ESP SAFETY PVT. LTD.

Addressable Fire Alarm Control Panel

FACPES

Installation & Operation Manual

Contents

1 GENERAL OVERVIEW

To be added finally.

1.1 Introduction

This document is intended to provide the information necessary to operate the FACPES Addressable Fire Alarm Control Panel. It is prepared for use by a competent, qualified fire alarm engineer.

This manual covers complete product details of FACPES useful for operation and commissioning.

2 PRODUCT OVERVIEW

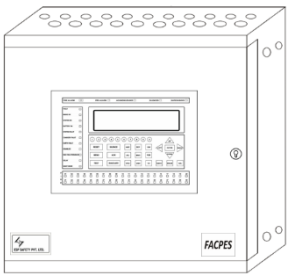
Advanced, intelligent addressable fire detection and control system ideally suitable for any small, medium, and large facilities.

FACPES is an addressable fire panel that is easily configurable from 2 loop cards to 12 loop cards. Each loop can support 254 devices of any combination of detectors and devices.

This fire panel supports proprietary ESP communication protocol for effective communication with field detectors & devices.

2.1 General Specification

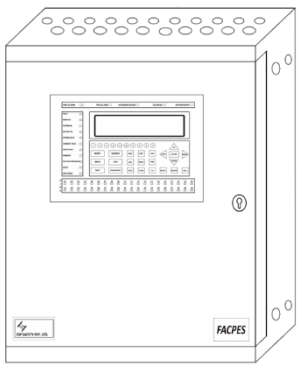
The front panel consists of a 40*4 LCD a light-emitting diode indication and a sturdy touch keypad to access all important operational functions. Distinct operator and user-level passwords provide access to the functions of the panel. The panel has a built-in real-time clock and calendar that allow automatically switching between day and night modes of work. The panel can store 4000 events like FIRE, RESET, Fault, etc., into its memory and create an event log file.



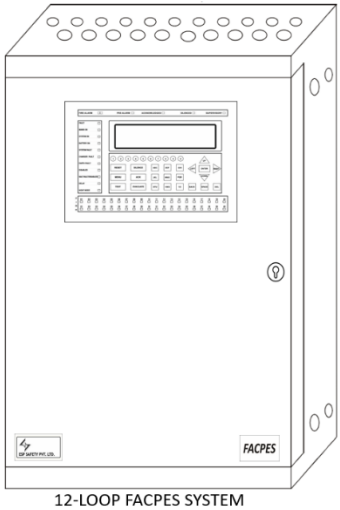
2-LOOP FACPES SYSTEM

Features:

- ✓ Up to 12 loop card configurations
- ✓ 254 Devices, any combination, per loop
- ✓ High-End Microcontroller
- ✓ 40*4 LCD Display
- ✓ Alphanumeric Touch Keypad
- ✓ Battery Backup Support
- ✓ Built-in Battery Charger
- ✓ Event logging
- ✓ Real-time clock
- ✓ Multilevel password
- ✓ Automatic day/night mode
- ✓ Test facility
- ✓ Fire, Fault, Configurable Relay
- ✓ NAC ports
- ✓ Up to 32-panel interfaces
- ✓ File holder (in 6/12-loop system)



6-LOOP FACPES SYSTEM



12-LOOP FACPES SYSTEM

Figure 2.1: 2/6/12-Loop System FACPES View

3 INSTALLATION

3.1 PANEL INSTALLATION

3.1.1 Unpacking

Before installing the FACPES Fire Alarm Control Panels in its designated location after removing it from its packaging, make sure it hasn't been damaged during transit. and, also before installing the Panels, make sure that all of the necessary equipment has arrived.

3.1.2 Mounting the Enclosure on the Wall

To mount the fire panel on the wall, users need to follow the following steps:

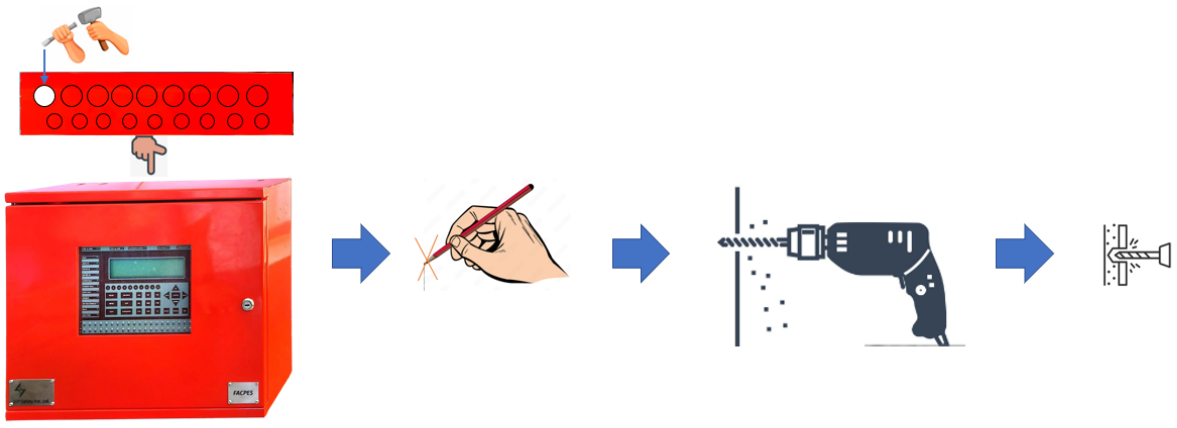
- ✓ Remove the knockouts required for the installation of the external cabling.
- ✓ The FACPES is positioned on the wall so that operating controls are easily accessible and displays can be seen clearly. The LCD should be positioned just above normal eye level (roughly 1.5 meters) at the height above floor level.
- ✓ Use all four mounting holes to position as given in clause no. 3.1.4. for the particular type of FACPES panel.
- ✓ For making the four holes in the wall, make sure to use a drill bit with a diameter of 7.0 mm and do the drill according to the length of the screw and now put an expansion plug in these holes.
- ✓ Now use the 4 screws measuring 1½ inch length or M5 screws 40mm length to secure the panel to the wall. Countersunk-headed screws should not be used.
- ✓ After that, check the proper fitting of the panel on the wall, all screw tight according to.
- ✓ Make sure the mounting screws that are used to attach the enclosure to a surface can hold its weight properly.

3.1.3 Installing the Enclosures

Installing the FACPES Fire Alarm Control Panels is easy if you follow the suggested steps outlined in this manual:

- ✓ Choose suitable mounting locations for the Control panel, detectors, fire warning, and fire control devices.
- ✓ Lay the cables between the Control panel and the system peripherals.
- ✓ Carry out the all-necessary connections, and make the power-supply connection at the last.
- ✓ Before installing any accessory modules, make sure the control panel's power supply (mains and batteries) has been disconnected.
- ✓ It is recommended that the installer re-verify all wiring connections according to this manual before powering the panel.

✓ Operating the panel after properly locking the panel door. Do not open the panel door when it is ON.



Step 1: Firstly, before mounting the repeater on the wall, the installer needs to remove the required knockout hole for external cabling.

Step 2: After that, the installer needs to mark the mounting screw hole location on the wall for the drill.

Step 3: Then, the installer needs to drill all the marking positions with suitable drill bits.

Step 4: Finally, the installers need to tighten the upper two screws, then hang the panel on the wall after, then tighten the lower two screws for completely mounting the repeater .

Figure 3.1: Mounting and Installing the Enclosure on the Wall steps.

☞ It is suggested to perform the megger test on cables before connecting to any active device terminal blocks.

3.1.4 Dimension and Fixing Points

3.1.4.1 2-Loop System Dimensions and Fixing Points

- To install the panel on the wall, users need to follow the steps given in this manual (clause 3.1.3).

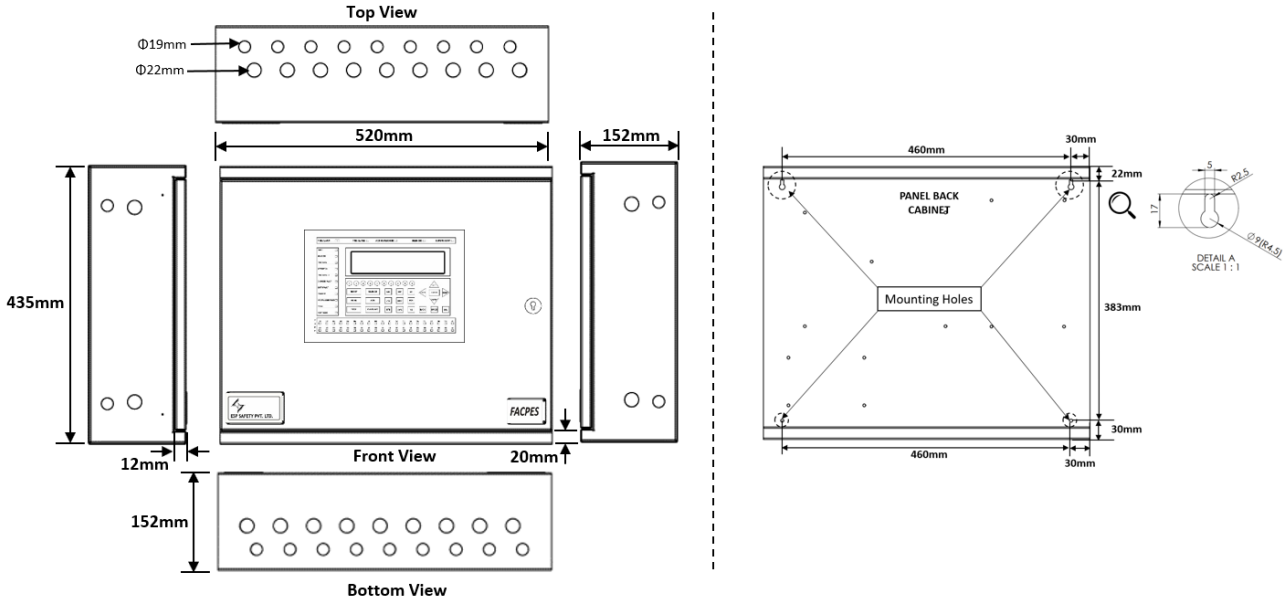


Figure 3.4: 2-Loop System Panel Dimensions and Fixing Points

☞ For Mounting the panel required drill and screw sizes user needs to see clause 3.1.2 in this manual.

3.1.4.2 6-Loop System Dimensions and Fixing Points

- To install the panel on the wall, users need to follow the steps given in this manual (clause 3.1.3).

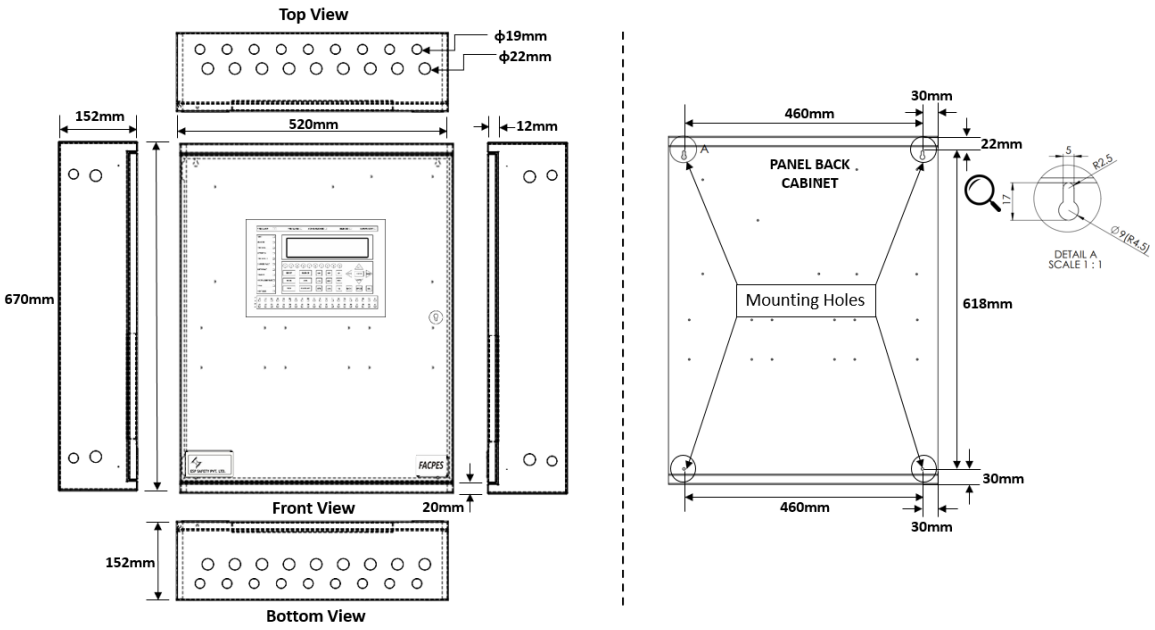


Figure 3.5: 6-Loop System Panel Dimensions and Fixing Point

☞ For Mounting the panel required drill and screw sizes user needs to see clause 3.1.2 in this manual.

3.1.4.3 12-Loop System Dimensions and Fixing Points

- To install the panel on the wall, users need to follow the steps given in this manual (clause 3.1.3).

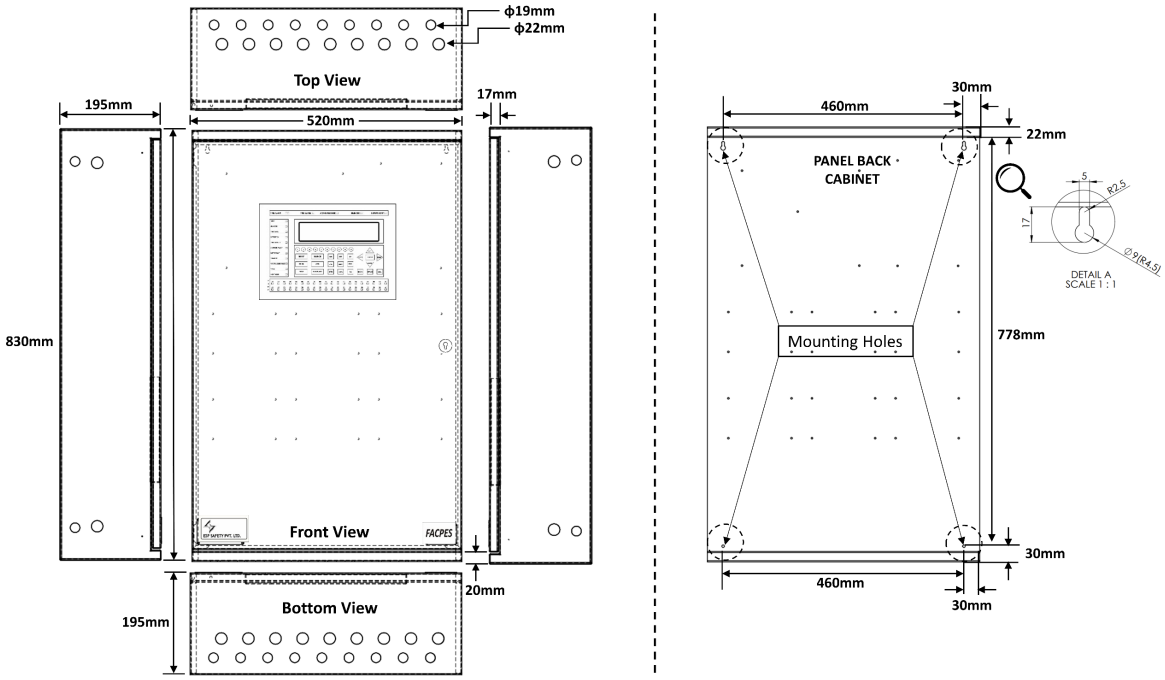


Figure 3.6: 12-Loop System Panel Dimensions and Fixing Points

☞ For Mounting the panel required drill and screw sizes user needs to see clause 3.1.2 in this manual.

3.1.5 Product Image View

3.1.5.1 2-Loop System

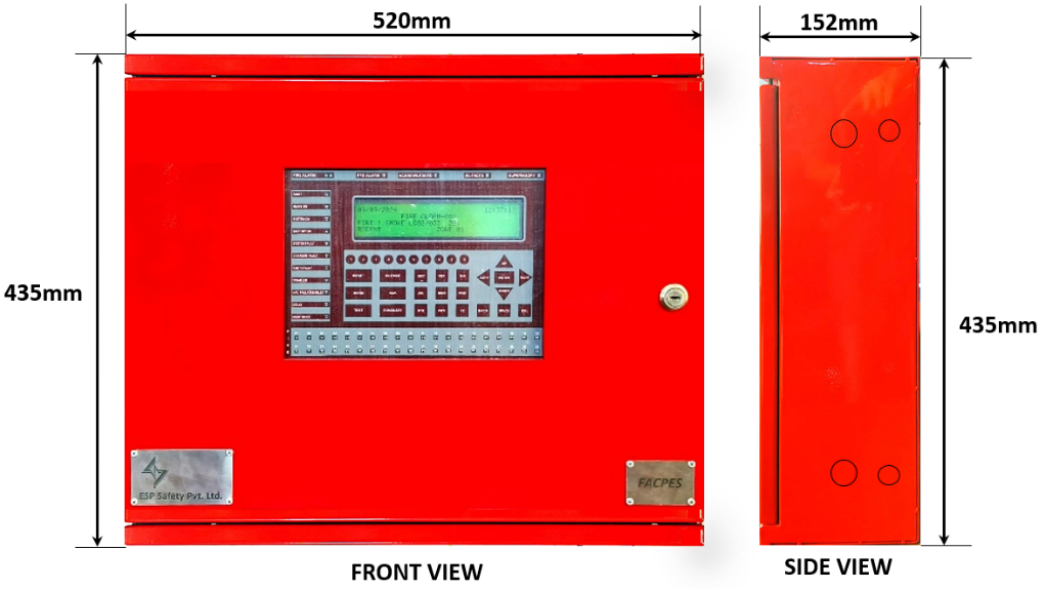


Figure 3.1: 2-Loop System Panel Front and Side View

3.1.5.2 6-Loop System

Figure 3.2: 6- Loop System Panel Front and Side View

3.1.5.3 12-Loop System

Figure 3.3: 12- Loop System Panel Front and Side View

3.1.6 Panel Description

3.1.6.1 2-Loop System Panel Description

Panel All Points with All Side Described Image below:

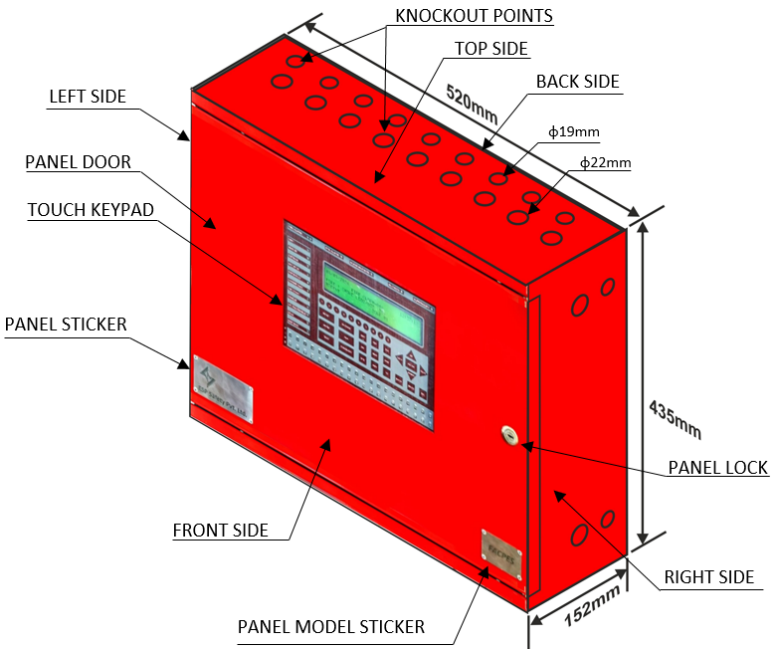


Figure 3.7: 2-Loop System Panel Description

3.1.6.2 6-Loop System Panel Description

Panel All Points with All Side Described Image below:

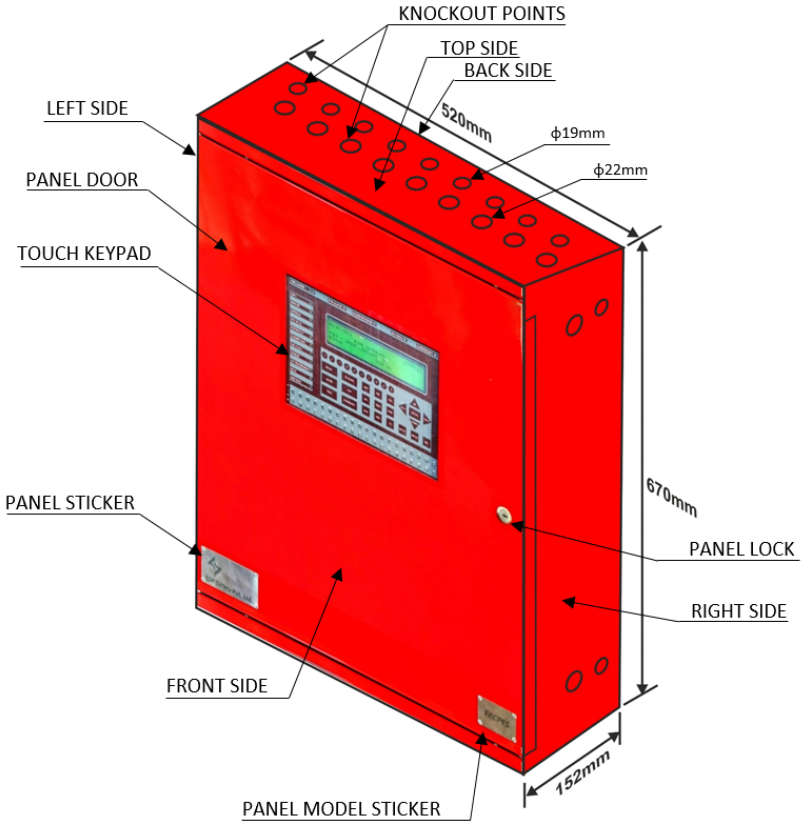


Figure 3.8: 6-Loop System Panel Description

3.1.6.3 12-Loop System Panel Description

Panel All Points with All Side Described Image below:

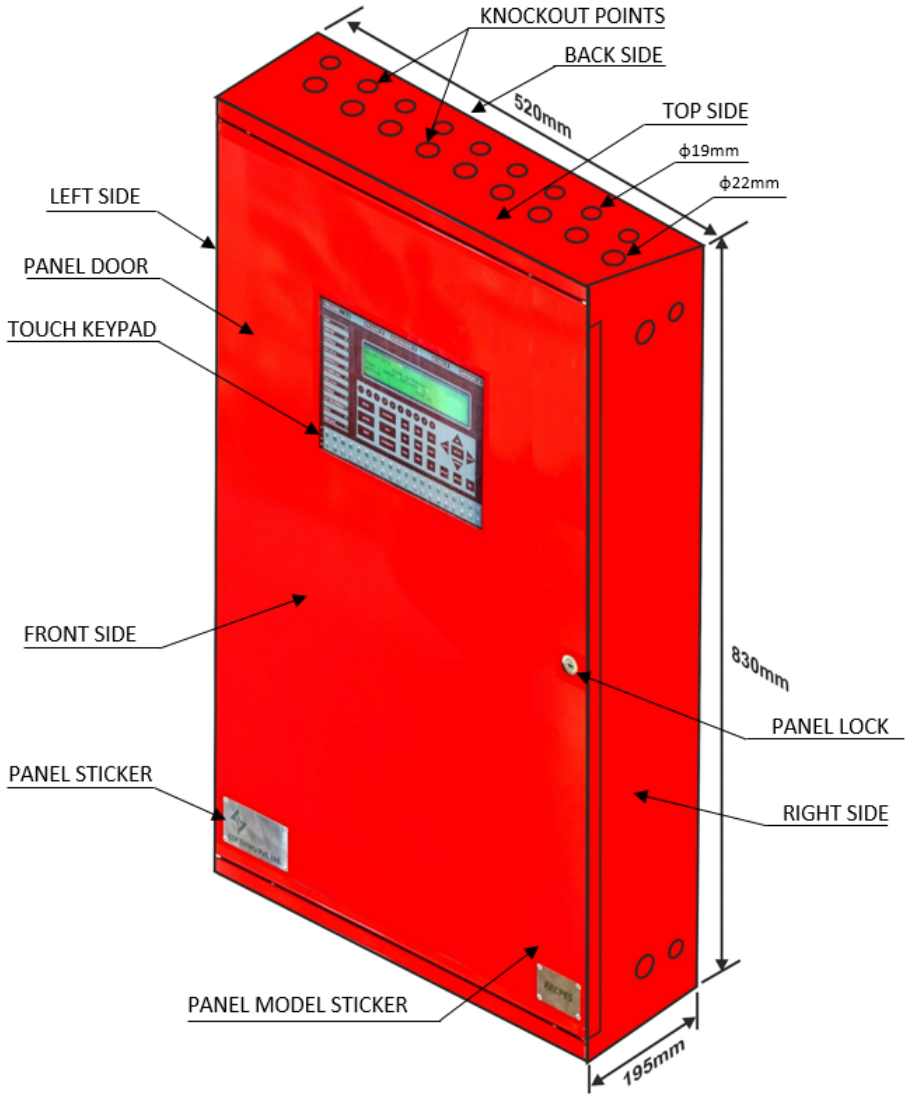


Figure 3.9: 12-Loop System Panel Descriptions

3.2 FACPES PCB BOARDS

3.2.1 Power Supply Board (PSBES)

The SMPS power supply is capable of providing power to the different sections of the panel. This power supply is also capable of providing different ranges of voltages with associated loads connected to the panel operations. The power supply section contains two types main(ac) power supply or battery power supply (absent of main supply).

3.2.1.1 AC/ Main Power Supply

This Control panel is powered by AC Mains (85/265V~ 60/50 Hz) given to a switch mode power supply, located inside the case. This SMPS converts AC to the required DC power to operate different modules present in the panel.

- ✓ Max AC drawn: 85-265VAC & 2A.
- ✓ Main Power Output: 29V & 7A.
- ✓ Auxiliary Power Output: LPV: 30V & 7A / 5V & 3A.

3.2.1.2 Battery Power Supply

The panel also houses two 12V-7/14/21Ah Lead Acid Battery used to power the Panel during the main AC cut-off. As soon as AC supply is absent Battery provides immediate power to avoid panel shutdown.

Batteries can provide 10 Hr power backup facility.

SMPS also have battery charging, and low battery indication features which allow efficient charging of the battery.

Charging Parameters:

- ✓ with 0-90% CC 1.2A.
- ✓ with 90-100% CV 27.2V.

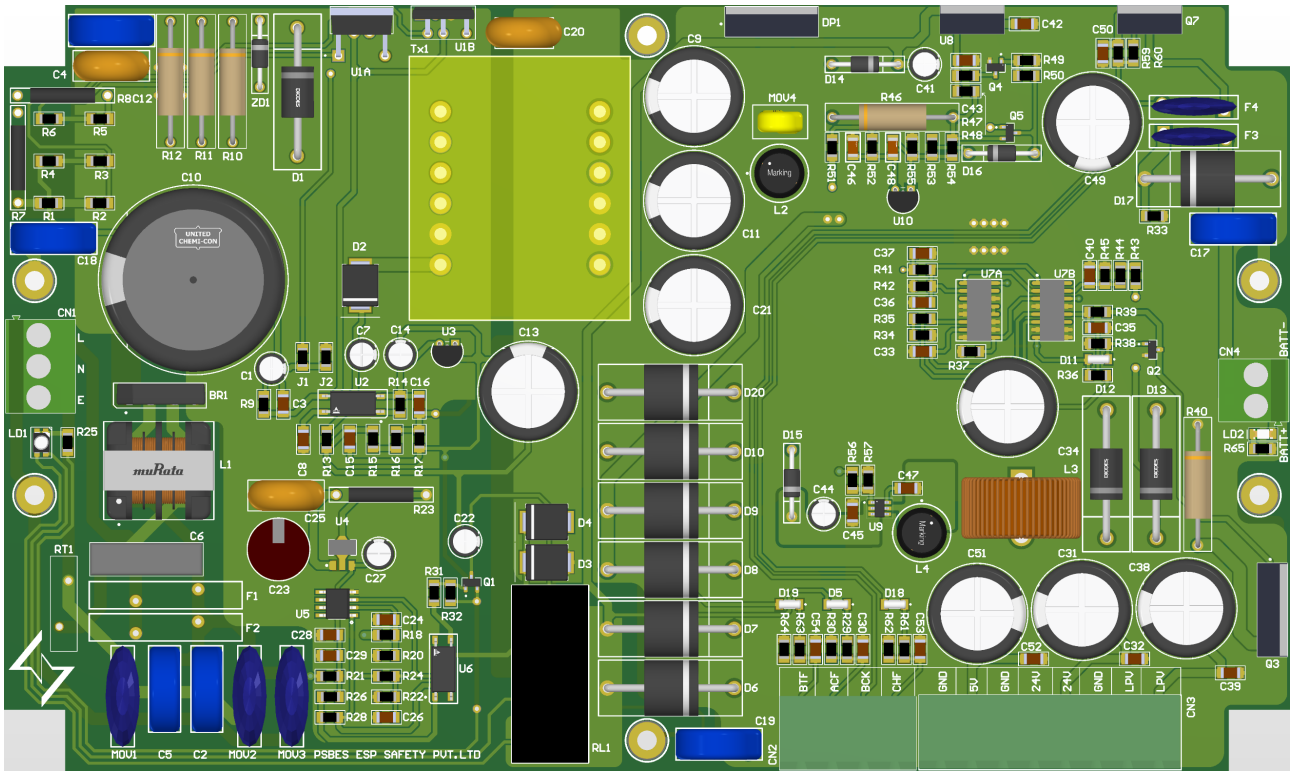


Figure 3.10: AC/ Battery Power Supply Board (PSBES) PCB.

3.2.2 Mother Board (MBES)

This board is responsible for whole panel inter-communication and operating commands. The main wires for all communication protocols come out of this Board. It is also responsible for controlling the other sections present in this panel. This board has the following features:

- ✓ Loop Card interfacing: A maximum of 12-loop cards can be configured.
- ✓ Touch Keypad interfacing: A connection can be made between the Touch Keypad and the CPU board by using a 26-pin FRC cable.
- ✓ Internal inbuilt Buzzer.
- ✓ This board supports different types of communication protocols: RS-485, CAN, USB, and Ethernet.
- ✓ An LED indication for data transmission and receive is also available with this board.
- ✓ An LCD for viewing and controlling the panel operations.
- ✓ An internal buzzer built to be given the sound notification.
- ✓ An internal RTC (Real-time clock) feature is also present on this board.
- ✓ Different types of connector ports are also available with this board to interface and control them.
- ✓ This board is also providing programming flexibility by removing its CPU card section.

3.2.2.1 CPU Board (CBES)

This board is the brain of the Motherboard card which is responsible for controlling every operation of the motherboard. It is also capable of handling multiple operations at the same time. This board has the following specifications:

- ✓ Clock Frequency: 480MHZ
- ✓ Flash Size: 1MB
- ✓ Bit: 32 Bit
- ✓ RAM Size: 32KB
- ✓ ADC: 3x16Bit, DAC: 1x12Bit
- ✓ Extra flash size 32MB to store more events log.

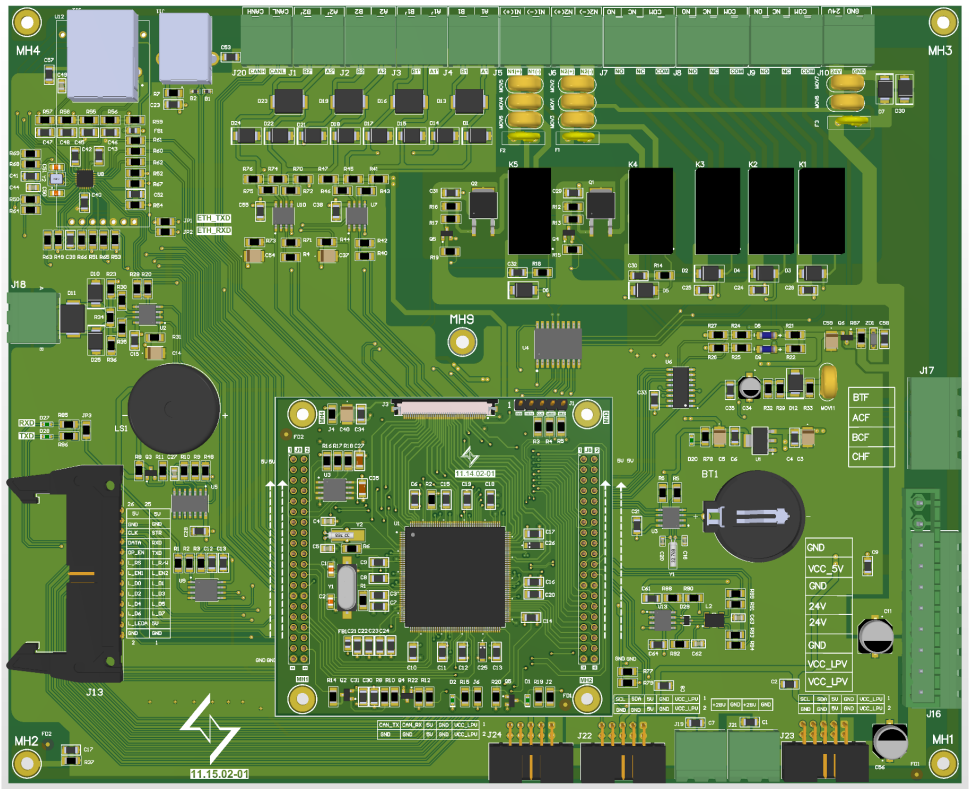
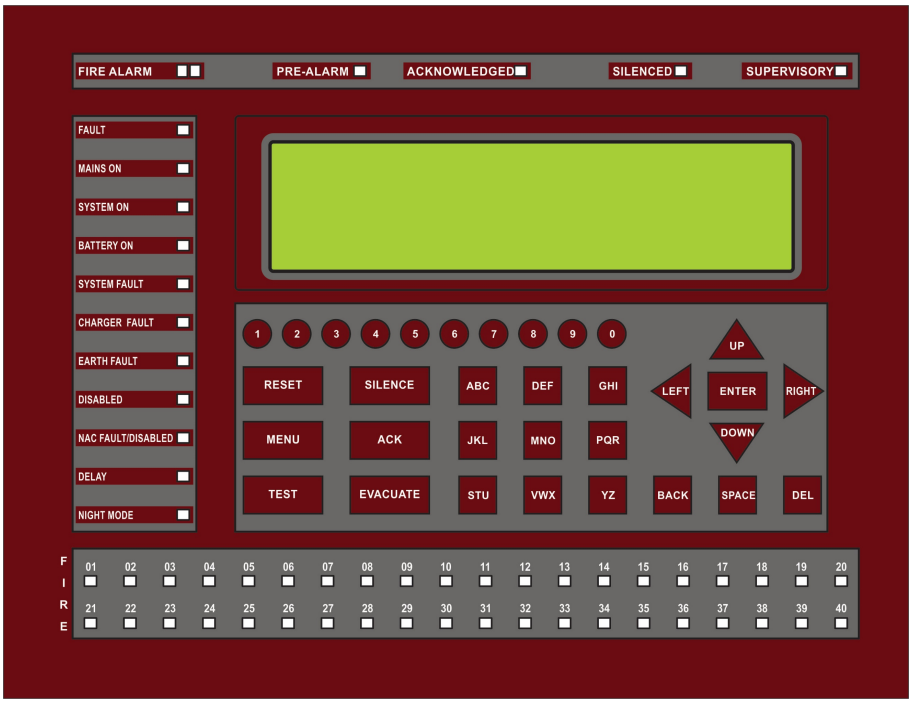


Figure 3.12: Motherboard Card (MBES) PCB.

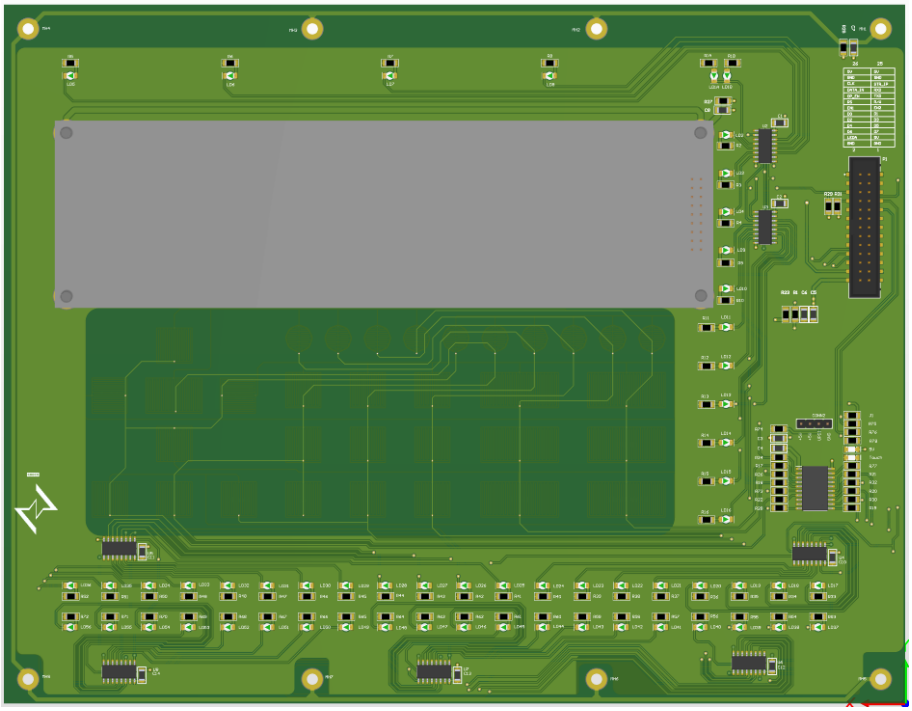
3.2.3 Keypad & Display Board (KDBES)

The Keypad & Display board provides the user access to view alarms and control the operation of the panel. This board acts as an interface between the User and the Control Panel with easy to operate. This board has the following features:

- ✓ All keys are touching based control
- ✓ 40X4 Alpha Numeric Display
- ✓ Different colour LED indications (Green, Red & Amber)



KDBES PCB FRONT SIDE VIEW



KDBES PCB BACKSIDE VIEW

Figure 3.13: Keypad & Display Board (KDBES) PCB.

3.2.4 Loop Card Base Board (LCBES)

- This section is responsible for all input devices to be connected to the panel.
- One loop base card contains two loop wiring ports (Port 1 & Port 2).
- Each Loop port handles up to 254 devices.
- It is also responsible for sending or transmitting data from devices to loop card and from loop card to CPU/main board using I2C protocol.
- One loop base card contains two loop card modules which is responsible to control up to 508 devices connected with the respective loop.
- This part is also capable of direct communication with another same part (in the 6/12 loop system).
- This base card presents 1 in a 2-loop System, 3 in a 6-loop System, and 6 in a 12-loop System.

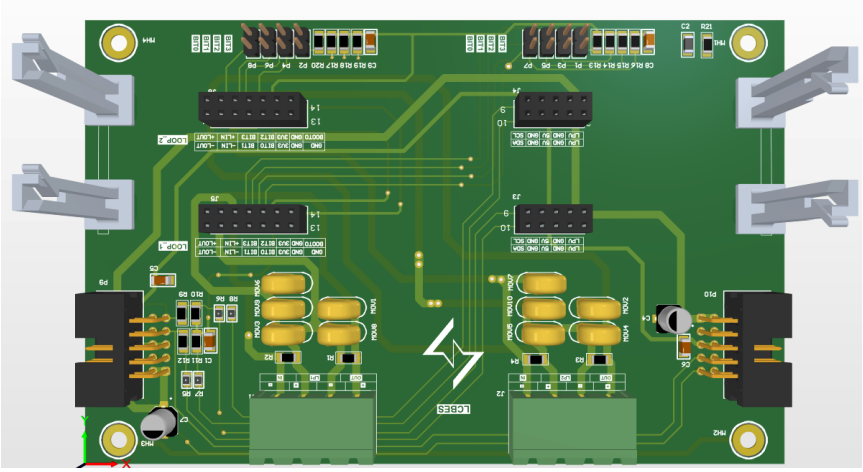


Figure 3.14: Loop Card Base Board (LCBES) PCB.

3.2.5 Loop Card Board (LCES)

- Microcontroller-based loop card which is more accurate and fast response.
- This section is responsible for controlling and watching all activities happening in the looping devices.
- Also, this card has a feature to fully control the different input devices connected across the respective loop.
- This card is handled to transmit or receive all input device information to the CPU/ Main Board with I2C protocol.
- This one card is capable of handling up to 254 detectors. Which presents 2 Cards in a 2-loop System, 6 Cards in a 6-loop System, and 12 Cards in a 12-loop System.

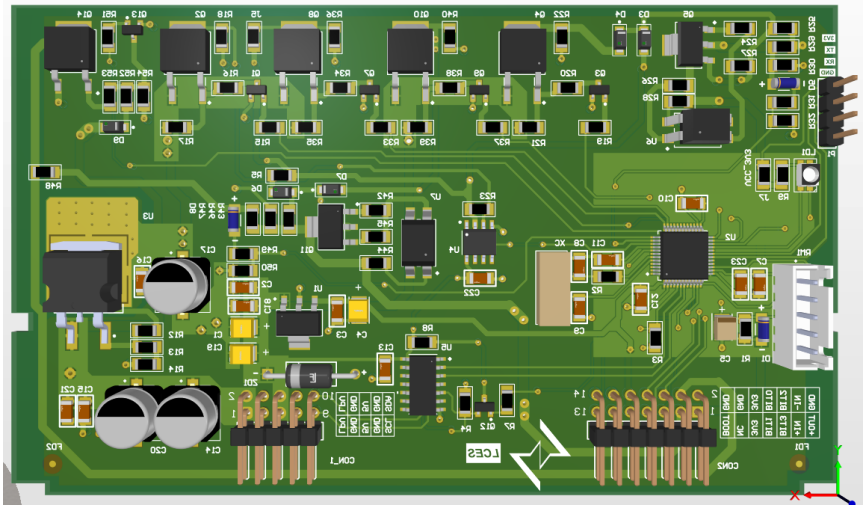


Figure 3.15: Loop Card Board (LCES) PCB.

3.3 FACPES PCB BOARDS TERMINAL DESCRIPTION

3.3.1 Power Supply Board (PSBES)

Terminal	Description	Specification	Description of terminals
CN1	AC Input Port	From 85-265VAC 50-60Hz input AC is given here as input power source.	P: Phase/Live wire N: Neutral wire E: Earth wire
CN2	Power Supply Monitoring Signals Output Port	Different control signals are sent to the MCU for monitoring the battery.	BTF: Battery fail ACF: AC input fail BCK: Battery clock fail CHF: Charging fail
CN3	Power Supply Output Port	Responsible for providing DC voltages to the different sections of the panel.	GND: Ground/Negative 5V: 5V DC output GND: Ground/Negative 24V: 24V DC output 24V: 24V DC output GND: Ground/Negative LPV: Loop Voltage LPV: Loop Voltage
CN4	Battery Power Supply Port	To provide battery input to the power supply board, or it is also used for battery charging.	BATT+: Battery (+ve) wire BATT-: Battery (-ve) wire

Table 3.1: PSBES All Terminal Description (in table)

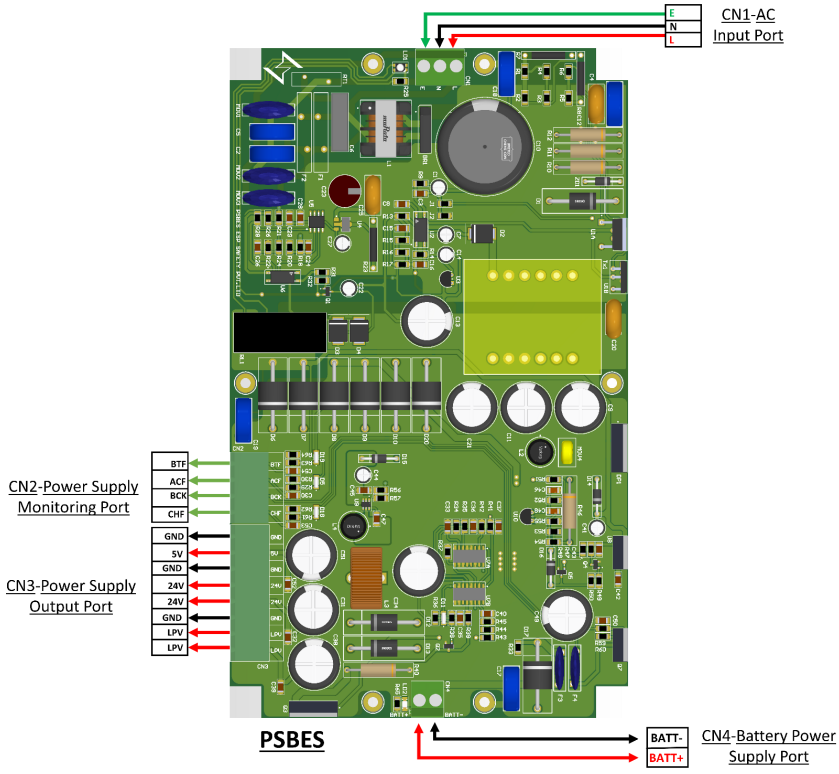


Figure 3.16: PSBES All Terminal Description (in Figure)

☞ Before doing the wiring connection, installers need to verify the connector terminal name from the above table as well as from the below figure for interfacing this board with other boards in the FACPES.

3.3.2 Motherboard Card (MBES)

Terminal	Description	Specification	Description of terminals
J1	RS-485 Input(return) wire Port-1	SERIAL BUS. Input terminals to connect the Repeater and other Panel modules.	A2': Positive signal line(return). B2': Negative signal line(return).
J2	RS-485 Output wire Port-1	SERIAL BUS. Output Terminals to connect the Repeater and other Panel modules.	A2: Positive signal line. B2: Negative signal line.
J3	RS-485 Input(return) wire Port-2	SERIAL BUS. Input terminals to connect the Repeater and other Panel modules.	A1': Positive signal line(return). B1': Negative signal line(return).
J4	RS-485 Output wire Port-2	SERIAL BUS. Output Terminals to connect the Repeater and other Panel modules.	A1: Positive signal line. B1: Negative signal line.
J5	NACs Output Port1	Output Port to give power to the Sounder & Beacon device	N1+: Positive terminal N1-: Negative terminal
J6	NACs Output Port2	Another Output Port to give power to the Sounder & Beacon device	N2+: Positive terminal N2-: Negative terminal
J7	Programmable Relay Output Port-1	FIRE / FAULT / SUPERVISORY OUTPUT	NO: Normally Open terminal NC: Connected terminal COM: Common terminal
J8	Programmable Relay Output Port-2	FIRE / FAULT / SUPERVISORY OUTPUT	NO: Normally Open terminal NC: Connected terminal COM: Common terminal
J9	Programmable Relay Output Port-3	FIRE / FAULT / SUPERVISORY OUTPUT	NO: Normally Open terminal NC: Connected terminal COM: Common terminal
J10	Auxiliary Power Supply Port	24 V AUXILIARY POWER SUPPLY	24V: Positive terminal GND: Negative terminal
J11	USB PORT	TYPE-B USB PORT used for PC Communication	NA
J12	ETHERNET PORT	Used for Networking Purposes	NA
J13	26-Pin Right Angle FRC Male Lockable Connector	Used to connect the motherboard card with keypad & Display board (I2c).	NA
J15	DC Input Port	Responsible for providing DC voltages to the different sections of the panel.	GND: Ground/Negative VCC_5V: 5V DC output 24V: 24V DC output 24V: 24V DC output VCC_LPV: Loop Voltage VCC_LPV: Loop Voltage

J17	Battery Charging Signals Output Port	Different control signals are sent from the MCU to the battery charging section in SMPS board.	BTF: Battery fail ACF: AC input fail BCK: Battery clock fail CHF: Charging fail
J18	RS-485 Output wire Port-3	SERIAL BUS. Output Terminals to connect the Repeater and other Panel modules.	A: Positive signal line. B: Negative signal line.
J20	CAN Comm. Port	Used for CAN Communication Protocol	CANH: CAN High signal CANL: CAN Low signal
J19	Loop Auxiliary Power Supply Port-1	28V AUXILIARY POWER SUPPLY for Loop	+28V: Positive terminal GND: Negative terminal
J21	Loop Auxiliary Power Supply Port-2	28V AUXILIARY POWER SUPPLY for Loop	+28V: Positive terminal GND: Negative terminal
P22	10-Pin FRC Male Connector loop base Port-1	Used to connect the loop card baseboard with the motherboard card(I2c).	NA
P23	10-Pin FRC Male Connector loop base Port-2	Used to connect the loop card baseboard with the motherboard card (I2c).	NA
P24	10-Pin FRC Male Connector loop base Port	Used to connect the loop card baseboard with the motherboard card (CAN).	NA

Table 3.2: MBES All Terminal Description (in table)

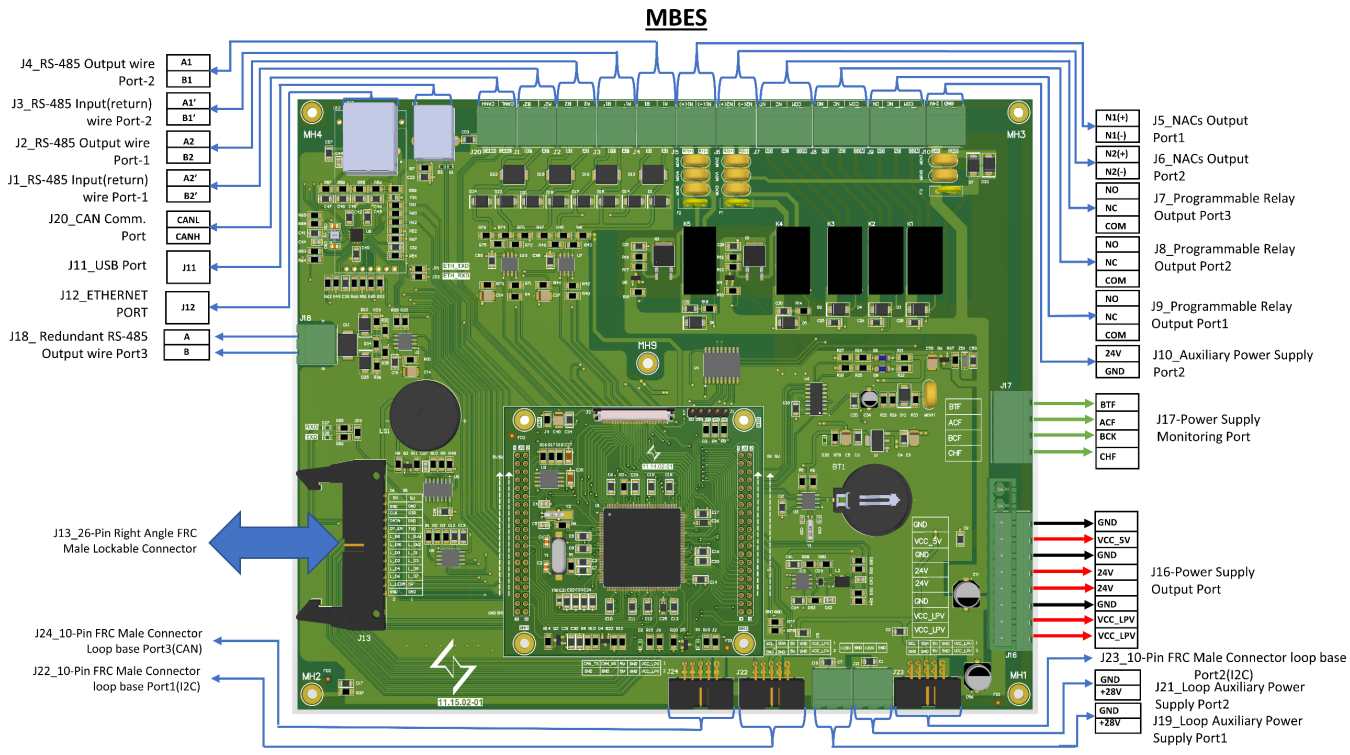


Figure 3.17: MBES All Terminal Description (in diagram)

☞ Before doing the wiring connection, installers need to verify the connector terminal name from the above table as well as from the below figure for interfacing this board with other boards in the FACPES.

3.3.3 Keypad & Display Board (KDBES)

Terminal	Description	Specification	Description of terminals
P1	26-Pin Right Angle FRC Male Lockable Connector	Used to connect the keypad & Display board with the motherboard card with (I2c).	NA

Table 3.3: KDBES All Terminal Description (in table).

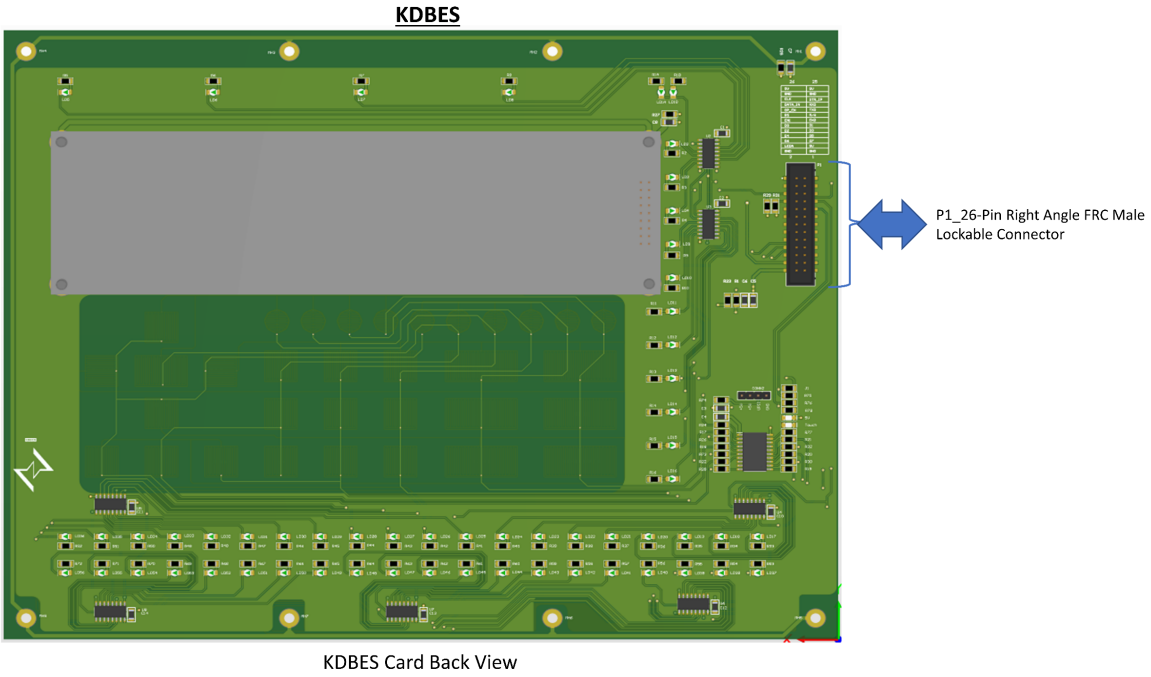


Figure 3.18: KDBES All Terminal Description (in the diagram)

☞ Before doing the wiring connection, installers need to verify the connector terminal name from the above table as well as from the below figure for interfacing this board with other boards in the FACPES.

3.3.4 Loop card Base Board (LCBES)

Terminal	Description	Specification	Description of terminals
J1	Loop Card 1 Port	Used to connect the Input Devices (Detectors) up to 254.	LP1: Loop Card 1 IN: Input wire Out: Output wire (+): Positive line (-): Negative line
J2	Loop Card 2 Port	Used to connect the Input Devices (Detectors) up to 254.	LP2: Loop Card 2 IN: Input wire Out: Output wire (+): Positive line

			(-): Negative line
J3-J5	Loop Card 1 Inserting Port	Used To insert the loop card into the loop card baseboard.	Loop _1: Loop card 1
J4-J6	Loop Card 2 Inserting Port	Used To insert the loop card into the loop card baseboard.	Loop _2: Loop card 2
P1, P3, P5, P7	Jumper Pin	Used to set the Loop card 1 address	BIT0: LSB (1st Bit) BIT1: 2nd Bit BIT2: 3rd Bit BIT3: MSB (4th Bit)
P2, P4, P6, P8	Jumper Pin	Used to set the Loop card 2 address	BIT0: LSB (1st Bit) BIT1: 2nd Bit BIT2: 3rd Bit BIT3: MSB (4th Bit)

Table 3.4: LCBES All Terminal Description (in table)

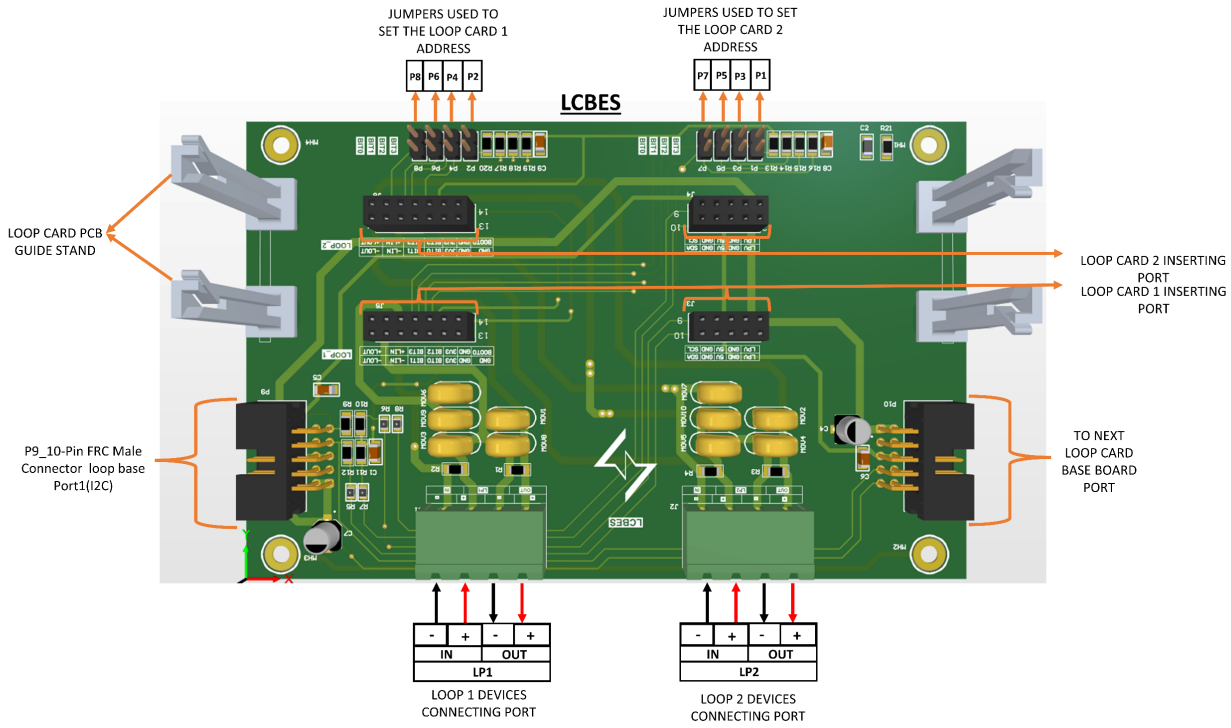


Figure 3.19: LCBES All Terminal Description (in diagram)

☞ Before doing the wiring connection, installers need to verify the connector terminal name from the above table as well as from the below Figure for interfacing this board with other boards in the FACPES.

3.3.5 Loop Card Board (LCES)

Terminal	Description	Specification	Description of terminals
CON_1, CON2	Loop Card Base Board Connector	Used to connect the Loop card to the loop card baseboard	NA
P1	UART Pin	Used for UART Communication	3V3: 3.3VDC TX: Transmit RX: Receive GND: Ground
RM1	Programming Pin	Used to program the loop card	NA

Table 3.5: LCES All Terminal Description (in table)

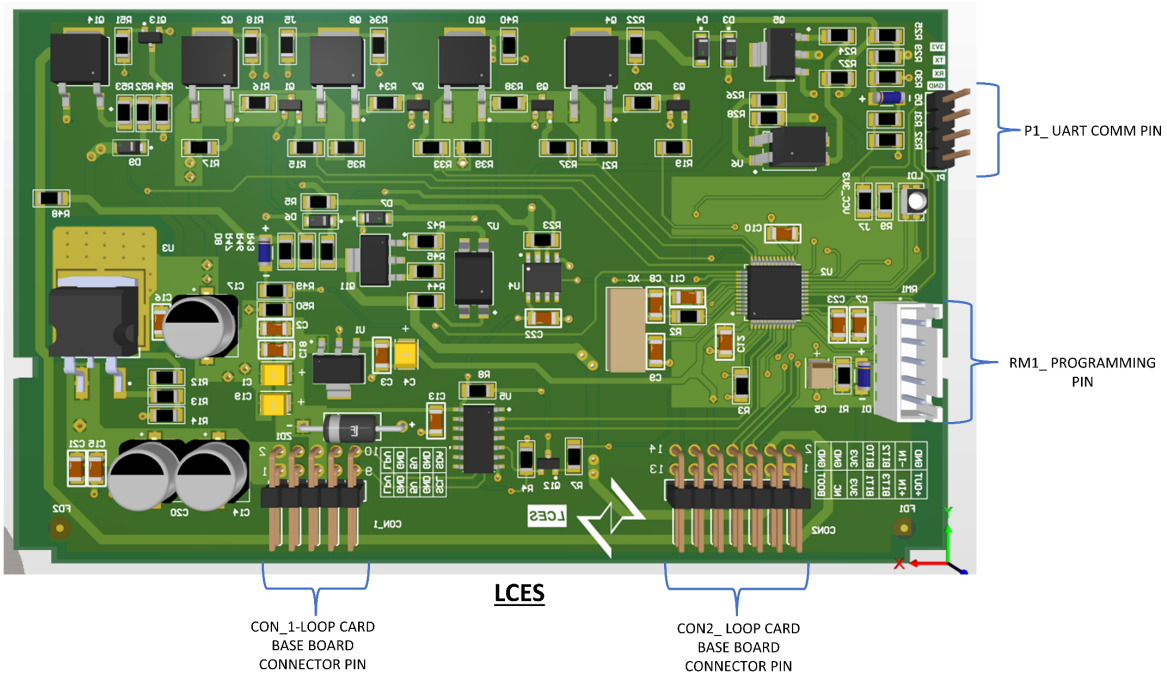


Figure 3.20: LCES All Terminal Description (in diagram)

☞ Before doing the wiring connection, installers need to verify the connector terminal name from the above table as well as from the below Figure for interfacing this board with other boards in the FACPES.

3.4 WIRING DIAGRAM

3.4.1 Input Power Supply

3.4.1.1 Main (AC) Power Supply

- This Control panel is powered from the Mains (110/230V~ with 60/50 Hz) through a switching power supply inside the case.
- Follow these steps to connect the Mains Supply:
  - ✓ Connect the required wires to the Neutral [N], the Live [L], and Earth [E] terminals on the Power Supply Board to give the AC power supply to the FACPES.
  - ✓ Now, connect the other ends of the power supply board wires with the external power supply (AC/Main) to ON the FACPES.

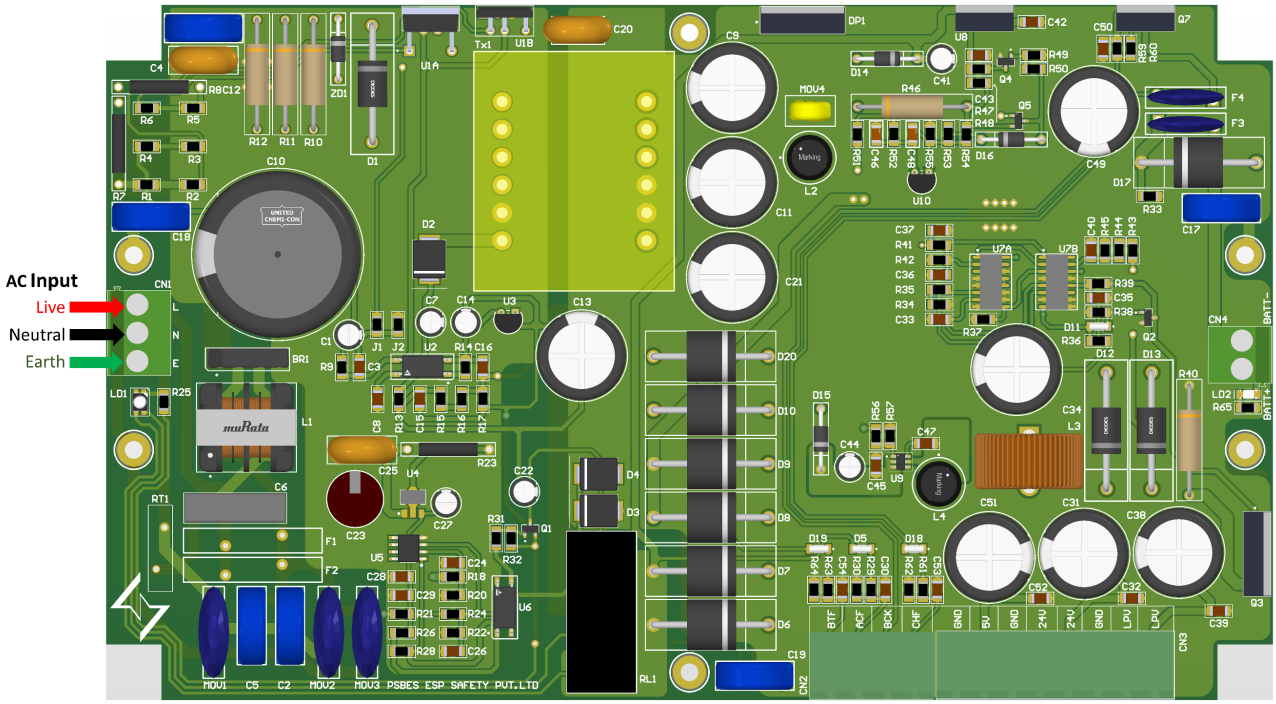


Figure 3.21: AC Input to Power Supply (PSBES) Board wiring diagram

Description of the Terminals:

Live[L] – Live wire terminal.
Neutral[N] – Neutral wire terminal.
Earth[E] – Earth terminal.

☞ 1. Earth wire must be connected.
2. All connections are done with proper insulation.
3. Terminal screws tight with carefully.
4. The user should ensure that the AC supply is given to the FACPES after all installation processes are completed.

3.4.1.2 Battery Power Supply

- The FAPES Control panel provides housing for two 12V, 21Ah maximum batteries for power during Mains failure.
- Follow these steps to connect the Battery Power Supply:

- ✓ Observing the battery polarity, connect the battery-positive terminals to (BATT+) terminals and the battery-negative terminal to (BATT-) terminal on the Power Supply Board (wires supplied).
- ✓ Using the Jumper supplied, connect the batteries in series.

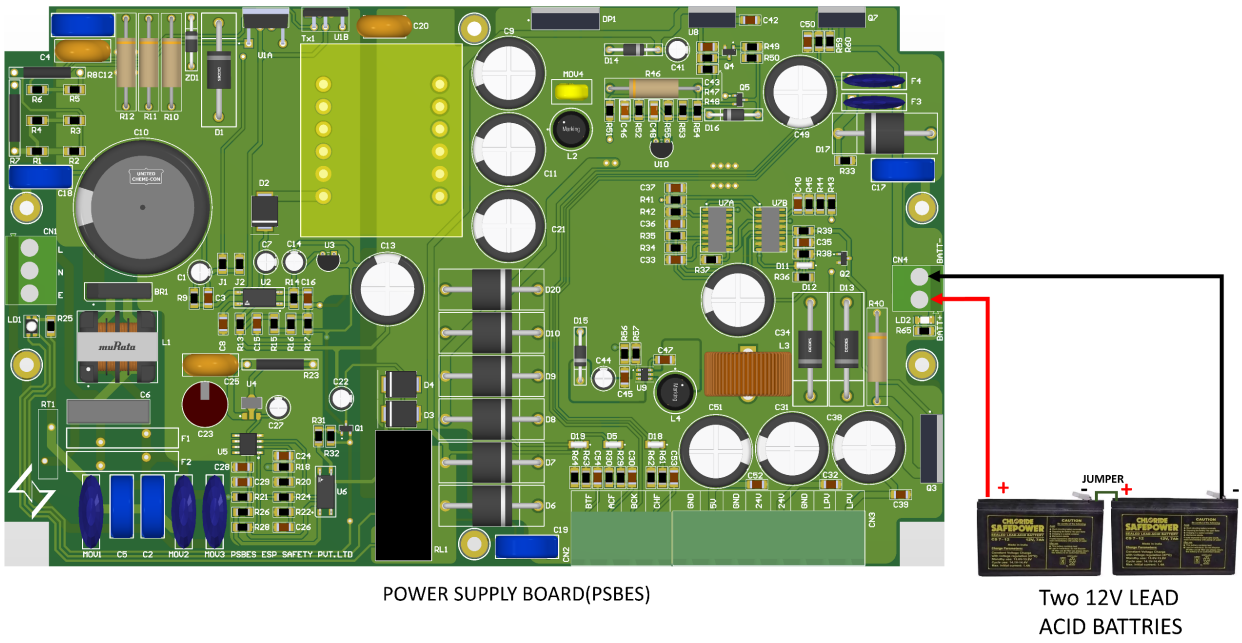


Figure 3.22: Battery Input to Power Supply (PSBES) Board wiring diagram

Description of the Terminals:

Batt [+] – Battery Positive terminal.
Batt [-] – Battery Negative terminal.

☞
1. All wire connections are done with proper insulation
2. Terminal screws tight with carefully.
3. Check the wire's loose connection.
4. The main supply should be off before connecting the battery.

3.4.2 Input Devices Wiring

- The control panel has 2-12 loops available for interfacing the addressable analog devices.
- One loop can handle up to 254 addressable analog devices (Heat, Smoke, Multi-Sensor, Relay board, and MCP).
- Every detector and module connected to the loops must be assigned a unique address.
- You can use a 2 or 4-wire style for the device's loop connections.
- Use only shielded cable for all connections, with one end of the shield connected to the LP1/LP2 (+/-) terminal of the Control panel and the other left free.
- The same wiring diagram should be followed in the 6 & 12-loop System

3.4.2.1 Class-A Type Wiring

3.4.2.1.1 With Isolator

- The type of connection is a 4-wire type connection, Let's start the installation of the wiring by connecting all devices in a loop.
- First, create a loop by using wires from the LOOP1 (OUT+) and (OUT-) terminals on one side of the connector located on the LCBES card.
- Reconnect the wiring to the LOOP1 (IN+) and (IN-) terminals on the opposite side of the connector on the LCBES card. all available loop card connections should be the same.
- Verify that all connected devices are oriented correctly for both positive and negative connections within the loop.
- For information about the detectors, please refer to the datasheet supplied by the manufacturers of the signaling devices.
- It is advisable to install short circuit isolation devices as a safety measure. Strategic placement of the isolators within the loop is recommended (e.g., at zonal boundaries) to guarantee that the system's addressable points cannot be disabled by an external short circuit beyond 32 places.
- Refer to the below diagrams for more information.

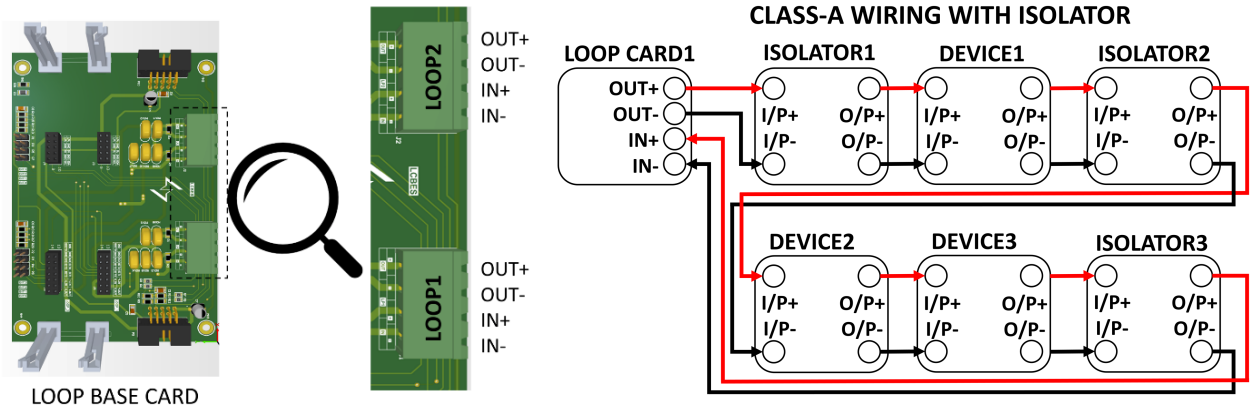


Figure 3.23: Input Device (Class A) wiring diagram with isolator

Description of the Terminals:

For Loop 1 / Loop 2	For Device / Isolator
IN [+] – Positive signal (return).	I/P [+] – Input Positive terminal.
IN [-] – Negative signal (return).	I/P [-] – Input Negative terminal.
OUT [+] – Positive signal.	O/P [+] – Output Positive terminal.
OUT [-] – Negative signal.	O/P [-] – Output Negative terminal.

☞ At the time of wiring the device, the installer should re-verify the wiring connection of each device before powering on the FACPES.

☞ Users should also perform the walk-test to check the devices or detector's functionality.

3.4.2.1.2 Without Isolator

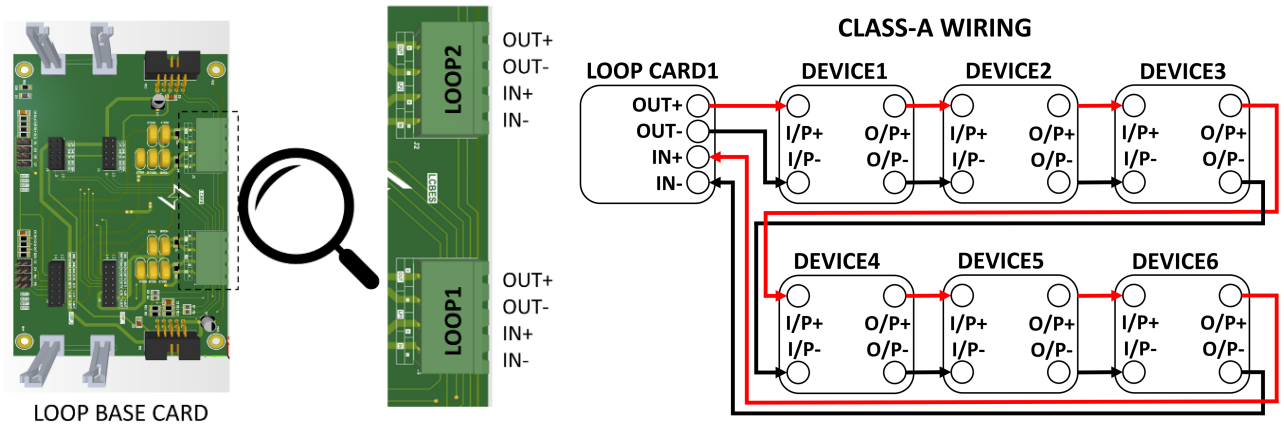


Figure 3.24: Input Device (Class A) wiring diagram without isolator

Description of the Terminals:

For Loop 1 / Loop 2	For Device
IN [+] – Positive signal (return).	I/P[+] – Input Positive terminal.
IN [-] – Negative signal (return).	I/P[-] – Input Negative terminal.
OUT [+] – Positive signal.	O/P[+] – Output Positive terminal.
OUT [-] – Negative signal.	O/P[-] – Output Negative terminal.

☞ At the time of wiring the device, the installer should re-verify the wiring connection of each device before powering on the FACPES.

3.4.2.2 Class-B Type Wiring

3.4.2.2.1 With Isolator

- The type of connection is a 2-wire type connection, Let's start the installation of the wiring by connecting all devices in a loop.
- In this type of wiring, create a loop by using wires from the LOOP1 (OUT+) and (OUT-) terminals on one side of the connector located on the LCBES card.
- No return wire back from the end of the last loop connected devices.
- Refer to the below diagrams for more information.

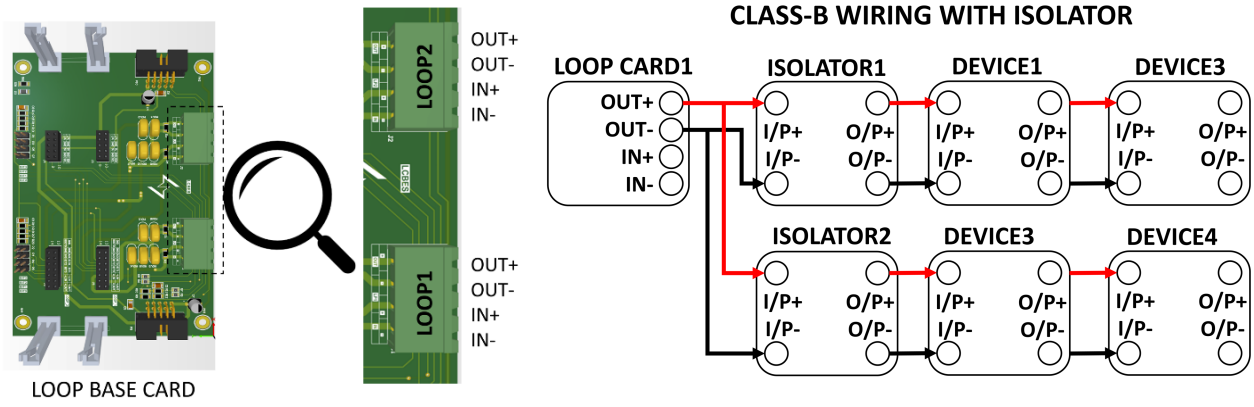


Figure 3.25: Input Device (Class B) wiring diagram with isolator

Description of the Terminals:

For Loop 1 / Loop 2	For Device/Isolator
IN [+] – Positive signal (return).	I/P[+] – Input Positive terminal.
IN [-] – Negative signal (return).	I/P[-] – Input Negative terminal.
OUT [+] – Positive signal.	O/P[+] – Output Positive terminal.
OUT [-] – Negative signal.	O/P[-] – Output Negative terminal

☞ 1. The loop driver modules have built-in isolators so it is not required to place isolator modules on the outputs of the FACP.
2. At the time of wiring the device, the installer should re-verify the wiring connection of each device before powering on the FACPES.

3.4.2.2.2 Without Isolator

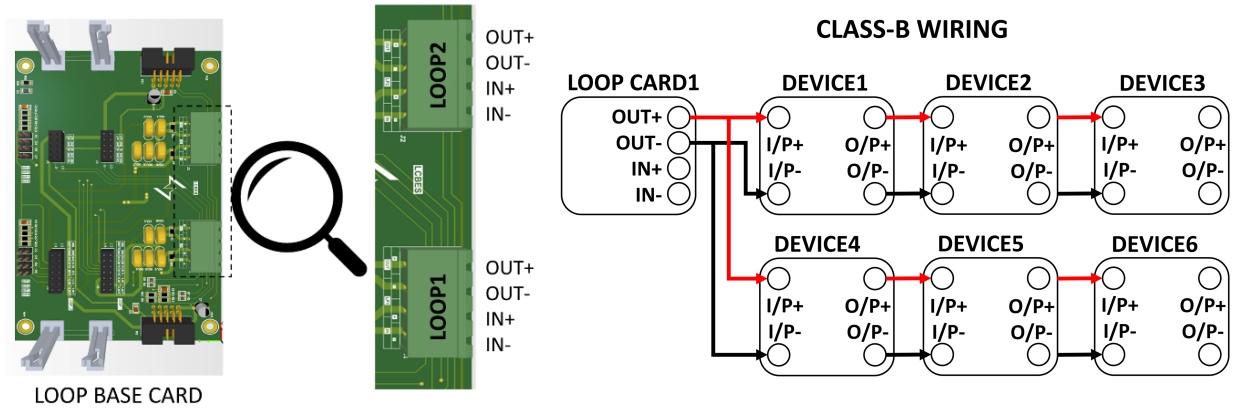


Figure 3.26: Input Device (Class B) wiring diagram without isolator

Description of the Terminals:

For Loop 1 / Loop 2	For Device
IN [+] – Positive signal (return).	I/P[+] – Input Positive terminal.
IN [-] – Negative signal (return).	I/P[-] – Input Negative terminal.
OUT [+] – Positive signal.	O/P[+] – Output Positive terminal.
OUT [-] – Negative signal.	O/P[-] – Output Negative terminal.

☞ At the time of wiring the device, the installer should re-verify the wiring connection of each device before powering on the FACPES.

3.4.3 Output Devices Wiring

3.4.3.1 Relay

- This FACPES includes three programmable relays with a contact rating of 1 amp at 24 volts DC.
- Assigned as Supervisory, Fault, and Fire by default, respectively, to Programmable Relays 1, 2 and 3.

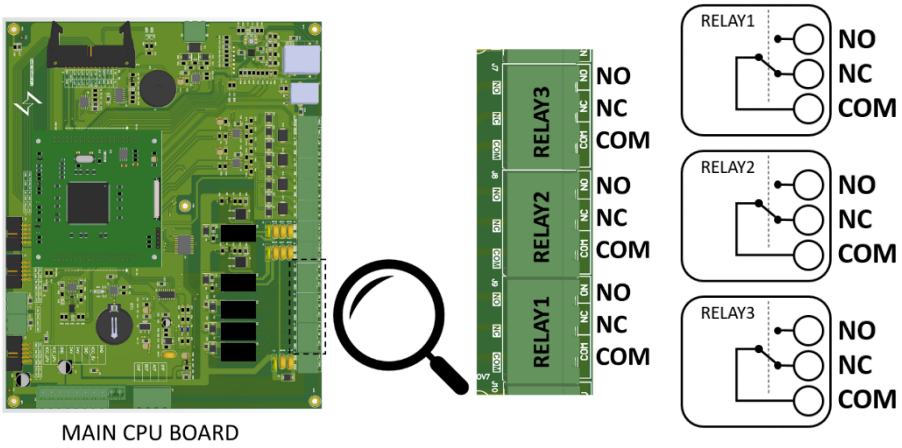


Figure 3.27: Output Device (Programmable Relay) wiring diagram

Description of the Terminals:

NO – Open terminal.
NC – Connected terminal.
COM – Common terminal

☞ 1. During standby status, terminal [COM] closes to terminal [NC].
2. In the event of a fire, fault, and supervisory terminal [COM] closes to terminal [NO]

3.4.3.2 NACs

- Each supervised NAC is given a current rating of one amp. For NACs (Notification Appliance Circuits), it provides a constant output.
- Open and short circuits are checked on every sounder output. The final sounder on the circuit needs to be equipped with an end-of-line (EOL) resistor (4k7, 2W minimum).
- The sounder should include a built-in diode to block power consumption and also provide reverse protection.
- It is not recommended to run cables longer than 1km (3200 feet).

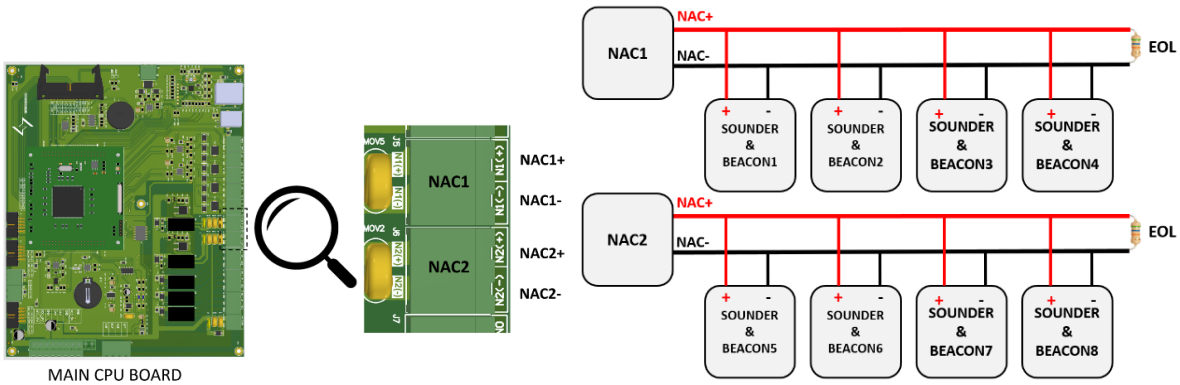


Figure 3.28: Output Device (NACs) wiring diagram

Description of the Terminals:

NAC[+] – Positive terminal.
NAC[-] – Negative terminal.
EOL – End of line resistor.

3.4.4 RS-485 Wiring Diagram

- Two RS-485 ports are located on the motherboard card and both ports contain two terminals; one terminal is used as an input to obtain data from the other panels, and the other terminal is an output to link the panel to the next in the network.
- There are two types of wiring diagrams, "loop style" and "daisy-chain style", which are available in RS-485 configurations to interface one panel with another panel/repeater on the same network.
- There must be an address assigned to every supervised panel and repeaters. The address can be anywhere between 01 and 32.
- The RS-485 network can support a maximum no. of 32 panels/repeaters connected to it.
- One Redundant RS-485 Output Port is also available in the motherboard to connect the additional panel and repeaters.

3.4.4.1 Loop Style Wiring

- Connect the wires from the A1 and B1 terminals of the output port1 on the first FACPES motherboard card connector to the A2' and B2' terminals of the input port2 on the next available FACPES to create the panel RS-485 link.
- Continue wiring to all the panels/repeaters to be connected to the link – connecting A1 to A1' and B1 to B1'.
- Connect return wiring from the output port1 terminals on the last FACPES to the input port1 terminals on the first FACPES present in the loop to complete the wiring.
- The maximum allowed length of the link is 1.2km(1200mtr).

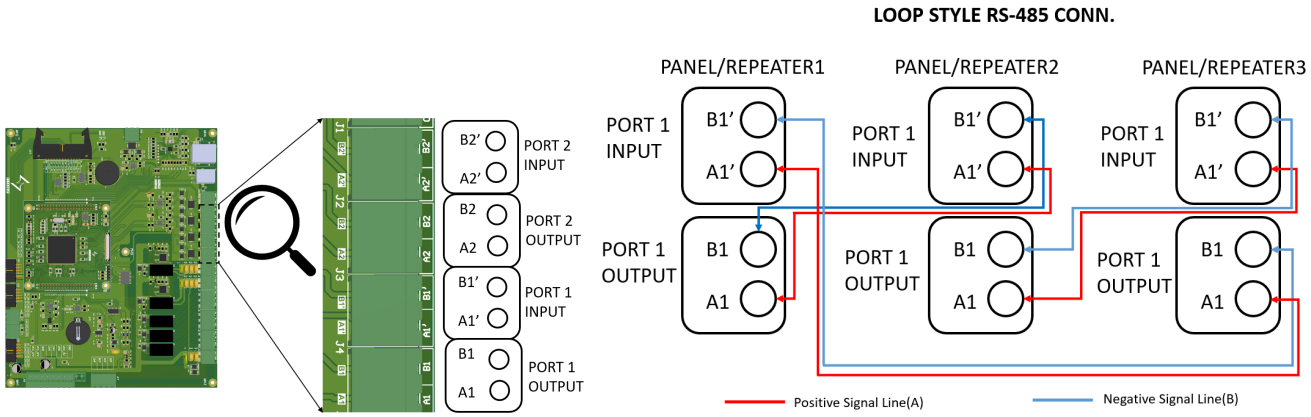


Figure 3.29: RS-485 Loop style wiring diagram

Description of the Terminals:

A[1] – Positive signal lines.
B[1] – Negative signal lines.
A[1'] – Positive signal lines(return).
B[1'] – Negative signal lines(return).

3.4.4.2 Daisy Chain Style Wiring

- Connect the wires from the A1 and B1 terminals of the output port1 on the first FACPES motherboard card connector to the A2' and B2' terminals of the input port2 on the next available FACPES to create the panel RS-485 link.
- Continue wiring to all the panels/repeaters to be connected to the link – connecting A1 to A1' and B1 to B1'.
- Install EOL 4K7, 0.5W minimum resistors in the output port1 terminals on the last FACPES and also in the input port1 terminals on the first FACPES present in the loop to complete the wiring.
- The maximum allowed length of the link is 1.2km(1200mtr).

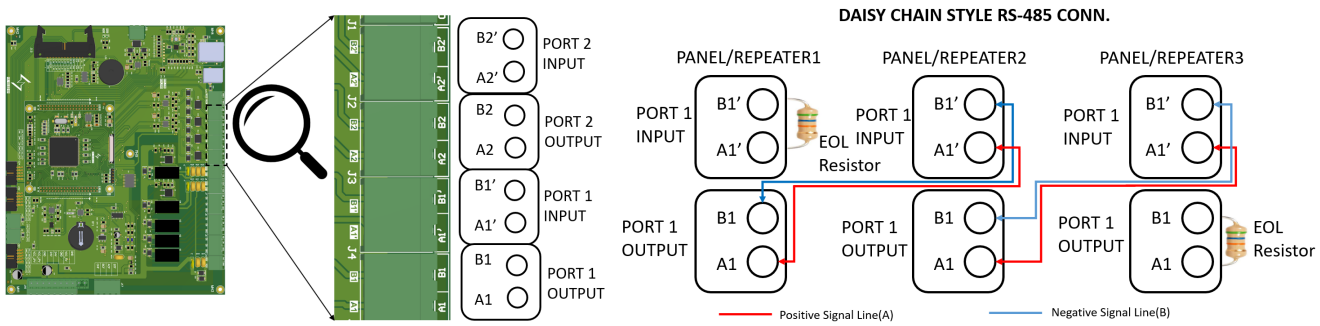


Figure 3.30: RS-485 Daisy Chain style wiring diagram

Description of the Terminals:

A[1] – Positive signal lines.
B[1] – Negative signal lines.
A[1’] – Positive signal lines(return).
B[1’] – Negative signal lines(return).

3.4.4.3 RS-485 Linked Network Arrangement.

The following diagram illustrates the RS-485 network connection overview:

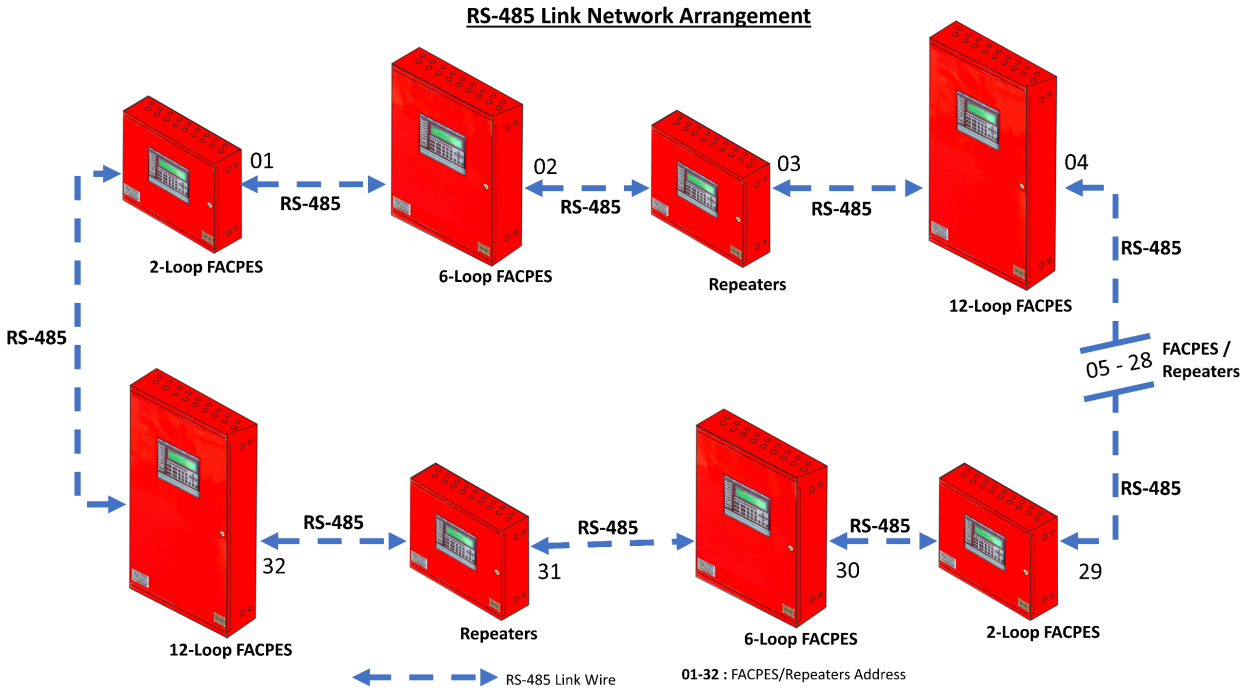


Figure 3.31: RS-485 wiring diagram arrangement

3.4.5 CAN Communication Wiring Diagram

- One CAN communication port is also available in the panel motherboard to communicate with another panel with minimum interference.
- This port is used for future or additional communication/networking purposes.

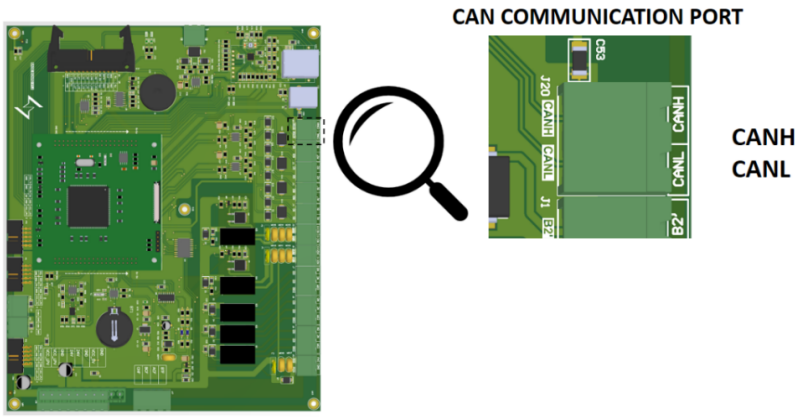


Figure 3.32: CAN Communication Port Position

Description of the Terminals:

CAN[H] – CAN High lines.
CAN[L] – CAN Low lines.

☞ This Comm. Port is used for additional and feature reference.

3.4.6 Panel Networking / PC Interfacing

- The Ethernet Port on the Motherboard card is used for the Panel Network interfacing purposes.
- A Master Panel FACPES can also be connected to a PC/Desktop by using the Motherboard USB Port for PC Communication such as., PC Programming, software updating, Printing data etc.,

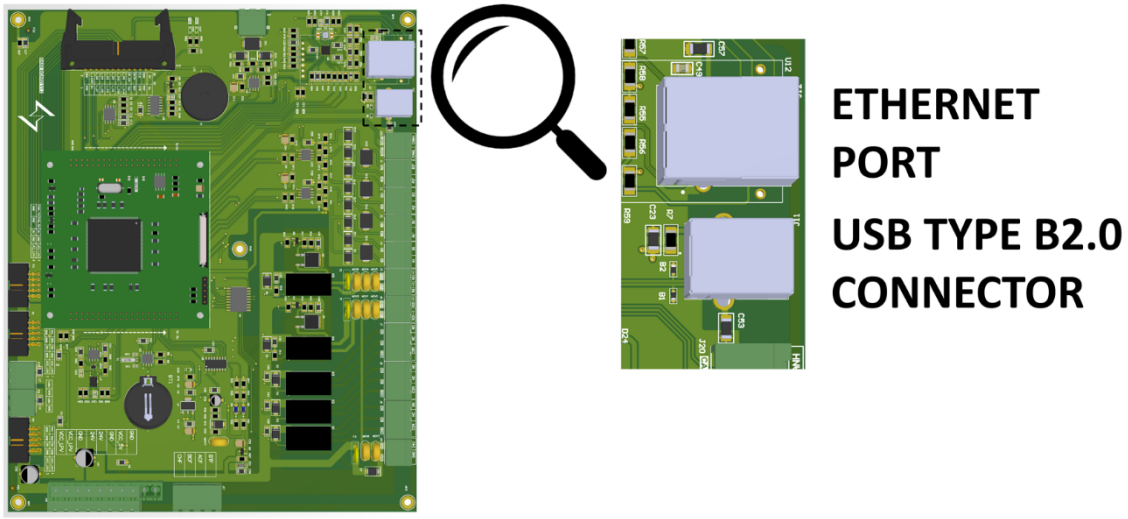


Figure 3.33: Ethernet & USB Communication Port Position

3.4.7 Auxiliary Supply Output (24V)

- The FACPES Ogon Fire Alarm Control Panels feature an unsupervised, power-limited 24V auxiliary output supply with a maximum 7A rating.
- The Remote Annunciator (Repeater) units and other peripheral loop units or signalling loop units can be powered using this supply.

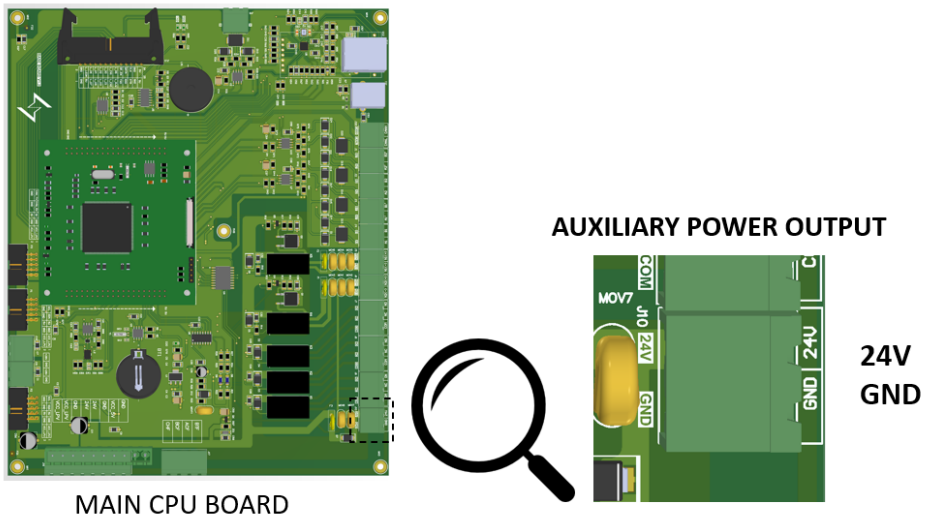


Figure 3.34: Auxiliary Power supply(24V) Port Position

Description of the Terminals:

24V – 24V DC(+) Positive Power supply.
GND – 24V DC(-) Negative Power supply.

3.4.8 All Internal Wire Interfacing Overview

- The diagram shows that the all-interfacing connection for panel's internal different sections:

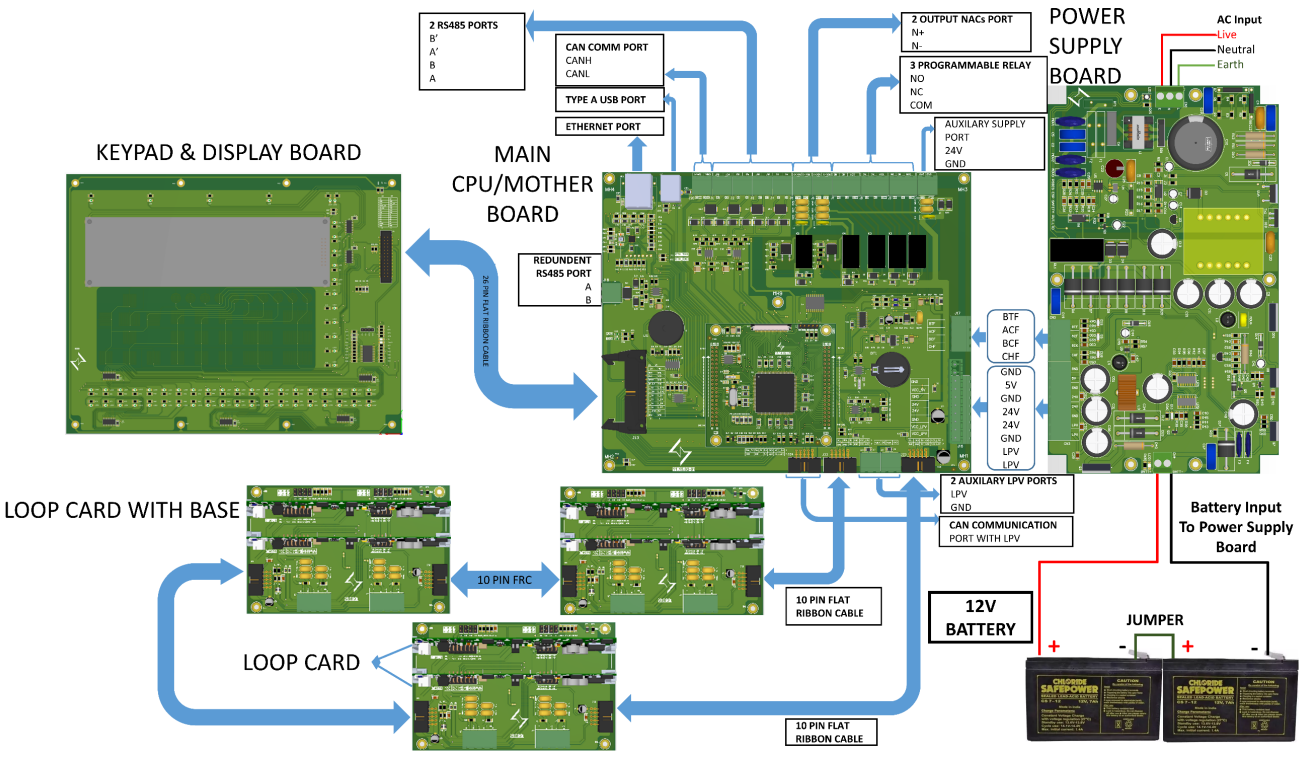


Figure 3.35: Panel all part interfacing overview

☞ For, the 2/12-Loop System FACPES Loop card base wiring interfacing overview, users need to see clause no. 3.6.1.1, 3.6.1.3 in this manual.

3.5 PANEL DIFFERENT PARTS INTERFACING

3.5.1 Input Power Supply

3.5.1.1 AC / Main Supply to Power Supply Board

- For interfacing this section user should follow the given Figure.
  - ✓ Wires must be entered from the nearest Knock-out to SMPS input with proper insulation.
  - ✓ Wire Colour coding must also be adhered to avoid wrong connections.
  - ✓ Wire gauge used according to panel full load capacity.

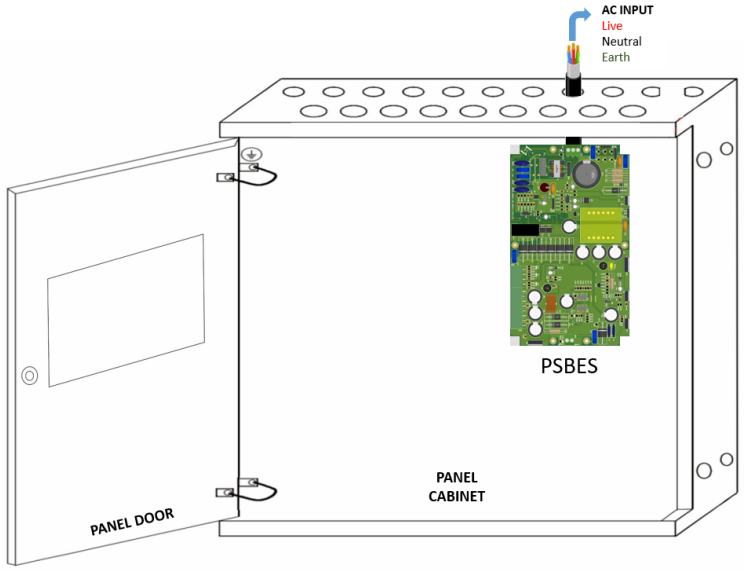


Figure 3.36: AC supply to Power supply board interfacing

☞ Before connecting the panel to the AC supply, the user should ensure that all internal and external connections are made properly with the required insulation and grounding.

3.5.1.2 Battery to Power Supply Board

- Batteries are mounted inside the panel to give backup power if AC is absent.
- They are directly mounted on the SPMS board. Avoid mounting the wires anywhere else.
- Make sure to properly connect 2-12V batteries in series not in parallel to get 24V output.
- Follow proper colour wires to mark (+) and (–) at both ends to avoid shorting and wrong connections.

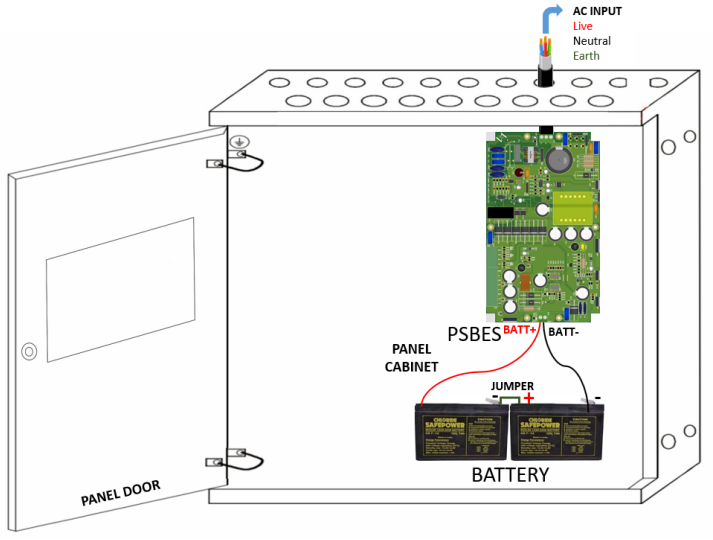


Figure 3.37: Battery supply to Power supply Board interfacing

☞ Before connecting the panel to the battery supply, the user should ensure that the AC supply is turned off at that time and also ensure the proper connection is made with the PSBES Board.

3.5.2 Power Supply Board to Motherboard Card

- After SMPS and batteries are properly wired, the next task is to mount the CPU main board.
- The CPU board is the brain of operation and all communications for our panel.
- Properly wire the CPU board to SPMS for powering up with the given wire data in the below Figure.
- Communication outputs are given on top of the CPU board, follow the instruction manual to properly connect them.

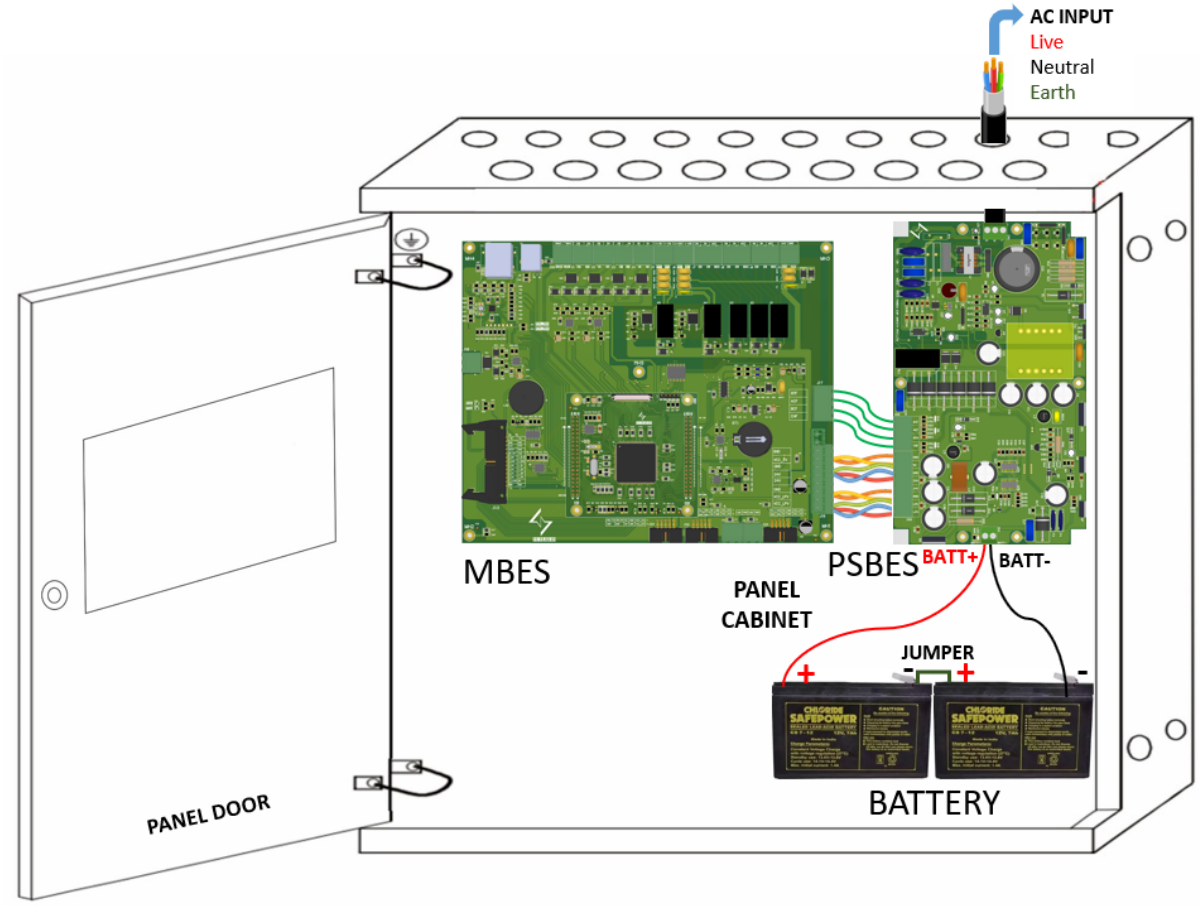


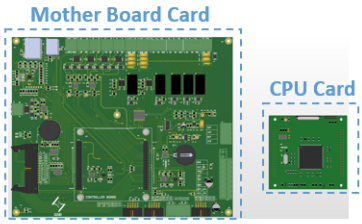
Figure 3.38: Power supply board to Motherboard interfacing

☞ Before connecting the motherboard to the power supply, the user should ensure that the terminal-to-terminal connection is according to the wiring diagram (3.4) and terminal description (3.3) clause given in this manual.

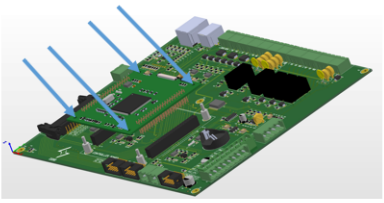
3.5.3 CPU Card to the Motherboard Card

- An CPU Card interfacing with the Mother Board is required to put over the two female connectors built upon the mother board.
- The direction of the connection, as shown below Figure, must be followed
- This type of connection allows the user to program the CPU card after removing it from the main board

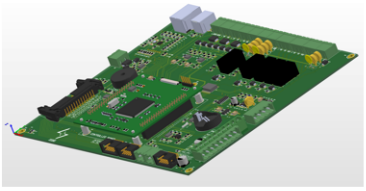
Steps to Properly Mount CPU Card on Mother board Card



Step 1: Make Sure to use the Same working part provided by ESP.
Keep the position as shows in the figure and avoid mounting in opposite direction.



Step 2: Gently press the card on the given connector and make sure to give proper pressure to both sides to get proper fitment. Make sure no Pins get bent during the process.



Step 3: After proper fitment and all connection, mount 4 M3 bolts to ensure card stays in place.

Figure 3.39: CPU Card to Mother Board interfacing

☞ Before inserting/changing the CPU card to /from the Motherboard, the user should ensure that the power supply is turned off and the battery is disconnected at that time and also ensure the proper tightness of this card over the motherboard.

3.5.4 Motherboard Card to Keypad & Display Board

- The Touch Keypad board is responsible for the LCD, LED indications, and Capacitive touch keys.
- A 26-PIN FRC cable is used to connect the Keypad and CPU.
- Make sure to use a good quality cable having a female-to-female connector.

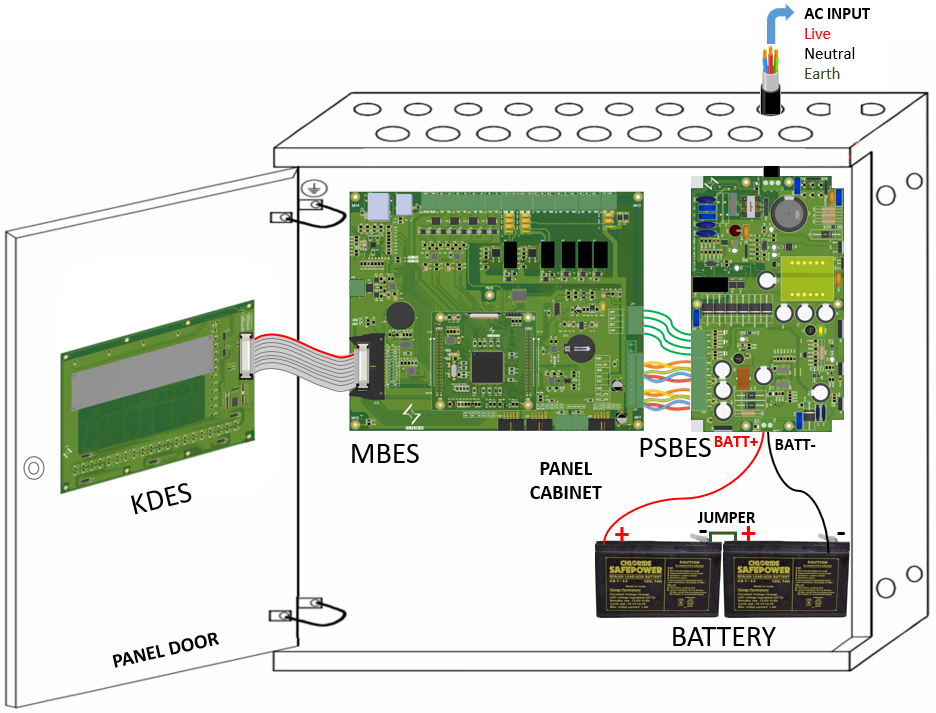


Figure 3.40: Mother board to Keypad display board interfacing

☞ Check the FRC cable tightness on both connector sides.

3.5.5 Motherboard Card to Loop Card Base Board

- To Connect the loop card base with the motherboard card we are using a 10-pin FRC cable.
- Make sure the connection is proper and tight, loose connection may cause any miscommunication.

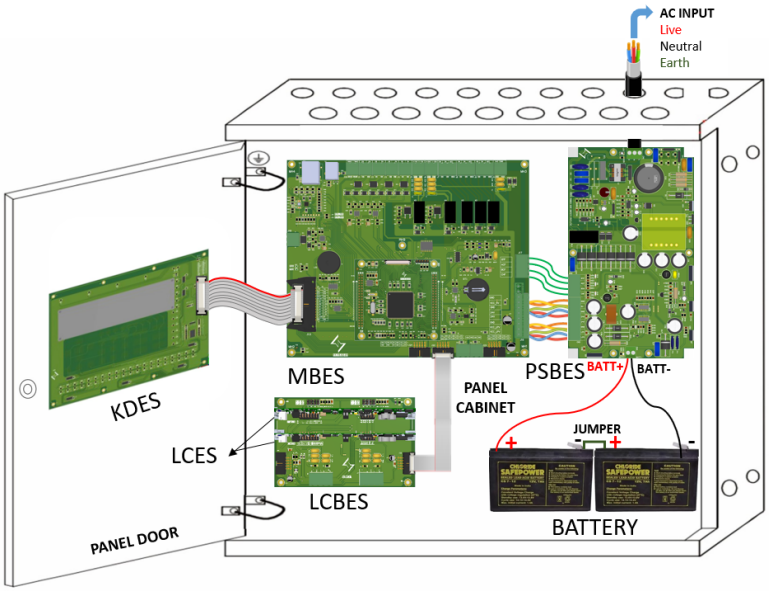


Figure 3.41: Mother Board to Loop Card Base Board Interfacing

☞ Check the FRC cable tightness on both connector sides.

3.5.6 Loop Card to Loop Card Base Board

- User should follow the below 3 steps to ensure loop cards are properly mounted on their respective base card.
- If more detectors are required, we can increase the number of loop cards according to our needs.
- The same steps should be followed in the 6 & 12-loop System.

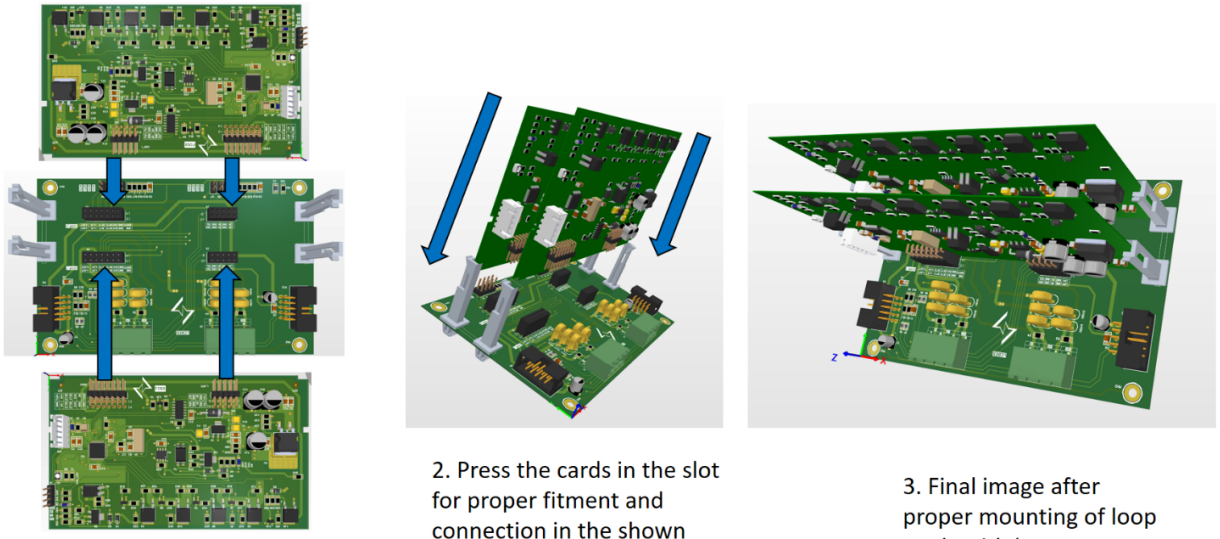


Figure 3.42: Loop Card to Loop Card Base Board Interfacing

☞ Users need to follow the above steps as shown in the above images to insert the loop card properly into the loop card base.

3.5.7 One Loop Card Base to Another Loop Card Base Board

- To connect two loop card bases we are using a 10-pin FRC cable.
- To connect more than two loop card bases, all the bases are to be connected in series.

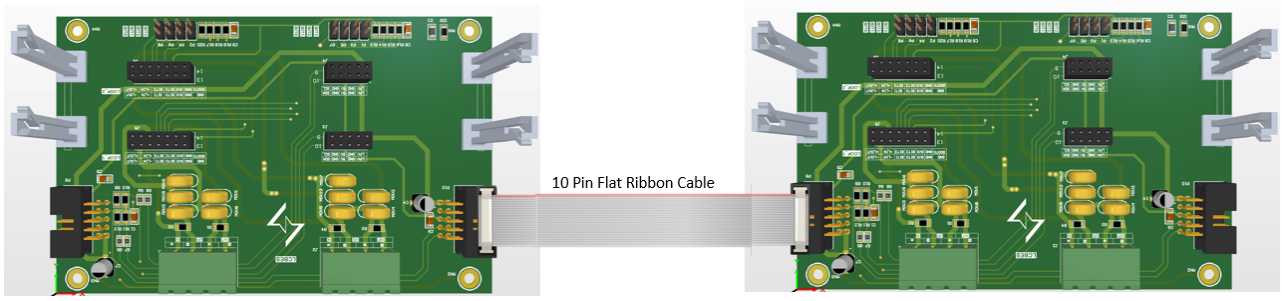


Figure 3.43: One Loop Card Base Board to Next Loop Card Base Board Interfacing

☞ 1. Check the FRC cable tightness on both connector sides.
2. Only For 6/12-Loop system FACPES

3.6 PANEL ARRANGEMENTS

3.6.1 Different Sections Arrangements

3.6.1.1 2-Loop System Arrangements

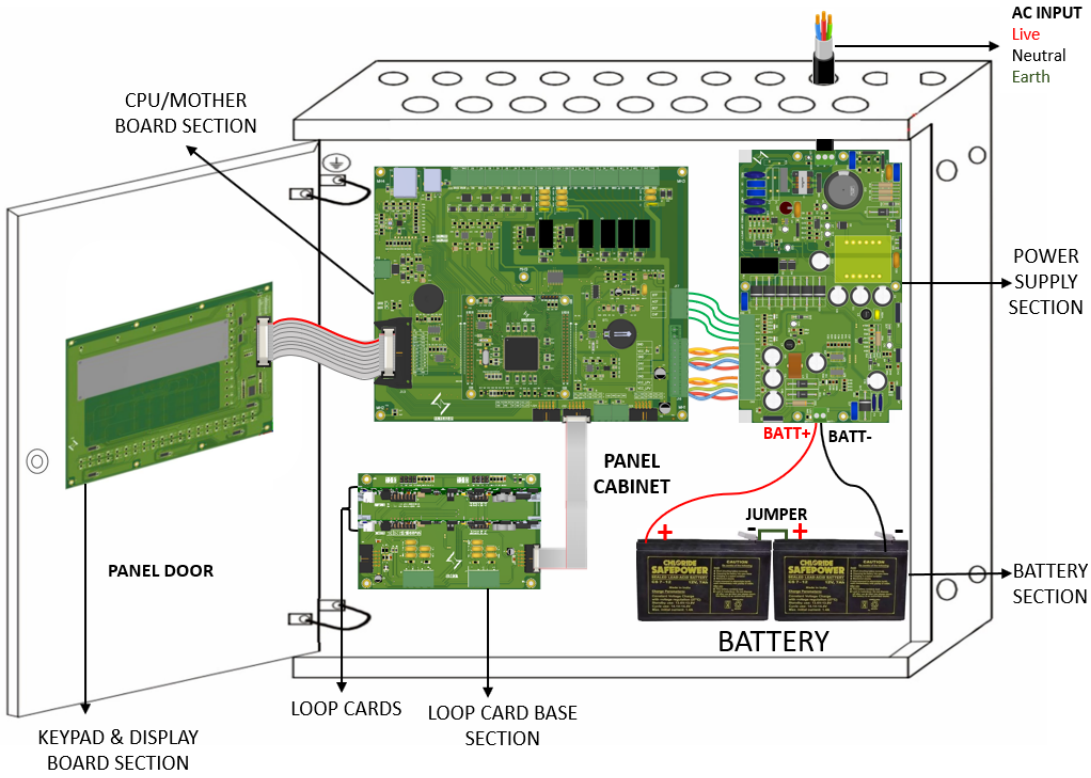


Figure 3.44: 2-Loop system FACPES Different Sections/Boards Interfacing Arrangement

3.6.1.2 6-Loop System Arrangements

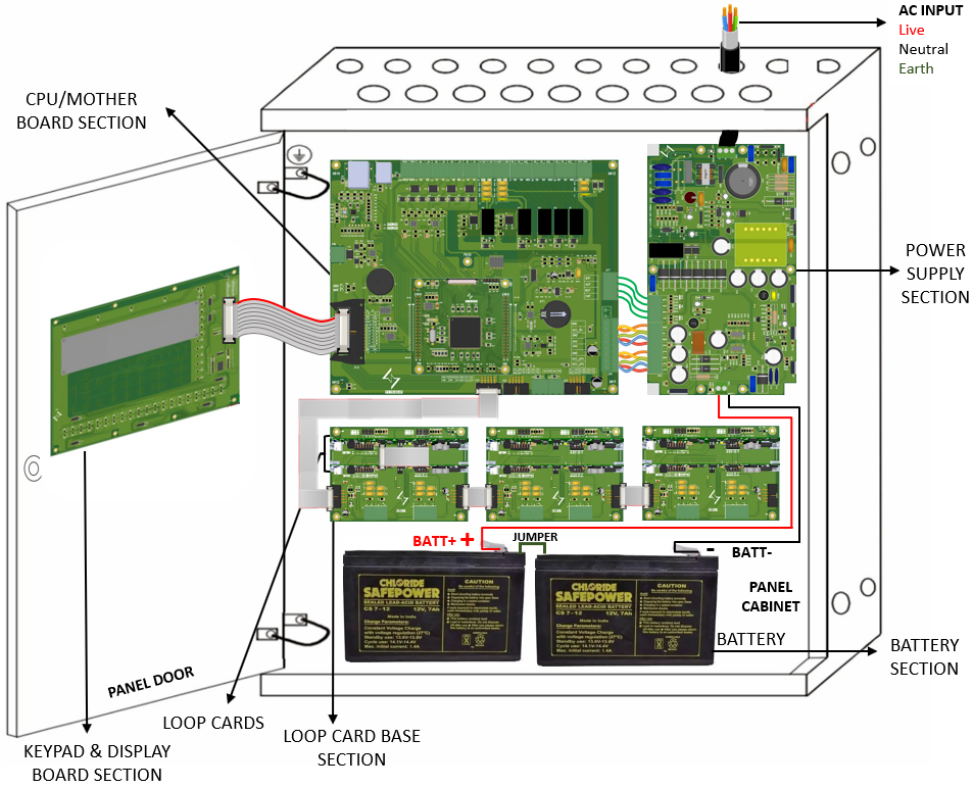


Figure 3.45: 6-Loop system FACPES Different Sections/Boards Interfacing Arrangement

3.6.1.3 12-Loop System Arrangements

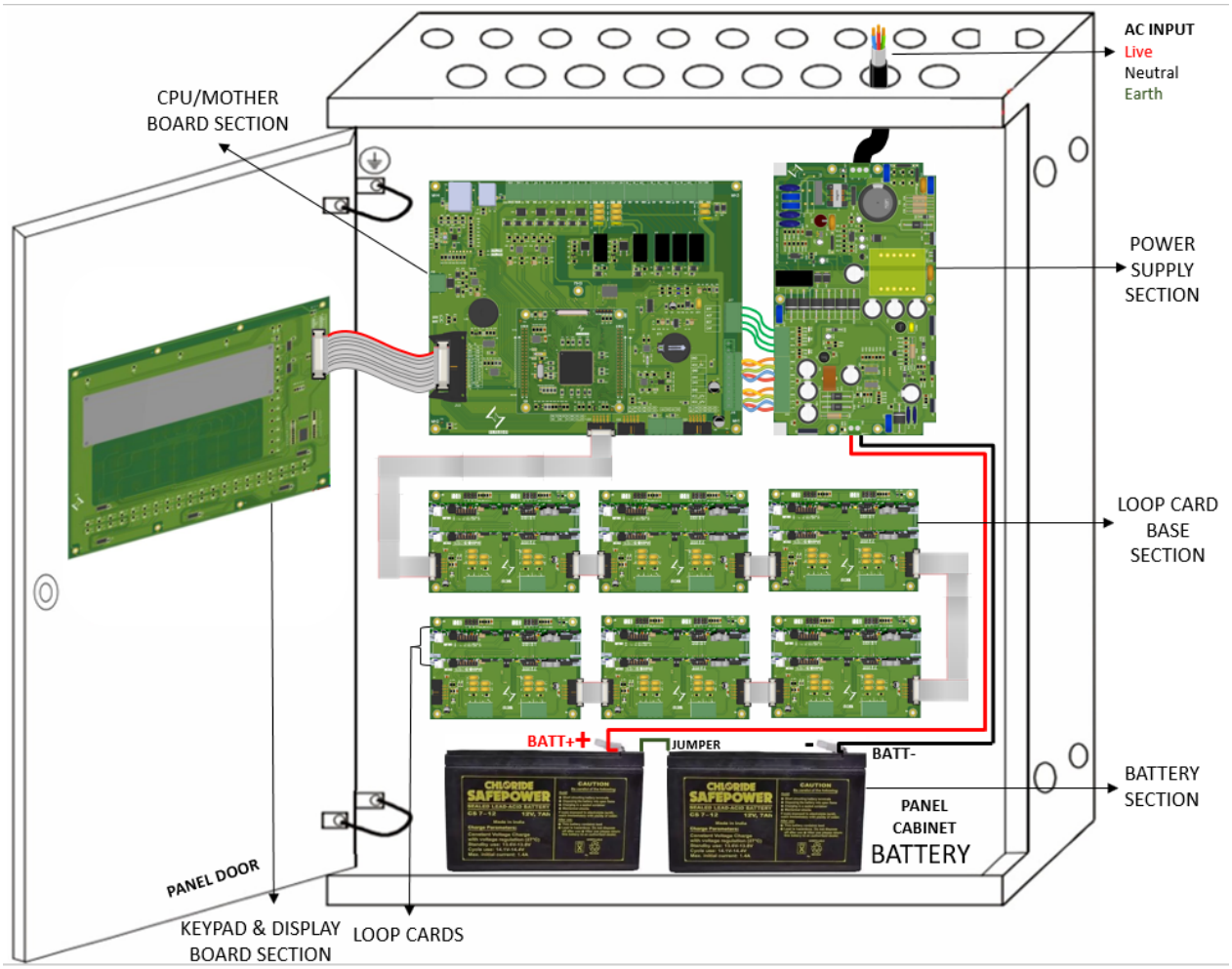


Figure 3.46: 12-Loop system FACPES Different Sections/Boards Interfacing Arrangement

3.6.2 Batteries Positions

There is a battery cable kit included in the packaging. To connect the PSBES board to the batteries the following connection should be made:

- Used red wire to connect from the terminal (BATT+) of the Power Supply to the positive terminal of battery No.1.
- Used black wire to connect from the terminal (BATT-) of the Power Supply to the negative terminal of battery No.2.
- Connect the jumper wire from the negative terminal of battery No.1 to the positive terminal of battery No.2 to make a series connection of both batteries.
- When installing the batteries, ensure that the wiring between the power board and the batteries is routed as shown below.

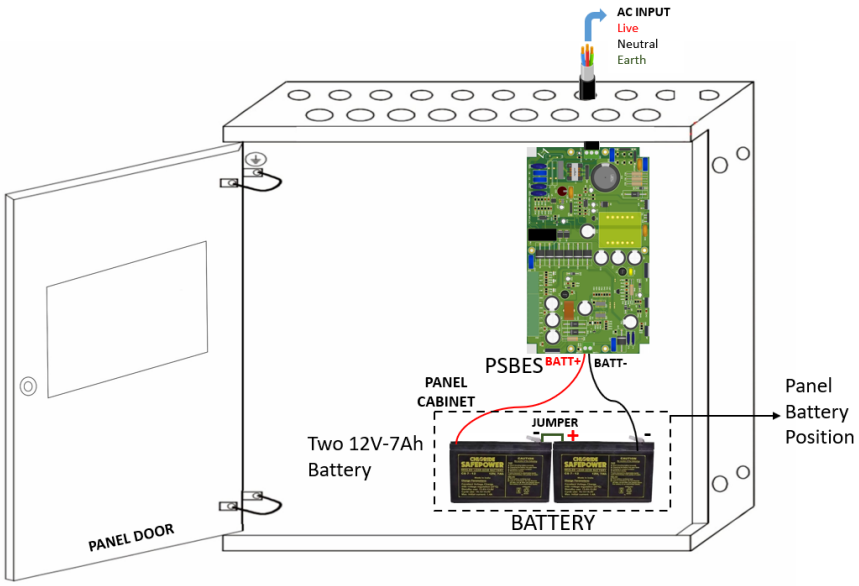


Figure 3.47: 2-Loop System Panel Battery Position

☞ 1. Users need to place the battery in the position mentioned in the above image and also check the battery fitting in this particular panel.
2. For the 6/12 Loop system, users need to see figures 3.42 & 3.43 for their battery fitting position.

3.6.3 Knockout Points

Knockouts for cables ducted externally.

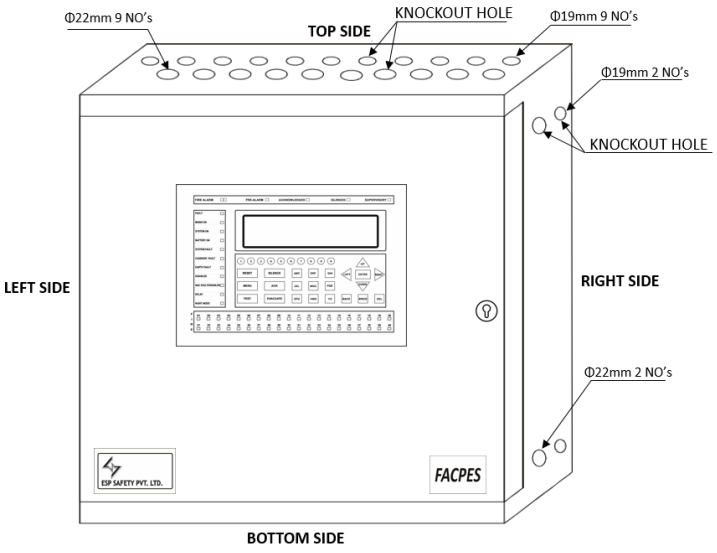


Figure 3.48: Panel all side knockout points location

☞ The top side and bottom side knockout points are the same in number and size.

☞ The right-side and left-side knockout points are the same in number and size.

☞ If a user needs to open the extra knock-out points, they just need to open that particular point carefully.

☞ For the 6/12 Loop system, knockout hole count, size, and positions are the same as in the 2-loop system FACPES.

3.6.4 Earthing / Grounding Points

The panel various earth wire connection positions as shown in the figure below:

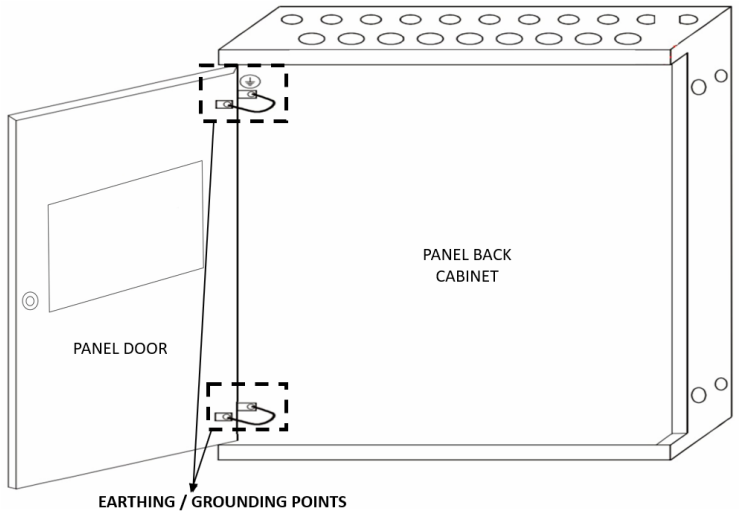


Figure 3.49: 2-Loop System Panel Earthing points positions

☞ Before connecting the panel to the power supply, users should ensure that all earth/grounding connections are made properly with the required insulation.

☞ For the 6/12 Loop system, earthing wire positions are the same as in the 2-loop system FACPES given.

3.6.5 Panel Door Lock Position

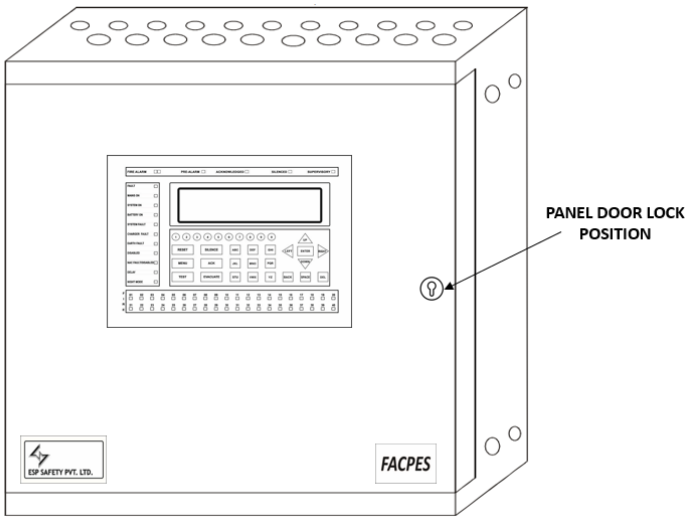


Figure 3.50: 2-Loop System Panel Door Lock position

☞ A Secured key lock is provided in the panel door to secure the panel from any tampering or unauthorized use.

☞ Only User access level 4 has access to open the panel and replace the battery/PCB.

☞ For the 6/12-Loop system, the Panel door lock position is the same as in the 2-loop system FACPES given.

3.6.6 FACPES Cable Routing Diagrams

The following diagram should be followed when routing cables within the enclosure. Make sure to route power-limited cables separately from AC Mains and non-power-limited cables.

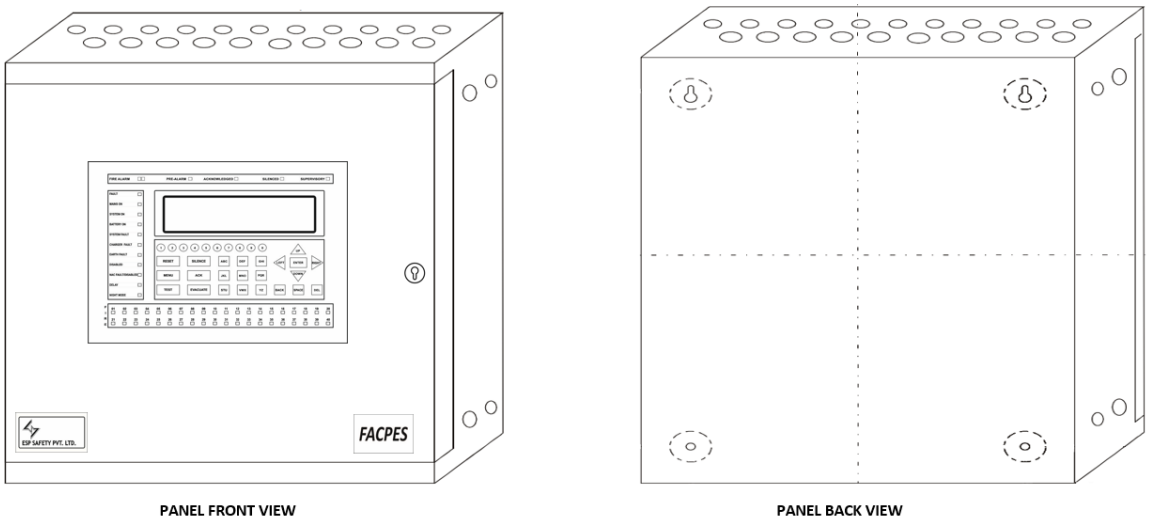


Figure 3.51: FACPES Panel (2-Loop System) Front and Back View

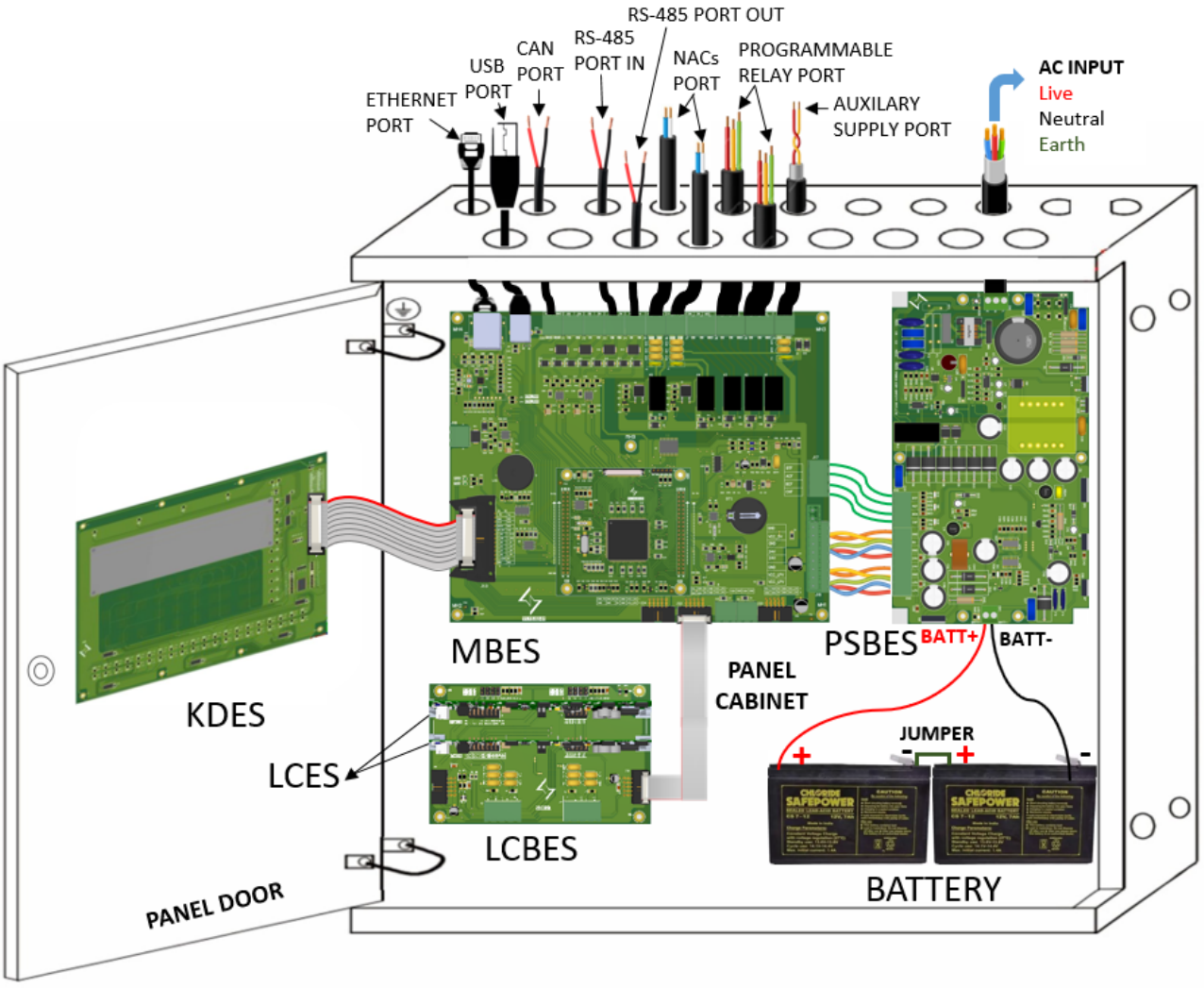


Figure 3.52: Panel All Cable Routing Arrangement

☞ To the inside of the panel user needs to do only the required wiring cannot use or store any extra wire inside the panel.

☞ User should ensure that all wiring is done with their gauge requirement with proper insulation and earthing.

☞ For the 6/12 Loop system, cable routing is the same as in the 2-loop system given (with extra knockout).

3.7 PANEL SPECIFICATIONS

3.7.1 Functional Specification

Specification Items	Values
Enclosure (W*H*D)	2-Loop: 520*435*152 mm 6-Loop: 520*670*152mm 12-Loop: 520*830*193mm Sealed to IP30
Weight	2-Loop: 10 kg without batteries. 18.5 kg with 7Ah batteries fitted. 6-Loop: 12 kg without batteries. 20.5 kg with 12Ah batteries fitted 12-Loop: 15 kg without batteries. 25.5 kg with 24Ah batteries fitted
Operating Temperature	0°C to +85°C
Relative Humidity	Up to 95% non-condensing
Knockouts (22mm) / (19mm) Points	18 (Top), 18 (Bottom), 4 (Left) and 4 (Right)
Sounder (NAC) Output	2 programmable outputs. Open- and short-circuit monitored. 1A maximum output current. Minimum switched current – 1mA
Auxiliary Relay	3 Programmable outputs. Relay 1 is configured as Fault output. Relay 2 is configured as Fire output. Relay 3 is configured as Supervisory output. Contacts rated at 24V AC/DC, 1 Amp Minimum switched load – 1mA @ 5V
Loop Module	2-Loop: 2 6-Loop: 6 12-Loop: 12
Devices Connected Up to	2-Loop: 508 (254 per Loop Module) 6-Loop: 1524 (254 per Loop Module) 12-Loop: 3048 (254 per Loop Module)
Monitoring zones	Up to 40 zones with individual LED indicators.

Table 3.6: 2/6/12-Loop system FACPES specification

3.7.2 Power Supply or Charger Specification

Specification Items	Values
Main Voltage	85-265VAC 50Hz
Voltage tolerance	+ 10%- 15%
Power Supply card fuses	AC Fuse: 4A 260VAC Resettable 28s Battery Fuse: 5A 30VDC Resettable 14s Charging Fuse: 5A 30VDC Resettable 14s
Aux. Outputs Nominal Voltage	5VDC, LPV
Aux. Outputs Min. and Max. Voltage	4.8- 5.2VDC, 29- 32VDC
Main Output voltage	29VDC
Current drawn	1A (220V)
Maximum Power Supply Output Rating	Main Output: 29V 7A LPV Output: 30V 7A 5V Output: 5V 3A
Battery Charger Output	27.6 VDC 1.2A
Temperature Storage	-40 to +80°C
Standby Batteries	2-12V sealed lead acid Capacity- 21Ah (Internally Fitted)

Table 3.7: 2/6/12-Loop system FACPES Power Supply or Charger Specification

3.7.3 Battery Specification

Specification Items	Values
Manufacture	EXIDE
Model No.	EP-12-12
Nominal Voltage	12V
Capacity	12Ah
Weight	3.8KG
Dimensions(L*W*H)	151*98*94mm
Battery Type	Lead Acid

Table 3.8: FACPES battery specification table

4 INDICATION & USER INTERFACE

4.1 Overlay View

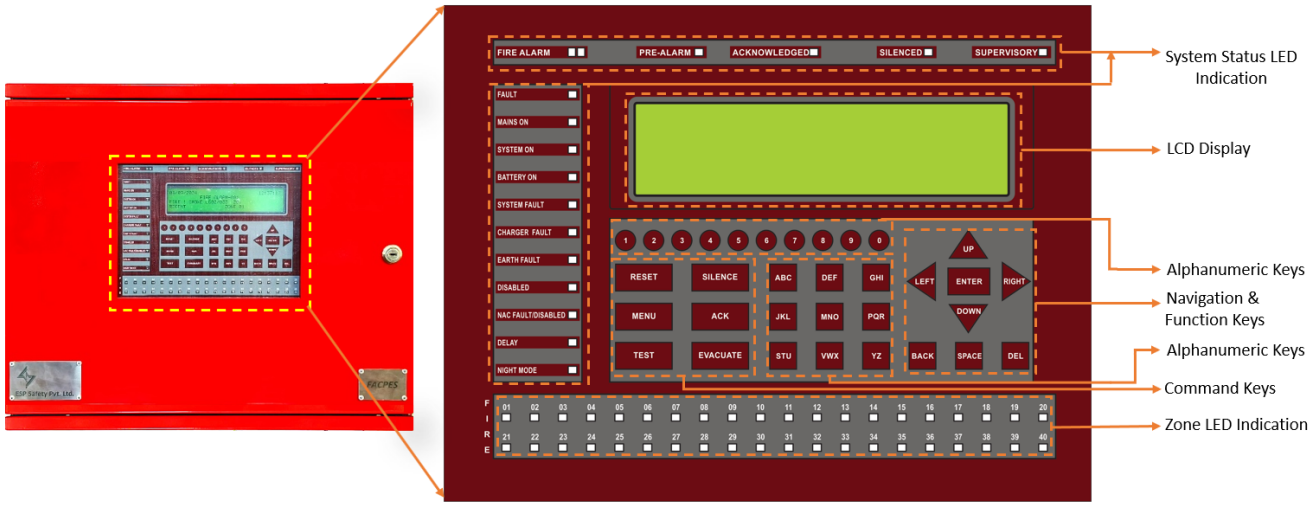


Figure: 4.1: KDBES Overlay View

4.2 Output Indication

4.2.1 LED Indication

LED Function	Description	LED Colour
Fire Alarm	This twin fire LED will glow when any one or more of the zones are in firecondition.	Red
Pre-Alarm	This pre-alarm LED glows when the first zone grouped (Pre-Alarm is enabled) device goes to alarm.	Red
Acknowledged	This Button allows the user to accept alarm or fault conditions of the Panel.	Green
Silenced	This LED will glow when the silence key is pressed in fire condition only. NAC FAULT: Whenever there is any fault in Notification Appliances Circuits like NAC loop Open / Short / Earth fault, it will be identified by COMMON NAC FAULT LED.	Green
Supervisory	This supervisory LED will glow when any one or more of the zones arein supervisory condition.	Orange
Fault	This fault LED will glow when any one or more of the zones are in faultcondition	Orange
Mains ON	The LED indicates that the panel is operated through the mains supply 220VAC. Whenever the Main Supply fails, the Mains ON LED will go to off condition and it is also indicated in LCD with toggle Buzzer tone.	Green
System ON	The LED will glow when the primary and standby power is applied to the panel.	Green
Battery ON	The LED indicates that the battery is present and connected with the panels and it is undercharging. Whenever the backup battery fails, the battery fault LED will go to ON condition and it is also indicated in the LCD with toggle and Buzzer tone. Similarly, the same LED will blink when the battery voltage goes down below 21.6v (Battery Low).	Green

Charger Fault	It indicates that the battery is connected to the panels but the charger circuit fails/battery is deep discharged. Whenever the backup battery charger fails, the charger fault LED will be illuminated and it is also indicated in the LCD with a toggle Buzzer tone.	Orange
NAC Fault	Will glow whenever the connector opens or the sounder circuit is not present or disconnected.	Orange
System Fault	Glowing of this LED indicates the failure of the CPU.	Orange
Earth Fault	Whenever the Signalling Device circuits (SLCs), Notification Alarm Circuits (NACs), Remote Inputs, and DC output come gets contact with the Earth or Body of the cabinet, the earth fault LED and common fault LED will be illuminated, and t also indicates in LCD earth fault with toggle Buzzer tone. The Earth fault can becreated through a 0 Ohms resistor.	Orange
Night Mode	This day/night LED glows, and panels are in night mode	Orange
Sounder Disabled	This disabled LED glows steadily in any output is in a disabled condition	Orange
Relay Disabled	This disabled LED glows steadily in any output is in a disabled condition	Orange
Zone LEDs (1-40)	This fire LED will glow when the zones are i n fire condition. The first firedzone continuously blinks and the other zone fire LED will glow steadily in fire conditions. The fired zone is displayed in the LCD, first fire zone and total no. of zone are displayed separately.	Red

Table 4.1: Output LED indication with description and colour

4.2.2 LCD Indication

The primary purpose of the 40 X 4 Character LCD is to program the panel and display all events, along with LED indications, except for system on and system fault. It allows viewing of programmed zone-wise location details.

4.2.3 Buzzer Notification

A piezo buzzer provides separate and distinct sounds for alarm, trouble, and supervisory conditions: continuous tone for alarm and intermittent tone for others.

- ✓ Alarm – Continuous
- ✓ Fault – Pulse 0.5sec ON and 5sec OFF
- ✓ Supervisory – Pulse 0.25sec ON and 0.25sec OFF

4.3 Keypad

The panel consists of 33 keys for the intended operation. These keys can be classified as Command keys, Control & Navigation keys, and Alphanumeric keys.

4.3.1 Command Keys

FACPES has the following command buttons for the operation of the fire alarm system.

Command Keys	Descriptions
RESET	RESET will return the panel to normal condition and the internal buzzer, and NAC will be silenced. RESET will clear all alarm conditions received from detectors and call points. RESET will clear/reset all latching events.
SILENCE	After pressing the silence button all internal buzzers and NAC devices will be turned off (silenced) Re-sound alarms (or any better name like Re-Activate) will be displayed on LCD for re-sounding internal buzzers and all NAC devices. Buzzer Silence will also appear on the LCD screen to silence the internal buzzer only not the NAC devices.
ACKNOWLEDGE (ACK)	All the major or minor notifications must be attended by the user. Faults and Alarm Conditions Acknowledgement allows the system to understand that the condition has been attended by the user.
MENU	The MENU button allows the user to reach the system function.
EVACUATE	The EVACUATE button helps to initiate manual evacuation. It will activate NAC ports, Relay ports, and internal Buzzer.
TEST	The TEST button allows the user to test the FACP system. Lamp Test, Keypad Test, Internal Buzzer Test, Output (Relay, NAC) test, and Walk Test

Table 4.2: Keypad command keys description.

4.3.2 Navigation & Function Keys

There are 6 keys available for navigating throughout the system. Also, there are 2 keys for helping to enter user entries.

Keys	Functions
ENTER	Accept the condition/State
BACK	For navigating to the previous menu
UP	Navigation / Selection
DOWN	Navigation / Selection
LEFT	Navigation / Selection
RIGHT	Navigation / Selection
SPACE	Blank space entry
DEL	Deletes the current entry

Table 4.3: Navigation key functions.

4.3.3 Numeric & Alphabet / User Entry Keys

Numeric Keys: 0 to 9 are available for entering numerical key.

Alphabets: A to Z can be entered by using keys as per below:-

Key	Single Clicked	Double Clicked	Tripple Clicked
ABC	A	B	C
DEF	D	E	F
GHI	G	H	I
JKL	J	K	L
MNO	M	N	O
PQR	P	Q	R
STU	S	T	U
VWX	V	W	X
YZ	Y	Z	

Table 4.4: Numeric & alphabet keys functions

5 OPERATION

5.1 System ON

When the Panel gets ON it displays a welcome message.

The panel goes into an initialization state for internal system check and scanning of connected control or active devices.

After successful initialization system displays the following message.

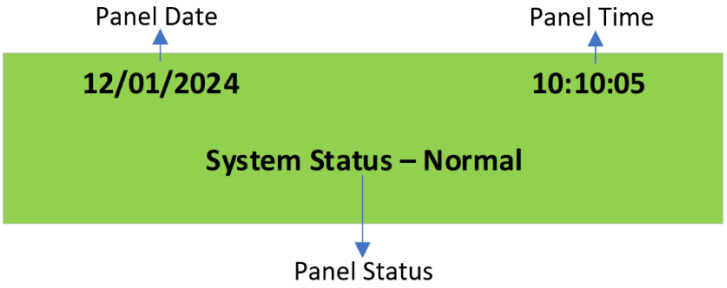
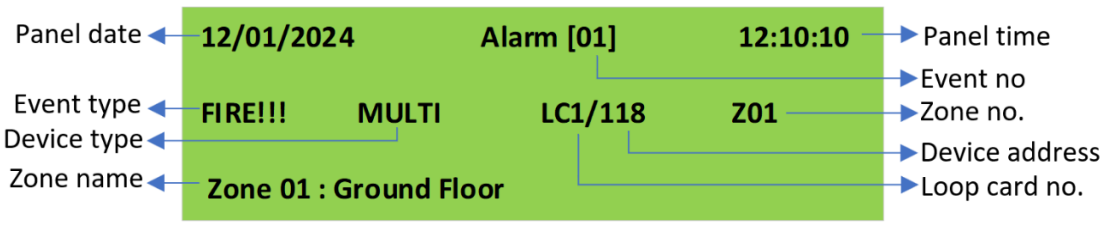


Figure 5.1: Display System Start, Initialization, and Normal window.

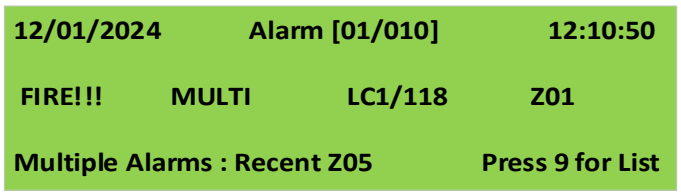
5.2 Fire Alarm State

In the Fire Alarm state following shall be acted on the panel. Twin Red LED will start flashing.

- ✓ The panel buzzer will sound continuously.
- ✓ Relay gets ON if enabled.
- ✓ NAC gets ON if enabled.
- ✓ Dedicated Zone LED will blink if configured.
- ✓ Alarm information will be visible on 40*4 LCD as per below



In case of Multiple Alarms, notification will be visible on the 40*4 LCD with the recent Fire Zone area. The Bottom row describes these conditions.



Multiple Alarms can be observed by pressing the 9 number button on the panel. A complete list will be visible below.

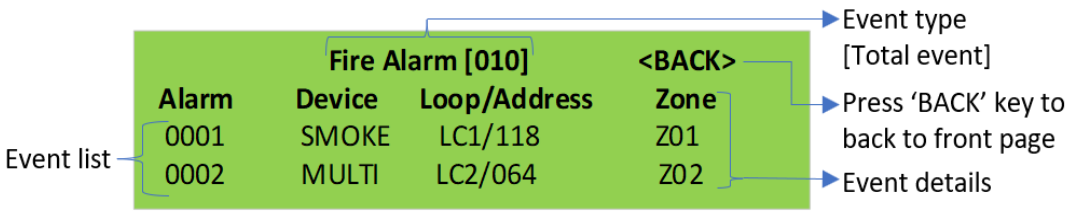


Figure 5.2: Display System in fire alarm state.

In case of Fire alarm conditions, the attendee can press command keys as per their intended instructions.

The following actions can be performed during fire alarm conditions.

- ✓ Acknowledge button to mute the panel buzzer. Fire LED will stop flashing and glow steady.
- ✓ SILENCE button to mute NAC devices (sounders). Silence LED will glow.
- ✓ SILENCE button to Resound the NAC devices. The silence LED will be off.
- ✓ Evacuate to activate NAC devices (sounders) and initiate manual evacuation.
- ✓ RESET button to clear a fire alarm condition. After resetting the panel, it will restore normal operation.

A subsequent alarm or multiple alarms received from another zone shall blink the panel alarm twin LED on the control panel. Further Acknowledgment or action will be required for this new alarm.

5.3 System RESET

The System Reset or RESET shall return the system to its normal state after an alarm condition has been remedied.

In RESET condition system will clear ALARM, PRE-ALARM, and Fault Conditions.

5.3.1 Normal RESET Procedure

In normal conditions when the RESET button is pressed messages, "SYSTEM RESET IN PROGRESS", shall be displayed first followed by the message "SYSTEM RESET COMPLETED", and finally, "SYSTEM IS NORMAL", should all alarm conditions be cleared, and panel buzzer be silenced.

After 2 seconds, the System status normal screen will appear as shown in the figure below:

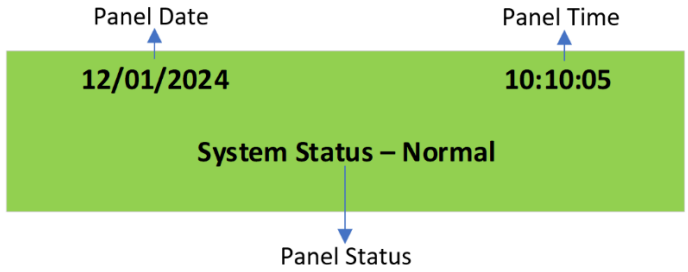


Figure 5.3: Display System reset normally.

5.3.2 In Case of Alarm Conditions (if Acknowledgement not done)

The message "SYSTEM RESET IN PROGRESS" shall be followed by the message "SYSTEM RESET ABORTED" and the system shall remain in an abnormal state.

System control relays shall not reset.

The audible device/buzzer and Alarm LED shall be on.

After 2 seconds, the display will show the Fire Condition on LCD as shown in the figure below:

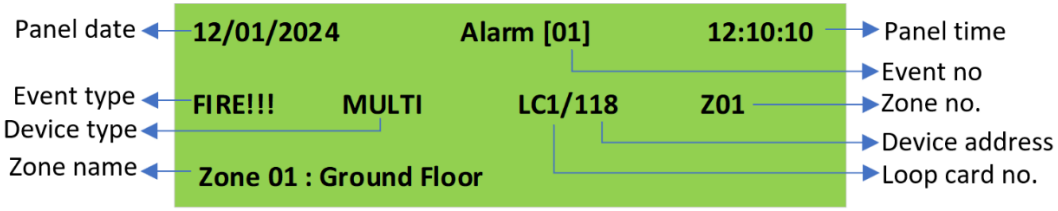


Figure 5.4: Display System reset in case of alarm.

☞ Pressing the acknowledgment button will globally acknowledge every point.

☞ The acknowledgment button will work for every event like Alarm, fault, and isolate.

☞ After all points have been acknowledged, the LEDs shall glow steady and the audible device shall be silenced.

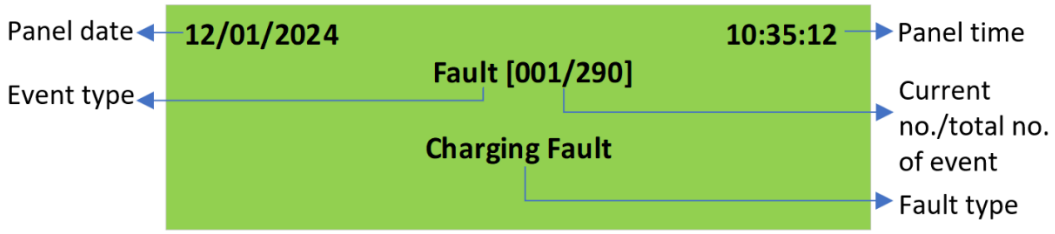
☞ The total number of alarms, isolates, and fault conditions shall be displayed along with a prompt to review each list chronologically. The end of the list shall be indicated by an end-of-list message "END OF LIST".

5.4 Faults State

Whenever the system detects any Fault, it goes into Fault State and illuminates Yellow LEDs.

In Fault Condition Panel Buzzer gets activated and sounds intermittently.

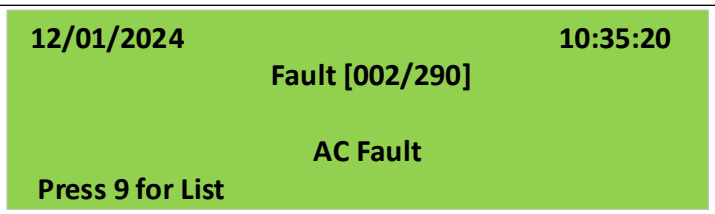
The panel displays fault conditions as below image.



☞ The second row indicates the Fault that occurred and their counts.

☞ The third row displays the Fault Details.

In case of multiple faults, the following will be displayed



All fault lists can be viewed after pressing the 9-number key.

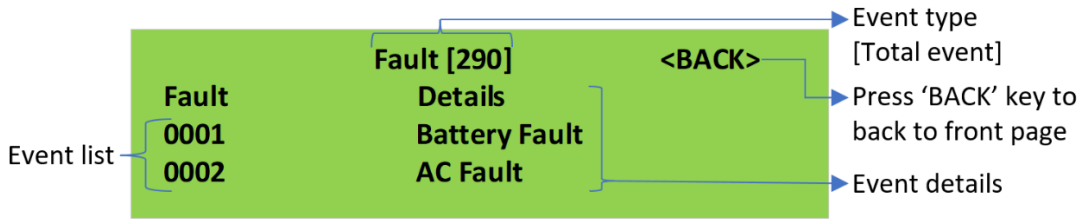


Figure 5.5: Display System in fault state.

The Below table shows the various faults that occurred in the panel:

Fault Types	Description
Power Fail	When the system operates on the battery
Battery Fail	When the Battery is not present or discharged
System Fault	When any system fault occurred
Earth Fault	When any voltage leakage to the earth
NAC1 Fault	When any fault occurred in NAC1
NAC2 Fault	When any fault occurred in NAC2
Zone Fault	When any zone-related fault happened
Loop Card (1-6) Absent	When enabled loop cards are not present
Loop Card (1-6) Fault	When no response from the enabled loop cards

Table 5.1: Fault types with their descriptions

All normal functions of the panel shall continue to act in case of all types of faults.

- ✓ Panel Buzzer – Turned ON (Signal 0.5sec ON 5sec OFF)
- ✓ Fault LED – Turned ON (common fault led on the TOP)
- ✓ Respective Fault LED – Turned ON
- ✓ Fault Relay (if configured/defined) – Turned ON

Fault Restoral

To restore the fault conditions, press the Acknowledge button. In this condition, the Common Fault LED, Respective Fault LED, and Panel Buzzer will be Turned OFF. Also, if a Fault Relay is configured, it will be turned OFF.

5.5 Disablement State

In case of disablement of any device, the Disabled LED will glow on the panel.

When sounder / NAC points are disabled, will Sounder Disabled LED will glow.

All types of disablement can be viewed in Disablement MENU

5.6 Pre-Alarm State

The panel monitors the pre-alarm conditions and log-in events. The Pre-Alarm conditions can be observed in View MENU. All conditions can be viewed using the Up and Down Key.

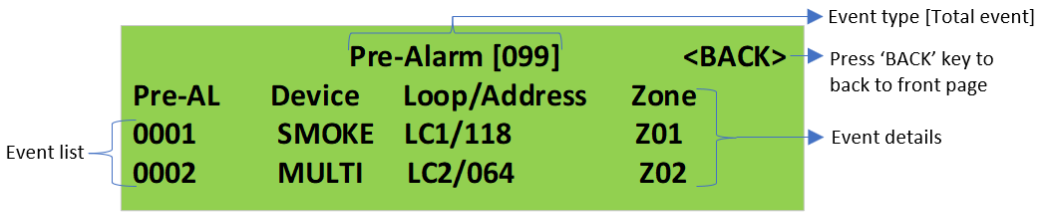


Figure 5.6: Display System in Pre-alarm state.

5.7 Supervisory Condition

A Supervisory Condition happens when any issue occurs with the system, process, or equipment attached to FACPES. It is generally a non-emergency situation but these conditions are necessary for system overall performance such as a valve tamper or low water pressure in a sprinkler system.

When the control panel detects a supervisory signal, the panel will cause the following:

- ✓ The corresponding zone supervisory LED will blink.
- ✓ The common supervisory LED will glow.
- ✓ Turn on the panel buzzer with an intermittent buzzer tone.
- ✓ Turn on the supervisory relay.

After the Supervisory Condition is taken care of, press the Reset Key to turn the Supervisory LED, Buzzer, and Relay off.

5.8 User Access Levels

The panel has set up several User Levels for protection and to avoid misuse. The following table describes the user levels intended for panel operation.

Access Level	User Type	Key/Password
User Access Level 1	General/Untrained User	No Key/Password Required
User Access Level 2	Authorized User (View / Event log)	Key/Password Required
User Access Level 3	Authorized Installer (Programming Mode)	Key/Password Required
User Access Level 4	ESP Service Engineer (Troubleshoot/PCB Replacement)	Key/Password Required

Table 5.2: Various user access levels in FACPES.

6 PANEL PROGRAMMING

The following section provides an overall view of how to use the User interface Programming (Main panel) of the control panel. The Program option in the main menu is user Access Level-3 (54321) password protected if the user wants to do any program-related operation performed in the panel, then they need to enter the secured 5-digit password as shown in the figure below:

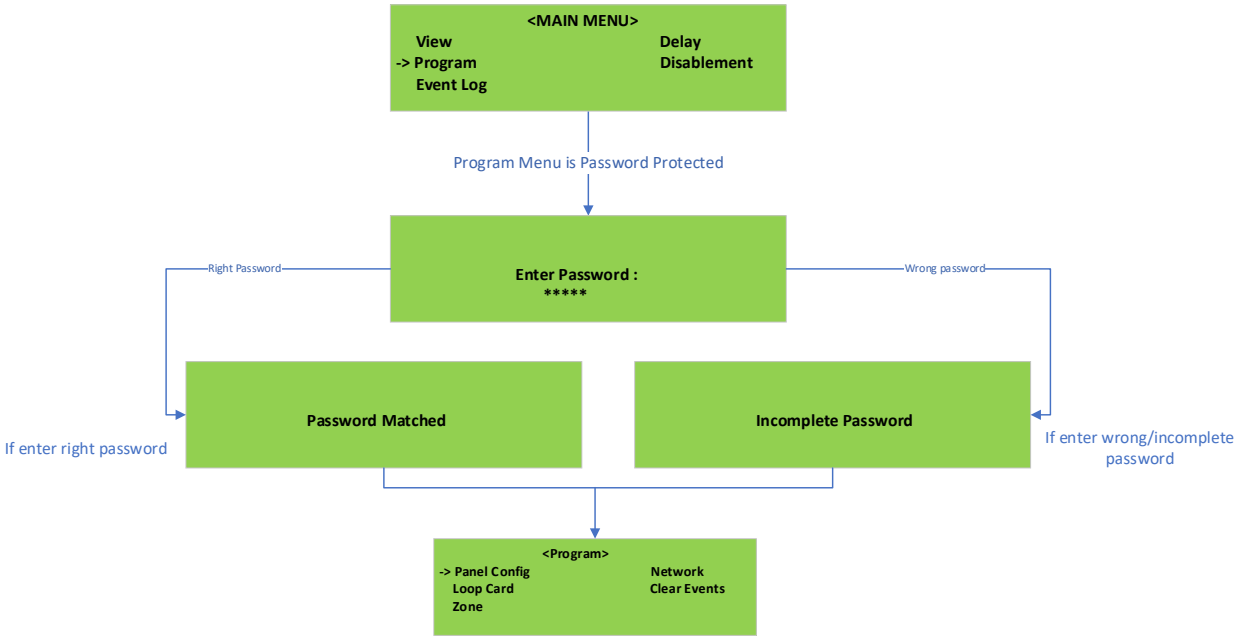


Figure 6.1: Display Program Menu and Password window.

The Program menu page allows users access to program the control panel's Panel Configuration, Loop Cards, Zone, and Network features. As shown in the window above.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the selection.
Use the BACK key to step back to the Program menu page.
Use the UP and DOWN key to move the-> sign.

6.1 Panel Configuration

The Panel Configuration option in the Program menu activates the screen used to select and program the Output Devices, Date & Time, Night Mode, and Password Update of the panel. As shown in the window below:

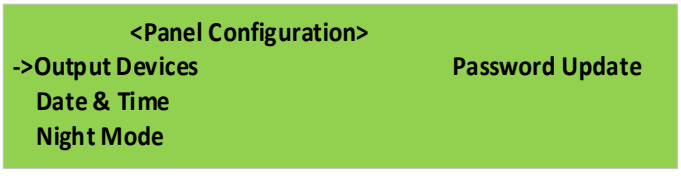


Figure 6.2: Display Panel configuration program.

☞ Insert Access Level 3 Password (54321) before any selected option to program.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the selection.
Use the BACK key to step back to the Program Menu page.
Use the UP and DOWN key to move the-> sign.

6.1.1 Output Devices

The Outputs Devices option in the Panel Configure Program menu selects the type of output devices to configure such as Relay or NAC. As shown in the window below:

Figure 6.3: Display Output devices program.

If the user selects the Relay's output device to program, then it activates all available relays to configure their Status (Enable/Disable), Mode (Fire/Fault), and Delay time (0 to 180s). See fig. below:

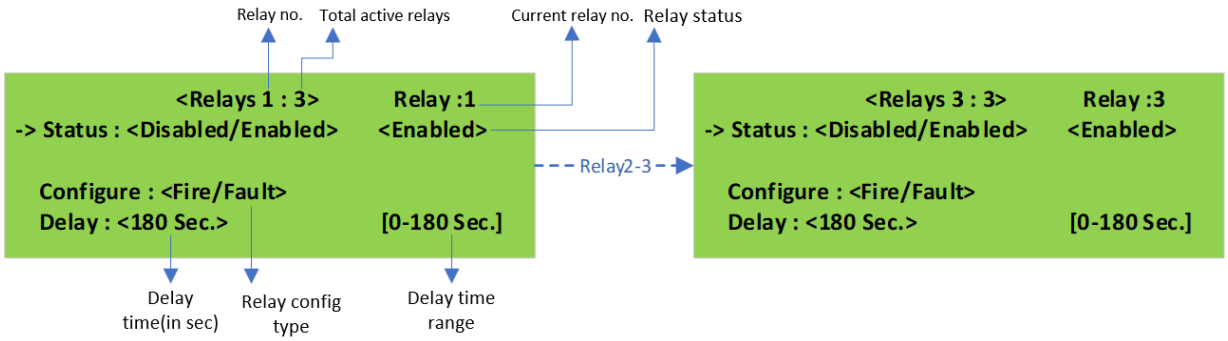


Figure 6.4: Display Output Devices (Relay) program.

If the user selects the NAC's output device to program, then it activates all available NACs to configure their Status (Enable/Disable) and Delay time (0 to 180s). See fig. below:

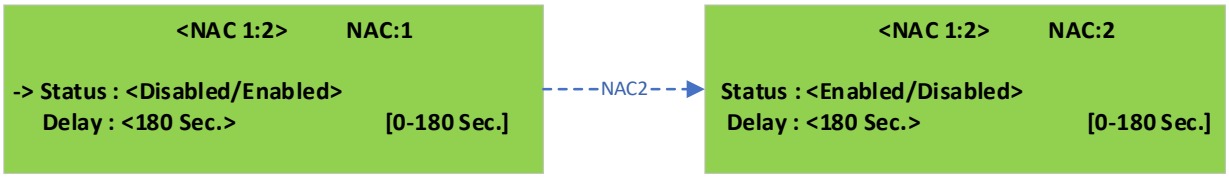


Figure 6.5: Display Output Devices (NAC) program.

☞ To configure <Enable/Disable> any option, the panel asks users to put Access level 3 Password.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the selection.
Use the BACK key to step back to the Panel Configure Program Menu page.
Use the UP and DOWN key to move the-> sign.
Use the RIGHT and LEFT keys to program the next and previously available NACs.

6.1.1.1 Date & Time

The Date & Time option in the Panel Configure Program menu is used to program or update the control panel date and time in the format as shown in the window below:

Date: DD:MM: YYYY Time: HH:MM: SS

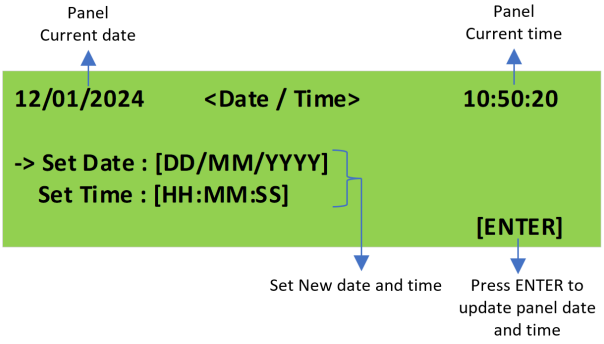


Figure 6.7: Display Date & time program.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Panel Configure Program Menu page.
Use the UP and DOWN key to move the-> sign.

6.1.1.2 Night Mode

The Night Mode option in the Panel Configure Program menu sets the control panel to work at night. In this screen, the user configures the Night mode status and sets the Night mode duration of the control panel. As shown in the window below:

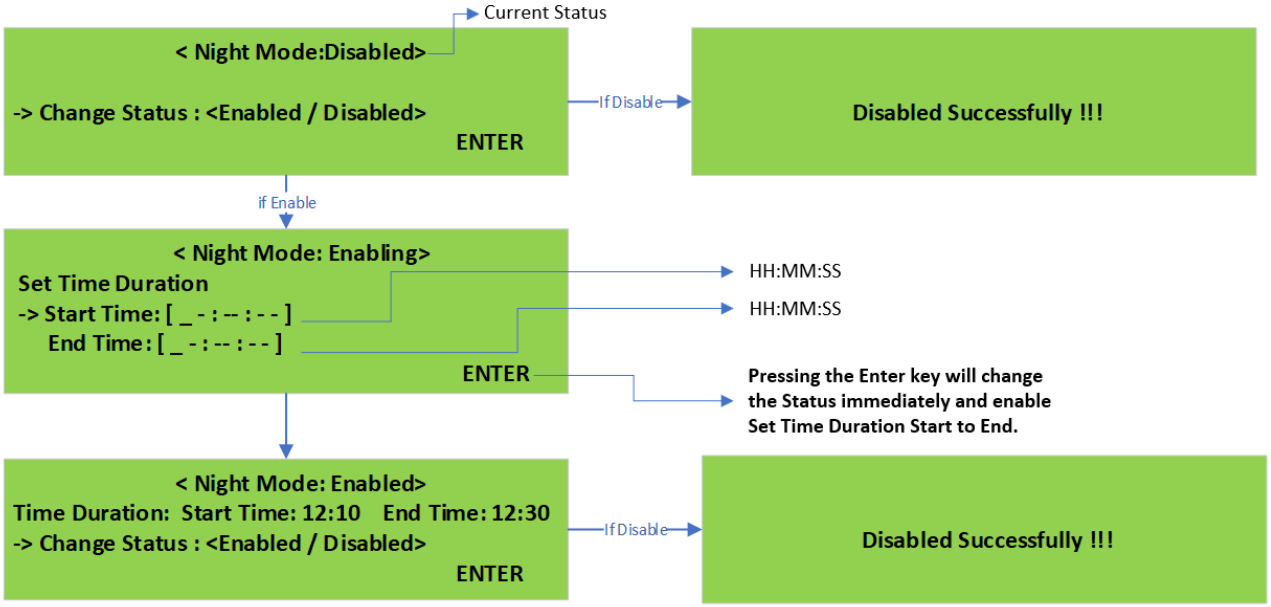


Figure 6.8: Display Night mode program.

☞ To configure <Enable/Disable> any option, the panel asks users to put Access level 3 Password.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Panel Configure Program Menu page.
Use the UP and DOWN key to move the-> sign.

6.1.1.3 Password Update

The Password Update option in the Panel Configure Program menu is used to update different access level passwords in the control panel. On this screen, the user can view the current password or update it. As shown in the window below:

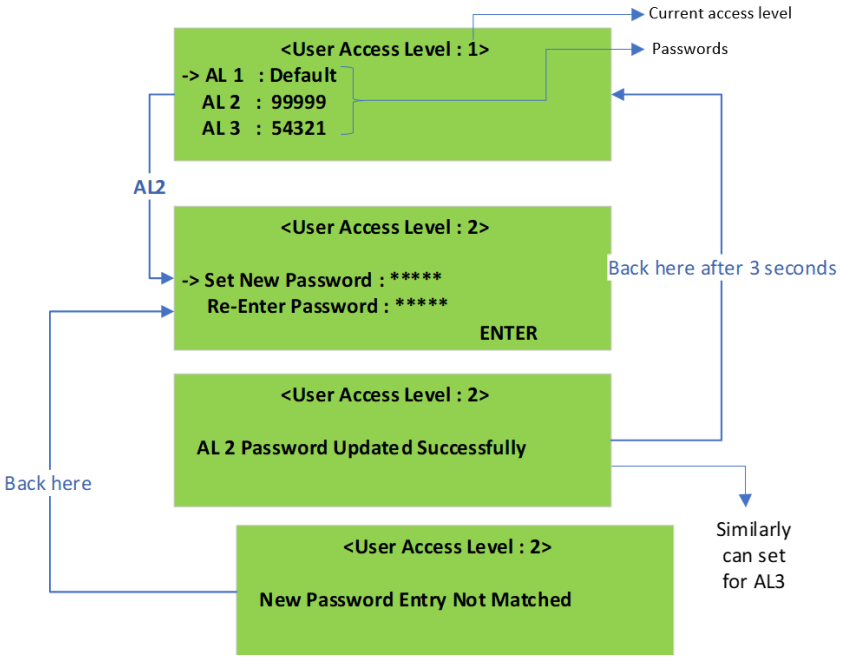


Figure 6.9: Display Password update program.

☞ When the wrong password is entered it will show: new password Entry Not matched.

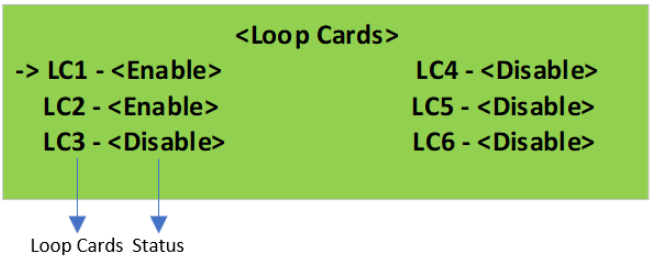
☞ To configure <Enable/Disable> any option, the panel asks users to put Access level 3 Password.

KEY FUNCTION:

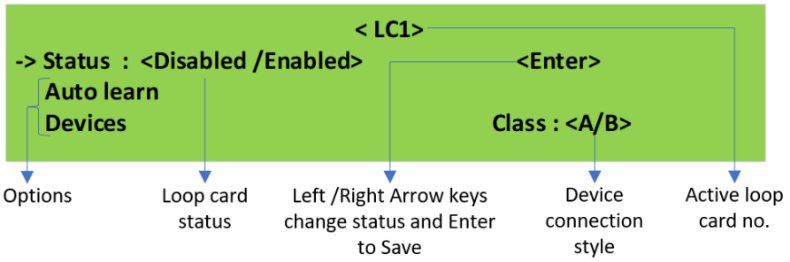
-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Panel Configure Program Menu page.
Use the UP and DOWN key to move the-> sign.
Use the Alphanumeric key to enter the Password.

6.1.2 Loop Cards

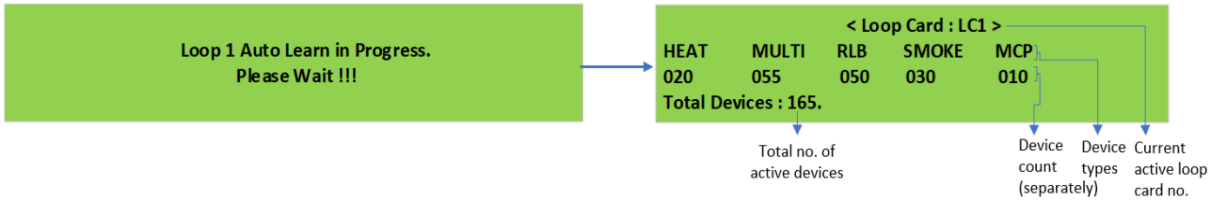
The Loop Cards option in the Program menu activates the viewing of all active loop cards. Furthermore, by selecting a particular loop card, the user can also view the details of the Devices present in this loop, as shown in the window below:



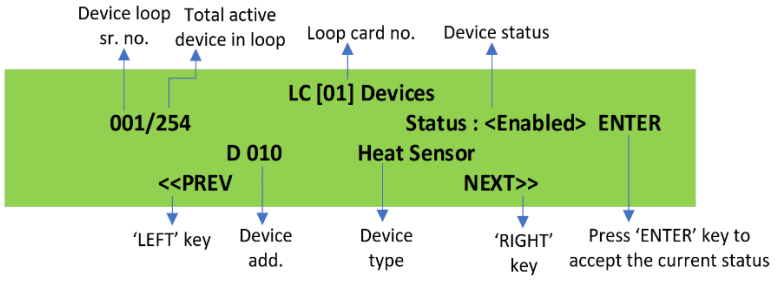
After selecting the loop card to program, the user can configure the loop card status to enable or disable, as figure below:



The Auto-learn option in the Loop Card Program menu will allow the panel to learn all the devices attached to the particular loop. During this phase, it will also show different types of devices with their count given the total number of devices present. As below, figure:



The Devices option from the Loop Card Programming menu will allow users to view all the devices present in that loop with their status, address, and name. During this phase user can also program the status of the devices as enable or disable, as below figure:



If the user disables the device, then the screen will not show the device number and name, as the figure below;

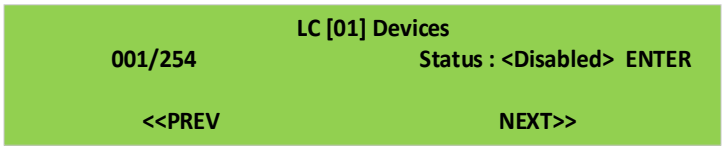


Figure 6.10: Display Loop cards devices program steps.

☞ To configure <Enable/Disable> any option, the panel asks users to put Access level 3 Password.

☞ When the Device is Disabled a Device number and name do not show in the third LCD row.

☞ In the 12-loop system FACPES, users need to press the RIGHT key to view the list of remaining Loop cards and also perform the device programming operations present on that particular LC.

KEY FUNCTION:

Use the Left /Right Arrow keys to change status.
Use the Enter key to Save.
Use the BACK key to step back to the Loop Card Program Menu page.

6.1.3 Zone

The Zone option in the Programming menu activates the screen used to select and program the Zones. During this phase, the user can Create a New Zone, edit in the Present Zone, and Delete the particular present Zone, as shown on the screen below:

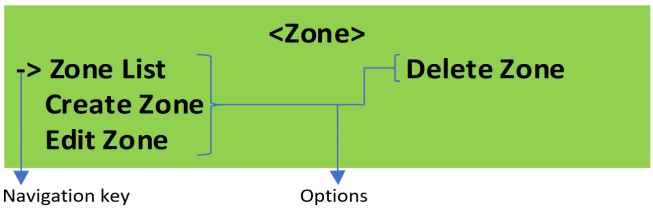


Figure 6.11: Display Zone program.

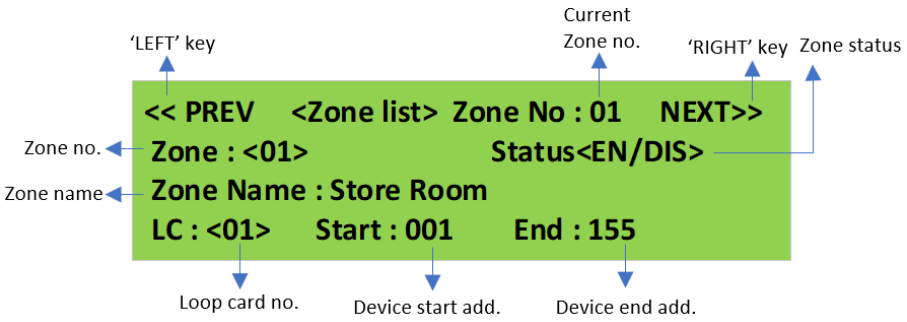
☞ Insert Access Level 3 Password (54321) before any selected option to program.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Program Menu page.
Use the UP and DOWN key to move the-> sign.

6.1.3.1 Zone List

The Zone List option in the Zone Programming menu activates the screen to view the all-created list of zones, as shown on the screen below:



If No zone is created or present in the panel then the below screen will appear:

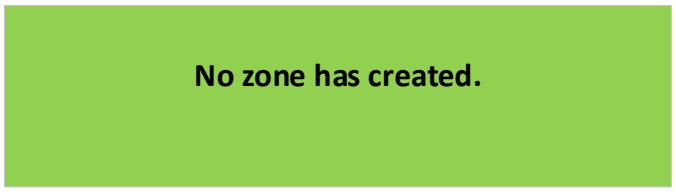
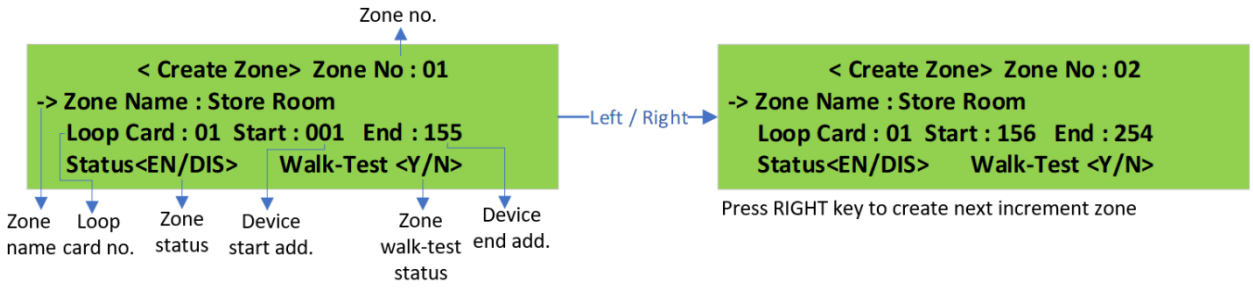


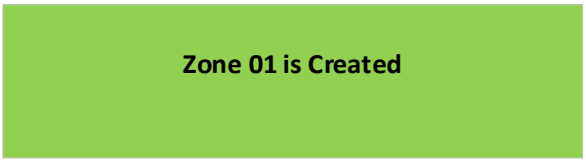
Figure 6.12: Display Zone list window.

6.1.3.2 Create Zone

The Create Zone option in the Zone Programming menu activates the screen used to create a new zone. During this phase, the user can configure the attributes: Loop card No, Walk-Test Status, Device Start Add., Device End Add., Zone Name, and Status of Zone to create the Zone, as shown on the screen below:



If the user presses the ENTER key, then the screen shows below screen.



If the user fails to put any wrong/incomplete value, then the screen shows below screen.

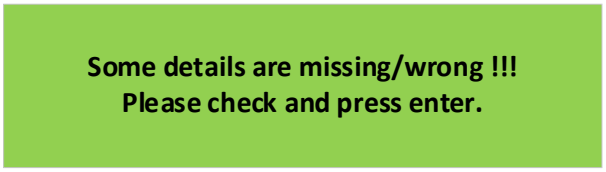


Figure 6.13: Display Create zone program.

☞ Maximum Zones Available to Create – 40

☞ As per Activated loop cards in the particular FACPES.

☞ To configure the <Enable/Disable> option, the panel asks users to put Access level 3 Password.

☞ Zone creation will start from 1 and auto increment to the next count, one cannot jump to a random zone count.

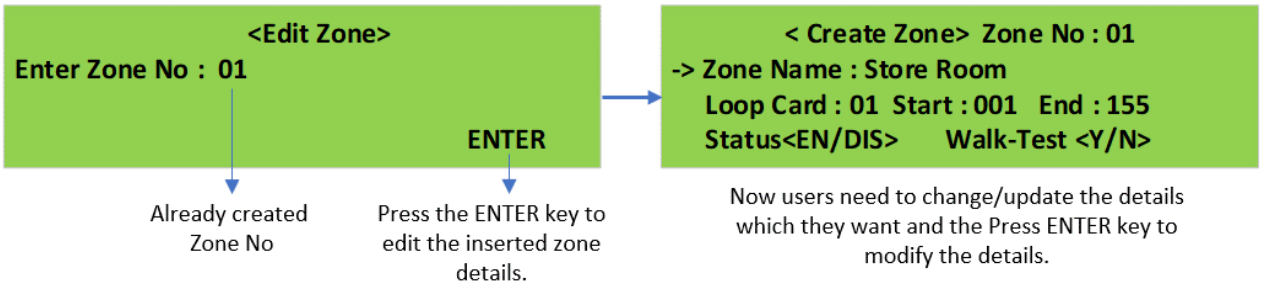
☞ In this phase, the panel provides features to create a zone it only depends on whether the user wants to enable or disable the zone, and if the users disable the zone, then the device's address present in that particular zone will be disabled.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Zone Program Menu page.
Use the UP and DOWN key to move the-> sign.
Use the Left /Right Arrow keys to change status.
Use the Alphanumeric key to put the numeric values.

6.1.3.3 Edit Zone

The Edit Zone option in the Zone Programming menu activates the screen used to select and edit the available zone data. During this phase, users can edit the particular zone data after entering the zone number. As shown on the screen below.



After, Pressing the ENTER key below screen will appear.

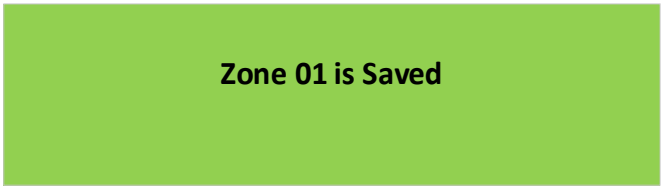


Figure 6.14: Display Edit zone program.

☞ To configure <Enable/Disable> any option, the panel asks users to put Access level 3 Password.

☞ Maximum zone: 01 – 40.

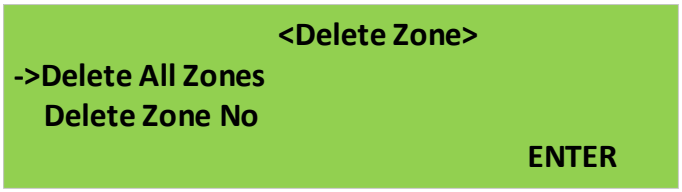
KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Zone Program Menu page.

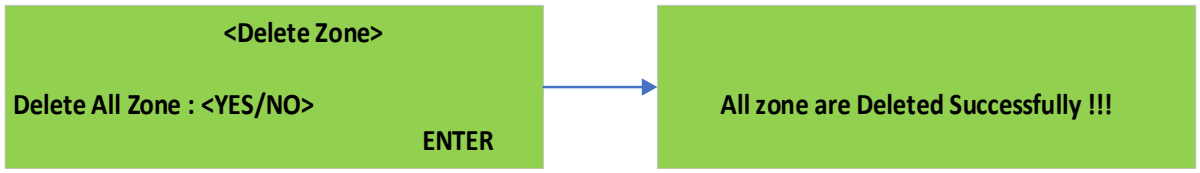
Use the UP and DOWN key to move the-> sign.
Use the <Left /Right> Arrow keys to change status.
Use the Alphanumeric key to put numeric values (Max zone – 40).

6.1.3.4 Delete Zone

The Delete Zone option in the Zone Programming menu activates the screen used to delete the available zone data. During this phase, users can delete the whole zone or a particular zone data after entering the zone number, as shown on the screen below:



If the user wants to delete all Zones present in the control panel, the Delete all Zones option is used, as shown below figure:



If the user wants to Delete a particular zone from the panel, then Delete Zone No is selected. Then enter the Zone number to delete the respective zone, as shown below figure:

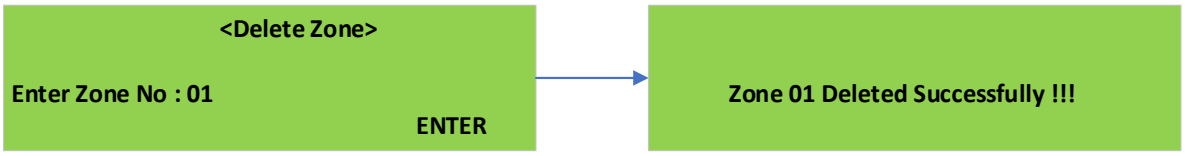


Figure 6.15: Display Delete zone program steps.

☞ Maximum zone: 01 – 40.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Zone Program Menu page.
Use the UP and DOWN key to move the-> sign.
Use the Left /Right Arrow keys to change status.
Use the Alphanumeric key to put the numeric values.

6.1.4 Network

The Network option in the Program menu is to activate the networking-related features of the control panel. During this phase, the user can program the status of the panel for networking and set a unique panel ID (01-32) with its mode of operation (IN/OUT/IN-OUT) defined, as shown in the window below.

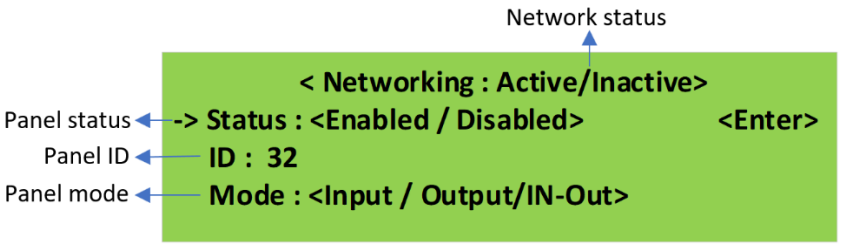


Fig 6.16: Display Network menu.

☞ To configure the <Enable/Disable> option, the panel asks users to enter Access level 3 Password.

☞ Panel/ Repeater ID Range: 01-32.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select program.
Use the BACK key to step back to the Zone Program Menu page.
Use the UP and DOWN key to move the-> sign.
Use the Left /Right Arrow keys to change status.
Use the Alphanumeric key to enter the Panel ID.

7 PANEL TESTING

The Test option in the Menu activates the procedure to test the input and output features in the control panel. In this phase, users can perform the Lamp Test, Keyboard Test, Panel Buzzer Test, Relay Output Test, NAC Output Test, and Device Walk-Test, as shown in the figure below:

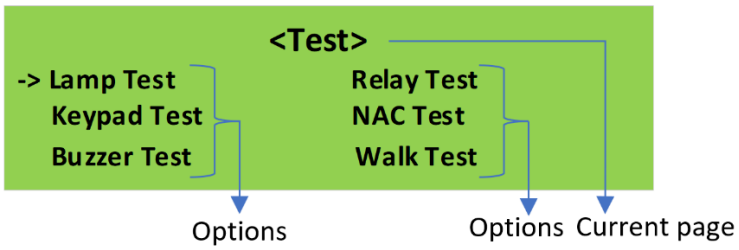


Figure 7.1: Display Test menu window.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the select loop.
Use the BACK key to step back to the Disable Menu page.
Use the UP and DOWN keys to move the-> sign.

7.1 Lamp Test

The Lamp Test option in the Test Menu allows users to test the LED and LCD-related operations in the control panel. On this screen, users can test all LEDs present in the panel, and the LCD functions easily, as shown in the figure below:

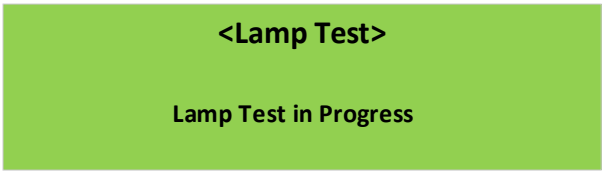


Figure 7.2: Display Lamp test window.

☞ All LEDs and LCD pixels will blink for 1Sec. on-off 3 times and automatically go back to the TEST menu.

☞ Allow to test output notification devices like LCD, and LEDs.

KEY FUNCTION:

Use the ENTER key to start the test.
Use the BACK key to step back to the Test Menu page.

7.2 Keypad Test

The Keyboard Test option in the Test Menu allows users to check all the key-related functions in the control panel. On this screen, users can test all keys present in the panel and every pressed key will display on LCD if the pressed key is sensed, as shown in the figure below

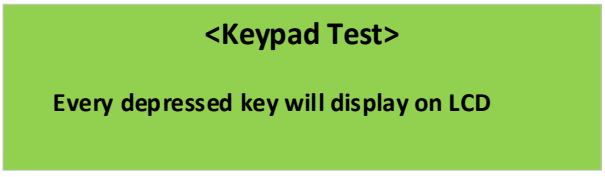


Figure 7.3: Display Keypad test window.

☞ To manage the system from the User interface (Main panel), the Alphanumeric keypad, the Cursor keys, the ESC key, and the ENTER key are used.

☞ Each time the alphanumeric key is pressed in the selected position, pointed by the cursor, the characters printed on the key will appear in sequence and cyclically.

KEY FUNCTION:

Use the ENTER key to accept the selection to test.
Use the BACK key to step back to the Test Menu page.

7.3 Buzzer Test

The buzzer test provides an audible indication of the panel's buzzer status. On this screen, users will be able to test the panel buzzer's working functions and also the buzzer silence by pressing the silence key on the panel, as shown in the figure below:

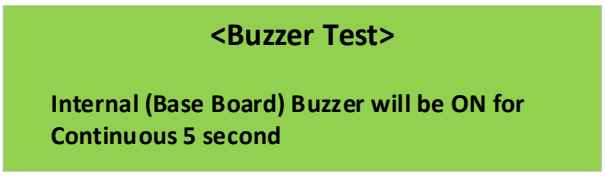


Figure 7.4: Display Buzzer (Internal) test window.

☞ A piezo buzzer provides separate and distinct sounds for alarm, trouble and supervisory conditions.

KEY FUNCTION:

Use the ENTER key to accept the selection to test.
Use the BACK key to step back to the Test Menu page.
Press the SILENCE key to put the buzzer in silence mode.

7.4 Relay Test

The Relay Test option in the Test Menu allows users to check all the Relay Output-related functions in the control panel. On this screen, users can activate all the relays to check if they are working properly as shown in the figure below:

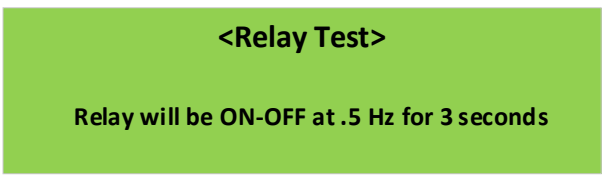


Figure 7.5: Display Relay test window.

KEY FUNCTION:

Use the ENTER key to accept the selection to test.
Use the BACK key to step back to the Test Menu page.

7.5 NAC Test

The NAC Test option in the Test Menu allows the user to check all the NAC Output-related functions in the control panel. On this screen, users can operate all NACs to check if they are working properly or not, as shown in the figure below:

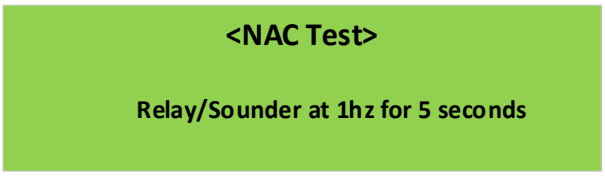


Figure 7.6: Display NAC test window.

KEY FUNCTION:

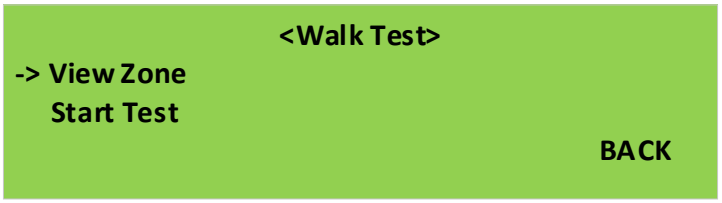
Use the ENTER key to accept the selection to test.
Use the BACK key to step back to the Test Menu page.

☞ Allows users to test Relays and NACs

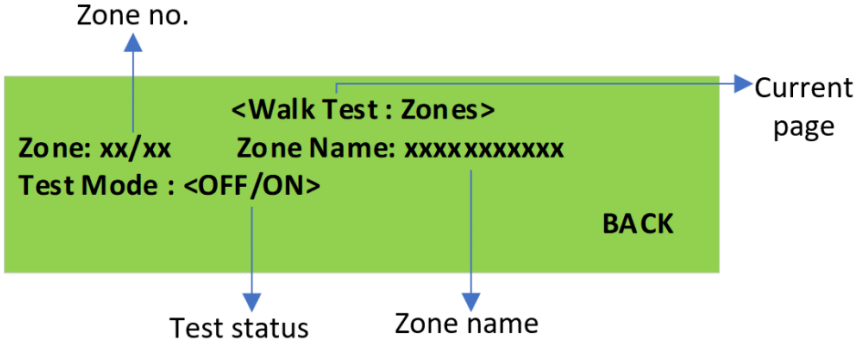
Output 1 – Relay1
Output 2 – Relay2
Output 3 – Relay3
Output 4 – NAC1
Output 5 – NAC2

7.6 Walk-Test

The Walk-Test option in the Test Menu allows the user to check all the Input Device-related functions in the control panel. On this screen, users can view zones in the walk-test and also put available zones in the walk-test to test all input devices such as., Heat, Smoke, Multi, RLB, and MCP in the control panel, as shown in the figure below:



If the View zone option is selected then the user can see zones that are available in the panel and also see the test mode(on/off) status with the option to put the zone in walk-test mode, as shown in the figure below:



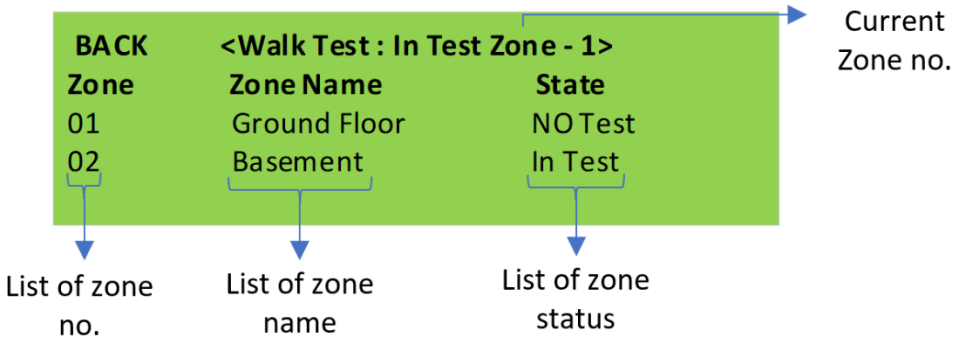


Figure 7.7: Display Walk-test window.

☞ Walk test zones are enabled in Program-Zone.

☞ FACPES can be divided into 40 zones. Each zone may have 1 to 16 devices.
By default, all devices are assigned to Zone-1.

KEY FUNCTION:

-> Sign Used for navigation.
Use the ENTER key to accept the selection to test.
Use the BACK key to step back to the Test Menu page.

8 MAINTENANCE

The system must be maintained by routine user testing and routine installer maintenance in compliance with local legal requirements to guarantee proper operation.

8.1 Maintenance Points

The following must be done regularly:

- ✓ Using a moist cloth, remove any dust from the control panel housing (avoid using any kind of solvent).
- ✓ Use the test button to check that the LEDs and buzzers are working properly.
- ✓ Make sure that the batteries are charged and functioning properly. If not, replace them immediately.
- ✓ Make sure that all cables and connections are tightly connected.
- ✓ Make sure that no unauthorized persons have placed any foreign objects inside the control panel housing.
- ✓ Verify that the control panel is capable of processing a fire alarm and turning on the proper output or sounder in response to that alarm. Make sure the fire alarm signal is correctly received if there is a facility to transmit it to the control panel.
- ✓ Check the actual functionality of the ground fault detection circuit.

8.2 Replacement of Components

Long lifespan and high reliability are the reasons behind the selection of components used in the control panel. These products might need to be replaced in the future because their manufacturers' life expectancy is less than 15 years.

8.2.1 Battery

The manufacturer’s expected life- is 3-5 years at an ambient temperature of 20° Celsius, NB life decreases approximately 50% for every 10° Celsius increase in temperature.

- ✓ Service- Contact Battery manufacturer/supplier
- ✓ Suppliers- EXIDE POWER PLUS (7Ah/12Ah/24Ah Model)

8.2.2 CPU Card

Please only use the same or similar type when replacing. Get in touch with the Service Organization to obtain a replacement CPU card.

- ✓ Manufacturer’s life- approx. 10 Years
- ✓ Recommended replacement- 10 years for panels in continuous service. 4 years for CPU cards held as spares and not powered up.

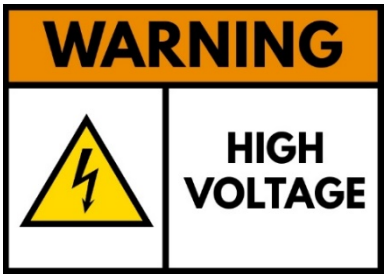
8.2.3 LCD

The LED-backlit LCD provides superior lifelike visuals compared to other display technologies. As this component ages, the LCD's contrast will diminish over time. Hence, it is advisable to replace this component when the standard contrast begins to fade.

- ✓ Manufacturer’s life – approx. 10 Years.
- ✓ Recommended replacement- When the display becomes difficult to read or any other visual fault happens.

9 WARNING / PRECAUTIONS

9.1 Warning



- Make sure to unplug all power sources attached to the fire alarm control panel before performing any maintenance on it.
- When the unit is energized, it can be harmful to the control unit and related equipment to remove and replace cards, modules, or connecting cables.
- Before trying to install, service, or use this unit, make sure you have read and understood the manual.

9.2 Cautions

- System Re-acceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition, or deletion of system components, or after any modification, repair, or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

- This system meets NFPA requirements for operation at 0-49º C/32-120º F and relative humidity up to 95% RH (noncondensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15-30 º C/60-80º F.

9.3 ESD

- Avoid using any sharp objects to pierce the ESD laminates and paints. Loss of ESD protection may result from damaged or improperly maintained ESD-protected work surfaces.
- Keep superfluous items and non-conductors out of an ESD-protected area.
- Make sure that everyone who uses the ESD workspace understands that adhering to the company's ESD control standards is essential.
- Unless in an ESD-safe environment, do not handle, transport, or store static-sensitive components.
- Whenever working in an ESD-protected area, wear a wrist strap or other personal grounding device.

10 ABBREVIATIONS

Abbreviations table:

S. NO	ABBREVIATIONS	FULL FORM
1	FACPES	Fire Alarm Control Panel-ESP Safety
2	PSBES	Power Supply Board-ESP Safety
3	MBES	Motherboard Card-ESP Safety
4	CBES	CPU Card Board-ESP Safety
5	KDBES	Keypad & Display Board-ESP Safety
6	LCBES	Loop Card Base Board-ESP Safety
7	LCES	Loop Card Board-ESP Safety
8	CPU	Central Processing Unit
9	ESD	Electrostatic Discharge
10	NAC	Notification Appliance Circuit
11	AC	Alternating Current
12	DC	Direct Current
13	FRC	Flat Ribbon Cable
14	A	Ampere
15	mA	Mili-Ampere
16	LCD	Liquid Crystal Display

Table 10.1: Abbreviations table

11 FACPES Recommendation Table

Recommendation table for using the Various FACPES System:

Sr. No.	Available Detectors/Devices	FACPES System to control the Detectors/Devices	Zone Indication
1	Up-to 508	Used 2-loop FACPES system	Up-to 40
2	From 509 to 1524	Used 6-loop FACPES system	Up-to 40
3	From 1525 to 3048	Used 12-loop FACPES system	Up-to 40

Table 11.1: Various FACPES systems using recommendation table.

NOTE: Users have to keep in mind the number of detectors/devices used as per project needs. FACPES comes in 3 variants to fulfil any demands to protect the user's required premises.

12 NOTES

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