

Conventional Fire Alarm Control Panel Installation And Operation Manual



NOTICE

All information, documentation, and specifications contained in this manual are subject to change without prior notice by the manufacturer.

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Fire Alarm System Limitations

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, 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 premise 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 the Guide for Proper Use of System Smoke 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 photo electronic sensing chambers tend to detect smoldering fires better. **Telephone lines** needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

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 7 of NFPA 72 shall be followed.

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

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 and a given type of detector may 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 control panel 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 control. It is essential to use only equipment listed for service with your control panel.

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

WARNING - Several different sources of power can be connected to the fire alarm control panel. 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 7 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 a relative humidity of 85% RH (non-condensing) at 30° C/86° F. However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and all peripherals be installed in an environment with a nominal room temperature of 15-27° C/60-80° F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

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

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.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, and printed circuit board location.

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 control panel and associated equipment. FACP operation and reliability depend upon proper installation by authorized personnel.

FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

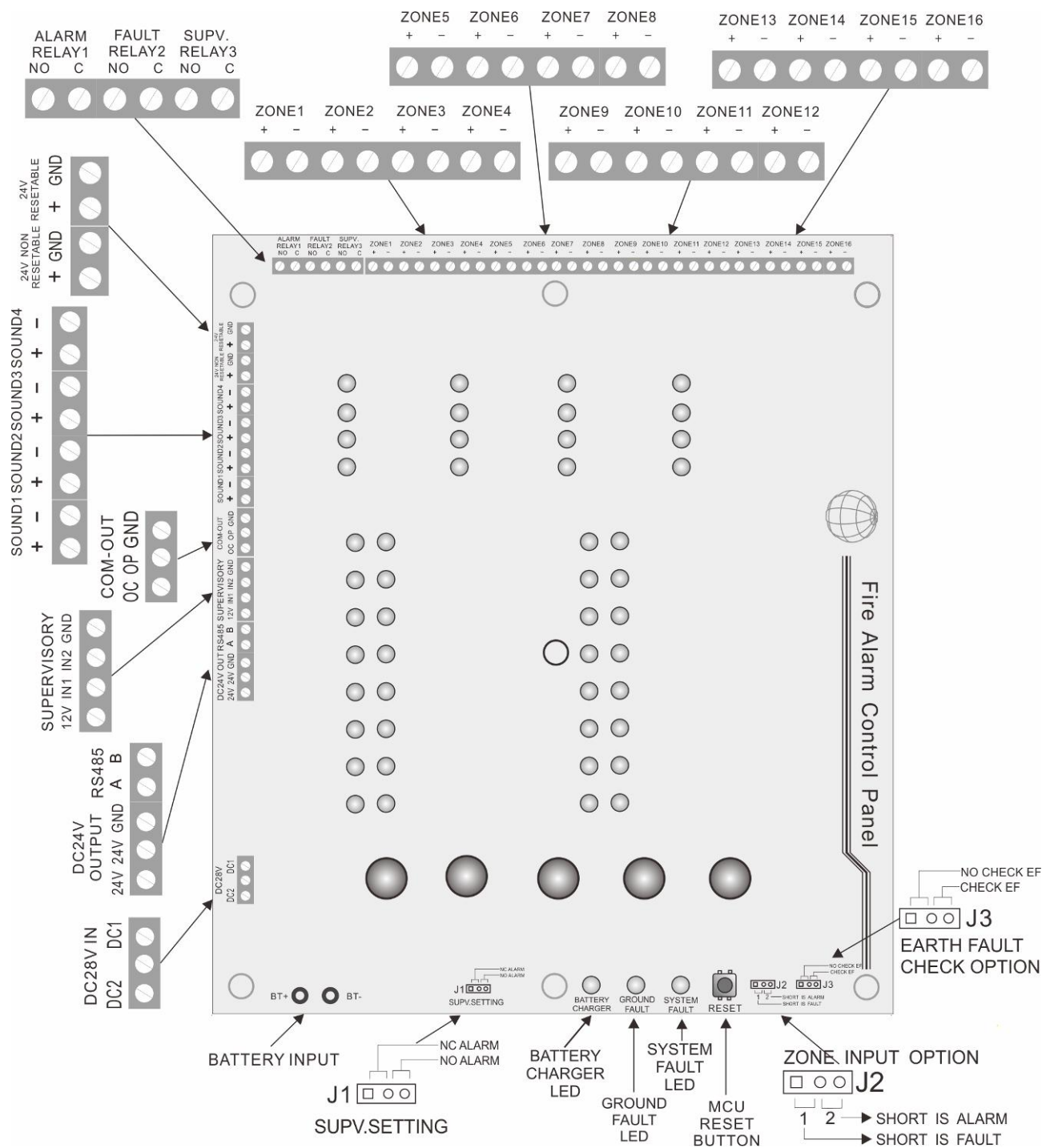
Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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Main Circuit Board



PANEL Terminals and Connectors

CHAPTER 1: *Product Description*

The PANEL is a 4-zone to 16-zone FACP (Fire Alarm Control Panel), which uses conventional input devices. The panel accepts water flow devices, two-wire smoke detectors, four-wire smoke detectors, pull stations and other normally-open contact devices. Outputs include four Notification Appliance Circuits (NAC, SOUND1-4), three standard Form-A relays (alarm, trouble and supervisory) and an EIA-485 port to interface with remote annunciators and optional remote relay modules. The FACP is field programmable via the panel keypad. It also supervises all wiring, AC voltage and battery level.

This series of panels are basically the same in application and operation, their differences are shown in Table 1-1. PANEL will be described as the example in the following sections.

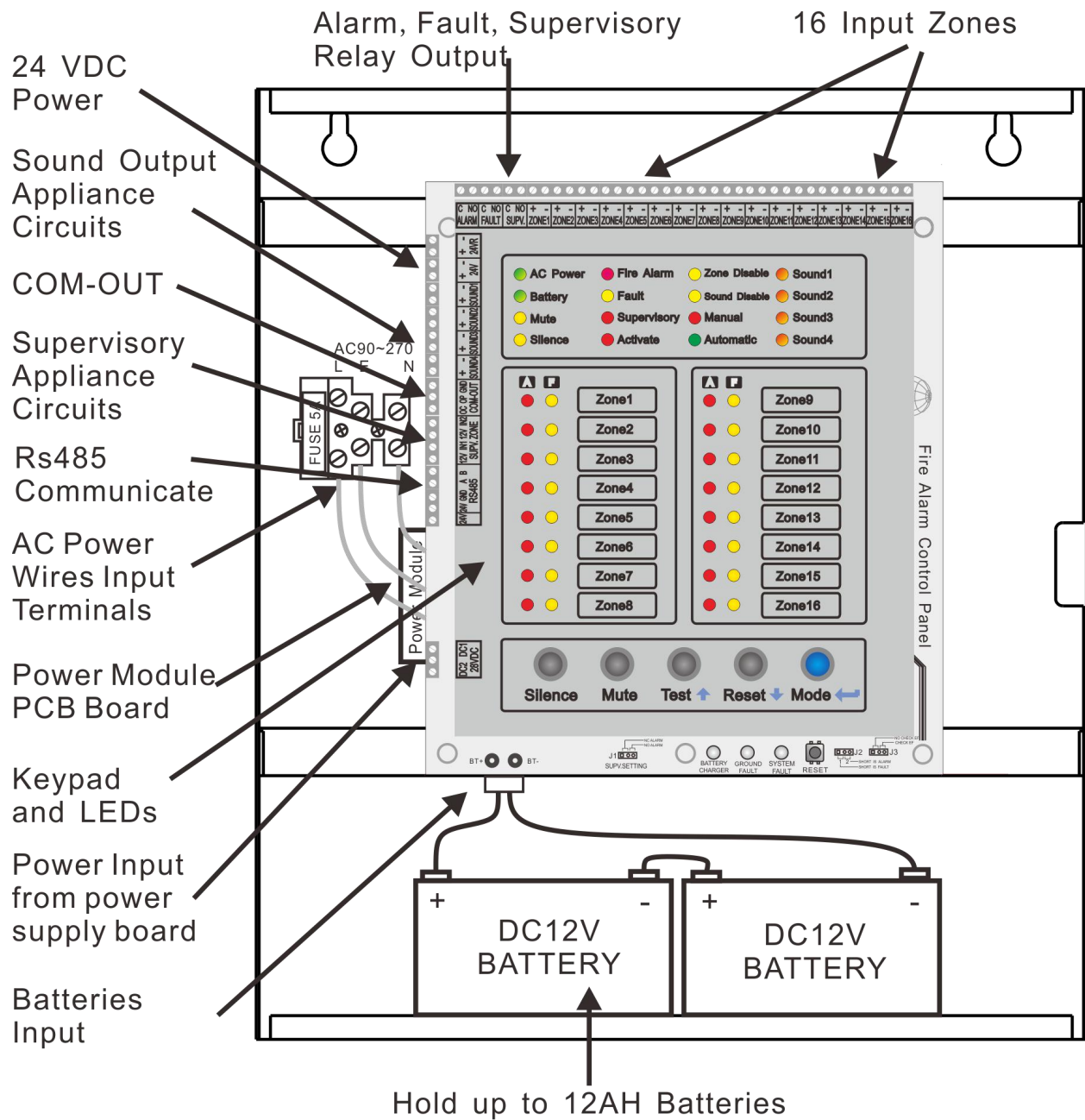
Table 1-1

FACP	Number of Detection Zones	Number of Sounder Outputs	Output Delay Settings
8113-4	4	1	N/A
8113-8	8	2	N/A
8113-16	16	4	N/A

1.1 Product Features

- 4,8,16 Class B Initiating Device Circuits (IDCs)
 - ✓ All zones accept conventional detectors and any normally open contact device
- Four Class B Notification Appliance Circuits (NACs)
- One Form-A Alarm Relay
- One Form-A Trouble Relay
- One Form-A Supervisory Relay
- 3.0 amps of system power
- Max 30 conventional detectors in one zone.
- Auto/Manual mode setting enable walk test.
- Each Zone can be disabled,
- Sound output can be disabled.
- Manual active sound output enabled.
- Able to report short and broken circuit of detection zones.
- Designed with standby batteries and space provision for two sealed lead-acid batteries.
- Testing and disable functions.
- Can connect max 32 repeater panels by RS485 communication port
- Dimensions : 14.57" (37 cm) long X 17.32" (44 cm) high X 3.94"(10cm).
- Weight: 6.6kg (without battery).

The functions of terminal



1.2 Specifications

AC Power

90-270 VAC, 50 Hz, 2.3 amps

Wire size: minimum #14 AWG (2.0 mm²) with 600V insulation

Battery (lead acid only)

Maximum Charging Circuit: Normal Flat Charge—27.6V @ 0.8 amp

Maximum Charger Capacity: 18 Amp Hour batter

Sound Output Device Circuits

General Alarm Zones 1 through 16

Operation: All zones Class B

Normal Operating Voltage: Nominal 24 VDC (ripple = 100 mV maximum)

Alarm Current: 15 mA threshold

Short Circuit Current: 42 mA maximum

Maximum Loop Resistance: 100 ohms

End-of-Line Resistor: 4.7K, ½ watt

Detector Loop Current is sufficient to ensure operation of two alarmed detectors per zone

Standby Current: 7.26 mA

Three Relays Output

Relay contact rating: 2.0 amps @ 30 VDC (resistive), 2.0 amps @ 30 VAC (resistive)

Nonresettable 24 VDC Power

Maximum ripple voltage: 10 mVRMS

Operating Voltage nominal 24 volts

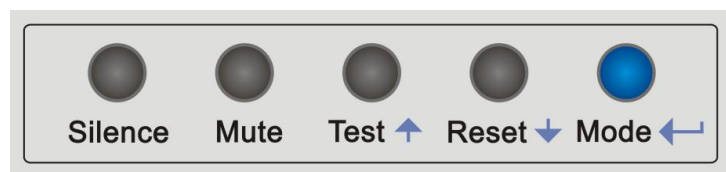
Total DC current available from this output is up to 500 mA

Recommended maximum Standby current is 150 mA

1.3 Controls and Indicators

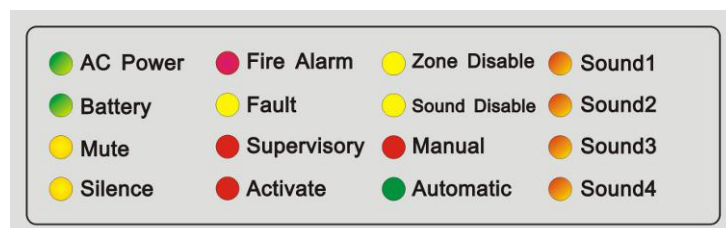
Front Panel Keys in Normal Mode

- Silence
- Mute
- Test/↑
- Reset/↓
- Mode ←



LEDs

- AC Power - green or yellow LED
- Battery - green or yellow LED
- Mute - yellow LED
- Silence - yellow LED
- Fire Alarm - red LED
- Fault - yellow LED
- Supervisory - red LED
- Activate - red LED
- Zone Disabled - yellow LED
- Sound Disabled - yellow LED
- NAC Fault - yellow LED



- Manual - red LED
- Automatic - red LED
- Sound1 to 4 - red LED or yellow LED
- Zone Fire Alarm - red LED
- Zone Fault Alarm - yellow LED
- Ground Fault - yellow LED

FIGURE 1.3.1: PANEL-4 LEDs and Keypad

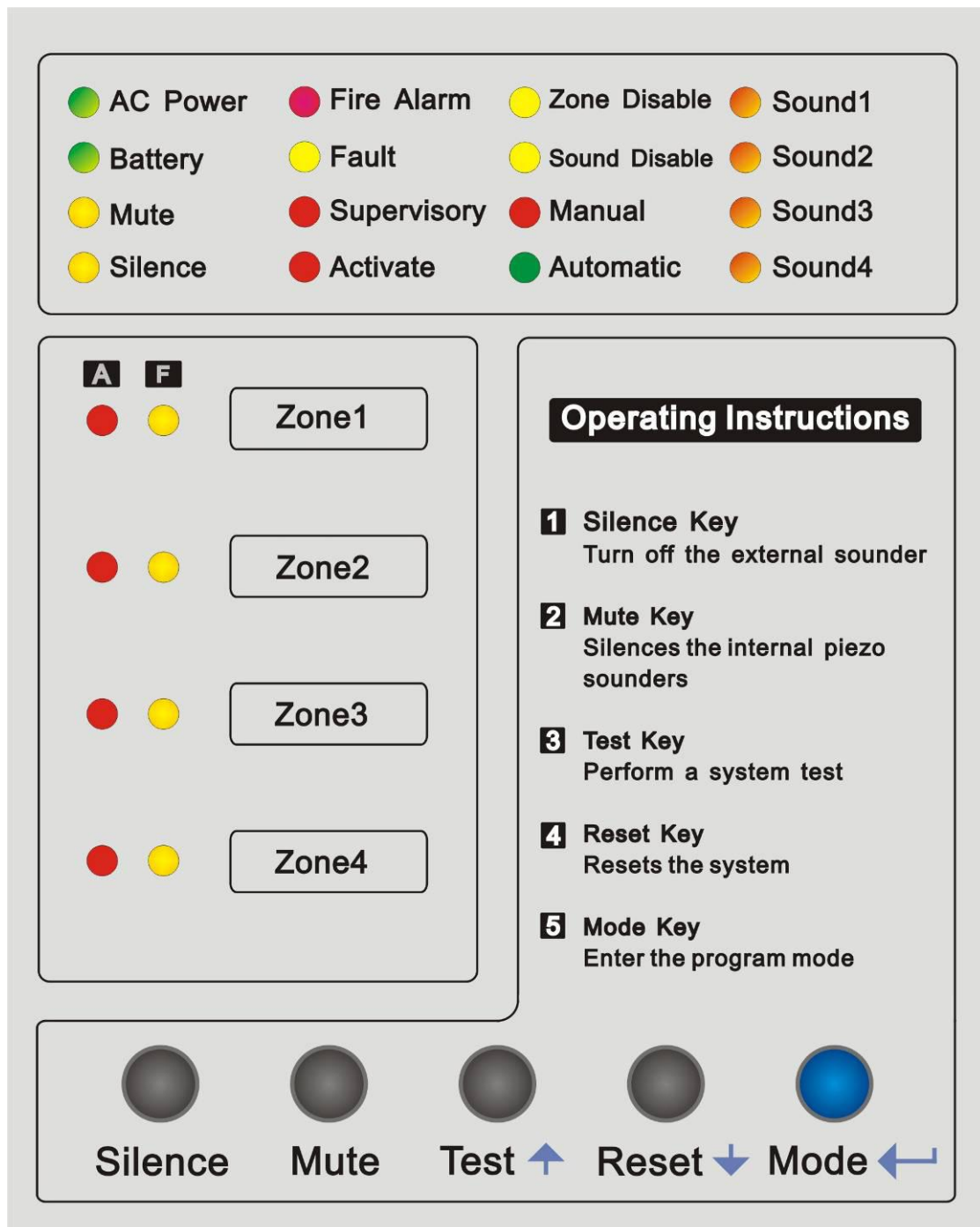


FIGURE 1.3.2: PANEL-8 LEDs and Keypad

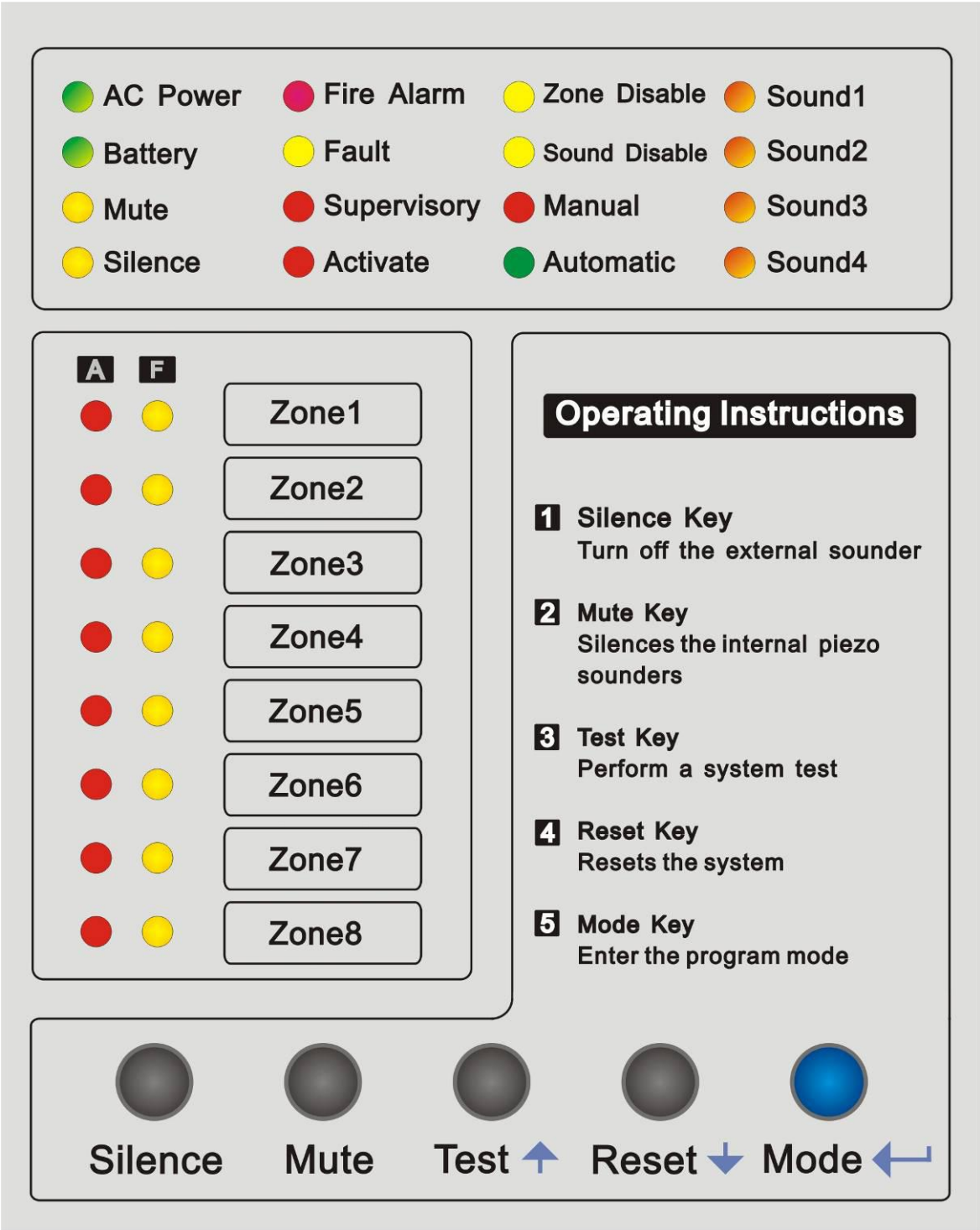
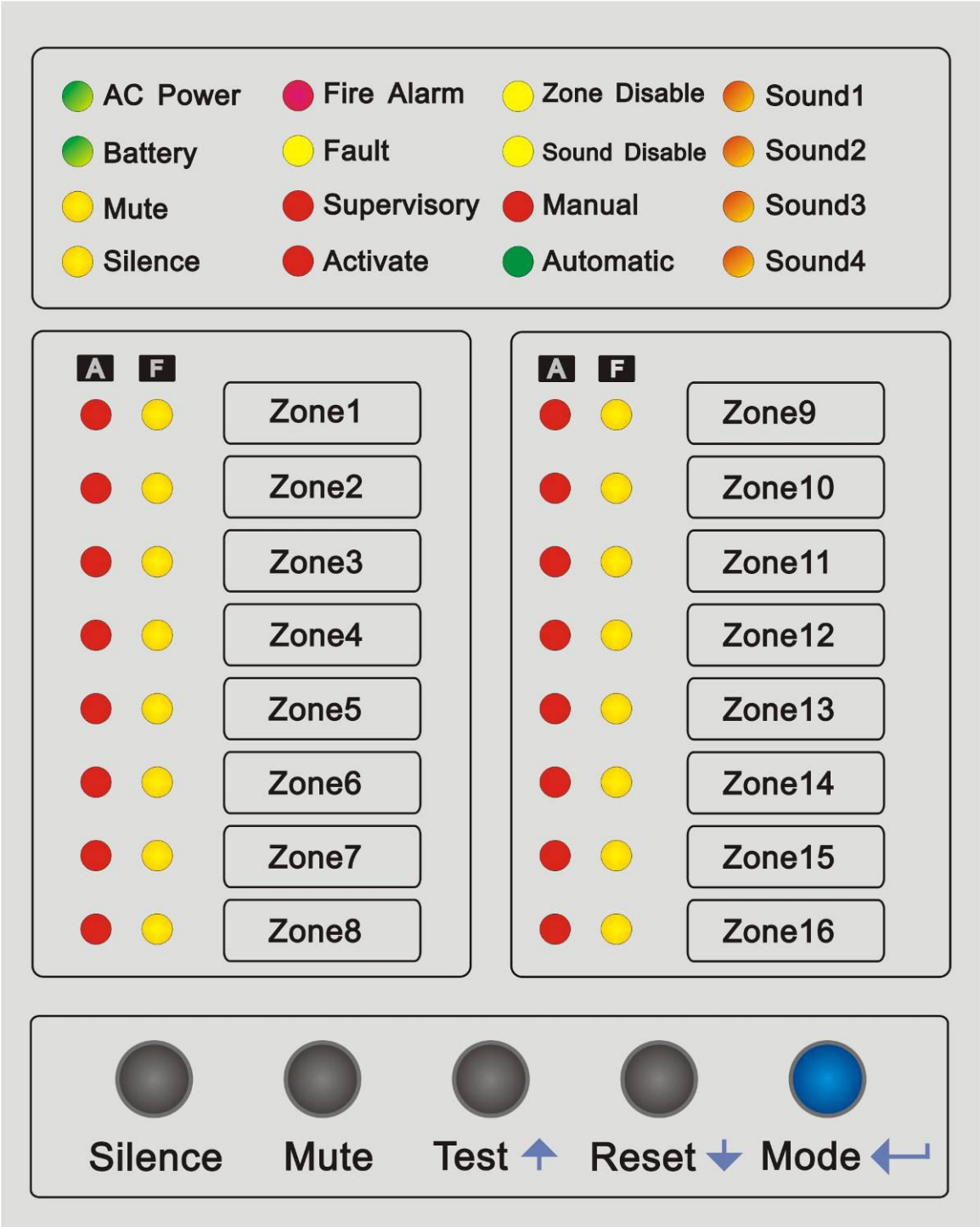


FIGURE 1.3.3: PANEL-16 LEDs and Keypad



Local Sounder

A piezo sounder provides separate and distinct sounds for alarm, trouble and supervisory conditions:

- Alarm - pulse ½ second On and ½ second OFF
- Fault - pulse 1½ second On and 4 second OFF
- Supervisory - pulse ½ second On and ½ second OFF

1.4 Circuits

Input Circuits

Sixteen input circuits provide configuration. Input circuits 1 through 16 may be used as standard fire alarm control panel zones. All sixteen Initiating Device Circuits accept normally-open contact devices and two-wire smoke detectors.

Output Circuits

- 24 Volt Resettable Power Output 1000 mA
- 24 Volt Nonresettable Power Output 1000 mA
- 24 Volt Battery Charger (up to 18 AH batteries)
- EIA-485 Port (interfaces to Annunciators, and Graphic Annunciators and Remote Relay Module)

Sounder (Notification Appliance)Circuits

Four Notification Appliance Circuits.

Relays

Three dry relays for system alarm, system trouble and supervisory are provided standard. Contacts are rated 2.0 amps @ 30 VDC (resistive) and 2.0 amps @ 30 VAC (resistive).

EIA-485 Port

EIA-485 compatible port supports up to 32 repeater panels.

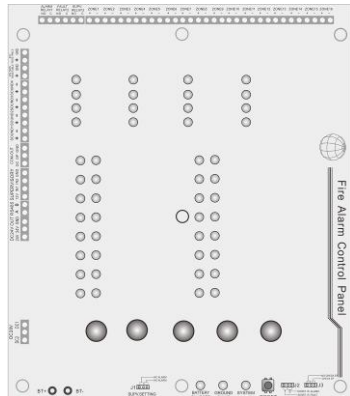
Battery Charger

Battery Charger will charge up to 18 AH batteries. The PANEL cabinet holds a maximum of 7 AH batteries. The external box is required to hold 18 AH batteries. The charger is rated for 500 mA maximum current.

1.5 Components

Main Circuit Board

The main circuit board contains the system's CPU, power supply, other primary components and wiring interface connectors. Optional modules plug in and are mounted to the main circuit board. The main circuit board is delivered pre-mounted in the cabinet.



Cabinet

The cabinet is red and the backbox measures 14.57" (37 cm) long X 17.32" (44 cm) high X 3.94"(10cm) deep and provides space for two batteries (up to 7 Amp Hours).

Power Module Assembly

One 75VA power module is provided standard with the panel.

Batteries

The cabinet provides space for 7 Amp Hour batteries (larger batteries up to 18 Amp Hour batteries, use the external battery box). Batteries must be ordered separately.

CHAPTER 2: *Installation*

2.1 Mounting Options

The cabinet may be either semi-flush or surface mounted. The door is attached to the cabinet by two hinges. The cabinet mounts using two key slots and one additional 0.250" (6.35 mm) diameter holes located in the backbox. The key slots are located at the top of the backbox and the one securing holes at the bottom.

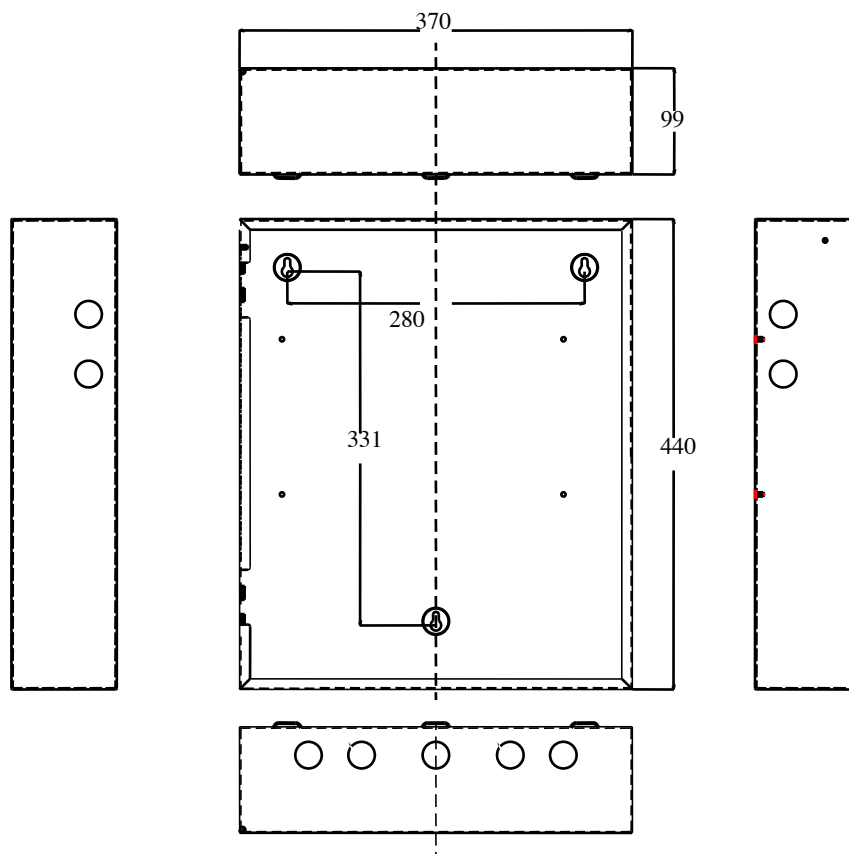
Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the top of the cabinet approximately five feet above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

2.2 Backbox Mounting

- ✓ Open the door.
- ✓ Remove the main PC board assembly by unscrewing the four screws in the corners of the board. Set the board aside in a safe, clean place. Avoid static discharge which may damage the board.
- ✓ Mark and predrill holes for the top two keyhole mounting bolts using the dimensions illustrated.
- ✓ Install two upper fasteners in the wall with the screw heads protruding.
- ✓ Using the upper 'keyholes', mount the backbox over the two screws.
- ✓ Mark and drill the lower one holes.
- ✓ Mount backbox, install remaining fasteners and tighten.
- ✓ When the location is dry and free of construction dust, reinstall the main PC board.

Draw wires through the respective knockout locations.

FIGURE 2-2: Cabinet Dimensions and Knockout Locations



2.3 Operating Power



WARNING: Several different sources of power can be connected to this panel. 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.

Primary Power Source (AC) and Earth Ground Connections

AC power connections are made inside the control panel cabinet. The primary power source for the PANEL is 220 VAC, 50 Hz, 2.3 amps. Run a pair of wires (with ground conductor) from the protected premises main breaker box to AC Power Terminal of the main circuit board. As per the Canadian Electrical Code, use 14 AWG (2.00 mm², 1.6 mm O.D.) or heavier gauge wire with 600V insulation. No other equipment may be connected to this circuit. In addition, this circuit must be provided with overcurrent protection and may not contain any power disconnect devices. A separate Earth Ground connection must be made to ensure proper panel operation and lightning and transient protection. Connect the Earth Ground wire [minimum 14 AWG (2.00 mm²)] to the mounting stud located on the cabinet.

Do not use conduit for the Earth Ground connection since this does not provide reliable protection.

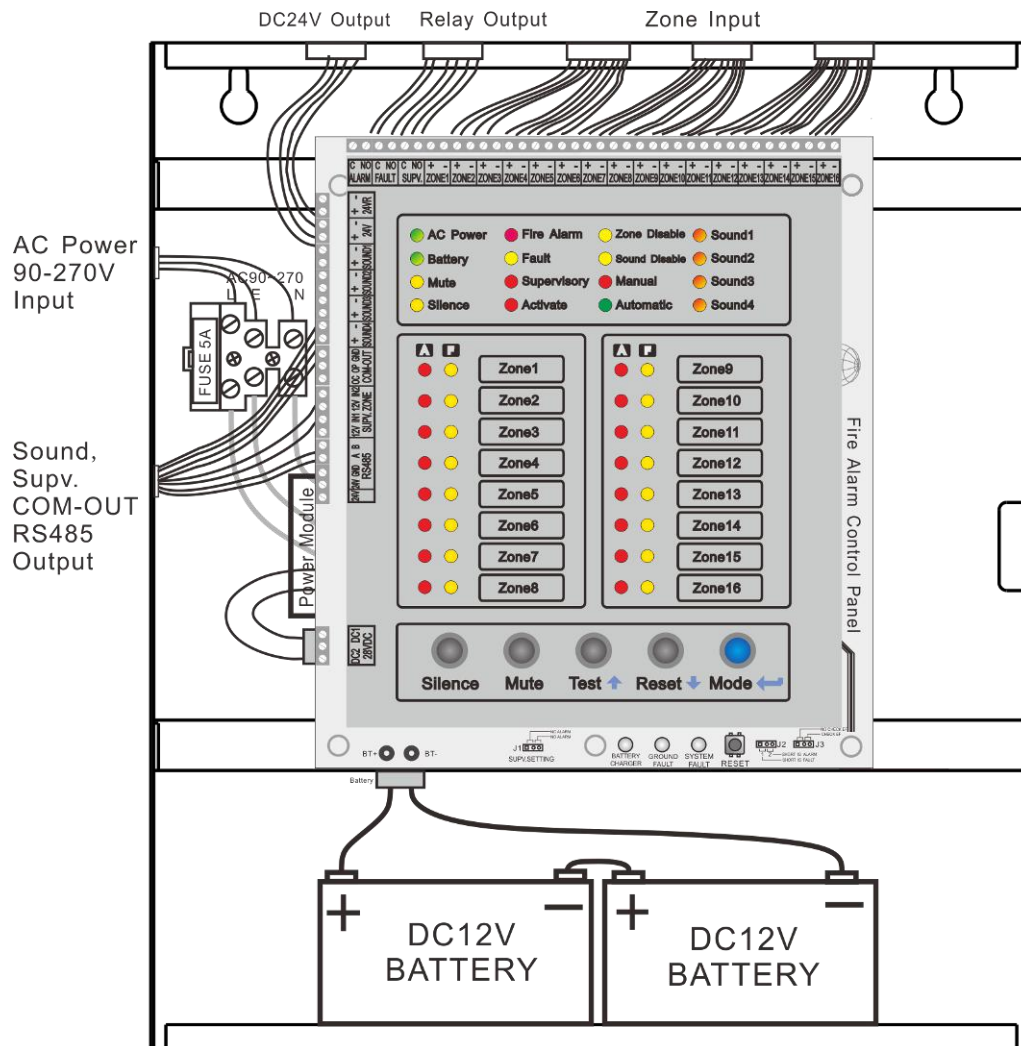
Secondary Power Source (Batteries)

Observe polarity when connecting the battery. Connect the battery cable to Battery Terminal on the main circuit board using the plug-in connector and cable provided. The battery charger is current-limited and capable of recharging sealed lead acid type batteries. The charger shuts off when the system is in alarm. See “Battery Calculations” on page 27 for calculation of the correct battery rating.



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.

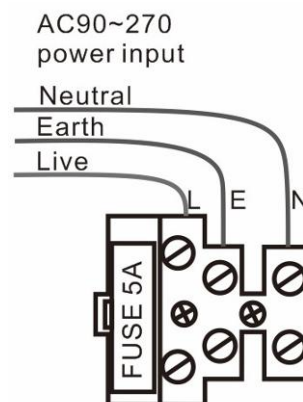
FIGURE 2-3: Typical Operating Power Connections



AC Power Input Terminals

The AC 90-270V power input wires must be connected to AC Power input terminals. Live, Earth, Neutral from left to right.

And there is one 5A fuse inserted into the terminal.



2.4 Input Zones Circuits

The control panel has 4-16 zone input circuits. The maximum loop resistance limit for each input circuit is 100 ohms. All field wiring of each zone is supervised for opens and ground faults. Both conditions are visually and audibly annunciated.

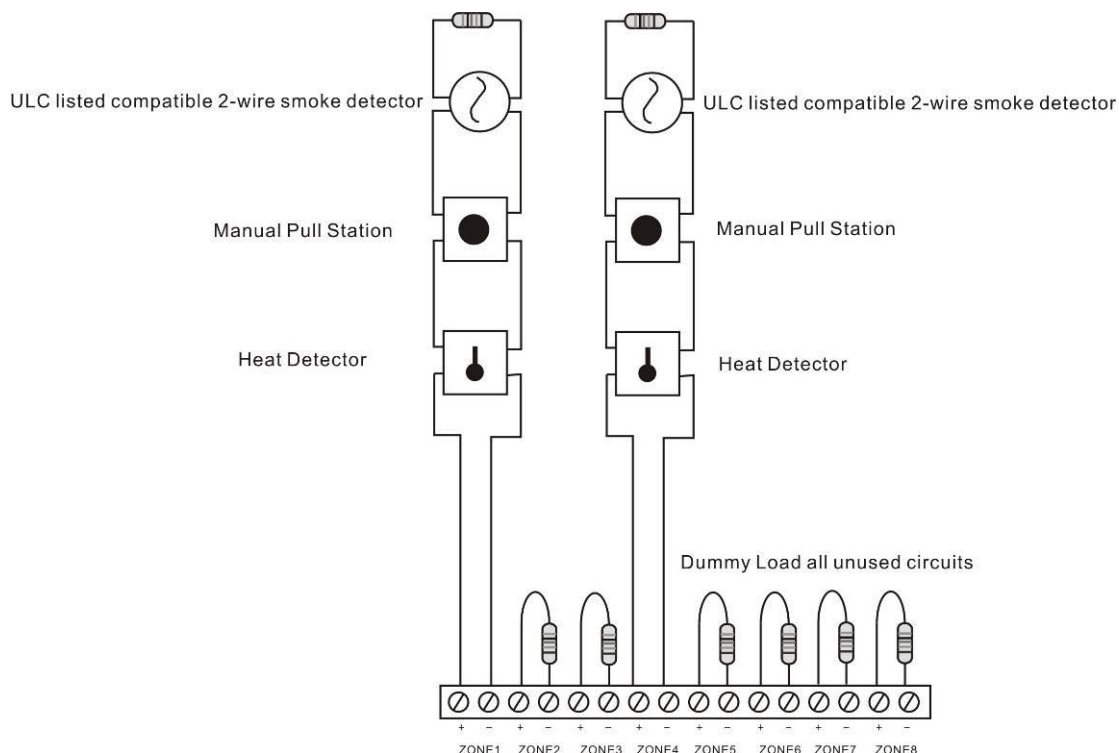
Each zone is a Initiating Device Circuit (IDC) designed to accept any normally-open contact devices and conventional 2-wire, 24 volt smoke detectors.

All zones may be configured for general fire alarm applications.

Max 30 conventional detectors in one zone.

Four-wire smoke detectors may be connected to any zone. Resettable power is provided via RESETABEL DC24V Terminal. Refer to the Device Compatibility Document for a list of compatible smoke detectors.

It is allowable to mix an assortment of device types (i.e. smoke detectors, heat detectors, pull stations, etc.) on any zone.



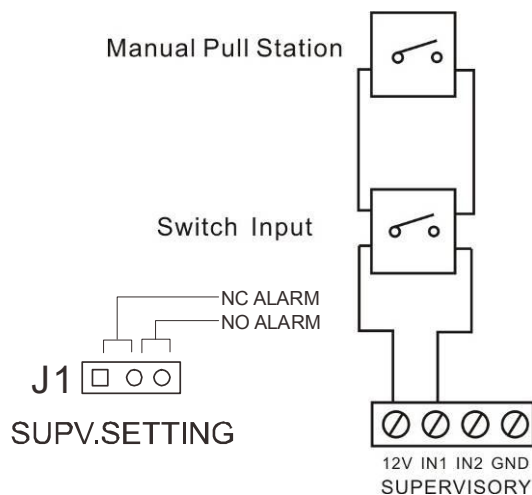
2.5 Input Supervisory Appliance Circuits

Any switch or push button can be connected in supervisory terminal IN1, IN2.

Normal Close (NC) Alarm: In the normal the switch that connect to the IN1 and IN2 is closed, and the INT1 and INT2 has DC12V, when the switch open and the IN1 or IN2 without DC12V, then there is a supervisory alarm.

Normal Open (NO) Alarm: In the normal the switch that connect to the IN1 and IN2 is opened, and the INT1 and INT2 has not DC12V, when the switch close and the IN1 or IN2 has DC12V, then there is a supervisory alarm.

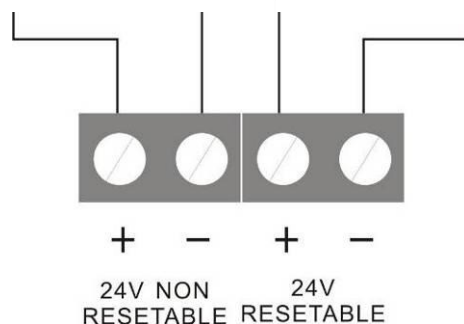
One alarm option J1 jump on the PCB board, you can select Normal Close(NC) or Normal Open(NO) alarm.



2.6 DC Power Output Connections

Nonresettable Power (1000 mA) 24 VDC
filtered, nonresettable power can be obtained from Terminals 1(+) and 2(-).

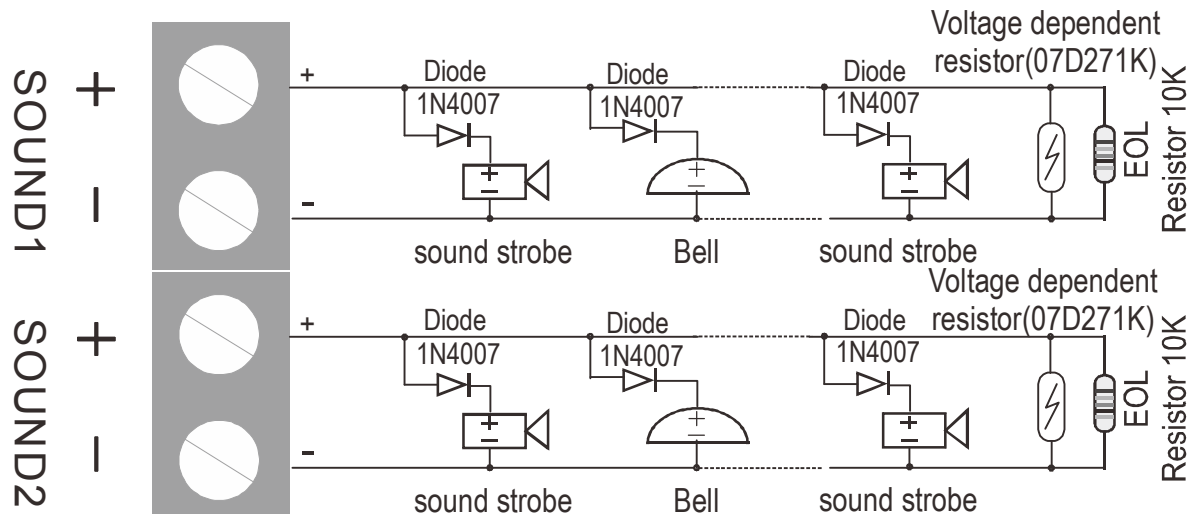
4-Wire Smoke Detector Power (1000 mA) 24VDC
filtered, resettable power for 4-wire smoke detectors can be obtained from Terminals 3(+) and 4(-)



2.7 Notification Appliance Circuits (Sounder or Bell)

The PANEL provides 1-4 Notification Appliance Circuits standard. Each circuit is capable of 0.5 amps of current. Total current drawn from these as well as other DC power outputs cannot exceed 3.0 amps with the standard transformer. Circuits are supervised. When one electric bell would be connected into sound output circuit, you should connect one diode 1N4007 before every device, and connect one voltage dependent resistor (07D271K) and one EOL resistor 10K at the end of wires.

FIGURE 2-7-1: Notification Appliance Circuit Connections



2.8 COM-OUT Circuits

The PANEL provides one DC24V positive output (OP) and one open collector GND output (OC) when panel in alarm status..

When the panel alarms, the terminal OP would connected with DC24V positive, and the terminal OC would connected with GND.

The maximum current carrying capacity of OP or OC is 1A@24VDC.

2.9 Relays Output

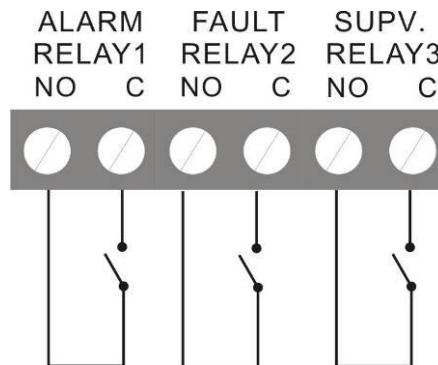
The control panel provides three relays rated for 2.0 amps @ 30 VDC (resistive) and 2.0 amps @ 30 VAC(resistive).

Relay connections may be power-limited or nonpower-limited, provided that a minimum of 0.25" is maintained between conductors of power-limited and nonpower-limited circuits.

The ALARM RELAY is open in normal , it will be close in a any alarm.

The FAULT RELAY is open in normal, it will close in a any fault.

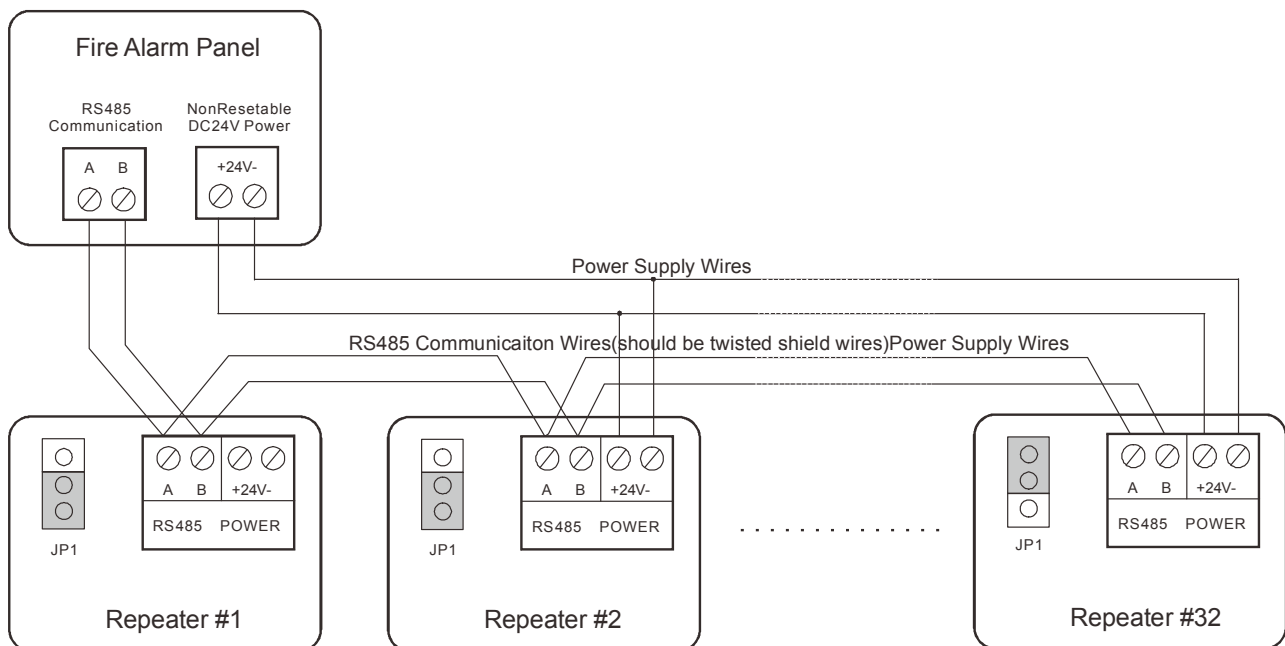
The SUPV. RELAY is open in normal , it will be close in INT1 or INT2 alarm.



2.10 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" (6.35 mm) away from any nonpower-limited circuit wiring. Furthermore, all power-limited and nonpower-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. A typical wiring diagram for the PANEL is illustrated in Figure 2-3.

2.11 RS485 Communication with repeater panels



CHAPTER 3: *Programming Instructions*

This chapter describes programming the PANEL from the onboard keypad. Programming can be performed only by a factory authorized representative. Control panel programming is possible at any time except when an alarm or zone fault condition is present or during a fire test.

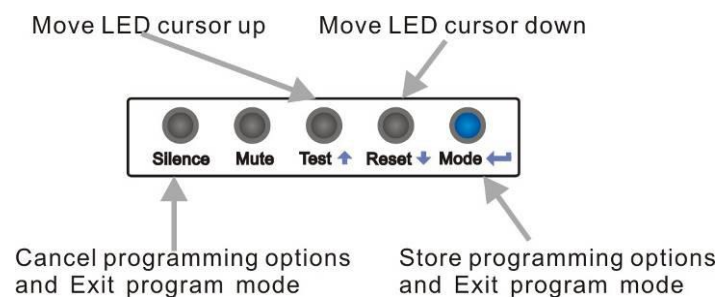
All programming selections are stored in nonvolatile Electrically-Erasable Programmable Read-Only Memory (EEPROM). This ensures that the control panel will remember all entries made in programming mode even if both AC and battery power are removed.

The control panel comes with factory chosen options already programmed. Other options may be programmed if desired. If all factory default settings are acceptable, programming is complete.

Successful entry into Program Mode from the keypad shuts off the fire protection and causes the all other LED turn off except the relative function programming LED.

3.1 Key Functions

The function of each key in Program Mode is illustrated below:



3.2 Entering Program Mode

To enter program mode, the Mode key must be pressed and held for more than three seconds (time to prevent accidental activation).

Once in Programming Mode, the control panel will:

- ✓ The piezo sounder beep twice
- ✓ Blink the Activate LED upon first entering Program Mode
- ✓ Turn off all other LEDs

3.3 Programming Functions

There are four features can be programmed as below:

- Manual Activate Sound 1-4 Output directly
- Disable Zone1-16
- Disable Sound 1-4
- Switch panel running mode in manual and automatic.

3.4 Activate Sound Output by manual

1. Press and held Mode key for more than three seconds until the Activate LED blinks.
2. Press “Enter (Mode)” key to activate ALL Sound output. The corresponding relay is activated.

3.5 Zone Disable

1. Press and held Mode key for more than three seconds until the Activate LED blinks.
2. Press “Up” and “Down” arrow key to select Zone Disable LED blinks.
3. Press “Enter (Mode)” key to enter Zone Disable menu.
3. Press “Up” and “Down” arrow key to select Zone1 to Zone16, the selected Zone LED blinks.
4. Press “Enter (Mode)” key to disable the corresponding zone. Then panel will be reset automatically.
5. After reset automatically, the disabled Zone Yellow LED turns on, and the Zone Disable LED turns on.

3.6 Sound Disable

1. Press and held Mode key for more than three seconds until the Activate LED blinks.
2. Press “Up” and “Down” arrow key to select Sound Disable LED blinks.
3. Press “Enter (Mode)” key to enter Sound Disable menu.
4. Press “Up” and “Down” arrow key to select Sound1 to 4, the selected Sound LED blinks.
5. Press “Enter (Mode)” key to disable the corresponding sound. Then panel will be reset automatically.
6. After reset automatically, the disabled Zone Yellow LED turns on, and the Zone Disable LED turns on.

3.7 Manual / Automatic running mode switch

1. Press and held Mode key for more than three seconds until the Activate LED blinks.
2. Press “Up” and “Down” arrow key to select Manual or Automatic LED blinks.
2. Press “Enter (Mode)” key to set panel running mode.

In program mode, press “Cancel (Silence)” key to exit the program mode in any time.

A pause of up to 30 seconds is allowed between each key press, otherwise the panel will exit program mode anyway.

3.8 Zone Input mode selection

There is one jump J2 on the right bottom of main PCB board,

1. Short the terminal 1, 2, all zone input short circuit indicate the fault event.
2. Short the terminal 2, 3, all zone input short circuit indicate the alarm event.

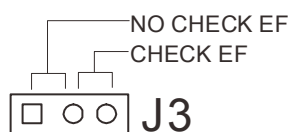
ZONE INPUT OPTION



3.9 Earth fault check selection

The panel could detect the power earth fault when the Earth Check option is selected.

The J3 jump option on the PCB board is for you to select.

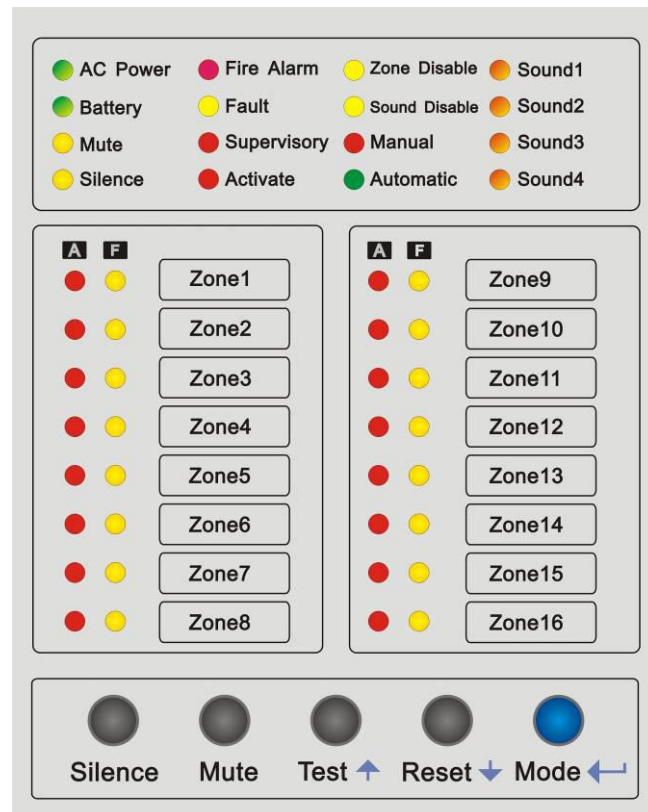


3.10 Earth fault check selection

The panel could detect the power earth fault.

EARTH FAULT CHECK OPTION

CHAPTER 4: *Operating Instructions*



The PANEL has two modes of operation which are Normal, Program.

Upon initial power-up, the system will be in Normal Mode. This section discusses operation of the control panel in the Normal Mode.

4.1 Switch Functions in Normal Mode

Silence

A Silence key is located on the PANEL keypad (illustrated in Figure 4-1).

If Silence key is pressed, the following will occur:

- ✓ The silenceable Notification Appliance Circuits (Sound1-Sound 4 Output) will be turned OFF.
- ✓ The corresponding Sound LED will be turned OFF
- ✓ The main circuit board signal Silence LED will be turned ON

Upon the occurrence of a subsequent event (alarm or trouble), signal Silence is overridden and the control panel will respond to the new event.

Mute

An Mute key is located on the PANEL keypad (refer to Figure 4-1), The Mute key silences the system piezo sounders and changes all flashing system LEDs to steady. Pressing the Mute key will have no effect on the Notification Appliance Circuits.

Test

If the Test key is pressed, the PANEL will perform a Lamp Test, All panel LEDs will be turned on and the piezo will sound.

Reset

The System Reset key resets the system and any detectors. A Reset key is located on the PANEL keypad (illustrated in Figure 4-1). If the System Reset keys are pressed, the control panel will:

- ✓ Clear the status LEDs
- ✓ Turn off the Notification Appliance Circuits
- ✓ Reset all zones by temporarily removing power
- ✓ Silence the onboard piezo sounder
- ✓ Restore all system relays to normal
- ✓ Temporarily remove power from the resettable power output Terminals

Any alarm, supervisory or fault condition that exists after a system reset will resound the system, reactivating normal system activity. Any zones and sounds that were disabled before the reset will remain disabled after the reset, the panel running mode will remain the same after the reset..

4.2 Status LEDs

AC Power LED

A green LED that remains on while the AC power supply is within correct limits. A yellow LED blinks under Battery powered condition. It turns on steady when Mute key is pressed. If this indicator fails to light under normal conditions, service the system immediately.

Battery LED

A green LED that remains on while the Battery power supply is within correct limits. A yellow LED that blinks is to indicate a low battery or no battery condition on the PANEL. It turns on steady when Mute key is pressed. If this indicator fails to light under normal conditions, service the system immediately.

Mute LED

A yellow LED that turns on to indicate that an Alarm or Fault condition exists in the system, but piezo sounder have been silenced.

Silence LED

A yellow LED that turns on to indicate that an Alarm condition exists in the system, but Notification Appliance Circuits have been silenced.

Fire Alarm LED

A red LED that turn on when a system fire alarm condition is detected.

Fault LED

A yellow LED that turn on to indicate that a system fault or abnormal condition exists and that the fire alarm system may be inoperative. It turns on steady when a signal Silence or Mute key is pressed.

Supervisory LED

A red LED that turn on to indicate the need for action in connection with the supervision or maintenance of sprinklers, extinguishing systems or other protective systems that connected in Supervisory Terminal.

Activate LED

A red LED that flashes when enter the directly activate mode. In this mode, the Notification Appliance Circuits (Sound1-Sound 4 Output) can be activated directly by manual. A red LED that turn on to indicate any of sound1 to sound 4 has been activated.

Zone Disabled LED

A yellow LED that turn on to indicate that one or more alarm zones have been disabled. The disabled zone(s) fault LED will also be on. When enter program mode, a flash LED indicates the program features.

Sound Disabled LED

A yellow LED that turn on to indicate that one or more Notification Appliance Circuits (Sound1-Sound 4 Output) have been disabled. The disabled Sound(s) yellow LED will also be on. When enter program mode,

a flash LED indicates the program features.

Manual LED

A red LED that turn on to indicate that the panel is running in manual mode. In manual mode, All Notification Appliance Circuits (Sound1-Sound 4 Output) have been disabled, but Sound1-Sound 4 Output can be activated by manual.

Automatic LED

A green LED that turn on to indicate that the panel is running in automatic mode. In automatic mode, All Notification Appliance Circuits (Sound1-Sound 4 Output) have been enabled that can be activated by Zone alarms.

- Zone1-Zone4 activates Sound1.
- Zone5-Zone8 activates Sound2.
- Zone9-Zone12 activates Sound3.
- Zone13-Zone16 activates Sound4.

Sound1-4 LED

A red LED that turn on to indicate that the corresponding Notification Appliance Circuits (Sound1-Sound 4 Output) is be activated. A yellow LED that turn on to indicate that the corresponding Notification Appliance Circuits (Sound1-Sound 4 Output) have been disabled or has some fault.

Zone 1 through Zone 16 Alarm LED

Red LEDs that blink to indicate that an alarm exists on the corresponding zone. It turns on steady when Mute key is pressed.

Zone 1 through Zone 16 Fault LED

Yellow LEDs that blink to indicate that a fault or abnormal condition exist on the corresponding zone. It turns on steady when Mute key is pressed.

LEDs on Main PCB board:

Charger LED

A green LED that remains on while the batteries has been charging by AC power.

Ground Fault LED

A yellow LED that remains on while the panel has earth fault.

System Fault LED

A yellow LED that remains on while the panel has some fault.

4.3 Operation

Normal Mode is the standard mode of operation. In this mode, the panel continuously monitors system status. The Notification Appliance Circuits will be off, all relays are in their normal state and the onboard piezo sounder will be off.

All alarm and system fault conditions are annunciated on the control panel's LEDs. The control panel will maintain a 'last event list' which will consist of all alarms, supervisory alarms and system faults currently active and not cleared, requiring immediate service. When the system is cleared and restored to normal, the LEDs will be off except for the AC Power LED and Battery LED and status LEDs.

Higher priority events take precedence over lower priority events. Display and reporting of System Status is done on a priority basis. Priorities are, from highest to lowest:

1. Alarms
2. Supervisory Alarms
3. System Faults

4.3.1 Fire Alarm Response

The control panel will, upon detection of an alarm condition, cause the following:

- Turn on the system Alarm LED
- Blink the Zone Alarm Red LED (½ second On, ½ second Off)
- Turn the Notification Appliance Circuits on
- Turn the piezo sounder on steady
- Turn on alarm relay

4.3.2 Fire Alarm Restoral

The control panel returns to normal after all alarms have been cleared and a system reset key has been pressed (pull stations have been reset, smoke detectors have reset and no smoke is present, waterflow has stopped). The control panel will perform the following upon restoral of all active alarms:

- Turn off the alarm LED
- Turn off the Zone Alarm LED
- Turn off the Notification Appliance Circuits
- Turn off the piezo sounder
- Turn off appropriate zone relay output
- Turn off alarm relay

4.3.3 System Supervisory Condition Response

These Supervisory zones can be for supervisory in applications where a waterflow sensing device has been employed and the wiring to the waterflow valve and/or a tamper switch is to be monitored. If the tamper switch has been activated (normally open contacts close), a supervisory alarm condition will occur.

When a supervisory condition occurs, the control panel will cause the following:

- Turn on the supervisory LED
- Pulse system piezo sounders (½ second On, ½ second Off)
- Turn on supervisory relay

4.3.4 System Supervisory Restoral Response

When the supervisory condition has been cleared and the reset key has been pressed, the control panel will perform the following:

- Turn off the supervisory LED
- Shut off system piezo sounders
- Turn off supervisory relay

4.3.5 Fault Condition Response

The control panel will perform the following upon detection of one or more fault conditions:

- Turn on the trouble LED
- Blink the Zone fault LED if fault condition is on the zone (½ second On, ½ second Off)
- Activate fault relay
- Sound system piezo sounders at a rate of 1½ second On, 1½ second Off

4.3.6 Fault Condition Restoral

The control panel performs the following upon restoral of all trouble conditions:

- Shut off the fault LED
- Shut off the zone fault LED(s)
- Shut off the piezo sounder
- Deactivate the fault relay

Appendix A *Battery Calculations*

Use the Total Standby and Alarm Load Currents calculated in Table A-2 and Table A-3 for the following battery calculation.

TABLE A-1: Battery Calculation

Standby Load		Required Standby Time in Hours		
Current (amps)	X	(24 or 60 Hours)	=	_____
[]		[]		
Alarm Load		Required Alarm Time in Hours		
Current (amps)	X	(i.e. 5 min. = 0.084 hours)	=	_____
[]		[]		
Add Standby and Alarm Load for Required Ampere Hour Battery			=	_____
		Multiply by derating factor of 1.2	X1.2	_____

Note:

1. 7 Ampere Hour battery can be located in the backbox.
2. Batteries larger than 7 Ampere Hour, up to 18 Ampere Hour, require the External battery box.

A.1 Main Power Supply

The PANEL provides filtered power for operating the fire alarm control panel, operating external devices and operating the standby battery. The power for operating external devices is limited. Use Table A-2 (standby or non-alarm) and Table A-3 (alarm) to determine if external loading is within the capabilities of the power supply.

TABLE A-2: Filtered Load in Standby @24 VDC.

Device Type	# of Devices		Current (amps)		Total Current (amps)
Main Circuit Board	1	X	0.08	=	0.08
2-wire Detector Heads	[]	X	[] ¹	=	
4-wire Detector Heads	[]	X	[] ¹	=	
Power Supervision Relays ²	[]	X	0.025	=	
Current Draw from DC24V (nonalarm ³)				=	
Sum Column for Standby Load				=	amps

1. Refer to the Device Compatibility Document for 2-wire smoke detector standby current.
2. Must use compatible listed Power Supervision Relay.
3. The total standby current must include both the resettable and nonresettable DC24 output.. Caution must be taken to ensure that current drawn from these outputs during alarm does not exceed maximum ratings specified (see Table A-2).

TABLE A-3: Filtered Load in Alarm @24 VDC .

Device Type	# of Devices		Current (amps)		Total Current (amps)
Main Circuit Board	1	X	0.138	=	0.138 ¹
4-wire Smoke Detector ²	[]	X	[]	=	
Power Supervision Relay ³	[]	X	0.025	=	
Notification Appliances ⁴	[]	X	[]	=	
Notification Appliances	[]	x	[]	=	
Current Draw from DC24V (alarm current)				=	
Sum Column for Standby Load⁵				=	amps

1. The current shown represents one zone on the Main Circuit Board in alarm. For all zones in alarm, the current draw increases to **0.590** amps.
2. Current limitations of terminals:
Nonresettable power :1.0 amps, filtered, 24 VDC +/-5%, 120 Hz ripple @ 10 mVRMS
Resettable power: 1.0 amps, filtered, 24 VDC +/-5%, 120 Hz ripple @ 10 mVRMS,
3. Must use compatible listed Power Supervision Relay
4. Current limitation of per Notification Appliance Circuit expandable to 1.25 amps.
5. Total current draw listed above cannot exceed 3.0 amps

Appendix B Wire Requirements

Connecting external system accessories to the PANEL main circuits must be carefully considered to ensure proper operation. It is important to use the correct type of wire, wire gauge and wire run length per each PANEL circuit. Reference the chart below to specify wire requirements and limitations for each PANEL.

TABLE B-1: Wire Requirements

CIRCUIT CONNECTIONS			WIRE REQUIREMENTS	
CIRCUIT TYPE	CIRCUIT FUNCTION	WIRE TYPE AND LIMITATIONS	RECOMMENDED MAX. DISTANCE Feet (meters)	WIRE GAUGE
Initiating Device Circuit	Connects to Initiating Devices	Untwisted, unshielded wire (Do not exceed 100 ohms)	10,000 (3,000 m) 8,000 (2,400 m) 4,875 (1,480 m) 3,225 (975 m)	12 AWG (3.25 mm ²) Belden 9583 WPW999 14 AWG (2.00 mm ²) Belden 9581 WPW995 16 AWG (1.30 mm ²) Belden 9575 WPW991 18 AWG (0.75 mm ²) Belden 9574 WPW975
EIA-485	Connects to annunciator modules and relay module	Twisted, shielded pair with a characteristic impedance of 120 ohms	6,000 (1,800 m)	18 AWG (0.75 mm ²)
24 VDC resettable, nonresettable	Connects to annunciators and other accessories	No more than 1.2 volt drop allowed from supply source to end of any branch	Distance limitation set by 1.2 volt maximum line drop	12 AWG (3.25 mm ²) - 18 AWG (0.75 mm ²)