



Fire detection and evacuation solutions that save lives.



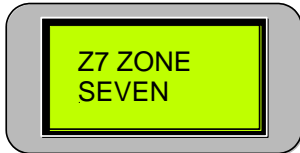
# ZoneSense PLUS Agent Release

## Installation, Commissioning & Operation


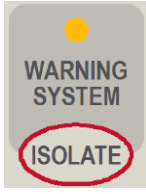
MAN1543-6



# Isolating a Zone



1. **Indicator**
  - **Zone Alarm** Indicator (flashing)
  - **Common Alarm** Indicator (flashing)
  - First **Zone in Alarm** is displayed on the LCD.




2. To **Isolate External Bell** press 



3. To **Isolate Warning System** press 


4. To **Acknowledge Alarm** press 

*ALARM LED will go steady.*

5. To **Isolate Alarm** press 

*ISOLATED LED will be illuminated.*

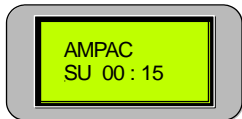
6. To **Reset Panel** press 


1<sup>st</sup> RESET LCD Screen Displayed 


2nd. RESET LCD Screen Displayed 


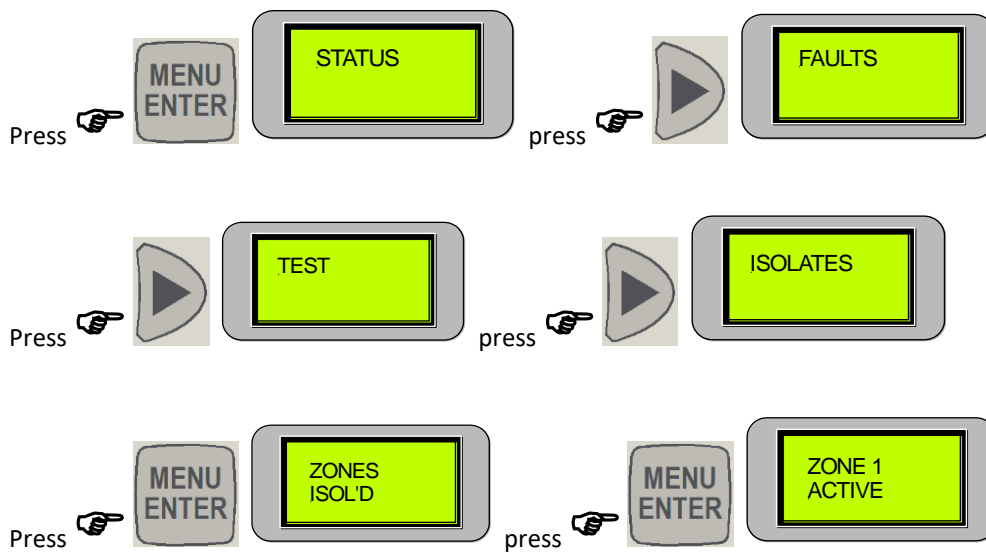
# Isolating a Zone

Example below isolates Zone 2)

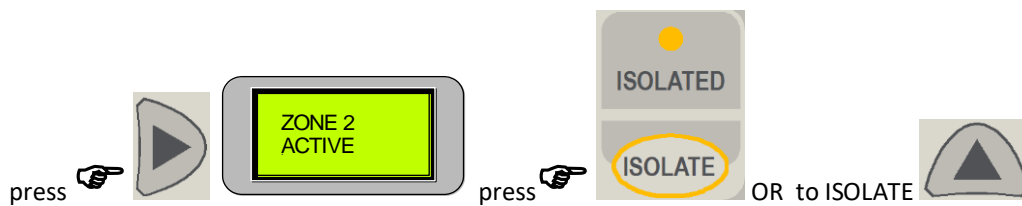


Default Screen

Moving to the ISOLATE MENU



Moving to ZONE 2



Zone 2 accessed and ISOLATED - To DE-ISOLATE press the ISOLATE or DOWN button.

 **Note:** If a Zone ISOLATE has been initiated the ZONE and the COMMON indicator LED's are illuminated.

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## 1 About This Manual

### 1.1 Introduction

This manual contains all the information required to install, commission and operate the **ZoneSense PLUS - AR** 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 **ZoneSense PLUS - AR** 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 **ZoneSense PLUS - AR** 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

**ZoneSense PLUS** Technical Manual






**ZoneSense PLUS – AR** Operation and Programming

Australian Standards:

AS4214 – Gaseous Fire Extinguishing Systems

AS4428 - Fire Detection, Warning, Control and Intercom Systems – Control and Indicating Equipment. Part 1 and Part 5

### 1.4 Symbols

	Important operational information
 <b>Note:</b>	Configuration considerations
	Observe antistatic precautions
	Mains supply earth
	DANGER mains supply present

## 2 System Overview

The ZoneSense PLUS - AR 4 and 8 zone FACP complies with the highest level of approval for any applicable code and can be connected to an appropriate Fire Service monitoring facility.

As a Minimum, the conventional panel meets the following Standards;

- AS4428
- AS4214



**Note:** *Only devices compatible with ZoneSense PLUS - AR should be used in an installation*

Feature Include:

- The front panel 8 x 2 line LCD, navigation keys ◀ ▶ ▲ ▼ and the Menu/Enter keys allow the ZoneSense PLUS - AR to be programmed 'on site'. The same LCD and keys are also used for panel operation and interrogation.
- Four monitored conventional Alarm circuits.
- Two optional auxiliary input connections.
- Two open collector outputs (fire and fault).
- Two relay outputs (ancillary and fault )
- Optional external buzzer or reset output.
- System expansion capabilities / options:
- Password entry to a wide range of programming and diagnostic functions which include;
  - Zone configurations;
  - MCP Zone assignment;
  - Default display; and
  - Zone labels;
- A wide range of secure user functions. This includes the ability to isolate / de-isolate a large number of system functions.
- Flush (surround is required for the metal cabinet) or surface mountable enclosure.
- Controls have tactile and audible feedback of operation.
- All terminals cater for 2.5mm cables.

### 3 ZoneSense PLUS - AR Description

The following description does not relate to specific cabinets as the size of each cabinet will vary. The ZoneSense PLUS AR (Agent Release) Panel is a dedicated panel for agent release systems.

Housed in a metal cabinet, the ZoneSense PLUS AR is available in either four (4) or eight (8) zones.

Based on a ZoneSense PLUS Fire Alarm Control Panel (FACP), the AR version is fitted with an Agent Release Panel Add-on (control card and termination board) and a dual action yellow manual call point as standard. The Agent Release panel add-on option is factory set.

Each zone can accommodate up to 40 conventional detectors that can be programmed to function in one of the following modes:

- Normal (latching)
- Alarm Verification Facility (AVF)
- Non-latching
- Self Reset
- Dual selectable Agent Release

Up to four (4) Local Control Stations (LCS) can be connected remote to the AR panel. An operator may manually release, or inhibit release of, the agent from any of these LCS's.

In addition to manual controls at the LCS, eight (8) system status indicators are also available. These system status indicators are updated in real-time and gives the operator reliable and up-to-date information. This facilitates ease of maintenance and quick response in the event of an alarm condition.

LCS's come in indoor or outdoor versions.

As part of a system solution, Ampac also offers other ancillary devices such as:

- Orbis conventional detectors,
- Warning signs, and
- Audible devices.

The Agent Release Panel Add-on is available as a kit, complete with cables and documentation, to facilitate easy installation. A yellow manual call point is required to be installed adjacent to the FACP. This yellow manual call point is supplied with a hinged cover and is a requirement in AS4214 Agent Release Systems. The FireFinder FACP will need to be re-programmed using ConfigManager to activate the Agent Release panel add-on.

For upgrades to existing ZoneSense PLUS FACP's, please contact your nearest Customer Service Office.

The Agent Release panel can be configured to operate in a single group or dual group mode.

In a single group mode of operation, only one (1) zone circuit is configured as an 'agent release'. A detector in alarm, associated with this type of zone, will initiate a stage 2 condition. The timer is activated and upon expiry the agent is released.

In a dual group mode the operator can configure up to four (4) zones as an 'agent release'. When a detector in any zone programmed as an 'agent release' goes into alarm, Stage 1 is activated. Subsequently when a detector in any other zone that is programmed as an 'agent release' goes into alarm, Stage 2 is activated and the timer starts. Upon expiration of the timer, the agent is released.

The AR panel supports agents released using either Metron or a solenoid.

The activation of "Agent Inhibit" switch disables the automatic release of the agent.

Inputs to the AR panel include:

- Pressure switch – monitors release of agent
- Low pressure switch – active if pressure in an agent storage cylinder drops below a set level
- Interlock – active if the agent release manual lock-off valve has been operated



Main and reserve agent release storage cylinders are supported. The circuit between the panel and the cylinders is monitored for short and open circuit.

Connection from the AR panel to the LCS is via RS485 communications protocol. Subsequent LCS's are connected in a 'daisy chain' wiring configuration.

The AR panel supports a 2-wire connection to warning signs. The 2-wire connection supports both single or dual stage signs. The latter is possible because of the voltage reverse technology adopted by the AR panel. Multiple warning signs may be connected to the AR panel. The connection will be in a 'daisy chain' configuration with the last warning sign fitted with an End-Of-Line (EOL) resistor. The EOL resistor facilitates the monitoring of the warning sign circuit. A maximum of 6 warning signs may be fitted to an AR panel.

An on-board buzzer fitted to every sign provides audible warning. However in the event AS1670.4 audible warning tones are required, external electronic sounders may be connected directly to each warning sign. An external switch may be connected to the sign to mute audible warning.

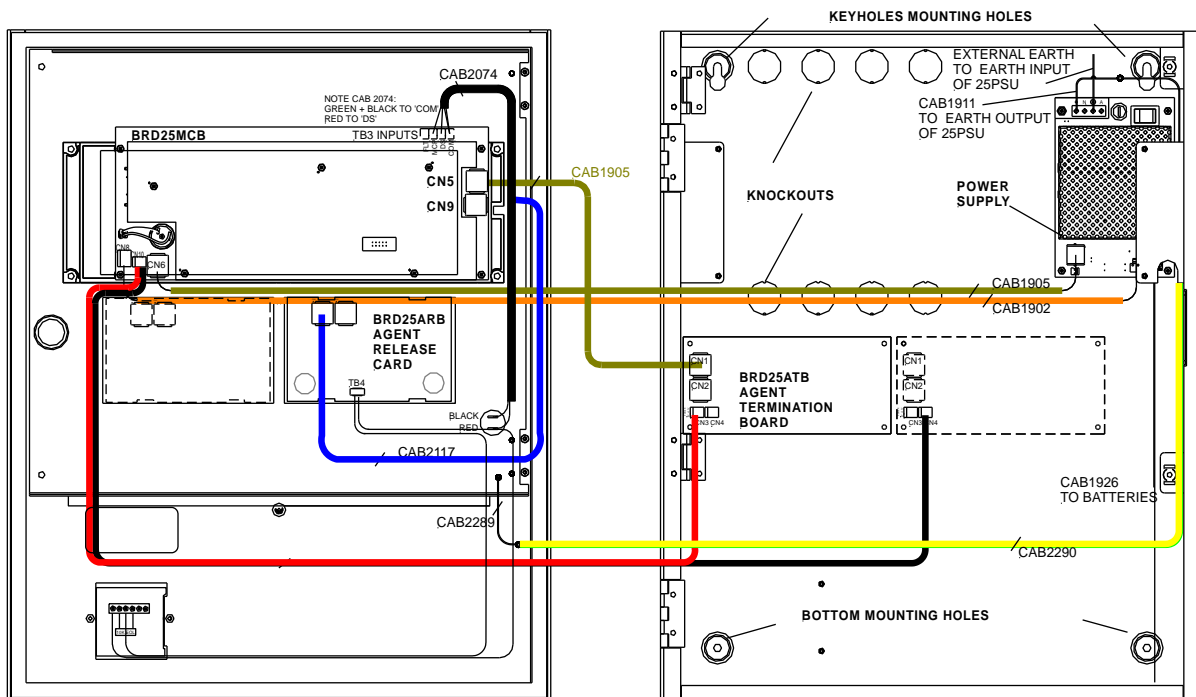


Figure 1: Typical Example of LoopSense Plus - AR

## 4 Placing the Basic System into Operation

### 4.1 Unpacking

Carefully unpack the **ZoneSense PLUS-AR**.

The package should include:

- Main Card, with all controls and indicators mounted directly onto it;
- a switch-mode power supply;
- 2 X 12 Volt batteries connected in series.
- 2 X 003 keys

### 4.2 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

### 4.3 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.

### 4.4 The Cabinet

**Features:**

- The cabinet is available in three different styles. Each style has the capability of being either surface or flush mounted. With flush mounting though a 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.

## 4.5 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.

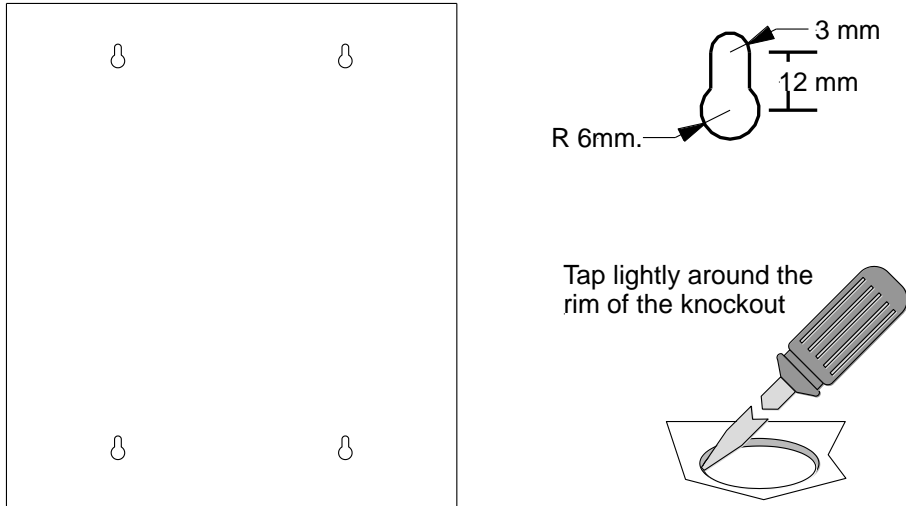


Figure 2: Example ZoneSense PLUS - AR Mounting & Removing Knockouts

## 4.6 PCB Removal / Replacement



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

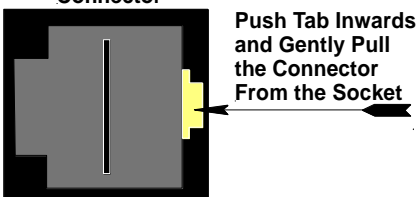
- Removing the door will provide better access to the boards and ensure the hinges are not accidentally stressed.
- Personal anti- static procedures must be followed.
- When disconnecting the 20 way connecting cable from the PCB, make sure that the cable remains connected to at least one board to prevent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

### Connector



## 4.7 Power Supplies and AC Mains Installation

### 4.7.1 Primary Power Supply

The **ZoneSense – AR 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.

### 4.7.2 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.

### 4.7.3 Connecting the Panel

Connecting **ZoneSense PLUS - AR** internal connections and boards 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.

**i** 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.

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

### 4.7.4 Connecting the Mains Earth

All earth cabling shall be terminated to the panel Chassis Earth Terminal in a star configuration.

The earth cable closest to the cabinet body shall have an M4 SPW beneath the lug then an M4 SPW and M4 nut.

Each additional earth cable shall be terminated with an M4 SPW and M4 nut.

An additional M4 nut and M4 SPW are fitted to the Chassis Earth Terminal for installers to connect their Mains Earth.

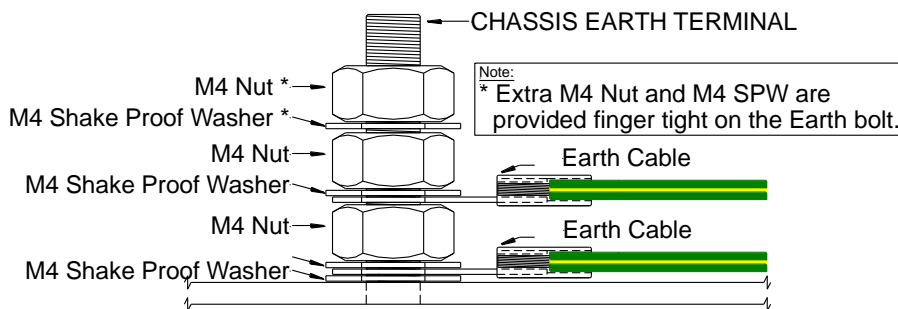


Figure 3: Panel Earthing

### 4.7.5 Connecting the Mains Power to the Power Supply

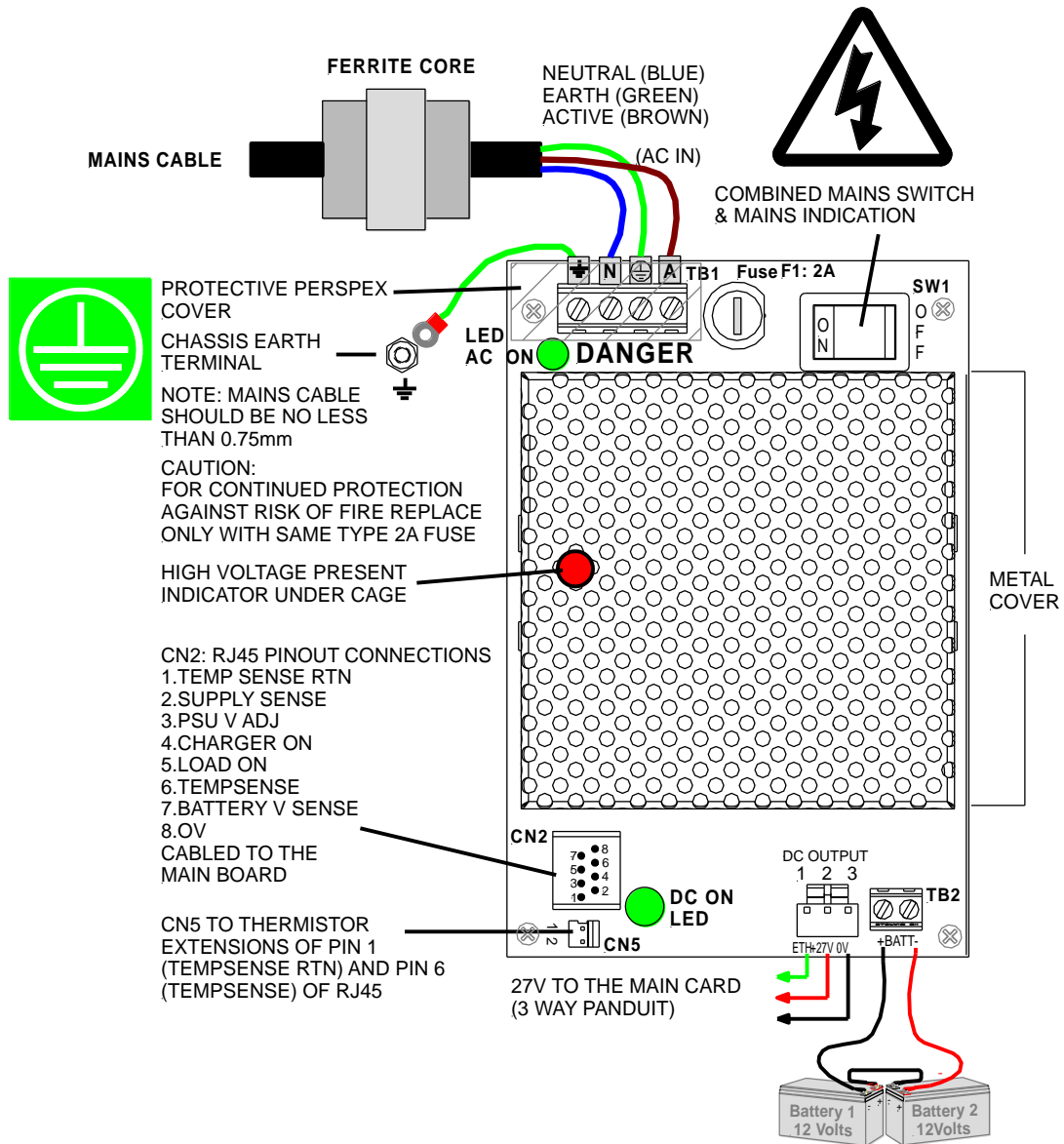


Figure 4: Power Supply Battery Charger Wiring (3A PSU SHOWN)


## 4.8 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.

### 4.8.1 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.

## 5 Main Control Board

The Main Control Card and its front display panel combined with the Power Supply / Battery Charger and batteries form the basis for the **ZoneSense PLUS - AR FACP**.

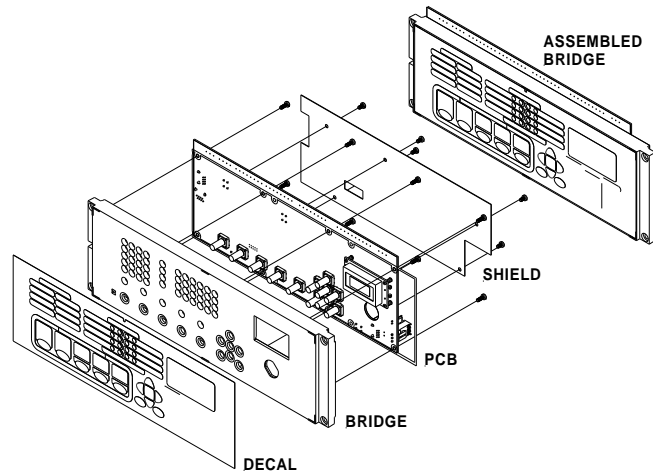


Figure 5: Exploded view of the Control Panel

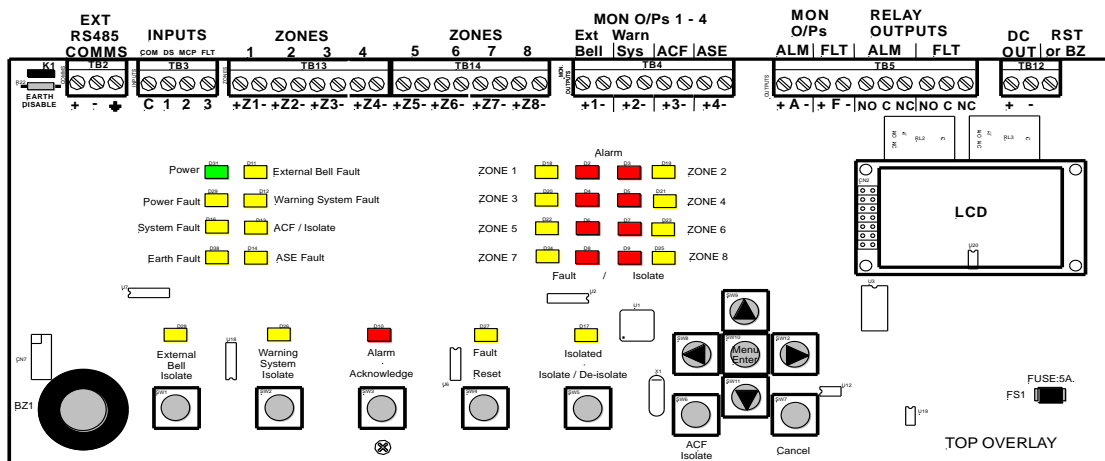


Figure 6: Main Control Card Front PCB View

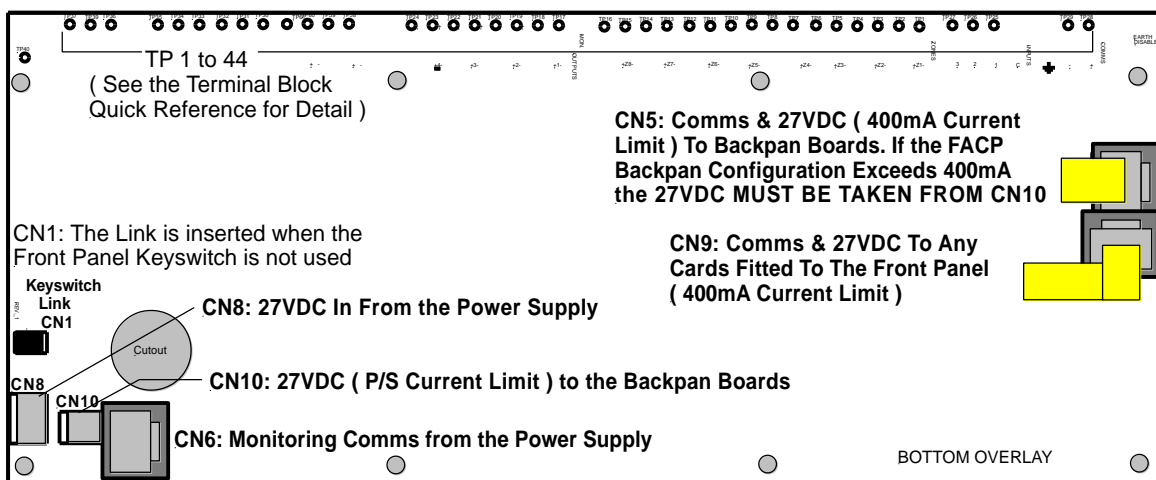



Figure 7: Main Control Card Rear PCB View

 **Note:** When connecting to the Brigade PSU Monitor board transient and “Flyback” (Back EMF) protection methodologies **MUST** be applied.

**Cabling**

Connector	Purpose /Pins			
CN1	Link pins ∂ & • when the front panel keyswitch is NOT used.			
CN2	LCD Driver			
CN3 & 4	LCD Back Lighting			
CN5	Comms and +/- 27V and earth to the backpan boards. (Imax = 400mA)			
Pins	∂ &   0V	• & ... +27V,	÷ & ≠ RS 485 Bus,	≡ Tx. Enable
CN6	Monitoring / Comms from the Power Supply.			
Pins	∂ &   0V	• PSU Sense	÷ PSU Adjust	≠ Charger ON
	≡ Batt Load	≈ Temp sense	... Batt V Sense.	
CN7	Factory Use Only			
CN8	+/- 27V and earth from the Power Supply / Charger.			
Pins	∂ 0V	• +27V	÷ Earth	
CN9	Comms to the internal front panel cards. (Imax = 400mA)			
Pins	Pin connections are the same as CN5			
CN10	∂ +27V and • 0V to the Sounder, Agent Release and Fan Termination back plan boards (Imax = P/S limit). All other backpan boards, 27VDC supply is via the RJ45 Comms cable.			





## 5.1 Earth Monitoring

The earth monitoring disable/enable feature is accessible via the SYSTEM menu at access level 3. Disabling the earth monitoring does not illuminate the Earth Fault LED on the control panel.



**Note:** If ZoneSense PLUS - AR is connected to a third party system which has earth monitoring and it's earth monitoring is being affected by ZoneSense PLUS - AR even after being disabled through programming the resistor R22 on the Main Card in ZoneSense PLUS - AR can be removed.

## 5.2 Communications (TB2)

External Communications Terminals (RS485) TB2 1, 2 & 3

The RS 485 output drives the remote cards and mimics up to a distance of 1.2km from the FACP. The external cabling (1 pair twisted shielded cable plus power) is wired to TB2 +, - and earth.



**Note:** If a fault occurs on the communications line the common FAULT and SYSTEM FAULT LED'S will be illuminated. Selecting the Faults Menu will display the fault details on the LCD.

### 5.2.1 Main Card Comms Link (K1)

K1 MUST be inserted when;

- Front door panel cards and the Main Card are used as an FACP; or
- Backpan boards and the Main Card are used as an FACP; or
- Remote boards and the Main Card are used as an FACP.

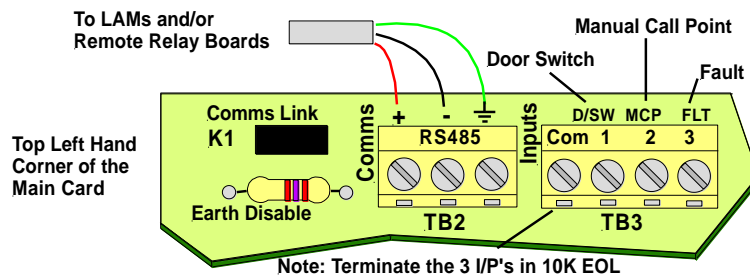


Figure 9: Comms Wiring Details

## 5.3 Inputs – Monitored (TB3)

### 5.3.1 Common Terminal (TB3 Com)

The COM terminal is used as the common for the following three 0v potential inputs.

### 5.3.2 Door Switch Input (TB3 Com / 1)

This optional input is used for connecting the FACP's door switch. Connection is to TB3 COM & 1

### 5.3.3 MCP (TB3 Com / 2)

The optional external MCP I/P is monitored for normal operation and must be mapped to a particular zone.

To test the input insert the test key provided into the MCP. Removal of the key resets the MCP.

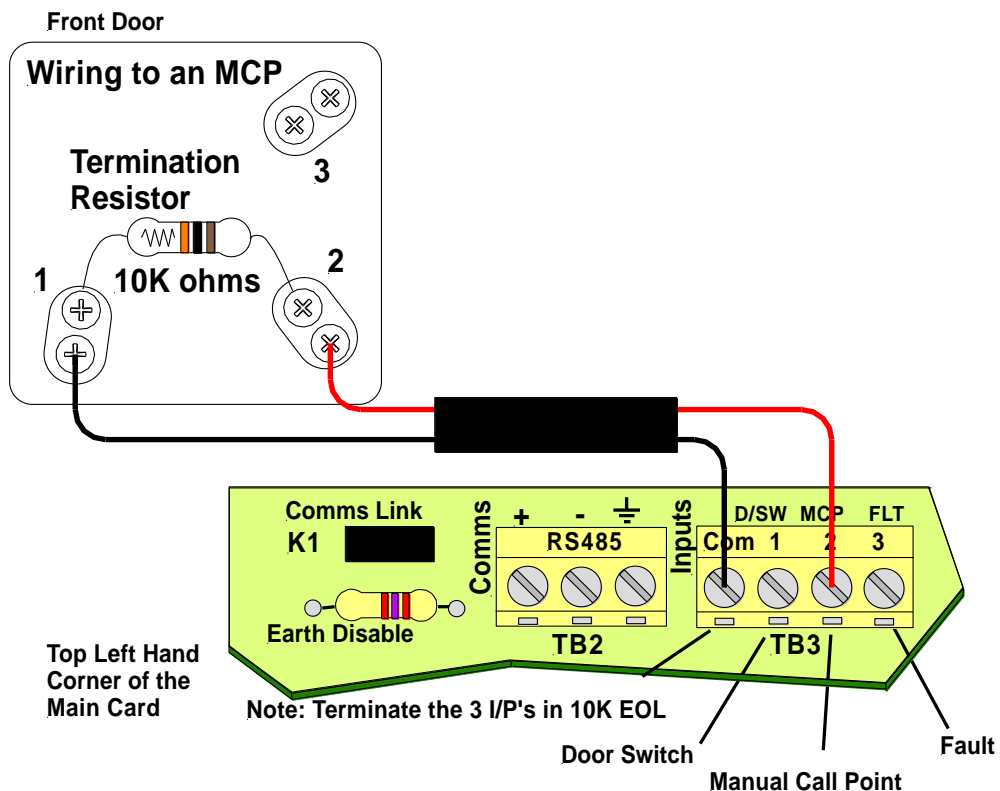


Figure 10: Typical MCP Wiring

### 5.3.4 Fault Input (TB3 Com / 3)

This optional input is used to bring a fault into the system from an external source. Requirements for the input are an open collector or 0 volt, voltage free contact to initiate a fault. Connection is to TB3 COM & 3

## 5.4 Detector Zones (TB13 & TB14)

Zone circuit connections are made directly to TB13 & TB14 on the Main Card and if screened cabling is used the screen is terminated at the panel's chassis earth terminal. All zones can be programmed to operate in one of the 5 different configuration modes each with a reset time in the order of > 1 second < 2 seconds.

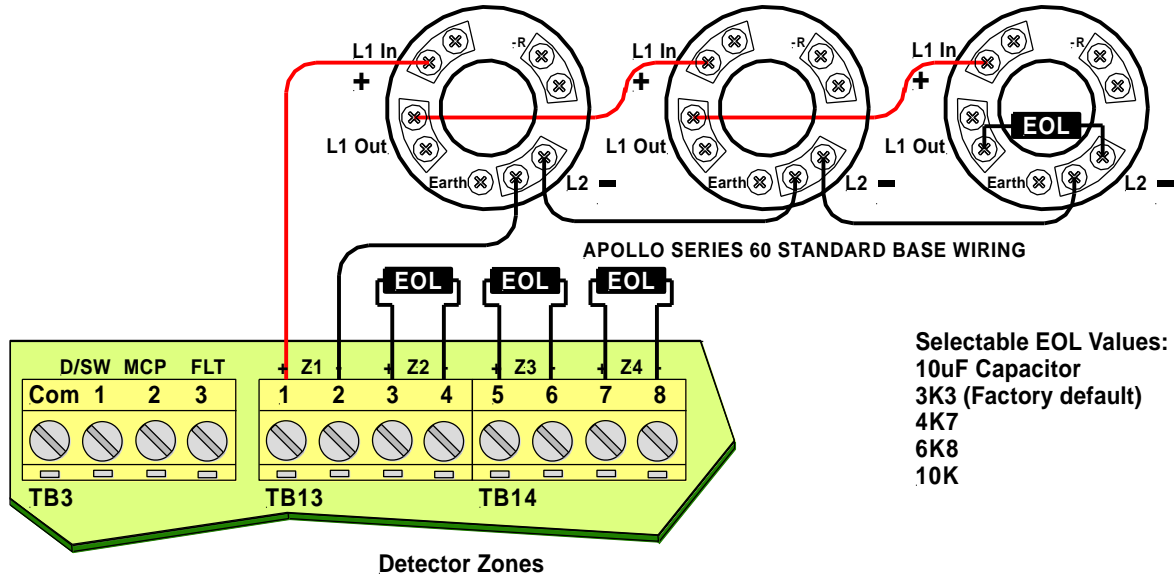


Figure 11: Typical Detector Wiring

### 5.4.1 Detector Configuration

The operating configuration modes are:

Operating Configuration	LCD
Normal	Normal
Alarm Verification Facility	AVF
Non Latching	No Latch
Self Reset	Self Reset
Agent Trigger Zone 1, 2, 3, & 4	T1, 2, 3, & 4




**Note:** AS1670 SECTION 8.6 ALARM VERIFICATION FACILITY states that alarm zone facilities used for the following shall not be subject to alarm verification:


- Manual call points.
- Detectors used to activate fire suppression systems.
- Detectors installed in hazardous areas.
- Fire suppression systems.
- Beam detectors where a beam-interrupt fault overrides the alarm state.
- AZF's containing fixed temperature detectors only.
- Detectors that have integral alarm confirmation delays such as some multipoint aspirated smoke detector systems.

Since the provision of alarm verification delays transmission of a signal to the monitoring service, it is desirable that it only be provided where other efforts to eliminate unwanted alarm signals have been unsuccessful.



**Note:** EOL type (capacitive / resistive) and value are set in the Programming Menu

 **Note:** A maximum of 40 **ZoneSense PLUS - AR** compatible Optical / Heat and Ionisation Detectors or Manual Call Points can be fitted to each circuit and mixed in any order.

 **Note:** An End of Line EOL (Factory set default = 3K3) device must be connected across the terminals of the last device on each zone circuit to allow the circuit to be monitored. Zones that are not used must also have an EOL fitted to the zone terminals on the Main Control Board.

## 5.5 Outputs - Monitored (TB4)

### 5.5.1 Alarm Outputs

The panel has 4 dedicated individually monitored outputs which are;

- rated at 500mA @ 24VDC nominal;
- protected against short circuits;
- Monitored for open and short circuit conditions even when an output is active. The monitoring operates on a reverse voltage principal and will indicate a fault within 60 seconds.

Programming which zones will operate any of the outputs is done via the front Panel.

### 5.5.2 External Bell Output (TB4 1 / 2)

Switched 24VDC.

Operated by an alarm from a non-isolated zone.

Is controlled by the “External Bell Isolate” switch. When pushed the “External Bell” output is inhibited and the LED is illuminated. If pushed again the output is toggled back to the normal state.

Operates the audible fault indication if the output is still in fault and left isolated for longer than 8 hours.

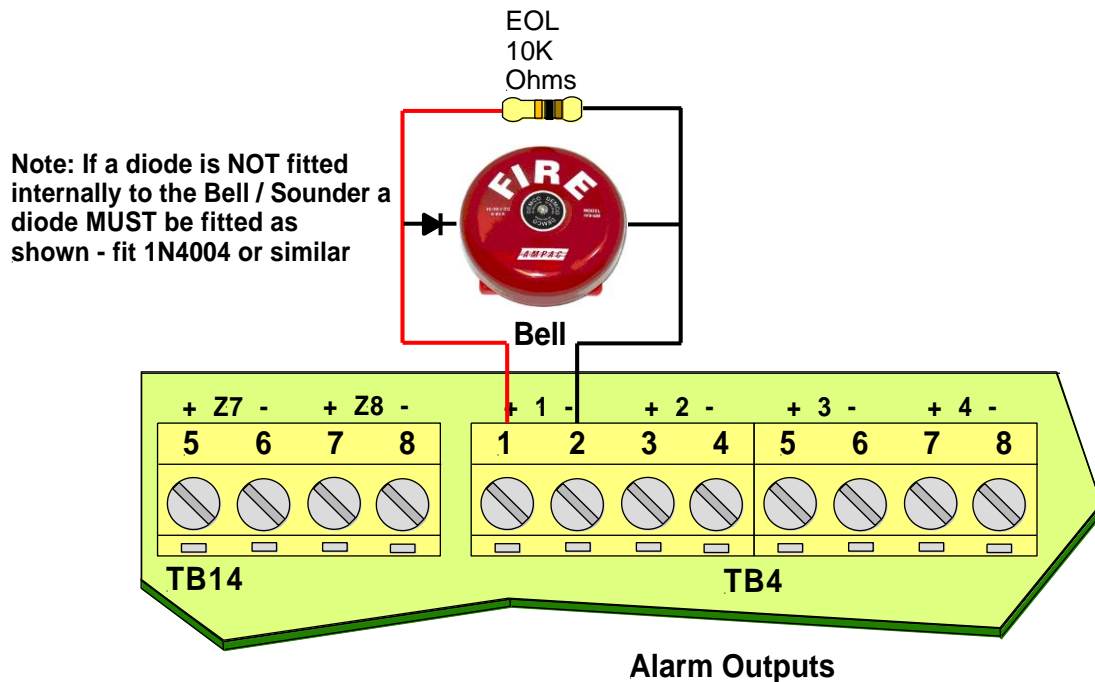


Figure 12: Typical Bell Wiring



**Note:** If a diode is NOT fitted internally to the Bell a diode MUST be fitted as shown above

### 5.5.3 Warning System Output (TB4 3 / 4)

Switched 24VDC.

Operated by an alarm from a non-isolated zone.

The “Warning System Isolate” switch controls this output. When pushed the “Warning System” output is inhibited and the LED is illuminated. If pushed again the output is toggled back to the normal state.

Re-activates the audible fault indication if the output is still in fault and left isolated for longer than 8 hours.

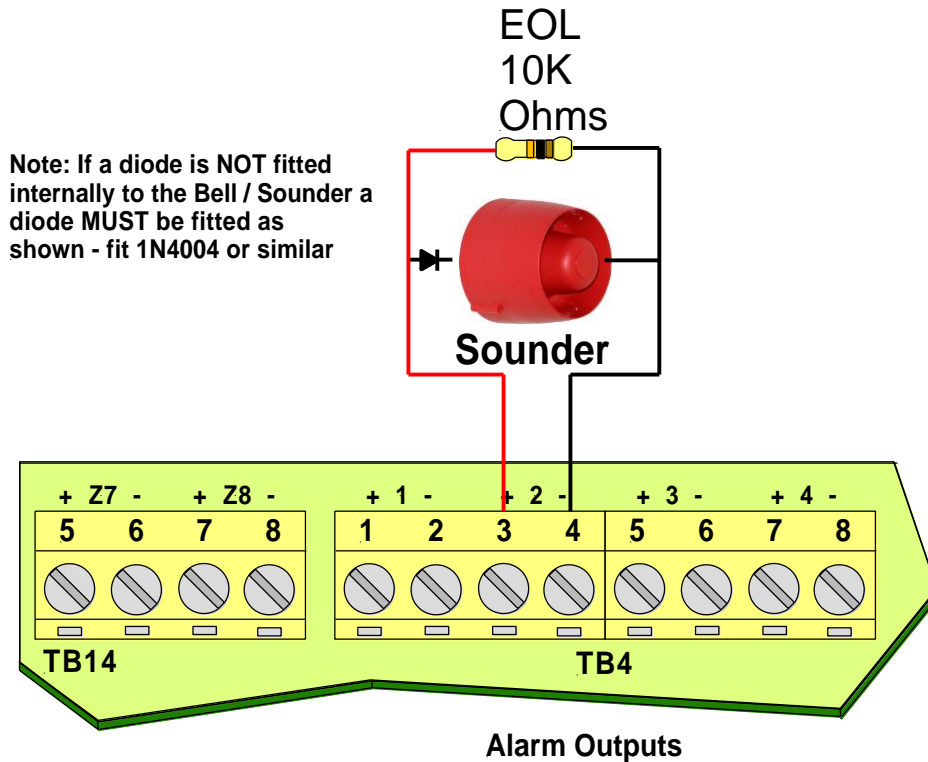


Figure 13: Typical Warning System Wiring

**Note:** If a diode is NOT fitted internally to the Sounder a diode MUST be fitted as shown above

### 5.5.4 Ancillary Control Facility (ACF Output) (TB4 5 / 6)

Switched 24VDC.

Operated by an alarm from a non-isolated zone

The “ACF Isolate” switch controls this output. When pushed the “ACF” output is inhibited and the LED is illuminated. If pushed again the output is toggled back to the normal state.

Re-activates the audible fault indication if the output is still in fault and left isolated for longer than 8 hours.

### 5.5.5 Alarm Signalling Equipment (ASE Output) (TB4 7 / 8)

Is a dedicated switched 24VDC output controlled via programming through the menu structure and operated by an alarm from a non- isolated zone.

Re-activates the audible fault indication if the output is still in fault and left isolated for longer than 8 hours.

### 5.5.6 Conventional Sounder Circuit Wiring (TB4)

Each of the four alarm outputs can also be configured to drive a conventional sounder circuit.

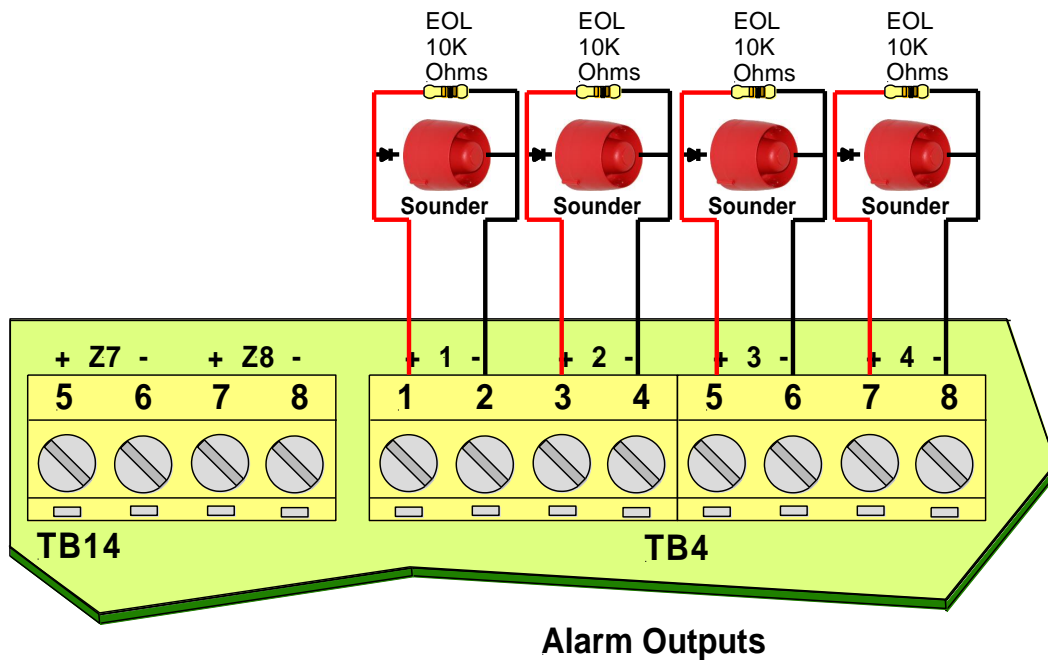



Figure 14: Typical Sounder Wiring

An end of line resistor (10k $\Omega$ ) must be connected at the end of each circuit to allow the wiring to be monitored.

The wiring for each circuit is connected to the relevant 2.5mm connector block on the Main Control Card and the screens terminated to the chassis earth terminal.

 **Note:** All Sounders must be polarised.

 **Note:** If a diode is NOT fitted internally to the Bell / Sounder a diode MUST be fitted as shown.

 **Note:** No Spurs off the main line as EOL monitoring will be compromised

### 5.5.7 Sounder Loading and Distribution

The FACP's power supply is designed to give a maximum output current of 1.8A. In addition to powering the sounders, this current is also used for handling short circuit faults, supplying the FACP's battery charging circuit and any output relays that may be fitted. As a safe margin and to allow for these other loads, the total sounder loading for the panel should not exceed a maximum of 1.5A.

Each output and or sounder circuit is current limited to a maximum alarm current of 500mA. The Sounders should be distributed throughout the building according to the sound levels required, and the load distributed as equally as possible across each circuit.



## 5.6 Outputs – Monitored Open Collector (TB5)

Definition: A monitored open collector output for user connections.

Via the front panel it is possible to program which zones will operate any of the outputs.

### 5.6.1 Alarm Output (TB5 1 / 2)

The output operates in parallel to the Alarm Output relay and energises if a zone is not isolated and is in the alarm condition.

The output is current limited to 30mA.

If a zone is configured as non-latching it will not operate this output.

### 5.6.2 Fault Output (TB5 3 / 4)

The output operates in parallel to the Fault Output relay and de-energises in any fault condition.

The output is current limited to 30mA.

All faults automatically cancel on clearance (buzzer and indication).

## 5.7 Outputs – Volt Free Relay Programmable

Definition: A relay with voltage free change over contacts for user connections.

Programming which zones will operate any of the outputs is done via the front panel.

### 5.7.1 Alarm Output (TB5 5 / 6 / 7)

The relay is energised in the alarm condition of a zone that is not isolated.

The contacts are to rated at 1A 30VDC.

This output is not monitored.

## 5.8 Outputs – Volt Free Relay Non-Programmable

Definition: A relay with voltage free change over contacts for user connections.

### 5.8.1 Fault Output (TB5 8 / 9 / 10)

The relay is de-energised in any fault condition.

All faults automatically cancel on clearance (buzzer and indication).

The contacts are rated at 1A 30VDC.

This output is not monitored.

## 5.9 Auxiliary Power Output (TB12 1 / 2)

An output supplying power, with both the + TB12/1 and – TB12/2 legs fused is provided for ancillary devices.

The output is rated at 500mA @ 24VDC.

The output is protected against short circuit conditions.

In the event of the protection device operating a fault shall be signalled.

The monitoring is only up to the terminal block and does not extend to the field.

Current drawn from this output reduces that available to the sounders.

A fault on this output is indicated by the common FAULT LED illuminating steady and indication on the LCD.

External bell isolated

When fitted Ancillary control functions have been isolated.

### 5.9.1 Reset Terminal / Buzzer Output. (TB12 / 3)

An output rated at 24VDC @ 100mA that can be configured to the user's requirement to provide either of the following 2 functions:

1. Reset.

Reset is used to reset field devices such as beam detectors that is Reset switches negative for a period of 1.2 seconds on operation of the "Reset" button.

2. Buzzer.

Buzzer is connected to an external Buzzer which will sound at the same time as the internal panel buzzer. The output is protected against transient voltages.

### 5.9.2 Buzzer

The buzzer is required to operate on any alarm, fault or isolate condition. If the buzzer has been muted there is provision for the buzzer to resound again after an 8 hour period has elapsed if a new condition has not occurred. This provision is provided for;

Zone isolated

Warning system isolated

### 5.9.3 Internal Communications Connector (RS485)

PCB mounted connectors provide serial communications to internal ancillary boards. CN9 on the Main Card cables to CN5 or 6 on the Agent Release Card or CN1 or 2 on the “Add on” front panel cards and CN5 on the Main Card cables to CN1 or 2 on the back pan boards

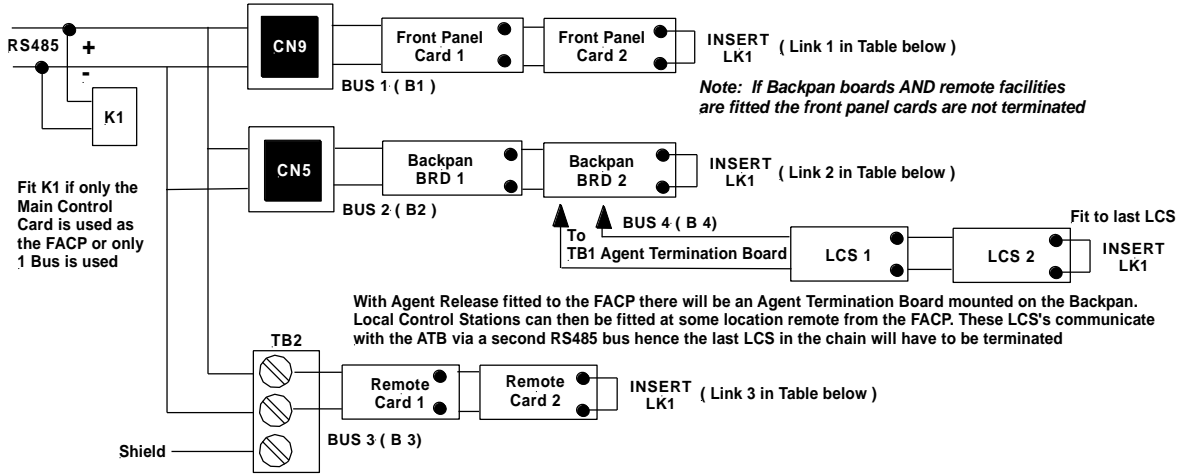


Figure 15: RS485 Communication Bus Terminating

#### Linking Table

K1 is fitted as standard on the Main Control Board. It is removed when more than one Bus is used as defined in the Linking Table below.

Link	Bus Configuration						
	B1	B1,2	B1,3	B1,2,3	B,2	B2,3	B3
1	X & K1	X	X				
2		X		X	X & K1	X	
3			X	X		X	X & K1

X = Insert Link

B1: Bus 1 Front Panel Cards

B2: Bus 2 Backpan Boards

B3: Bus 3 Remote facilities

B4: Bus 4 Local Control Station fitted to the backpan Agent Release Board.

## 6 Agent Release Control

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

### 6.1 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 10KΩ 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

## 6.2 Agent Release Module

The Agent Release Module controls and monitors all the requirements for agent release and carries the slide in label for identification of the agent and application area.

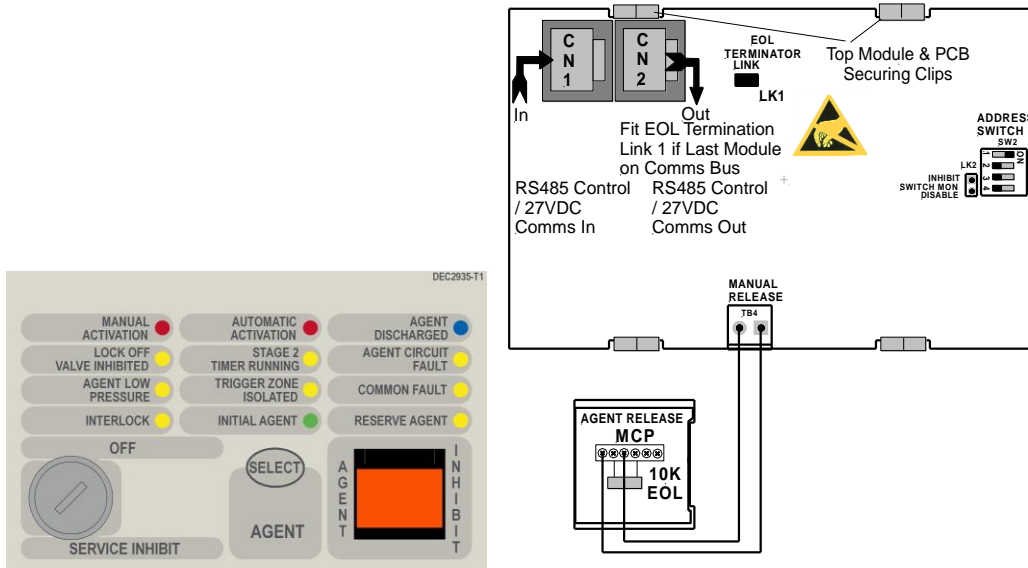


Figure 16: Exploded View of Module and Front Panel Layout

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.

### 6.3 Local Control Station (LCS)

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 17: Local Control Station

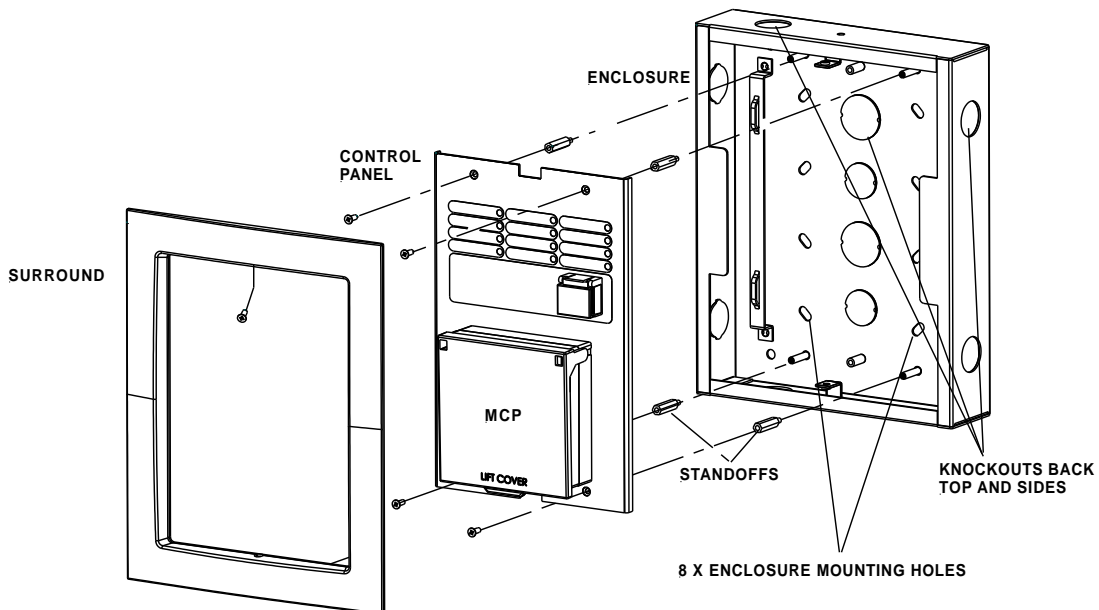


Figure 18: Local Control Station Layout



## 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



## 6.4 Agent Release Termination Board

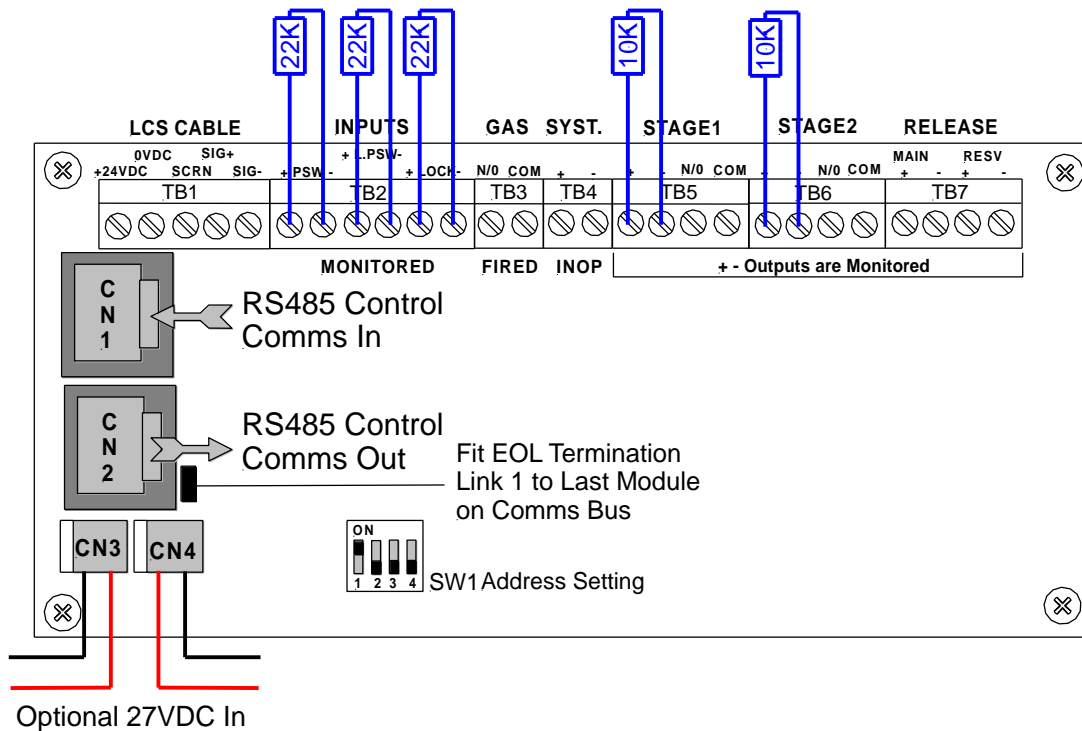


Figure 20: Agent Termination Board PCB Layout

### 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 22K $\Omega$ , Series Resistance 4K7 $\Omega$ )
  - 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 10K $\Omega$ ) 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 10K $\Omega$ ) and
  - Un-monitored; via RL3 N/O contacts wired to TB6 3 & 4
8. Release: Main actuating circuit, monitored (10K $\Omega$  EOL required) via TB7 1 & 2 (2A current limited),
9. Release: Reserve actuating circuit, monitored (10K $\Omega$  EOL required) via TB7 3 & 4 (2A current limited)

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

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

### 6.4.1 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.

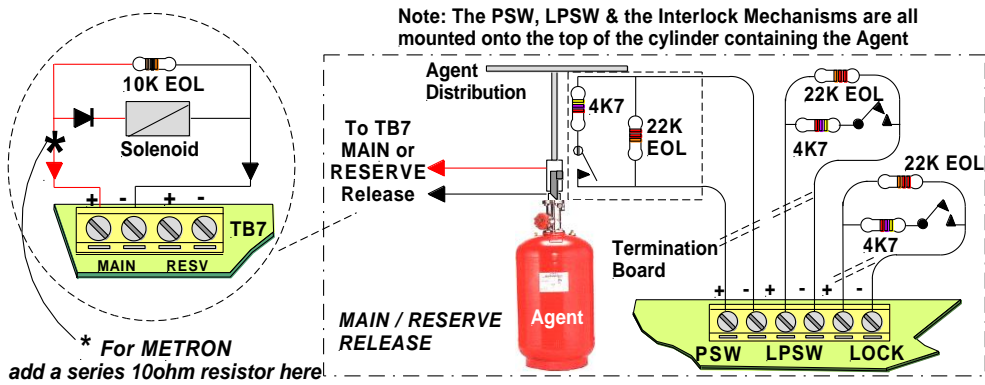


Figure 21: Solenoid, Metron PSW, LPSW and "LOCK" Wiring

#### LPSW & Lock

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

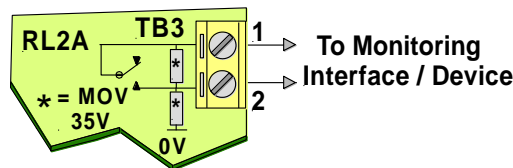


Figure 22 Gas Fired Wiring

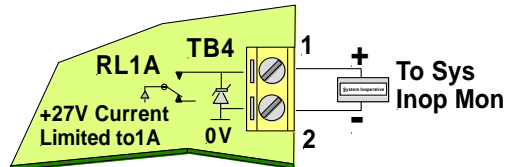


Figure 23: System Inoperative Wiring

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

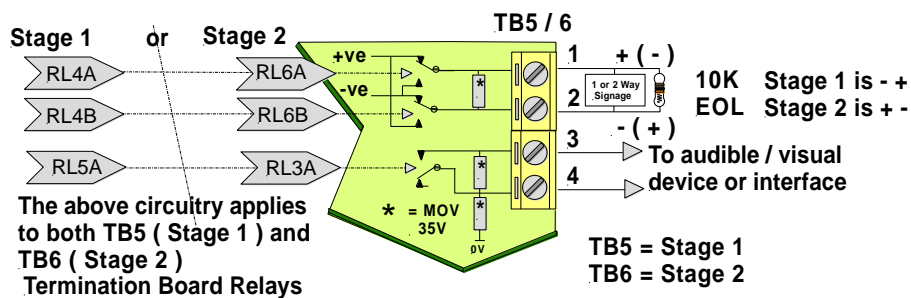


Figure 24: Stage 1 and 2 Wiring

## 6.4.2 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 JP3.

External evacuation devices, e.g. sounders may be connected to TB3 of the input termination board. An external mute push-button (N/O contacts) may also be connected to Term 3 on the warning sign PCB to enable the user to silence the internal buzzer and evacuation device. Inserting JP4 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 3** (Buzzer Mute)

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

### INPUT

Term 4 ( Single pair polarity reversing / 2 Stage Input )	
Stage 1	0V – 24VDC
Stage 2	24VDC – 0V

**Configuration – Jumper Settings**

<b>JP 1 (Continuous / Flashing)</b>		<b>JP 2 (Single / Dual Stage)</b>	
1-2 Continuous	LED's Permanently ON	1-2 Single Stage	Full sign on for Stage 1&2
2-3 Flashing <i>(DEFAULT)</i>	LED's flashing at 1.5Hz	2-3 Dual Stage <i>(DEFAULT)</i>	Half sign on for Stage 1 Full sign on for Stage 2
<b>JP 3 (Enable Buzzer)</b>		<b>JP 4 (Disable External Mute)</b>	
1-2 ENABLE BUZZER <i>(DEFAULT)</i>	Buzzer activates for both Stage 1 & 2	1-2 EXTERNAL MUTE <i>(DEFAULT)</i>	Disable external mute for internal Buzzer
<b>JP 5 ( Enable External Evacuation Device )</b> <i>[not used]</i>			
1-2 Enable External Evacuation	External evacuation device will activate on Stage 1 & 2		
DEVICE <i>(DEFAULT)</i>	with the tone dependent on the input polarity		

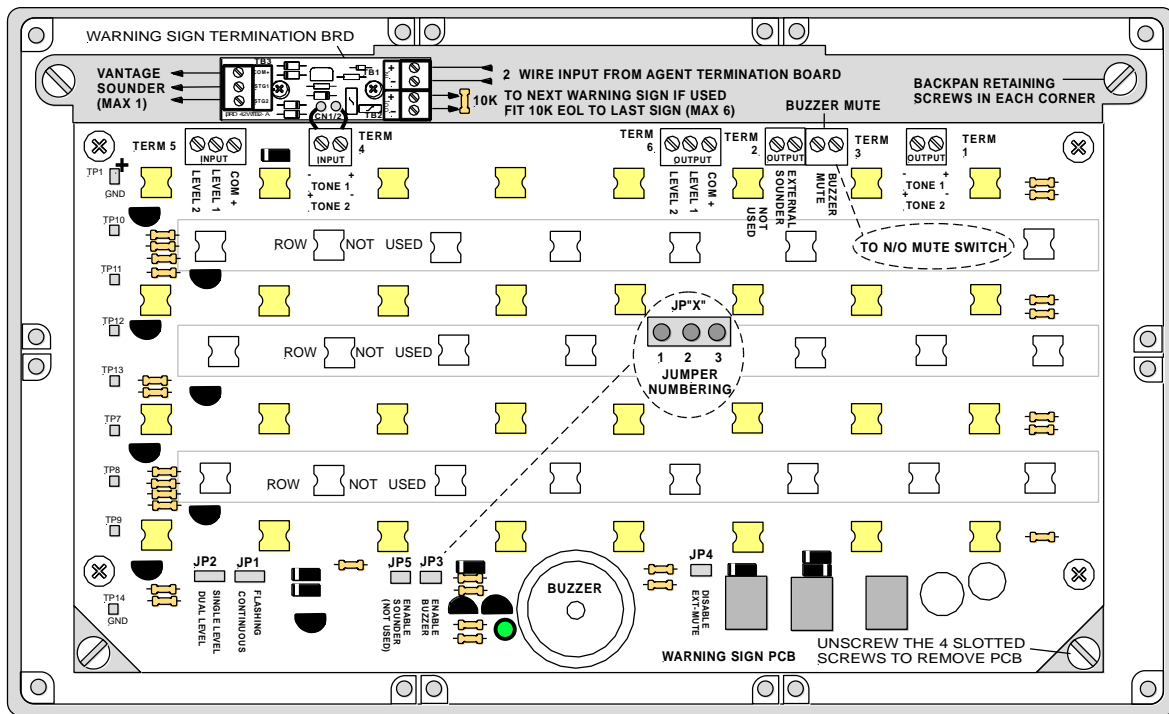


Figure 25: Warning Sign PCB Layout and Cabling



## 7 Battery Capacity Calculation

The standby power source capacity, or battery capacity, determines how long the system will continue to operate in the event of the loss of the primary power source. It therefore becomes necessary to calculate the battery and hence power supply / battery charger capacity required for each installation.

The following calculator has been designed to determine the required capacity to meet the required standard. Should an existing panel be expanded the required battery and power supply capacity should be recalculated to ensure the panel continues to operate within the standard.

The standards considered in this document are AS1670.1 2004

### 7.1 Description

Enter the number of units listed in the left hand column which go to make up the panel, complete the multiplication to obtain the quiescent current then multiply by the standby and alarm hours required by the standard.

### 7.2 Power Supply Rating

The minimum Power Supply Rating ( 4 ) is obtained by calculating the manufacturers recommended battery charge current and [ see Note ] ( 1 ) then adding the quiescent current of the entire system ( 2 ) and the alarm current ( 3 ).

1. Battery Capacity (AH) (determined from Calculator) = \_\_\_\_\_Amps  
 $24 \times 0.8$
2. **Add** Quiescent Current of the System (Iq) = \_\_\_\_\_Amps
3. **Add** the extra current that is drawn when in alarm (Ia) = \_\_\_\_\_Amps
4. Minimum Current Rating of Power Supply is = \_\_\_\_\_Amps



**Note #1:** The capacity of the battery shall be such that in the event of failure of the primary power source the batteries shall be capable of maintaining the system in normal working (quiescent) condition for at least 24 hours, after which sufficient capacity shall remain to operate two worst case AZF's and associated ACF's for 30 min.



**Note #2:** Where the fire control station will not receive the system's total power supply failure signal the battery shall have sufficient capacity to maintain normal system operation for 72 hours plus 30min. in alarm.



**Note #2:** Where the fire control station will not receive the system's total power supply failure signal and Agent Release is incorporated in the FACP, the battery shall have sufficient capacity to maintain normal system operation for 96 hours plus 30min. in alarm.



**Note #3:** When calculating battery capacity, allowance shall be made for the expected loss of capacity over the useful life of the battery. A new battery shall be at least 125% of the calculated capacity requirements, based on a loss of 20% of its capacity over the useful life of the battery.




### 7.3 Power Supply & Battery Calculator

Panel Configuration	Criteria		Example		Iq = Iq
	Iq Calculation	Iq	Iq Calculation	Iq	
	No Off X mA	= Iq	No Off X mA		
Basic 4 zone gas panel	60				0
Basic 8 zone gas panel	90		1 90	90	90
<b>Interface Cards/Boards</b>					
Sounder Board	6				0
Brigade Board	23		1 23	23	23
Input Board	5				0
Fire Fan Module	16.5		1 16.5	16.5	16.5
General Indicator Card	3				0
Relay Board (Internal)	0.5		1 0.5	0.5	0.5
Switch & Indicator Card	3.5				0
EV20SZEWS	41				0
EV40SZEWS	58				0
LED Annunciator Master (LAM)	11.5		1 11.5	11.5	11.5
Local Control Station	18.5				0
Relay Board (Remote)	16				0
<b>Total</b>					
Orbis range (average)	0.107		21 0.107	0.107	2.3
Apollo range (average)	0.048		32 0.048	0.048	1.5
					0
Fireray 2000 Beam Det.	13				0
	<b>Iq =</b>			<b>Iq =</b>	<b>145.3</b>
<b>Devices activating when the system is in alarm</b>					
2 Gas Zones in Alarm	215		1 215	215	215
Sounder Board	152		1 152	152	152
Brigade Board	41		1 41	41	41
Input Board	5				0
Fire Fan Module	87		1 87	87	87
General Indicator Card	3				0
Relay Board (Internal)	67				0
Switch & Indicator Card	3.5				0
EV20SZEWS	650				0
EV40SZEWS max 30Watt Load	3400				0
Relay Board (Remote)	102		1 102	102	102
Local Control Station	21				0
Relay Board (Remote)	102				0
Warning Signs (2 Stage)	140		2 280	280	280
Bells	100		1 100	100	100
Strobe	125		2 125	125	250
Other					0
	<b>Ida=</b>			<b>Ida=</b>	<b>1227</b>
<b>Devices de-activating when the system goes into alarm</b>					
Aircon Relays	20		2 20	20	40
Electric locks	100		2 100	100	200
Other					
	<b>Idd=</b>			<b>Idd=</b>	<b>240</b>

**I Alarm ( Ia = Iq + Ida – Idd ) = mA**

Ia = 145 + 1227 – 240 = 1132 rounded for calculation

	<i>Criteria</i>	<i>Example</i>
<b>Battery capacity at end of battery life</b>	$= (I_q \times 24) + (I_a \times 0.5)$	$= (I_q \times 24) + F_c(I_a \times 0.5)$
<b>NOTE:</b> 	<b>Note: the figure of 24 above should be 96 if Brigade unmonitored Agent Release is used.</b>	Fc – capacity de-rating factor. AS1670.1 states a factor of is deemed to satisfy the criteria. <i>(using rounded figures)</i>
<b>Note:</b> 1,000ma = 1 Amp	= Ah	$= (145\text{mA} \times 24) + 2(1227\text{mA} \times 0.5)$ $= 3480\text{mA} + 1227\text{mA} = 4707\text{mA}$ $= 4.7\text{Ah( rounded )}$
<b>New battery capacity requirement</b>	$= \text{Ah} \times 1.25$	$= 4 \times 1.25$ $= 5.875 \text{ Ah}$
<b>Rounded up to nearest available battery rating</b>		$= 6 \text{ or } 7\text{Ah}$

## 7.4 Primary Power Source Calculations

### Battery Charger Current

Requirement: Battery is charged for 24 hrs. to provide  $5I_q + 0.5I_a$

$$\begin{aligned}
 &= (5 \times I_q) + F_c(0.5 \times I_a) &= (5 \times I_q) + F_c(0.5 \times I_a) \\
 & &= (5 \times 145) + 2(0.5 \times 1227) \\
 & &= 725 + 1227 \\
 & &= 1952 \text{ Ah}
 \end{aligned}$$

### Ah Requirement

### Battery Charging Current Required

$$\begin{aligned}
 &= \frac{\text{Ah above}}{24 \times e} &= \frac{1952}{24 \times e} (= 19.2) \\
 & &= 0.101\text{A}
 \end{aligned}$$

e is the battery efficiency, 0.8

### Power Supply Requirement

Select the greater of 1 or 2

1.  $I_a$  + non battery backed ancillary alarm loads
2.  $I_q$  + non battery backed quiescent loads


If the power supply is used as the charger the current rating of the supply shall be  $[(1 \text{ or } 2) + \text{battery charger current}]$ .





**Note: Remember to take into account ALL outputs that will be switched on when calculating  $I_{da}$ .**


## 8 Battery Guidelines

(Tested by SSL to comply with AS 1603.4-1987 Appendix G).

 **Note #1:** **afp** number is the SSL Listing Number.

 **Note #2:** Types are the Manufacturers and not the suppliers.

 **Note #3:** Those listed below in small *Italic* are not generally used by Ampac.

 **Note #4:** Automotive type batteries are not normally suitable for stationary use.

<b>afp - 791</b>	<b>afp - 792</b>	<b>afp - 1220</b>	<b>afp - 1221</b>	<b>afp - 1222</b>	<b>afp - 1228</b>
<b>Yuasa NP Series</b>	<b>Power-Sonic PS Series</b>	<b>Matsushita LCR Series</b>	<b>Matsushita LCL Series</b>	<b>Matsushita LCX Series</b>	<b>B &amp; B BP Series</b>
<i>NPH1.3-6</i>	<i>PS-605</i>	<i>LC-R065P</i>	LC-LA12V33P	LC-	<i>BP 1.2-6</i>
<i>NPH3.2-6</i>	<i>PS-610</i>	LCR12V4BP		X1224P9(AP)	<i>BP 4.0-6</i>
NPH1.3-12	<i>PS-630</i>	LC-R125P		LC-	<i>BP 4.5-6</i>
NPH2-12	<i>PS-632</i>	LC-RC1217P		X1228P(AP)	<i>BP 6-6</i>
NPH3.2-12	<i>PS-640</i>	<i>LC-R064R2P</i>		LC-	<i>BP 7-6</i>
NPH5-12	<i>PS-650L</i>	<i>LC-R067P</i>		X1238P(AP)	<i>BP 8-6</i>
NPH16-12	<i>PS-670</i>	<i>LC-RO011P</i>		LC-	<i>BP 10-6</i>
<i>NP1-6</i>	PS-1208	LC-R127P		X1242P(AP)	BP 1.2-12
<i>NP1.2-6</i>	PS-1212	LC-R127R2P			BP 1.9-12
<i>NP2.6-6</i>	PS-1219				BP 4-12
<i>NP3-6</i>	PS-1232				BP 7-12
<i>NP4-6</i>	PS-1240				BP 12-12
<i>NP4-6W</i>	PS-1270				BP 17-12
<i>NP4.2-6H</i>	PS-12120				BP 24-12
<i>NP7-6</i>	PS-12180				BP 40-12
<i>NP8-6</i>	PS-12240				
<i>NP10-6</i>	PS-12330				
NP0.8-12	PS-12400				
NP1.2-12	PS-12650				
NP1.9-12					
NP2.3-12					
NP2-12					
NP2.6-12					
NP4-12					
NP7-12					
NP12-12					
NP24-12					
NP24-12B					

## 9 Trouble Shooting Chart

Problem	Solution
No Mains Power	Check mains Fuse
Supply fault LED illuminated	Check output voltage it should be set to 27.2VDC. Low = (less than 26.5VDC ) High = (greater than 28VDC ) 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
Warning System Fault LED illuminated	Check correct E.O.L is fitted Check wiring is connected correctly
RS485 Communication Bus not working	Refer 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 and directions will be given to provide you with a temporary code
Bell / Sounder Fault	Make sure you have a 10K $\Omega$ EOL resistor fitted and a diode (1N4004) in series with the bell / sounder

## 10 Installation and Commissioning Report

This **ZoneSense PLUS - AR** Fire Alarm Control Panel is installed at:

Company Name \_\_\_\_\_

Street \_\_\_\_\_

Suburb \_\_\_\_\_

State / Country \_\_\_\_\_

*(Company Name & Installation Address)* Postcode \_\_\_\_\_

Owner or Owners' Authorised Representative:

Company Name \_\_\_\_\_

Street \_\_\_\_\_

Suburb \_\_\_\_\_

State / Country \_\_\_\_\_

*(Company Name & Installation Address)* Postcode \_\_\_\_\_

Type of Installation:      NEW              MODIFIED              ADDITION              UPGRADE

*(Please Circle)*

Date of commissioning tests:                      \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Name and address of commissioning company,                      (in 'BLOCK LETTERS')

Company Name \_\_\_\_\_

Street \_\_\_\_\_

Suburb \_\_\_\_\_

State / Country \_\_\_\_\_

*(Company Name & Installation Address)* Postcode \_\_\_\_\_

Commissioning Representative Name: (Print) \_\_\_\_\_

Signature: \_\_\_\_\_

## 10.1 Procedure

The following tests are the minimum that shall be performed when commissioning a system using the **ZoneSense PLUS - AR** Fire Alarm Control Panel. Supplements to these tests 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.

## 10.2 System Information

	<i>Tick relevant box</i>	Yes	No	Not Applicable
1. Ensure that all detectors used in the system:				
i. Are listed in the operator's manual;		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii. Are compatible with the installed AZF,		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii. Do not exceed the permitted number of detectors on each circuit; and		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv. Are installed in an environment for which they are suitable.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Check that the primary power source for the system has been provided in accordance with AS 3000, and that the isolating switch disconnects the active conductors.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Check that the detector and the FACP locations are in accordance with the appropriate clauses of, AS 1670.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Alarm Zone Circuit:				
i. Measure each alarm zone circuit voltage, and ensure each is within the equipment manufacturer's specifications.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii. Insulation resistance of all installation wiring measured in accordance with AS 3000 or similar approved method and record the worst case result in the logbook.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Open circuit and short circuit the end of line device on each alarm zone circuit, or conduct other appropriate tests to ensure that fault and alarm conditions are operating correctly on all alarm zone facilities on other sections of the control and indicating equipment.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. FACP test to be carried out as follows:				
i. Operate each alarm test, fault test, isolate and reset facility provided for each alarm zone facility to determine correct operation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii. Operate the primary power source switch on and off at least five times to check the system will not cause a false alarm from primary power source interruptions.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Detector testing to be carried out as follows:				
i. Test each installed detector or sampling point with an approved in-situ tester, and ensure that each detector has operated in the correct range, and the alarm has indicated on the control and indicating equipment and, if applicable, at the detector tested.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii. Confirm that response of the system does not exceed 6 s from the time the detector operates until the master alarm facility registers the alarm (while in normal mode) on each zone, or 32 s when AVF is fitted.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii. Record tests on detector test record as required by AS 1851.8 and attach to the report.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Check the operation of each manual call point and all other actuating devices.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. For flame detectors, perform the following:
- i. Check that the number and type of detectors provide adequate protection of the area.
  - ii. Check that there are no 'blind' spots in areas protected.
  - iii. Check that detectors are rigidly fixed.
  - iv. Check that detectors are properly connected to compatible control and indicating equipment.
  - v. Check that detector lenses are clean and adequately protected from dust and extraneous radiation sources where these are present.
  - vi. Test the detection response to a flame source or simulated flame.
10. For smoke detection sampling systems, perform the following:
- i. Measure the response time of all sampling points using smoke placed at each sampling point.
  - ii. Check the back-up power supply capacity.
  - iii. Check the operation of alarm settings and indicators.
  - iv. Check operation of remote indication of alarm and fault signals.
  - v. Check the operation of airflow failure indicators.
  - vi. Check the operation of the system (signal) failure indicators.
  - vii. Check the isolate/reset functions.
  - viii. Check the fault and alarm test facilities.
11. Test each ancillary function by operating the alarm zone facility(ies), associated with the ancillary function.
12. Alarm signaling:
- i. Check that the master alarm facility is able to receive the alarm signal by operating each alarm zone facility.
  - ii. Check that the master alarm facility initiates an alarm to the fire control station equipment.
13. Battery supply:
- i. Check that both the primary and secondary power sources are of a suitable type and capacity complying with Clause 8.2.
  - ii. Perform a float voltage check according to the battery manufacturer's recommendation to ensure that the charger type and setting is correct.
- Type of battery. \_\_\_\_\_ Float voltage/ required. \_\_\_\_\_  
 Charger type. \_\_\_\_\_ Charger set at. \_\_\_\_\_
14. Check that all alarm zone facilities have been correctly labeled and that the alarm zone is immediately apparent from the labeling.
15. Check the 'as-installed' drawings are marked up, are consistent with the installation and the operator's manual is relevant to the installation.
16. Ensure the results of these tests are recorded in the system logbook.



## 11 Statement of Installation 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)*

<ol style="list-style-type: none"> <li>1 _____</li> <li>2 _____</li> <li>3 _____</li> <li>4 _____</li> <li>5 _____</li> </ol>	<ol style="list-style-type: none"> <li>6 _____</li> <li>7 _____</li> <li>8 _____</li> <li>9 _____</li> <li>10 _____</li> </ol>
---	--

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.I, -

**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*



## 13 Certification Information

The **ZoneSense PLUS - AR** is designed and manufactured by:

AMPAC TECHNOLOGIES PTY LTD

7 Ledger Rd

Balcatta

WA 6021

Western Australia

PH: 61-8-9201 6100

FAX: 61-8-9201 6101



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

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

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

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

## 14 Specifications

### Mechanical

Dimensions Metal Cabinet: (mm) 500H x 405W x 145D

Note: A battery box is available should either model be optioned to capacity.

### Environmental

Temperature: -5°C to + 55°C

Humidity: 25% to 75% Non condensing

### Power Supply

Input Voltage: 180 - 264VAC ( 47-63Hz )

Protection (Quick Acting Fuse): 1.25 Amp M205

Minimum Cable Requirements: Not less than 0.75mm

Voltage: 27.2VDC +/- 0.1VDC

Power Supply Ripple Voltage: <100mV

Power Supply Regulation: 2%

Power Supply Fault Indication Volts High 28VDC

(at room temperature) Volts Low 26.5VDC

Power Supply Output Current: 2Amps

Protection: Current Limiting

Charger O/P Voltage: (@ 25°C) 27.3 +/- 0.1VDC

Battery Type: Sealed Lead Acid 2 x 12V Sealed Lead Acid

Maximum Battery Capacity: 7AH - 12AH for metal cabinet

Maximum Charger Current Limited: 400mA

Battery Supply Current Limited: 3A (PTC)

Battery Discharged Cut-off Voltage: 21VDC

### Main Card

Quiescent Current (Iq) (Add 8mA / zone for 3K3 EOL) 25mA

Iq plus Zone 1 in Alarm 90mA

Maximum Current Draw per Output (Current Limited) 500mA

Maximum Number of Devices per Conventional Zone: 40 max

Cabling Requirements: 2 core 1.5 to 2.5mm<sup>2</sup>

Fault monitoring: O/C, S/C, (EOL default = 3K3)

### Outputs

Alarm (Current Limited) 24VDC @ 500mA Max

Alarm / Fault Monitored Open Collector (Current Limited) 24VDC @ 30mA Max

Alarm Fault Relay Contacts 24VDC @ 1A

Auxiliary VDC 24VDC 500mA Monitored

### Inputs

MCP, Door Switch and Fault 0VDC Closing Contact

### Communications

Internal to FACP RS485

External to FACP RS485

## 15 Glossary of Terms

ACF:	ANCILLARY CONTROL FACILITY
ACKD:	ACKNOWLEDGED
AHU:	AIR HANDLING UNIT
ALM:	ALARM
AVF:	ALARM VERIFICATION FACILITY
AZF:	ALARM ZONE FACILITY
AZC:	ALARM ZONE CIRCUIT
C:	RELAY COMMON CONTACT (WIPER)
CIC:	CONTROLLER INTERFACE CARD
CN:	CONNECTOR
CPU:	COMMON PROCESSOR UNIT
DGP:	DATA GATHERING POINT
EARTH:	BUILDING EARTH
EOL:	END OF LINE
FDS:	FIRE DETECTION SYSTEM
FACP:	FIRE ALARM CONTROL PANEL
FLT:	FAULT
GND:	GROUND (0 VOLTS) NOT EARTH
I/O:	INPUT/OUTPUT
LCD:	LIQUID CRYSTAL DISPLAY
MAF:	MASTER ALARM FACILITY
MCP:	MANUAL CALL POINT
MOV:	METAL OXIDE VARISTOR (TRANSIENT PROTECTION)
NIC:	NETWORK INTERFACE CARD
N/C:	NORMALLY CLOSED RELAY CONTACTS
N/O:	NORMALLY OPEN RELAY CONTACTS
N/W:	NETWORK
PCB:	PRINTED CIRCUIT BOARDS
P/S:	POWER SUPPLY
PSM:	POWER SUPPLY MODULE
REM:	REMOTE
SPOT:	SINGLE PERSON OPERATING TEST
TB:	TERMINAL BLOCK
VDC:	DIRECT CURRENT VOLTS

## 16 Definitions

**Addressable system** - a fire alarm and detection system that contains addressable alarm zone facilities or addressable control devices.

**Alarm Verification Facility (AVF)** - that part of the FACP, which provides an automatic resetting function for spurious alarm signals so that they will not inadvertently initiate Master Alarm Facility (MAF), or ACF functions. Using ConfigManager prior to downloading to the *FireFinder*<sup>™</sup> sets this option

**Alarm zone** - the specific portion of a building or complex identified by a particular alarm zone facility.

**Alarm Zone Circuit (AZC)** - the link or path that carries signals from an actuating device(s) to an alarm zone facility(s).

**Alarm Zone Facility (AZF)** - that part of the control and indicating equipment that registers and indicates signals (alarm and fault) received from its alarm zone circuit. It also transmits appropriate signals to other control and indicating facilities.

**Alert signal** - an audible signal or combination of audible and visible signals, from the occupant warning system to alert wardens and other nominated personnel as necessary to commence prescribed actions.

**Ancillary Control Facility (ACF)** - that portion of the control and indicating equipment that on receipt of a signal initiates predetermined actions in external ancillary devices.

**Ancillary equipment** - remote equipment connected to FACP.

**Ancillary relay** - relay within FACP to operate ancillary equipment.

**Ancillary output** - output for driving ancillary equipment.

**Approved and approval** - approved by, or the approval of, the Regulatory Authority concerned.

**Card-detect link** - a link on a module connector to indicate the disconnection of the module.

**Conventional System** - is a fire detection system using a dedicated circuit for each alarm zone.

**Distributed system** - a fire alarm and detection system where sections of the control and indicating equipment are remotely located from the FACP or where sub-indicator panel(s) communicate with a main FACP.

**Field connections** - are connections made to FACP or ancillary equipment during installation.

**Fire alarm system** - an arrangement of components and apparatus for giving an audible, visible, or other perceptible alarm of fire, and which may also initiate other action.

**Fire detection system** - an arrangement of detectors and control and indicating equipment employed for automatically detecting fire and initiating other action as arranged.

**Fire Alarm Control Panel (FACP)** - a panel on which is mounted an indicator or indicators together with associated equipment for the fire alarm or sprinkler system.

**Fire resisting** - an element of construction, component or structure which, by requirement of the Regulatory Authority, has a specified fire resistance.

**Indicating equipment** - the part of a fire detection and or alarm system, which provides indication of any warning signals (alarm and fault), received by the control equipment.

**Interface** - The interconnection between equipment that permits the transfer of data.

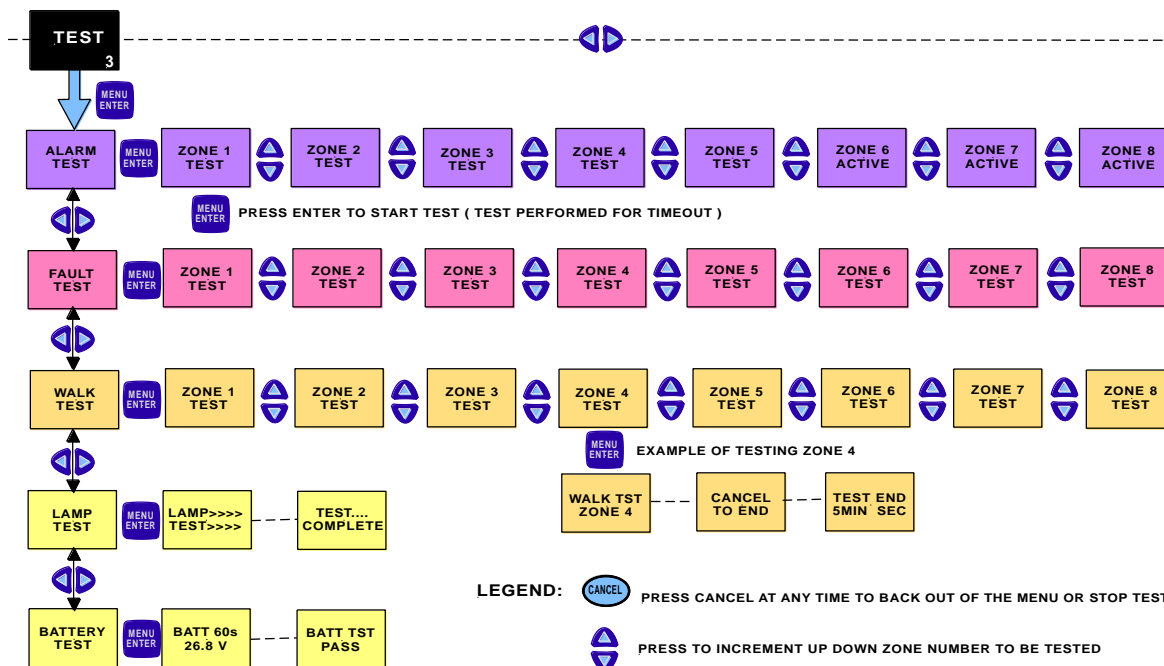
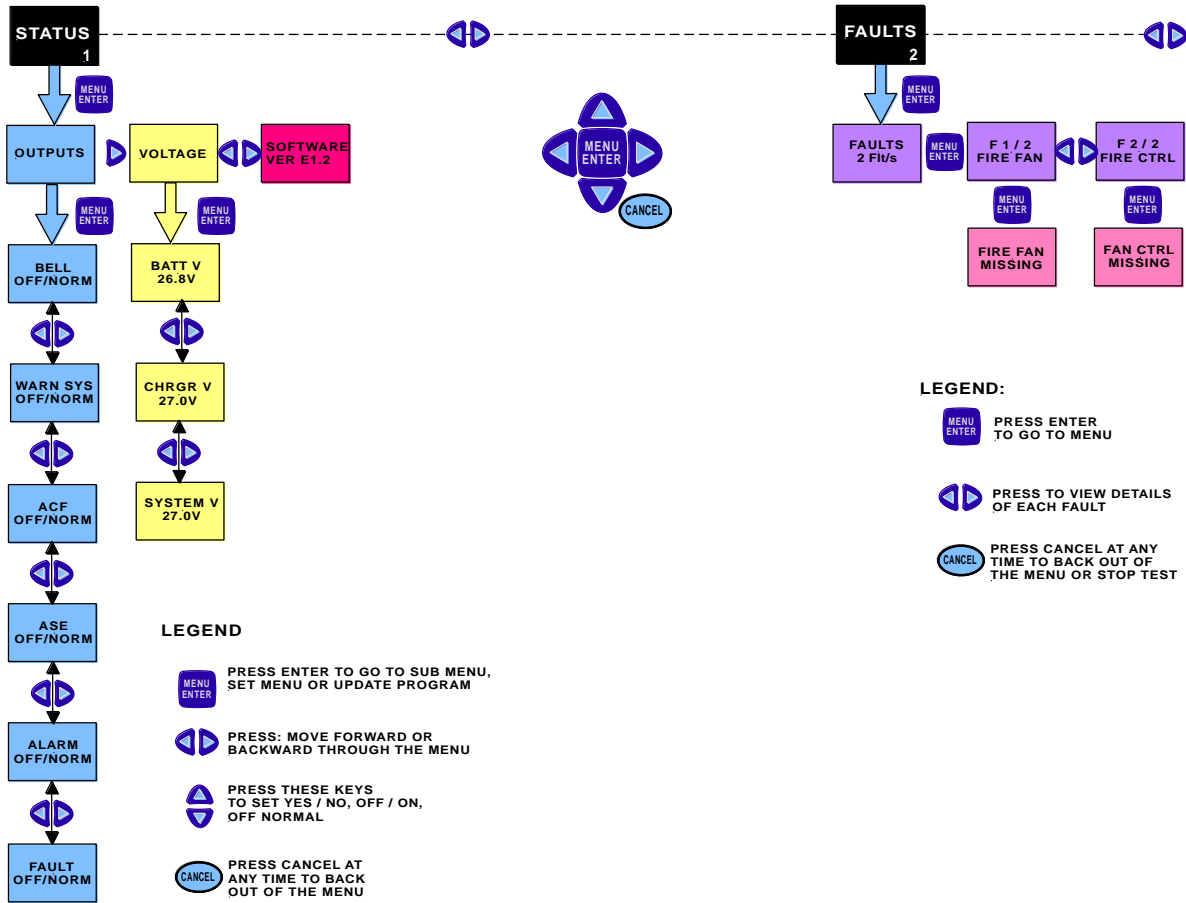
**Main equipment** - equipment essential to the operation of the system including, control equipment, amplification equipment and power supply modules.

**Master Alarm Facility (MAF)** - that part of the equipment which receives alarm and fault signals from any alarm zone facility and initiates the common signal (alarm and/or fault) for transmission to the fire control station. Bells and other ancillary functions may be initiated from this facility.

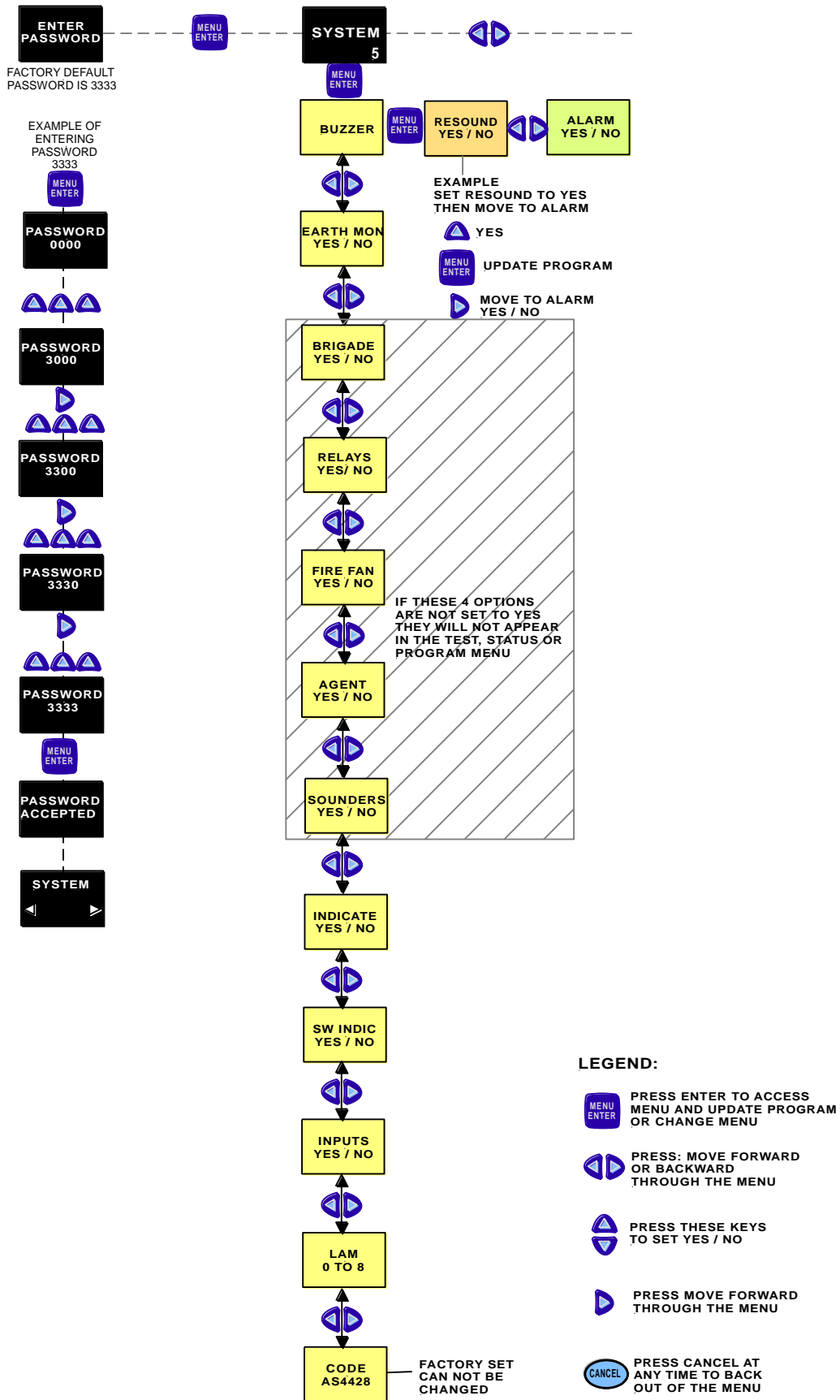
**Power Supply** - that portion of the FACP which supplies all voltages necessary for its operation.

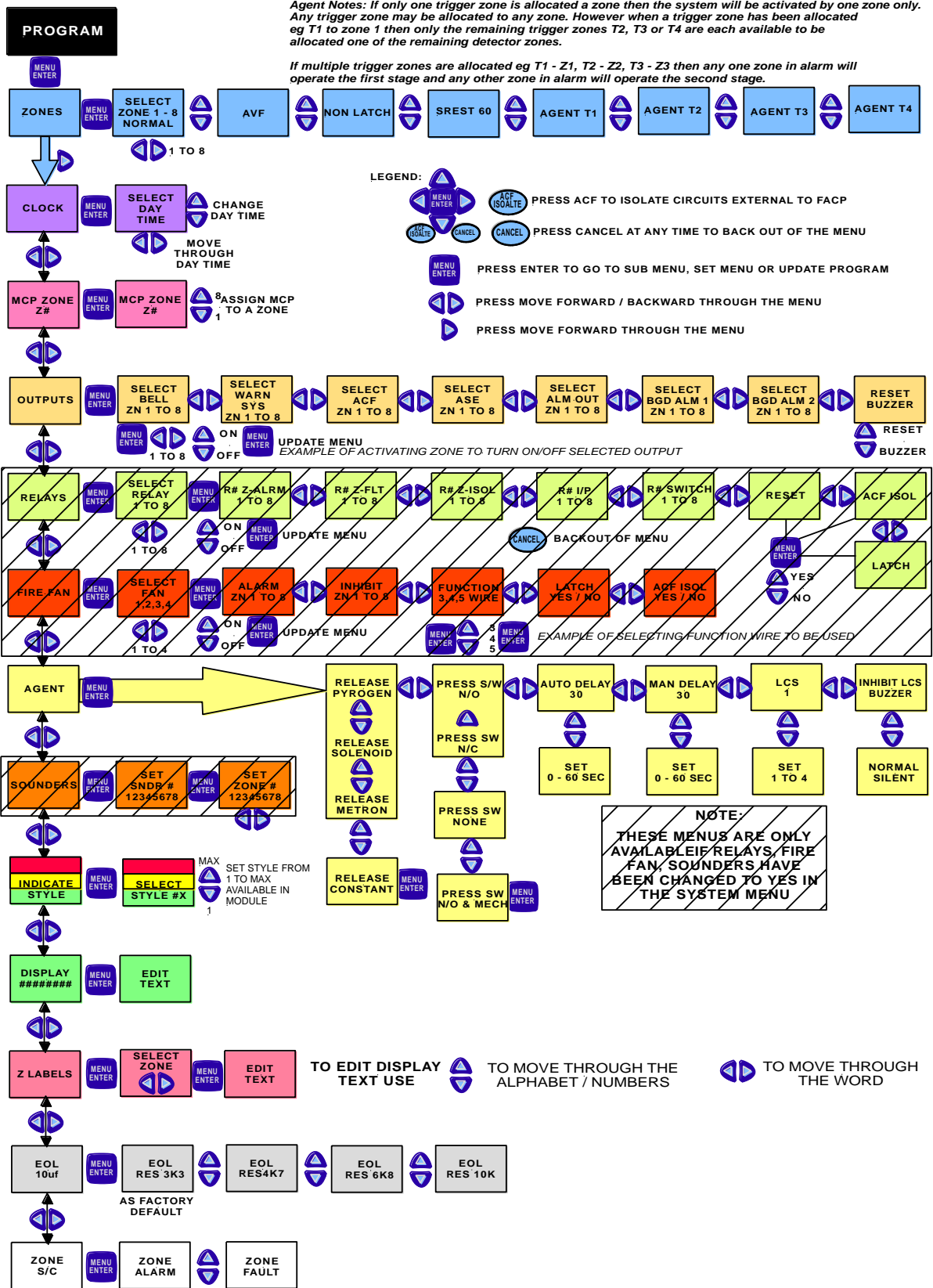
**Regulatory Authority** - an authority administering Acts of Parliament or Regulations under such Acts.

## 17 Quick Reference Guides













**UNCONTROLLED DOCUMENT**

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