 _____
5 _____	10 _____



15. I/We

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

*Print Name/s*

Hereby certify that the installation has been thoroughly tested from each actuating device and that a test of the transmission of the alarm signal to the monitoring service provider has been satisfactorily carried out.

I/We further certify that the whole system and all components called up in Clause 1.3 in connection therewith are installed entirely in accordance with the current requirements of AS 1670.1, -

**Except with regard to the following details which have already been approved, approval attached.**

*Strike out the bolded sentence if there have not been any exceptions.*

Signature \_\_\_\_\_

Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Installing Company \_\_\_\_\_

*Please PRINT or Stamp*

**11.1 Installation Details**

# Indicate with a number in brackets the number of actuating devices in concealed spaces.

\* Add addressable loop number in brackets where applicable.

Zone Alarm Zone #	Number and Type of Actuating Devices											
	* No of Actuating Devices per Zone	Thermal					Fire		Flame		MCP	Other
		A	B	C	D	E	Smoke	CO	IR	UV		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
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30												
31												
32												

**Additional Information:**

*(Attach if necessary)*

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**Name**

**Company**

**Signature**

**Date**

---



**12.1 Procedure**

The following tests are the minimum that shall be performed when commissioning a system using the **LoopSense** Fire Alarm Control Panel. Supplements to these test may be added by way of attachments or notation (*using waterproof ink*) to this documentation. If supplements or tests are added reference to them shall be made at an appropriate point on this document.

This Commissioning Record is to be completed in conjunction with the -

- operator's manual;
- installer's statement(s);
- 'as-installed' drawings; and
- detector test records,

The Record provides a complete description of the installed system and its tested performance at the time of being commissioned.

**12.2 System Information**

Check relevant box

**GENERAL**

YES  NO  NA

- |  |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|
| (a) Equipment: Equipment has been designed and constructed in accordance with the relevant Standards.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Installation: Equipment has been located, installed and interconnected in accordance with the system documentation   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Compatibility: All detectors and other devices used in the system are—   |                          |                          |                          |
| (i) listed in the operator's manual;   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (ii) compatible with the relevant parts of CIE, particularly that the permitted number of detectors and other devices for each circuit is not exceeded;                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (iii) installed in an environment for which they are suitable;   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (iv) not set to a sensitivity outside that prescribed in the relevant product Standard.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Alarm zone limitations: The alarm zone limitations in Clause 2.4 of AS 1670.1 are not exceeded.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (e) Primary power source   |                          |                          |                          |
| (i) The primary power source for the system has been provided in accordance with AS/NZS 3000.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (ii) The isolating switch disconnects all active conductors.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (iii) Five operations of the primary power source switch did not cause an alarm to be indicated on the system.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (f) Secondary power source   |                          |                          |                          |
| (i) The secondary power source is of a suitable type and capacity complying with the requirements of Clause 3.16.2 of AS 1670.1.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (ii) The float voltage, charger type and setting is correct and in accordance with the battery manufacturer's recommendation.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (g) Battery temperature and voltage: The battery voltage corresponds to that specified by the battery manufacturer for the temperature measured after 24 hour quiescent operation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- (h) Alarm zone parameters: Each alarm zone circuit is within the equipment manufacturer's specifications.
- (i) Wire-free alarm zones: Wire-free actuating device parameters meet the minimum parameters specified by the manufacturer, including that the receiver responds to signals from an actuating device for alarm, tamper, low standby power signals and gives a fault signal when the supervisory signal condition is absent.
- (j) Operation of fault and alarm signals: Fault and alarm conditions correctly detect and indicate as the correct. alarm zone, operating other required indicators, and operate relevant outputs of the CIE.
- (k) Mimic panel: All mimic panels, annunciators, etc., operate correctly.
- (l) Alarm zone controls: Alarm test, fault test, isolate and reset facility of each alarm zone operates correctly.
- (m) Alarm dependency: Alarm dependency works correctly and does not apply to devices listed in Clause 3.3 of AS 1670.1.
- (n) CIE response to actuating device operation: Each actuating device has operated when tested with a medium suitable for the device type and the alarm has indicated on the FIP and at the tested device.
- (o) Fault response time: The response to a fault does not exceed 100 s for each alarm zone circuit.
- (p) Alarm response time: At least one detector in each alarm zone has been tested and the response to the alarm does not exceed 10 s or the period specified when dependency on more than one alarm signal is used.
- (q) Supervisory signal response time: At least one supervisory device in each alarm zone circuit has been tested and the response to the supervisory device does not exceed 100 s.
- (r) Alarm acknowledgment facility: Alarm acknowledgment facilities operate in accordance with the requirements of Clause 3.2 AS 1670.1.
- (s) Occupant warning system
  - (i) A fault signal is displayed at the CIE when the circuit wiring at the last speaker or sounder is short or open circuited.
  - (ii) Each sounder/speaker operates in accordance with the requirements of Clause 3.22 of AS 1670.1 and a record of the sound pressure level has been made.
- (t) The external alarm indication is visible from the main approach to the building.
- (u) Manual call points
  - (i) Each manual call point operates correctly.
  - (ii) The activation of manual call points do not cause existing detector alarm indications to be extinguished.
  - (iii) Manual call points are not subject to alarm dependency.
- (v) Smoke and fire door release: Each door-release device operates correctly.
- (w) Flame detectors
  - (i) The number and type of flame detectors provide adequate protection for the area.

- (ii) There are no 'blind' spots in the area protected.
- (iii) Detectors are rigidly fixed.
- (iv) Detector lenses are clean and adequately protected from dust and extraneous radiation sources.
- (v) Detectors respond to a flame or simulated flame source.
- (x) Multi-point aspirating smoke detectors
- (i) Response time of all sampling points meets the requirements of AS 1670.1.
- (ii) Alarm settings and indicators operate correctly.
- (iii) Remote indication of alarm and fault signals operate correctly.
- (iv) Airflow failure indicator operates correctly.
- (v) System (signal) failure indicators operate correctly.
- (vi) Isolate and reset functions operate correctly.
- (vii) Alarm and fault test facilities operate correctly.
- (y) Duct sampling unit: The alarm indicator is clearly visible from a trafficable area and the duct air velocity exceeds the minimum velocity specified for the unit. If not, the measured differential pressure is at least the minimum specified for the unit.
- (z) Ancillary control functions: Each ancillary control function operates with the activation of associated alarm zones.
- (aa) Alarm signaling equipment: Alarm signaling equipment initiates a fire alarm signal to the monitoring service provider.
- (bb) Labeling: Alarm zone location is immediately apparent from the alarm zone labeling.

**DOCUMENTATION**

The following documentation is located in or adjacent to the FIP:

- (a) 'As-installed' drawings.
- (b) CIE documentation required by AS 4428.1 or AS 7240.2.
- (c) Commissioning test report.
- (d) Installer's statement in accordance with Appendix E of AS 1670.1.
- (e) A log complying with the requirements of Clause 7.3 of AS 1670.1.
- (f) Aspirating system design tool calculation.

**UNCONTROLLED DOCUMENT**

*NOTE: Due to AMPAC's commitment to continuous improvement specifications may change without notice.*