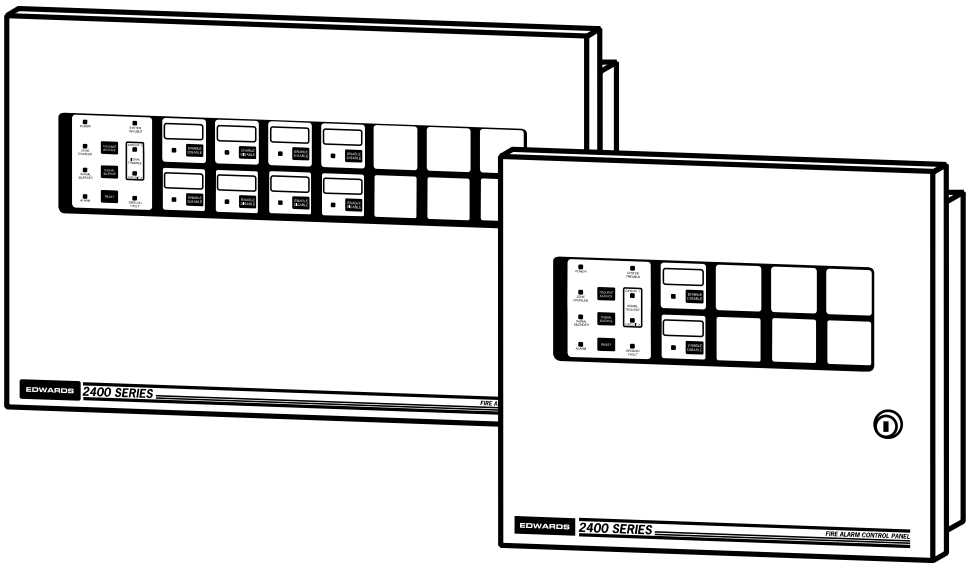
EDWARDS®
SIGNALING

Installation Instructions & Owner's Operation Manual

for Two to Eight Zone 2400 Series Fire Alarm Control Panels



P/N 46000-1320, Rev. 1.6

This product has been designed to meet the requirements of NFPA Standard 72, 1990 Edition; Underwriters Laboratory, Inc., Standard 864, May 2, 1991 Edition; and Underwriters Laboratory of Canada, Inc. Standard ULC S527. Installation in accordance with this manual, applicable codes, and the instructions of the Authority Having Jurisdiction is mandatory.

FCC WARNING: This equipment can generate and radiate radio frequency energy. If this equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply within the limits for Class A computing devices pursuant to Subpart J of part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment in a residential environment is likely to cause interference, in which case the user at his own expense, will be required to take whatever measures may be required to correct the interference.

CAUTION

1. Read and thoroughly understand this manual before proceeding to install and operate the control panel.

2. To ensure proper operation of the control of the panel, only those initiating, signaling, and other devices whose compatibility with the panel has been established by Underwriters Laboratories may be connected to the control panel. Refer to the compatability information supplement supplied with the panel for a complete list of compatible devices.

3. Test all installation wiring for opens, shorts or grounds and correct any fault found before connecting wiring to the control panel.

4. Do not connect AC or battery power until indicated.

5. Servicing of the control panel must be performed by qualified fire alarm service technicians only.

FCC Information

1. The dialer complies with Part 68 of the FCC rules. The Dialer' FCC registration number and the Ringer Equivalence Number (REN) are on the back of the dialer. This information must be provided to the telephone company, if requested.
2. An FCC compliant telephone cord and modular plug cord is supplied with the dialer. The dialer is designed to be connected to the telephone network using the supplied cord and an RJ31X or RJ38X jack, which must also comply with FCC Part 68 rules.
3. The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5). To be certain the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.
5. If the dialer causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice isn't practical, the telephone company will notify you as soon as possible. You will also be advised of your right to file a complaint with the FCC, if you believe it is necessary.
6. The telephone company may make changes in it's facilities, equipment, operations, or procedures that could affect the operation of the dialer. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.
7. If trouble is experienced with the dialer, for repair or warranty information, contact Edwards Co. 90 Fieldstone Court, Cheshire, Ct 06410-1212 Telephone: 1-203-699-3000. If the dialer is causing harm to the telephone network, the telephone company may request you disconnect the dialer until the problem is resolved.
8. No repairs may be performed on the dialer by the user.
9. The dialer cannot be used on public coin phone or party line service provided by the telephone company.

CANADA DOC Information

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction

Before installing this equipment, users should ensure that is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate

NOTICE: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirements that the sum of the Load Numbers of all the devices does not exceed 100.

FOR TECHNICAL ASSISTANCE PLEASE CALL YOUR LOCAL REPRESENTATIVE LISTED ON THE FOLLOWING PAGE.

Effectivity Page for P/N 46000-1320, Edwards 2400 Manual

Revision	Description
0.0	Initial Release
0.1	Editorial Corrections
0.2	Add 2400-ADM, 2400 -ADS, & 2400-RTU Module Information
1.0	Renamed Table 2.1 to Table 1.1. Add Table 1.2. Correct Cat. # 2245 to 2445.
1.3	Revise part numbers; Delete Table 5.9; Add Table 10.11
1.4	Add Battery Box & revise battery tables; Revise 4-wire EOL Relay; Add Auxiliary Power note; Revise RCT; delete remote station from RCT module; Add 2400-DL1 Dialer Module; Revise 2400-ADMM supervisory operation; add additional replacement parts.
1.5	Revised dialer and compatibility information
1.6	Editorial corrections. Revised: Dialer Information. Added programming warning.

Table of Contents

List of Tables, Figures, & Illustrations

Fire Alarm Control Panel

Two Zone, Three Expansion Space Panel, Cat. # 2412(R)
Four Zone, Two Expansion Space Panel, Cat. # 2414(R)
Eight Zone, Six Expansion Space Panel, Cat. # 2418(R)

1.0 DESCRIPTION

The 2412, 2414, & 2418 Fire Alarm Control Panels are protective signaling systems which feature modular construction and installer programmable microprocessor technology.

- **Panel Supervisory Features** include: continuous internal testing; a CPU watchdog timer; and module placement supervision.

- **Operational Features** include: alarm, supervisory, and trouble resound; fire drill mode; one man test mode; lamp test; alarm silence inhibit; and automatic alarm silence.

- **Programmable Options** include: verified or non-verified alarm; waterflow with or without retard; and supervisory Initiating Device Circuits (IDCs). Verified circuits support dry contact alarm initiating devices when used with high impedance smoke detectors. Indicating Appliance Circuits (IACs) may be programmed as silenceable or non-silenceable with continuous, March Time at 120 Strokes per Minute (SPM), California, or temporal rates (Figure 3.3). The temporal rate meets the requirements of the national emergency evacuation signal. Alarm silence/reset inhibit, automatic alarm silence, and off-premise AC/brownout 6 hr. trouble delay timers are provided. Resettable power for 4-wire smoke detectors is provided.

- **Hardware Options** include an 2400-RCT Relay/City-Tie Module with provisions for municipal box, reverse polarity and dry relay contact operation. The 2400-BPA Class A Base Panel Converter is available to convert the IDC and IAC circuits on the Base panels to Class A (Style D) IDC and Class A (Style Z) IAC wiring. The 2400-IDCA Class A (Style D) IDC Converter is available to convert 2400-2IDC Two Zone IDC Modules to Class A (Style D) wiring. The 2400-DL1 Dialer Module provides a supervised connection to a Central Monitoring Station via dial-up telephone lines. The 2400-ADM Four Circuit Remote Anunciator Driver Master Module and the 2400-ADS Four Circuit Remote Annunciator Driver Slave Module are available to supervise and drive remote annunciation panels. All circuits external to the panel are transient protected. All circuits except the AC power wiring, municipal box, and relay contacts are power limited. Panel option module capacity is indicated in Table 2.1. The panels have steel enclosures with a textured baked enamel finish. The enclosure has a Lexan™ viewing window, key lock, and is suitable for semi-flush or surface mounting. Room is provided in the enclosure for standby batteries. Conduit and nail knockouts, and keyhole style mounting holes help support quick installation. An optional battery enclosure, model 2400-BATBOX (R), is available when 10 Amp-Hour batteries are required.

The panel is listed by ULI to standard UL 864 and ULC to standard ULC S527.

1.1 Components

2412
Two Zone Base Panel w/3 Option Module Expansion Spaces, Gray Enclosure (Cat.# 2412)
Two Zone Base Panel w/3 Option Module Expansion Spaces, Red Enclosure (Cat.# 2412-R)
This panel provides two Class B (Style B) Initiating Device Circuits (IDCs) and two Class B (Style Y) Indicating Appliance Circuits (IACs). There is space for three option modules. Option modules include a Relay/City-Tie, Two Zone Initiating Device, a Dialer Module, and Remote Annunciator Driver Modules. Space for standby batteries is provided in the enclosure. Refer to the Appendix to select the proper battery for your application.

2414
Four Zone Base Panel w/2 Option Module Expansion Spaces, Gray Enclosure (Cat.# 2414)
Four Zone Base Panel w/2 Option Module Expansion Spaces, Red Enclosure (Cat.# 2414-R)
This panel provides four Class B (Style B) Initiating Device Circuits (IDCs) and two Class B (Style Y) Indicating Appliance Circuits (IACs). There is space for two option modules. Option modules include a Relay/City-Tie, Two Zone Initiating Device, a Dialer Module, and Remote Annunciator Driver Modules. Space for standby batteries is provided in the enclosure. Refer to the Appendix to select the proper battery for your application.

2418
Eight Zone Base Panel w/3 Option Module Expansion Spaces, Gray enclosure (Cat.# 2418)
Eight Zone Base Panel w/3 Option Module Expansion Spaces, Red enclosure (Cat.# 2418-R)
This panel provides eight Class B (Style B) Initiating Device Circuits (IDCs) and two Class B (Style Y) Indicating Appliance Circuits (IACs). There is space for three option modules. The available option modules include a Relay/City-Tie Module, a Dialer Module, and Remote Annunciator Driver Modules. Space for standby batteries is provided in the enclosure. Refer to the Appendix to select the proper battery for your application.

Table 1.1 - Base Panel Capacity

Accessory/Option Module	Base Panel		
	2412 **Panel Capacity:** **3 Option Modules**	**2414** **Panel Capacity:** **2 Option Modules**	**2418** **Panel Capacity:** **3 Option Modules**
Internal Batteries	Two 12 V @ 4.5 AH Two 12 V @ 6.5 AH	Two 12 V @ 4.5 AH Two 12 V @ 6.5 AH	Two 12 V @ 4.5 AH Two 12 V @ 6.5 AH Four 6 V @ 8.0 AH
External Batteries	2400-BATBOX(R) 2 ea. P/N 12V10, 12 V @ 10 AH	2400-BATBOX(R) 2 ea. P/N 12V10, 12 V @ 10 AH	2400-BATBOX(R) 2 ea. P/N 12V10, 12 V @ 10 AH
2 Zone Initiating Device Circuit 2400-2IDC (P/N 240457)			0
Relay/City-Tie Module 2400-RCT (P/N 240459)	Any Combination of 3, Max	Any Combination of 2, Max	Any Combination of 3, Max
Annunciator Driver Master Module 2400-ADM (P/N 240461)			
Dialer Module 2400-DL1 (P/N 240508)			

2400-BPA Base Panel Class A (Style D/Z) Converter Module (P/N 46199-1072)
This Class A (Style D/Z) Base Panel Converter changes the base panel to Class A (Style D) Initiating Device Circuits and Class A (Style Z) Indicating Appliance Circuits. The Class A Base Panel Converter does NOT require any option module expansion spaces.

2400-2IDC Two Zone Initiating Device Circuit Module (P/N 240457)
This module provides two additional Class B (Style B) Initiating Device Circuits. Each circuit is provided with an **ENABLE/DISABLE** switch and a tri-color LED. The module requires one option module expansion space.

2400-IDCA Class A (Style D) IDC Converter Module (P/N 46199-1074)
This Class A (Style D) IDC Converter changes the two Class B (Style B) Initiating Device Circuits on a Two Zone Initiating Device Circuit Module to Class A (Style D) operation. The module does NOT require any option module expansion space.

2400-RCT Relay/City-Tie Module (P/N 240459)
The Relay/City-Tie Module is a configurable Normally-Open (N.O.) or Normally-Closed (N.C.) relay contact, which is configurable to operate on panel Alarm, Trouble, Supervisory, or Reset conditions. The Relay/City-Tie Module may be configured for, municipal box, reverse polarity, or dry contact operation. Relay contacts are rated for 24 VDC @ 1A. The module has a disconnect switch and an amber Trouble LED. The module requires one option module expansion space. Off premise power failure trouble signaling using this module has a 6 hour delay.

Table 1.2 - 2400-RCT Battery Standby Requirements

Feature	2412	2414	2418
Dialer	Up to 60 Hrs.	Up to 60 Hrs.	Up to 60 Hrs.
Dry Contact (Shunt)	Up to 60 Hrs.	Up to 60 Hrs.	Up to 60 Hrs.
Master Box	Up to 60 Hrs.	Up to 60 Hrs.	Up to 60 Hrs.
Reverse Polarity	Up to 60 Hrs.	Up to 60 Hrs.	Up to 60 Hrs.

NOTES:
1. Refer to battery calculations.
2. NFPA 72 requires 60 hours of stand by battery when connecting to an off premises monitoring location

DL1 Dialer (Digital Alarm Communicator Transmitter) (P/N 240508)
The DL1 dialer module is a Digital Alarm Communicator Transmitter (DACT) for transmitting alarm, supervisory and trouble information to a compatible Digital Alarm Communicator Receiver (DACR) via two dial-up telephone lines. The dialer supports 20 PPS 3/2 or 4/2 format for communicating between the panel and the DACR (see specifications). Both Dual Tone Multi Frequency (DTMF) and Pulse dialing are automatically supported. AC power failure reporting may be delayed. The dialer performs an automatic test call every 24 hours to verify communications between the fire alarm panel and the receiving equipment. Dialer module programming is performed with any standard tone dial(DTMF) telephone. All programming is password protected.

2400-ADM Four Circuit Annunciator Driver Master Module (P/N 240461)
The Four Circuit Remote Annunciator Driver Module is used to supervise and operate the connection to four individual alarm zone LEDs on a conventional zone annunciator. The -ADM is automatically configured for IDC zones 1 to 4. The Annunciator Driver Master Module requires one expansion module space in the enclosure.

2400-ADS Four Circuit Annunciator Driver Slave Module (P/N 240463)
The Four Circuit Remote Annunciator Driver Slave Module is used to supervise and operate the connection to four additional alarm zone LEDs on a conventional zone annunciator. The -ADS is automatically configured for IDC zones 5 to 8. The Remote Annunciator Driver Slave Module mounts on the 2400-ADM Master, module and does NOT require any expansion module space.

2400-RTU Remote Trouble Unit (P/N 46199-1076)
The 2400-RTU Remote Trouble Unit is a remote trouble annunciator which displays fire alarm normal and trouble conditions. The unit is provided with a power LED and an integral trouble buzzer. A trouble silence switch with ring-back is also provided.

2400-xZA Remote Zone Annunciators
The 2400-xZA Remote Zone Annunciators duplicate the control panel's individual zone alarm LEDs at a location remote from the control panel. Model 2400-4ZA provides 4 zone LEDS, model 2400-8ZA provides 8 zone LEDs.

2400-RTUxZA Combination Remote Annunciators
The 2400-RTUxZA Remote Annunciators combine the features of the 2400-RTU and the 2400-xZA annunciators in a single package. Model 2400-RTU4ZA provides remote trouble annunciation and 4 zone LEDS, model 2400-RTU8ZA provides remote trouble annunciation and 8 zone LEDs.

Batteries are available in a variety of sizes to meet the 24 and 60 hour standby requirements, followed by 5 or 30 minutes in alarm. Table 1.1 shows the batteries suitable for each panel. Appendix 1 provides information on battery sizing.

2.0 APPLICATION

The 2412, 2414, and 2418 panels are suitable for small to medium size buildings, requiring from two to eight Initiating Device Circuits (IDCs), and two Indicating Appliance Circuits (IACs).

2.1 Fire Alarm System Limitations

Fire Alarm Systems provide the occupants of a facility with early warning of smoke and fire conditions. Fire alarm systems use a variety of components to meet the requirements of each installation. The fire alarm panel, automatic and manual detection devices, alarm annunciators, and the installation wiring are all factors in a reliable system. To maintain proper operation, fire codes require, and this manufacturer recommends preventive maintenance and testing on a routine basis by qualified personnel.

3.0 THEORY OF OPERATION

3.1 Initiating Device Circuits (IDCs)

The supervised IDCs operate with compatible smoke detectors (refer to Appendix) and normally-open alarm initiating devices. An IDC may be programmed as an Alarm, Waterflow/Supervisory, or Supervisory zone. Alarm zones may have verified or non-verified operation. Waterflow/Supervisory zones programmed with or without a 15 second retard period, also support *a single* supervisory input device with a 1.1K Ω series resistor. IDC circuits may take one of four operating states: Normal, Trouble, Alert, or Alarm. Table 3.1 defines the states for the various IDC zone types.

Table 3.1 - IDC Operation

Zone Type	State of Operation			
	Alarm (Low Impedance)	Alert (High Impedance)	Normal	Open
Non-Verified Alarm Zone	Alarm	Alarm	Normal Operation	Trouble
Verified Alarm Zone with high impedance smoke detectors and N.O. contact devices	Alarm	Verifying the Alarm	Normal Operation	Trouble
Verified Alarm Zone with smoke detectors only	Verifying the Alarm	Verifying the Alarm	Normal Operation	Trouble
Waterflow/Supervisory Zone	Alarm	Supervisory Condition	Normal Operation	Trouble
Waterflow/Supervisory Zone with Retard	Alarm after 15 seconds	Supervisory Condition	Normal Operation	Trouble
Supervisory Zone	Supervisory Condition	Supervisory Condition	Normal Operation	Trouble

WARNING! Do NOT put contact devices on Low Impedance Verified Circuits.

An active IDC defined as an Alarm or Waterflow Zone may be identified by a steady red zone LED. Active IDCs defined as supervisory zones may be identified by a rapid flashing amber zone LED.

When an IDC is programmed as a waterflow zone, the IACs DO NOT respond to the **ALARM SILENCE** switch or automatic alarm silence until the waterflow device is no longer active. Both an alarm initiating device and a supervisory contact may co-exist on the same circuit by putting a 1.1KΩ in series with the supervisory contact. When the waterflow with retard option is programmed, a special algorithm samples the circuit repeatedly. If 66% of the samples taken in any 15 second period indicate a waterflow (shorted) condition, the circuit activates a waterflow alarm.

When an IDC is programmed as a verified zone and a smoke alarm is detected, the panel enters the Alarm Verification state. A twenty five second sequence in which the detector is reset, delayed, and restarted is initiated, as shown in Figure 3.1. If auxiliary power is programmed as resettable, it is de-energized for the reset period. Following the reset-delay-restart sequence, a 60 second verification window is opened. If the verifying zone should go into the Alert, Alarm, or Trouble conditions within the 60 second window as shown in Figure 3.2, the panel enters the alarm mode. If any *other* IDC on the panel goes into the alert or alarm state during the verification period, the panel *immediately* enters the alarm mode. Dry contact alarm initiating devices may be combined with *High Impedance* 2-wire smoke detectors on verified zones. The closing of a normally open dry contact alarm initiating device generates an Alarm state immediately, and the panel enters the alarm mode.

Initiating Device Circuit, Class A (Style D) Operation
To convert a Class B (Style B) IDC zone to a Class A (Style D) IDC zone, install a 2400-BPA Class A

NOTE

2- Wire Relay Bases are NOT supported on Initiating Device Circuits (IDCs).

(Style D/Z) Converter on the *base panel*, or a 2400-IDCA Class A (Style D) Converter on the *Two Zone IDC Module*. The converters provides an alternate path to the zone module for all Initiating Devices in the event of a single wire break in an IDC.

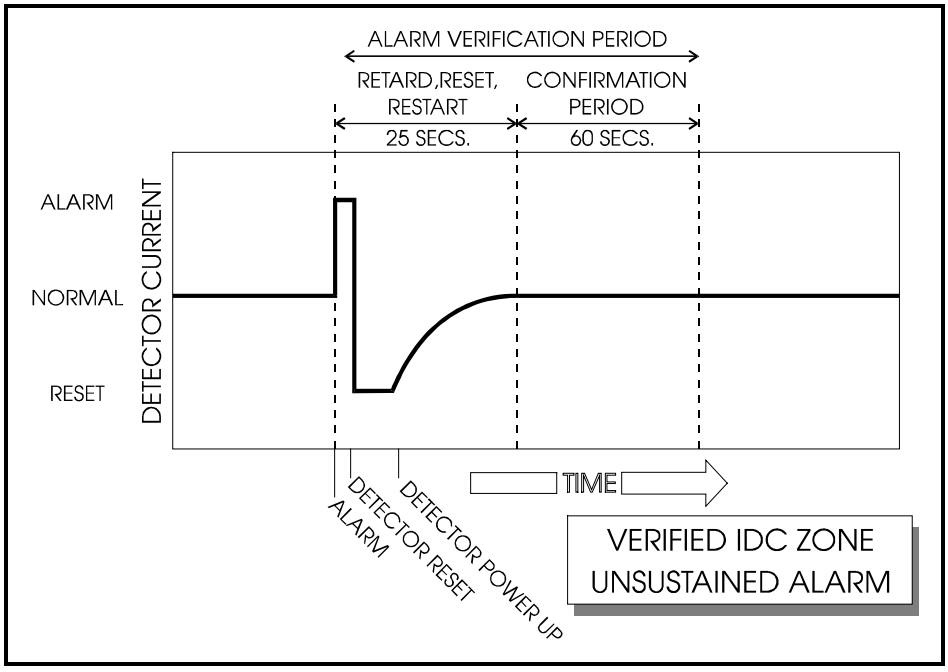


Figure 3.1 - Unsustained Alarm Operation

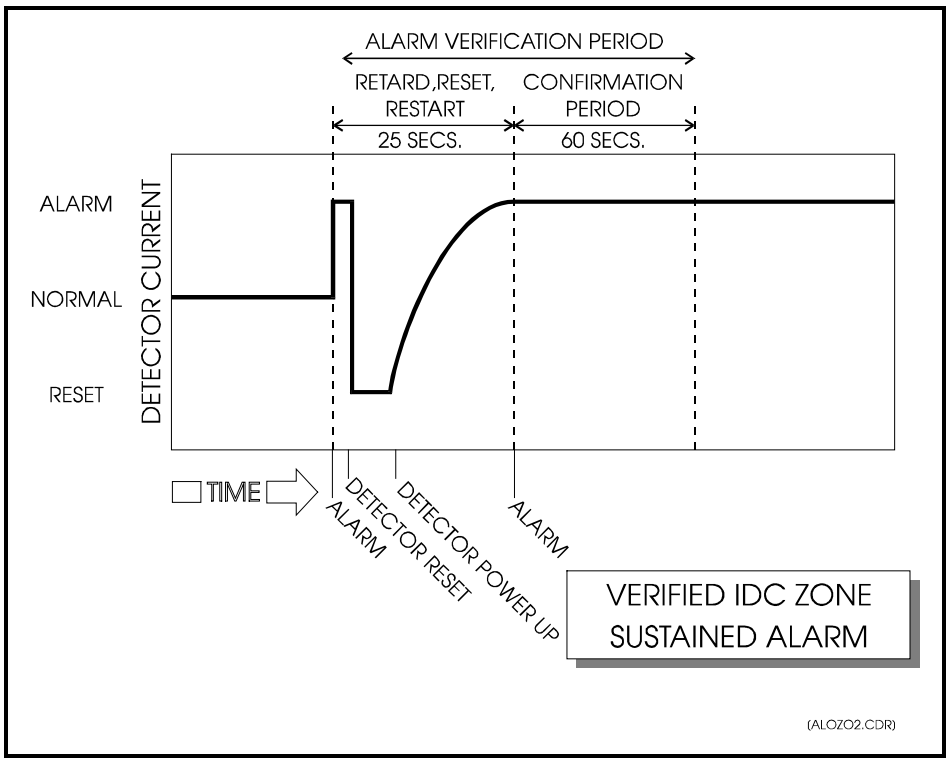


Figure 3.2 - Verified Alarm Operation

3.2 Indicating Appliance Circuits (IACs)

Two supervised Indicating Appliance Circuits (IACs) operate using compatible 24 VDC (nominal) polarized signaling appliances. Each circuit is rated at nominal 24 VDC @ 2.5 Amps, with a total of 4.0 Amps available for both circuits. An IAC may be programmed as either silenceable or non-silenceable. Signal rate selection is independently programmable for each IAC as shown in Figure 3.3. Refer to the Appendix for compatible Indicating Appliances.

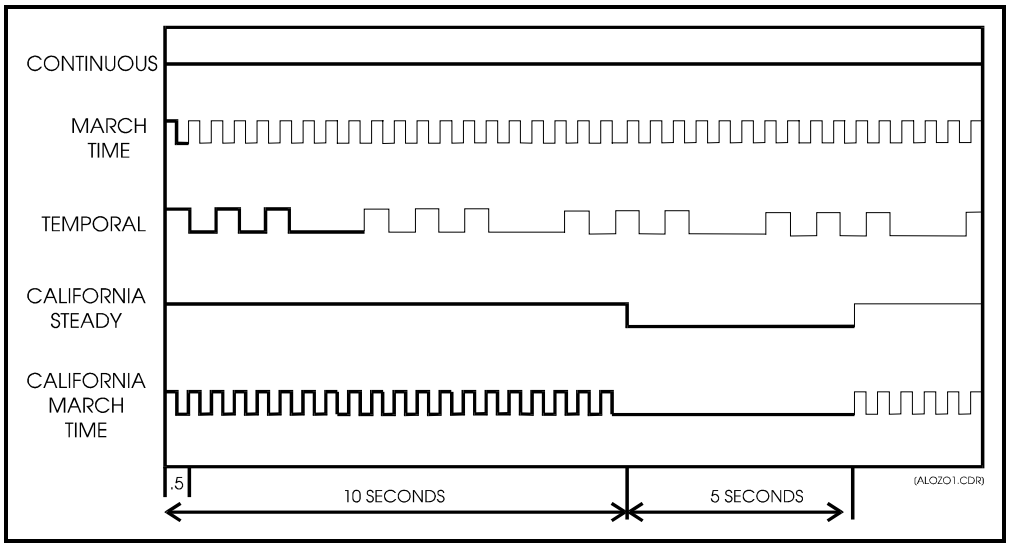


Figure 3.3 - IAC Signal Rates

IACs generate a trouble indication (slow flashing LED) when field wiring is *open* or *shorted*. In an open fault condition, the panel will attempt to energize the signal appliances (i.e., all appliances up to the circuit break will operate). An IAC with shorted field wiring will NOT operate in the event of an alarm. If an IAC develops a short during an alarm, the IAC will automatically shut off and continuously monitor the field wiring. When the fault is cleared, the IAC will re-energize. These actions protect the power supply and other panel components from damage caused by the short circuit.

Indicating Appliance Circuit, Class A (Style Z) Operation
To convert Class B IAC zones to Class A (Style Z) IAC zones, install a 2400-BPA Class A (Style D/Z) Converter Module on the base panel. The converter provides alternate paths to the base panel for both Indicating Appliance Circuits in the event of a single wire break in an IAC.

4.0 INSTALLATION

4.1 Codes and Standards

Install this panel in accordance with all applicable codes and standards to the satisfaction of the Authority Having Jurisdiction (AHJ). A partial list of codes and standards appears in the Appendix.

US Installations: For Class B (Style B/Y) circuits, the End-Of-Line resistor is installed on the last device.

Canadian Installations: For Class B (Style B/Y) circuits, purchase End-Of-Line resistor plates separately from your Distributor. Use the specified resistors and install in a separate electrical box in an accessible location beyond the last device on a circuit.

4.2 Site Storage

Remove backbox from top of carton. Place extra modules in panel carton and store safely in a dry location during rough-in, to avoid damage to electronic parts.

4.3 Drawing References

Table 4.1 lists the drawings that are included at the end of this manual.

Table 4.1 - Drawing References

Subject	Drawing Title
Assembly Details Ribbon Connectors Battery Interconnect	Control Panel Installation 1 Control Panel Installation 2
Base Panel Circuits IAC Wiring Diagram IAC Wire Chart	Control Panel
Initiating Device Circuits IDC Wire Chart	Initiating Device Circuit Wiring
2IDC Two Zone Initiating Device Circuit Module	INITIATING DEVICE CIRCUIT WIRING or see the Installation Sheet supplied with the Two Zone IDC Module
Relay/City-Tie Module Applications. Connections and Jumper Settings	Relay/City Tie Module Control Panel Applications 1 or see the Installation Sheet supplied with the Relay/City-Tie Module
Remote Annunciators & Annunciator Driver Modules	REMOTE ANNUNCIATORS
4-Wire Smoke Detectors	Control Panel Applications 2
Class A Wiring	CONTROL PANEL INITIATING DEVICE CIRCUIT WIRING or see the Installation Sheets supplied with the BPA Base Panel Class A Converter Module & IDCA, 2IDC Module Class A Converter
Panel Programming Instructions	Panel Programming
Panel Operations	Panel Operation

4.4 Installation Instructions

Mounting the Backbox
Install backbox per drawings Control Panel INSTALLATION 1 and Control Panel INSTALLATION 2. If a 2400- BATBOX Battery Cabinet is required, refer to the CONTROL PANEL APPLICATIONS 2 drawing for information.

Utility or Primary Power Circuit

NOTE

Install primary power conduit on *lower left side* or *left bottom* of backbox.

The panel requires a dedicated 120 VAC, 15A, 50/60 Hz branch circuit. Label the circuit breaker "Fire Alarm Control Panel." Within the fire alarm enclosure, route wire away from power limited circuit wiring.

WARNING

Do NOT apply power at this time.

System Control Wiring

1. Refer to the drawings at the end of this manual for circuit wiring diagrams and wire charts showing maximum wire runs and loading. Install system wiring using the wire type and gauge per the Authority Having Jurisdiction. Locate field wiring conduit on the upper sides and top of the backbox. **At the panel, leave approximately 5' (1.5 m) of wire available for dressing and termination.** Pair and label wires according to zone and function. Do not mix power limited and non-power limited wiring in the same conduit.

2. Do not remove the factory installed test resistors from the panel at this time. The test resistors are used for panel testing in the next steps. Refer to the drawings provided with each initiating and signaling device for installation details. Install End-Of-Line resistors at the end of Class B circuits.

3. Use an ohm meter to check circuit continuity and verify that the wiring is free of shorts and ground faults, as follows:

   Class B (Style B) IDC meter readings should show 4.7KΩ (EOL Resistor) between circuit pairs. Each wire should show an *open* to ground.

   Class A (Style D) IDC meter readings should show a *short* between each set of outgoing and incoming wires, and an *open* between each side of the circuit.

   Class B (Style Y) IAC meter readings should show 4.7KΩ (EOL Resistor) between circuit pair in one direction and a short (polarized signals conducting) with the meter leads reversed. Each wire should show open to ground.

   Class A (Style Z) IAC meter readings should show a *short* between each set of outgoing and incoming wires. Readings should show an *open* in one direction and a *short* (polarized signals conducting) with the meter leads reversed between each side of the circuit.

Base Panel Assembly

CAUTION

The electronic components used in this system are sensitive to static electricity. Always discharge any static buildup on your body by touching the panel enclosure before handling any electronic components.

WARNING

The System Power Supply (the printed circuit board on the back of the Base Panel Assembly) handles 170 VDC when powered. DO NOT handle this board with power on.

1. Remove the Base Panel Assembly from its anti-static carton.
2. Remove and place the anti-static foam packing on a flat work area.
3. Place the Base Panel Assembly Display face down on the foam packing. *Leave the factory end-of-line resistors in place on the base panel and expansion modules until making final connections.*

Option Module Installation

If your system requires no optional expansion modules, skip to the section entitled **Base Panel Assembly Installation**.

1. Refer to the CONTROL PANEL INSTALLATION 1 and CONTROL PANEL INSTALLATION 2 drawings.
2. Remove the Power Supply from the Base Panel Assembly to allow for first module installation.
3. Install Expansion Modules on the Base Panel Assembly from left to right (front view) starting with IDC Modules, Remote Annunciator Driver Modules, then the Relay/City-Tie Modules. **Before installing the ADM & ADS Annunciator Driver Modules, verify that all jumpers are installed. Before installing the RCT Relay/City-Tie Modules, verify that jumpers 1 & 2 are installed. Refer to** RELAY/CITY-TIE & REMOTE ANNUNCIATOR **drawings for additional jumper information.**

NOTE

The Dialer Module MUST be installed in position number 3 or higher to prevent mechanical interference with other system components.

Do NOT connect the Dialer Module's ribbon cable to the adjacent module until the rest of the system has been installed and tested.

4. Insert all ribbon connectors (except the Dialer Module) into the adjacent socket, and re-install the Power Supply on the back of the Base Panel Assembly. The Dialer Module will be connected later.
5. For Class A (Style D/Z) circuits, install the 2400-BPA Class A Converter modules on the back of the Base Panel Board and 2400-IDCA on the back of the IDC Expansion Modules. Refer to CONTROL PANEL INSTALLATION 1, CONTROL PANEL INSTALLATION 2, and INITIATING DEVICE CIRCUIT drawings.

Base Panel Assembly Installation

1. Refer to the CONTROL PANEL INSTALLATION 1 or CONTROL PANEL INSTALLATION 2 drawings. If a 2400-BATBOX Battery Cabinet is required, refer to the CONTROL PANEL APPLICATIONS 2 drawing for information.
2. Lift wiring up and away from the backbox, and install the Base Panel Assembly using the four quick fasteners. **Do not connect control circuit wiring at this time.**
3. Install the panel door and make the ground connection (green wire) from the power supply to the middle door mounting stud.

WARNING

Batteries can deliver extremely high currents. To prevent serious burns caused by short circuiting the battery, remove all jewelry before handling.

4. Place the batteries in the lower right area of the backbox. If using the external battery cabinet, put the batteries in the battery cabinet.
5. Interconnect the cells per the CONTROL PANEL INSTALLATION 1 or CONTROL PANEL INSTALLATION 2 drawings. If a Battery Cabinet is being used, refer to the CONTROL PANEL APPLICATIONS 2 drawing for information. **Connect panel battery leads at this time. Observe polarity: Red = positive (+); Black = negative (-)**

CAUTION

Observe polarity. Red is positive(+), Black is negative(-). A non-replaceable fuse protects the system from damage caused by a reversed battery connection.

Power Up

1. Verify that all factory installed end-of-line resistors are still in place, all -ADM & -ADS module jumpers are all installed, and -RCT module jumpers 1 & 2 are installed.
2. Connect primary power wires: **L**ine, **N**eutral, and **G**round to the input terminals of the power supply.
3. Energize AC power to the system. *When you first apply power to the system it will follow an initialization procedure. This procedure programs all connected IDCs as non-verified alarm inputs and identifies the configuration of all output modules (it can take up to 15 seconds). You will see zone LEDs turning on and off in sequence and communication LEDs (lower edge of expansion module boards) flashing. Allow the system to complete this procedure before touching any controls. At the end of the process, all LEDs except the Power On LED should be off. If the system trouble LED is on and the trouble signal is sounding, refer to the trouble shooting procedures in this manual. If module LEDs remain on steady, refer to the Programming section for additional information.*
4 Install the lower protective plastic barrier over the high voltage terminals. **Make sure to install this cover strip. It protects you from the high voltage input terminals and traces on the power supply printed circuit board.**

Programming the Panel

1. Remove the Common Control insert card, reverse it, and then return it to its panel location. The Common Control switches are now labeled for programming functions.
2. Refer to Table 5.1 for panel default operations and the PANEL PROGRAMMING drawing for programming information. For Dialer Module programming, refer to the DIALER MODULE drawing

3. Fill-in the Panel Configuration & Programming Worksheets (located in the Appendix) and program the panel for the desired operation. *Save the Panel Configuration Worksheets for future reference.*
4. Remove, label, and re-insert the IDC, Relay/City-Tie, and Anunciator Driver Module insert cards. Use the Panel Configuration Worksheets in this manual to assist in labeling. Reverse the Base Panel insert card to display Fire Alarm Control functions.

Panel Function Testing

1. Test panel operations by *shorting* (Alarm) or *opening* (Trouble) the factory installed End-Of-Line resistors.
2. To activate IDC circuits which combine *high impedance* smoke detectors and contact devices, or supervisory signal operation of a waterflow/supervisory circuit, use a 1.2KΩ resistor in parallel with the End-Of-Line resistor.
3. Remove the End-Of-Line resistor to verify proper trouble response.
4. Reset the panel, allowing 20 seconds for the panel to return to normal.

IDC & IAC Field Wiring Connections

1. Refer to the CONTROL PANEL INSTALLATION, initiating device circuit wiring, control panel applications 1, & control panel applications 2 drawings for wiring details.
2. Dress all wires to allow "hinging" the Base Panel Assembly on the left by dressing your connections from right to left. This allows you to rotate the Base Panel Assembly out of the enclosure for access to system modules, facilitating additions or changes.
3. Leaving the system powered up, install the IDC & IAC circuits one at a time. The system will go into Trouble mode. Remember to **remove** the factory installed End-of-Line resistor from the panel or module terminals.)
4. Use the **TROUBLE SILENCE** switch to silence the Trouble signal.
5. Connect the appropriate field wiring, observing circuit polarity. If the wiring is correct, the trouble condition will clear (Trouble LED and amber Zone LED turn off).

2400-DL1 Dialer Panel and Field Wiring Connections

> *To eliminate excessive calls to the Central Monitoring Station, the Dialer Module panel connection (ribbon cable) and programming should be performed after the balance of the panel has been tested and verified operational.*

1. Verify the Central Monitoring Station (CMS) is properly programmed and ready for connection.
2. Refer to the DIALER drawing and DACR technical manual for wiring and programming details.

3a. Dress all wiring to allow "hinging" the Base Panel Assembly on the right by dressing your connections from right to left. This allows you to rotate the Base Panel Assembly out of the enclosure for access to system modules, facilitating additions or changes.

3b. Fasten the dialer module to the panel assembly with the screws and standoffs provided.

3c. Fasten the bus interface adapter to the rear of the dialer, using the screws provided.

3d. Connect the ribbon cable to the next module in line. The system and dialer module will indicate trouble conditions.

4a. Set the panel's program switch to program mode (UP), and push the RESET switch.

4b. Wait for the Power LED to flash, then return the program switch to normal mode (down). This process installs the Dialer Module in the panel's data base. The panel will remain in trouble until the dialer is properly wired and programmed.

CAUTION

The telephone jacks must be installed by an authorized representative of the telephone company. Phone lines must be loop start on the public switched network.
PBX, ground start, and party lines are not acceptable

5. Using the supplied 7Ft. (2.13 M) phone jack extension cables, connect J1 & J2 to the RJ31X, or RJ38X (CA31A or CA38A in Canada) telephone jacks. A protective grommet is supplied for the enclosure knockout. The telephone jacks must be installed by an authorized representative of the telephone company. The phone lines must be loop start on the public switched network. PBX, ground start, and party lines are not acceptable.
6. With system powered up, program the dialer as shown in the drawing. **A new dialer module will remain in disabled until completely programmed**. Use the TROUBLE SILENCE switch to silence the Trouble signal.
7. If the telephone lines are wired properly and the panel is programmed correctly, the trouble condition will clear (panel and module trouble LEDs turn off), when the dialer is enabled.
8. Activate and open all IDCs and IACs, verifying proper reception at the CMS.
9. Verify that failure of the primary signal path (phone line connected to J1) results in a trouble signal being transmitted via the secondary signal path (phone line connected to J2) within 4 minutes.
10. Verify that failure of the secondary signal path (phone line connected to J2) results in a trouble signal being transmitted via the primary signal path (phone line connected to J1) within 4 minutes.

NOTE

If a DL1 Dialer Module is installed, it will introduce a panel trouble until programmed.

NOTE

The Dialer Module will be disabled, with the LED “double flashing” amber until both phone numbers and both site ID numbers are set. Pressing the disconnect switch will have no effect.

WARNING

The DL1 Dialer Module requires separate programming in order to operate.
Refer to the DIALER MODULE Drawing.

2400-ADM & 2400-ADS Field Wiring Connections

1. Refer to the REMOTE ANUNCIATOR drawing for wiring details.
2. Dress all wires to allow "hinging" the Base Panel Assembly on the left by dressing your connections from right to left. This allows you to rotate the Base Panel Assembly out of the enclosure for access to system modules, facilitating additions or changes.
3. Leaving the system powered up, connect the (+)24 VDC wire from the annunciator to the (+) Auxiliary Power terminal.
4. Connect the NO (Normally Open) and NC (Normally Closed) wires from the annunciator to the NO and NC trouble relay contacts on the control panel. Install a jumper between the trouble relay common terminal and the (-) Auxiliary Power terminal.
5. Install all supervision jumpers
6. Connect the ADM & ADS LED circuits one at a time by removing the corresponding supervision jumper.
7. Use the **TROUBLE SILENCE** switch to silence the Trouble signal.
8. Connect the appropriate field LED wiring. If the wiring is correct, the trouble condition will clear (Trouble LED and amber Zone LED turn off).

2400-RCT Field Wiring Connections

1. Refer to the RELAY/ CITY-TIE drawing and receiving station technical manual for wiring details.
2. Dress all wires to allow "hinging" the Base Panel Assembly on the left by dressing your connections from right to left. This allows you to rotate the Base Panel Assembly out of the enclosure for access to system modules, facilitating additions or changes.
3. Use the **TROUBLE SILENCE** switch to silence the Trouble signal, if sounding.
4. Connect the appropriate field wiring, observing circuit polarity. If the supervised wiring is correct, the trouble condition will clear (Trouble LED and amber Zone LED turn off).

Field Wiring Trouble (Also refer to **Troubleshooting**)

1. Clear any wiring faults as you install the field wiring. When a fault on a Class B circuit is cleared, the panel will automatically return to the Normal mode. When a fault on a Class A circuit is cleared, the panel must be manually reset to return it to the Normal mode.
2. If an IAC is *shorted* (or a signal appliance connection is reversed) or *open*, the circuit will continue to display trouble. If an IAC has a *ground fault*, the trouble signal will resound and the Ground Fault LED will turn on.
   If an IDC has a *short*, the zone LED will change to red and the system will go into Alarm mode (delayed 25 seconds if the circuit is programmed as a Low Impedance verified smoke detector circuit). If an IDC has a *ground fault*, the trouble signal will resound and the Ground Fault LED will turn on.
3. Continue to complete supervised circuit connections one at a time using the panel to verify proper wiring.
4. Connect ancillary circuits and remote monitoring and remote annunciator circuits per installation drawings in this manual.
5. Test each circuit for proper function by putting the system into Alarm, Supervisory, or Trouble modes. Refer to **Operating the Panel** for a description of testing procedures.

5.0 PROGRAMMING

Panel Configuration Worksheets may be found at the end of this manual. These worksheets should be filled out prior to programming the panel, and saved with this manual should further programming be required at a later date. Refer to the PANEL PROGRAMMING drawing during the programming process. The reverse side of the base panel identification labels are programming templates. Remove, reverse, and re-insert the template labels as a programming aid. Dialer programming is covered in section 5.6.

CAUTION

The panel MUST be reprogrammed whenever permanently *adding* (or *removing*) option modules to (from) the system. Replacing a module with another module of the same type does NOT require reprogramming.
DO NOT DISCONNECT AC POWER WHILE IN THE PROGRAMMING MODE!

The panel is shipped from the factory with the default configuration denoted by ✷ in Table 5.1. The panel defaults may be re-programmed any time during the programming sequence by simultaneously pressing the **TROUBLE SILENCE** and **RESET** switches for one second, which also returns you to the start of the programming process. The programming step (of the panel being programmed) is indicated by the flash phase of the green Power LED. The program variable and flash phase is indicated in Table 5.2.

Table 5.1 - Programmable Features
✷ = Default

Initiating Device Circuit (IDC)	
1✷	Non-Verified Alarm
2	Verified High Impedance Detector w/Contact Device (See Note)
3	Verified Low Impedance Detector Only
4	Supervisory
5	Waterflow & Supervisory
6	Waterflow w/retard & Supervisory
Indicating Appliance Circuit (IAC)	
1✷	Affected by Alarm Silence Features
2	Not affected by Alarm Silence Features
IAC Signal Rates	
1✷	Continuous
2	March Time @ 120 SPM
3	Temporal 3-3-3
4	Continuous ON for 10 Seconds., 5 Seconds. OFF
5	March Time ON for 10 Seconds., 5 Seconds. OFF
Alarm Silence Inhibit Timer	
1✷	No Timer
2	One Minute Inhibit
3	Two Minute Inhibit
4	Three Minute Inhibit
Automatic Signal Silence Timer	
1✷	No Timer
2	10 Minutes to Silence
3	20 Minutes to Silence
4	30 Minutes to Silence
Auxiliary Power Reset	
1✷	Auxiliary Power NOT Reset
2	Auxiliary Power Reset

NOTE: Do Not use this option. High Impedance detectors are not presently available.

Table 5.2 - Programming Step Indications	
Program Step	**Power LED Flash Phase**
Module Placement & Verification	1 = ✡PAUSE ✡ PAUSE ✡...
Initiating Device Circuits (IDC)	2 = ✡✡ PAUSE ✡✡ PAUSE ✡✡..
Indicating Appliance Circuits (IAC)	3 = ✡✡✡ PAUSE ✡✡✡ PAUSE ✡✡✡..
Timer Settings	4 = ✡✡✡✡ PAUSE ✡✡✡✡ PAUSE ✡✡✡✡..
Auxiliary Power Setting	5 = ✡✡✡✡✡ PAUSE ✡✡✡✡✡ PAUSE ✡✡✡✡✡..

To modify the panel default settings shown in Table 5.1, enter the programming mode as follows:

1. Move the **PROGRAMMING MODE** switch to the ON (down) position.

2. Press the **RESET** switch. The green Power LED will display a single-phase flash after approximately 20 seconds. The trouble buzzer sounds at a four pulse/minute rate, indicating you are in the automatic module placement & verification step of the programming process.

   The panel automatically identifies all option modules installed in the panel by lighting each installed module's amber trouble LED. This process can take up to 30 seconds. Failure to light a module's trouble LED indicates a defective module or connection.

NOTE

If no front panel switches are activated for 15 minutes after entering the programming mode, the panel automatically exits the programming mode. The trouble buzzer will remain active as long as the **PROGRAMMING MODE** switch is in the ON (programming) position.

5.1 Programming Initiating Device Circuits (IDCs)

1. Press the **RESET** switch to enter the Initiating Device Circuit configuration step. The program IDC step is indicated by the 2-phase flashing green Power LED. IDC zones are programmed ***individually***, starting with zone #1. The IDC zone actively being programmed is identified by an active *zone* LED. The IDC circuit type may be identified by the LED color and flash rate, using Table 5.3.

Table 5.3 - IDC Zone Type Codes	
IDC Zone Type	**Zone LED Code**
Alarm, Non-Verified Detector	Steady Red
Alarm, Verified Detector & Dry Contact Alarm Initiating Devices. (Do NOT select this option. High Impedance Detectors are not presently available.)	✡ PAUSE ✡ PAUSE ✡... RED
Alarm, Verified Detector ONLY For Low Impedance devices only. (ex. 2400 series detectors) No contact devices permitted.	✡✡ PAUSE ✡✡ PAUSE ✡✡✡.. RED
Normally-Open Supervisory	Steady Amber
Waterflow	Steady Green
Waterflow with Retard	✡ PAUSE ✡ PAUSE ✡... GREEN

2. Use the **TROUBLE SILENCE** switch to step through the various IDC zone types, until the desired IDC type code is displayed by the LEDs.

3. Select the IAC circuit to be operated by this zone by pressing the **ALARM SILENCE** switch until the desired configuration is reached. Signal circuits selected for activation by the IDC are indicated by the respective IAC's Trouble LED illuminating.

4. To program the next Initiating Device Circuit, press the **RESET** switch and repeat steps 2 and 3 above.

5. When the last installed IDC has been programmed, press the **RESET** switch; the panel is now ready for programming Indicating Appliance Circuits (IACs).

5.2 Programming Indicating Appliance Circuits (IACs)

1. The panel is automatically ready to program Indicating Appliance Circuits. The program IAC step is indicated by the 3-phase flashing green Power LED. Each IAC zone is programmed ***individually***, starting with IAC #1. The IAC circuit actively being programmed is identified by its active Signal Circuit *trouble* LED. The IAC circuit type may be identified by the status of the alarm silenced LED **and** by the flash pattern of the respective IAC trouble LED as shown in tables 5.4 and 5.5.

Table 5.4 - Panel Indicating Appliance Circuit Status

IAC Mode	Alarm Silenced LED
Silenceable	✡ PAUSE ✡ PAUSE ✡...
Non-Silenceable	OFF

Table 5.5 - IAC Signal Output Rates

IAC Circuit Type	Signal Circuit Trouble LED
Continuous	Steady
120 Strokes per Minute (SPM)	120 Flashes per Minute
Temporal (3-3-3)	FLASH-FLASH-FLASH-PAUSE
Continuous California Rate	10 Seconds ON, 5 Seconds OFF...
March Time California Rate	10 Seconds @ 120 SPM, 5 Seconds OFF...

2. Use the **ALARM SILENCE** switch to set IAC #1 as Silenceable or Non-Silenceable, as shown in Table 5.4 and indicated by the Alarm Silenced LED.

3. Use the **TROUBLE SILENCE** switch to step through the various IAC output signal rates, until the desired flash pattern is displayed for IAC #1.

4. Press the **RESET** switch to program IAC #2.

5. Use the **ALARM SILENCE** switch to set IAC #2 as Silenceable or Non-Silenceable, as shown in Table 5.4 and indicated by the Alarm Silenced LED.

6. Use the **TROUBLE SILENCE** switch to step through the various IAC output signal rates, until the desired flash pattern is displayed for IAC #2.

7. When IAC #2 has been programmed, press the **RESET** switch; the panel is now ready for Configuring the System Timers.

5.3 Configuring System Timers

1. The configure System Timers step is indicated by the 4-phase flashing green Power LED. The status of the panel's Alarm Silence Inhibit Timer is indicated by the *zone disabled* LED as shown in Table 5.6.

Table 5.6 - Alarm Silence Inhibit Timer Status	
Alarm Silence Inhibit Timer Setting	**Zone Disabled LED**
Disabled	OFF
1 Minute	✡ PAUSE ✡ PAUSE ✡✡..
2 Minutes	✡✡ PAUSE ✡✡ PAUSE ✡✡...
3 Minutes	✡✡✡ PAUSE ✡✡✡ PAUSE ✡✡✡...

2. Use the **TROUBLE SILENCE** switch to select between the four states. The status of the panel's automatic Alarm Silence Timer is indicated by the *alarm silenced* LED as shown in Table 5.7.

Table 5.7 - Automatic Alarm Silence Timer Status	
Timer setting	**Alarm Silenced LED**
No timer	OFF
10 Minutes	✡ PAUSE ✡ PAUSE ✡...
20 Minutes	✡✡ PAUSE ✡✡ PAUSE ✡Y...
30 Minutes	✡✡✡ PAUSE ✡✡✡ PAUSE ✡✡✡...

3. Use the **ALARM SILENCE** switch to toggle between the four states.

4. When the proper LED combination is displayed, press the **RESET** switch; the panel is now ready to program Auxiliary Power.

5.4 Programming Auxiliary Power

1. The program Auxiliary Power step is indicated by the 5-phase flashing green Power LED. Use the **ALARM SILENCE** switch to program the auxiliary power as shown in Table 5.8.

Table 5.8 - Auxiliary Power on Reset Status	
Auxiliary Power	**Alarm Silenced LED**
Remains energized during reset	OFF
De-energize on reset (alarm, verification, & test modes)	✡ PAUSE ✡ PAUSE ✡...

2. Use the **ALARM SILENCE** switch to toggle between the two states.

3. Press the **RESET** switch to return to the automatic module configuration step (1-phase flash), where the programming process started. You may modify any panel configuration by repeating the programming cycle.

To exit the programming mode, return the **PROGRAMMING MODE** switch to the **OFF** (down) position. The panel should return to the Normal mode. You may exit the Programming mode at any time. This is useful when changing only one system parameter.

5.5 Returning to Panel Default Settings

To restore the panel to *system default settings*, before exiting the programming mode, press the **TROUBLE SILENCE** and **RESET** switches simultaneously for one second. This will return all parameters to default settings (Table 5.1), and return the panel to the beginning of the programming sequence.

5.6 Dialer Module Programming

Refer to the **DIALER MODULE** drawing

You will need to know the following information in order to program the dialer module:

- The primary and secondary telephone numbers at the CMS used to receive the signals.
- The DL1 Password = 4727 (GSBS).
- Site primary and secondary ID numbers for the dialer. The site ID numbers are supplied by the CMS.
- Number of retry attempts to CMS. Valid entries are 5 to 10.
- The retry interval. This is the delay time between subsequent attempts to call the CMS.
- The AC power fail notification delay time, if any.
- Daily dialer supervision message delay period. This is the delay interval from power until the first dialer supervision message is transmitted to the CMS. Valid entries are 0 to 18 hours, with a 12 Hour default time. The panel must be powered down, then powered up for a change in the delay time to take effect.
- Status retransmission enable/disable setting. Enable this option if the CMS requires all off-normal status to be re-transmitted with the daily dialer supervision message.

A Put the dialer in the programming mode by plugging any tone dial telephone into J3 on the Dialer Module and lift the handset off-hook. *The touch pad dial on this phone is used for all dialer module programming.* If the Dialer Module is unresponsive, verify that steps 1 & 2 in the *DL1 Dialer Panel and Field Wiring Connections* section were performed.

B Enter the dialer password using the programming phone. A beep indicates that a program item has been entered. NOTE: The dialer will make one attempt to call the monitoring station and report that it is disabled before you can proceed with programming.

C When the LED goes solid green, you may select any programming item by entering an asterisk "*" followed by the item number, e.g."*08" for AC fail delay. The suggested sequence is listed in the following steps:

1 Enter the primary site ID number supplied by the Central Monitoring Station (CMS). Always enter four (4) digits. If ID has less than four digits, enter leading zeros, i.e. 0012.

2 Enter the primary CMS phone number. **This is the primary phone number of the DACR receiving equipment, not the administrative phone numbers.**

3 Enter the secondary site ID number supplied by the Central Monitoring Station (CMS). Always enter four (4) digits. If ID has less than four digits, enter leading zeros, i.e. 0012.

4 Enter the secondary CMS phone number. This is the secondary phone number of the DACR receiving equipment, not the administrative phone numbers.

5 Select the number of phone lines to be used. NOTE: **Two lines are required to comply with NFPA 72.**

6 Enter the number of times the module attempts to call the CMS receiving equipment.

7 Enter the retry interval. This is the time between subsequent attempts to reach the CMS in the event of line trouble or busy signals.

8 Enter the AC failure delay time. This is the length of the delay between the time AC power fails and the CMS is notified of the failure. NFPA requires a delay of 25% to 50% of rated standby power period. Valid entries are 0 to 18 hours. This setting does NOT effect any other trouble signals.

9 Enter the daily supervisory message delay time. The module sends a supervisory message to the CMS once every 24 hours to verify the communications path and message receipt. The delay is used to set the time the daily message is transmitted based on a delay from the time the panel is powered up.
EXAMPLE: If the CMS requires the daily supervisory message to be sent at 0300 (3 AM) and the current time is 1400 (2 PM), set the delay for 13 hours, power down, then power up.

10 Enable or disable the status message re-transmission option. The dialer can optionally re-transmit all status messages when the daily dialer supervision message is sent. Status retransmission is in addition to the message sent when the event occurred.

11 Select the order in which the zone number and status code are sent, zone first (default) or code first.

D Hang up the handset and remove the programming telephone from Dialer Module jack J3 to end programming.

NOTES:

1. If no activity occurs in programming mode for one hour, the DL1 will exit from programming mode. To re-enter programming mode, hang up the programming phone, then start at step B of the programming procedure.
2. Factory new dialers remain disabled until both phone numbers and both site ID's are programmed. Once programmed, the dialer will attempt to call the monitoring station on power up. Programming mode cannot be entered until the call is completed, or all call attempts have failed.
3. When dialer programming step 10 is enabled, it causes all off-normal status, including alarms, to be retransmitted along with the 24 hour test call.

6.0 OPERATION

Table 6.1 - Panel Indicators	
Indicator	**Function**
Zone Disabled LED	✡✡ PAUSE ✡✡ PAUSE ✡✡... - One or more zones disabled ✡✡✡ PAUSE ✡✡✡ PAUSE ✡✡✡... - Audible test mode ✡✡✡✡ PAUSE ✡✡✡✡ PAUSE ✡✡✡✡... - Silent test mode
Power LED	ON - AC power normal OFF - AC power fail
Zone Alarm (Red) LED	STEADY - Zone in alarm
Zone Trouble (Amber) LED	STEADY - Supervisory condition restored RAPID FLASHING - Zone in supervisory alarm. SLOW FLASHING - Zone in trouble condition. ✡✡ PAUSE ✡✡ PAUSE ✡✡... - Zone disabled
Alarm Silenced LED	ON - The audible alarm signals have been silenced
Alarm LED	ON - System in the alarm state
System Trouble LED	SLOW FLASHING - System in Trouble state RAPID FLASHING - System in Supervisory state STEADY - Trouble buzzer silenced
Signal Trouble, Ckt #1 LED	SLOW FLASHING - Open/short on IAC #1 wiring
Signal Trouble, Ckt #2 LED	SLOW FLASHING - Open/short on IAC #2 wiring
Ground Fault LED	SLOW FLASHING - A ground fault condition exists on the panel or field wiring

Normal Mode
In the Normal Mode, the panel is operating properly and has ***not*** detected any Alarm, Supervisory, or Trouble conditions. The green power LED is ON and all other LEDs are OFF in the normal mode.

Alarm Mode
When a fire alarm condition is detected, the common alarm LED is ON (RED), and the panel is in Alarm Mode. If the alarm occurs while in trouble or supervisory mode, the panel displays the system trouble LED steady ON, and silences the trouble buzzer. The trouble relay continues to indicate panel trouble. Zone Trouble and Supervisory LEDs not in conflict with the alarm LEDs remain ON.

WARNING

Do NOT silence fire signals until certain that a fire condition does not exist.

In the alarm mode, the Indicating Appliance Circuits operate as programmed. The system alarm LED turns on, the alarm relay operates, and the Relay/City-Tie Module transmits a fire alarm condition, if so configured. The red IDC zone LED lights, indicating the area of the alarm. The appropriate alarm zone LED on the Remote Annunciator operates via the Annunciator Driver Module. The dialer will transmit a zone specific alarm signal to the Central Monitoring Station.

To silence the Indicating Appliances, press the **ALARM SILENCE** switch. Indicating Appliance Circuits will not respond to the **ALARM SILENCE** switch until all waterflow zones are no longer in the active alarm condition. Reactivation of the waterflow zone will reactivate the IACs.

Reset Mode
When the facility is safe to re-enter, the panel may be Reset. Manual stations and other manually restorable devices must be returned to their normal condition. Non-restorable devices which have been activated by the fire must be replaced. In the event replacement is not immediately feasible, disable the affected zone using its disable switch. Pressing the **RESET** switch automatically resets the smoke detectors and returns the panel to the normal (trouble mode if zones have been disabled) mode. If all alarm initiating devices have not been restored, the panel will re-enter the alarm mode. The entire reset process takes about 20 seconds to complete. The panel can NOT be reset while the alarm silence inhibit timer is active. Panel reset does not change a zone's enabled/disabled status.

Reset the panel by pressing the **RESET** switch. Reset causes the system trouble LED to light, the trouble buzzer to sound, and the trouble relay to go into the trouble state. Operation of the **RESET** switch also causes all front panel LEDs to turn on, verifying their operation. After internal processing is completed, the panel returns to the normal mode.

Trouble Mode
When the panel is in the Trouble Mode, some portion of the panel or field wiring is in an abnormal condition and the proper operation of the fire alarm system may be affected. If an alarm is detected while in the trouble mode, the panel will enter the alarm mode and sound an alarm. If a supervisory condition is detected while in the trouble mode, the panel will enter the supervisory mode mode and the trouble contacts will remain activated.

In the trouble mode: the system trouble LED flashes, the trouble buzzer sounds at a 20 pulse/minute rate, the trouble relay operates, and the Relay/City-Tie Module transmits a trouble signal if it is configured to transmit trouble. The dialer will transmit a trouble signal to the Central Monitoring Station. If the trouble occurs on an Initiating Device Circuit, the trouble message will be zone specific.

The Relay/City-Tie Module (if configured to transmit trouble) delays its trouble output for 6 hours when activated by a loss of AC power. The base panel trouble relay activates 6 seconds after the loss of AC power. The relay's 6 second contact transfer delay minimizes nuisance troubles due to brownouts and power line failures. All other trouble conditions are transmitted off premise without delay. In addition to the system trouble LED, IDC zones, IAC zones, and option modules light a unique trouble LED, further identifying the cause of the problem.

To silence the trouble buzzer, press the **TROUBLE SILENCE** switch. The system trouble LED will light steadily. New trouble conditions resound the trouble buzzer, and cause the system trouble LED to flash slowly. Correction of the problem causing a trouble condition automatically returns the panel to the normal mode, if no other faults exist. Certain critical internal faults and Class A trouble conditions latch the panel into the trouble mode, requiring the panel to be reset before exiting the trouble mode. Module placement trouble conditions remain active until the panel is reprogrammed.

Supervisory Mode
When the panel is in the Supervisory Mode, a portion of the building fire protection system (not the panel) is in an abnormal condition and its proper operation is affected. If an alarm occurs while in the supervisory mode, the panel will enter the alarm mode and sound an alarm. If a supervisory condition is detected while in the trouble mode, the panel enters the supervisory mode.

In the supervisory mode, the system trouble LED, amber supervisory zone LED, and trouble buzzer all operate at 120 pulses per minute. The trouble relay operates and the Relay/City-Tie Module (if configured to transmit supervisory alarm) transmits a supervisory and trouble signal. The respective zone LED on the remote annunciator will illuminate. The dialer will transmit a zone specific supervisory signal to the Central Monitoring Station.

Restoration of the supervisory condition causes the amber supervisory zone LED to light steadily. The trouble buzzer continues to pulse rapidly, or will resound if previously silenced. The respective zone LED on the remote annunciator will remain illuminated during the supervisory restore mode.

Press the **RESET** switch to exit the supervisory mode when all supervisory alarms have restored. The dialer will transmit a zone specific restore signal to the Central Monitoring Station.

Drill Mode
The drill mode operates both IACs. The panel *will* leave the drill mode, enter the alarm mode, and sound an alarm if an alarm is detected. The panel *will* leave the drill mode and enter the supervisory mode if a supervisory condition occurs.

The drill mode is entered from the normal mode by *simultaneously* pressing the **ALARM SILENCE** and **RESET** switches for at least one second. Entering the drill mode places the panel in the trouble mode. The trouble LED will flash slowly. Pressing the **ALARM SILENCE** switch terminates the drill. The alarm relay and the Relay/City-Tie Module (when configured to transmit alarms) do not operate in the drill mode.

To exit the drill mode, *either* press the **ALARM SILENCE** switch, or press the **RESET** switch.

IDC Zone Disable
Initiating Device Circuits (IDCs) may be individually Disabled by operating a zone's **ZONE DISABLE** switch.

WARNING

Disabling a zone removes the zone's ability to put the panel in an Alarm or Supervisory condition.

Disabling a zone permits the panel to be reset and restore protection to all zones except the disabled ones. The **ZONE DISABLE** switch is also used to select a zone for testing, as detailed in the section entitled **Test Mode**.

When a zone(s) is disabled, the Zone Disabled LED as well as the individual zone trouble LED exhibit a 2-phase flash, and the panel is put in the trouble mode. If the panel was in an Alarm, Supervisory, or Trouble state when the **ZONE DISABLE** switch was activated, the panel will *not* return to normal.

When a disabled zone is re-enabled, its zone LED indicates its status. If a re-enabled zone indicates it is in alarm, the panel will wait 10 seconds before going into the alarm mode. Pressing the **ZONE DISABLE** switch within the 10 second period disables the zone again, without the panel going into the alarm mode. A disabled zone's status is retained in the panel's memory during power down, and will remain disabled upon power up. Panel reset does not change a zone's enabled/disabled status.

Test Mode
The Test Mode is used to verify the operation of the panel, alarm initiating devices, and the integrity of field wiring.

WARNING

Fire detection capability on the zone(s) under test is NOT functional in the Test Mode.

The panel *will* leave the test mode, enter the alarm mode, and sound an alarm if a zone *not* selected for testing detects an alarm. The panel *will* leave the test mode and enter the supervisory mode if a zone *not* selected for testing detects a supervisory condition. Putting the panel in the test mode also puts it in the trouble mode.

Select an IDC zone(s) for testing by operating its respective zone disable switch(s). The "audible" test mode is entered from the normal or trouble modes by *simultaneously* pressing the **TROUBLE SILENCE** and **RESET** switches for at least one second. This causes the zone disabled LED to show a 3-phase flash and the trouble buzzer to pulse slowly. The trouble buzzer can be silenced in the test mode. The alarm relay, Relay/City-Tie Module (when configured to transmit alarms) will *not* operate in the test mode unless a valid alarm on any zone not being tested is received. Pressing the **TROUBLE SILENCE** and **RESET** switches *a second time*, for at least one second while in the audible test mode, puts the panel in the "silent" test mode. This causes the zone disabled LED to show a 4-phase flash and the trouble buzzer continues to sound. The silent test mode operates identically to the audible test mode with the exception that the IACs are not activated. The use of a Preventive Maintenance Tester (P/N 46288-0017) is recommended when performing a *silent* walk test.

Any alarm (verified or non-verified) on a zone under test will operate both IACs. The panel will sound one *short* pulse for zone 1, five *short* pulses for zone 5, etc., audibly identifying the number of the zone successfully tested. A trouble condition or ground fault on any zone under test, or an *open* or *ground* on either IAC, sounds a one second pulse on both IACs. If the auxiliary power is programmed as resettable, it will be deactivated while the zone under test is being reset.

In the test mode, the time the disabled IDC zone(s) takes to reset is characteristic of the source initiating the test sequence, as shown in Table 6.2. This feature is primarily used when testing in the *silent* test mode. The IDC zone reset period may be determined by measuring the length of time that the nominal IDC voltage (24 VDC) equals 0 VDC.

Table 6.2 - Test Mode

Initiating Condition	IAC Response (Audible Test Mode Only)	IDC Zone Reset Period (Audible & Silent Test Modes)
Alarm on disabled IDC under test	Coded zone #	8 seconds
Open on disabled IDC under test	1 second pulse	4 seconds
Ground fault on any panel wiring	1 second pulse	2 seconds
Open IAC circuit	1 second pulse	Not Applicable

NOTE

When verifying the operation of strobe lights using the Test Mode, the strobe lights may not receive enough energy to successfully charge. Use independent test methods such as Drill Mode to verify strobe lights and field wiring.

NOTE

Before exiting Test Mode, be sure to Enable the zone(s) that were Disabled for testing.

CAUTION

If there is no activity on the system for 30 minutes, the system will exit the Test Mode and the Disabled zone(s) will remain Disabled.

To exit the test mode, press and hold the **RESET** switch for one second.

Dialer Operations
Refer to Dialer Operations drawing

Table 6.3 - Dialer LED Indications

Display	Description
Single Flash Green	Call to Central Monitoring Station in progress.
Steady RED	Alarm Sent & Acknowledged
Fast Flash AMBER	Supervisory alarm sent & Acknowledged
Steady AMBER	Supervisory restore sent & acknowledged.
Single Flash AMBER	Module in trouble
Double Flash AMBER	Module disabled

Remote Trouble Unit
The green Power LED will be on whenever the RTU is receiving power from the control panel.
The Amber Trouble LED will be on whenever the control panel is in trouble.
The Trouble Buzzer will sound when the control panel is in trouble and the trouble silence switch is in the normal position, **and** will sound when the control panel is not in trouble and the trouble silence switch is in the silence position.

7.0 TROUBLESHOOTING

CAUTION

Disconnect AC and battery power before installing or removing modules.

WARNING

Lethal voltages from other equipment may be present within the panel even with the alarm system AC power source disconnected.

Table 7.1 - Trouble LEDs

Condition	Possible Cause
3 or 4-Phase flashing Amber ZONE DISABLED LED	1. System is in the Test mode (Disabled zones are under test)
Slow flashing Amber TROUBLE LED & Signal Appliances operating	1. System is in the Drill mode
Slow flashing Green POWER ON LED & Trouble Buzzer pulsing	1. System is in the Program mode 2. Program switch in "ON" position
Slow flashing Amber Common TROUBLE LED NOTE: When ONLY the common trouble LED is lit, the problem is related to possible causes 3 through 12. To determine the cause: 1. Silence the Trouble 2. Duplicate fault conditions 3 to 11, one at a time to see if there is a subsequent trouble. When NO subsequent trouble when the fault is duplicated, you have isolated the cause of the trouble.	1. Circuit open, missing or wrong EOL resistor 2. Fuse F1 open 3. Excessive load on auxiliary power terminals 4. Battery lead not connected or open 5. Defective batteries 6. Defective power supply (replace) 7. Battery lead poorly connected 8. Battery low and currently charging 9. New module installed on power/data bus (program module) 10. Unresponsive module on power/data bus (replace module) 11. Programming Mode Switch in program mode 12. Battery fuse open
Slow flashing Amber TROUBLE LED, & slow flashing Amber Signal Trouble LED	1. Electronic circuit breakers open 2. Circuit open, missing, or incorrect EOL resistor 3. Circuit shorted, improperly installed device
Slow flashing Amber TROUBLE LED & Ground Fault LED.	1. Ground fault on field wiring
-RCT Trouble LED	1. Open Circuit on field wiring 2. Master box not reset
- ADM Trouble LED	1. Field wiring open

Table 7.2 - Panel Trouble

Condition	Possible Cause
4-Wire detectors will not reset	Auxiliary power not programmed as resettable
2-phase flashing Amber zone LED & zone disabled LED	Zone disable switch activated
3-phase flashing Amber zone LED & zone disabled LED	Zone in audible test mode
4-phase flashing Amber zone LED & zone disabled LED	Zone in silent test mode
Power LED flashing, panel will not work	Programming Mode Switch in the ON position

Table 7.3 - Dialer Module LED Trouble Codes	
Condition	Possible Cause
Trouble (☆ PAUSE ☆ PAUSE ☆...AMBER)	1. Retry count exceeded, unable to communicate. 2. Phone line open or shorted.
Disabled (☆☆ PAUSE ☆☆ PAUSE ☆☆... AMBER)	1. Disable switch activated. (dialer will automatically re-enable in 24 Hrs. and transmit current status) 2. Dialer not completely programmed. 3. In programming mode.

8.0 PREVENTIVE MAINTENANCE

Before commencing testing, notify all areas where the alarm sounds and off premise locations that receive alarm and trouble transmissions that testing is in progress.

- Records of all testing and maintenance shall be kept on the protected premises for a period of at least five (5) years.

- Required Tools:
  Slotted Screwdriver, Insulated
  Digital Multimeter.
  1.1KΩ, 1 W resistor
  12" (30.5 cm) jumper lead with alligator clips
  Panel Door Key

- A complete check of installed field wiring and devices should be made at regular intervals, in accordance with NFPA 72 and ULC 524 requirements. This includes testing all alarm and supervisory alarm initiating devices and circuits and any off premise connections.

- Panel operation should be verified in the alarm, supervisory, and trouble modes.

- To insure that the panel can be powered when primary power is lost, the batteries should be periodically inspected, tested, and replaced (as a minimum) every four (4) years.

8.1 Preventive Maintenance Schedule

Table 8.1 - Preventive Maintenance Schedule

Component	Testing Interval	Test Procedure
Manual Stations	Semi-annually	1. Visual inspection 2. Put zone in test mode 3. Activate mechanism 4. Verify proper IDC zone response
Non-Restorable Heat Detectors	Semi-annually	1. Visual inspection 2. Put zone in test mode 3. Test mechanically and/or electrically 4. Verify proper IDC zone response
Restorable Heat Detectors	Semi-annually	1. Visual Inspection 2. Put zone in test mode 3. Activate at least one detector on each IDC. Within five years all detectors on each IDC shall be tested
Smoke Detectors	Annually	1. Visual inspection 2. Put zone in test mode 3. Functional test to verify proper IDC zone response 4. Check sensitivity 5. Clean as required
Waterflow Switches	2 Months	1. Put zone in test mode 2. Activate sprinkler test valve. Refer to Sprinkler system test procedure.

Table 8.1 continued on next page.

Table 8.1 - Preventive Maintenance Schedule (Continued)		
Component	**Testing Interval**	**Test Procedure**
Supervisory Signal Initiating Devices	Semi-annually	1. Put zone in test mode 2. Operate valve 3. Test pressure, temperature, and water level sensors per the sprinkler system test procedure
Remote Annunciators	Annually	1. Verify all indicators operating properly. 2. Verufy RTU Trouble Signal Operating properly.
Alarm Indicating Appliances	Annually	1. Visual Inspection 2. Put panel in alarm, drill, or test mode. Verify all indicating appliances operating properly
All Initiating Device Circuits Verified Non-Verified Waterflow Waterflow w/ Retard Supervisory	Annually	1. Bypass zone and enter test mode 2. Short IDC zone (15 Sec. For waterflow). IACs should activate, sounding the zone number 3. Wait 15 seconds. Place 1.1KΩ across IDC. IACs should activate, sounding the zone number 4. Wait 15 seconds, then open the IDC field wiring. IACs should activate, sounding a 1 second pulse 5. Wait 15 seconds, then ground one side of the IDC field wiring. IACs should activate, sounding a 1 second pulse 6. Reset and lock panel at conclusion of all testing
Panel LEDs & Trouble Buzzer	Annually	1. Illuminate all LEDs by pressing the RESET switch 2. Reset and lock panel at conclusion of all testing
Panel Primary Power	Acceptance and Re-acceptance tests	1. Remove Primary AC power 2. Verify panel operates from battery 3. Verify panel goes into trouble (6 second delay) 4. Restore AC power at end of test 5. Reset and lock panel at conclusion of all testing
Panel Secondary Power	Acceptance and Re-acceptance tests	1. Remove Primary AC power 2. Measure standby and alarm currents, and compare with battery calculations to verify adequate battery capacity. 3. Test under full load for five (5) minutes 4. Measure battery voltage under full load (20.4 to 27.3 VDC) 5. Restore AC power at end of test 6. Reset and lock panel at conclusion of all testing
Panel Trouble Signals	Annually	1. Verify operation of System Trouble LED and trouble buzzer 2. Reset and lock panel at conclusion of all testing
Auxiliary System Off-Premise **Fire Alarm** Signal Transmission	Monthly	1. Coordinate test with receiving location 2. Verify receipt of all transmitted signals 3. Reset and lock panel at conclusion of all testing
Remote System Off-Premise **Waterflow** Signal Transmission	Every 2 Months	1. Coordinate test with receiving location 2. Verify receipt of all transmitted signals 3. Reset and lock panel at conclusion of all testing

8.2 Testing Procedures for the DL1 Dialer Module

Every Six months (or as required by the Authority Having Jurisdiction):

- Verify that the dialer module is connected to two separate phone lines.
- Activate an alarm initiating device and verify the alarm is received at the Central Monitoring Station (CMS). Restore System to normal.
- Verify that failure of the primary signal path (phone line connected to J1) results in a trouble signal being transmitted via the secondary signal path (phone line connected to J2) within 4 minutes.
- Verify that failure of the secondary signal path (phone line connected to J2) results in a trouble signal being transmitted via the primary signal path (phone line connected to J1) within 4 minutes.

8.3 Testing Procedures for Compatible 2-Wire Smoke Detectors

EDWARDS 2420

- **Functional Test:** Hold a magnet next to the alarm LED. The detector should alarm within 5 seconds.

- **Cleaning:** To clean the ion chamber, disable the zone using the **ENABLE/DISABLE** switch to prevent accidental alarm. Remove the detector from its base. Remove the grill. Place the vacuum cleaner nozzle over the chamber and remove dust. Reinsert the grill by aligning tabs on the grill with slots on the housing. Press the grill into the housing and turn clockwise until grill locks into position.

EDWARDS 2430

- **Functional test:** Insert the long end of the calibrated test probe (P/N 6278-001A) into the oblong opening on top of detector grill. The detector should alarm within 10 seconds. Insert the short end of the calibrated test probe into the oblong opening on top of the detector grill. The detector should NOT alarm within 10 seconds. If an alarm occurs, clean or replace the detector.

- **Cleaning:** To clean photo chamber, disable the zone using the **ENABLE/DISABLE** switch to prevent accidental alarm. Remove the detector from its base. Remove the grill. Vacuum dust and foreign material from the optic ramp area. Remove the bug screen from the grill. Wash the bug screen and grill in water and air dry. Reinsert the screen into the grill. Reinsert the grill by aligning the arrow on the rim of the grill with the LED on the housing and turn clockwise until the grill locks into position.

CAUTION

If the grill is removed while the detector is in its base, the detector will generate an alarm.

NOTE

Aerosol test sprays are NOT recommended due to possible interaction with composite detector housings.

At the conclusion of testing, notify all locations previously contacted that testing is complete.

8.4 Replacement Parts

Table 8.2 - Related/Spare Parts

Part ID	Description
12V6A5	12 V, 6.5 AH Battery (2 required)
6V8A	6 V, 8.0 AH Battery (4 required)
12V10A	12V, 10 AH Battery (2 required)
46288-0017	Preventive Maintenance Tester
46071-0409	ULI Listed series supervisory resistor (1.1KΩ) and ULI Listed EOL resistor (3.6 KΩ)
EOL-P1	ULC Listed End-Of-Line Resistor on 1-Gang Plate
46229-0107	4.7KΩ UL Listed End-Of-Line Resistor
46097-0110	Battery Cabinet 8 Amp Fuse
46063-1065	2412 Replacement Door
46063-1066	2412-R Red Replacement Door
46063-1067	2414 Replacement Door
46063-1068	2414-R Red Replacement Door
46063-1069	2418 Replacement Door
46063-1070	2418-R Red Replacement Door
46166-0144	Cat. # 45 Lock & 2 Keys
46262-0007	0.5" (13 mm) Hex threaded Standoff
46073-0138	EST1-2Z3 Terminal Cover (2 required per panel)
46073-0139	EST1-2Z6 Terminal Cover (2 required per panel)

9.0 SPECIFICATIONS

Table 9.1 - Specifications	
Base Panel Assemblies	
Dimensions (HWD) 2412 & 2414 Panels Back box Finished 2418 Panel Back box Finished	 12" x 14" x 2.75" [30.5 cm x 35.6 cm x 7.0 cm] 14" x 15.75" x 1.125" [35.6 cm x 40.0 cm x 2.9 cm] 13" x 20.19" x 2.75" [33.0 cm x 51.3 cm x 7.0 cm] 15" x 22" x 1.125" [38.1 cm x 55.9 cm x 2.9 cm]
Weight (less battery) 2412 Panel 2414 Panel 2418 Panel	 12 lbs. (5.5 Kg) 12.5 lbs. (5.7 Kg) 16 lbs. (7.3 Kg)
Input Power	120 VAC @ 3.5 A, 50 - 60 Hz
Output Power - Signals	24 VDC @ 4A. Refer to Compatibility Section.
Auxiliary Power Maximum Capacitance	24 VDC nominal @ 500 mA., filtered, reset programmable. Refer to Compatibility Section. 100 ❍F
Option Module Spaces	2412 Panel: 3 Input/Output 2414 Panel: 2 Input/Output 2418 Panel: 3 Output
Battery Type 2412 & 2414 Panels 2418 Panel 2400-BATBOX(R) Battery Cabinet	 2 x 12 V, 6.5 AH, Lead-Acid 2 x 12 V, 6.5 AH, Lead-Acid 4 x 6 V, 8.0 AH, Lead-Acid 2 x 12V, 10 AH Lead-Acid
Ground Fault Detection	10KΩ to earth, all field wiring except AC input and common relay contacts
IDC Zones Style Configurations	 Two Class B (Style B) or Class A (Style D) Verified or non-verified alarm Waterflow or waterflow with retard Supervisory
Detector Capacity per IDC Circuit	30 - photoelectric smoke 50 - ionization smoke Detector voltage 17.85 to 26.4 VDC. Max. Ripple = 400 mVDC Max. Alarm Current = 33 mADC. Refer to Compatibility Section. **2-Wire Relay Bases are NOT supported.**
Supervisory Series & EOL Resistors (P/N 46071-0409 for ULI) (2 each P/N EOL-P1 for ULC)	1.1KΩ, 1 Watt; 3.6KΩ, 1/2 Watt
IDC End-Of-Line Resistor	4.7KΩ, 1/2 Watt
Max. IDC Circuit Field Wiring Resistance	50Ω
IAC Circuits	Two Class B (Style Y), optional Class A (Style Z)
IAC Output Power/Ckt	Nominal 24 VDC @ 2.5A; 4.0 Amp total for both zones
IAC EOL	4.7KΩ, 1/2 Watt
System Alarm Relay	Form C, 24 VDC @1 A. Refer to Compatibility Section for proper installation.
System Trouble Relay	Form C, 24 VDC @1 A. Refer to Compatibility Section for proper installation.
Indicators	Power, System Trouble, Zone Disabled, Alarm Silenced, Alarm, Signal circuit trouble (2), and Ground Fault LEDs
Controls	Trouble Silence, Alarm Silence, Reset, and Zone Enable/Disable Switches
Max. Battery Charger Current	500 mADC

Table 9.1 - Specifications	
Base Panel Assemblies	
Environment	
Relative Humidity	85% @ 86°F (30°C)
Operating Temperature	32°F to 120°F (0°C to 49°C)

Table 9.2 - Specifications	
2400-BPA Base Panel Class A (Style D/Z) Converter Module (P/N 46199-1072)	
Expansion Space	None
IDC Wiring	Converts two Style B Circuits into two Style D Circuits
IAC Wiring	Converts two Style Y Circuits into two Style Z Circuits
Weight	0.4 lbs (0.18 Kg)

Table 9.3 - Specifications	
2400-2IDC IDC Module (P/N 240457)	
Expansion Space	1
IDC Zones	Two Style B, verification optional
Detector Capacity per IDC Circuit	30 - Photoelectric Smoke 50 - Ionization Smoke Detector voltage 17.85 to 26.4 VDC. Max. Ripple = 400 mVDC. Max. Alarm Current = 33 mADC Refer to Compatibility Section. **Relay Bases are NOT supported.**
IDC EOL	4.7KΩ, 1/2 Watt
Max. Circuit Resistance	50Ω
Indicators and Controls	Trouble LED Enable/Disable Switch
Weight	0.3 lbs (0.14 Kg)

Table 9.4 - Specifications	
2400-IDCA IDC Class A (Style D) Converter Module (P/N 46199-1074)	
Expansion Space	None
IDC Wiring	Two Class A (Style D) Circuits
Weight	0.3 lbs (0.14 Kg)

Table 9.5 - Specifications	
2400-RCT Relay/City-Tie Module (P/N 240459)	
Expansion Space	1
Configurable Operation	Reset, Alarm, Trouble, or Supervisory
Master Box Operation Max. Wiring Resistance Trip Current	Nominal 24 VDC 25 Ω 200 mA into 14.5 Ω coil
Reverse Polarity Operation Loop and Receiver Resistance Current Range	Nominal 24 VDC 1.5 KΩ, Max. 2.5 to 9.9 mA
Dry Contact (Shunt)	Normally-Open **OR** Normally-Closed, 24 VDC @ 1 A See Application Section for proper installation.
Indicators and Controls	Trouble LED Enable/Disable Switch
Weight	0.4 lbs (0.18 Kg)

Table 9.6 - Specifications	
2400-ADM Annunciator Driver Master Module (P/N 240461)	
Expansion Space	1
Circuit Rating	30 V @ 15 mA Max.
Weight	0.4 lbs (0.18 Kg)

Table 9.7 - Specifications	
2400-ADS Annunciator Driver Slave Module (P/N 240463)	
Expansion Space	0
Circuit Rating	30 V @ 15 mA Max.
Weight	0.3 lbs (0.14 Kg)

Table 9.8 - Specifications		
Remote Annunciators		
Wiring		22 AWG, Min.
Power		24 VDC, Nominal
Model	Supervisory Current	AlarmCurrent
2400-RTU	10 mA	10 mA
2400-RTU4ZA	11 mA	11 mA + 11 mA/ Active zone LED
2400-RTU8ZA	12 mA	12 mA + 11 mA/ Active zone LED
2400-4ZA	1 mA	1 mA + 11 mA/ Active zone LED
2400-8ZA	2 mA	2 mA + 11 mA/ Active zone LED

(C) = Bilingual version

Table 9.9 - Specifications	
2400-BATBOX(R) Battery Cabinet	
Wiring	5 Ft (1.52 M) Max. 16 AWG Min.
Battery Type	2 x 12 V, 10 AH, Lead-Acid
Dimensions (HWD) Back box Finished	 13" x 20.19" x 2.75" [33.0 cm x 51.3 cm x 7.0 cm] 15" x 22" x 1.125" [38.1 cm x 55.9 cm x 2.9 cm]

Table 9.10- Specifications	
DL1 Dialer Module	
Expansion Space	1
Phone Line: Wall Connector	Two Loop Start lines on Public switched telephone network, Pulse or DTMF dialing. Standard RJ-31X jack
Line Supervision	Trouble when line voltage < 10 V & line current < 5 mA.
Communications Protocol	SIA pulse format P3, 20 PPS, 4/2, double round, 1400 Hz handshake, 1900 Hz carrier
Telephone Numbers	Two, 24 digit numbers
FCC Registration Number	4Z2USA-22549-AL-E
Dialing Retries	5 to 10
AC Power Failure Delay	0 to 18 hours
Clock Accuracy	Within one hour/year
Compliance	Communications Canada CS-03 FCC / CFR 47 Parts 15 & 68 NFPA 72; UL 864; ULC S527-M87; FM
Programming Phone	Any Tone dial (DTMF) Phone with RJ11 plug
Weight	0.4 lbs (0.18 Kg)

DL1 Dialer Codes					
Event Condition		**Event Code**		**Event Condition**	**Event Code**
Zone 1	Alarm	11	Zone 6	Alarm	61
	Supervisory Alarm	12		Supervisory Alarm	62
	Trouble	13		Trouble	63
	Restore	14		Restore	64
	Supervisory Restore	15		Supervisory Restore	65
Zone 2	Alarm	21	Zone 7	Alarm	71
	Supervisory Alarm	22		Supervisory Alarm	72
	Trouble	23		Trouble	73
	Restore	24		Restore	74
	Supervisory Restore	25		Supervisory Restore	75
Zone 3	Alarm	31	Zone 8	Alarm	81
	Supervisory Alarm	32		Supervisory Alarm	82
	Trouble	33		Trouble	83
	Restore	34		Restore	84
	Supervisory Restore	35		Supervisory Restore	85
Zone 4	Alarm	41	Panel	Normal 24 Hr. Check in	90
	Supervisory Alarm	42		Trouble	93
	Trouble	43		Restore	94
	Restore	44		AC Power Fail	96
	Supervisory Restore	45		Abnormal 24 Hr. Check in	97
Zone 5	Alarm	51		Telephone Line trbl	98
	Supervisory Alarm	52		Dialer Disabled	99
	Trouble	53			
	Restore	54			
	Supervisory Restore	55			

10.0 APPENDICES

10.1 Appendix 1 - Battery Calculations

10.1.1 Battery Tables

Maximum battery size is 8.0 AH. Maximum battery size with optional 2400-BATBOX(R) Battery Cabinet is 10 AH. Refer to Replacement Parts Section for part numbers.

The battery tables allow quick battery selection. Three battery tables are provided for the three most common Supervisory and Alarm Time combinations.

For instructions on using the battery tables, refer to the section entitled **Using the Battery Tables**.

Table 10.1 - 24 Hours Supervisory, 5 Minutes of Alarm
Signal Circuit Current: 4 Amps for 5 Minutes
Aux. Circuit Current: 0-0.5 Amps for 5 Minutes

Panel Current Load								
		Aux. Power Supervisory Current (A)						
		0	25	50	75	100	125	150
# Zones	# Option odules	Amp/Hour Battery Size						
2	0	4.5	4.5	4.5	4.5	6.5	6.5	6.5
2	1	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
2	2	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
2	3	4.5	4.5	6.5	6.5	6.5	8.0	8.0*
4	0	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
4	1	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
4	2	4.5	4.5	6.5	6.5	6.5	8.0*	8.0*
8	0	4.5	4.5	6.5	6.5	6.5	8.0	8.0*
8	1	4.5	6.5	6.5	6.5	8.0	8.0	-
8	2	4.5	6.5	6.5	6.5	8.0	8.0	-
8	3	4.5	6.5	6.5	8.0	8.0	8.0	-

* = Must Purchase Auxiliary Battery Box P/N 2400-BATBOX Separately.

Table 10.2 - 60 Hours Supervisory, 5 Minutes of Alarm
Signal Circuit Alarm Current for 5 Minutes
Aux. Circuit Current: 0-0.5 Amps for 5 Minutes

Panel Current Load										
			Signal Circuit Alarm Current (A)							
Aux. Sup Current	**# Zones**	**# Option Modules**	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
0 mA			**Amp/Hour Battery Size**							
"	2	0	4.5	4.5	4.5	4.5	4.5	6.5	6.5	6.5
"	2	1	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
"	2	2	6.5	6.5	6.5	8.0*	8.0*	8.0*	8.0*	8.0*
"	2	3	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*
"	4	0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
"	4	1	6.5	6.5	6.5	8.0*	8.0*	8.0*	8.0*	8.0*
"	4	2	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*
"	8	0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
25 mA			**Amp/Hour Battery Size**							
"	2	0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
"	2	1	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*
"	2	2	8.0*	-	-	-	-	-	-	-
	4	0	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*
	4	1	8.0*	-	-	-	-	-	-	-
50 mA			**Amp/Hour Battery Size**							
"	2	0	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	8.0*	-

* = Must Purchase Auxiliary Battery Box P/N 2400-BATBOX Separately.

Table 10.3 - 24 Hours Supervisory, 30 Minutes of Alarm Signal Circuit Current for 30 Minutes Aux. Circuit Current: 0-0.5 Amps for 30 Minutes									
Panel Current Load									
		Signal Circuit Alarm Current (A)							
Aux. Sup Current	**# Option Modules**	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
0 mA		**Amp/Hour Battery Size**							
"	0	4.5	4.5	4.5	4.5	4.5	6.5	6.5	6.5
"	1	4.5	4.5	4.5	4.5	6.5	6.5	6.5	6.5
"	2	4.5	4.5	4.5	6.5	6.5	6.5	6.5	6.5
"	3	4.5	4.5	6.5	6.5	6.5	6.5	8.0	8.0
"	4	4.5	4.5	6.5	6.5	6.5	8.0	8.0	8.0
"	5	6.5	6.5	6.5	6.5	8.0	8.0	8.0	8.0
"	6	6.5	6.5	6.5	6.5	8.0	8.0	8.0	-
25 mA		**Amp/Hour Battery Size**							
"	0	4.5	4.5	4.5	6.5	6.5	6.5	6.5	8.0
"	1	4.5	4.5	4.5	6.5	6.5	6.5	6.5	8.0
"	2	4.5	4.5	6.5	6.5	6.5	6.5	8.0	8.0
"	3	4.5	6.5	6.5	6.5	6.5	8.0	8.0	8.0
"	4	6.5	6.5	6.5	6.5	8.0	8.0	8.0	-
"	5	6.5	6.5	6.5	6.5	8.0	8.0	-	-
"	6	6.5	6.5	6.5	6.5	8.0	-	-	-
50 mA		**Amp/Hour Battery Size**							
"	0	4.5	4.5	6.5	6.5	6.5	6.5	8.0	8.0
"	1	4.5	6.5	6.5	6.5	6.5	8.0	8.0	8.0
"	2	6.5	6.5	6.5	6.5	8.0	8.0	8.0	-
"	3	6.5	6.5	6.5	8.0	8.0	8.0	-	-
"	4	6.5	6.5	6.5	8.0	8.0	8.0	-	-
"	5	6.5	6.5	8.0	8.0	8.0	-	-	-
"	6	6.5	8.0	8.0	8.0	-	-	-	-
75 mA		**Amp/Hour Battery Size**							
"	0	4.5	6.5	6.5	6.5	6.5	8.0	8.0	8.0
"	1	6.5	6.5	6.5	6.5	8.0	8.0	8.0	-
"	2	6.5	6.5	6.5	8.0	8.0	8.0	-	-
"	3	6.5	6.5	8.0	8.0	8.0	-	-	-
"	4	6.5	8.0	8.0	8.0	-	-	-	-
"	5	8.0	8.0	8.0	-	-	-	-	-
"	6	8.0	8.0	8.0	-	-	-	-	-
100 mA		**Amp/Hour Battery Size**							
"	0	6.5	6.5	6.5	8.0	8.0	8.0	-	-
"	1	6.5	6.5	6.5	8.0	8.0	8.0	-	-
"	2	6.5	6.5	8.0	8.0	8.0	-	-	-
"	3	6.5	8.0	8.0	8.0	-	-	-	-
"	4	8.0	8.0	8.0	-	-	-	-	-
"	5	8.0	8.0	-	-	-	-	-	-
"	6	8.0	-	-	-	-	-	-	-

Using the Battery Tables
Having selected the proper table, you must know the number of option modules installed in the panel, any auxiliary current required, and when using Tables 10.2 and 10.3, the signal current required. Option modules are 2400-2IDC Two Zone Initiating Device Circuit Modules, 2400-RCT Relay/City-Tie Modules, and 2400-ADM Annunciator Driver Master Modules. 2400-BPA Class A Converters, 2400-IDCA Class A IDC Converters, and 2400-ADS Annunciator Driver Slave Modules are NOT considered in the module count.

Table 10.1 - 24 Hours Supervisory, 5 Minutes of Alarm
The *intersection* of the row representing the number of installed modules with the auxiliary supervisory current column equal to or greater than the required auxiliary current load indicates the minimum required battery size in Amp Hours (AH).

Table 10.2 - 60 Hours Supervisory, 5 Minutes of Alarm, &
Table 10.3 - 24 Hours Supervisory, 30 Minutes of Alarm
Enter the table by selecting the auxiliary supervisory current equal to or greater than that required. Staying within the chosen supervisory current portion of the table, the intersection of the row representing the number of installed modules with the column representing the required alarm signal current indicates the minimum required battery size in Amp Hours (AH).

Battery Calculation Example #1

A panel with one (1) option module is to be installed in accordance with the Canadian National Building Code (NBC) requirement of 24 hours standby, 30 minutes alarm. The IAC requires 2.5 Amps, and there is no auxiliary power used. Calculate the minimum required battery capacity that will meet the requirements. Looking at Table 10.3, the intersection of the one (1) option module row and the 2.5 Amp IAC alarm current column within the "0 mA" area of the table occurs at 6.5. This indicates that the required battery capacity is 6.5 AH. Two 12 V, 6.5 AH batteries (P/N 12V6A5) will adequately power this system.

EXAMPLE #1

Table 10.3 - 24 Hours Supervisory, 30 Minutes of Alarm

Signal Circuit Current for 30 Minutes

Aux. Circuit Current: 0-0.5 Amps for 30 Minutes

Panel Current Load									
		Signal Circuit Alarm Current (A)							
Aux. Sup Current	**# Option Modules**	0.5	1.0	1.5	2.0	**2.5**	3.0	3.5	4.0
0 mA		Amp/Hour Battery Size							
"	0	4.5	4.5	4.5	4.5	4.5	6.5	6.5	6.5
"	**1**	4.5	4.5	4.5	4.5	**6.5**	6.5	6.5	6.5
"	2	4.5	4.5	4.5	6.5	6.5	6.5	6.5	6.5
"	3	4.5	4.5	6.5	6.5	6.5	6.5	8.0	8.0
"	4	4.5	4.5	6.5	6.5	6.5	8.0	8.0	8.0
"	5	6.5	6.5	6.5	6.5	8.0	8.0	8.0	8.0
"	6	6.5	6.5	6.5	6.5	8.0	8.0	8.0	-

Battery Calculation Example #2

A two zone panel with two (2) option modules requires 24 hours of standby, 5 minutes of alarm. The IAC requires 2.5 Amps. The 4-wire smoke detectors require 25 mA of auxiliary power. Calculate the minimum battery capacity that will meet these requirements.

Looking at Table 10.1, the intersection of the two (2) option module row and the 25 mA supervisory current occurs at 4.5. This indicates that the required battery capacity is 4.5 AH. Two 12 V, 6.5 AH batteries (P/N 12V6A5) will adequately power this system. NOTE: If 8 zones were installed in the panel, the battery capacity would remain at 6.5 AH.

EXAMPLE #2
Table 10.1 - 24 Hours Supervisory, 5 Minutes of Alarm
Signal Circuit Current: 4 Amps for 5 Minutes

Panel Current Load								
		Aux. Power Supervisory Current (A)						
		0	**25**	50	75	100	125	150
# Zones	# Option odules	Amp/Hour Battery Size						
2	0	4.5	4.5	4.5	4.5	6.5	6.5	6.5
2	1	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
2	**2**	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
2	3	4.5	4.5	6.5	6.5	6.5	8.0	8.0*
4	0	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
4	1	4.5	4.5	4.5	6.5	6.5	6.5	8.0*
4	2	4.5	4.5	6.5	6.5	6.5	8.0*	8.0*
8	0	4.5	4.5	6.5	6.5	6.5	8.0	8.0*
8	1	4.5	6.5	6.5	6.5	8.0	8.0	-
8	2	4.5	6.5	6.5	6.5	8.0	8.0	-
8	3	4.5	6.5	6.5	8.0	8.0	8.0	-

* = Must Purchase Auxiliary Battery Box P/N BATBOX Separately.

10.1.2 Battery Calculation Worksheets

If the panel parameters exceed the values in the battery calculation tables, or if detailed battery calculations are required, the battery calculation worksheets should be used.

1. Enter the quantity of each module installed in the "Quantity" column, next to the appropriate module description.
2. For each quantity entry, multiply the value in the "Quantity" column by the value in the "Supervisory" column, and enter the value in the "Total Supervisory" column.
3. For each quantity entry, multiply the value in the "Quantity" column by the value in the "Alarm" column, and enter the value in the "Total Alarm" column.
4. Add all values in the "Total Supervisory" column and put the answer in the Total Supervisory box "*A*".
5. Add all values in the "Total Alarm" column and put the answer in the Total Alarm box "*B*".
6. Enter the required supervisory time (hours) in box "*C*", and the total alarm time (minutes) in the alarm time box "*D*".
7. Substitute the values from boxes "*A*" through "*D*" in the battery calculation formula, and calculate the minimum battery capacity.

Description	Quantity		Supervisory (mA)	Total Supervisory (mA)	Alarm	Total Alarm
Base Panel	1	x	55	55	100	100
2 Zone input module		x	16		45	
Relay Modules		x	16		76	
Style D IDC Converter			0	0	40	
Dialer		x	12		25	
Annunciator Master		x	10		100	
Remote Trouble Unit		x	10		10	
Auxiliary Power (mA)						
Number of Detectors			0.050			
Signal Load (mA)						
			TOTAL	(*A*)		(*B*)
Battery Calculation						
Supervisory Hours	(*C*)					
Alarm Minutes	(*D*)					

$$\text{attery Capacity (A.H.)} = \frac{(1.11 \times A \times C) + (0.033 \times B \times D)}{1000}$$

NOTE: Battery capacity of panel can be extended to 10 AH using the 2400-BATBOX Battery Cabinet.

Battery Calculation Example #3
A panel with two (2) Two Zone Initiating Device Circuit Modules requires 24 hours standby, 5 minutes alarm. The Indicating Appliance Circuit requires 2.5 Amps. The remote trouble unit to be installed with the panel requires 15 mA in the Supervisory mode and 15 mA in the Alarm mode. Calculate the minimum required battery capacity that will meet these requirements.

Description	Quantity		Supervisory (mA)	Total Supervisory (mA)	Alarm	Total Alarm
Base Panel	1	x	55	55	100	100
2 Zone input module	2	x	16	32	45	90
Relay Modules		x	16		76	
Style D IDC Converter			0	0	40	
Dialer		x	12		25	
Annunciator Master		x	10		100	
Remote Trouble Unit	1	x	10	10	10	10
Auxiliary Power (mA)						
Number of Detectors	60		0.050	3.0		3.0
Signal Load (mA)						2,500
			TOTAL	105 (*A*)		2,703 (*B*)
Battery Calculation						
Supervisory Hours	24 (*C*)					
Alarm Minutes	5 (*D*)					

Enter the data in the formula and solve the equation.

$$\text{Battery Capacity (A.H.)} = \frac{(1.11 \times 105 \times 24) + (0.033 \times 2{,}703 \times 5)}{1000}$$

$$= 3.24 \text{ A.H.}$$

NOTE: Battery capacity of panel can be extended to 10 AH using the 2400-BATBOX Battery Cabinet.

Two 12V, 6.5 AH batteries (P/N 12V6A5) will adequately power this system. Note that this is the same sample problem as Example #2. In this case, however, the answer provided by using the worksheets is only slightly lower than the answer provided by using the tables.

Battery Calculation Example #4

A panel with a Two Zone Initiating Device Circuit Module is to be installed in accordance with the Canadian National Building Code (NBC) requirement of 24 hours standby, 30 minutes alarm. The Indicating Appliance Circuit requires 2.5 Amps, and there is no auxiliary power used. Calculate the minimum required battery capacity that will meet these requirements.

Description	Quantity		Supervisory (mA)	Total Supervisory (mA)	Alarm	Total Alarm
Base Panel	1	x	55	55	100	100
2 Zone input module	1	x	16	16	45	45
Relay Modules		x	16		76	
Style D IDC Converter			0	0	40	
Dialer		x	12		25	
Annunciator Master		x	10		100	
Remote Trouble Unit		x	10		10	
Auxiliary Power (mA)						
Number of Detectors	20		0.050	1.0		1.0
Signal Load (mA)						2,500
			TOTAL	72 (*A*)		2,646(*B*)
Battery Calculation						
Supervisory Hours	24 (*C*)					
Alarm Minutes	30 (*D*)					

Enter the data in the formula and solve the equation.

$$\text{attery Capacity (A.H.)} = \frac{(1.11 \times 72 \times 24) + (0.033 \times 2{,}646 \times 30)}{1000}$$

$$= 4.5 \text{ A.H.}$$

NOTE: Battery capacity of panel can be extended to 10 AH using the 2400-BATBOX Battery Cabinet.

Two 12 V, 6.5 AH batteries (P/N 12V6A5) will adequately power this system. Note that this is the same sample problem as Example #1. In this case, the answer provided by using the worksheets is the same as the answer provided by using the tables.

10.2 Appendix 2 - Compatible Devices

ULI Compatibility Listings
Compatible devices listed in this section are for use in the **USA ONLY**.

Table 10.4 - ULI Control Unit Compatibility Specifications - Edwards

Device	UL Smoke Detector Compatibility ID	Electrical Data				
		Standby Voltage @ Detector	Ripple Voltage	Maximum Standby Detector Load		EOL
				Style B	Style D	
2412 2 zone-3 space panel	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N 46299-0107
2414 4 zone-2 space panel	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N 46299-0107
2418 8 zone-3 space panel	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N 46299-0107
2400-2IDC 2 Zone IDC Module (P/N 240457)	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N 46299-0107
2400-BPA Base Panel Class A Converter (P/N 46199-1072)	0.0	17.85 -26.4 VDC	400 mV	N/A	2.5 mA @ 22.3 VDC	N/A
2400-IDCA IDC Converter (P/N 46199-1074)	0.0	17.85 -26.4 VDC	400 mV	N/A	2.5 mA @ 22.3 VDC	N/A

Table 10.5 - ULI Compatible Receivers for the DL1 Dialer Module

Model	Manufacturer	Location
685	Alarm Device Manufacturing Co., Div. of Pittway Corp.	Syosset, NY 11791
CP220	Fire Burglary Instruments, Div. of Pittway Corp.	Syosset, NY 11791
Quick Alert II	Osborne - Hoffman Inc.	Point Pleasant Beach, NJ 08742
D6500	Radionics Inc.	Salinas, CA 93912
9000	Silent Knight Security Systems, Div. of Willknight Inc.	Maple Grove, MN 55369

Table 10.6 - ULI Device & Panel Compatibility - Initiating Devices				
Cat. #	**Description**	**UL Identifier**	**Max. # Devices per IDC Zone**	**Options**
2420	Ionization Smoke Detector c/w Base	001	50	2
2430	Photoelectric Smoke Detector c/w Base	001	30	2
2432B	Photoelectric Smoke Detector c/w Base	001	30	2
2435P	Duct Housing w/Photoelectric Detector	001	30	2
6424	Beam Smoke Detector - 4 wire	NA	NA	1
AI9850-4	Ionization Smoke Detector c/w Base	001	50	
AI9854-3	Photoelectric Smoke Detector w/Heat Detector c/w Base	001	30	
AI9854-1	Photoelectric Smoke Detector c/w Base	001	30	

NOTES

1. The Cat.# 6424 Beam Smoke Detector is powered from auxiliary power.
2. Low impedance detectors. (Refer to Programming Section for proper operation.)
3. High Impedance detectors (Refer to Programming Section for proper operation.)

Table 10.7 - ULI Compatible Signaling Appliances			
Cat.#	**Description**	**Cat.#**	**Description**
2440S-15-R	Strobe, Red	2452HS-15-R	Strobe/Horn, Red
2441S-15-R	Strobe, Red	2452HS-15-W	Strobe/Horn, White
2440S-15-W	Strobe, White	2452HS-30-R	Strobe/Horn, Red
2441S-15-W	Strobe, White	2452HS-30-W	Strobe/Horn, White
2440S-30-R	Strobe, Red	2452HS-15/75-R	Strobe/Horn, Red
2441S-30-R	Strobe, Red	2452HS-15/75-W	Strobe/Horn, White
2440S-30-W	Strobe, White	2452HS-110-R	Strobe/Horn, Red
2441S-30-W	Strobe, White	2452HS-110-W	Strobe/Horn, White
2440S-60-R	Strobe, Red	2453BSA-30-R	Bell/Strobe Adapter
2441S-60-R	Strobe, Red	2453BSA-15/75-R	Bell/Strobe Adapter
2440S-60-W	Strobe, White	2453BSA-110-R	Bell/Strobe Adapter
2441S-60-W	Strobe, White	2455C-W	Chime, White
2440S-15/75-R	Strobe, Red	2455C-R	Chime, Red
2441S-15/75-R	Strobe, Red	2457CS-15-R	Chime/Strobe, Red
2440S-15/75-W	Strobe, White	2457CS-15-W	Chime/Strobe, White
2441S-15/75-W	Strobe, White	2457CS-30-R	Chime/Strobe, Red
2440S-110-R	Strobe, Red	2457CS-30-W	Chime/Strobe, White
2441S-110-R	Strobe, Red	2457CS-15/75-R	Chime/Strobe, Red
2440S-110-W	Strobe, White	2457CS-15/75-W	Chime/Strobe, White
2441S-110-W	Strobe, White	2457CS-110R	Chime/Strobe, Red
2445-B	Horn, Beige	2457CS-110W	Chime/Strobe, White
2445-R	Horn, Red	439D-6AW-R	6” Vibrating Bell, Red
2447H-W	Horn, White	439D-8AW-R	8” Vibrating Bell, Red
2447H-R	Horn, White	439D-10AW-R	10” Vibrating Bell, Red
2450-H-B	110cd Strobe/Horn, Beige	439DEX-6AW	6” Explosionproof Bell
2450-H-R	110cd Strobe/Horn, Red	439DEX-8AW	8” Explosionproof Bell
2450-M-B	15 cd Strobe/Horn, Beige	439DEX-10AW	10” Explosionproof Bell
2450-M-R	15cd Strobe/Horn, Red		

Table 10.8 - ULI Compatible Accessories	
Cat. Number	**Description**
*MR-101/C	1-SPDT Relay w/LED
*MR-101/T	1-SPDT Relay w/LED
*MR-104/C	4-SPDT Relay w/LEDs
*MR-104/T	4-SPDT Relay w/LEDs
*MR-201/C	1-DPDT Relay w/LED
*MR-201/T	1-DPDT Relay w/LED
*MR-204/C	4-DPDT Relay w/LEDs
*MR-204/T	4-DPDT Relay w/LEDs
PAM-1	1-SPDT w/LED, Adhesive Mt.
2400-RTU	Remote Trouble Unit
2400-4ZA	Remote Annunciator, 4 Zone
2400-8ZA	Remote Annunciator, 8 Zone
2400-RTU4ZA	Remote Annunciator, 4 Zone w/ Trouble Unit
2400-RTU8ZA	Remote Annunciator, 8 Zone w/ Trouble Unit

* = Manufactured by Air Products and Control, Ltd.

ULC Compatibility Listings
Compatible devices listed in this section are for use in **CANADA ONLY**.

Table 10.9 - ULC Control Unit Compatibility Specifications - Edwards

Device	ULC Smoke Detector Compatibility ID	Electrical Data				
		Standby Voltage @ Detector	Ripple Voltage	Maximum Standby Detector Load		EOL
				Style B	Style D	
2412 2 zone-3 space panel	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N EOL-P1
2414 4 zone-2 space panel	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N EOL-P1
2418 8 zone-3 space panel	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N EOL-P1
2400-2IDC 2 Zone IDC Module (P/N 240457)	0.0	17.85 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	N/A	4.7KΩ P/N EOL-P1
2400-BPA Base Panel Class A Converter (P/N 46199-1072)	0.0	17.85 -26.4 VDC	400 mV	N/A	2.5 mA @ 22.3 VDC	N/A
2400-IDCA IDC Converter (P/N 46199-1074)	0.0	17.85 -26.4 VDC	400 mV	N/A	2.5 mA @ 22.3 VDC	N/A

Table 10.10 - ULC Compatible Receivers for the DL1 Dialer Module

Model	Manufacturer	Location
685	Alarm Device Manufacturing Co., Div. of Pittway Corp.	Syosset, NY 11791
CP220	Fire Burglary Instruments, Div. of Pittway Corp.	Syosset, NY 11791
Quick Alert II	Osborne - Hoffman Inc.	Point Pleasant Beach, NJ 08742
D6500	Radionics Inc.	Salinas, CA 93912
9000	Silent Knight Security Systems, Div. of Willknight Inc.	Maple Grove, MN 55369

Table 10.11 - ULC Device & Panel Compatibility - Initiating Devices				
Cat. #	**Description**	**UL Identifier**	**Max. # Devices per IDC Zone**	**Options**
291C	135ºF (57ºC) Heat Detector	001	50	1
292C	197ºF (92ºC) Heat Detector	001	50	1
293C	135ºF (57ºC) Heat Detector	001	50	1
294C	197ºF (92ºC) Heat Detector	001	50	1
5956A	Fire Alarm Indicator - LED	NA	NA	
6249C	Ionization Smoke Detector c/w Base	001	50	3,5
6250C	Ionization Smoke Detector	001	50	1,5
6260A-100	Duct Detector/Sensor Housing (housing only)	NA	NA	
6260C-005	Duct Detector Assembly, Low Velocity	NA	NA	
6262A-001	Fire Alarm Indicator/Test Station	NA	NA	
6264C-001	Ionization Detector, Duct	001	50	1,2,5
6264C-005	Ionization Detector, Duct, Low Velocity	001	50	1,2,5
6266C-001	Photoelectric Detector, Duct	001	30	1,2,5
6269C	Photoelectric Smoke Detector c/w Base	001	30	3,5
6269C-003	Photoelectric/Heat Detector c/w Base	001	30	3,5
6270C	Photoelectric Smoke Detector	001	30	1,5
6270C-003	Photoelectric/Heat Detector	001	30	1,5
6426A	Beam Smoke Detector - 4-wire	NA	NA	4

NOTES

1. These detectors plug into the following base: Cat.# 6251B-001A. Compatibility ID for all bases is 001. The Cat.# 5956A remote LED may also be used with these bases.
2. These detectors are used with the following detector housings: Cat.# 6260A-100 and Cat.#6260C-005 duct detector assembly and fire alarm indicator/test station.
3. The Cat.# 5956A remote LED may also be used with these bases.
4. The Cat.# 6424A Beam Smoke Detector is powered from auxiliary power.
5. Low impedance detectors. (Refer to Programming Section for proper operation.)
6. High impedance detectors. (Refer to Programming Section for proper operation.)

Table 10.12 - ULC Compatible Signaling Appliances

Cat.#	Description	Cat.#	Description
2440S-15-R	Strobe, Red	2452HS-15/75-R	Strobe/Horn, Red
2441S-15-R	Strobe, Red	2452HS-15/75-W	Strobe/Horn, White
2440S-15-W	Strobe, White	2452HS-110-R	Strobe/Horn, Red
2441S-15-W	Strobe, White	2452HS-110-W	Strobe/Horn, White
2440S-30-R	Strobe, Red	2453BSA-30-R	Bell/Strobe Adapter
2441S-30-R	Strobe, Red	2453BSA-15/75-R	Bell/Strobe Adapter
2440S-30-W	Strobe, White	2453BSA-110-R	Bell/Strobe Adapter
2441S-30-W	Strobe, White	2455C-W	Chime, White
2440S-60-R	Strobe, Red	2455C-R	Chime, Red
2441S-60-R	Strobe, Red	2457CS-15-R	Chime/Strobe, Red
2440S-60-W	Strobe, White	2457CS-15-W	Chime/Strobe, White
2441S-60-W	Strobe, White	2457CS-30-R	Chime/Strobe, Red
2440S-15/75-R	Strobe, Red	2457CS-30-W	Chime/Strobe, White
2441S-15/75-R	Strobe, Red	2457CS-15/75-R	Chime/Strobe, Red
2440S-15/75-W	Strobe, White	2457CS-15/75-W	Chime/Strobe, White
2441S-15/75-W	Strobe, White	2457CS-110-R	Chime/Strobe, Red
2440S-110-R	Strobe, Red	2457CS-110-W	Chime/Strobe, White
2441S-110-R	Strobe, Red		
2440S-110-W	Strobe, White	333D-4G1	Single Stroke Bell, 4”
2441S-110-W	Strobe, White	333D-6G1	Single Stroke Bell, 6”
2445-B	Horn, Beige	333D-10G1	Single Stroke Bell, 10”
2445-R	Horn, Red	339D-G1	Single Stroke Chime
2447H-W	Horn, White		
2447H-R	Horn, White	439D-6AWC-R	6” Vibrating Bell, Red
2450-H-B	110cd Strobe/Horn, Beige	439D-10AWC-R	10” Vibrating Bell, Red
2450-H-R	110cd Strobe/Horn, Red	439DEX-6AWC	6” Explosionproof Bell
2450-M-B	15 cd Strobe/Horn, Beige	439DEX-10AWC	10” Explosionproof Bell
2450-M-R	15cd Strobe/Horn, Red		
2452HS-15-R	Strobe/Horn, Red	5520D-G1	Horn/Siren
2452HS-15-W	Strobe/Horn, White	5524D-G1	Explosionproof Horn
2452HS-30-R	Strobe/Horn, Red	5525D-G1	Explosionproof Siren
2452HS-30-W	Strobe/Horn, White	5530D-AWC	Multi-Tone Signal

Table 10.13 - ULC Compatible Accessories

Cat. Number	Description
*MR-101/C	1-SPDT Relay w/LED
*MR-101/T	1-SPDT Relay w/LED
*MR-104/C	4-SPDT Relay w/LEDs
*MR-104/T	4-SPDT Relay w/LEDs
*MR-201/C	1-DPDT Relay w/LED
*MR-201/T	1-DPDT Relay w/LED
*MR-204/C	4-DPDT Relay w/LEDs
*MR-204/T	4-DPDT Relay w/LEDs
2400-RTU(C)	Remote Trouble Unit
2400-4ZA(C)	Remote Annunciator, 4 Zone
2400-8ZA(C)	Remote Annunciator, 8 Zone
2400-RTU4ZA(C)	Remote Annunciator, 4 Zone w/ Trouble Unit
2400-RTU8ZA(C)	Remote Annunciator, 8 Zone w/ Trouble Unit
*PAM-1	1-SPDT w/LED, Adhesive Mt.
6254A-003	Fire Alarm/Power Supervision Relay

* = Manufactured by Air Products and Control, Ltd.

(C) = French /English bilingual version

Table 10.14 Mixed Ion/Photo Detector Maximum Devices per Circuit Refer to Compatibility Tables 10.4 & 10.8	
ION Detectors	PHOTO Detectors
0	30
1	29
2	28
3	28
4	27
5	27
6	26
7	25
8	25
9	24
10	24
11	23
12	22
13	22
14	21
15	21
16	20
17	19
18	19
19	18
20	18
21	17
22	16
23	16
24	15
25	15
26	14
27	13
28	13
29	12
30	12
31	11
32	10
33	10
34	9
35	9
36	8
37	7
38	7
39	6
40	6
41	5
42	4
43	4
44	3
45	3
46	2
47	1
48	1
49	
50	

10.3 Appendix 3 - Glossary

Alarm Silence/Reset Inhibit Timer - A panel option which prevents silencing Indicating Appliance Circuits or resetting the panel for a programmed period after the last alarm.

Alarm Silence Timer - A panel option which automatically silences the Indicating Appliance Circuits (IACs) after a programmed time limit after the last alarm.

Alert - A condition or state of an Initiating Device Circuit (IDC) caused when the effective internal resistance of an initiating device is a relatively low impedance.

Alarm - A condition or state of an Initiating Device Circuit (IDC) caused when the effective internal resistance of an initiating device is approaching 0Ω.

Class A Supervision, IAC - Circuit monitoring technique which signals a trouble condition upon an *open* or *short* condition on an Indicating Appliance Circuit. All appliances can operate in spite of an open fault. Similar to Style Z supervision.

Class A Supervision, IDC - Circuit monitoring technique which signals a trouble condition upon an *open* condition on an Initiating Device Circuit. All devices can initiate an alarm in the event of an open fault.

Class B Supervision, IAC - Circuit monitoring technique which signals a trouble condition upon an *open* or *short* condition on an Indicating Appliance Circuit. Similar to Style Y supervision.

Class B Supervision, IDC - Circuit monitoring technique which signals a trouble condition upon an *open* condition on an Initiating Device Circuit. All devices up to the location of an open fault can initiate an alarm.

Dialer - See digital alarm communicator transmitter.

Digital Alarm Communicator Receiver (DACR) - Central monitoring station equipment which receives and displays messages from a digital alarm communicator transmitter (DACT) which are sent via the public switched telephone network.

Digital Alarm Communicator Transmitter (DACT) - Equipment installed in the fire alarm panel which transmits status changes to the central monitoring station by seizing a telephone line, dialing the preselected number of the digital alarm communicator and transmit fire alarm panel status changes.

High Impedance Initiating Device - An alarm initiating device whose equivalent resistance will put an Initiating Device Circuit in the Alert Mode.

Indicating Appliance Circuit (IAC) - A supervised output circuit connected directly to any audible or visual signal appliance used to indicate a fire.

Initiating Device Circuit (IDC) - A supervised input circuit connected directly to any manual or automatic initiating device whose normal operation results in an alarm or supervisory signal indication at the control panel.

Low Impedance Initiating Device - An alarm initiating device whose equivalent resistance will put an Initiating Device Circuit in the Alarm mode.

March Time - A 50% duty cycle, 120 beats/minute signal pattern.

Non-Silenceable - An indicating appliance circuit (IAC) which remains active after initiation, independent of the alarm silence features.

One-Man Test - Maintenance mode to test initiating and indicating circuits. Creating an alarm on the Initiating Device Circuit (IDC) under test causes both Indicating Appliance Circuit (IAC) to pulse out the zone number of the zone under test (i.e., three rings for zone 3). Creating a trouble or ground fault condition on the IDC under test causes both IACs to output a single long pulse.

Password, Dialer - 4727 (GSBS)

Power Limited - Wiring and equipment which conforms with and is installed to the National Electrical Code, article 760, power limited provisions.

Retard - The delay of waterflow signals to prevent false alarms due to fluctuations in water pressure.

Silenceable - An Indicating Appliance Circuit (IAC) which follows the action of the alarm silence switch.

SPM - Strokes Per Minute.

Style B Supervision, IDC - Circuit monitoring technique which signals a trouble condition upon an *open* condition or *ground fault* on an Initiating Device Circuit. All devices up to the location of an open fault can initiate an alarm.

Style D Supervision, IDC - Circuit monitoring technique which signals a trouble condition upon an *open* condition or *ground fault* on an Initiating Device Circuit. All devices can initiate an alarm in the event of an open fault. Similar to Class A IDC supervision.

Style Y Supervision, IAC - Circuit monitoring technique which signals a trouble condition upon an *open*, *short*, or *ground fault* condition on an Indicating Appliance Circuit. Similar to Class B IAC supervision.

Style Z Supervision, IAC - Circuit monitoring technique which signals a trouble condition upon an *open*, *short*, or *ground fault* condition on an Indicating Appliance Circuit. All appliances can operate in spite of an open fault. Similar to Class A IAC supervision.

Supervisory Operation - An IDC used to monitor the status of critical fire protection equipment.

Temporal Pattern - A 3 pulse signal meeting the requirements of NFPA Standard 72, section A-2-4.10(a), and ULC 527.

Verification, Alarm - After receipt of an alarm by a smoke detector, verified zones attempt to automatically reset the detector. Receipt of a second alarm within the 60 second confirmation period after the automatic detector reset period transmits the alarm to the panel.

Waterflow Zone - IDCs defined as waterflow zones do not permit alarm silence while the alarm is active.

10.4 Appendix 4 - Standards Relevant to the Installation of this Product

National Fire Protection Association (NFPA)
1 Batterymarch Park
PO Box 9101
Quincy, MA 02269-9101

NFPA 70, National Electric Code

NFPA 72, National Fire Alarm Code

Underwriter Laboratories Inc. (ULI)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 38, Manually Actuated Signaling Boxes
UL 217, Smoke Detectors, Single & Multiple Station
UL 228 Door Closers/Holders for Fire Protective Signaling Systems
UL 268 Smoke Detectors for Fire Protective Signaling Systems
UL 268A Smoke Detectors for Duct Applications
UL 346 Waterflow Indicators for Fire Protective Signaling Systems
UL 464 Audible Signaling Appliances
UL 521 Heat Detectors for Fire Protective Signaling Systems
UL 864, Standard for Control Units for Fire Protective Signaling Systems
UL 1481, Power Supplies for Fire Protective Signaling Systems
UL 1638 Visual Signaling Appliances
UL 1971 Visual Signaling Appliances

Underwriter Laboratories of Canada (ULC)
7 Crouse Road
Scarborough, Ontario M1R 3A9

ULC S527, Standard for Control Units For Fire Alarm Systems
ULC S524, Standard for the Installation of Fire Alarm Systems
ULC S536, Standard for the Inspection and Testing of Fire Alarm Systems
ULC S537, Standard for the Verification of Fire Alarm Systems

Requirements of state and local building codes.

Requirements of the Authority Having Jurisdiction (AHJ).

10.5 Appendix 5 - Fire Alarm Trouble & Maintenance Log

Date	Time	Event	Initial

10.6 Appendix 6 - Panel Configuration & Programming Worksheet

Project Name: _____

IDC Programming Worksheet								
	Zone							
Panel Location ➪	Base Panel IDC		1st -2IDC Module		2nd -2IDC Module		3rd -2IDC Module	
IDC Programming	1	2	3	4	5	6	7	8
Zone Coverage Area								
Class B								
Class A								
ALARM, Non-verified Detector (Steady RED zone LED)								
ALARM, Verified Detector & Dry Contact Devices (✡PAUSE✡ PAUSE✡... RED zone LED)								
ALARM, Verified Detector ONLY (✡✡ PAUSE ✡✡ PAUSE ✡✡... RED zone LED)								
Normally-Open SUPERVISORY (Steady Amber zone LED)								
WATERFLOW (Steady Green zone LED)								
WATERFLOW with Retard (✡PAUSE✡PAUSE✡... GREEN zone LED)								
Activate IAC #1 (IAC #1 Trouble LED ACTIVE)								
Activate IAC #2 (IAC #2 Trouble LED ACTIVE)								
Activate Remote Anunciator								

Panel Configuration and Programming Worksheet

Project Name: _____

IAC Programming Worksheet		
IAC Programming	**IAC #1**	**IAC #2**
Class B		
Class A		
Silenceable (Signal Trouble Circuit #2 LED ON **AND** Alarm Silenced LED = ✡ PAUSE ✡ PAUSE ✡...)		
Non-Silenceable (Signal Trouble Circuit #2 LED ON **AND** Alarm Silenced LED OFF)		
Continuous (Signal Trouble Circuit #2 LED ON Steady)		
120 SPM (Signal Trouble Circuit #2 LED 120 pulses/min)		
Temporal (Signal Trouble Circuit #2 LED Short-Short-Short-Long pulsing		
Continuous California Rate (Signal Trouble Circuit #2 LED ON for 10 seconds, off for 5 seconds...)		
March Time California Rate (Signal Trouble Circuit #2 LED ON for 10 seconds @ 120 SPM, off for 5 seconds...)		

Timer Configuration	
❑ No Alarm Silence Inhibit	Zone Disabled LED OFF
❑ 1 Minute Alarm Silence Inhibit	Zone Disabled LED = ✡ PAUSE ✡PAUSE ✡...
❑ 2 Minute Alarm Silence Inhibit	Zone Disabled LED =✡✡ PAUSE✡✡ PAUSE ✡✡...
❑ 3 Minute Alarm Silence Inhibit	Zone Disabled LED = ✡✡✡PAUSE ✡✡✡PAUSE ✡✡✡...
❑ No Automatic Silence	Alarm Silenced LED OFF
❑ 10 Minute Automatic Silence	Alarm Silenced LED = ✡PAUSE ✡PAUSE ✡...
❑ 20 Minute Automatic Silence	Alarm Silenced LED = ✡✡PAUSE✡✡ PAUSE✡✡...
❑ 30 Minute Automatic Silence	Alarm Silenced LED = ✡✡✡PAUSE✡✡✡ PAUSE✡✡✡...

Auxiliary Power Reset Configuration	
❑ Remains energized during Reset	Alarm Silenced LED OFF
❑ De-energize on Reset (alarm, verification, & test modes)	Alarm Silenced LED = ✡ PAUSE ✡ PAUSE ✡...

Option Modules
❑ 2400-2IDC Two Zone IDC Module (P/N 240457)
❑ 2400-RCT Relay/City-Tie Module (P/N 240459)
❑ 2400-ADM Annunciator Driver Master Module (P/N 240461)
❑ 2400-ADS Annunciator Driver Slave Module (P/N 240463)
❑ 2400-DL1 Dialer Module (P/N 240508)

Panel Configuration and Programming Worksheet

Project Name: _____

Description	Quantity		Supervisory (mA)	Total Supervisory (mA)	Alarm	Total Alarm
Base Panel	1	x	55	55	100	100
2 Zone input module		x	16		45	
Relay Modules		x	16		76	
Style D IDC Converter			0	0	40	
Dialer		x	12		25	
Annunciator Master		x	10		100	
Remote Trouble Unit		x	10		10	
Auxiliary Power (mA)						
Number of Detectors			0.050			
Signal Load (mA)						
			TOTAL	(*A*)		(*B*)

Battery Calculation

Supervisory Hours	(*C*)
Alarm Minutes	(*D*)

$$\text{attery Capacity (A.H.)} = \frac{(1.11 \times A \times C) + (0.033 \times B \times D)}{1000}$$

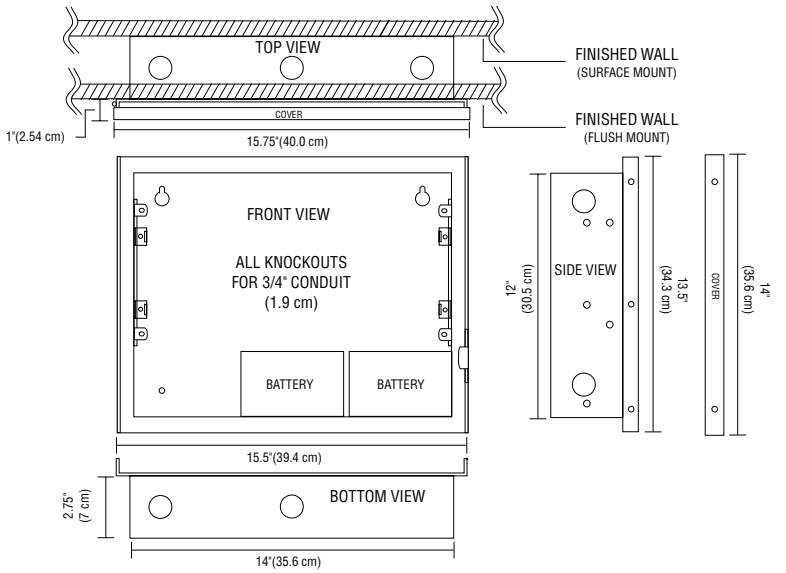
NOTE: Battery Capacity of panel can be extended to 10 AH by using the 2400-BATBOX Battery Cabinet.

DL1 Dialer Module Worksheet

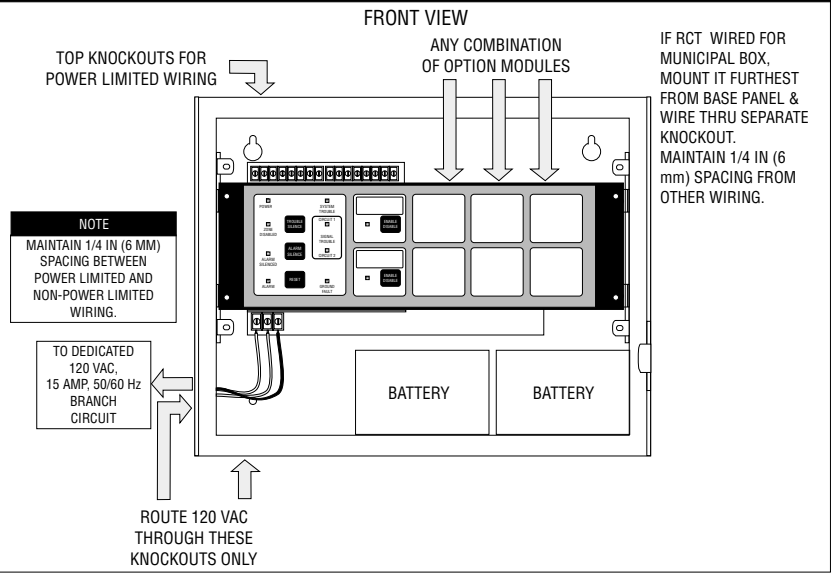
Primary Phone # _____ Primary ID# _____
Secondary Phone # _____ Secondary ID# _____
Number of Retries _____ Retry Interval _____ Seconds
AC Power Failure Delay_____ Hours

CONTROL PANEL INSTALLATION 1

CONTROL PANEL DIMENSIONS

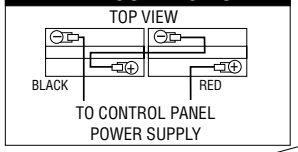


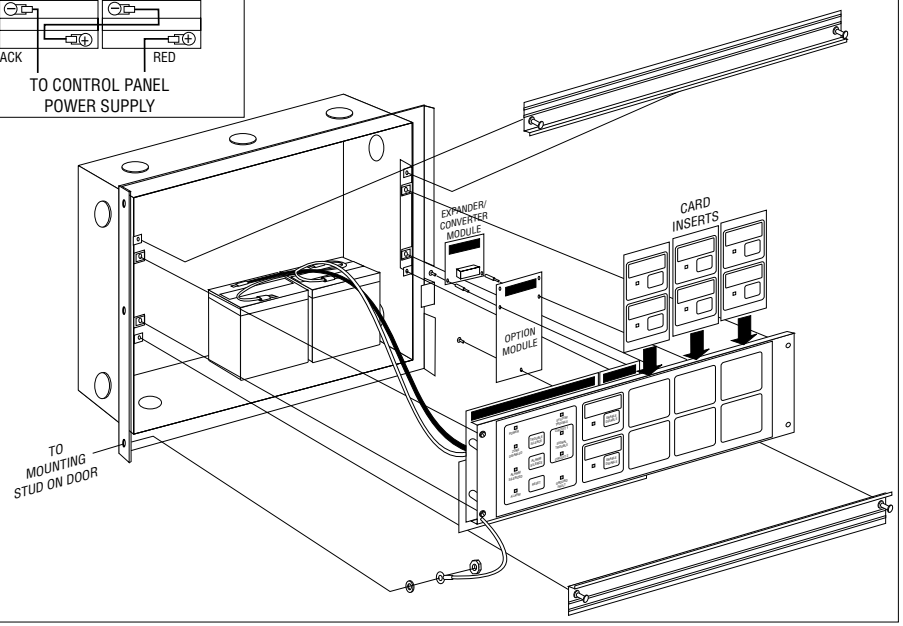
MODULE AND WIRING PLACEMENT



CONTROL PANEL ASSEMBLY

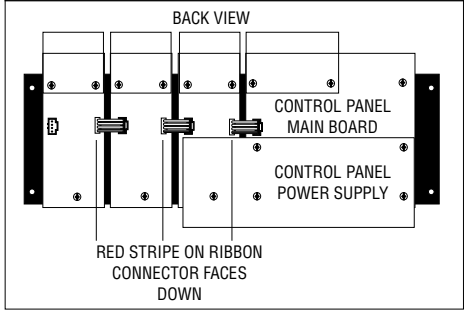
BATTERY CONNECTION

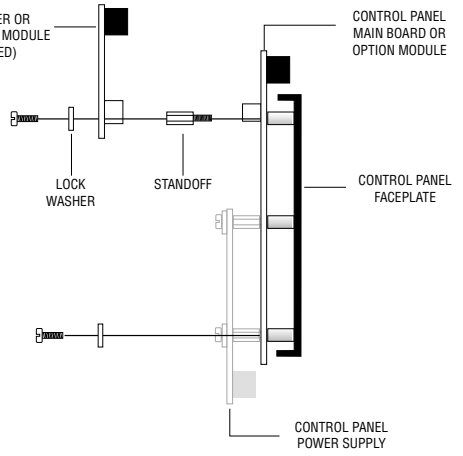




CONTROL PANEL ASSEMBLY DETAIL

RIBBON CONNECTORS

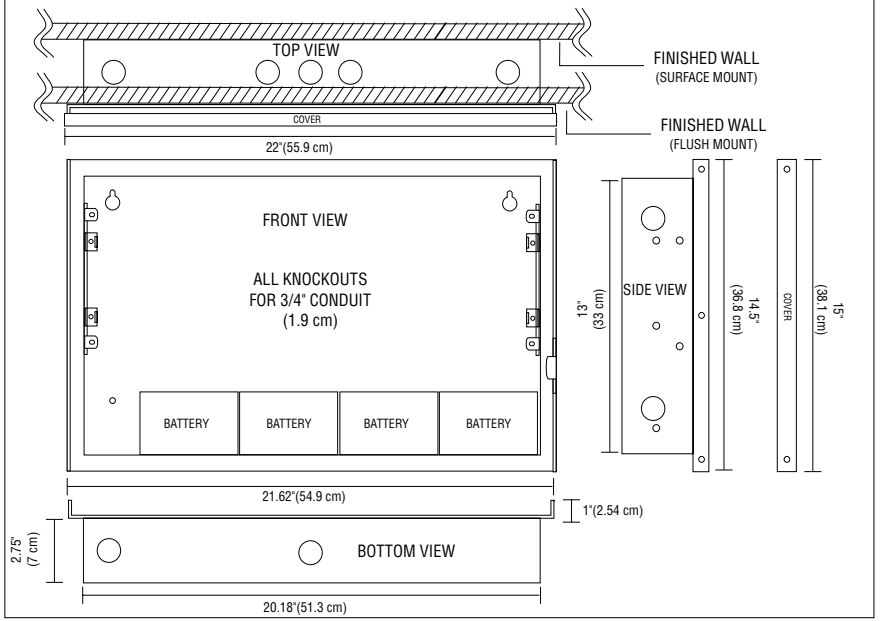




[EALZCPI.CDR]
05/23/95

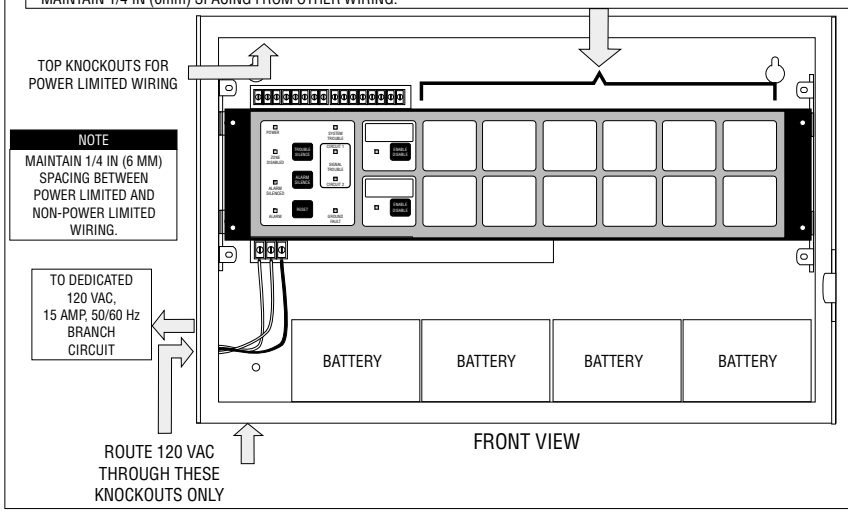
CONTROL PANEL INSTALLATION 2

CONTROL PANEL DIMENSIONS

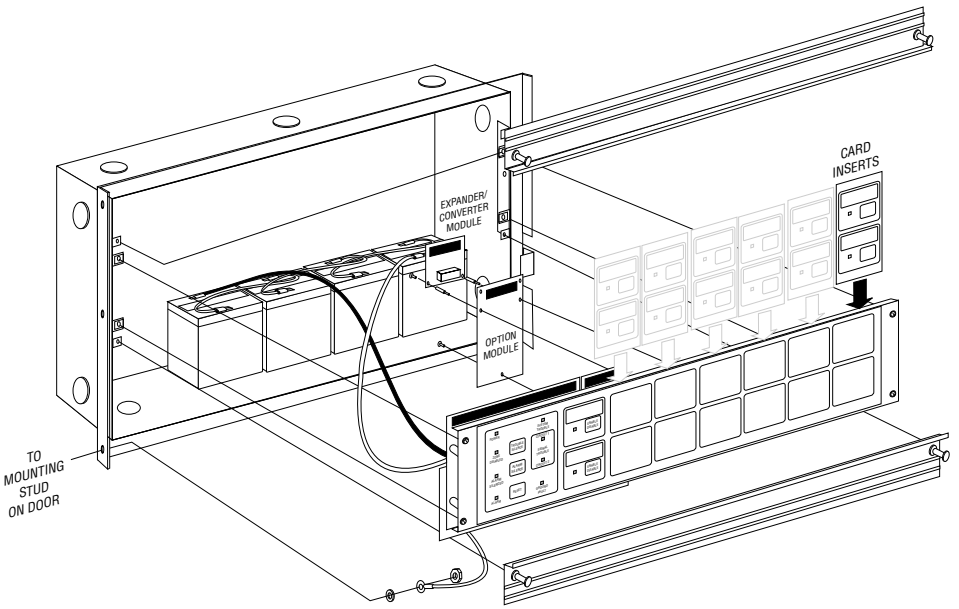


MODULE AND WIRING PLACEMENT

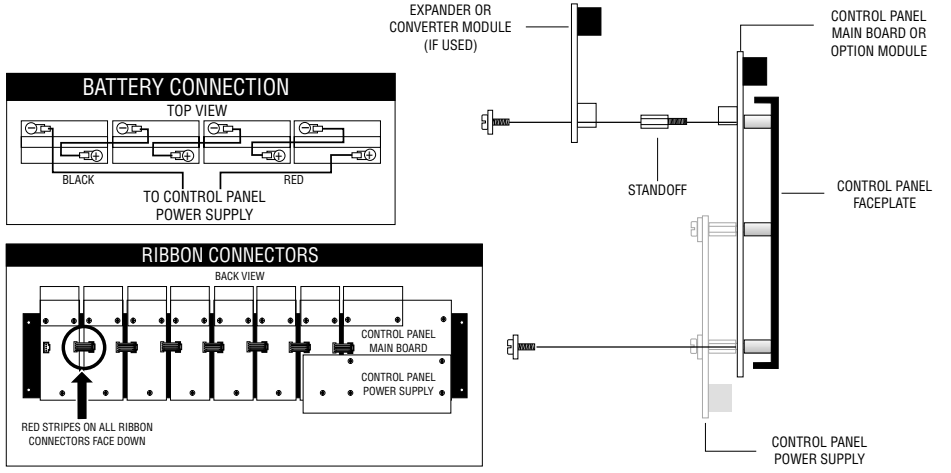
1 TO 3 TWO ZONE INITIATING DEVICE CIRCUIT MODULES (2400-2IDC) AND ANY COMBINATION OF 3 OPTION MODULES: RELAY/CITY TIE (2400-RCT), ANNUNCIATOR DRIVER (2400-ADM), OR DIALER (2400-DL1) MODULES.
IF RCT WIRED FOR MUNICIPAL BOX, MOUNT IT FURTHEST FROM BASE PANEL & WIRE THRU SEPARATE KNOCKOUT.
MAINTAIN 1/4 IN (6mm) SPACING FROM OTHER WIRING.



CONTROL PANEL ASSEMBLY

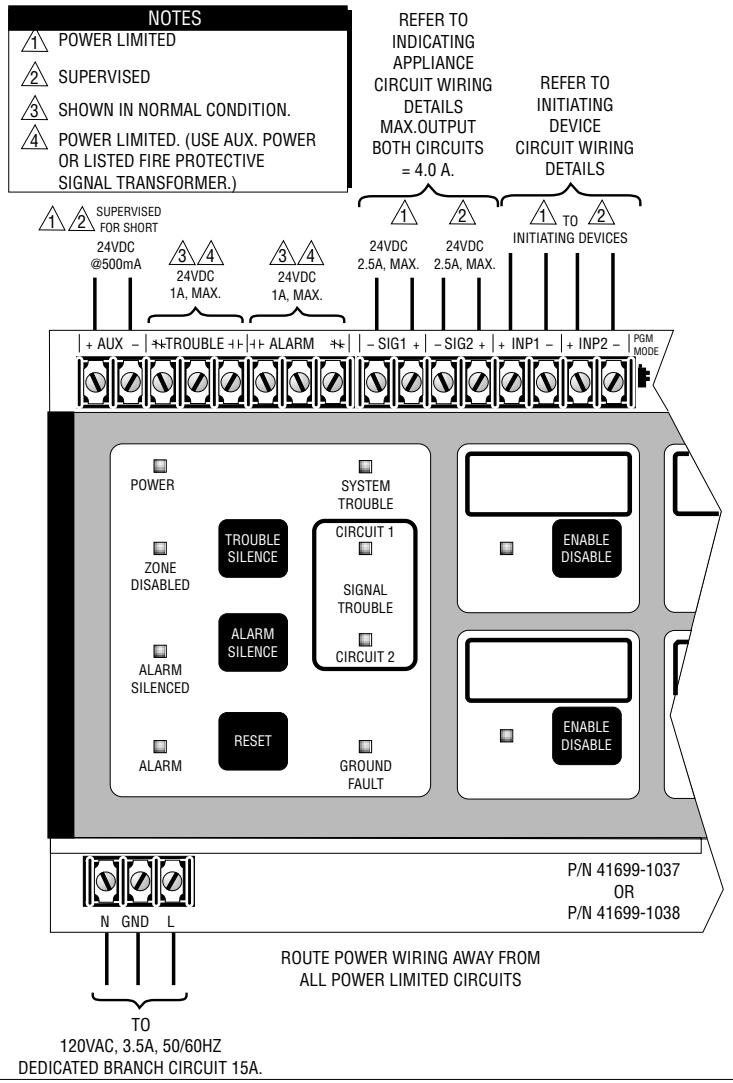


CONTROL PANEL ASSEMBLY DETAIL

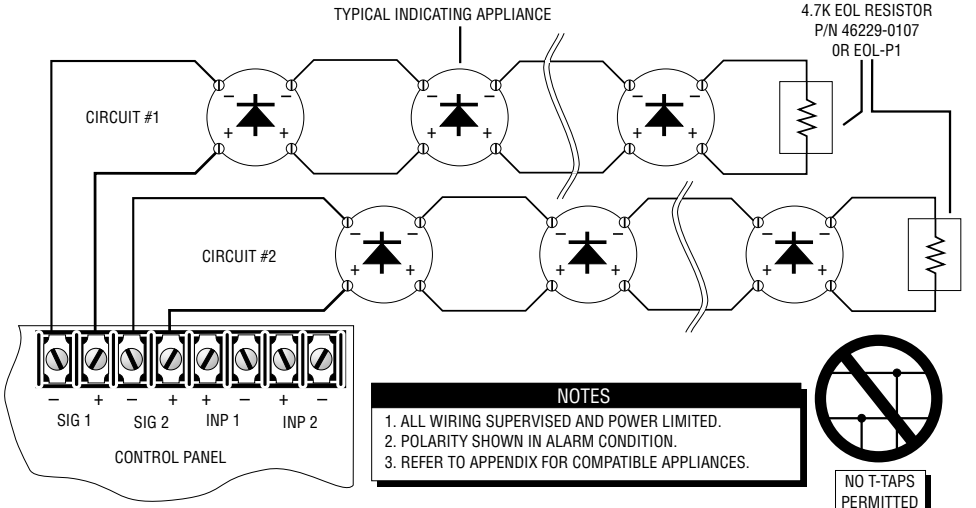


[EALZCPI3.CDR]
05/23/95

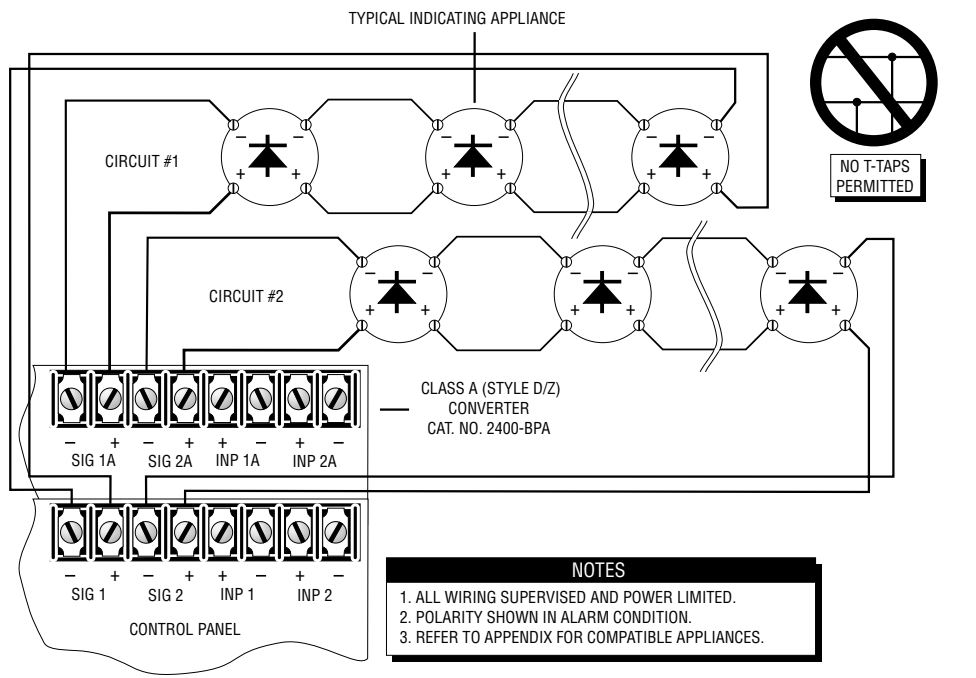
CONTROL PANEL



INDICATING APPLIANCE CIRCUIT MAXIMUM WIRING RUNS				
	MAXIMUM STYLE Y (CLASS B) RUN TO EOL RESISTOR. MAXIMUM STYLE Z (CLASS A) LOOP WIRING DISTANCE.			
LOAD CURRENT	#12 AWG FEET (METERS)	#14 AWG FEET (METERS)	#16 AWG FEET (METERS)	#18 AWG FEET (METERS)
0.10	10625 (3239)	6538 (1993)	4250 (1296)	2615 (797)
0.25	4250 (1296)	2615 (797)	1700 (518)	1046 (319)
0.50	2125 (648)	1308 (399)	850 (259)	523 (159)
0.75	1417 (432)	872 (266)	567 (173)	349 (106)
1.00	1063 (324)	654 (199)	425 (130)	262 (80)
2.00	531 (162)	327 (100)	213 (65)	131 (40)
2.50	425 (130)	262 (80)	170 (52)	105 (32)



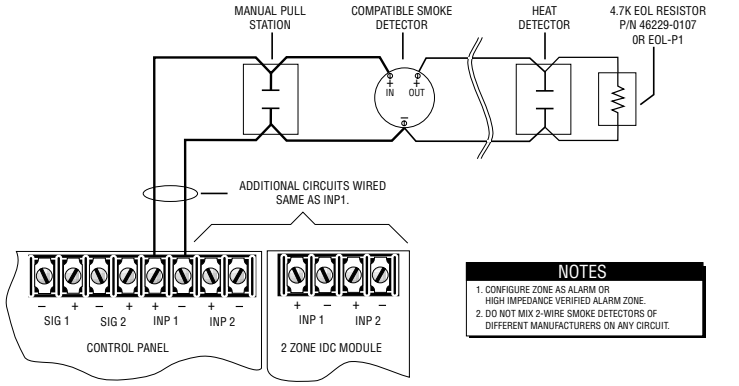
STYLE Y (CLASS B) INDICATING APPLIANCE CIRCUIT WIRING



STYLE Z (CLASS A) INDICATING APPLIANCE CIRCUIT WIRING

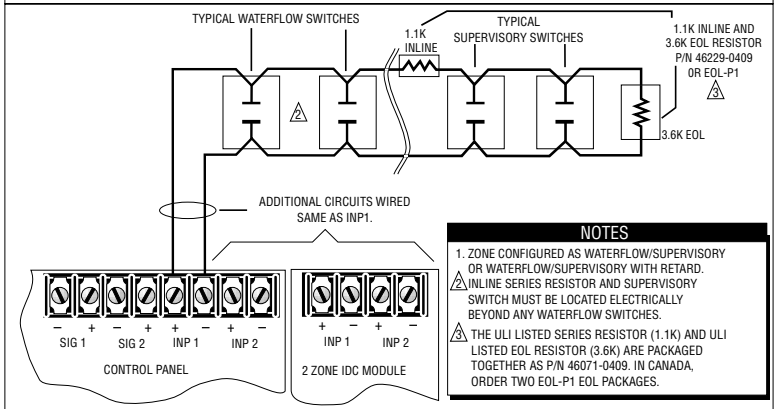
[EALZCP.CDR]

INITIATING DEVICE CIRCUIT WIRING



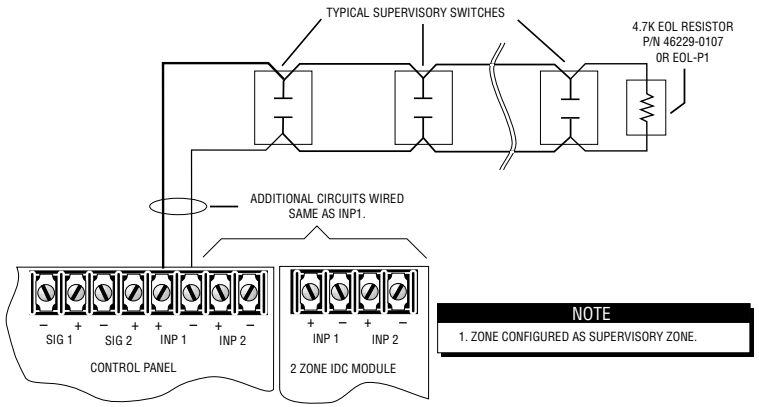
NOTES
1. CONFIGURE ZONE AS ALARM OR HIGH IMPEDANCE VERIFIED ALARM ZONE.
2. DO NOT MIX 2-WIRE SMOKE DETECTORS OF DIFFERENT MANUFACTURERS ON ANY CIRCUIT.

STYLE B (CLASS B) ALARM INITIATING DEVICE CIRCUIT WIRING



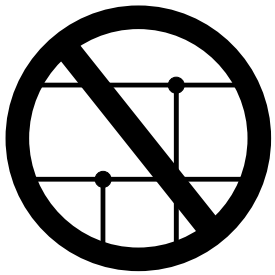
NOTES
1. ZONE CONFIGURED AS WATERFLOW/SUPERVISORY OR WATERFLOW/SUPERVISORY WITH RETARD.
2. INLINE SERIES RESISTOR AND SUPERVISORY SWITCH MUST BE LOCATED ELECTRICALLY BEYOND ANY WATERFLOW SWITCHES.
3. THE ULI LISTED SERIES RESISTOR (1.1K) AND ULI LISTED EOL RESISTOR (3.6K) ARE PACKAGED TOGETHER AS P/N 46071-0409. IN CANADA, ORDER TWO EOL-P1 EOL PACKAGES.

STYLE B (CLASS B) WATERFLOW/SUPERVISORY ALARM INITIATING DEVICE CIRCUIT WIRING



NOTE
1. ZONE CONFIGURED AS SUPERVISORY ZONE.

STYLE B (CLASS B) SUPERVISORY INITIATING DEVICE CIRCUIT WIRING

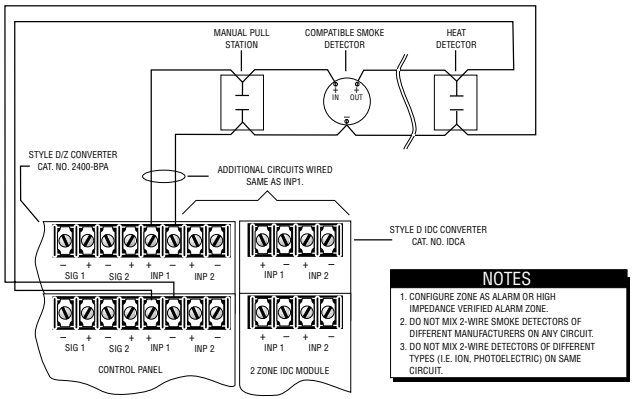


NO T-TAPS PERMITTED

NOTES
1. ALL WIRING SUPERVISED AND POWER LIMITED.
2. MAXIMUM WIRE RESISTANCE SHOULD NOT EXCEED 50 OHMS PER CIRCUIT.
3. NO T-TAPS PERMITTED ON ANY IDC CIRCUITS.
4. REFER TO APPENDIX FOR COMPATIBLE DEVICES.
5. 2-WIRE RELAY BASES ARE NOT SUPPORTED.
6. SEE CONTROL PANEL APPLICATIONS 2 DRAWING FOR 4-WIRE RELAY BASE CONFIGURATION

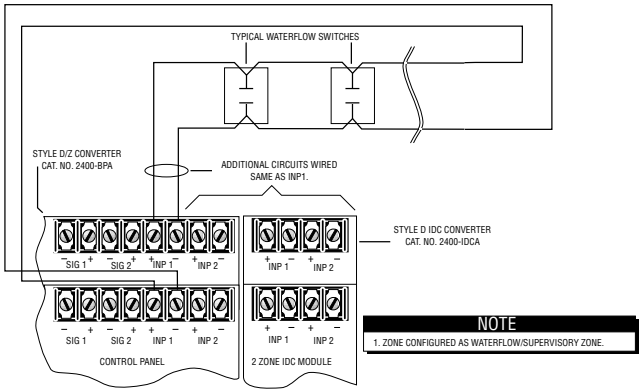
INITIATING DEVICE CIRCUIT MAXIMUM WIRING RUNS

CIRCUIT WIRING	
WIRE GAUGE	MAXIMUM WIRE RUN (TO EOL RESISTOR OR CLASS A LOOP LENGTH) FEET (METERS)
12	10000 (3049)
14	9600 (2927)
16	6250 (1905)
18	3800 (1159)



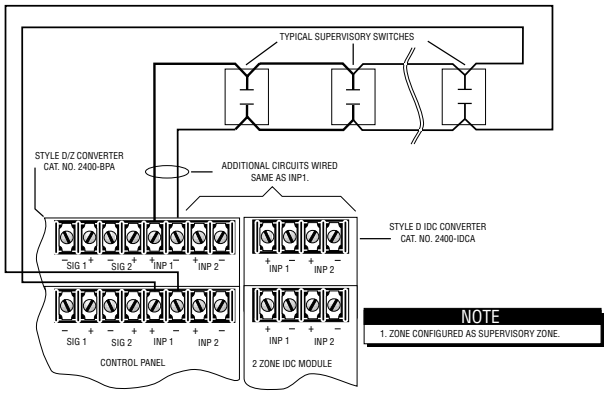
NOTES
1. CONFIGURE ZONE AS ALARM OR HIGH IMPEDANCE VERIFIED ALARM ZONE.
2. DO NOT MIX 2-WIRE SMOKE DETECTORS OF DIFFERENT MANUFACTURERS ON ANY CIRCUIT.
3. DO NOT MIX 2-WIRE DETECTORS OF DIFFERENT TYPES (I.E. ION, PHOTOELECTRIC) ON SAME CIRCUIT.

STYLE D (CLASS A) ALARM INITIATING DEVICE CIRCUIT WIRING



NOTE
1. ZONE CONFIGURED AS WATERFLOW/SUPERVISORY ZONE.

STYLE D (CLASS A) WATERFLOW ALARM INITIATING DEVICE CIRCUIT WIRING



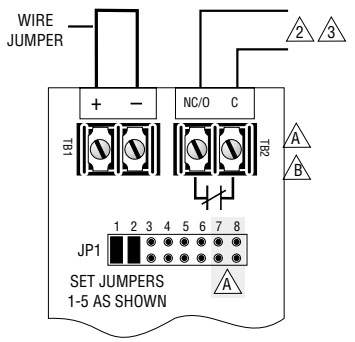
NOTE
1. ZONE CONFIGURED AS SUPERVISORY ZONE.

STYLE D (CLASS A) SUPERVISORY INITIATING DEVICE CIRCUIT WIRING

[EALZIDC.CDR]
03/08/95

RELAY/CITY-TIE MODULE

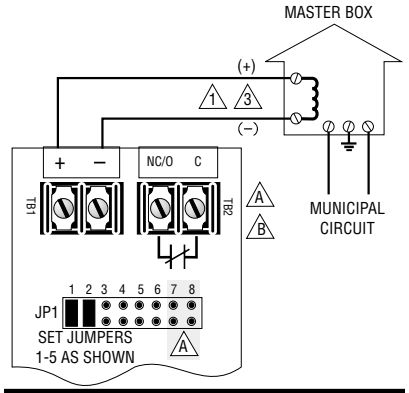
SHUNT CONNECTION/ DRY CONTACT



NOTES

1. CONTACTS RATED 24 VDC/VAC @ 1 A.
2. THE SHUNT CONNECTION IS RECOGNIZED ONLY AS A SUPPLEMENTARY SIGNALING UNIT AS PART OF A LOCAL CONTROL UNIT AND IS NOT RECOGNIZED AS AN AUXILIARY CONTROL UNIT CONNECTION PER NFPA 72.
3. CIRCUIT IS NOT SUPERVISED OR POWER LIMITED.

LOCAL ENERGY MASTER BOX

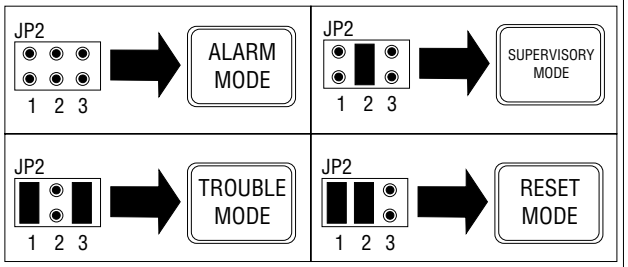


NOTES

1. 250 mA INTO A 14.5 OHM TRIP COIL. MAX. LOOP RESISTANCE= 25 OHMS.
2. CIRCUIT IS SUPERVISED FOR OPENS.
3. CIRCUIT NOT SUPERVISED FOR SHORTS AND IS NOT POWER LIMITED
4. MAY BE USED SIMULTANEOUSLY WITH DRY CONTACT.

NOTE B

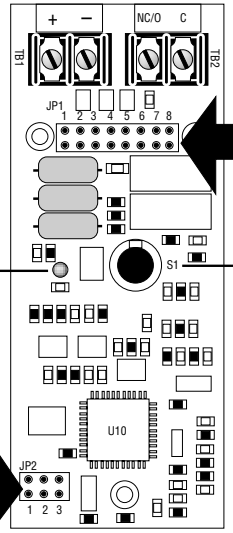
JUMPER JP2 1-3 CONFIGURES THE MODULE TO OPERATE IN EITHER ALARM, TROUBLE, SUPERVISORY, OR RESET MODES- WHEN MODULE NOT DISABLED.



INCORRECT JUMPER SETTINGS WILL RESULT IN IMPROPER OPERATION

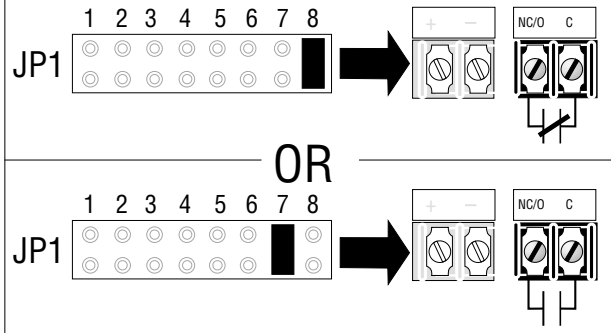
CAUTION

REMOVE ALL POWER BEFORE CHANGING JUMPERS



NOTE A

JUMPER JP1 7-8 DETERMINES CONTACT CONFIGURATION



CONTACT OPERATES SIMULTANEOUSLY WITH REMOTE OUTPUT
CONTACT SHOWN IN NORMAL STATE-
WHEN CONFIGURED FOR TROUBLE OPERATION, RELAY IS ENERGIZED AND CONTACT STATE REVERSED.

[CLZ1RLY4.CDR]
10/28/96

DIALER MODULE

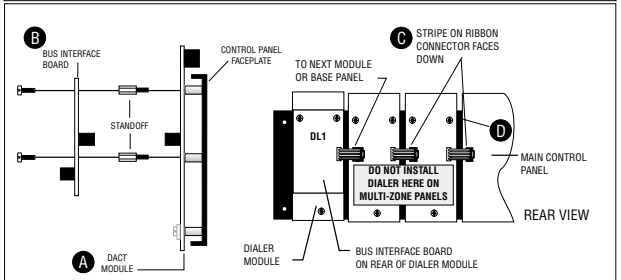
INSTALLATION STEP 1

A. INSTALL DIALER MODULE IN PANEL. SEE PANEL INSTALLATION DRAWING.

B. INSTALL BUS INTERFACE BOARD ON BACK OF DIALER MODULE.

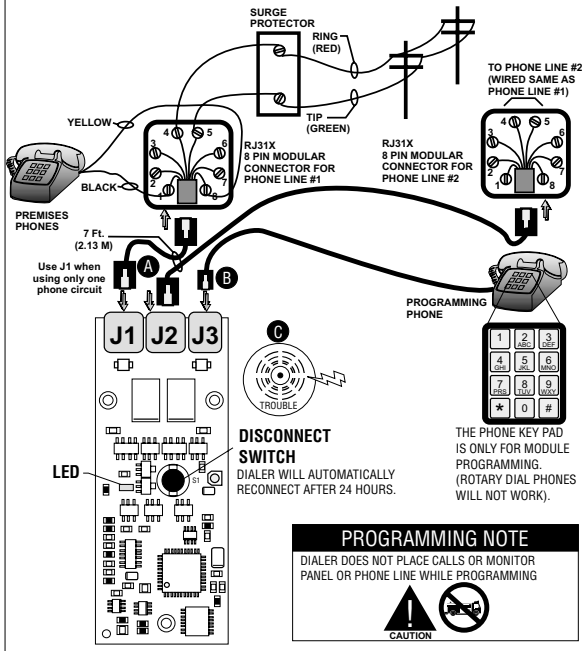
C. CONNECT RIBBON CABLE FROM MAIN CONTROL PANEL OR ADJECENT MODULE

D. SET PROGRAM SWITCH TO PROGRAM MODE (UP), AND PUSH RESET SWITCH.
WAIT FOR POWER LED TO FLASH, THEN RETURN SWITCH TO NORMAL MODE (DOWN).
Note: This process installs the dialer module in the panel's database. The panel will remain in trouble until the dialer is properly wired and programmed.



INSTALLATION STEP 2

A. CONNECT J1 AND J2 TO RJ31X OR RJ38X (CA31A OR CA38A IN CANADA) TELEPHONE JACKS INSTALLED BY AUTHORIZED TELEPHONE COMPANY REPRESENTATIVE. JACKS MUST BE INSTALLED WITHIN 5 FT. (1.5 M) OF PANEL. PROTECTIVE GROMMET SUPPLIED FOR ENCLOSURE KNOCKOUT.



PROGRAMMING NOTE

DIALER DOES NOT PLACE CALLS OR MONITOR PANEL OR PHONE LINE WHILE PROGRAMMING

CAUTION

LED LEGEND

- ■ = LED OFF
- ON STEADY = RED LED COLOR
- SLOW FLASH
- RAPID FLASH
- 2-PHASE FLASH

PROGRAMMING STEP A - ENTER PROGRAMMING MODE

CONNECT PHONE TO J3 (J1 J2 J3) → TAKE HANDSET OFF-HOOK. → GREEN

PROGRAMMING STEP B - ENTER PASSWORD

[*] → 4 DIGIT PASSWORD (– – – –) → CONFIRMATION BEEP = VALID PASSWORD → DIALING GREEN → GREEN

NOTE: IF PHONE NUMBERS HAVE BEEN PREVIOUSLY ENTERED INTO DIALER, DIALER WILL NOTIFY MONITORING STATION BEFORE PROGRAMMING CAN PROCEED.

PROGRAMMING STEP C - ENTER DIALER DATA

[*] → 2 DIGIT PROGRAMMING ITEM CODE (– –) → CONFIRMATION BEEP = VALID ITEM # ENTER REQUIRED INFORMATION FOR ALL 11 PROGRAMMING ITEMS.

PROGRAMMING ITEM 01 - PRIMARY SITE ID NUMBER

[*] [0] [1] → AMBER ON GREEN → 4 DIGIT ID NUMBER (– – – –) MUST BE 4 DIGITS USE LEADING ZEROS AS REQUIRED

PROGRAMMING ITEM 02 - PRIMARY CMS PHONE NUMBER

[*] [0] [2] → AMBER ON RED → UP T0 24 DIGIT PHONE NUMBER

PROGRAMMING ITEM 03 - SECONDARY SITE ID NUMBER

[*] [0] [3] → AMBER ON GREEN → 4 DIGIT ID NUMBER (– – – –) MUST BE 4 DIGITS USE LEADING ZEROS AS REQUIRED

PROGRAMMING ITEM 04 - SECONDARY CMS PHONE NUMBER

[*] [0] [4] → AMBER ON RED → UP TO 24 DIGIT PHONE NUMBER

PROGRAMMING ITEM 05 - 1 OR 2 PHONE LINE OPERATION

[*] [0] [5] → AMBER ON GREEN → [1] OR [2] (DEFAULT= 2)

PROGRAMMING ITEM 06 - NUMBER OF CMS RETRY CALLS

[*] [0] [6] → GREEN → 5, 6, 7, 8, 9, & 0 (10) ARE VALID ENTRIES (DEFAULT = 10)

PROGRAMMING ITEM 07 - RETRY INTERVAL

[*] [0] [7] → GREEN → 0 - 99 SECONDS. ARE VALID ENTRIES (DEFAULT = 0)

PROGRAMMING ITEM 08 - AC FAILURE DELAY

[*] [0] [8] → AMBER → 0 - 18 HOURS ARE VALID ENTRIES (– –) (DEFAULT = 0)

PROGRAMMING ITEM 09 - FIRST SUPERVISION CALL DELAY

[*] [0] [9] → AMBER → 2 DIGIT DELAY IN HOURS. (0 - 18) (– –) (DEFAULT = 12)

NOTE: DELAY TIME STARTS AT THE NEXT POWER ON.

PROGRAMMING ITEM 10 - 24 HR. TROUBLE RETRANSMISSION CHECK IN

[*] [1] [0] → RED → [1] ENABLE OR [2] DISABLE (DEFAULT)

PROGRAMMING ITEM 11 - ZONE/CODE ORDER

[*] [1] [1] → RED → Zone/Code [1] (Default) OR Code/Zone [2]

PROGRAMMING STEP D - EXIT PROGRAMMING MODE

DISCONNECT PHONE FROM J3 (J1 J2 J3) OR PUT HANDSET ON-HOOK.

DEFAULT PROGRAM ITEM RESTORATION

[*] [0] [0] → ENTERS DEFAULT VALUES & RETURNS TO PROGRAM STEP C. → GREEN

PROGRAMMING ITEM VERIFICATION

[*] → PROGRAMMING ITEM NUMBER (– –) → [#] → SOUNDS CONTENTS OF SELECTED ITEM THRU HANDSET (1 2 3 4; 0 = ●●●●●●●●●●)

GENERAL NOTES

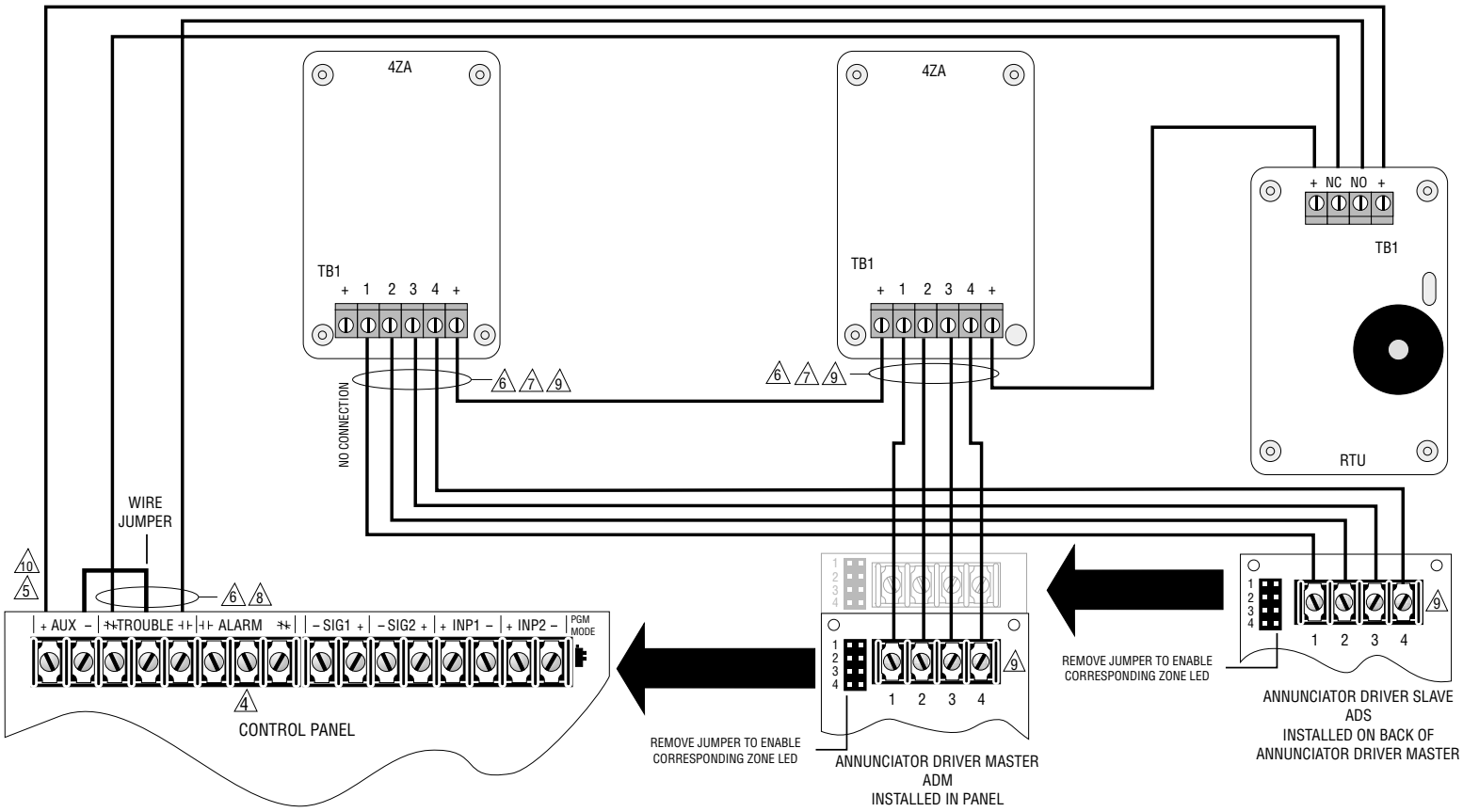
1. CONFIRMATION BEEP INDICATES PROGRAM ITEM ENTERED.
2. PHONE LINES MUST BE LOOP START ON A PUBLIC SWITCHED NETWORK. PBX, GROUND START, AND PARTY LINES ARE NOT ACCEPTABLE.
3. PASSWORD = 4727 (GSBS).
4. AFTER INITIAL PROGRAMMING, DIALER NOTIFIES CENTRAL MONITORING STATION OF TROUBLE, BEFORE PROGRAMMING CAN PROCEED.
5. TWO PHONE LINES ARE REQUIRED TO COMPLY WITH NFPA 72.
6. DIALER WILL AUTOMATICALLY SWITCH TO PULSE DIALING AFTER THREE CONSECUTIVE FAILURES USING TONE MODE. DIALER WILL SWITCH BACK TO TONE DIALING AFTER FAILING TO CONNECT USING PULSE MODE, OR UPON POWER UP.

DIALER LED OPERATION

- GREEN = DIALING
- RED = FIRE ALARM SENT & ACKNOWLEDGED
- AMBER = SUPERVISORY ALARM SENT & ACKNOWLEDGED
- AMBER = SUPERVISORY RESTORE SENT & ACKNOWLEDGED
- AMBER = MODULE / PHONE TROUBLE
- AMBER = MODULE DISABLED

[DIALPRG1.CDR]
10/29/97

REMOTE ANNUNCIATORS



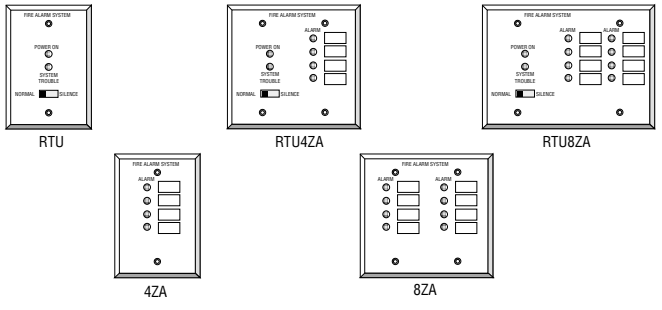
NOTES

1. IF **NOT** USING 4-WIRE SMOKE DETECTOR, CONFIGURE AUXILIARY POWER AS NON-RESETTABLE.
2. REFER TO BATTERY CALCULATION SECTION FOR POWER REQUIREMENTS.
3. ALL WIRING POWER LIMITED.
4. CONTACTS SHOWN IN NORMAL CONDITION.
5. POSITIVE ANNUNCIATOR POWER WIRING:
   18 AWG MIN.=7,500' (2,300 M) MAX.
   22 AWG MIN.=3,000' (900 M) MAX.
6. LED ANNUNCIATOR WIRING:
   22 AWG MIN.=7,500' (2,300 M) MAX.
7. SUPERVISED FOR OPENS AND GROUND FAULTS.
8. NOT SUPERVISED.
9. 24VDC NOMINAL @ 15mA DC MAX. PER CIRCUIT.
10. 24VDC NOMINAL @ 500mA DC MAX

IDC TO ANNUNCIATOR DRIVER CORRELATION

ACTIVE IDC ZONE	ACTIVATED ANNUNCIATOR DRIVER MASTER (-ADM) OUTPUT	ACTIVATED ANNUNCIATOR DRIVER SLAVE (-ADS) OUTPUT
BASE PANEL IDC ZONE #1	1	N/A
BASE PANEL IDC ZONE #2	2	N/A
1st IDC MODULE, ZONE #1	3	N/A
1st IDC MODULE, ZONE #2	4	N/A
2nd IDC MODULE, ZONE #1	N/A	1
2nd IDC MODULE, ZONE #2	N/A	2
3rd IDC MODULE, ZONE #1	N/A	3
3rd IDC MODULE, ZONE #2	N/A	4

REMOTE ANNUNCIATOR MODULES- FRONT VIEW

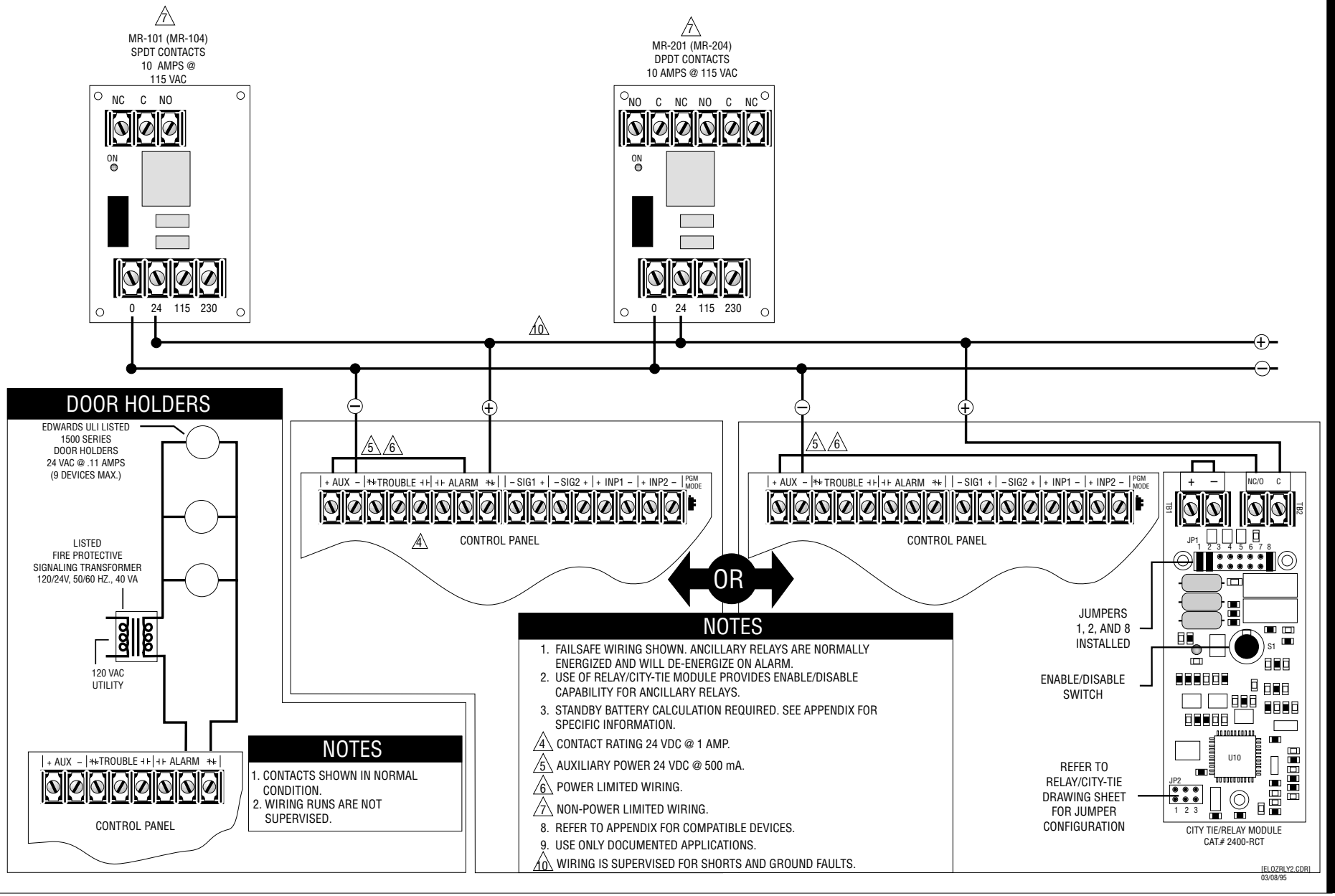


ANNUNCIATOR COMPONENT SELECTION GUIDE

MODE	PANEL OPTION MODULE(S)	ANNUNCIATOR HARDWARE	ANNUNCIATOR MOUNTING
TROUBLE ONLY	NONE	RTU	1 GANG BOX
TROUBLE & 4 ALARM ZONES	ANNUNCIATOR DRIVER MASTER	RTU & 4ZA RTU4ZA	2 x1 GANG BOX 2 GANG BOX
TROUBLE & 8 ALARM ZONES	ANNUNCIATOR DRIVER MASTER & SLAVE	RTU & 2 x 4ZA RTU8ZA	3 x1 GANG BOX 3 GANG BOX
4 ALARM ZONES ONLY	ANNUNCIATOR DRIVER MASTER	4ZA	1 GANG BOX
8 ALARM ZONES ONLY	ANNUNCIATOR DRIVER MASTER & SLAVE	2 x 4ZA 8ZA	2 x1 GANG BOX 2 GANG BOX

[EALZRTU.CDR]

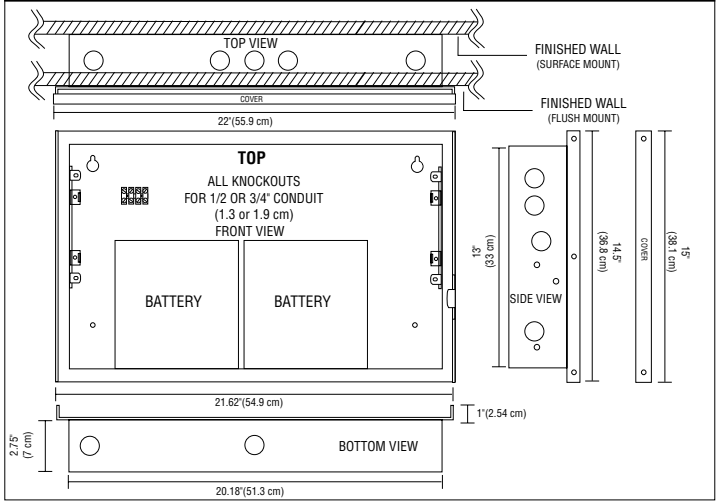
CONTROL PANEL APPLICATIONS 1



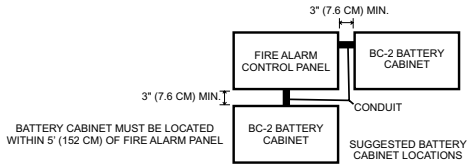
[ELOZRLY2.CDR]
03/08/95

CONTROL PANEL APPLICATIONS 2

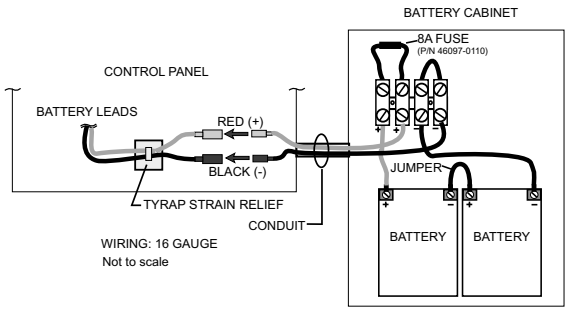
BATTERY CABINET DIMENSIONS



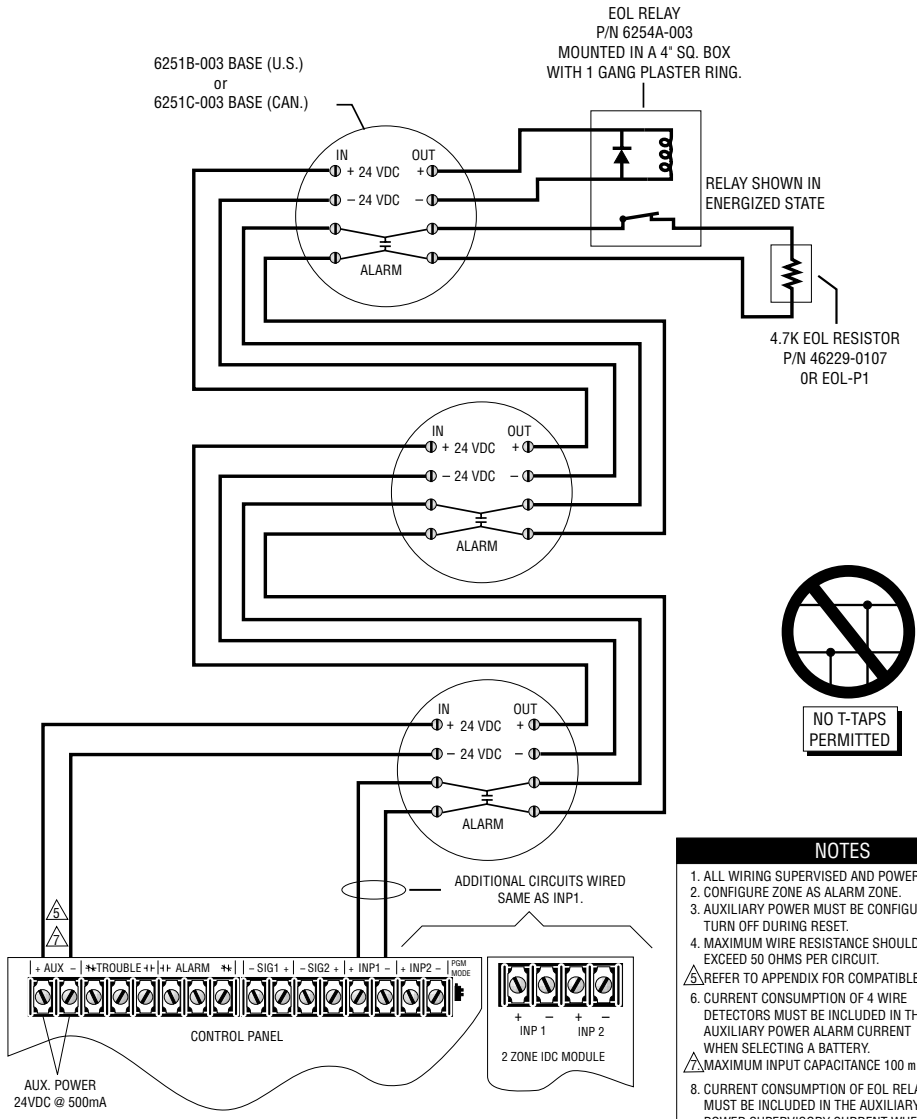
BATTERY CABINET LOCATION



BATTERY CABINET WIRING



BATTERY CABINET INSTALLATION



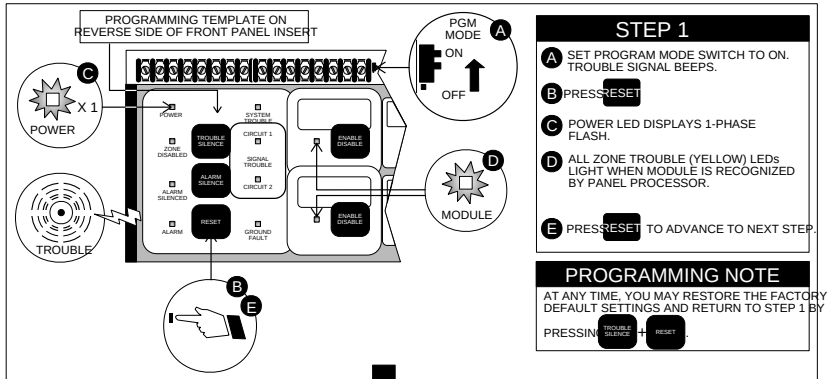
STYLE B (CLASS B) 4-WIRE SMOKE DETECTOR WIRING

NOTES

1. ALL WIRING SUPERVISED AND POWER LIMITED.
2. CONFIGURE ZONE AS ALARM ZONE.
3. AUXILIARY POWER MUST BE CONFIGURED TO TURN OFF DURING RESET.
4. MAXIMUM WIRE RESISTANCE SHOULD NOT EXCEED 50 OHMS PER CIRCUIT.
5. REFER TO APPENDIX FOR COMPATIBLE DEVICES.
6. CURRENT CONSUMPTION OF 4 WIRE DETECTORS MUST BE INCLUDED IN THE AUXILIARY POWER ALARM CURRENT WHEN SELECTING A BATTERY.
7. MAXIMUM INPUT CAPACITANCE 100 m f.
8. CURRENT CONSUMPTION OF EOL RELAY MUST BE INCLUDED IN THE AUXILIARY POWER SUPERVISORY CURRENT WHEN SELECTING A BATTERY.

[ALZCPA22.CDR]
03/01/95

PANEL PROGRAMMING



STEP 1

A SET PROGRAM MODE SWITCH TO ON. TROUBLE SIGNAL BEEPS.

B PRESS RESET

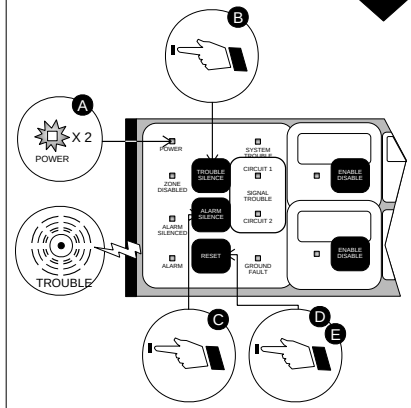
C POWER LED DISPLAYS 1-PHASE FLASH.

D ALL ZONE TROUBLE (YELLOW) LEDs LIGHT WHEN MODULE IS RECOGNIZED BY PANEL PROCESSOR.

E PRESS RESET TO ADVANCE TO NEXT STEP.

PROGRAMMING NOTE

AT ANY TIME, YOU MAY RESTORE THE FACTORY DEFAULT SETTINGS AND RETURN TO STEP 1 BY PRESSING TROUBLE SILENCE + RESET.



STEP 2

A POWER LED DISPLAYS 2 PHASE FLASH (CONFIGURE IDCs).

B SELECT IDC TYPES-

TROUBLE SILENCE

ALARM, NON-VERIFIED	STEADY RED
ALARM, VERIFIED DETECTOR & DRY CONTACT ALARM INITIATING DEVICE	RED
ALARM, VERIFIED DETECTOR ONLY	RED
SUPERVISORY, N.O. DEVICES	STEADY AMBER
WATERFLOW/SUPERVISORY	STEADY GREEN
WATERFLOW/SUPERVISORY W/ RETARD	GREEN

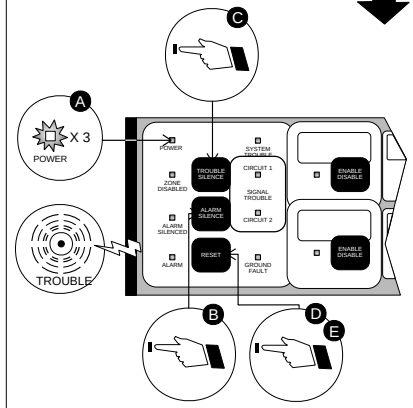
C SELECT SIGNAL CIRCUITS TO BE ACTIVATED BY ZONE. CIRCUIT TROUBLE LIGHTS WHEN SELECTED FOR ACTIVATION.

ALARM SILENCE

SIGNAL CIRCUIT 1	STEADY AMBER
SIGNAL CIRCUIT 2	STEADY AMBER
BOTH CIRCUITS	BOTH ON STEADY

D PRESS RESET TO PROGRAM THE NEXT IDC ZONE AND REPEAT STEPS B AND C FOR EACH ZONE.

E PRESS RESET TO ADVANCE TO NEXT STEP.



STEP 3

A POWER LED DISPLAYS 3 PHASE FLASH (CONFIGURE IACs).

B SELECT IAC TYPE. ACTIVE CIRCUIT TROUBLE LED SHOWS TARGET CIRCUIT. ALARM SILENCED LED SHOWS CIRCUIT TYPE.

ALARM SILENCE

SILENCEABLE	AMBER
NON-SILENCEABLE	OFF

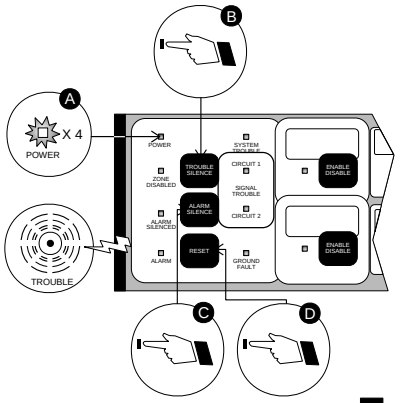
C SELECT OUTPUT RATE. IAC TROUBLE LED DISPLAYS ACTUAL OUTPUT PATTERN..

TROUBLE SILENCE

CONTINUOUS
120 PULSES PER MINUTE
TEMPORAL (3-3-3)
CALIFORNIA CONTINUOUS (10 SECS. ON, 5 SECS. OFF)
CALIFORNIA MARCH TIME (10 SECS.@120SPM 5 SECS. OFF)

D PRESS RESET TO PROGRAM NEXT IAC ZONE. REPEAT STEPS B AND C FOR SECOND IAC.

E PRESS RESET TO ADVANCE TO NEXT STEP.



STEP 4

A POWER LED DISPLAYS 4- PHASE FLASH (CONFIGURE TIMERS

B SELECT ALARM SILENCE INHIBIT TIMER. ZONE DISABLED LED INDICATES TIMER SETTING.

TROUBLE SILENCE

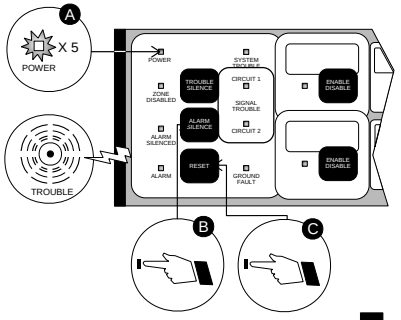
NONE	OFF
1 MINUTE	/
2 MINUTE	/
3 MINUTE	/

C SELECT AUTOMATIC ALARM SILENCE TIMER. ALARM SILENCED LED INDICATES TIMER SETTING.

ALARM SILENCE

NONE	OFF
10 MINUTES	/
20 MINUTES	/
30 MINUTES	/

D PRESS RESET TO ADVANCE TO NEXT STEP.



STEP 5

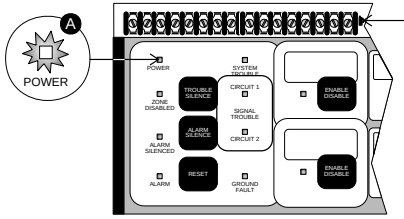
A POWER LED DISPLAYS 5- PHASE FLASH (CONFIGURE AUXILIARY POWER).

B ALARM SILENCED LED SHOWS AUXILIARY POWER RESET STATUS.

ALARM SILENCE

CONTINUOUS POWER	OFF
INTERRUPT ON RESET	

C PRESS RESET TO ADVANCE TO FINAL STEP.



STEP 6

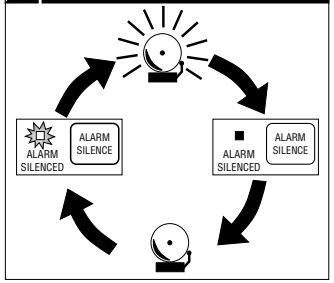
A POWER LED IS ON STEADY.

B SET PROGRAM SWITCH TO OFF. TROUBLE SIGNAL STOPS BEEPING.

[ALZPRG3.CDR]

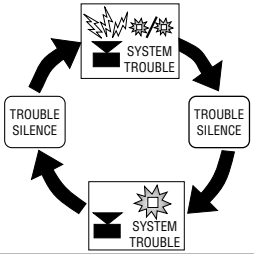
PANEL OPERATION

1 ALARM SILENCE

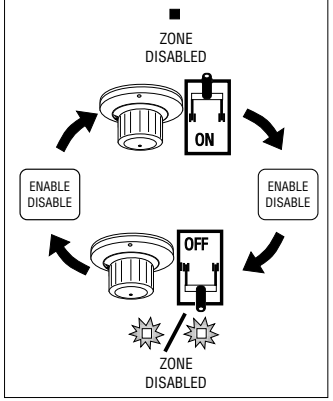


2 SYSTEM RESET

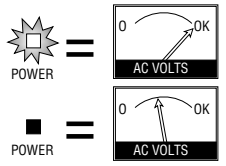
3 TROUBLE BUZZER SILENCE



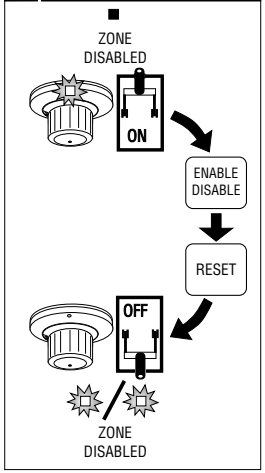
4 5 ZONE DISCONNECT



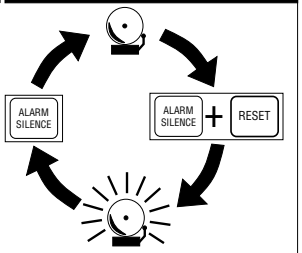
6 POWER



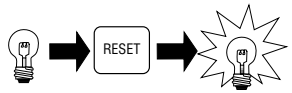
4 5 ACTIVE ZONE DISCONNECT



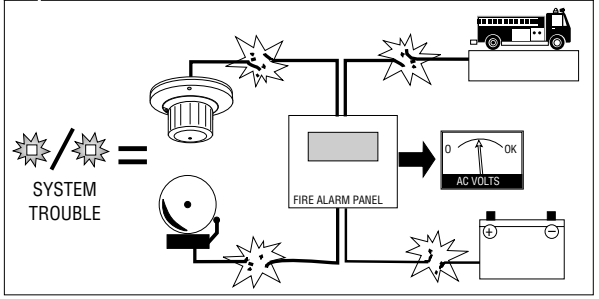
7 DRILL

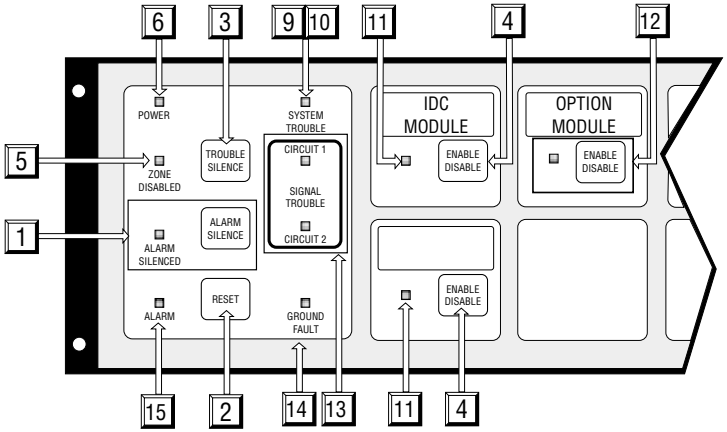


8 LAMP TEST

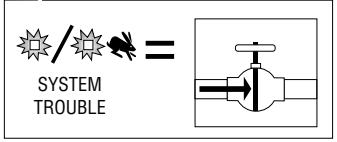


9 SYSTEM TROUBLE

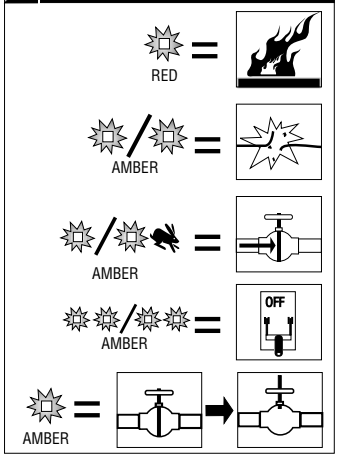




10 SUPERVISORY CONDITION

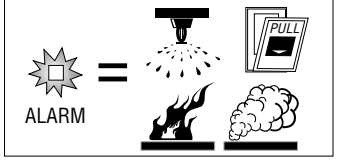


11 IDC ZONE LED



12 OPTION MODULES

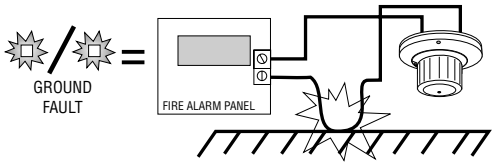
15 ALARM



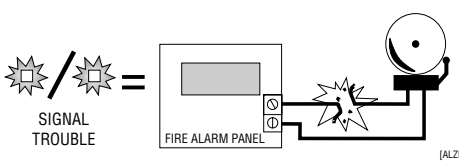
LED LEGEND

■ = LED OFF
= ON STEADY
= SLOW FLASH
= RAPID FLASH
= 2-PHASE FLASH

14 GROUND FAULT

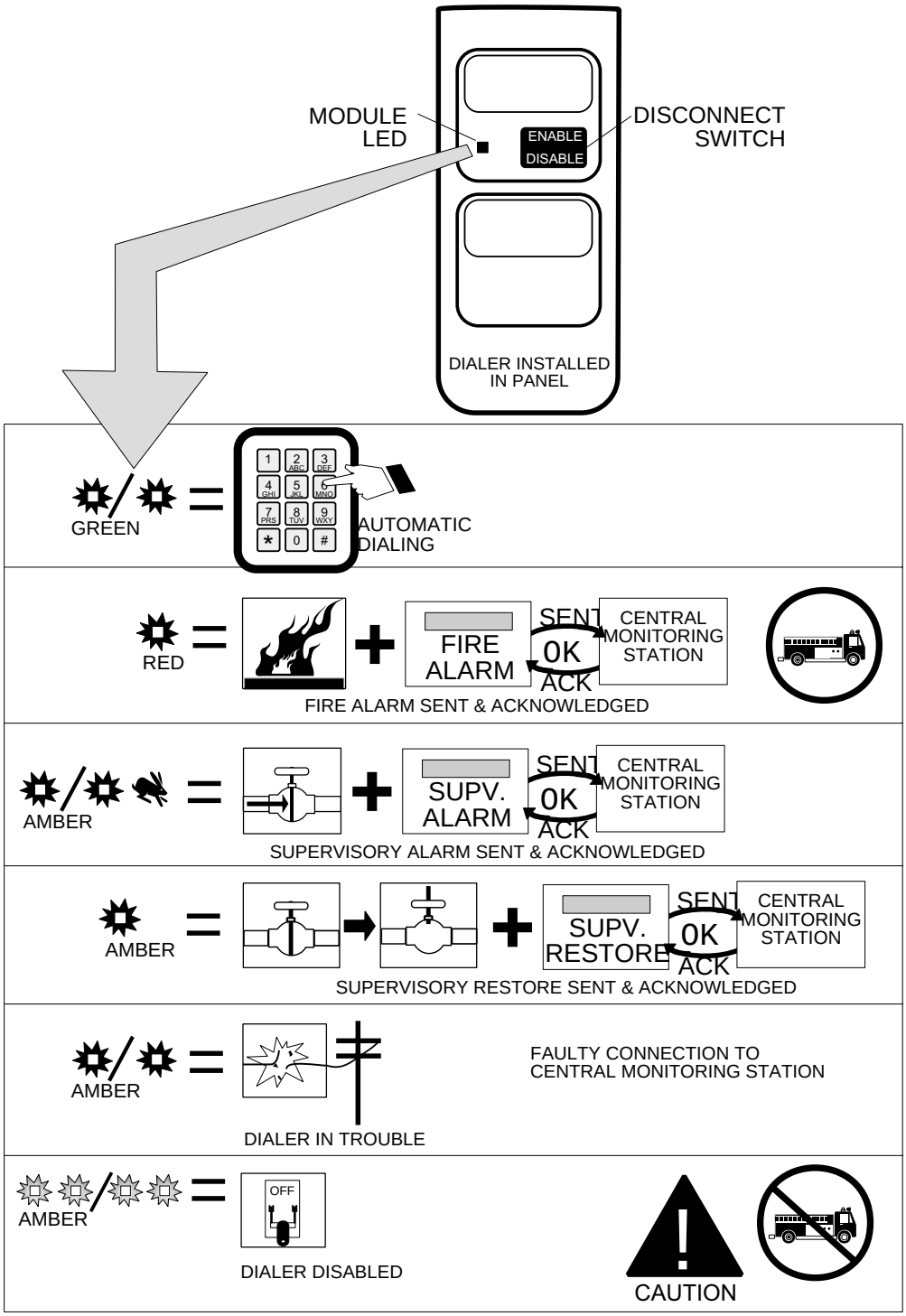


13 SIGNAL CIRCUIT TROUBLE



[ALZPRG4.CDR]

DIALER OPERATIONS



Dialer automatically contacts Central Monitoring Station (CMS) every 24 hours, verifying operation.
Dialer will automatically re-enable itself after being disabled for a 24 hour period, and report panel status to the Central Monitoring Station.

LED LEGEND

- LED OFF
- ON STEADY
- LED COLOR (RED)
- SLOW FLASH
- RAPID FLASH
- 2-PHASE FLASH

[DACTOPS1.CDR]
03/30/95