GST-IFP4M Intelligent Fire Alarm Control Panel

Installation and Operation Manual

Issue 1.06

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Fire Alarm System Limitations

While a fire alarm system may lower insurance rates, it is not a substitute for fire insurance!

An automatic fire alarm system – typically made up of smoke detectors, heat detectors, manual pull stations, Notification Appliances, and a fire alarm control with remote notification capability–can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premises following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in installation and operation manual of the detectors, which is made available at no charge to all installing dealers. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or "smoke" from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, or chimneys may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectric sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best nor may a given type of detector not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. *Heat detectors are designed to protect property, not life.*

IMPORTANT! Smoke detectors must be installed in the same room as the FACP and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

Audible warning devices such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol or medication.

Please note that:

- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond or comprehend the meaning of the signal. It is the property owner's responsibility to conduct fire drills and other training exercise to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A fire alarm system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the FACP. It is essential to use only equipment listed for service with your FACP.

The most common cause of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of Chapter 10 of NFPA 72 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional fire alarm installers only. Adequate written records of all inspections should be kept.

Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the fire alarm FACP. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until this manual is read and understood.

CAUTION - System Reacceptance Test after Software Changes. To ensure proper system operation, this product must be tested in accordance with NFPA 72 Chapter 14 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 0-49°C/32-120° F and at 93% RH (non-condensing), and applies to be installed in the dry indoor environment.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning-induced transients. Although no system is completely immune from lightning transients and interferences, proper grounding will reduce susceptibility. *Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes.* Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

Though designed to last many years, system components can fail at any time. This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static-suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the FACP and associated equipment. FACP (Fire Alarm Control Panel) operation and reliability depend upon proper installation by authorized personnel.

It is imperative that the installer understands the requirements of the Authority Having Jurisdiction (AHJ) and be familiar with the standards set forth by the following regulatory agencies:

- **Underwriters Laboratories**
- **NFPA**

Before proceeding, the installer should be familiar with the following documents.

- **NFPA Standards**
  - NFPA 72 National Fire Alarm Code
  - NFPA 70 National Electrical Code
- **Underwriters Laboratories Documents:**
  - UL 864 Standard for Control Units and Accessories for Fire Alarm Systems

Notices

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES:

This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below.

Program feature or option	Permitted in UL 864? (Y/N)	Possible settings	Settings permitted in UL 864
Output type of NACs	Y	Steady: a continuous output with no coding. March Time: 120 ppm (pulse-per-minute) output. Synch: a continuous output with synchronized pulse signal. Temporal: Temporal-3 pattern.	"Synch" - for compatible strobes and horns connected to NAC1 or NAC2 "Temporal" - for compatible bells connected to NAC1 or NAC2
Output type of AUX	Y	AUX, AUX SYNC	"AUX SYNC" - for DI-M9305 controlled NAC solution "AUX" - for 24Vdc Auxiliary power output
NAC1 NAC2 silencing	Y	Silenceable, Non-Silenceable	Silenceable
Cause & Effect Delay (Output module delay)	Y	0 – 300 seconds	0 second - for required fire signaling, e.g. DI-M9305 controlled NAC solution 0 – 300 seconds - for supplementary process controls. Consult with AHJs for permissible applications.

1 Product Introduction

GST-IFP4M is an Intelligent Fire Alarm Control Panel (FACP) designed for medium- to large-scale facilities. It complies to UL 864 standard with features of easy installation, operation, and maintenance. The FACP integrates an ARM7-Cotex CPU with inbuilt Linux OS. Its friendly and graphical screen can be touchable in operation.

Inventory

The FACP is delivered with all components installed. When the shipment is received, check to make certain that all accessories have been included:

- ✧ Cabinet key
- ✧ Manual

1.1 Standard Features

The FACP provides the following:

- ✧ Advanced Protocol mode with 1~6 loops which meets Class A requirements.
- ✧ 242 addressable devices (include sensors, modules and manual call points) per loop.
- ✧ Two Power-Limited Class B Notification Appliance Circuits (NAC).
- ✧ Built-in three fixed relays: Alarm, Supervisory, Trouble .
- ✧ Built-in two programmable relays which can be set as Alarm, Supervisory, Trouble, Disable function.
- ✧ Battery charger supports up to 66 amp hour sealed lead-acid batteries
- ✧ LCD display unit of 800×480，7.0 inch color TFT LCD.
- ✧ Capacitive Touch screen.
- ✧ History file with 100,000 events capacity.
- ✧ Advanced history filters allow sorting by event, time, date, address etc.
- ✧ Up to 1000 powerful Logic Equations.
- ✧ Network operation.
- ✧ Ground fault detection.
- ✧ Walk test, silent or audible.
- ✧ PAS (Positive Alarm Sequence) per point (NFPA 72 compliant).
- ✧ Password and key-protected nonvolatile memory.
- ✧ User programmable password.
- ✧ Field-programmable on panel, or by external computer with GST-IFPx-Def Defining Tool and connected via Ethernet / USB port on SD-400 LCD Drive Board.

1.2 System Limitations

System expansion must take into consideration the following:

- ✧ The physical limitations of the cabinet configuration.

- The electrical limitations of the system power supply.
- The capacity of the secondary power source (standby batteries).

1.3 Basic Components

A basic FACP requires at least the following components:

- **A PSU-250 Main Power Supply**

  Supply power to the whole panel and connected devices. Monitor the status of AC power, battery and charger, switch power between AC power and battery.

- **A Battery**

  The FACP uses only sealed lead-acid batteries for standby power. Maximum battery capacity is 66 AH (ampere-hour). Minimum battery capacity depends upon your system configuration; absolute minimum is 12 AH.

- **A Display and Keypad Module**

  This module includes LCD, Touch screen, display driver board, LED, Keypad board. It provides information in graphic and word, and customers can operate the panel using real keys and touch screen.

- **A Main Box Module**

  This module is the heart of the FACP. It includes a mother board, a CPU card, a NAC card and a Loop card.

- **An Enclosure with door**

  The enclosure can conclude a power supply, a host cabinet, two batteries of 12V/38Ah. A display and keypad module and 8 ZCPs can be installed on the door.

1.4 Optional Components

1.4.1 LC-401 Single Loop Card

Single Loop Card has one completely Class A SLC compatible with Digital Protocol Bus. The loop can connect maximum 242 devices. Users can add up this card to extend loop if necessary.

1.4.2 LC-402 Dual Loop Card

Dual Loop Card has two completely Class A SLCs compatible with Digital Protocol Bus. Each loop can connect maximum 242 devices. Users can add up this card to extend loop if necessary.

1.4.3 P-9966A CAN Class A Network Card

The network card is essential accessory for the FACP to be networked by inserting the card into the slot of the panel's motherboard. Many separate FACPs can form a fire alarm network through the card. Each panel supports Max three network cards working simultaneously and these 3 cards can be combination of P-9966A and P-9983. Please refer to Section2.5.7 for wiring and setting information.

1.4.4 P-9981 Zone Display Panel

Zone Display Panel is used to indicate a related zone, or device states of fire, fault and isolation. Each zone display panel can show 20 zones or devices, and every 2 indicators for one zone or device. The user can write or print descriptions on a label for a zone, and then put the label into the transparent box of the zone display panel.

1.4.5 P-9981F Zone Display Panel

Zone Display Panel is used to indicate a related zone, or device states of fire, fault and isolation. Each zone display panel can show 20 zones or devices, and every 2 indicators(monochromatic led) for one zone or device. The user can write or print descriptions on a label for a zone, and then put the label into the transparent box of ZCP.

1.4.6 P-9982 Zone Display and Control Panel

Zone Display and Control Panel is used to indicate a related zone, or device states of fire, fault and isolation. It can also be used to disable, enable, start and stop the related devices. Each zone display panel can show 20 zones or devices, and every 2 indicators(double color led) and 1 key for one zone or device. The user can write or print descriptions on a label for a zone, and then put the label into the transparent box of ZCP.

1.4.7 P-9982F Zone Display and Control Panel

Zone Display and Control Panel is used to indicate a related zone, or device states of fire, fault and isolation. It can also be used to disable, enable, start and stop the related devices. Each zone display panel can show 20 zones or devices, and every 2 indicators(monochromatic led) and 1 key for one zone or device. The user can write or print descriptions on a label for a zone, and then put the label into the transparent box of ZCP.

1.4.8 PR-400 or PR-400B Thermal Printer

PR-400 or PR-400B Thermal Printer is optional. It can be directly connected to the FACP through RS232. This printer, with its panel embedded, can be installed on the front panel of the FACP. It can print running record of the FACP. It’s easy to operate and convenient for checking.

1.4.9 CA-400-R CA-400-W or CA-400-G Cabinet

Either CA-400-R, CA-400-W or CA-400-G Cabinet is required. The CA-400-R Cabinet is red, CA-400-W Cabinet is white and the CA-400-G is gray.

1.4.10 P-9983 Fiber-Optical Network Card

P-9983 card is optional for GST-IFP4M control panel, providing two LC single-mode fiber interfaces. This card provides the same function as P-9966A CAN Class A network card. Transmission distance is longer when this card is used to network control panels.

1.4.11 P-9956-Modbus Modbus Card

P-9956-Modbus Modbus Card is optional for supplementary use in GST-IFP4M control panel, providing standard Modbus interface for transmitting logs or history for maintenance purposes P-9956-Modbus Modbus Card has three types of one interface: RS232, RS485 or RS422.

1.4.12 GST-BAT65-R GST-BAT65-W GST-BAT65-G Battery Box

As the control panel requires the battery with the capacity over 38Ah, an external battery box can be used. The battery with large capacity can be placed in the box. The largest capacity for the battery in the box is 65Ah.

The GST-BAT65-R is red, GST-BAT65-W is white and the GST-BAT65-G is gray.

1.5 Peripheral Devices

The following tables list all the devices available for the FACP.

Table 1 Series Addressable Detectors

Type	Description
I-9102(UL)	Intelligent Photoelectric Smoke Detector
I-9103(UL)	Intelligent Rate of Rise and Fixed Temperature Heat Detector
DI-M9101	Intelligent Combination Heat Photoelectric Smoke Detector
DI-M9102	Intelligent Photoelectric Smoke Detector
DI-M9103	Intelligent Rate of Rise and Fixed Temperature Heat Detector
DC-M9101*)	Conventional Combination Heat Photoelectric Smoke Detector
DC-M9102*)	Conventional Photoelectric Smoke Detector
DC-M9103*)	Conventional Rate of Rise and Fixed Temperature Heat Detector
C-9314P*)	Passive Remote Indicator
BP-9314P*)	Back Plate
DZ-03	Base for I-9102(UL) , I-9103(UL) detectors
DB-M01	Base for DI-M9101, DI-M9102, DI-M9103 , DC-M9101, DC-M9102, DC-M9103 detectors

*) Note: Conventional detectors are to be connected through DI-M9319 Digital Zone Monitor Module.

Table 2 Manual Call Points

Type	Description
DI-M9204	Digital Manual Call Point
DC-M9204	Innovation Manual Call Point

Table3 Input/Output Modules

Type	Description
I-M9300	Addressable Input Module
I-M9301	Addressable Output Module
DI-M9300	Digital Single Input Module

DI-M9301	Digital Single Input and Output Module
DI-M9305	Digital Single Riser Output Module

Table4 Digital Zone Monitor Module

Type	Description
DI-M9319	Digital Zone Monitor Module

Table5 Loop Isolator Module

Type	Description
DC-M9503	Loop Isolator Module
C-M9503	Loop Isolator
DC-M9504	Base Mount Isolator

Table6 Compatible Notification Appliances

Type	Quantity（max）	Description
DC-M9414W/ DC-M9414R	62	Horn
DC-M9415W/ DC-M9415R	24	Strobe
DC-M9413W/ DC-M9413R	19	Horn / Strobe
DC-M9416W/ DC-M9416R	17	
SSM24-6	78	Bells

Table7 Compatible Voice Evacuation System Master Panel

Type	Description
GST-MP	Voice Evacuation System Master Panel

Table8 Compatible Network Annunciators

Type	Description
GST-MNA2C	CAN Interface Network Annunciator
GST-MNA2F	Fiber Interface Network Annunciator

Accessories

✧ GST Series Hand Held Programmer

P-9910B Hand Held Programmer can read the address, sensitivity and device type and program device type of addressable detectors and modules.

The handheld programmer has to be separately ordered.

1.6 Defining Tool

GST-IFPx-Def Defining Tool is used for setting panel and network configuration, editing and downloading definition of device and C&E equation. Before the system starts operation, you need to set panel and network configuration, define the device and C&E using this software on a computer, and then download them to the FACP.

2 Installation

This chapter describes the installation of the FACP. The steps below are guidance for installation of the FACP.

1 Check if you have received all items ordered.
2 Install the cabinet.
3 Install the component (basic and optional).
4 Power up the FACP and check if it can be normally started.
5 External connection.
6 Check the lines.
7 Setup FACP and define devices using GST-IFPx-Def Defining Tool on a PC and download them to the FACP according to engineering configuration.
8 Check and commission peripheral devices.

2.1 Component Inspection

Before installation, check the following items:

✧ **Check Engineering Requirement**

Check the packing list according to engineering requirement. The main items to be examined are: installation and operation manual, key to the FACP, battery wires, terminal resistor and etc.

✧ **Check Internal Components and Interconnection inside the FACP**

All basic internal parts have been connected (including power supply box, mother board, main board, interface board and main front panel) before the FACP leaves the factory. Therefore, you can mainly check the optional units ordered and the connection among parts, including the connection between mother board and power supply, mother board and key board, the connection of the zone indication panel with key board, etc. Please refer to Appendix A for the internal connection diagram.

2.2 Install the Cabinet

2.2.1 Install the cabinet of panel

The cabinet mounts using three 12mm-diameter holes located in the back box. Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the cabinet at a proper height above the floor with the hinge mounting on the left.

The FACP can be flush-mounted or wall-mounted. The dimensions for wall-mounting are shown in following Fig 2.1

✧ Mark and predrill holes in the wall for the three keyhole mounting bolts using the

dimensions illustrated in following Fig 2.1.

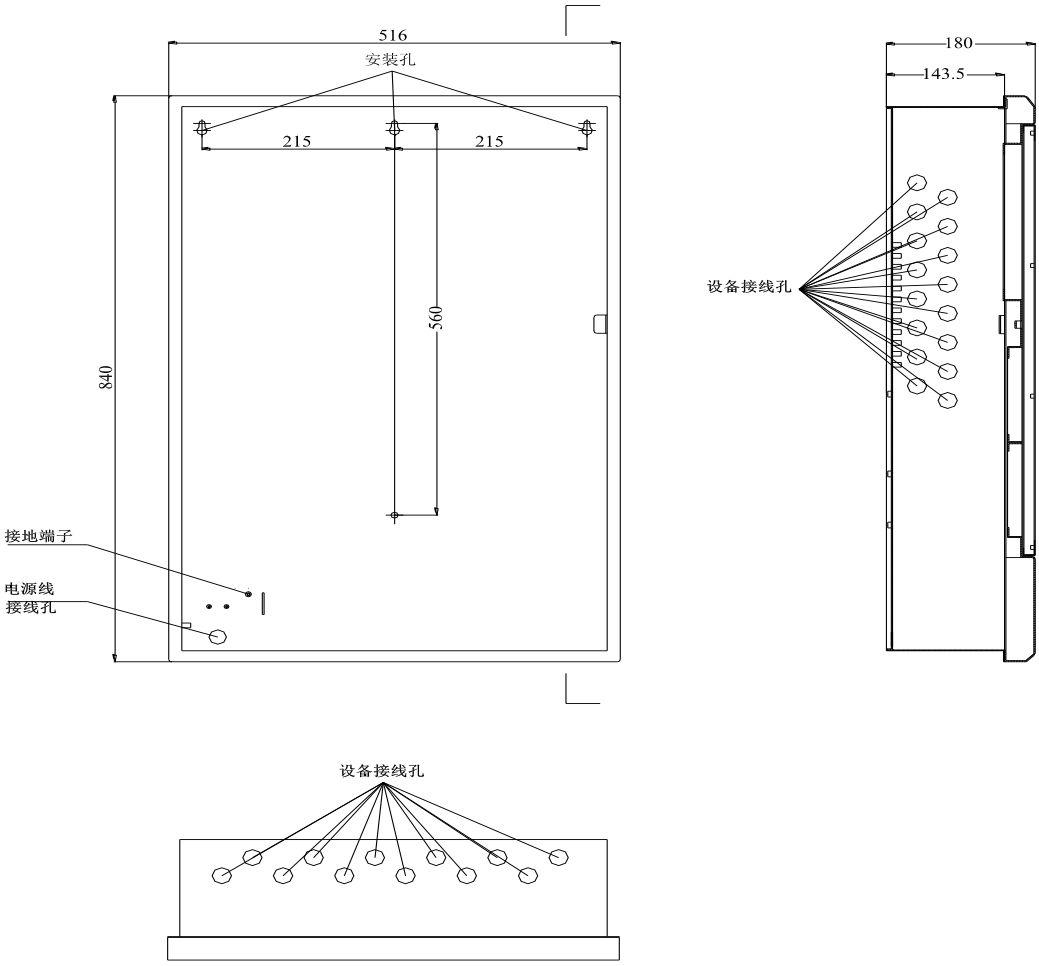


Fig 2.1

✧ Install three fasteners in the wall with the screw heads protruding.

✧ Using upper ‘keyhole’ place back box over the three screws, level and secure.

Hole distance for flush-mounting: 815mm x 490mm x 144mm. Dimensions for flush-mounting are shown in following Fig 2.2.

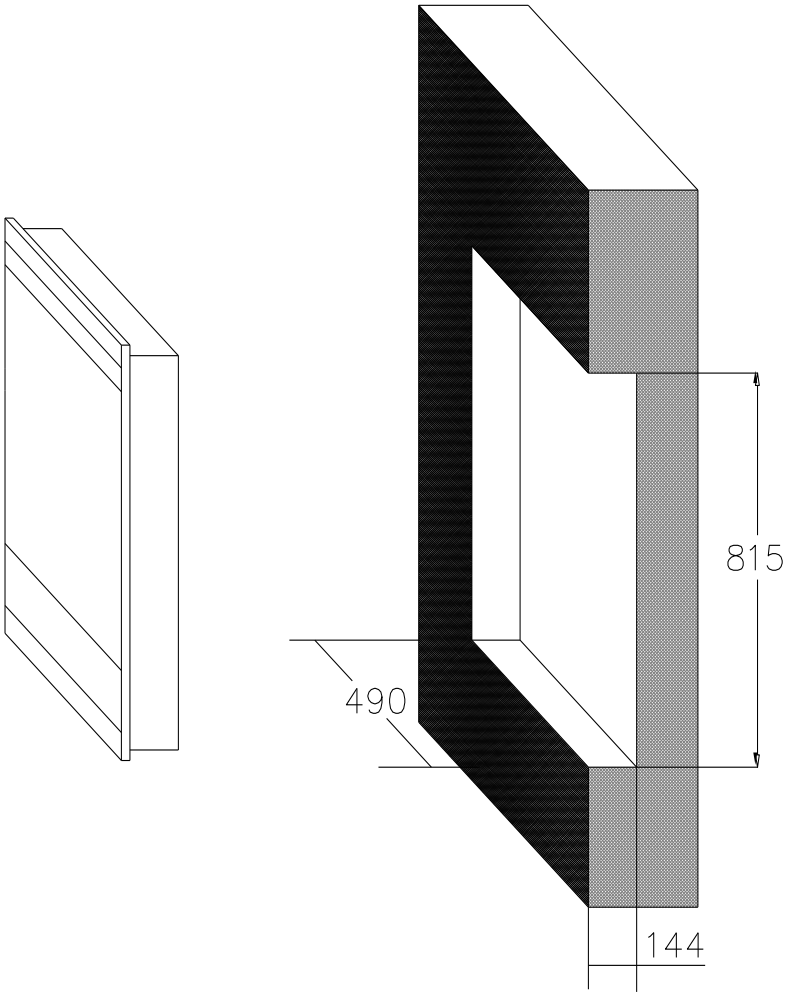


Fig 2.2

2.2.2 Install the cabinet of battery

User needs the external cabinet of battery when battery capacity is more than 38Ah.The battery cabinet is installed below the panel cabinet as Fig 2.3. The wiring from battery cabinet is connected to panel through knockout. This connection is recommended. User can choose other knockouts to connect the two cabinets according actual situation. The battery cabinet can be flush-mounted or wall-mounted also. The dimensions for wall-mounting are shown in following Fig 2.4. Dimensions for flush-mounting are shown in Fig 2.5.Hole distance for flush-mounting: 560mm x 490mm x 144mm.

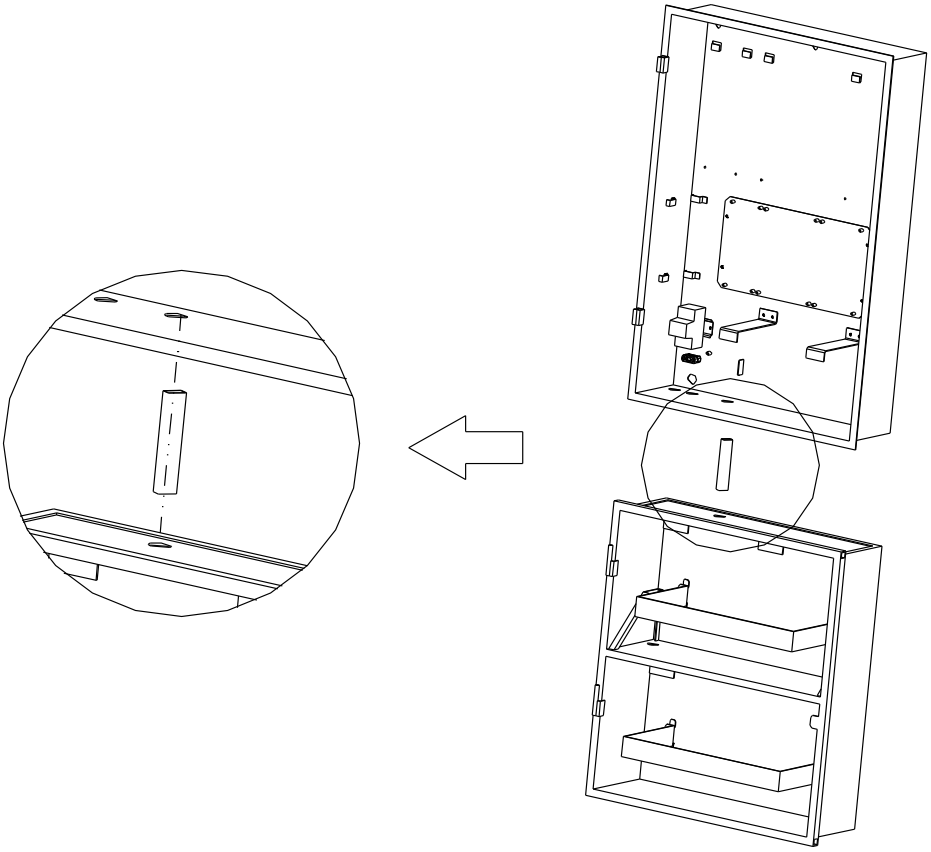


Fig 2.3

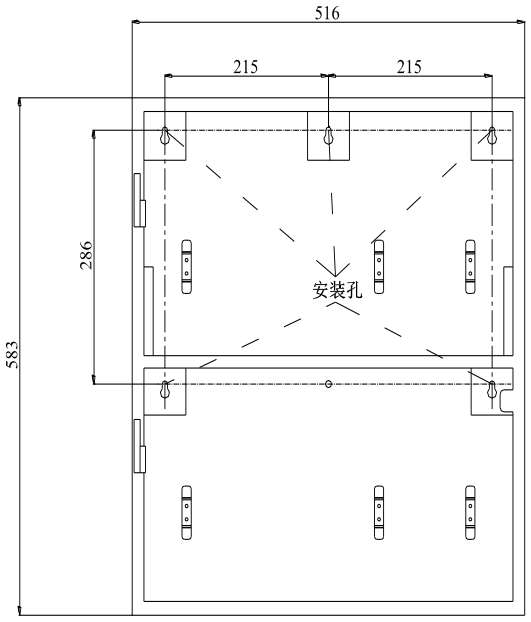


Fig 2.4

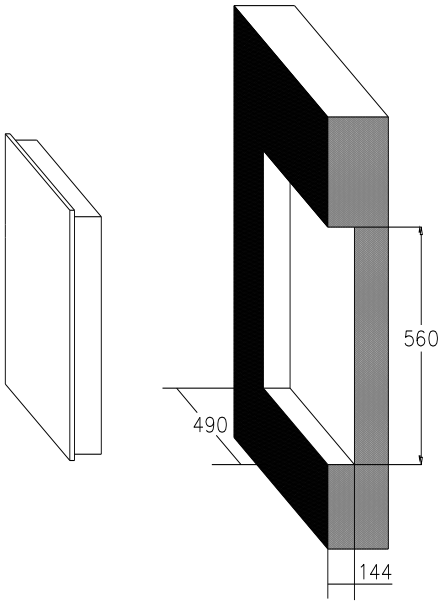


Fig 2.5

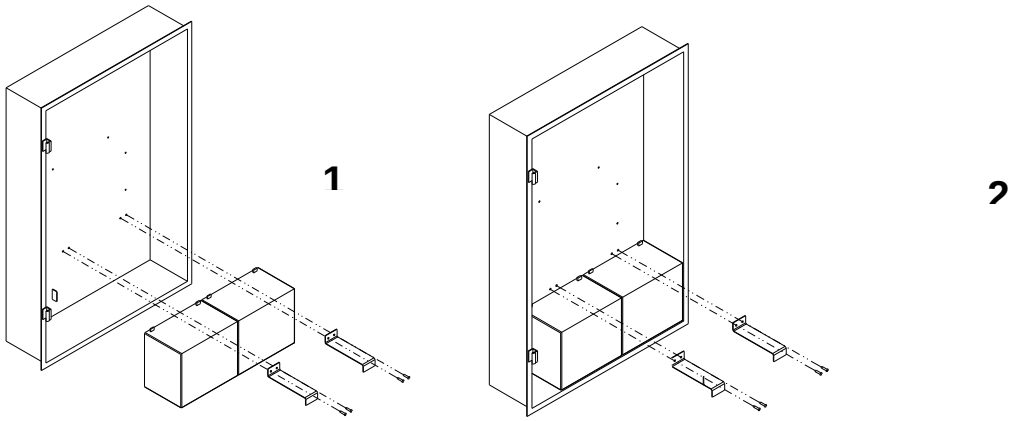
2.3 Install Components

WARNING: Disconnect all sources of power before servicing. The panel and associated equipment may be damaged by removing and/or inserting cards, modules or interconnecting cables while this unit is energized.

2.3.1 Battery Power

2.3.1.1 Small Capacity Battery (no more than 38Ah)

The small capacity battery is installed in the panel. The following graphics Fig 2.6 show how to install the battery inside the cabinet.



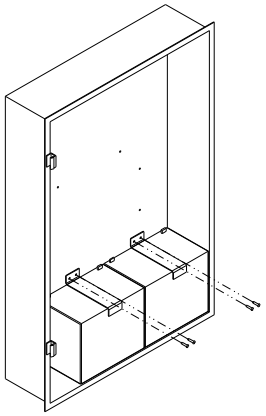
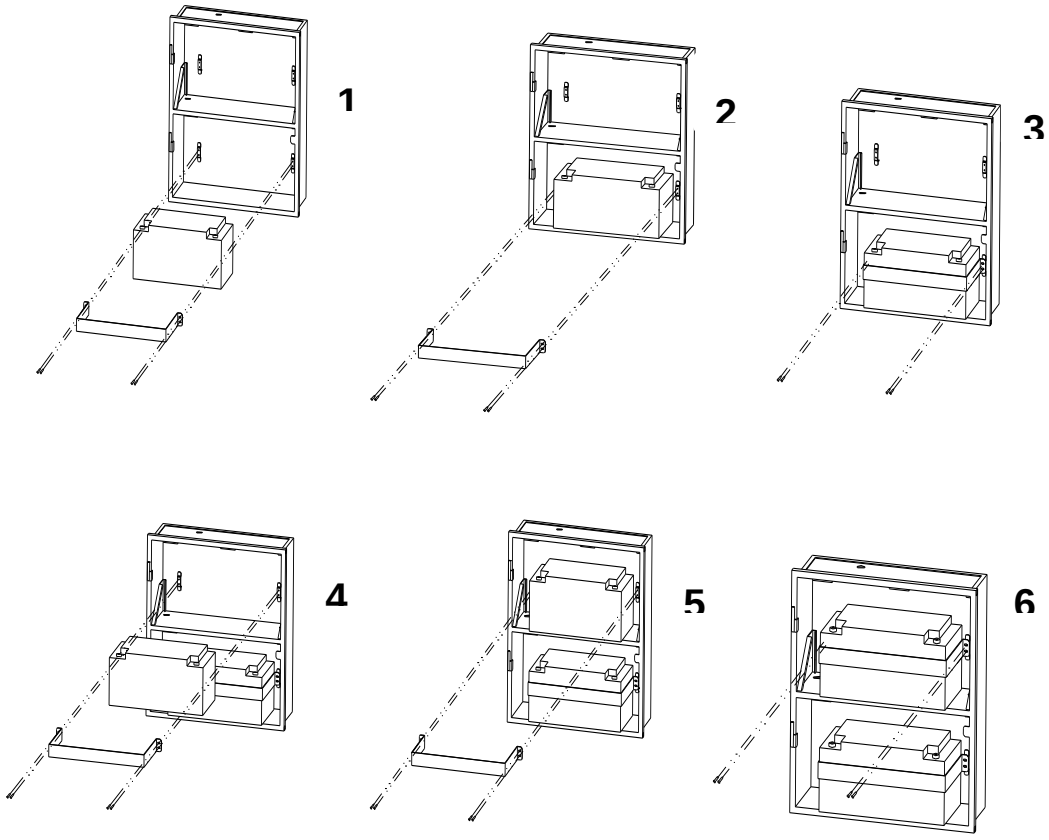


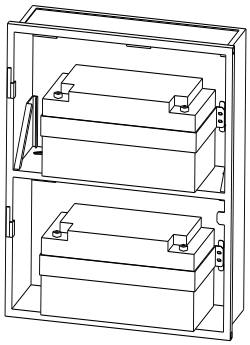
Fig 2.6

First, put two batteries on the right bottom side of the cabinet, then align the holes of battery holders with the holes on the cabinet, finally, fasten the battery holders through screws.

2.3.1.2 Large Capacity Battery (more than 38Ah)

The large capacity battery is installed in the external battery cabinet. The connection between the battery cabinet and the panel box shall be in conduit, within 20 ft, same room. The following graphics Fig 2.7 show how to install the battery inside the cabinet.





7

Fig 2.7

WARNING: Battery contains sulfuric acid, which can cause severe burns to the skin and eyes and can destroy fabrics. If contact is made with sulfuric acid, immediately flush the skin or eyes with water for 15 minutes and seek immediate medical attention.

2.3.2 Installing Circuit modules

Circuit modules are plugged into the inside of FACP, as shown below Fig 2.8~Fig 2.10.

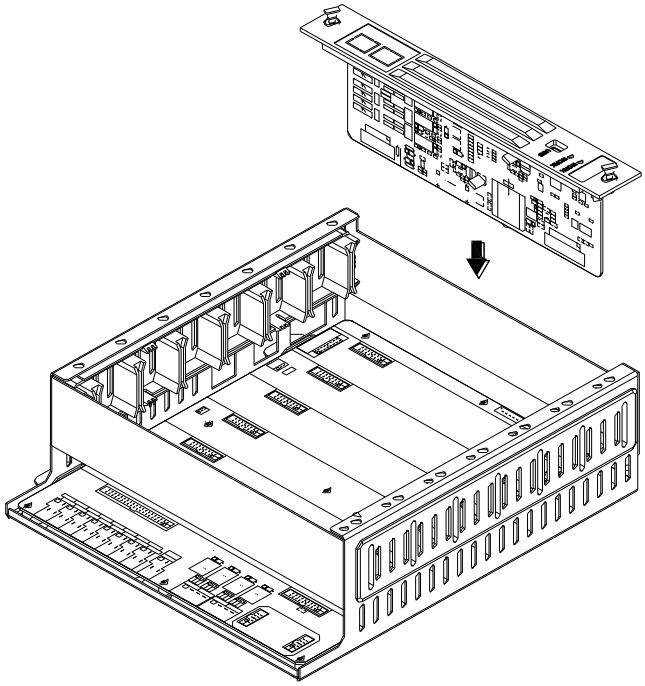


Fig 2.8

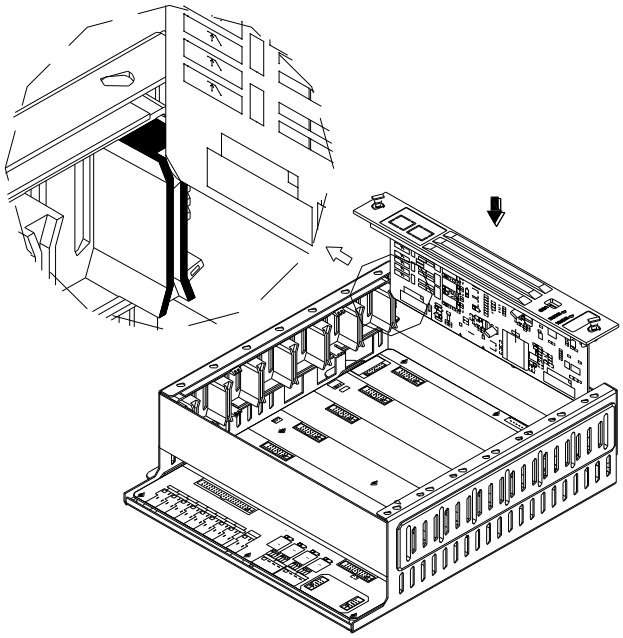


Fig 2.9

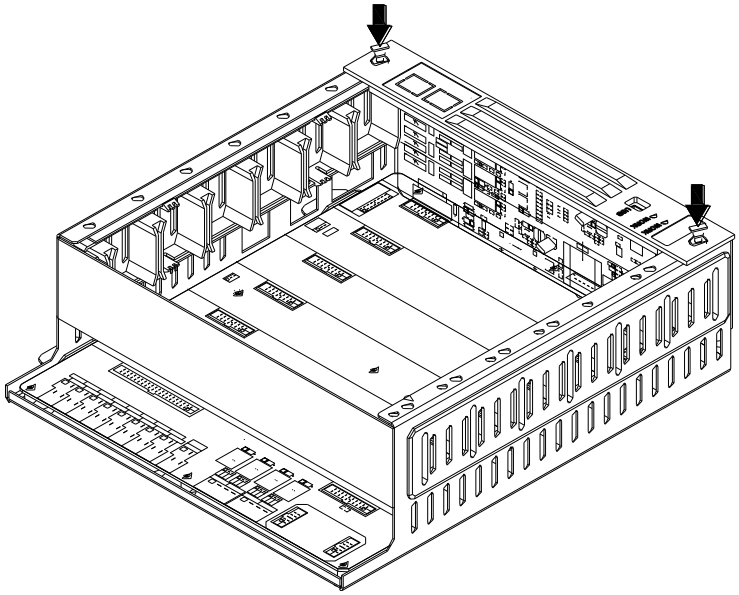


Fig 2.10

First, aligh the circuit module (board) with the slot inside the cabinet; Second, slide down two sides of the circuit board along the guide rail; Third, press it down to the end and lock it by pressing small buttons on the two sides.

The circuit board is disassembled according to the following Fig 2.11.

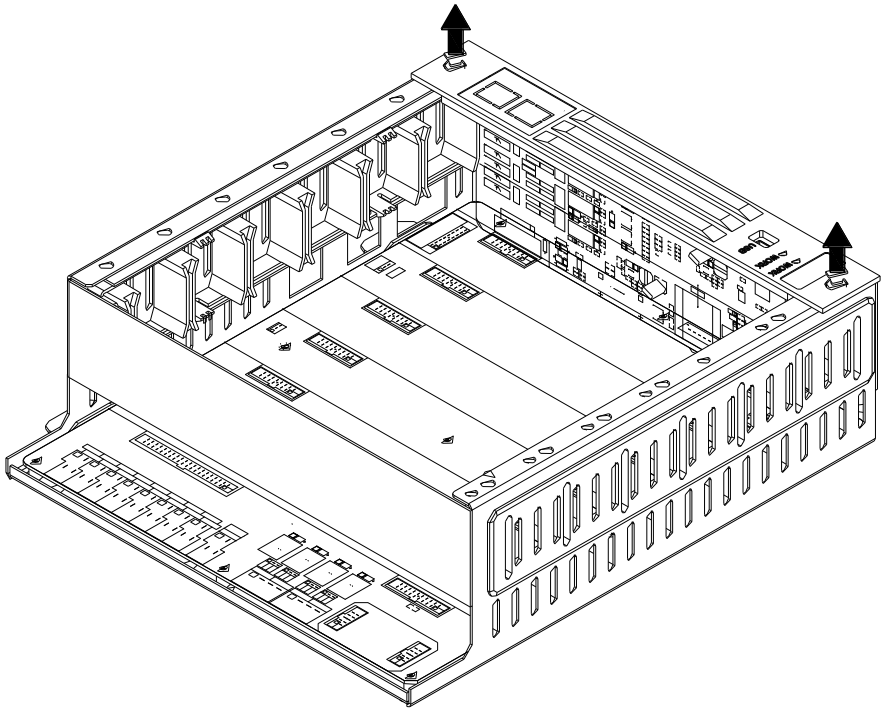


Fig 2.11

First, pinch small two buttons; Second, Pull them up to unlock; Third, Continue to pull up with strength. Finally, the board is disassembled.

2.3.3 Installing Zone Display and Control Panel

Zone display and control panel is installed on the cabinet door. The following Fig 2.12 shows how to install it.

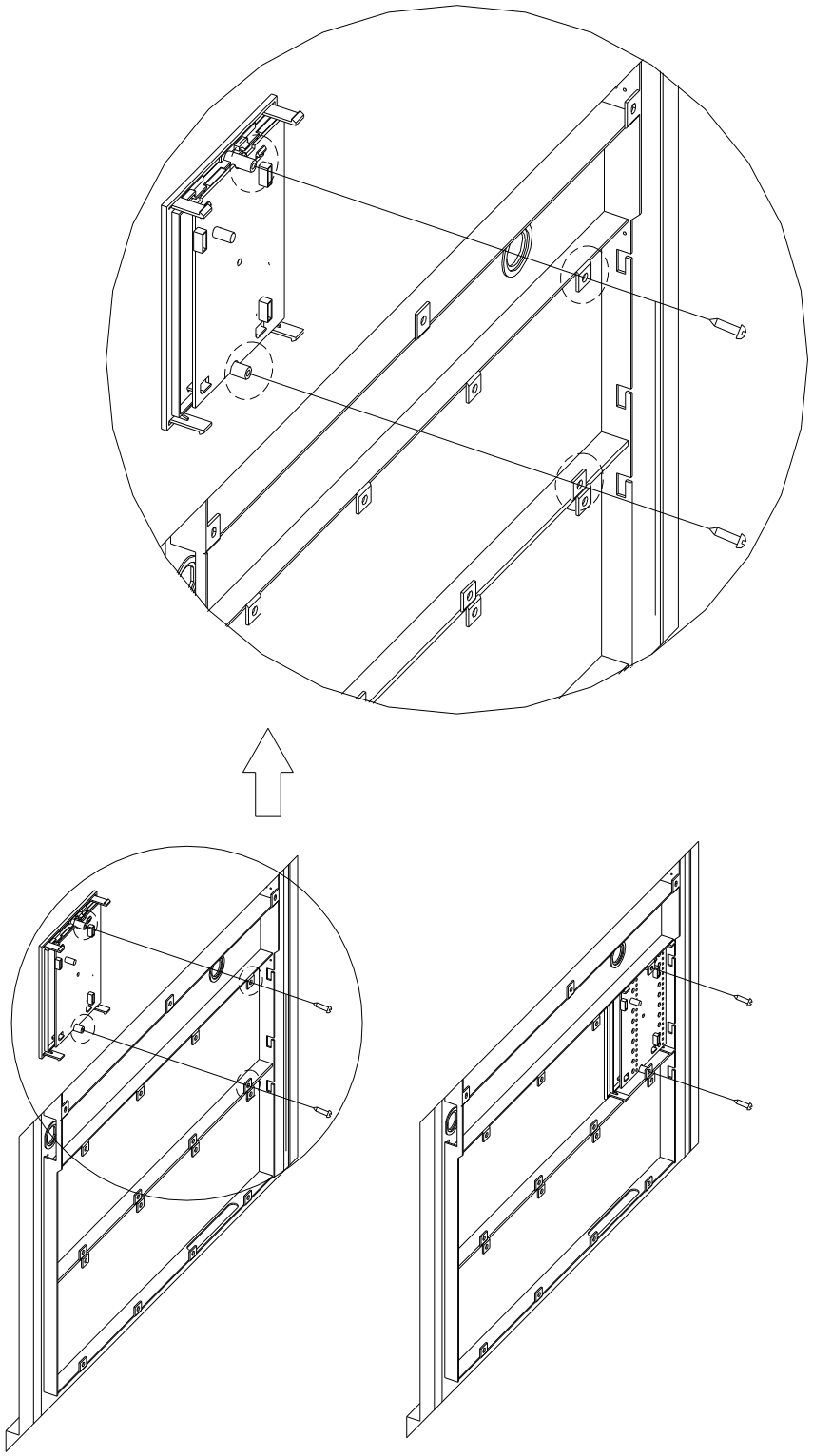


Fig 2.12

First, Align the snap of the zone display and control panle with the slot on the door; Second, Hook the zone display and control panel with the door; Finally, fix the panel with screws.

2.3.4 Installing Glass Door

The following Fig 2.13 to Fig 2.15 shows how to install the glass door on the cabinet.

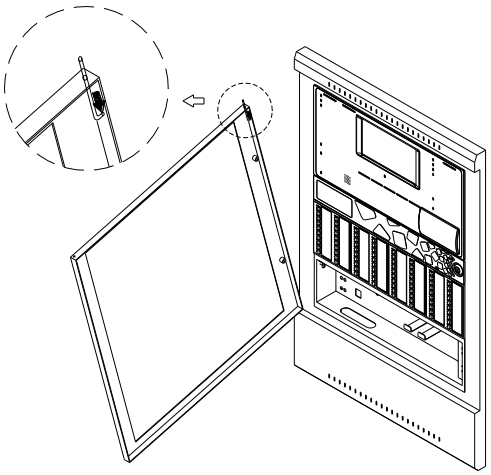


Fig 2.13

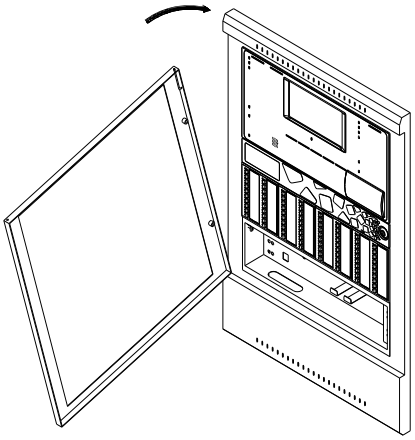


Fig 2.14

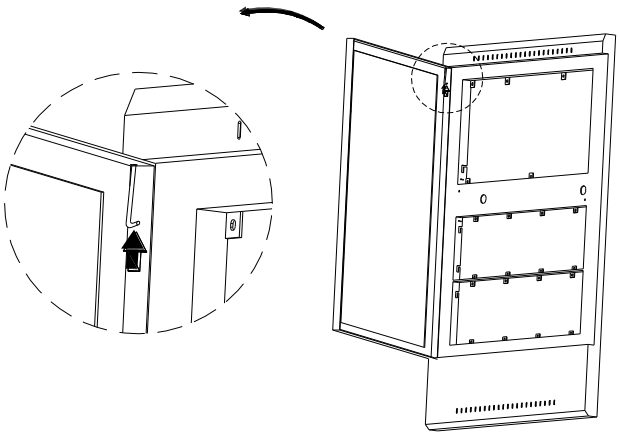


Fig 2.15

Put the glass door on the cabinet after pulling down the latch which is on the left upper corner of the glass door. The glass door is installed after releasing the latch and making it go through the latch hole.

2.3.5 Installation of Labels on the Front Panel

Installation steps Fig 2.16 to Fig 2.19 are shown below for labels on the front panel.

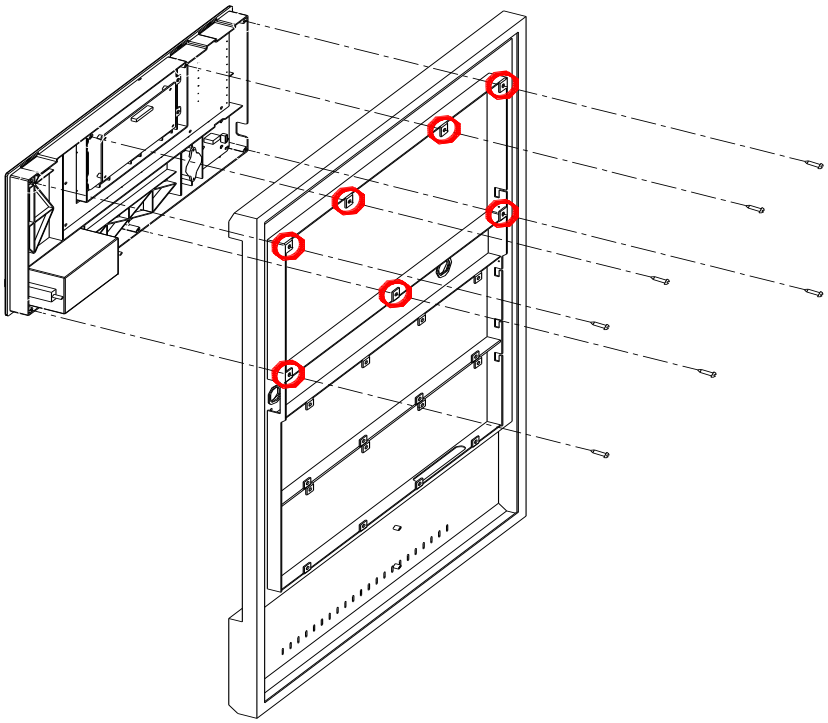


Fig 2.16

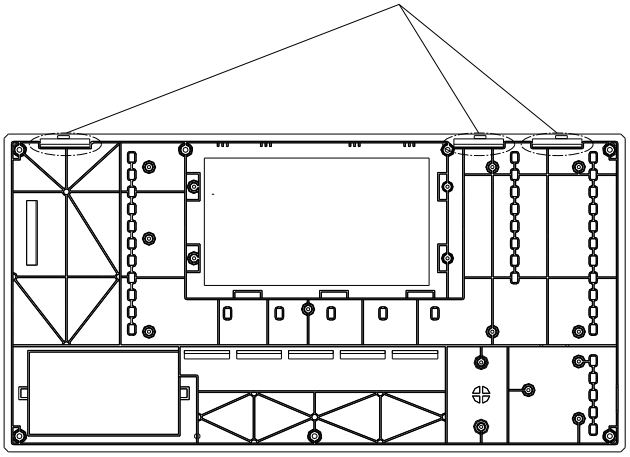


Fig 2.17

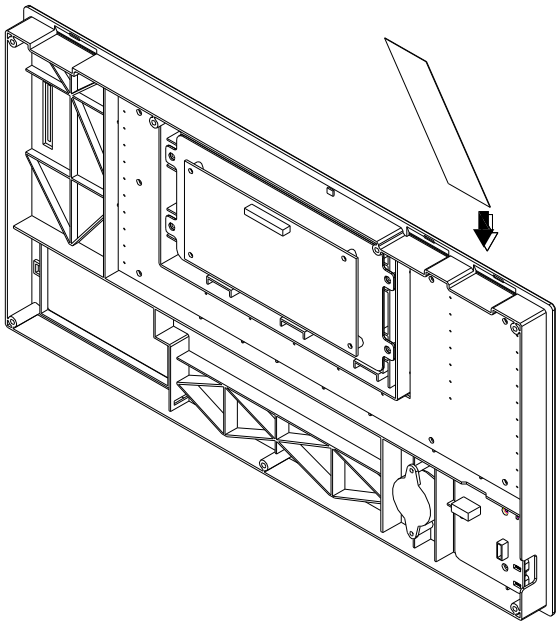


Fig 2.18

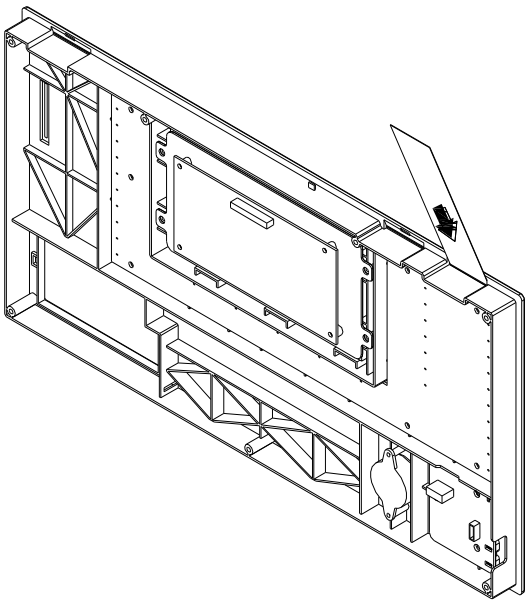
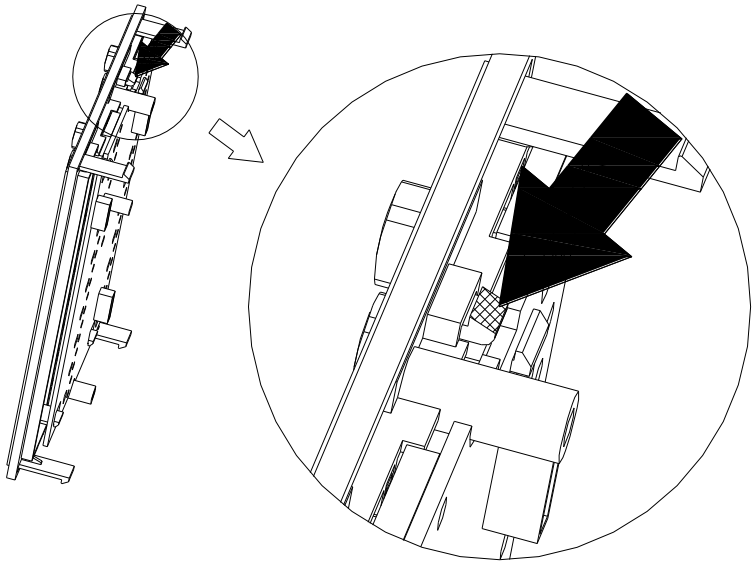


Fig 2.19

Take the front panel from the cabinet door as shown in Fig 2.16. The lable is inserted along the lead-in groove(as shown in Fig 2.17) after aligning the label with the label hole. Keep the lable vertical so that it can be down to the bottom as shown in Fig 2.18 and Fig 2.19.

2.3.6 Installation of Labels on the Zone Display and Control Panel (ZCP)

Installation steps Fig 2.20 are shown below for labels on the ZCP.



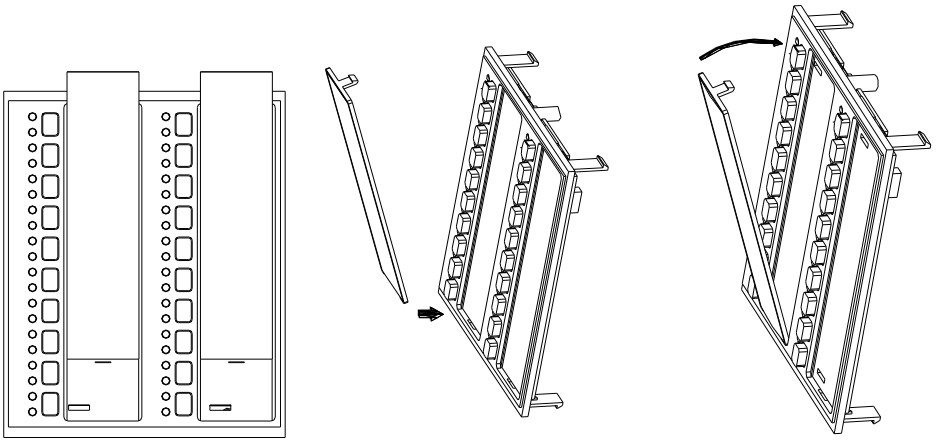


Fig 2.20

Take the transparent baffle from the ZCP by using a small screwdriver. Put the printed label into the slot for ZCP label and then restore the transparent baffle.

Maximum 8 locations can be installed with P-9981, P-9982, P-9981F or P-9982F Zone display and control modules. Any unused location shall be covered by ZD-400 blank faceplate.

2.4 Start-up Check

After installation, apply power to the FACP. Connect the battery plug onto the power board, and then turn on the mains switch in the cabinet and check if the FACP can self-test. The procedures are as follows.

- ✧ Powering on the FACP, LCD doesn't light and all LEDs are illuminated for 5s.
- ✧ As All LED go out, LCD displays ***Data Loading……*** and GST logo. Initiation of the system takes about 85s~90s.
- ✧ Self-test of LEDs on the front panel and ZCPs.
- ✧ Self-test of internal cards.
- ✧ Self-test of printer.
- ✧ Reset of the system.

Start-up check is done if the FACP switches on normally after undertaking above steps.

Note: After power on, the FACP will display some fault messages because the external wiring are not connected.

2.5 External Connection

2.5.1 AC Power Connection

Use 14AWG (2.00mm^2) or larger wire with 600 volt insulation rating. Make certain that the AC mains circuit breaker is off before wiring any connections between the mains and the FACP. Power supply wires should be connected to the terminal as shown in figure below Fig 2.21.

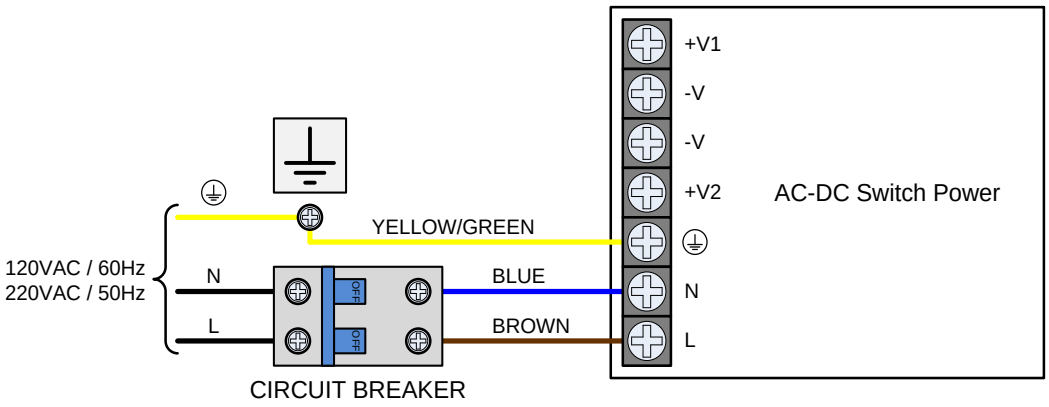


Fig 2.21

Note:

- ✧ **Verify all cables are correctly connected before connecting power supply.**
- ✧ **Please make sure the mains power is in line with the rated voltage marked on the panel's label.**

Connect a wire from the grounding stud in the cabinet to a known solid earth ground in the buildings. Refer to Fig 2.1 for location of the stud. This connection is vital for maintaining the FACP's immunity to unwanted transients generated by lightning and electrostatic discharge. Apply AC power to the panel only after the system is completely installed and visually checked. The FACP shall be connected to a dedicated 15 Amp branch circuit.

2.5.2 Battery Connection

Batteries wire is connected to **XT3** of power box, as shown in the figure below Fig 2.22

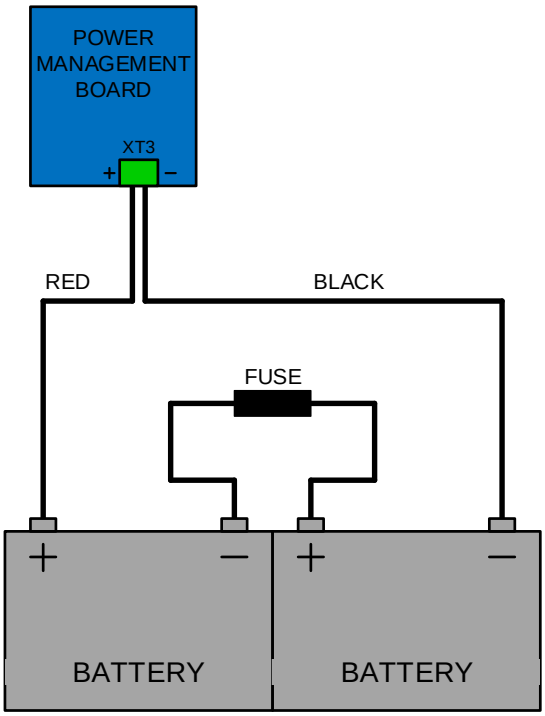


Fig 2.22

Before connecting the batteries to the FACP, make certain that the interconnect cable

between the batteries is not connected. Do not connect the interconnect cable until the system is completely installed. Observe polarity when connecting the batteries. The FUSE can be found in the accessories of panel.

2.5.3 Signaling Line Circuits (SLC) Connection

Each SLC includes four wires: O+ (bus output positive), O- (bus output negative), I+ (bus input positive), and I- (bus input negative). The wire from O+ is connected back to I+ and the wire from O- back to I-. SLC only has one connection of Class A.

When connecting with C-M9503/DC-M9503 Loop Isolator, each SLC can connect up to 50 Isolators. Maximum 30 detectors/MCPs/modules can be protected between two isolators. The connection is shown below Fig 2.23

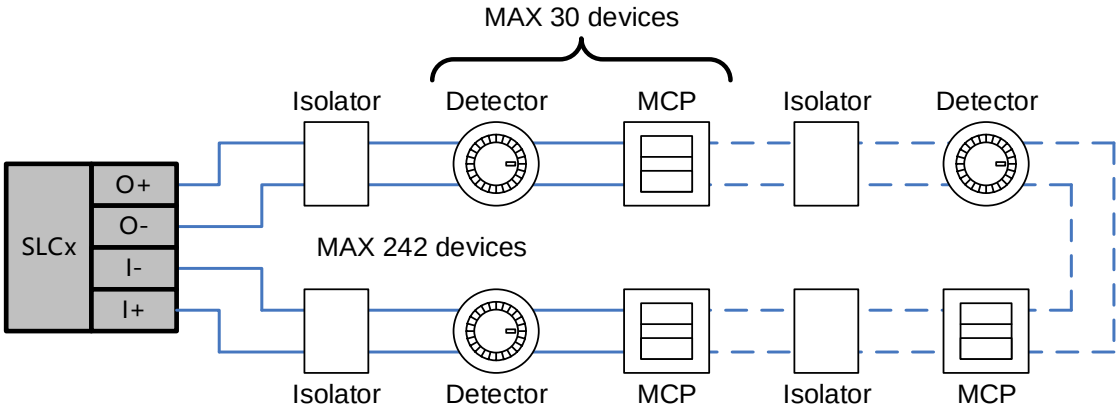


Fig2.23

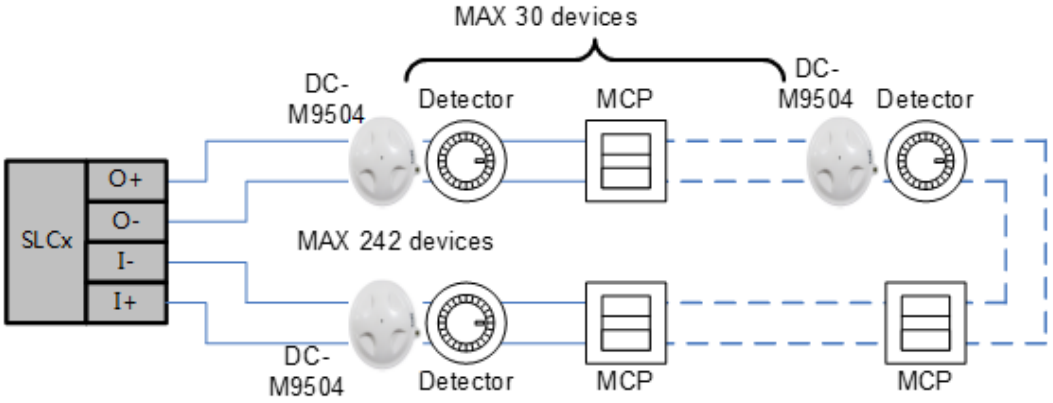


Fig2.23.1

When not connecting with C-M9503/DC-M9503 Loop Isolator, the connection of SLC is shown below Fig 2.24

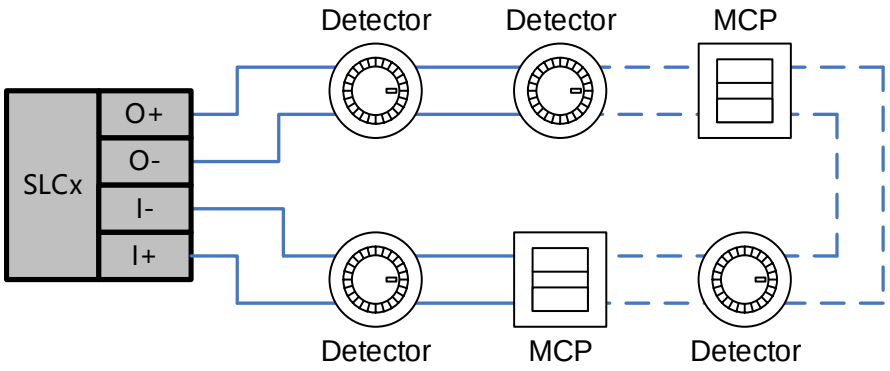


Fig2.24

2.5.4 Notification Appliance Circuits (NAC)

Note: Synchronization of the audible and visible alarm signal is only provided on a notification circuit basis or on a DI-M9305 controlled zone basis.

There are two Class B NACs on the panel. The total maximum current in alarm for two NACs cannot exceed 2.5A. Use compatible UL listed notification appliances (see Section 1.5, Table 6) that can work at regulated 24VDC. Circuits are regulated, supervised and power-limited.

Connection of NAC1 is shown in Fig 2.25 below.

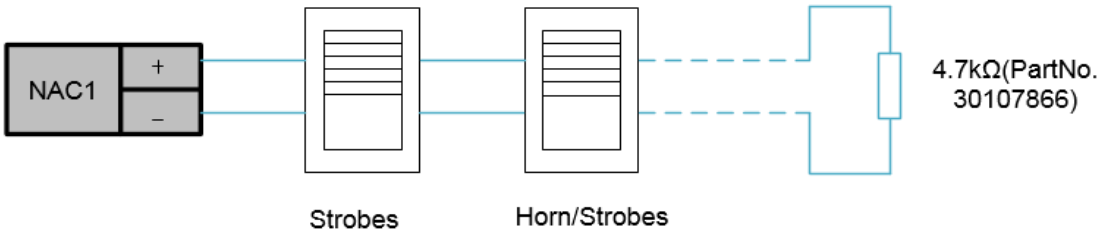


Fig 2.25

NAC2/AUX output can be configured as NAC or supervised 24Vdc Auxiliary Power Output (AUX). When it is configured as NAC2 output, it is same as NAC1 and a 4.7 kΩ End-of-Line resistor shall be connected. When it is configured as AUX, an 1 kΩ End-of-Line resistor shall be connected and the connection is shown in Fig 2.26 below.

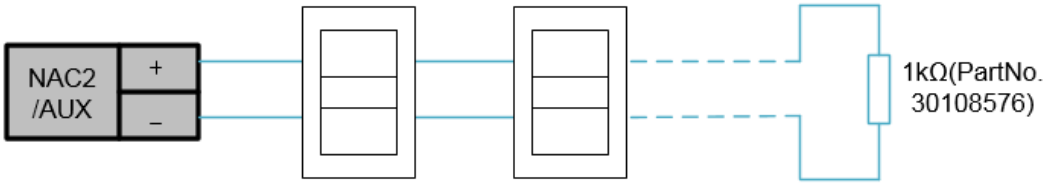


Fig 2.26

2.5.4.1 Connecting Strobes/Horns directly on NAC1 and/or NAC2

When NAC1 or NAC2/AUX is connected with Horns / Strobes directly, it needs to work in **NAC synch** Mode (Refer to Fig4.9 for the setting method). Connection of NAC is shown below Fig 2.27.

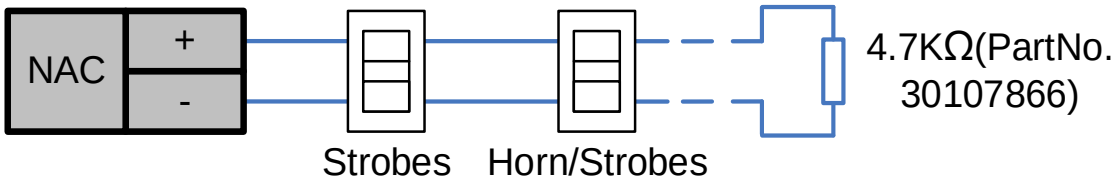


Fig 2.27

2.5.4.2 Connecting Bells directly on NAC1 and/or NAC2

When NAC1 or NAC2 is connected with Bells directly, it needs to work in **NAC Temporal** Mode (Refer to Fig4.9 for the setting method). Connection of NAC is shown below Fig 2.28.

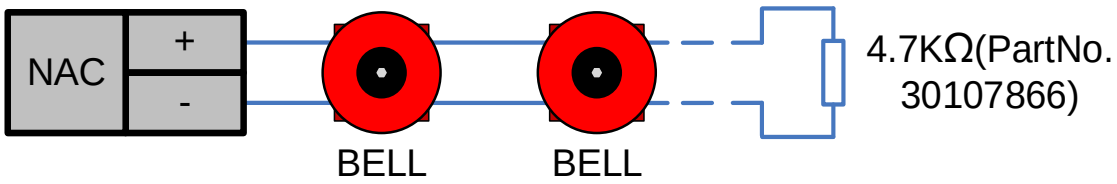


Fig 2.28

2.5.4.3 Connecting Strobes/Horns on NAC2/AUX via DI-M9305 Single Riser Output Module

When NAC2/AUX is connected with Strobes/Horns via DI-M9305 Modules, it needs to programmed as **AUX SYNC** Mode (Refer to Fig4.11 for the setting method). The NAC load after each DI-M9305 cannot exceed 2.0 A. Connection of NAC2/AUX is shown below Fig 2.27. This NAC solution requires installation of ZC-400 to indicate individual NAC zone status. See also Fig 3.2.

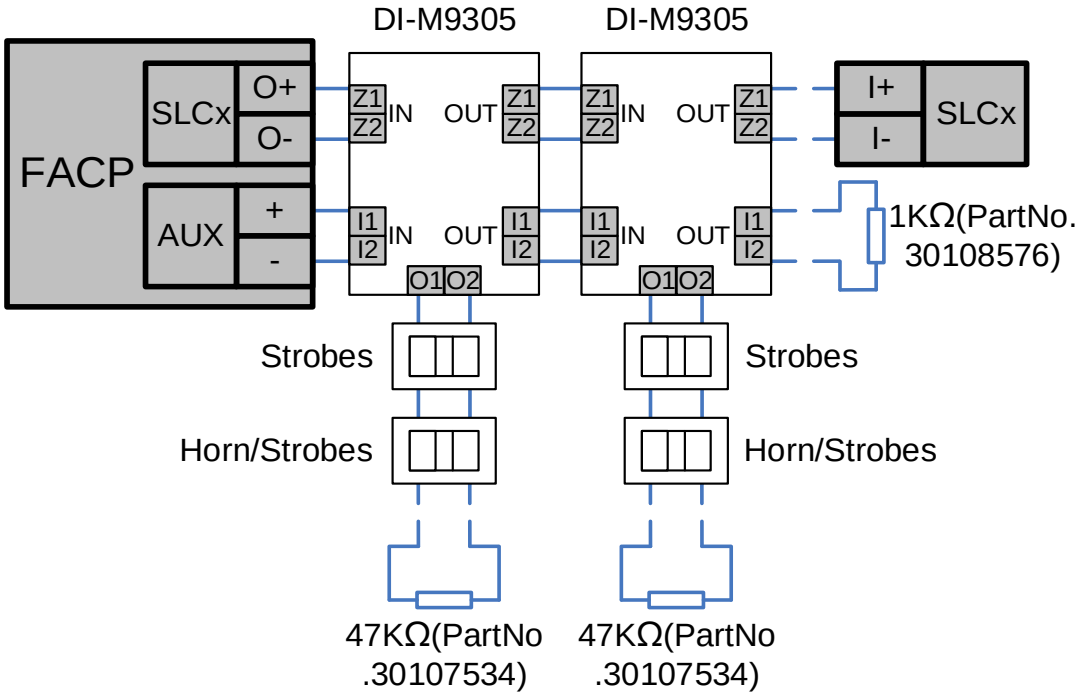


Fig 2.29

For NAC solution using DI-M9305 above, when a system is intended to provide signaling service to two or more physically separated buildings or zones, reenergization of the previously deactivated notification appliance circuits from a subsequent alarm may be programmed on a zone basis (Refer to Fig 4.16 for the setting method). Consult with AHJs for permissible applications.

2.5.5 Relays

Relays labelled as “Alarm”, “supervisory” and “Trouble” are designated as “Common”. Other relays are designated as “Programmable”.

The relay outputs can be set to normally open/close contact output. When connecting ***COM*** and ***NOx*** with a jumper, this relay output is set to normally open contact output, shown as Fig 2.30.

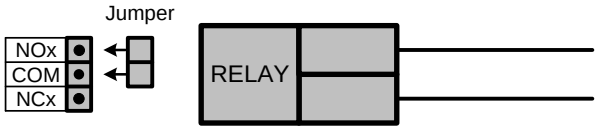


Fig 2.30

2.5.6 INPUT (Limit to non-monitored)

The INPUT interface wiring diagram is as following Fig 2.31:

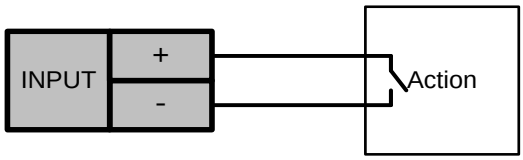


Fig 2.31

This interface can only be used non-fire, non-emergency input, e.g. door status sensor.

2.5.7 CAN Network Connection

P-9966A CAN Network Card can be plugged into L5/L6, S1 or S2 slot of MB-400 Mother Board. Maximum three Network cards, including P-9966A or P-9983 may be used in the panel. When plugged on slot L5/L6, connect external network wires on terminals L5I and L5O.When plugged on slot S1, connect external network wires on terminals S1I and S1O. When plugged on slot S2, terminals S2I and S2O are to be used.

Fig 2.32 shows the connection when P-9966A is plugged into S2 slot.

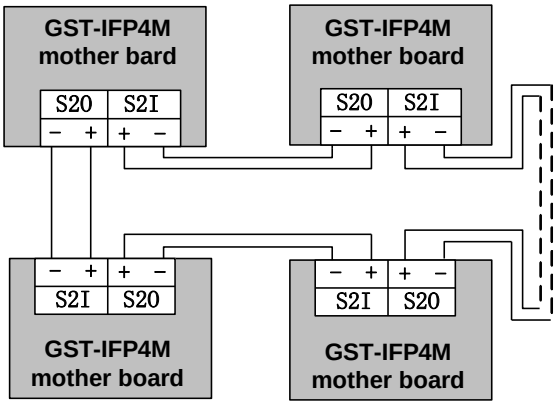


Fig2.32

2.5.8 Optical Network Connection

P-9983 Fiber-Optical Network Card can be plugged into L5/L6, S1 or S2 slot of MB-400 Mother Board. Maximum three Network cards, including P-9966A or P-9983 may be used in the panel. The position for the fiber interface is on the fiber network card. Fig 2.33 shows the connection between the P-9983 Fiber-Optical Network Card.

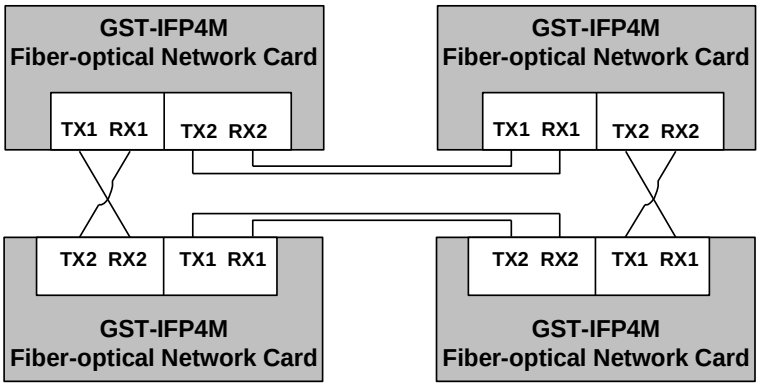


Fig 2.33

2.5.9 Hybrid Network Connection

User can set a hybrid network. For example Fig 2.34, on the mother board of No1 GST-IFP4M , a P-9983 Fiber-Optical Network Card is plugged into S2,two P-9966A CAN Network Cards are plugged into S1 and L5/L6. No1 GST-IFP4M and No2 GST-IFP4M make up a CAN network. At the same time, No1 GST-IFP4M and No3 GST-IFP4M make up a CAN network also. As a P-9983 is plugged into S2,a fiber network can be made up by No1 GST-IFP4M and No4 GST-IFP4M. The quantity of the GST-IFP4M in the whole network that shows in Fig 2.34 is no more than 250.

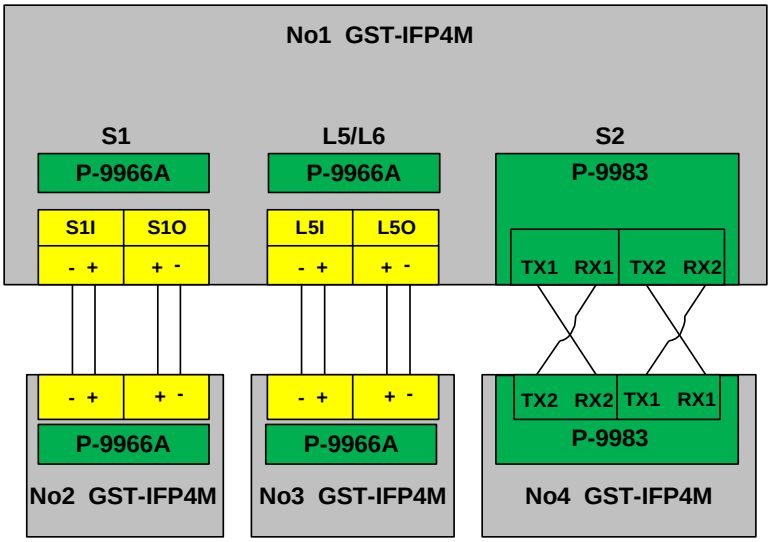


Fig 2.34

2.5.10 Modbus Card Connection

P-9956-Modbus Modbus Card can be plugged into L5/L6, S1 or S2 slot of MB-400 Mother Board. Only one P-9956-Modbus Modbus Card is to be used. When plugged on slot L5/L6, connect external network wires on terminals L5I and L5O.When plugged on slot S1, connect external network wires on terminals S1I and S1O. When plugged on slot S2, terminals S2I and S2O are to be used.

P-9956-Modbus Modbus card interface may be configured as RS485, RS232 or RS422..See Fig 2.35.The jumper is on the RS485 interface by factory defaults setting. User can select the other interface types by moving the jumper to RS232 or RS422 position.

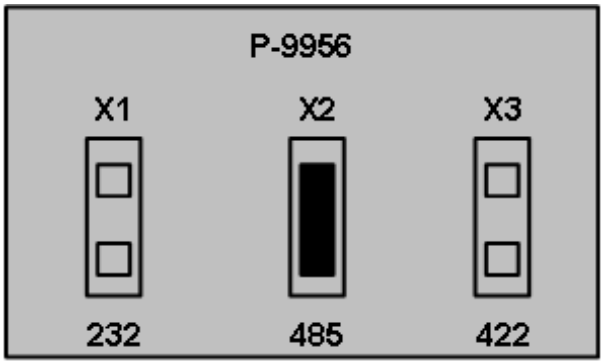


Fig 2.35

Fig 2.36 shows the connection when P-9956-Modbus is plugged into S2 slot.

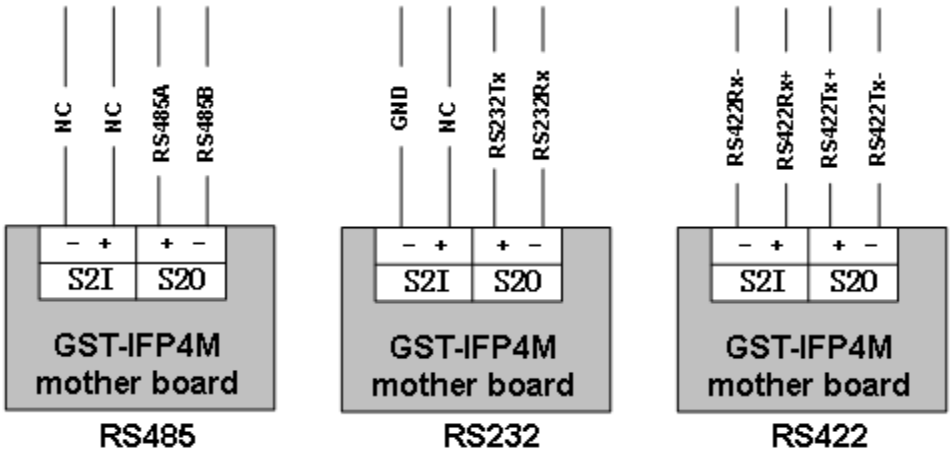


Fig 2.36

2.5.11 GST-MP Voice Evacuation System Master Panel

GST-IFP4M control panel can connect with GST-MP Voice Evacuation System Master Panel through RS232. The wiring between the control panel and ASC card of GST-MP Voice Evacuation System Master Panel is shown in Fig 2.37. Interconnecting wires shall be installed within conduit and maximum Length shall NOT exceed 20 feet, and GST-IFP4M can send Alarm signals to GST-MP.

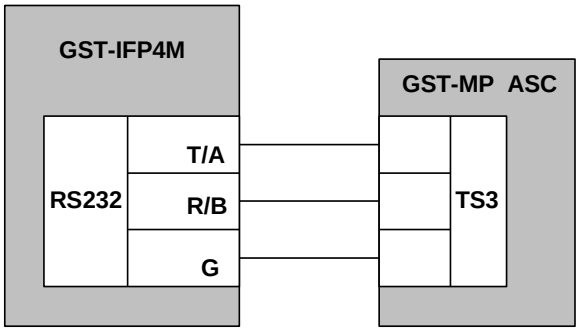
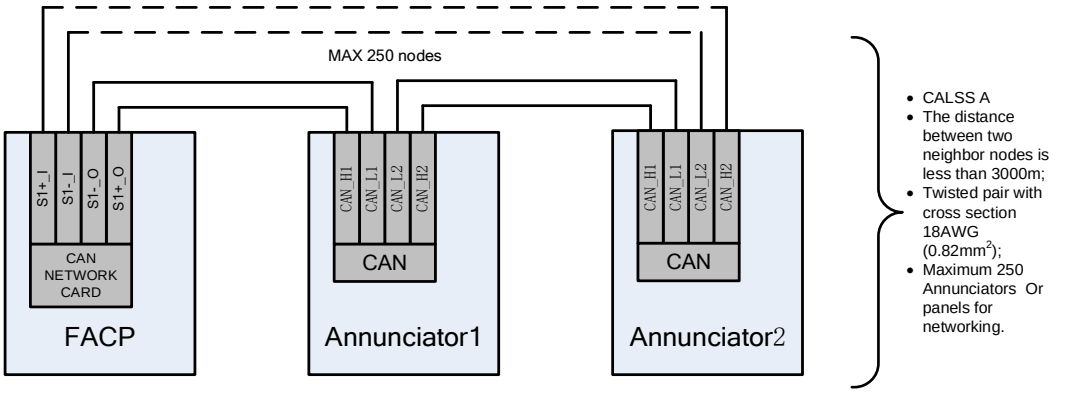


Fig 2.37

2.5.12 GST-MNA2C/GST-MNA2F Network Annunciator

GST-IFP4M control panel can connect with GST-MNA2C/GST-MNA2F Network Annunciator through CAN or Fiber network interface. The wiring between the control panel and GST-MNA2C/GST-MNA2F Network Annunciator is shown in Fig 2.38. The total number of panels and annunciators in the network shall not exceed 250 .



Note: the number of FACP is not less than annunciator because one FACP can drive one annunciator only.

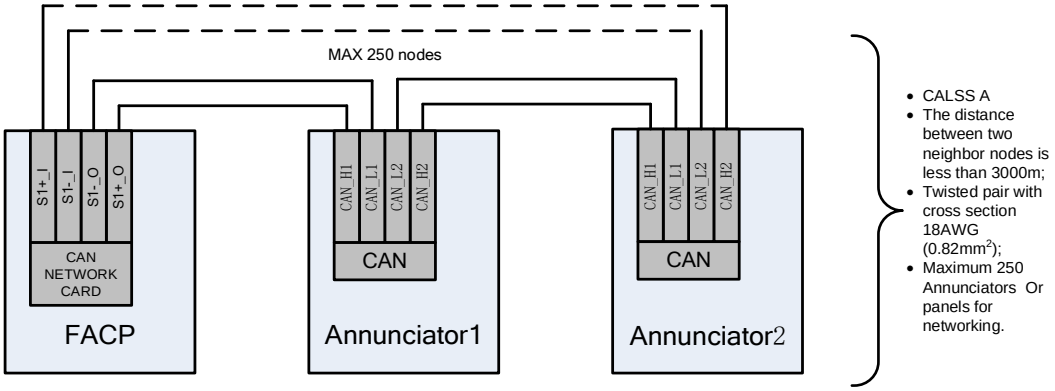


Fig 2.38

Note: the number of FACP is not less than annunciator because one FACP can drive one annunciator only.

2.5.13 UL Power-limited Wiring Requirements

Power-limited and nonpower-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25” (6.4mm) away from any nonpower-limited circuit wiring, and nonpower-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. The typical wiring diagram for the FACP is shown below Fig 2.39 and the typical wiring diagram for the battery cabinet is shown below Fig 2.40.

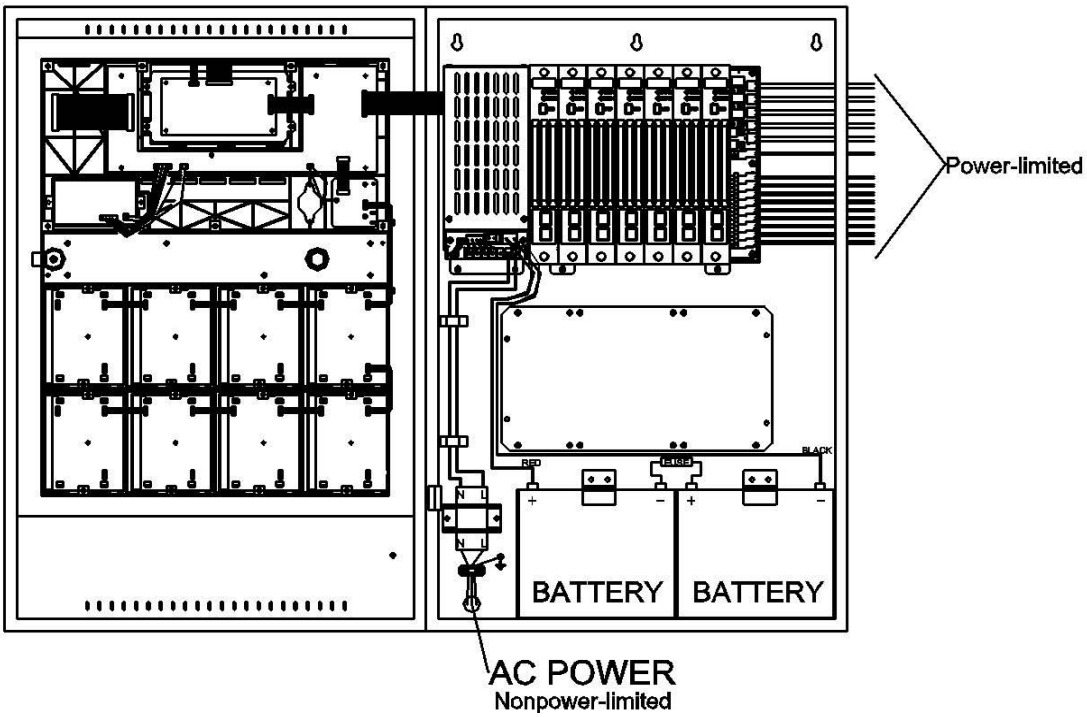


Fig 2.39

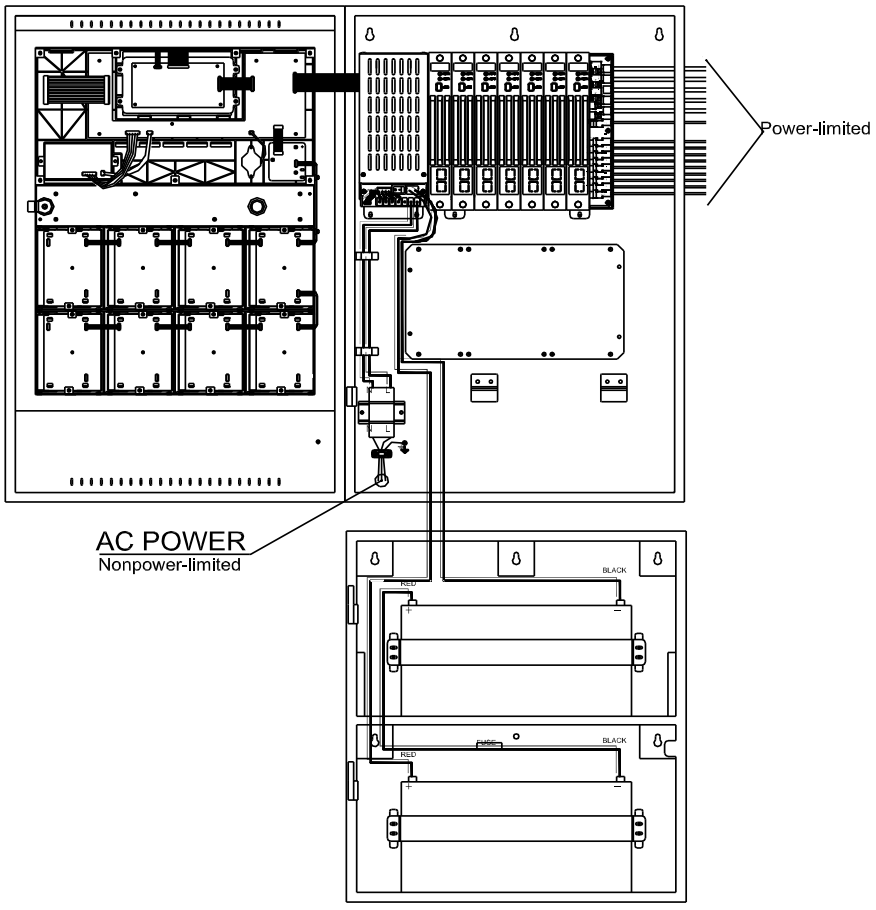


Fig 2.40

2.6 Connection Inspection

Check the circuit connected with the FACP. Measure the insulation resistance between loops and between loops and ground, which should be more than 20MΩ. Measure the load of detection loops, which should be more than 1kΩ. The resistance between cables of NAC1, NAC2 should be equal to the end-of-line resistance (4.7kΩ). If NAC2/AUX is set as AUX function, the resistance between cables should be equal to 1kΩ.

For testing Ground Fault detection, maximum 50 ohms testing resistor is to be used.

2.7 Setup FACP and Define Devices

Refer to Section 4 for FACP programming and configuration.

2.8 Field Device Commission

After connection, definition and download of device and C&E equations, you can power up the FACP and start commission. The following steps are for reference.

1 Complete the labels of zone indication panel.
2 Test all the detectors and make sure their positions are correct.
3 Check all device definition, and modify the improper definitions.
4 Check all C&E equations, modify improper equations, and test automatic action of the system by C&E equation.

3 Indication & Control

The keys and LED indicators of FACP are shown below Fig3.1.

Fig3.1

3.1 LED Indicators

Note:

Unless otherwise specified, all LEDs are yellow.

Except for POWER LED, all LEDs go out when the FACP is reset.

- **POWER**: Green. It lights steadily when the FACP is powered up.
- **PRE-ALARM**: Red. It lights when any device is in PAS delay period; it goes out as the PAS message disappears.
- **GENERAL TROUBLE**: It lights when there is fault message; it goes out as the fault is removed.
- **SYSTEM TROUBLE**: It lights when any card is fault or definition of devices/linkage equation is incorrect; it goes out as the fault is removed.
- **SUPERVISORY**: It lights when any supervisory message exists.
- **DISABLE**: It lights when any disabled messages exists; It doesn't light without disabled messages.
- **AC TROUBLE**: It lights when there is AC trouble; it goes out as the trouble is removed.
- **BAT TROUBLE**: It lights when there is battery fault; it goes out as the battery fault is removed.
- **CHARGER TROUBLE**: It lights when there is charger fault.
- **NAC1TROUBLE/DIS**: It lights when NAC1 port is fault; it goes out as the fault is removed. If NAC1 is disabled, the LED flashes.

- **NAC2TROUBLE/DIS**: This LED is enabled when NAC2/AUX output is programmed as “NAC” (See Fig 4.10). It lights when NAC2 port is fault; it goes out as the fault is removed. If NAC2 is disabled, the LED flashes.
- **FIRE ALARM**: Red. It lights when there is an alarm message.
- **NAC1 ACTIVATED**: Red. It lights when NAC1 outputs; it goes out as ***SILENCE ALARM*** key is pressed.
- **NAC2 ACTIVATED**: Red. It lights when NAC2 outputs; it goes out as ***SILENCE ALARM*** key is pressed.
- **GROUND TROUBLE**: It lights when there is ground trouble; it goes out as the trouble is removed.
- **DETECTOR DIRTY**: It lights when the detector is dirty; it goes out as the dirt is reported.
- **DELAY MODE**: It lights when the FACP enters delay mode; it goes out as the FACP exits delay mode.

  Warning: The Delay Mode shall NOT be applied to required output fire signaling in UL864. It may only be used for supplementary process controls.
- **TEST MODE**: It lights when the FACP enters test mode; it goes out as the FACP exits test mode.
- **MAINTENANCE**: It lights when the FACP enters maintenance mode; it goes out when the maintenance is completed.
- **FIRE ALARM INFORMATION**: Red. It flashes when an alarm message is not confirmed. It lights when all alarm messages have been confirmed.
- **SUPERVISORY INFORMATION**: It flashes when a supervisory message is not confirmed; it lights when all supervisory messages has been confirmed.
- **TROUBLE INFORMATION**: If flashes when a fault message is not confirmed. It lights when all fault messages have been confirmed; it goes out as all fault messages are cleared.
- **DISABLE INFORMATION**: It lights when a disabled message exists; it goes out as the message is disposed.
- **STATUS INFORMATION**: It lights when any message exists; it goes out as all messages are disposed.
- **MANUAL ALARM**: It lights when the ***MANUAL ALARM*** key is pressed.
- **ACKNOWLEDGE**: It lights when all real messages have been confirmed. It goes out as a new message occurs.
- **SILENCE ALARM**: The LED lights when any NAC is silenced. It goes out when all silenced NACs are reactivated .
- **SILENCE BUZZER**: It lights when the buzzer of the FACP is silenced. It goes out as the buzzer sounds again.
- **ALL RESOUND**: It lights when ***ALL RESOUND*** key is pressed. It goes out when any NAC is silenced again.

- **RESET**: It lights when the FACP is being reset; It goes out when the FACP completes reset.
- ☼/☾ **SWITCH**: It lights when the FACP is in Night mode; it goes out in Day mode.
- **NAC ZONE ACTIVATION:** When an individual NAC zone controlled by DI-M9305 is activated, the associated red LED lights. It goes out when the NAC zone is silenced or reset. This feature requires ZC-400 as shown in Fig 3.2. Refer to Fig 4.30 for programming.
- **NAC ZONE SILENCED:** When an individual NAC zone controlled by DI-M9305 is silenced, the associated yellow LED lights. It goes out when the NAC zone is reactivated or reset. This feature requires ZC-400 as shown in Fig 3.2. Refer to Fig 4.30 for programming.
-

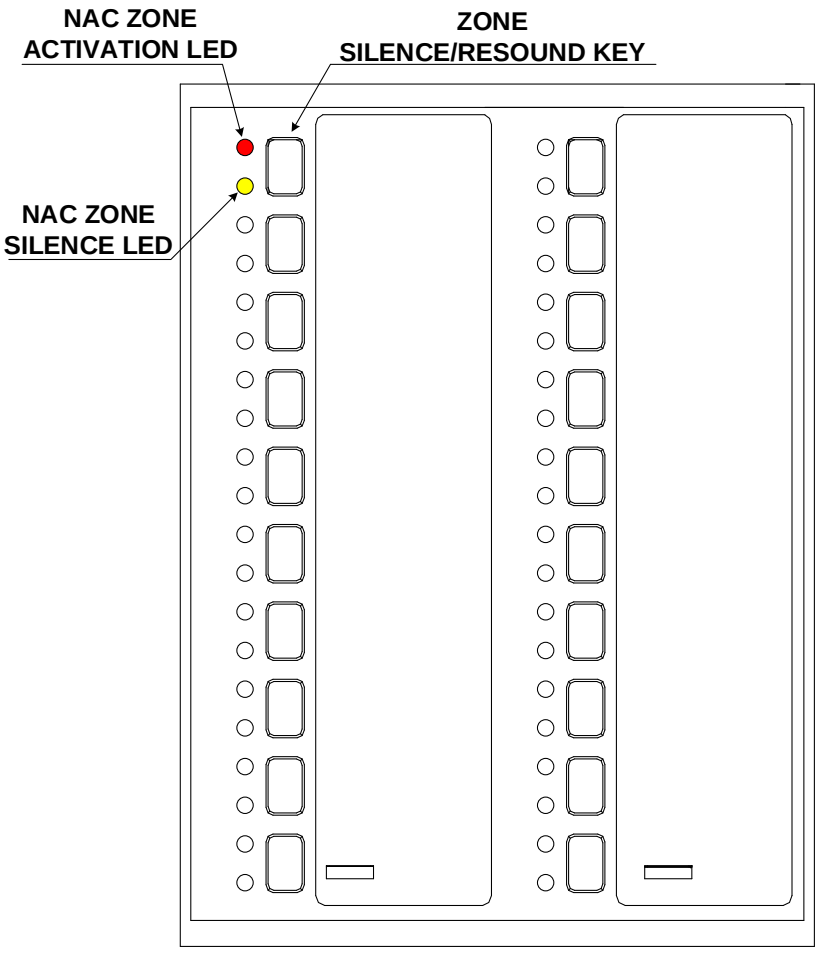


Fig3.2

3.2 Functional keys

- **FIRE ALARM INFORMATION**: Fire alarm information screen is displayed when there is fire alarm information and this key is pressed.
- **SUPERVISORY INFORMATION**: Supervisory signal may be programmed as latching or non-latching. For latching supervisory, cancellation of the signal is the

indication of restoration to normal condition. For non-latching supervisory, the signal will be locked-in until manually reset. Supervisory information screen is displayed when there is supervisory information and this key is pressed.

- ✧ **TROUBLE INFORMATION**: Fault information screen is displayed when there is fault information as this key is pressed.
- ✧ **DISABLE INFORMATION**: Disable information screen is displayed when there is disable information as this key is pressed.
- ✧ **STATUS INFORMATION**: Status information screen is displayed when there is status information as this key is pressed.
- ✧ **MANUAL ALARM**: Pressing the key shall activate alarm process, referred to section 6.1.3.
- ✧ **ACKNOWLEDGE**: The current information is confirmed to be selected if this key is pressed.
- ✧ **SILENCE ALARM**: All activated notification appliances can be silenced when this key is pressed.
- ✧ **SILENCE BUZZER**: the indication sound from the FACP can be silenced if this key is pressed.
- ✧ **ALL RESOUND**: All silenced notification appliances can be reactivated, when ***this*** key is pressed..
- ✧ **RESET**: The FACP will be reset as this key is pressed.
- ✧ ☼/☾ **SWITCH**: The FACP can be switched between day or night mode if this key is pressed.
- ✧ **ZONE SILENCE/RESOUND**：When an individual DI-M9305 controlled NAC zone is activated, it can be silenced by depressing the associated ZONE SILENCE/RESOUND key once, and then reactivated by second depressing. This feature requires ZC-400 as shown in Fig 3.2, refer to Fig 4.30 for programming.

3.3 Service / Program Keys:

Key	Description
Number Key of 0~9	Press number keys to input numbers.
▲	UP cursor. Press this key to move the cursor to previous or scroll up lists in a continuous loop.
▼	DOWN cursor. Press this key to move the cursor to next or scroll down lists in a continuous loop.
▶	RIGHT cursor. Press this key to switch the cursor to next box or select options to the right.

◀	LEFT cursor. Press this key to switch the cursor to previous box or select options to the left.
⮌	CANCEL key. Press this key to cancel an operation or exit a menu.
↵	ENTER key. Press this key to select a displayed item or confirm an operation.
⌫	BACKSPACE key. Press this key to delete an input number or letter.
␣	SPACE key. Press this key to input a space character.
⚙	MENU key. Press this key to call the main menu list.

3.4 User Interface

The FACP has a touch screen with graphical icons. The FACP enters ***System Normal*** screen as Fig 3.3 below after correct installation and wiring.

Fig 3.3

ALARM: when fire alarm signal is on the screen, the FACP will pop up fire alarm (first alarm) message with white words in red background, including alarm time, device address, device type and related description and so on. Alarm message taking the highest priority is displayed on the main screen and other messages are displayed the quantity on related tabs on the screen. Clicking each tab can check details. Refer to the figure below Fig 3.4.

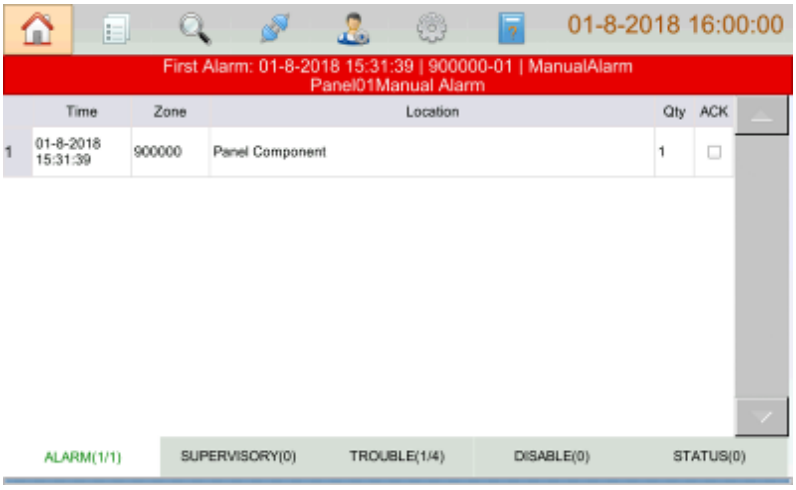


Fig 3.4

When there are multiple fire alarms, the Alarm tab will display all zones that are in alarm. If one of the zones in fire is clicked, the next screen will appear to show all devices with fire alarm in that zone. The ALARM tab will display the total number of fire alarms in the bracket, with the number before "/" representing the total number of zones, and that after the "/" the total number of devices in alarm, as shown in Fig 3.5.

Fig 3.5

SUPERVISORY: supervisory messages take lower priority than Alarm messages. The supervisory messages will be displayed if there is no alarm. Clicking ***SUPERVISORY*** tab can view details.

TROUBLE: trouble messages take lower priority than supervisory messages. The trouble messages will be displayed if there is no Alarm or supervisory messages. Clicking ***TROUBLE*** tab can view details.

Trouble messages have many types such as internal fault and loop device fault. Clicking on the related types can view the details.

DISABLED: there are disabled messages if some devices are disabled. Clicking

DISABLE tab can view the details as shown in the figure below Fig 3.5.

STATUS: clicking ***STATUS*** tab can view other status messages of the FACP.

4 Operations

4.1 Programming on FACP

Configurations and definitions can also be programmed directly on the FACP.

Clicking the button inputs engineering password to enter ***Panel Setup*** menu (tree diagram) as shown below Fig 4.1.

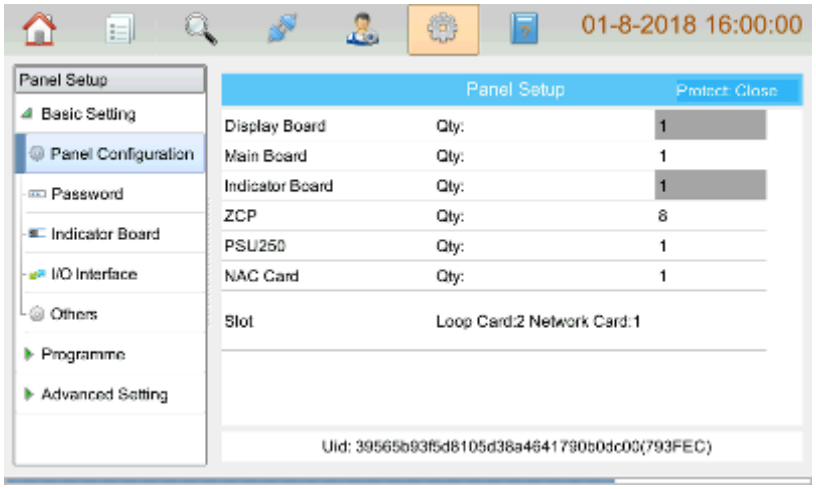


Fig 4.1

4.1.1 Basic Setting

- Panel Configuration: in the ***Basic Setting*** menu, clicking ***Panel Configuration*** shows all cards integrated in the FACP on the right for users to set cards quantity by manual.
  - ✧ Display Board: 1 (by default)
  - ✧ Main Board: 1 (by default)
  - ✧ Indicator Board: 1 (by default)
  - ✧ ZCP: user defined (0 ~ 32)
  - ✧ PSU250: 1 (by default)
  - ✧ NAC Card: 1 (by default)
  - ✧ Loop Card: user defined (1 ~ 4)
  - ✧ Slot: Loop Card:1 (by default)

  Clicking ***Slot*** enters the screen of Slot Definition as shown in Fig 4.2. In the menu, the listed slots are corresponding to those five slots of mother board on the control panel. Users can set types of cards such as: Single LoopCard, Double LoopCard, Network Card, Modbus Card, DACR Card, None.

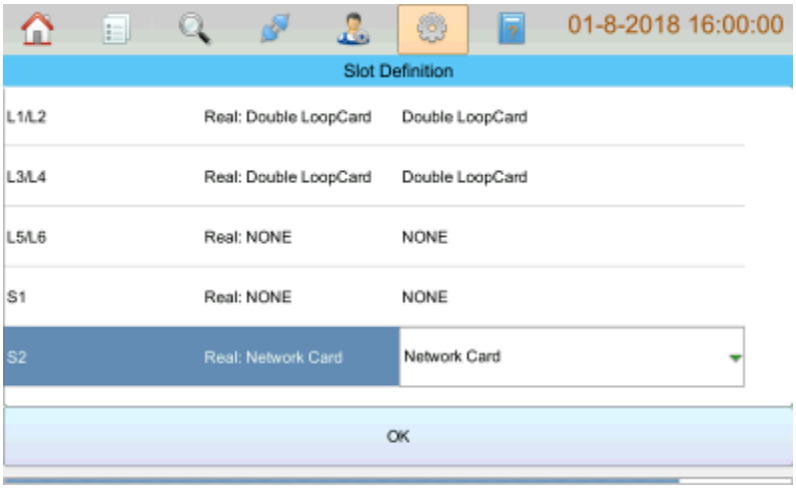


Fig 4.2

- Password: clicking ***Password*** in ***Basic Setting*** menu enters the screen for setting passwords as shown in the figure below Fig 4.3. There are two types of passwords including ***User Password*** and ***Engineering Password***. After setting, pressing ***OK*** can save the settings.

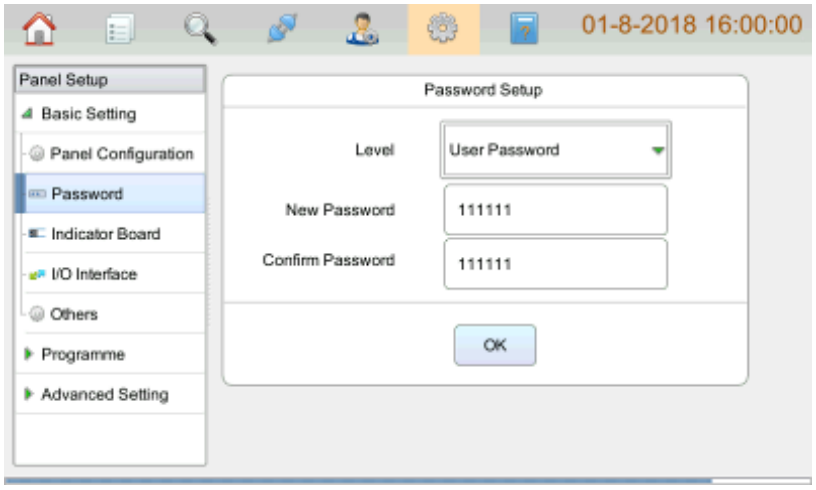


Fig 4.3

- Indicator Board: Clicking ***Indicator Board***, Indicator Info can be displayed on the right of the screen, including Defined Led Qty. and Defined LedKey Qty. Refer to Fig 4.4 for details.

  Clicking the message in Indicator Info can enter the screen to define Fascia Button/LED Definition as shown in Fig 4.5.

Fig 4.5

Clicking ***Undefined*** can define LEDs and buttons as shown in Fig 4.6.

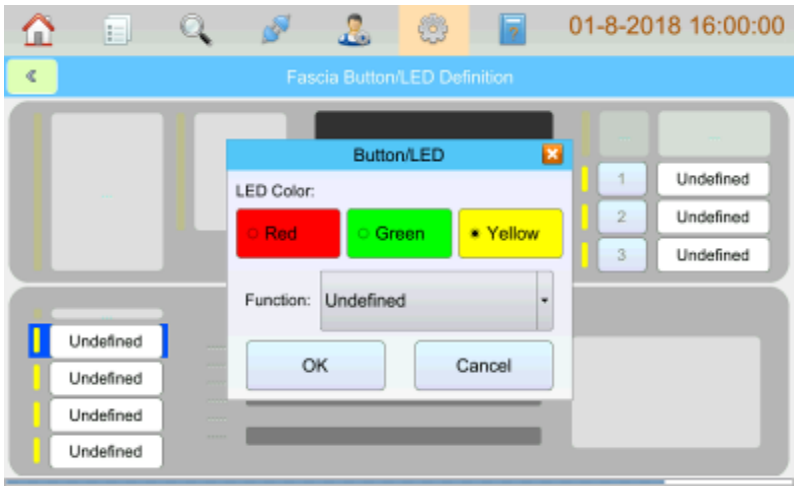


Fig 4.6

- I/O Interface: clicking ***I/O Interface*** in ***Basic Setting*** menu, all output interfaces are displayed on the right of the screen and users can edit each interface specifically. Refer to the following figure Fig 4.7.

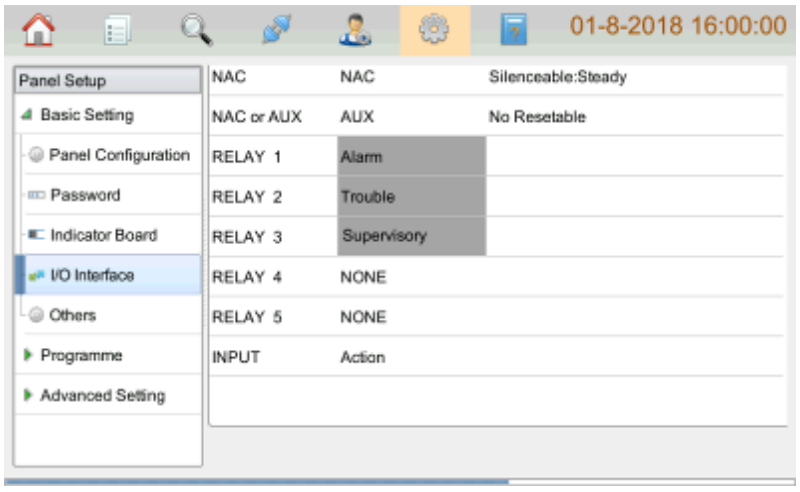


Fig 4.7

NAC: Clicking ***NAC*** enters the screen of setting NAC1. There are two programmable settings for NAC1：***Coding*** and ***Silenceable***. Refer to the following figure Fig 4.8.

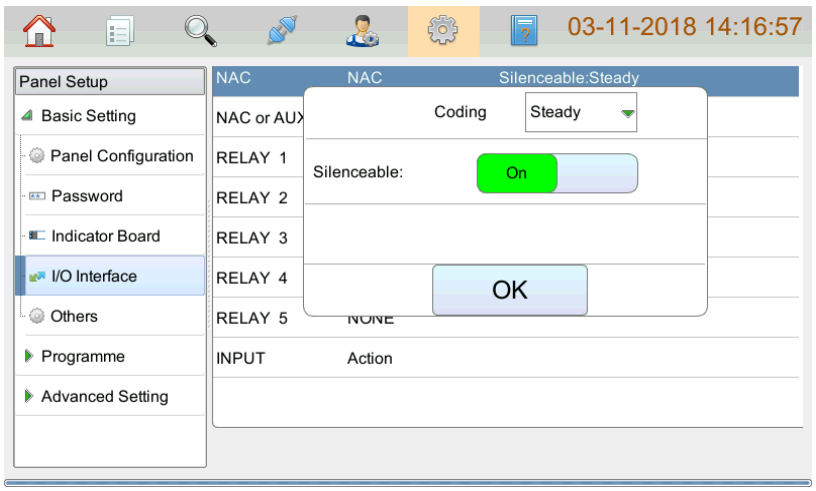


Fig 4.8

The ***Coding*** feature allows the user to select the type of output that NAC1 will generate when activated. Refer to the following figure Fig 4.9, four optional modes are available by selecting:

- **Steady**: a continuous output with no coding.
- **March Time**: 120 ppm (pulse-per-minute) output.
- **Synch**: a continuous output with synchronized pulse signal.
- **Temporal**: three-pulse temporal pattern per NFPA 72..

The ***Silenceable*** option defines whether NAC1 is silenceable or not.

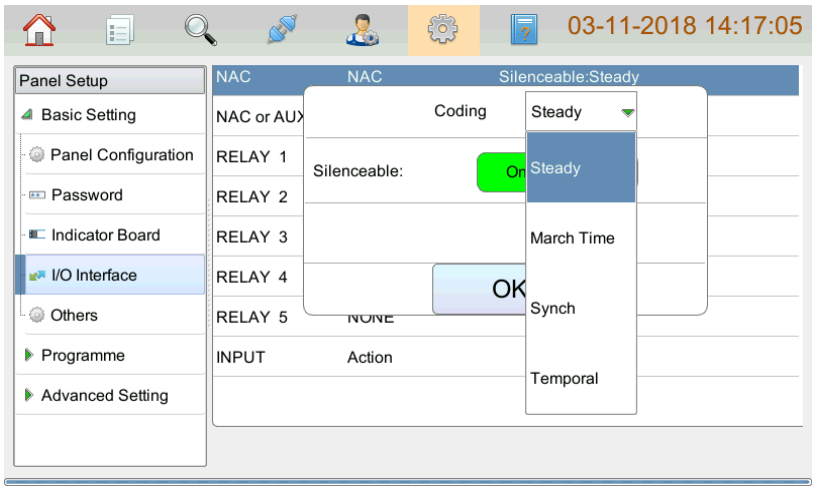


Fig 4.9

NAC or AUX: Clicking ***NAC or AUX*** enters setup screen for NAC2/AUX. This interface has “NAC”, “AUX” and “AUX SYNC” modes.

- When NAC mode is selected, NAC2/AUX is defined as NAC2 and it follows NAC1’s ***Coding*** and ***Silenceable*** settings.
- When AUX mode is selected, it provides Class B supervised auxiliary 24Vdc power output. The output can be defined as resettable or non-resettable by the

"Resettable" option as shown on Fig 4.10 below.

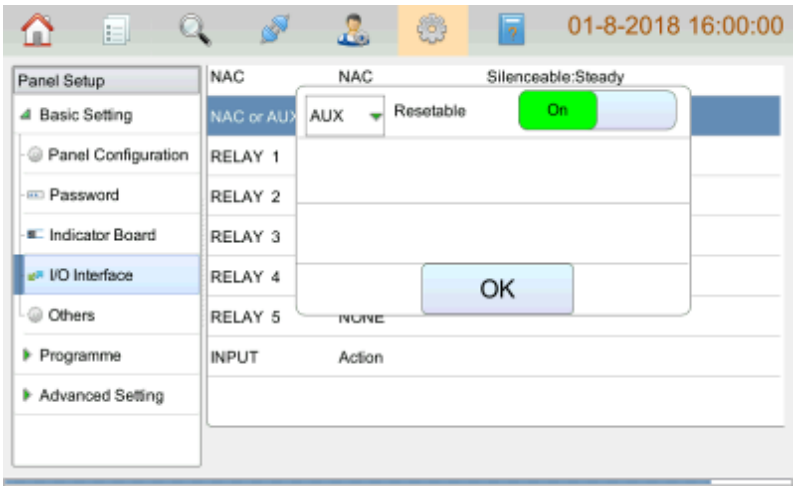


Fig 4.10

- AUX SYNC mode is to be used to provide a synchronized NAC power source for notification appliances controlled by DI-M9305 Single Riser Output Module. Refer to 2.5.4.3.

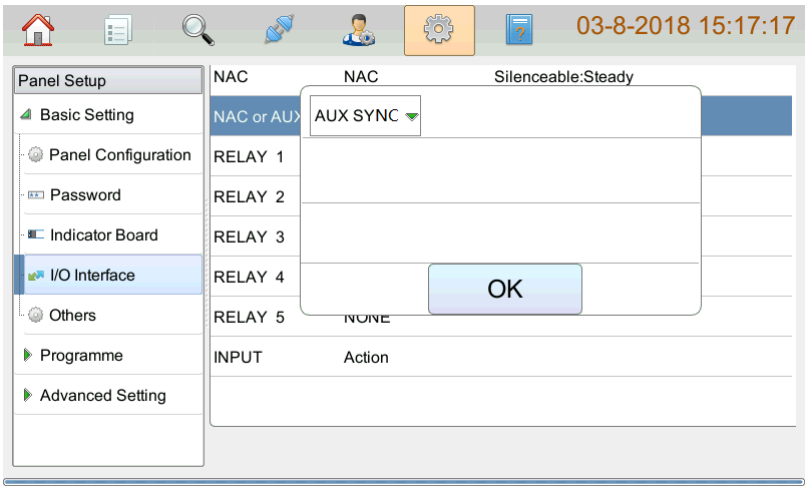


Fig4.11

RELAY: The FACP has 5 relays. Relay1 is fire alarm output, Relay2 is trouble output, Relay3 supervisory is trouble output. Relay4 and Relay5 are user-defined, and they can be set as ***Alarm***, ***Trouble*** , ***Supervisory***, ***AC Fault*** and ***Disable*** by requirement.

INPUT: The ***INPUT*** is analog input interface for non-emergency input.

➢ Others: Users can set dirty level and saving time based on the actual situation by clicking ***Others*** in ***Basic Setting*** menu as shown in Fig 4.12.

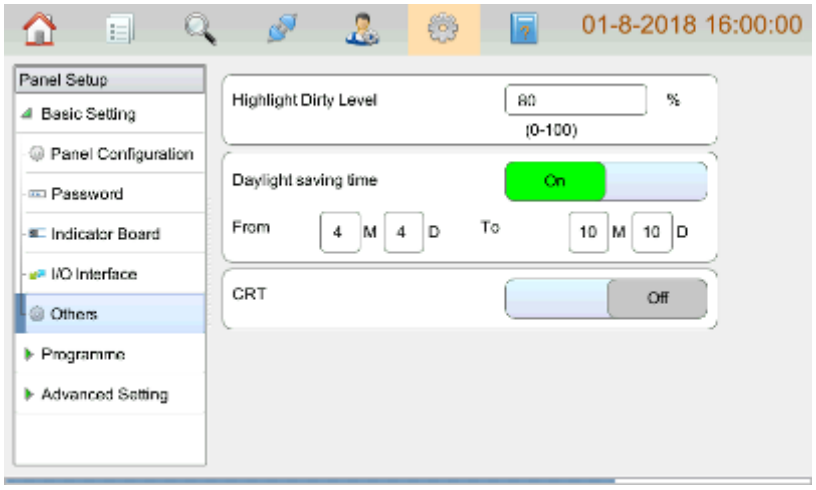


Fig 4.12

Sometimes users do not want detectors become too dirty to alarm. User can enter the screen for setting loop devices by following the path: Panel Setup->Programme->Loops. Clicking a certain loop, a list for the loop will be shown. Clicking Dirty button will check and show the devices dirty level. The devices which dirty level reach the Highlight Dirty Level will be highlighted as yellow. For example, Highlight Dirty Level is set 50% . In Fig 4.13, there is a device which dirty level is 70%.The device is highlighted as yellow.

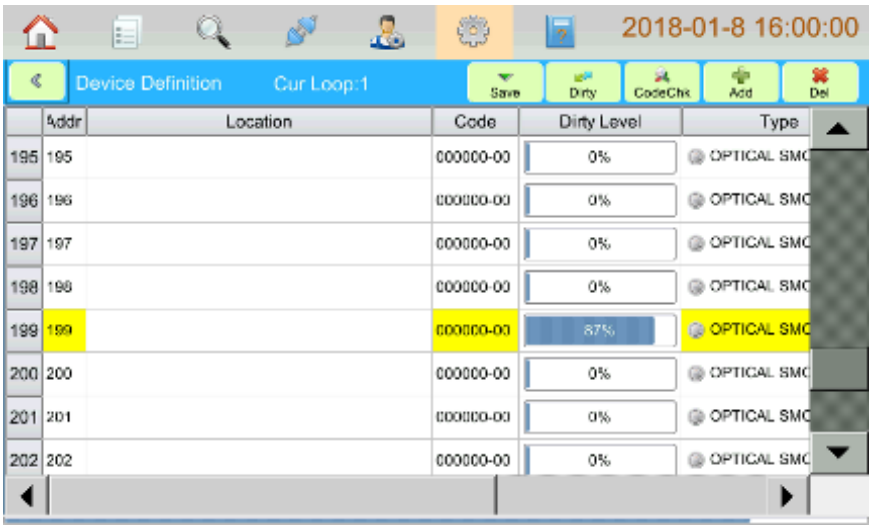


Fig 4.13

4.1.2 Program

In ***Panel Setup*** screen, clicking ***Program*** option enters the screen for setting program as shown in the figure below Fig 4.14.

- Zones: the zones screen shows all current defined zones. First column is zone number and the second is descriptions.

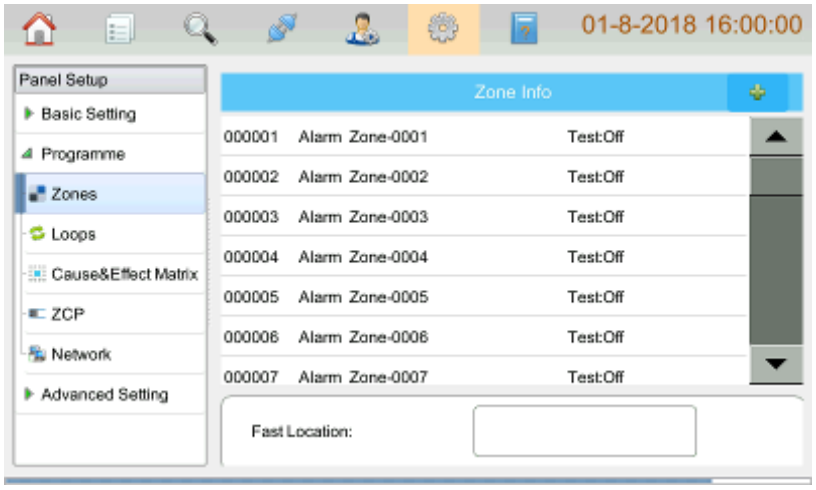


Fig 4.14

Fast Location: The related zone can be located by inputting a number.

Click the plus sign (**+**) to add a new zone, or double-click the existed zone to edit the selected zone. Modify the zone number and location and then click ***OK*** button. Refer to the figure below Fig 4.15.

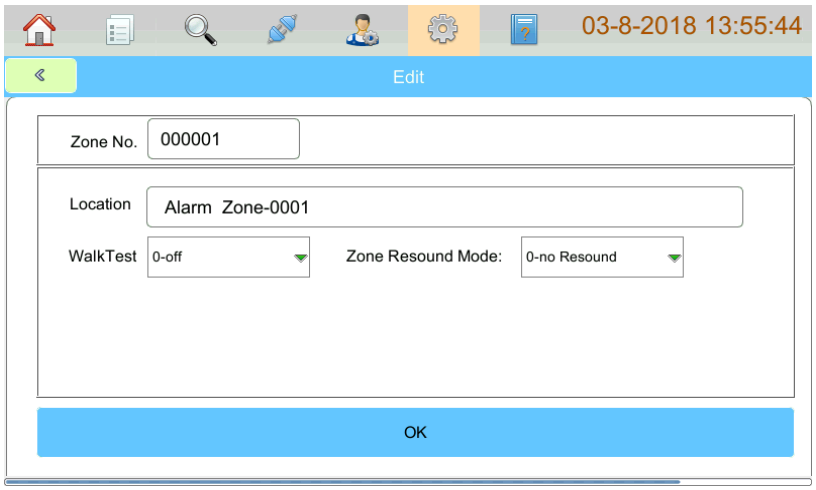


Fig 4.15

By default, a subsequent fire alarm from another zone will resound the silenced notification appliances in this zone. If user opts not to resound notification appliances upon a subsequent alarm from another zone, the ***Zone Resound Mode*** needs to be programmed as "***0-no Resound***" as shown in Fig4.16. See also 2.5.4.3.

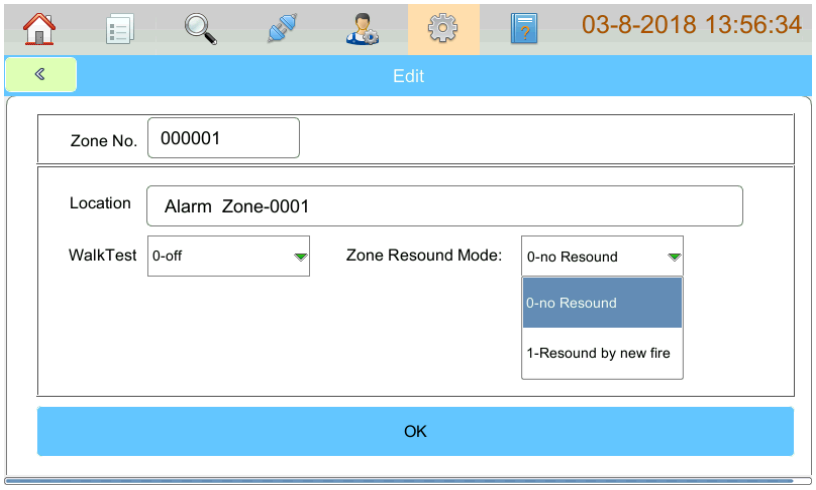


Fig 4.16

Adding the button in ZCP for individual “Silence” and “Resound” can control the Horn / Strobes in this zone independently.

- Loops: clicking ***Loops*** enters the screen for setting loop devices. The right screen shows all the loops of the FACP, quantity of devices of each loop, as shown in the figure below Fig 4.17.

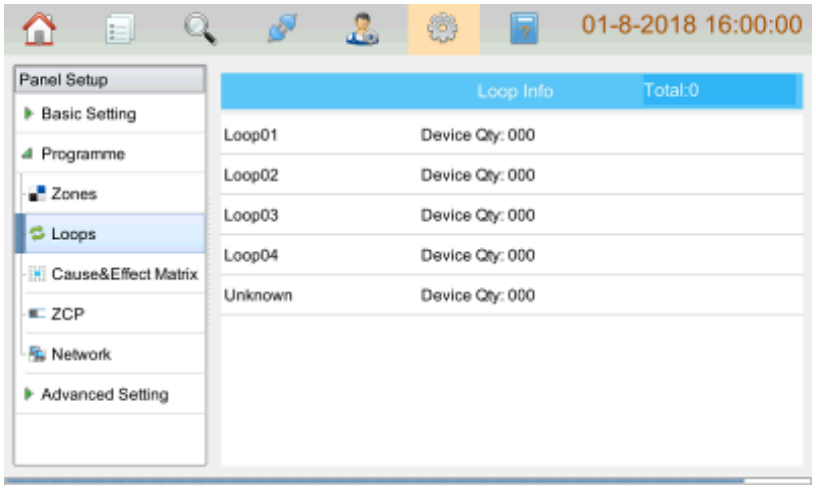


Fig 4.17

Clicking a certain loop, a list for the loop will be shown. In this screen, loop devices can be added, deleted and saved. Refer to the figure below Fig 4.18.

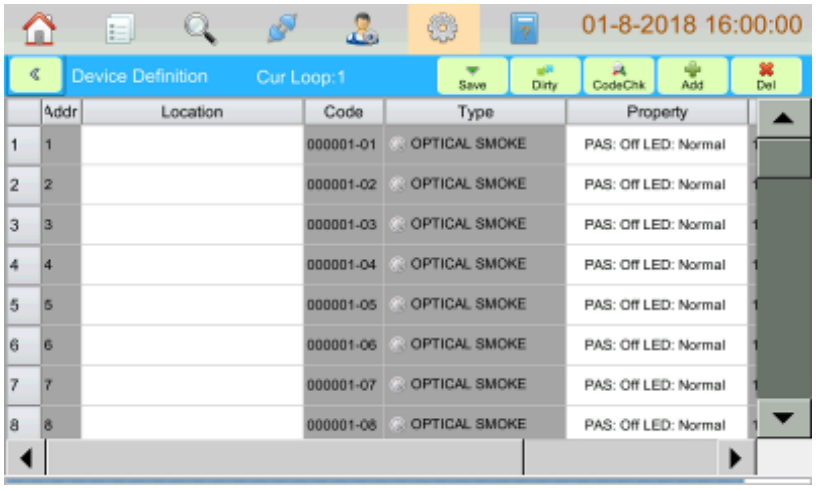


Fig 4.18

Add/Delete a Device: clicking ***Add*** or ***Del*** button on the right corner, devices can be added or deleted. Refer to the following figure Fig 4.19.

Fig 4.19

Clicking a device in device define screen pops up the screen for setting the device in details. Clicking **=>** or **<=** can skip to another device or the previous device respectively. Refer to the figure below Fig 4.20.

- ✧ **Panel**: address of the FACP
- ✧ **Loop**: loop number of the device
- ✧ **Address**: address code of the device
- ✧ **Reg State**: status of the device
- ✧ **Zone**: zone number of the device
- ✧ **Index**: device number of the device in the zone
- ✧ **Device Type**: device type
- ✧ **Location**: device descriptions
- ✧ **Class**: sensitivity information of the detector
- ✧ **LED Mode**: indicates polling state of the device
- ✧ **PAS**: enable or disable of PAS

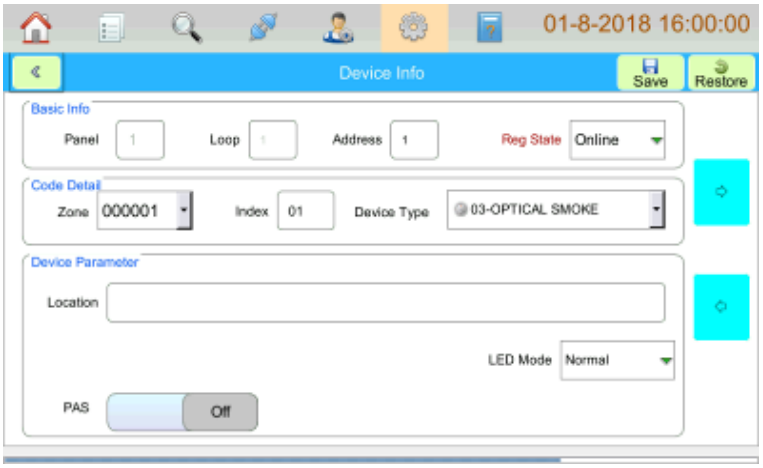


Fig4.20

Clicking ***Save*** button on the right corner, device definitions for the current loop can be downloaded to the loop board.

- ➢ Cause & Effect Matrix: clicking ***Cause&Effect Matrix*** in ***Programme*** menu enters the screen below Fig 4.21 including ***Alarm Equation***, ***Trouble Equation***, ***Action Equation*** and ***Mix Equation***.

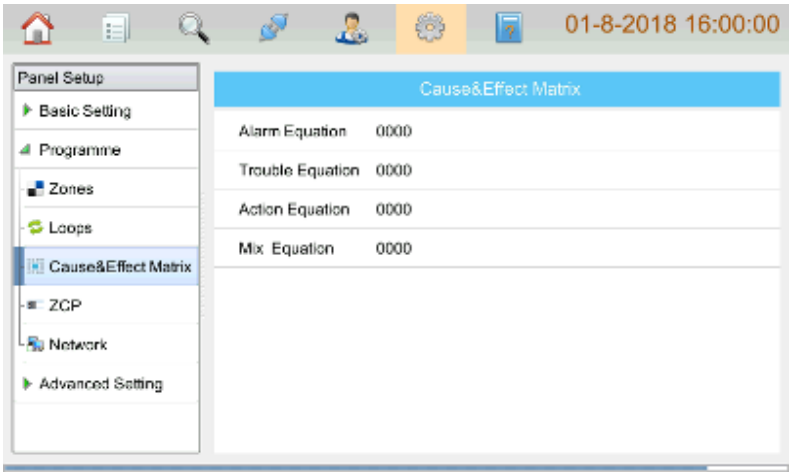


Fig 4.21

Clicking a cause and effect matrix of any kind, details of that kind of matrix can be shown as in Fig 4.22.

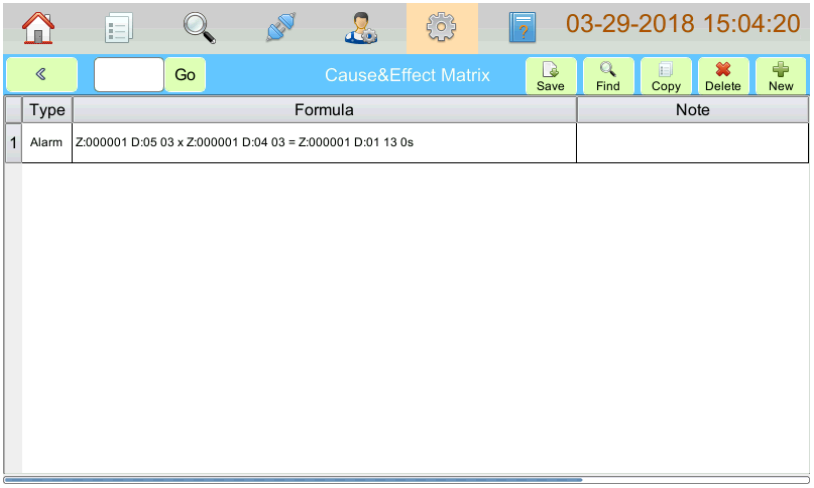


Fig 4.22

Clicking ***Find*** in Fig 4.22 can pop up a dialogue box as shown in Fig 4.23. As the conditions are changed as required, clicking ***OK*** can view those cause and effect matrixes meeting those conditions.

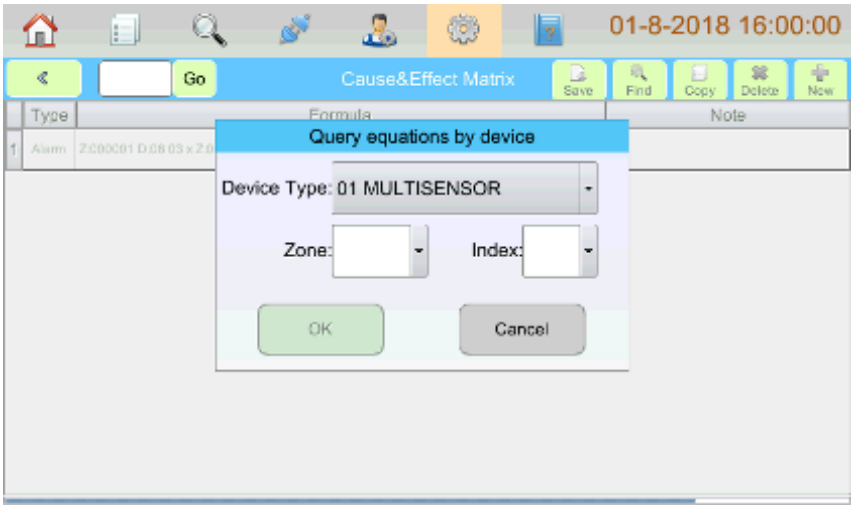


Fig 4.23

Clicking ***Copy*** in Fig 4.22 can pop up a dialogue box. As the parameters are changed, clicking ***OK*** can copy that selected cause and effect matrix or that with the same format.

Clicking ***Delete*** in Fig 4.22 can pop up a dialogue box for delete. Clicking ***OK*** can delete the selected matrix.

Clicking ***New*** in Fig 4.22 can enter the screen for creating a new cause and effect matrix as shown in Fig 4.24. Input device list is on the left and output device list on the right.

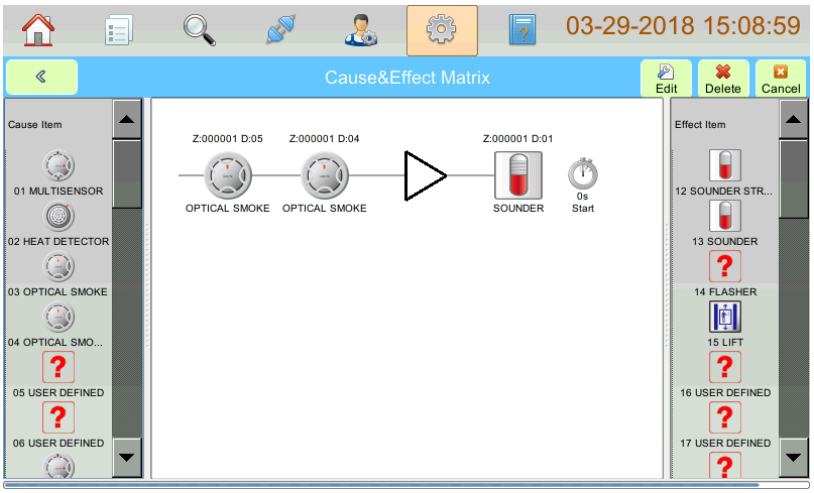


Fig 4.24

Clicking a device in the list, drag and release it in the editing area. A new matrix will be added by editing the parameters.

Selecting a device in editing area, its message can be changed by clicking ***Edit*** or double clicking on the device.

Selecting a device in editing area, it can be deleted by clicking ***Delete***.

Clicking ***Cancel*** can stop creating a new matrix and return to the previous screen.

When output devices enters the delayed start/stop state, click this output device as shown in in Fig4.25.

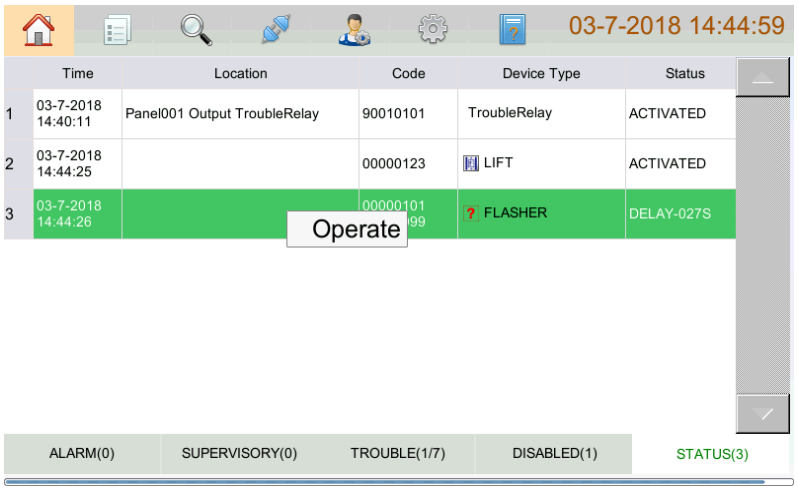


Fig4.25

The Operation as shown in Fig4.26, it can make the delayed devices start or stop immediately.

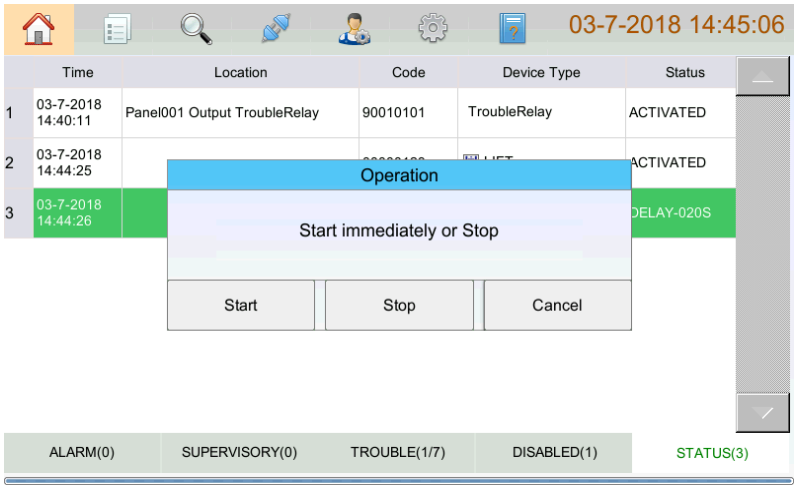


Fig4.26

- ZCP: clicking ***ZCP*** in ***Programme*** menu enters the screen for setting the zone display and control panels. Refer to the figure below Fig 4.27.

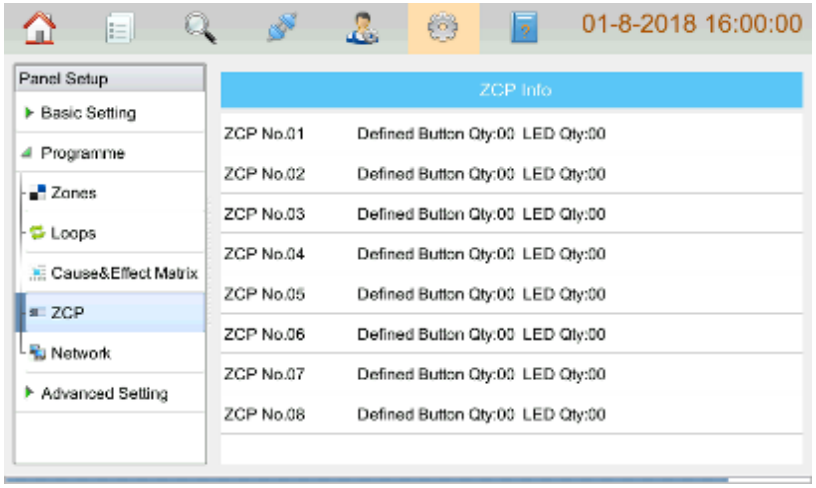


Fig 4.27

Click on a ZCP No enters the setting screen as shown in the figure below Fig 4.28. Every ZCP has 40 LEDs and 20 keys. Each LED had red, green and yellow colors for users to set.

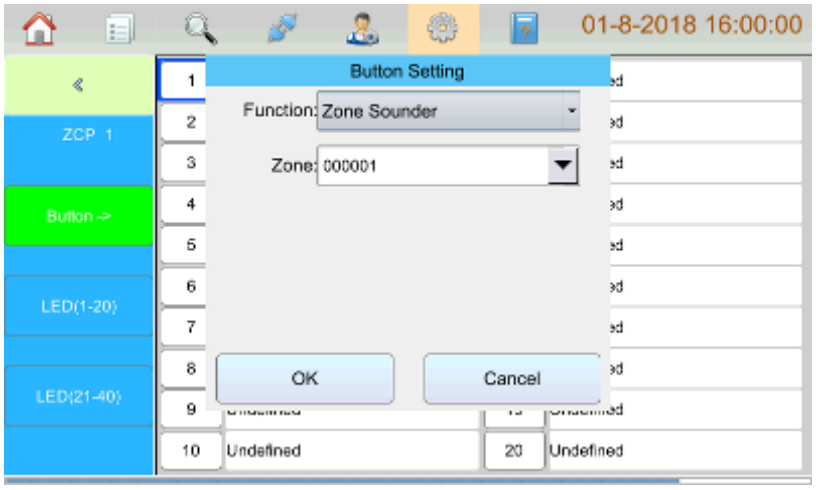


Fig 4.28

Individual NAC zone can be controlled by DI-M9305 modules (Device Type: 13) connected to SLC. Refer to the figure below Fig 4.29 for the setting method.

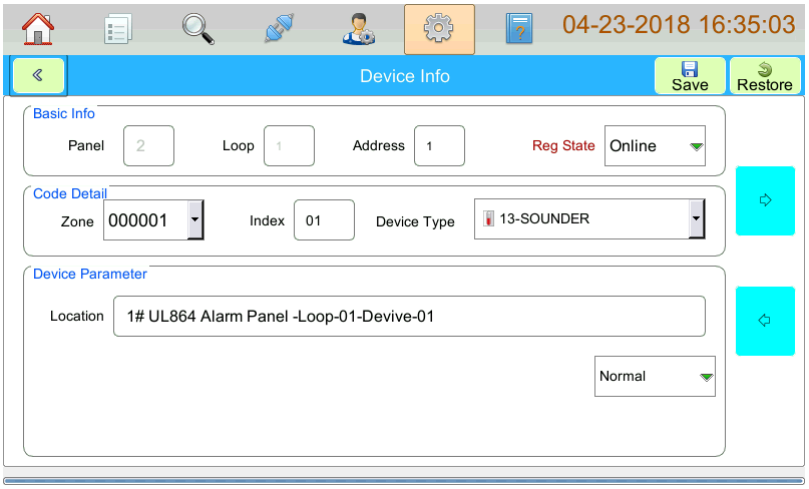


Fig 4.29

Then add the button in ZCP for individual “Silence” and “Resound” to control the DI-M9305 module individually. Refer to the figure below Fig 4.30.

Fig 4.30

Then, add the lamp of individual “Silence” and the lamp of individual “activation”. Refer to the figure below Fig 4.31.

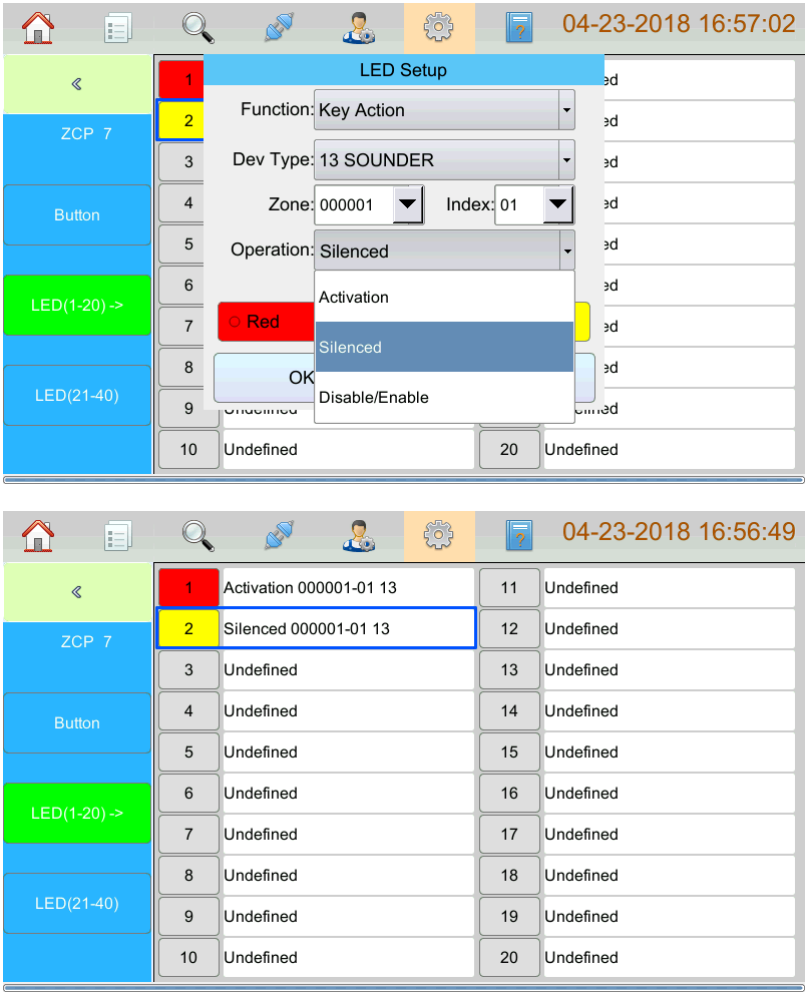


Fig 4.31

- Network: clicking ***Network*** in ***Programme*** menu enters the screen for checking the network topology of the whole system. Refer to the figure below Fig 4.32

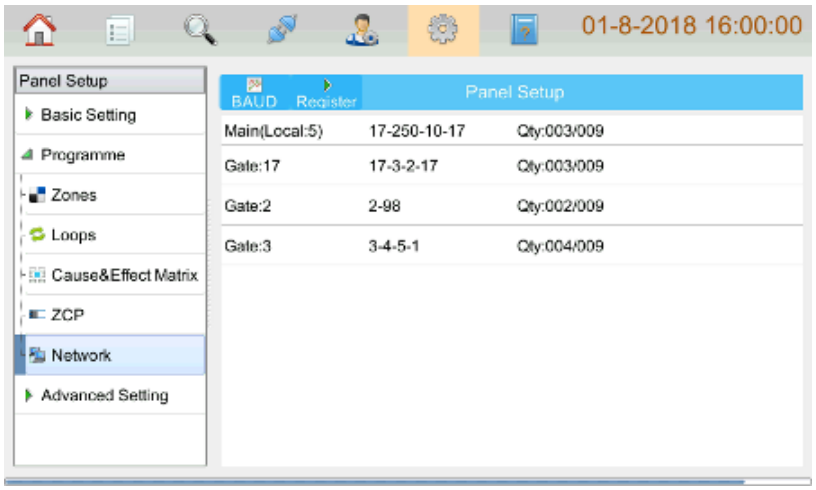


Fig 4.32

The detail information of whole network is displayed on this window, the main-net and

sub-nets are listed in line as shown in Fig 4.32.

For the first line: Main (Local: 5) 17-250-10-17 Qty:003/009

- ✧ Main (Local: 5): Main net, Local: 5 is the address of current panel.
- ✧ 17-250-10-17: No.17, No.250, No.10 panel are connected hand in hand and in a circle.
- ✧ Qty:003/009: main-net has 3 panels and the whole network has 9 panels.

For the second line: Gate:17 17-3-2-17 Qty:003/009

- ✧ Gate 17: Gateway panel, the panel address is 17.
- ✧ 17-3-2-17: No.17, No.3, No.2 panel are connected hand in hand and in a circle.
- ✧ Qty:003/009: Gate 17 has 3 panels and the whole net has 9 panels.

Clicking the BAUD button to set the baud rate of the whole net.

Clicking the Register button and wait 3 minutes to update the network topology of the whole system.

4.1.3 Advanced Setting

Clicking ***Advanced Setting*** in ***Panel Setup*** menu enters the screen for senior setting.

- ➢ Network Setup: clicking ***Network Setup*** in ***Advanced Setting*** menu pops up the screen for setting the network on the right. Users can set up based on actual situation. Refer to the figure below Fig 4.33.

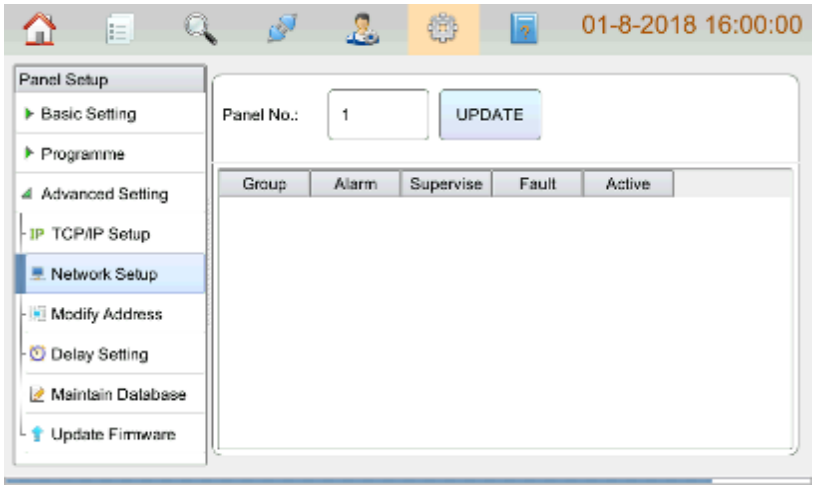


Fig 4.33

Panel No.: input the number of the FACP here.

- ➢ Modify Address: Users can modify a device address in a loop by clicking ***Modify Address*** in ***Advanced Setting*** menu as shown in Fig4.34. Please modify the device address based on the actual situation, pay attention not to make the new device address repeated with others.

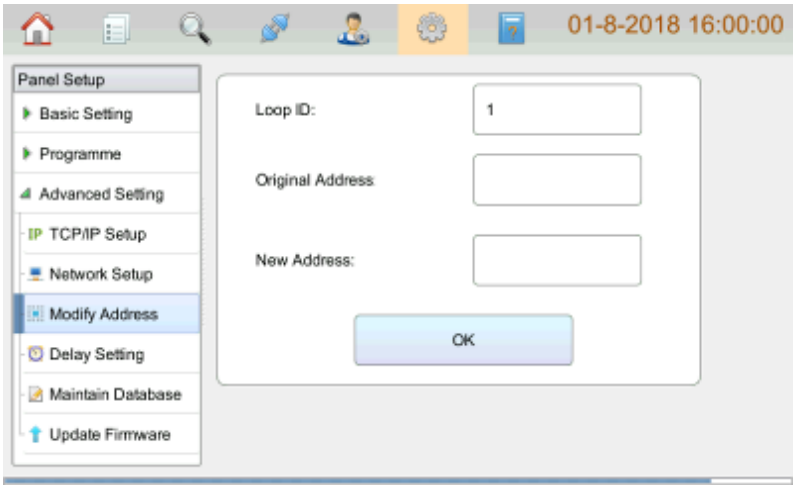


Fig 4.34

Loop ID: loop No.
Original Address: an existing device code.
New Address: a new device code.

- Delay Setting: Users can set delay based on the actual situation by clicking ***Delay Setting*** in ***Advanced Setting*** menu as shown in Fig 4.35. Delay for Silence, Mute and PAS can be set.

Note: **Silence Alarm Delay Timer** only applies to the "**SILENCE ALARM"** functional key (Refer to section 3.2) that is capable of deactivating all NACs simultaneously. It does NOT affect individual Zone Silence function of DI-M9305 controlled NAC zones.

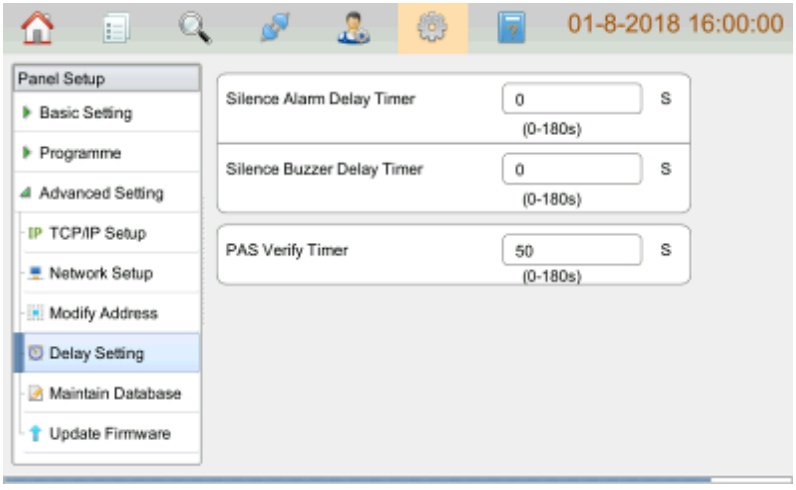


Fig 4.35

- Update Firmware: Clicking ***Update Firmware*** in ***Advanced Setting*** menu and entering the super password (obtained from the maintenance service supplier), users can update firmware as shown in Fig 4.36, then insert U-Key into the LCD drive board and click ***OK*** to update firmware.

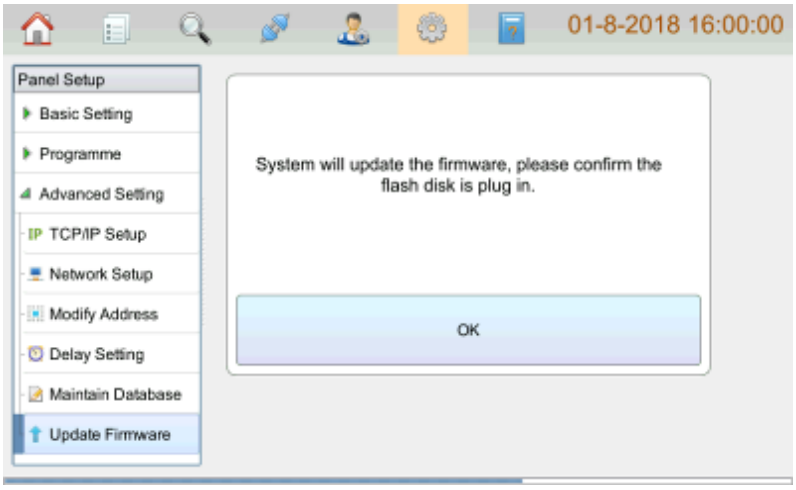


Fig4.36

4.2 Programming the FACP Through GST-IFPx-Def Defining Tool

Configurations and definitions can be downloaded to the FACP through USB or Ethernet interfaces after they are programmed by using GST-IFPx-Def (version 1.0 or above) Defining Tool.

4.2.1 Download thru USB interface

After programming the FACP using GST-IFPx-Def Defining Tool, save the configuration and definition to a USB stick, and then insert the USB stick into the USB port on the SD-400 LCD Drive Board of the FACP.

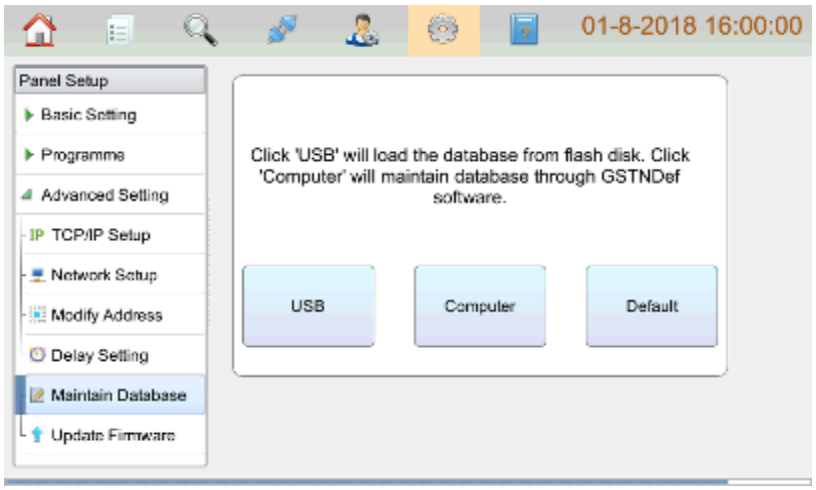


Fig 4.37

Clicking ***Maintain Database*** in ***Advanced Setting*** menu enters the screen as shown in Fig4.37. After clicking the ***USB,*** the FACP can automatically update according to data from U-disk.

4.2.2 Download thru Ethernet interface (the external computer connected must be located at the same room with the control panel)

After programming the FACP using GST-IFPx-Def Defining Tool, connect Ethernet port of the programming computer to the Ethernet interface on FACP's SD-400 LCD Driver Board through a switch, a router or a cross-over Ethernet cable. In ***Advanced Setting*** menu, select ***TCP/IP Setup*** as shown in the figure below Fig 4.38. On the programming window to the right, key in IP Address, Subnet Mask and Gateway address. Note that FACP's IP address shall be in the same subnet as the programming computer.

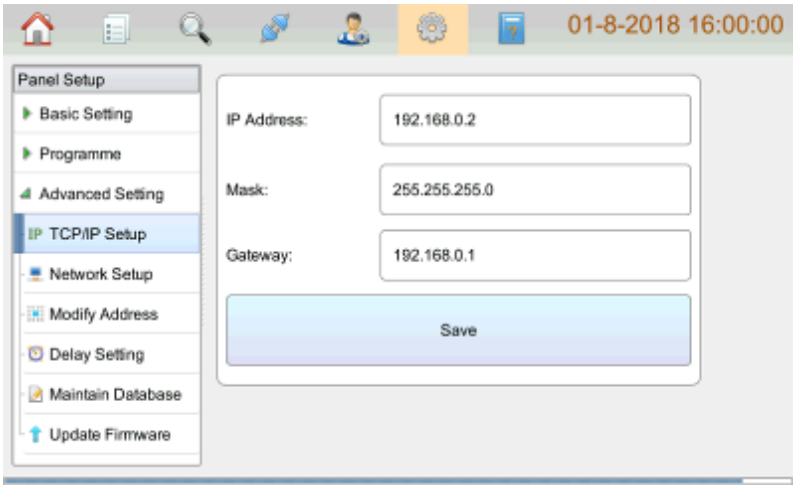


Fig 4.38

The screen as shown in Fig4.39. At this time, the configurations and definitions can be downloaded to the FACP accordingly.

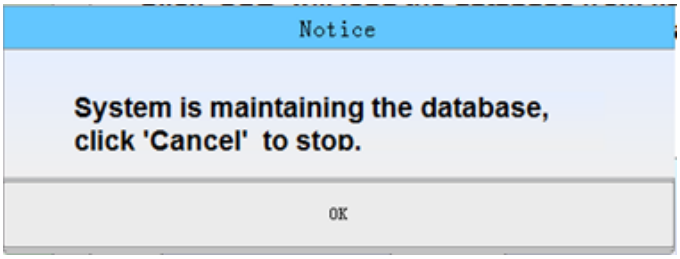


Fig 4.39

Canceled during upload/download, communication between the programming computer and FACP will be terminated.

4.2.3 Dongle

In some projects, data protection is required. In unauthorized way, configuration in the control panel, uplodading and downloading can't be modified. So, the control panel is added with a function that can be locked or unlocked through GST-IFPx-Def Defining Tool. USB Dongle is purchased from us to protect data not modifing by random.

4.2.4 Remote access to read panel status

After connecting computer to the panel via Erthernet port, authorized service engineer can remote access panels to diagnose troubles. Engineer should use Graphic Monitor

Center software on the computer and get authorization by using USB dongle. After authorization, he can read history records, status of panels and bus devices to find and solve the problems.

4.2.5 Bacnet (the external device connected must be located at the same room with the control panel)

Bacnet being disabled by default can be enabled by setting on the control panel. Integrated net port can communicate with the third party (such as BMS) through Bacnet protocol.

Follow the following to enable Bacnet. First click *Panel Configuration*.

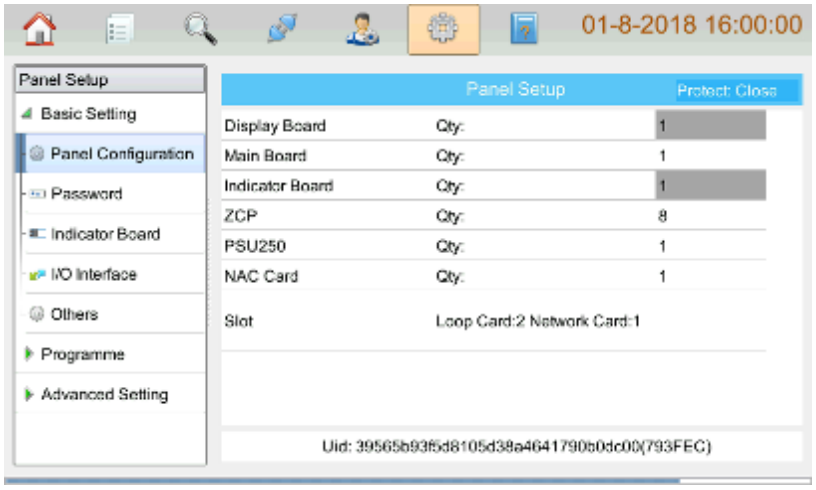


Fig 4.40

In Fig 4.40, Uid: 39565b93f5d8105d38a4641790b0dc00(793FEC) is shown on the bottom. Clicking it pops up the screen as shown in Fig. 4.41.

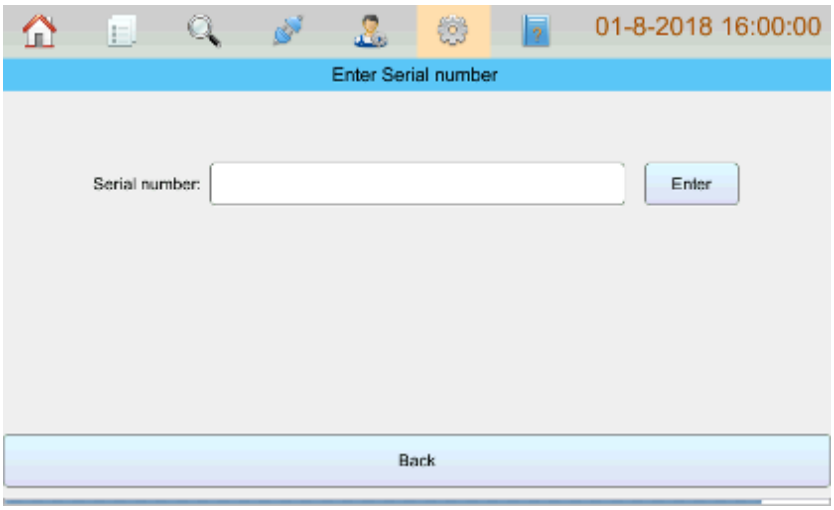


Fig 4.41

Inputting serial number (authorized code) can enable bacnet. Pressing Enter can have the tip of “Valid Serial Number BACnet Protocol Enabled” if the serial number is correct.

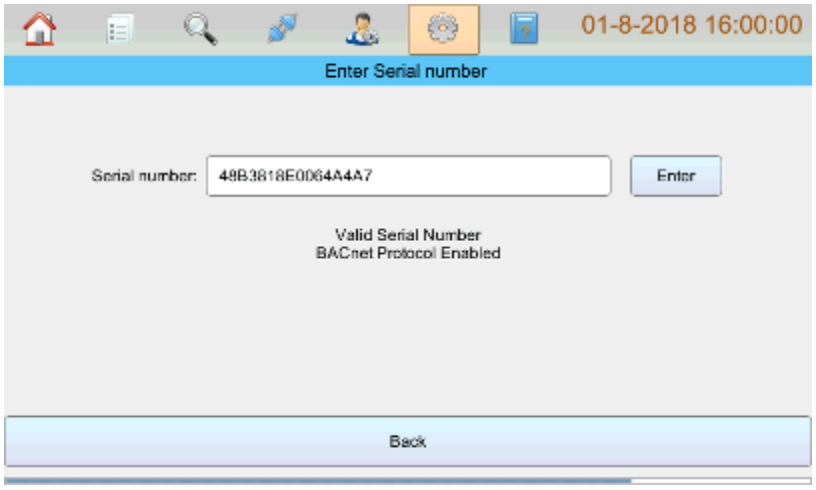


Fig 4.42

Pressing ”Back” can return and get BACnet added.

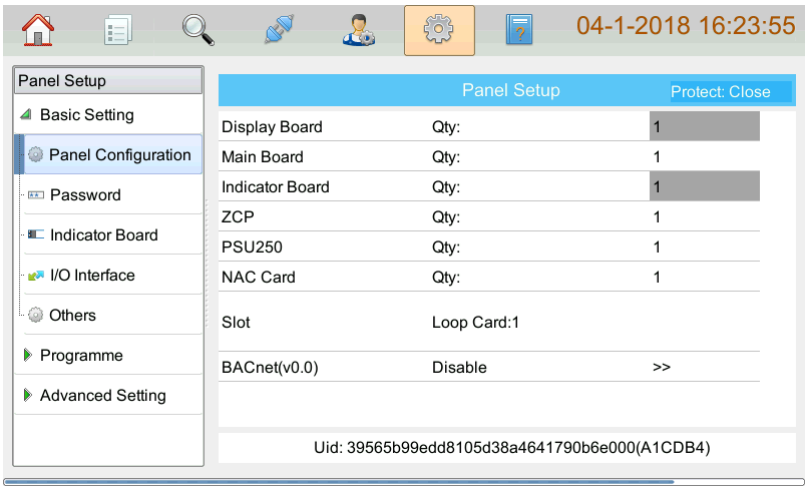


Fig 4.43

Clicking ”BACnet” enters the screen for setup.

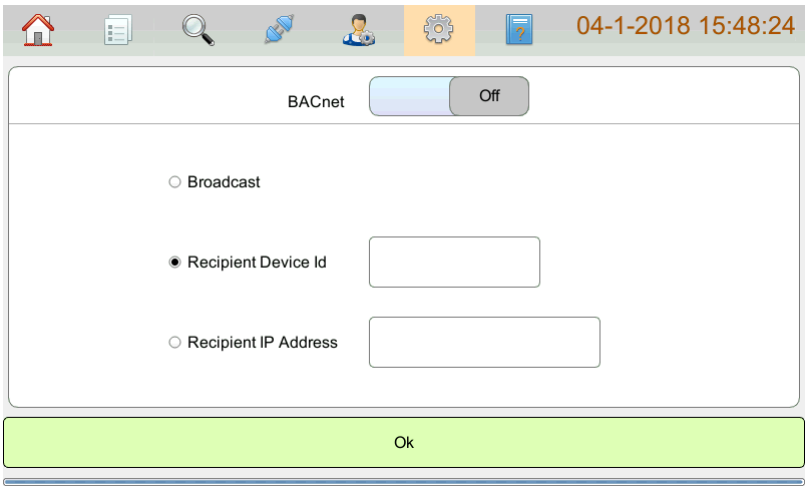


Fig 4.44

BACnet: Enable (on) Bacnet or not.

Recipient Device Id: ID of receiving devices.

Recipient IP Address: IP of receiving devices. (set one of ID or IP)

Broadcast: Broadcast or not.

Save: Save or not.

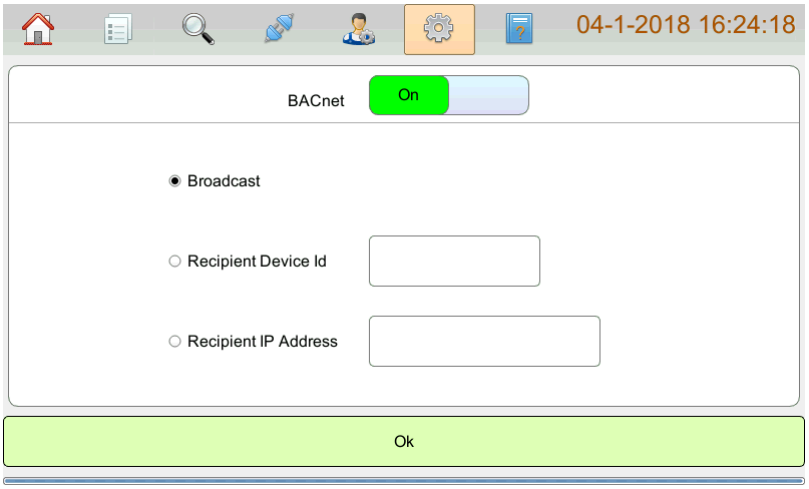


Fig 4.45

4.2.6 CPU Backup

The control panel configures 1 CPU of MP-401 in default and users can add another CPU of MP-401 for backup. Backup CPU can take over to make sure the control panel is operating normally if the main CPU is at fault, indicating main CPU fault.

Pressing enters the screen below to set 2 of Main Board. After that, two CPU cards function is available.

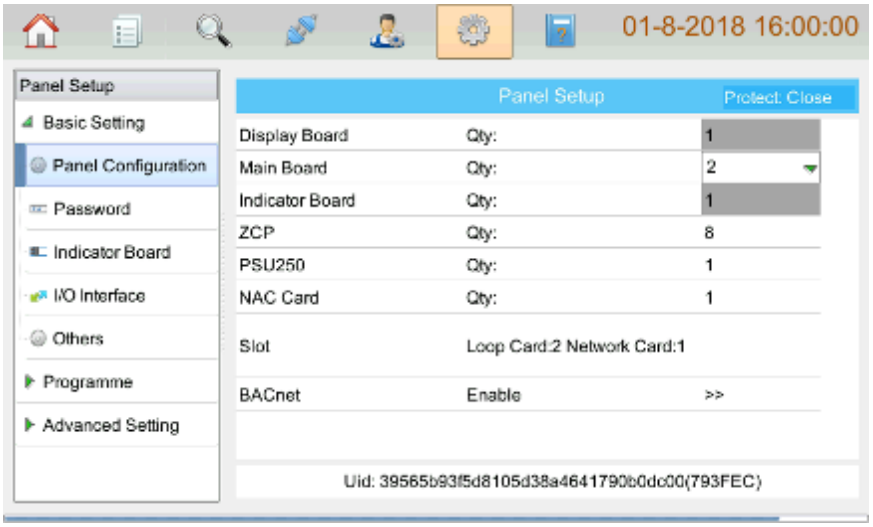


Fig 4.46

4.3 User Setup

Clicking button enters ***User Setup*** menu by inputting user password. Messages about soft keyboard, display, PAS, clock, printer, day/night mode, language, project name, and so can be set in this screen. Refer to the figure below Fig 4.47.

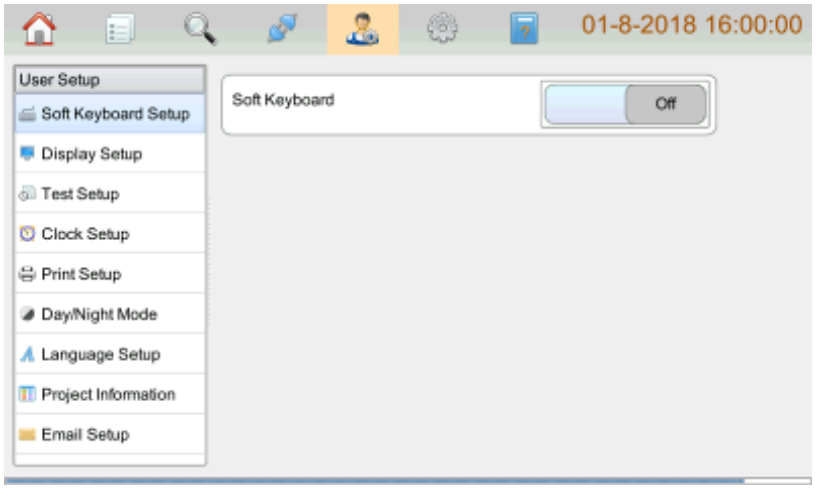


Fig 4.47

4.3.1 Soft keyboard Setup

Clicking Soft keyboard Setup can set ***On*** or ***Off*** the soft keyboard through this option, refer to the figure above Fig 4.46.

4.3.2 Display Setup

Clicking ***Display Setup*** in ***User Setup*** menu enters the screen for setting font size, LCD backlight time and so on. Refer to the figure below Fig 4.48.

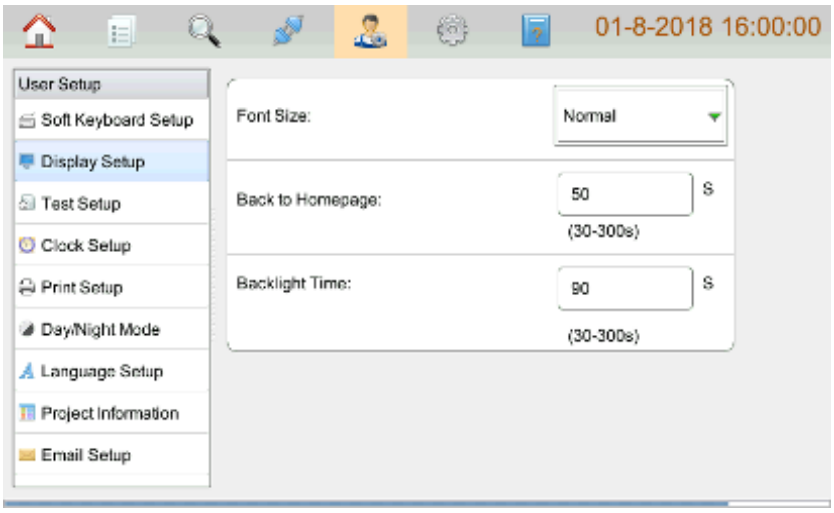


Fig 4.48

4.3.3 Test Setup

In Test Setup Menu , there are three items as shown in Fig 4.49.

Activate NAC in Test Mode: UL listed notification appliances are connected to the NACs.

User can set the activate time of notification appliances in test mode by the option.

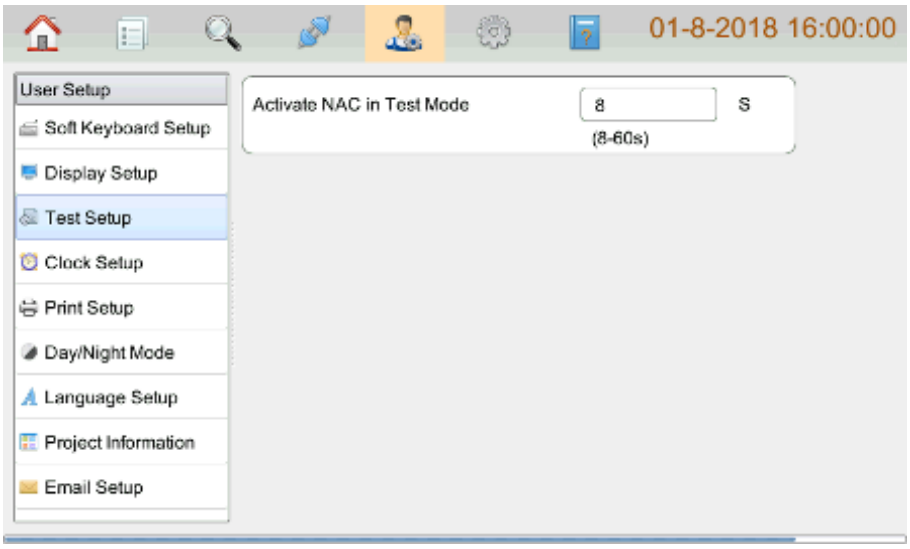


Fig4.49

4.3.4 Clock Setup

In user setup screen, users can set Data Format and Modify System Clock as required by clicking ***Clock Setup*** in ***User Setup*** menu. Refer to the figure below Fig 4.50.

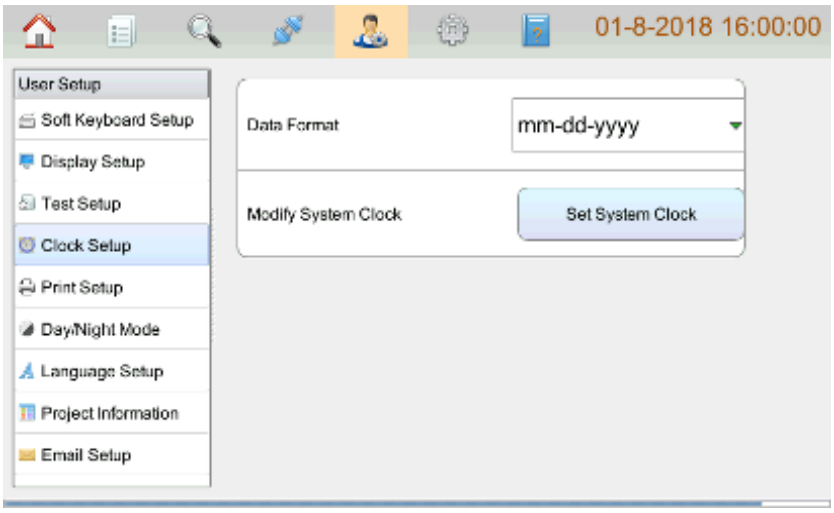


Fig 4.50

Clicking ***Set System Clock*** button behind ***Modify System Clock*** can modify the system time as shown in the figure below Fig 4.51.

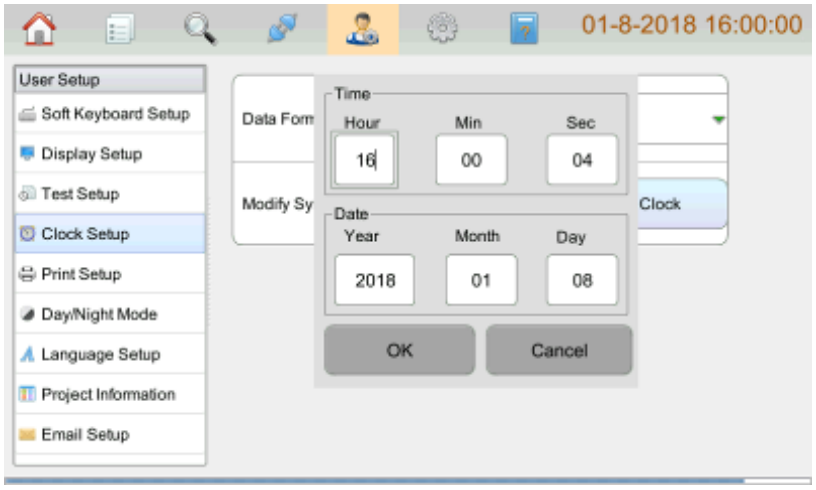


Fig 4.51

4.3.5 Print Setup

Clicking ***Print Setup*** in ***User Setup*** menu enters the screen for setting the printer. Real-time print and printing types can be set. Refer to the figure below Fig 4.52.

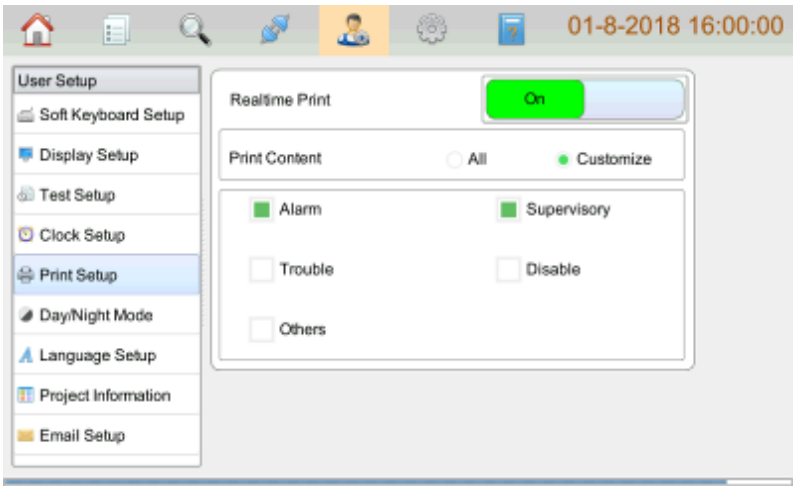


Fig 4.52

4.3.6 Day/Night Mode

Clicking ***Day/Night Mode*** in ***User Setup*** menu, Day/Night mode can be set. Refer to the following figure Fig 4.53.

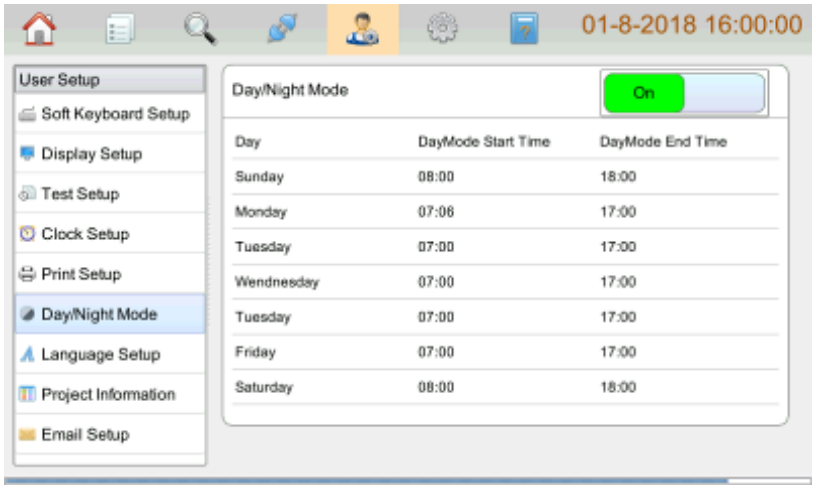


Fig 4.53

In this mode, starting and ending time for the day can be set. Refer to the following figure Fig 4.54.

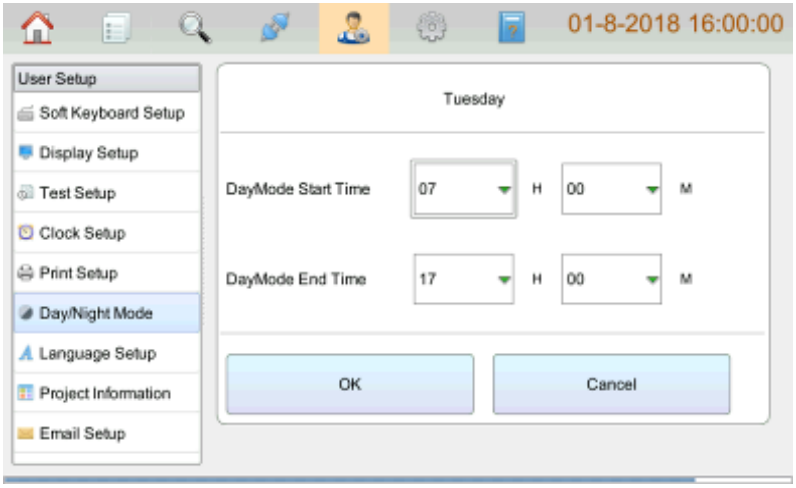


Fig 4.54

4.3.7 Language Setup

Clicking ***Language Setup*** in ***User Setup*** menu enters the screen for setting the language. Refer to the figure below Fig 4.55.

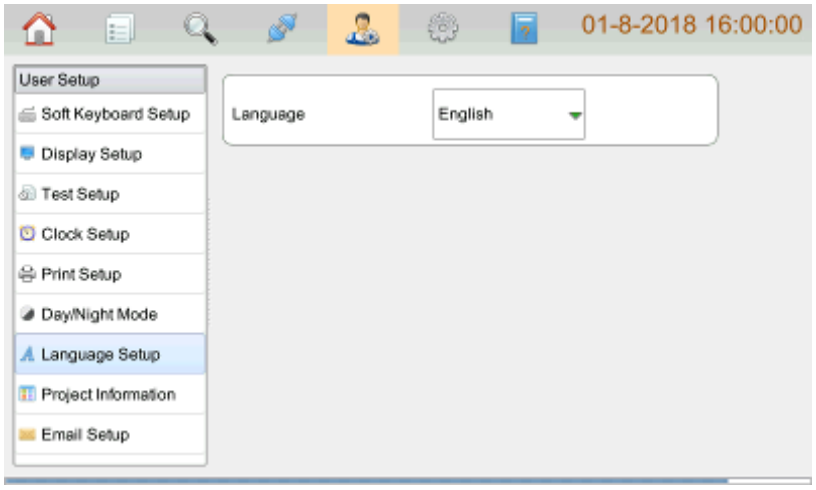


Fig 4.55

4.3.8 Project Information

Clicking ***Project Information*** in ***User Setup*** menu enters the screen for setting the project information. Refer to the figure below Fig 4.56.

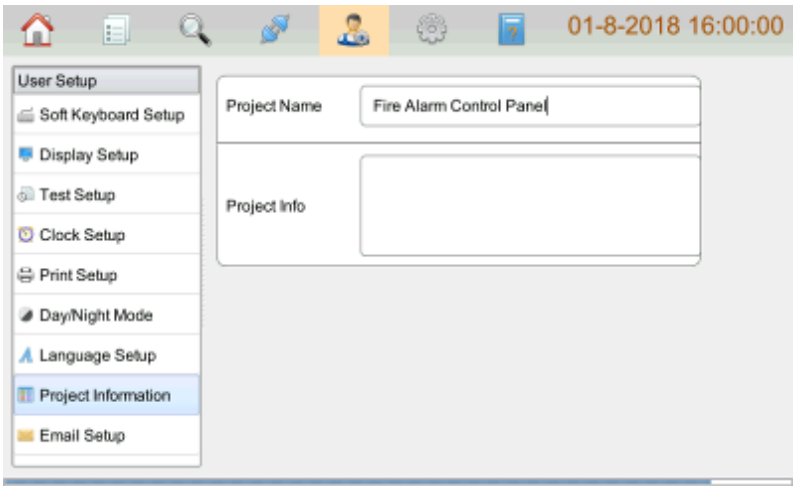


Fig 4.56

5 Equipment operation and information browsing

5.1 Equipment operation

Clicking button on the left corner enters the menu for operating device including ***Reset***, ***Mute***, ***Silence***, ***Self Check***, ***Start***, ***Stop***, ***Disable*** and ***Enable***. Refer to the following figure Fig 5.1.

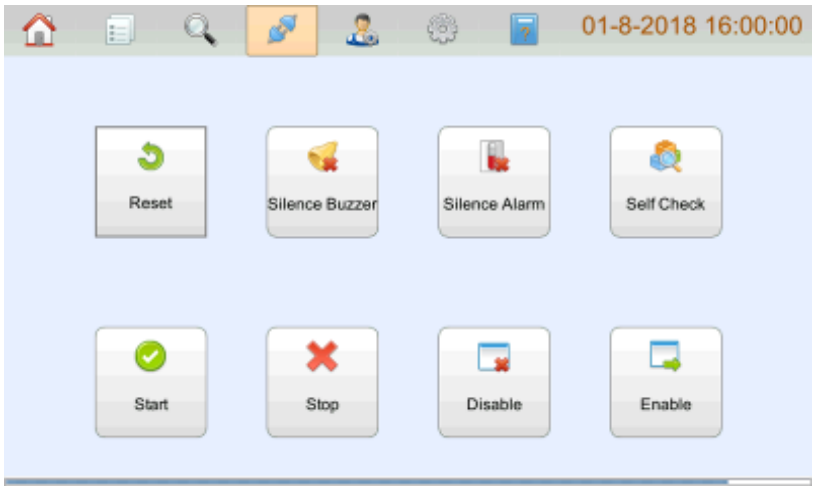


Fig 5.1

- **Reset**: clicking this button resets the FACP.
- **Mute**: clicking this button silences the buzzer sound of the FACP.
- **Silence**: clicking this button silences the sounds from notification appliances.
- **Self Check**: clicking this button checks LCD and LEDs automatically.
- **Start**: clicking this button enters the screen for starting devices as shown below Fig 5.2.

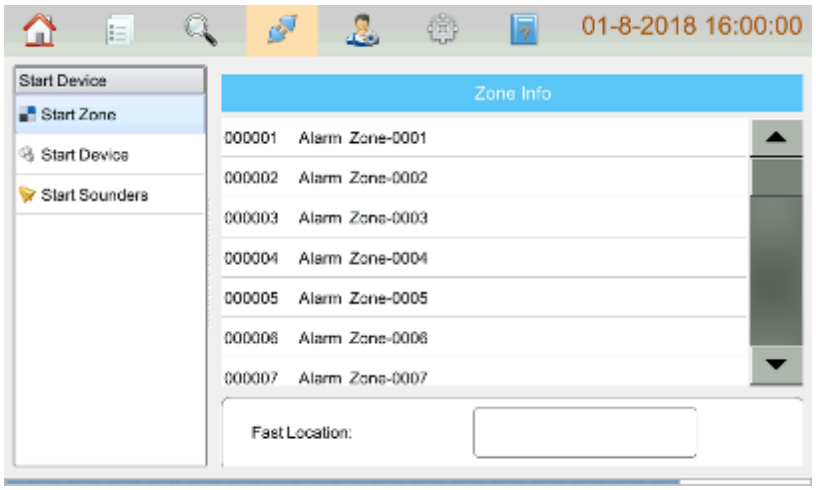


Fig 5.2

Start Zone: starting devices by zone. Clicking a designated zone enters the screen shown

in Fig5.3. Choosing device type and then clicking ***OK*** can confirm to start these devices in this zone.

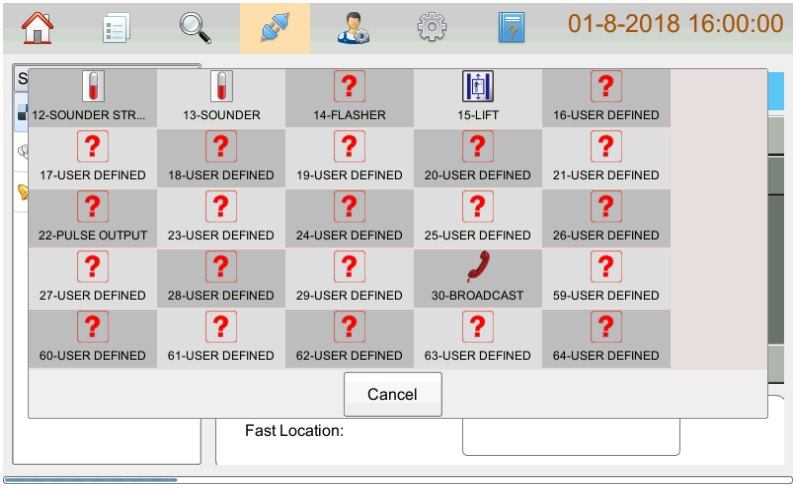


Fig 5.3

Start Device: starting a designated device. Clicking ***Start Device*** enters the screen shown below Fig 5.4. Input zone number, zone code and device type, then click START button to start the device. User can also click List button to browse all the devices which meet the input conditions.

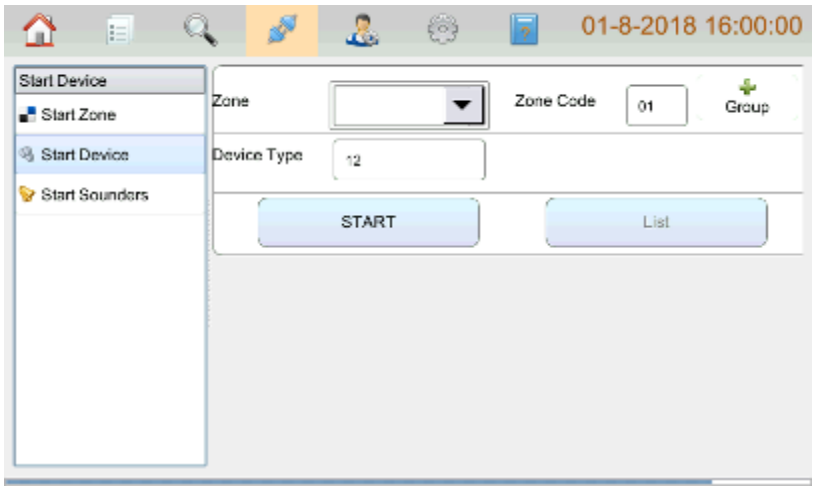


Fig 5.4

Clicking button, choosing start zone, zone code and stop zone, zone code and device type, then clicking ***START*** can start a range of the devices. Refer to the following figure Fig 5.5.

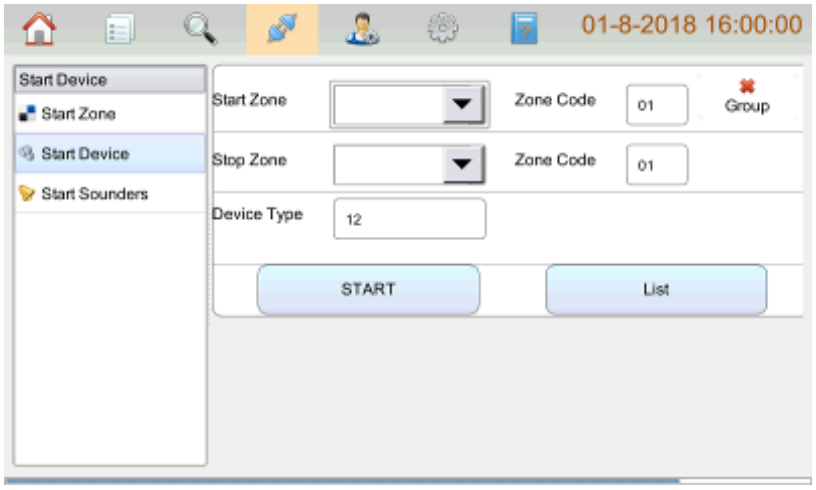


Fig 5.5

Start Sounder: Clicking ***Start Sounder*** enters the screen for starting sounders. Choosing a designated zone and then clicking ***OK*** can confirm to start all sounders in the zone. Refer to the figure below Fig 5.6.

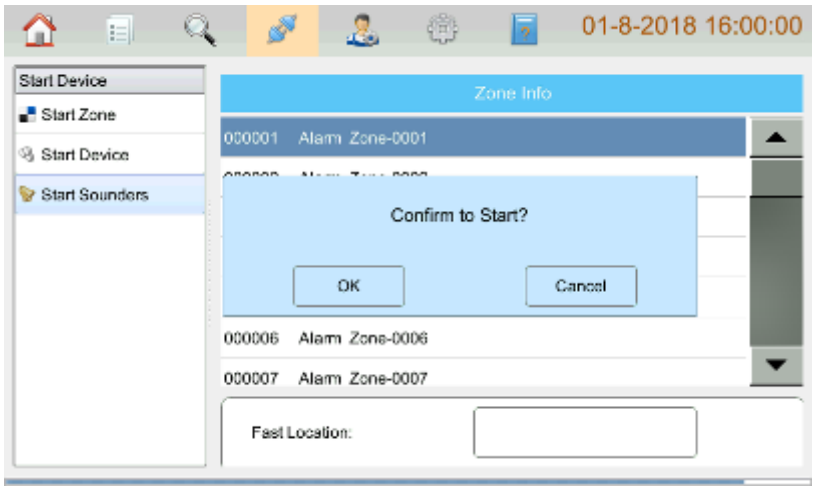


Fig 5.6

- **Stop**: clicking ***Stop*** button enters the screen for stopping the device screen. Stopping operations also include options such as ***Stop Zone***, ***Stop Device*** and ***Stop Sounder***. Its operation is the same as the starting. No more descriptions.
- **Disable**: clicking ***Disable*** button enters the screen for disabling the device screen. Disabling operations include options such as ***Disable Zone***, ***Disable Device*** and ***Disable NAC***. Its operation is the same as the starting. No more descriptions.
- **Enable**: clicking ***Enable*** button enters the screen for enabling the device screen. Enabling operations include options such as ***Enable Zone***, ***Enable Device*** and ***Enable NAC***. Its operation is the same as the starting. No more descriptions.

5.2 Devices information Browsing

Clicking button on the left corner enters the menu for browsing devices as shown in

the figure below Fig5.7.

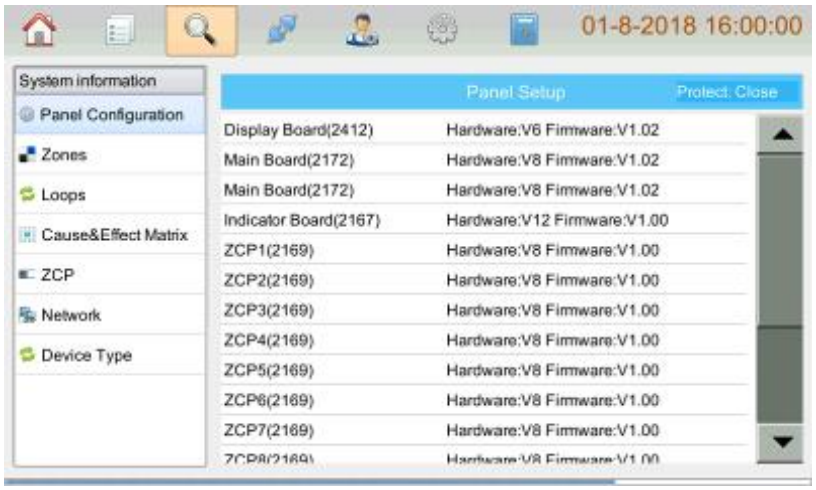


Fig 5.7

- **Panel Configuration**: clicking ***Panel Configuration*** can browse the hardware versions and firmware versions of all boards.
- **Zones**: clicking ***Zones*** can browse all loop devices by zone. Device browsing screen is the same as the editing screen, but the function is different. Device browsing screen is only for viewing devices without editing them.
- **Loops**: clicking ***Loops*** can browse all loop devices by loop. Clicking any loop can browse device list of this loop.
- **Device Type**: clicking ***Device Type*** can browse all loop devices by type. Clicking any device type can browse device list of this type.
- **Cause&Effect Matrix**: clicking ***Cause&Effect Matrix*** can browse all cause & effect matrixes. Clicking any type can browse the detailed matrix.
- **ZCP**: clicking ***ZCP*** can browse all zone panels. Clicking one zone panel can browse specific description for keys and LEDs.
- Net View: Browsing device information from other networked control panels. Other Information Browsing

  Clicking enters the screen below.

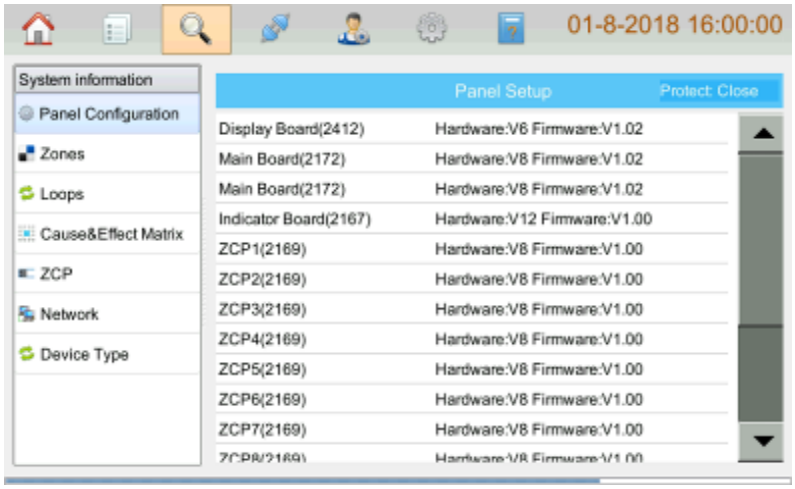


Fig 5.7.1

Clicking *Net View* enters the screen below for browsing network control panels.

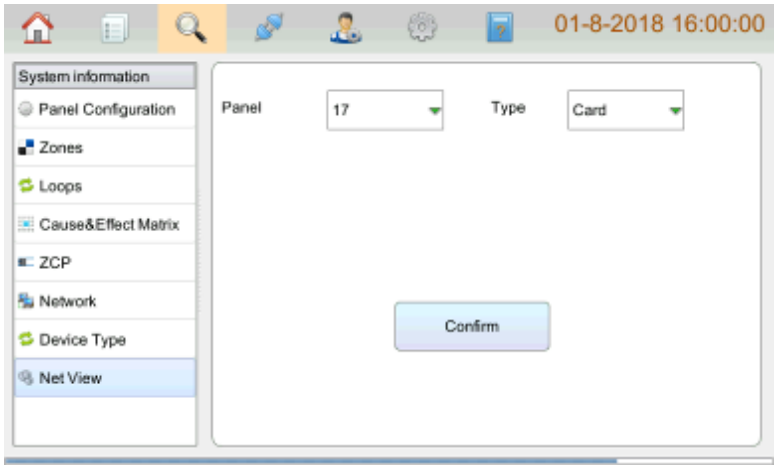


Fig 5.7.2

Panel: Filling in panel number to be browsed.

Type: Filling in information type including Card, Loop, ZCP, and Formula.

Clicking Confirm begins browsing the information of card type.

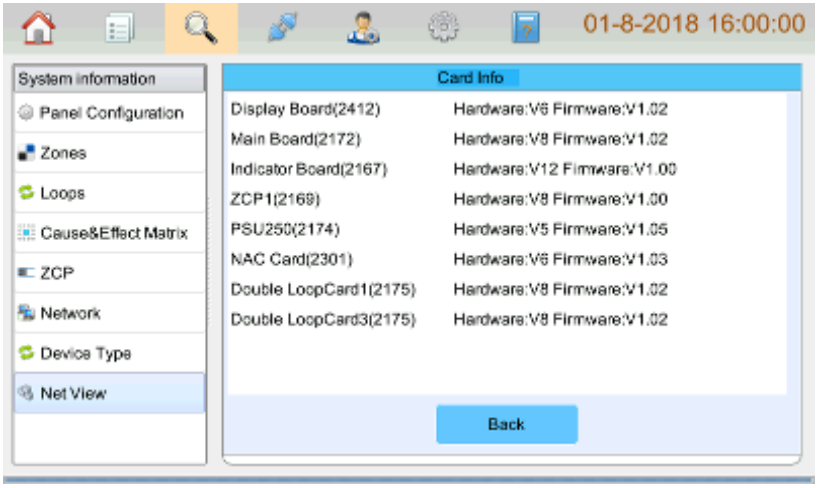


Fig 5.7.3

In Fig. 5.7.4 shows the information of Loop type is browsed.

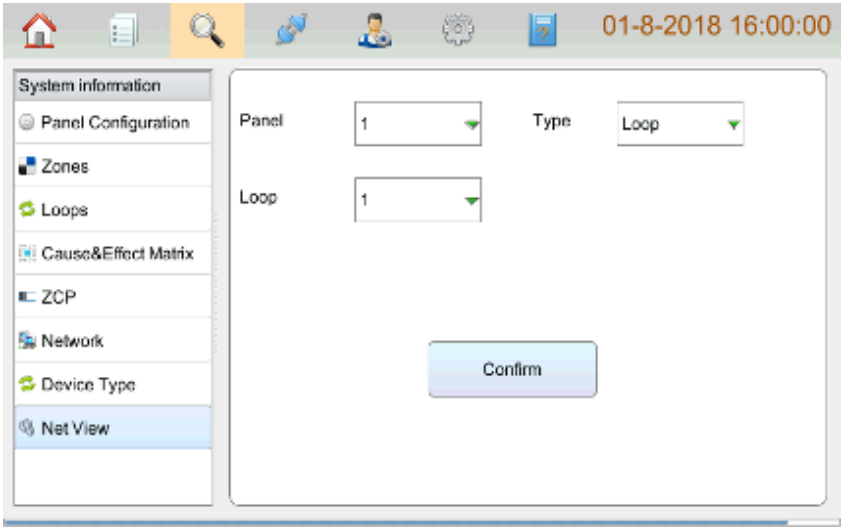
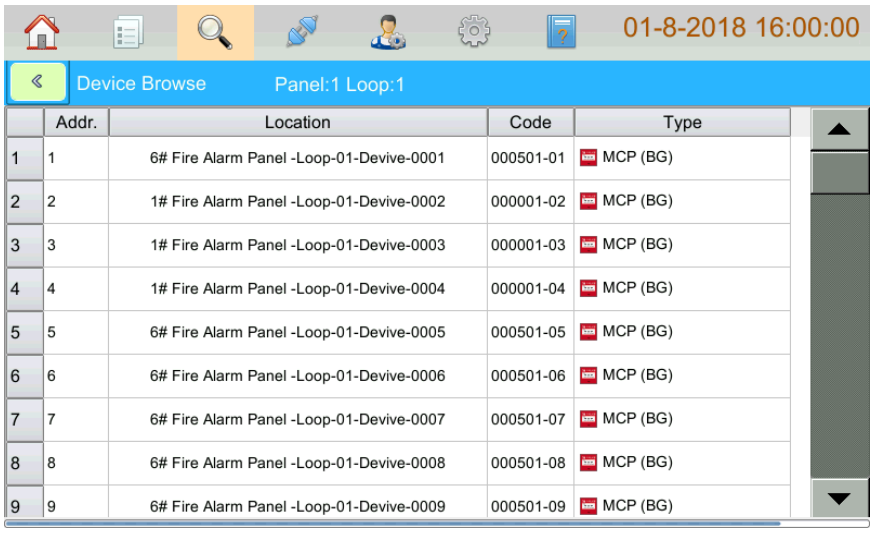


Fig 5.7.4

Clicking Confirm can enter the screen below.



	Addr.	Location	Code	Type
1	1	6# Fire Alarm Panel -Loop-01-Devive-0001	000501-01	MCP (BG)
2	2	1# Fire Alarm Panel -Loop-01-Devive-0002	000001-02	MCP (BG)
3	3	1# Fire Alarm Panel -Loop-01-Devive-0003	000001-03	MCP (BG)
4	4	1# Fire Alarm Panel -Loop-01-Devive-0004	000001-04	MCP (BG)
5	5	6# Fire Alarm Panel -Loop-01-Devive-0005	000501-05	MCP (BG)
6	6	6# Fire Alarm Panel -Loop-01-Devive-0006	000501-06	MCP (BG)
7	7	6# Fire Alarm Panel -Loop-01-Devive-0007	000501-07	MCP (BG)
8	8	6# Fire Alarm Panel -Loop-01-Devive-0008	000501-08	MCP (BG)
9	9	6# Fire Alarm Panel -Loop-01-Devive-0009	000501-09	MCP (BG)

Fig 5.7.5

In Fig. 5.7.6 shows the information of ZCP type is browsed.

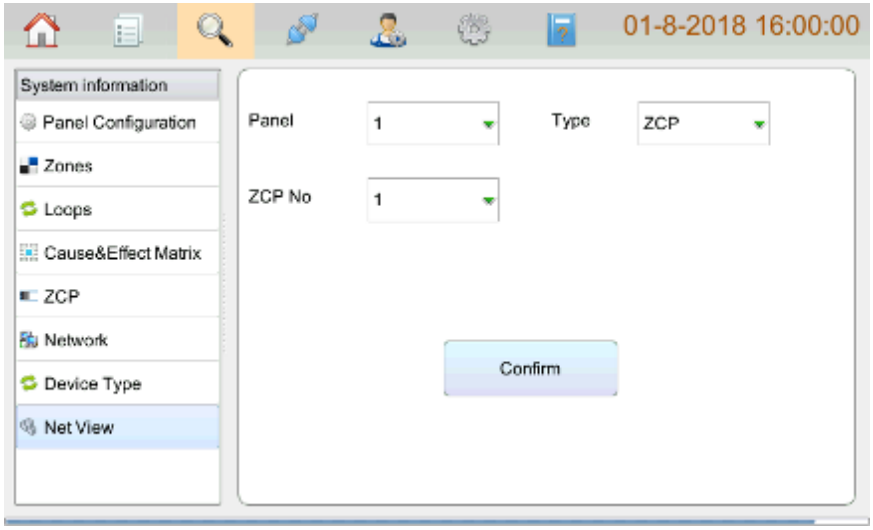


Fig 5.7.6

ZCP No: Fill in ZCP number to be browsed, and then press Confirm to enter the screen below.

Fig 5.7.7

Browsing the information of Formula type is shown in Fig. 5.7.8.

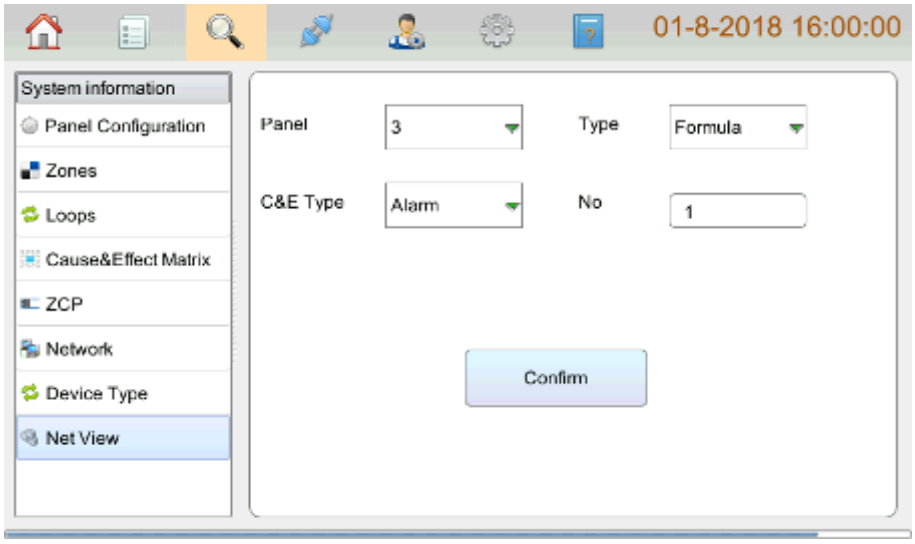


Fig 5.7.8

C&E Type: Fill C&E formula type and C&E formula No.，and then press Confirm to browse the screen below.

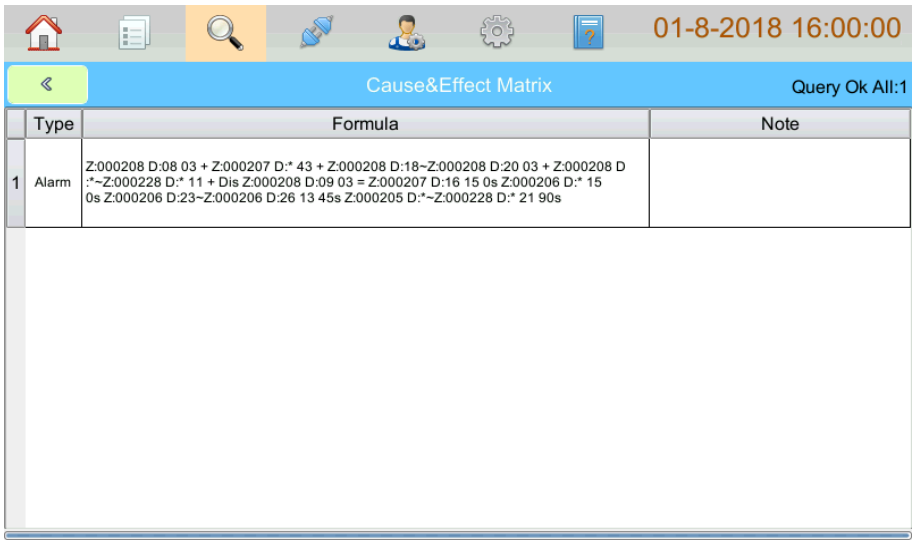


Fig 5.7.9

5.3 Record Browsing

Clicking button on the left corner enters the screen for browsing history record. There are six kinds of history records including ***Fire***, ***Supervisory***, ***Trouble***, ***Active Point***, ***Disable*** and ***All Events***. Refer to the figure below Fig 5.8.

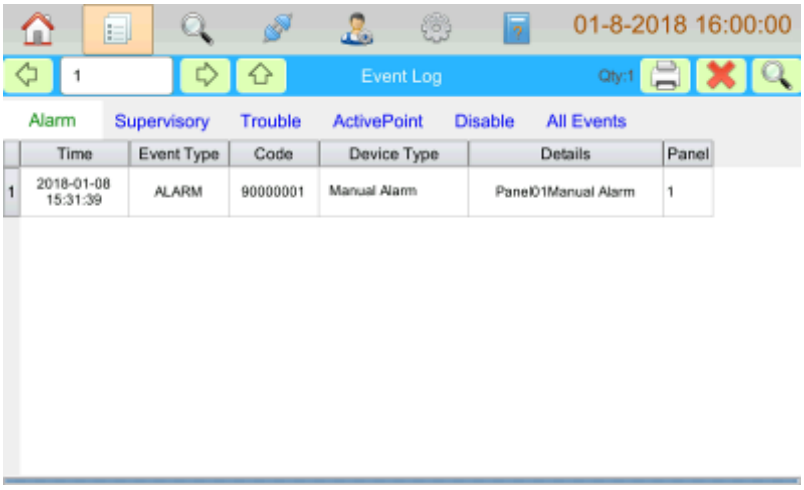


Fig 5.8

Each message includes ***Time***, ***Event Type***, ***Code***, ***Device Type***, ***Details*** and ***Panel***.

6 Operating Instructions

6.1 Panel Control Keys

6.1.1 *ACKNOWLEDGE* (User password)

Pressing ***ACKNOWLEDGE*** key will acknowledge a new fire, fault, or supervisory event. Pressing ***ACKNOWLEDGE*** key will result in the following actions:

- ✧ Silencing the buzzer of the FACP.
- ✧ Lighting the ***ACKNOWLEDGE*** LED.
- ✧ Marking an acknowledgement to the event displayed.
- ✧ Writing acknowledgement record in history file.
- ✧ Information of higher level will be displayed if there is more information. Pressing ***ACKNOWLEDGE*** repeatedly can toggle between different types of information and pressing up and down key can view them.

6.1.2 *SILENCE ALARM* (User password)

SILENCE ALARM key is used to silence the notification appliances. When this key is pressed, the following actions will be produced:

- ✧ Silencing all notification appliances.
- ✧ Lighting *the* ***SILENCE ALARM*** LED.
- ✧ Writing silence alarm records in history file.

6.1.3 *MANUAL ALARM* (User password)

When the ***MANUAL ALARM*** key is pressed, the following actions will be produced:

- ✧ Displaying a manual alarm message in LCD.
- ✧ Lighting the ***FIRE ALARM*** LED and ***MANUAL ALARM*** LED.
- ✧ Extinguishing the ***SILENCE ALARM*** LED if it illuminates.
- ✧ Turning on the buzzer.
- ✧ Turning on all notification appliances and Alarm Relay.
- ✧ Writing manual alarm record in ***FIRE ALARM INFORMATION*** and history file.

6.1.4 *RESET* (User password)

Pressing the ***Reset*** key, the following actions will be produced:

- ✧ Displaying ***System resetting…*** in LCD.
- ✧ Extinguishing all LEDs except of ***POWER*** LED and turning off the buzzer.
- ✧ Turning off all notification appliances.
- ✧ Resetting all loop devices.
- ✧ Writing system resetting record in history file.
- ✧ System self-check after resetting.

6.2 Positive Alarm Sequence

Positive Alarm Sequence (PAS) procedure: When a detector alarms, sound indication of the FACP shall be started immediately and PAS delay devices shall be activated.

- ✧ NACs will not be activated within 15 seconds. Pressing ***ACKNOWLEDGE*** key within this period, local sound will be silenced and the second period of delay will start. The second period can be programmed up to 3 minutes. At the end of the second delay period, if fire alarm condition is not cleared and the FACP not reset, NACs will be activated and all alarm sequence will begin.
- ✧ If the second alarm occurs during any delay period, the delay will stop and NACs and/or programmed control modules will be immediately activated.
- ✧ PAS does not affect water-flow indicators and supervisory devices.
- ✧ Action of PAS devices BYPASS will disable PAS until they reset.

6.3 Walk Test

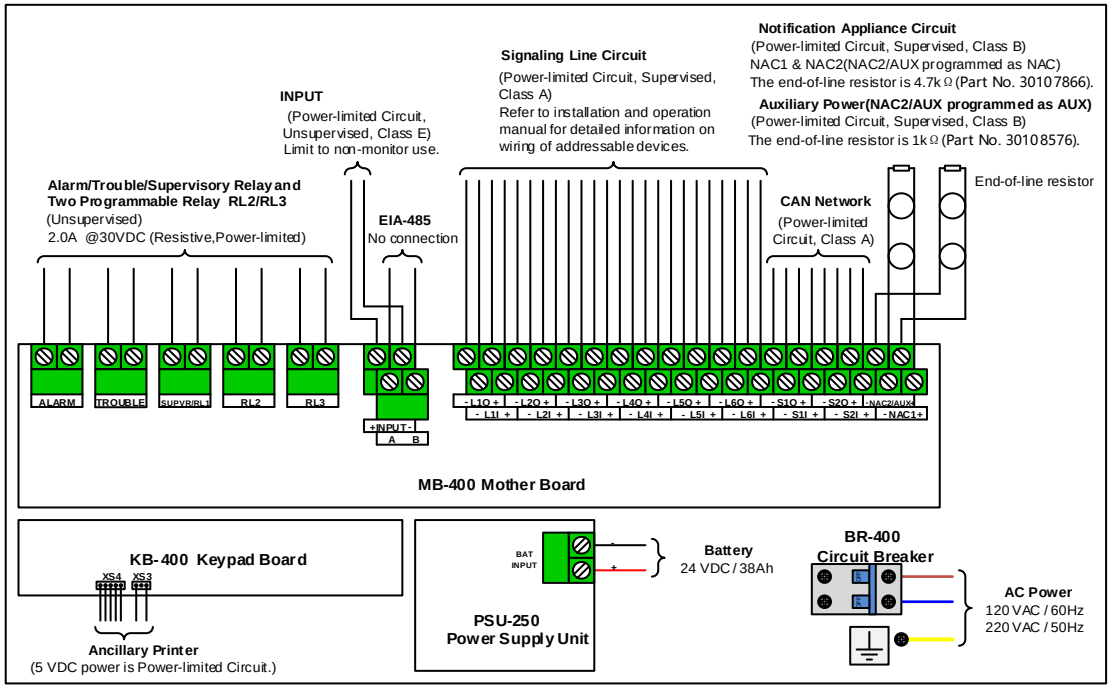
Walk test is a feature which allows one person to test the fire alarm system. During audible walk test, the NACs will output for a moment and record the test information. During silent walk test, the NACs will not output, but only record the test information. Disabled devices will not be activated during walk test.

Alarm test: During audible walk test, each new alarm will activate the NACs and associated modules for 3~4 seconds, the walk test of these devices shall be set to ON. The LCD will display the alarm events, which will be marked with the word *walk test* to distinguish with normal events. If there are no new messages in 30 minutes, the FACP exits walk test status. During walk test, if real fire or fault happens, the LCD will clear walk test message and show the real one.

7 Default Programming

Program Option	Factory Default
BANNER	GST CO., LTD.
Maintenance Password	Empty
User Password	111111
PAS Timer	0
Userwords	Undefined
Userdefine	Userdefine01-15
E&C	Undefined
Device address（1-242）	Zone: 001 Type: 0 Undefined Walktest: on PAS: off Silenceable: on Autosilence: off
Walk Test	Off

Appendix A Basic System Connection



Appendix B Electrical Specifications

B.1 Electrical Specifications

B.1.1 AC Power

- 120VAC, 60Hz, 3.0A (Maximum Alarm)
- 220VAC, 50Hz, 1.5A (Maximum Alarm)
- Wire size: Minimum 14AWG (2.0mm^2) with 600V insulation. The FACP shall be connected to max branch circuit of 15A.

Note:

Please note the AC power input (with ground bonding wire) must be in compliance with ratings on the FACP's label.

B.1.2 Battery

The FACP uses only sealed lead-acid batteries for secondary standby power.

- Rated voltage: 24VDC
- Float charging voltage: 27.5VDC
- Maximum charging current: 2.50A
- Battery capacity: two 12V / 66Ah batteries in series

B.1.3 Signaling Line Circuit (SLC)

- Class A, power-limited and supervised.
- Nominal operating voltage: 24VDC
- Maximum voltage: 28VDC
- Average current: 130mA
- Maximum alarm current: 200mA
- Maximum wiring resistance: 18ohms (each line).
- Maximum length is 1300m with 16AWG (1.32mm^2) or 2000m with 14AWG (2.08mm^2).

B.1.4 Notification Appliance Circuit (NAC)

- Class B, power-limited, supervised, and regulated circuit
- Nominal operating voltage: 24VDC
- Maximum signaling current: 2.5A (Shared by both NAC1 and NAC2/AUX)
- End-of-line resistor: 4.7kΩ (Part No. 30107866)
- Maximum wiring voltage drop: 2.0VDC

B.1.5 Auxiliary Power (NAC2/AUX programmed as AUX)

Class B, power-limited, supervised, special application. Compatible with I-M9300、DI-M9300、DI-M9301、DI-M9305.

- module.

- Programmable as resettable or non-resettable
- Nominal operating voltage: 24VDC
- Maximum standby current: 0.25A
- Maximum signaling current: 2.5A (Shared by both NAC1 and NAC2/AUX)
- End-of-line resistor: 1kΩ (Part No. 30108576)

B.1.6 Relays

- Three fixed relays: Alarm, Supervisory and Trouble.
- Two programmable relays: RL2, RL3. These two relays can be programmed as Alarm, Supervisory, Trouble or Disable.
- Contact rating: 2.0A @ 30VDC (resistive), power limited.

B.1.7 Input

- Maximum current: 1.7mA (short circuit)

B.1.8 CAN Network

- Class A.
- Maximum distance between two neighbor nodes is 2500m with 18AWG (0.81mm²) or 3000m with 16AWG (1.32mm²).
- Maximum 250 nodes for combination of CAN and Fiber-Optical Network.

B.1.9 Fiber-Optical Network

- LC single-mode fiber.
- Maximum distance between two neighbor nodes is 20000m.
- Maximum 250 nodes for combination of CAN and Fiber-Optical Network.

B.2.0 Modbus Communication – for supplementary use only

- RS232/RS485/RS422 configurable.
- Maximum distance is 3m from IFP4M FACP to the third party equipment.

B.2 Typical Configuration of SLCs

The typical configurations of SLCs include Intelligent Photoelectric Smoke Detector, Intelligent Rate of Rise and Fixed Temperature Heat Detector, Digital Manual Call Point, Addressable Input Module, Addressable Output Module and Loop Isolators. Refer to table B.1 for maximum length of wires in different configurations.

Table B.1

	Configuration 1	Configuration 2	Configuration 3	Configuration 4
No. of smoke detectors	60	80	100	120
No. of heat detectors	8	10	10	15

No. of MCPs	8	10	10	15
No. of input modules	4	4	4	10
No. of output modules	4	4	4	10
No. of loop isolators	2	3	4	5
Max. length with 14AWG	4000m	3300m	2600m	2000m
Max. length with 15AWG	3500m	2700m	2200m	1700m
Max. length with 16AWG	3000m	2300m	1900m	1400m
Max. length with 17AWG	2000m	1500m	1200m	900m

Appendix C Compatible Devices

C.1 Series Addressable Detectors

Intelligent, addressable detectors provide information to the FACP on an SLC (Signaling Line Circuit). This allows the FACP to continually monitor the status (alarm, trouble, maintenance or normal) of each detector.

C.1.1 Smoke Detectors (Photoelectric)

I-9102(UL) or DI-M9102 Intelligent Photoelectric Smoke Detector is developed on the principle of infrared scattering. With integrated microprocessor and amplifier, the detector has the following features:

- Addressable code written by a programmer makes the detector easy and reliable to commission.
- The microprocessor disposes data by sampling and can save 14 history records. The curve displayed on the FACP shows the field conditions.
- Compensating excursion of temperature and humidity, detecting dust accumulation fault.

DC-M9102 is a Conventional Photoelectric Smoke Detector. It can be connected to the panel through I-M9301 addressable input module or DI-M9319 Digital Zone Monitor Module.

C.1.2 Heat Detectors

I-9103(UL) or DI-M9103 Intelligent Rate of Rise and Fixed Temperature Heat Detector uses a thermistor as its sensor. The built-in microprocessor processes the signal from the sensor by intelligent algorithm. The detector has the following features:

- Addressable code is written by programmer.
- The microprocessor disposes data by real-time sampling and can store 14 history records. The curve displayed on the FACP shows the field condition.
- The detector can be set by programmer to be rate-of-rise detector or fixed temperature detector.

DC-M9103 is a Conventional Rate of Rise and Fixed Temperature Heat Detector. It can be connected to the panel through I-M9301 addressable input module or DI-M9319 Digital Zone Monitor Module.

C.1.3 Combination Heat Photoelectric Smoke Detector

DI-M9101 Intelligent Combination Heat Photoelectric Smoke Detector integrates photoelectric detection and fixed temperature detection technology by combining smoke sensor and semi-conductor heat sensor in mechanism and circuitry structure. The detector has the following features:

- Address can be set in field.
- Fault self-diagnostic.

- Built-in MCU can store 14 history messages.
- Polling LED can be set to close.
- 2 levels smoke sensitivities programmable, complies with UL268. Heat part complies with UL521.

DC-M9101 is a Conventional Combination Heat Photoelectric Smoke Detector. It can be connected to the panel through I-M9301 addressable input module or DI-M9319 Digital Zone Monitor Module.

C.1.4 Detector Bases

DZ-03 Base is used to mount I-9102(UL), I-9103(UL) detectors as their conductive base. During installation, you can easily fix the base before connecting cables, and then twist the detector onto the base.

DB-M01 Base is used to mount DI-M9101, DI-M9102，DI-M9103, DC-M9101 DC-M9102 and DC-M9103 detectors as their conductive base. During installation, you can easily fix the base before connecting cables, and then twist the detector onto the base.

C.2 Manual Pull Stations

DI-M9204 Digital Manual Call Point can be connected to the panel directly to complete a fire alarm system.

DC-M9204 is a non-Addressable Manual Call Point. It can be connected to the panel through I-M9301 addressable input module or DI-M9319 Digital Zone Monitor Module.

C.3 Loop Isolators

In loop type fire alarm system, short circuit of part of the loop often affects normal operation of the whole system. C-M9503/ DC-M9503 Loop Isolator and DC-M9504Base Mount Isolator can disable the shorted part of loop from the whole system to ensure normal operation of other parts and can easily find the location of the disabled part.

C.4 Control Modules

- I-M9300/ DI-M9300 Addressable Input Module is used to receive normally open switch signals from connected fire protection devices, and transmit the messages back to the FACP.
- I-M9301/ DI-M9301 Addressable Output Module can be connected on an SLC to receive the start command from the FACP. When receiving the command, it will close the output relay to output normally-open / normally closed contact signal and illuminate the active indicator.
- DI-M9305 Digital Single Riser Output Module can communicate with the panel. The module is designed to switch on/off 24VDC power at its output.
- DI-M9319 Digital Zone Monitor Module is designed to connect with conventional detectors.

C.5 Horn / Strobes / Signal Synchronization Module

- ✧ Strobes: UL listed DC-M9415W/ DC-M9415R manufactured by GST.
- ✧ Horns: UL listed DC-M9414W/ DC-M9414R manufactured by GST.
- ✧ Horns / Strobes: UL listed DC-M9413W/ DC-M9413R / DC-M9416W/ DC-M9416R manufactured by GST.

C.6 Base

- ✧ C-9314P Passive Remote Indicator (the indicator) is designed to display fire signals of the detector in the distance.
- ✧ BP-9314P Back Plate is used to connect C-9314P with a back box when embedded mounting is adopted.

Appendix D Battery Calculations

Power Requirements (All currents are in amperes)							
Model Type	**Description**	**Qty.**		**Standby**	**Total Standby**	**Alarm**	**Total Alarm**
GST-IFP4M	FACP	1	**X**	0.30	=	0.50	=
GST-IFP4M	AUX Load	1	**X**	(max.0.25)	=	(max.0.25)	=
PR-400 or PR-400B	Ancillary Printer	1	**X**	0.01	=	0.30	=
LC-401	Single Loop Card		**X**	0.040	=	0.060	=
LC-402	Dual Loop Card		**X**	0.070	=	0.080	=
P-9981	Zone Display Panel		**X**	0.008	=	0.016	=
P-9981F	Zone Display Panel		**X**	0.008	=	0.016	=
P-9982	Zone Display and Control Panel		**X**	0.008	=	0.016	=
P-9982F	Zone Display and Control Panel		**X**	0.008	=	0.016	=
P-9966A	CAN Class A Network Card		**X**	0.050	=	0.050	=
P-9983	Fiber-Optical Network Card		**X**	0.030	=	0.030	=
P-9956	Modbus Card		**X**	0.030	=	0.030	=
I-9102(UL)	Intelligent Photoelectric Smoke Detector		**X**	0.0008	=	0.002	=
I-9103(UL)	Intelligent Rate of Rise and Fixed Temperature Heat Detector		**X**	0.0008	=	0.002	=
DI-M9101	Intelligent Combination Heat Photoelectric Smoke Detector		**X**	0.0008	=	0.0018	=

DI-M9102	Intelligent Photoelectric Smoke Detector		X	0.0008	=	0.0018	=
DI-M9103	Intelligent Rate of Rise and Fixed Temperature Heat Detector		X	0.0006	=	0.0015	=
DI-M9204	Digital Manual Call Point		X	0.0006	=	0.0018	=
C-M9503	Loop Isolator		X	0.00015	=	0.00015	=
DC-M9504	Base Mount Isolator		X	0.00015	=	0.00015	=
I-M9300	Addressable Input Module		X	0.001	=	0.005	=
I-M9301	Addressable Output Module		X	0.002	=	0.003	=
DC-M9414W/ DC-M9414R	Horn Module		X	0	=	0.035	=
DC-M9415W/ DC-M9415R	Strobe		X	0	=	0.103	=
DC-M9413W/ DC-M9413R/	Sounder Strobes		X	0	=	0.075	=
DC-M9416W/ DC-M9416R	Soubder Strobe		X	0	=	0.087	
DC-M9101	Conventional Combination Heat Photoelectric Smoke Detector		X	0.0008	=	0.0018	=
DC-M9102	Conventional Photoelectric Smoke Detector		X	0.0008	=	0.0018	=
DC-M9103	Conventional Rate of Rise and Fixed Temperature Heat Detector		X	0.0006	=	0.0015	=
C-9314P	Passive Remote Indicator		X	0	=	0.003	=

DC-M9204	Innovation Manual Call Point		**X**	0.0006	=	0.0018	=
DI-M9300	Digital Single Input Module		**X**	0.00026	=	0.0005	=
DI-M9301	Digital Single Input and Output Module		**X**	0.00028	=	0.0007	=
DI-M9319	Digital Zone Monitor Module		**X**	0.00038	=	0.00039	=
DI-M9305	Digital Single Riser Output Module		**X**	0.00026	=	0.0005	=
Total currents (Add above currents)					(A)		(B)

Battery Capacity Requirement

Battery (AH) = (Standby Current Total x Discharge Time) + (Alarm Current Total x Alarm Time)

([STANDBY (A) _____] X [(24 Hours) _____]) + ([ALARM (B) _____] X [Alarm in Hr.] _____) = (C) _____ (AH)

NAC and AUX interfaces should not exceed 2.5A, and the standby current of AUX interface should not exceed 0.25A.

Battery Selection

Battery Size = Multiply (**C**) by 1.20 to derate battery.

PS-12380 (38 AH) and PS-12400 (40 AH) are the recommended Power-Sonic batteries for use with this panel.

Use of alternative batteries may result in failure of the FACP to meet agency and regulatory requirements, and may result in shortened battery life. Batteries should be tested regularly, and replaced at least every three years. If the Battery Trouble indicator activates, obtain required service.

Appendix E Operating Instructions

Normal Standby

With no alarm or trouble in the system, the display message is *System Normal*.

Alarm

If fire alarm condition occurs, the Fire Alarm Control Panel (FACP) will indicate the following:

- *FIRE ALARM* LED illuminates.
- The buzzer sounds fire alarm.
- The LCD displays the alarm message.

Trouble

If a trouble condition occurs, the FACP will indicate the following:

- *TROUBLE* LED illuminates. If it is system fault, AC fault, battery fault, charger fault, NAC1 fault, NAC2 fault or ground fault, corresponding LEDs will simultaneously illuminate.
- The buzzer sounds trouble.
- The LCD displays the trouble message.

Alarm Test

While doing alarm test:

- Each new alarm shall activate the NACs (Notification Appliance Circuits) and modules for 3~4 seconds (walk test setup of corresponding devices should be ON).
- The LCD displays alarm message, which is distinguished from a real fire by the words “Walk Test”. The FACP will automatically exit walk test state if there is no new alarm in 30 minutes.
- The alarm test shall be done every year.

ACKNOWLEDGE

Pressing *ACKNOWLEDGE* key shall acknowledge new alarm, trouble and supervisory events. If more than one event exists, the LCD displays the one of the highest level. Subsequent press of *ACKNOWLEDGE* shall switch between different messages, and pressing the *UP* and *DOWN* button can view these messages.

SILENCE ALARM

All activated notification appliances can be silenced when this key is pressed.

MANUAL ALARM

When this key is pressed, the *FIRE ALARM* LED and *MANUAL ALARM* LED shall be lighted, the buzzer shall be turned on, all NACs and the Alarm Relay shall be activated and a manual alarm message shall be displayed in *FIRE ALARM INFORMATION*.

RESET

Pressing this key can turn off all NACs and control modules, and reset all loop devices. If any alarm or trouble still exists, alarm will be activated again. If all alarms and troubles are cleared, the LCD displays *System Normal*.

Regular Maintenance

We recommend maintenance of the FACP and connected devices every 6 months.

Battery Maintenance & Replacement

Type of battery: Sealed lead-acid battery

Recommended period for replacing the battery: 5 years (25℃)

Recommended manufacturer and model number: PS-12380 (38 AH) and PS-12400 (40 AH).

Disposal of used batteries: Please properly dispose the used batteries according to your local rules and regulations.

Note: Risk of explosion if battery is replaced by an incorrect type

Limited Warranty

The manufacturer warrants its products to be free from defects in materials and workmanship for 2 years from the date of manufacture, under normal use and service. Products are date-stamped at time of manufacture. The sole and exclusive obligation of the manufacturer is to repair or replace, at its option, free of charge for parts and labor, any part which is defective in materials or workmanship under normal use and service. For products not under the manufacturer's date-stamp control, the warranty is 2 years from date of original purchase by the manufacturer's distributor unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. This warranty is void if the product is altered, repaired, or serviced by anyone other than the manufacturer or its authorized distributors, or if there is a failure to maintain the products and systems in which they operate in a proper and workable manner. In case of defect, secure a Return Material Authorization form from our customer service department. Return product, transportation prepaid, to the manufacturer.

This writing constitutes the only warranty made by this manufacturer with respect to its products. The manufacturer does not represent that its products will prevent any loss by fire or otherwise, or that its products will in all cases provide the protection for which they are installed or intended. Buyer acknowledges that the manufacturer is not an insurer and assumes no risk for loss or damages or the cost of any inconvenience, transportation, damage, misuse, abuse, accident, or similar incident.

THE MANUFACTURER GIVES NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR OTHERWISE WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. UNDER NO CIRCUMSTANCES SHALL THE MANUFACTURER BE LIABLE FOR ANY LOSS OF OR DAMAGE TO PROPERTY, DIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR INABILITY TO USE THE MANUFACTURER'S PRODUCTS. FURTHERMORE, THE MANUFACTURER SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL, OR INDUSTRIAL USE OF ITS PRODUCTS.

This warranty replaces all previous warranties and is the only warranty made by the manufacturer. No increase or alteration, written or verbal, of the obligation of this warranty is authorized.

Gulf Security Technology Co., Ltd.
No. 80, Changjiang East Road, QETDZ, Qinhuangdao, Hebei,
P. R. China 066004
Tel: +86 (0) 335 8502434
Fax: +86 (0) 335 8502532
service.gst@fs.utc.com
www.gst.com.cn