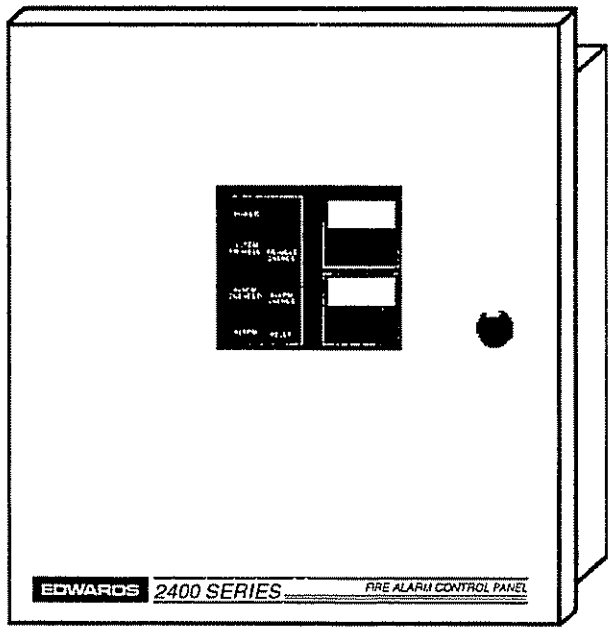
A UNIT OF GENERAL SIGNAL

EDWARDS

INSTALLATION INSTRUCTIONS AND OWNERS OPERATION MANUAL

for 2400 SERIES ONE ZONE FIRE ALARM CONTROL PANEL



P/N 46000-1329, Rev. 1.5

This product has been designed to meet the requirements of NFPA Standard 72, 1990 Edition; Underwriters Laboratory, Inc., and Standard 864, May 2, 1991 Edition; 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. 192 Farmington Ave., Farmington, Connecticut, USA 06034 Telephone: 1-203-678-0410. 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 telecommunicaions 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 46000-1329, Edwards 2411 Manual

Revision	Description
0.0	Initial Release
1.0	Add Table 1.2. Correct Cat # 2245 to 2445.
1.1	Revise door installation. Delete Aux terminals on Control Panel Applications Drawing. Revise door sheetmetal and remove ground strap on Control Panel Installation Drawing.
1.3	Revise part numbers
1.4	Revise RCT; delete remote station from RCT1; add 2400-DL1 Dialer Module; add 2400-RTUDR information; revise Table 1.2; and add additional replacement parts.
1.5	Revised dialer and compatibility information

Table of Contents

List of Tables, Figures, & Illustrations

Fire Alarm Control Panel

One Zone, One Expansion Space Panel, Cat. # 2411

1.0 INTRODUCTION

The 2411 Fire Alarm Control Panel is a protective signaling panel for small size buildings, which features modular construction and installer programmable microprocessor technology. The 2411 has a single Initiating Device Circuit.

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

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

- **Programmable Options** include: verified or non-verified alarm Initiating Device Circuits (IDCs) supporting dry contact alarm initiating devices and high impedance smoke detectors; Indicating Appliance Circuits (IACs) programmable as silenceable or non-silenceable with continuous, 120 Strokes per Minute (SPM), California, or temporal rates (Figure 3.3). The temporal rate meets the requirements of the national emergency evacuation signal. Automatic alarm silence and alarm silence inhibit timers are provided. An AC/brownout 6 hr trouble delay timers is provided when the 2400-RCT is used to transmit trouble signals off premise.

- **Hardware Options** include: an 2400-RCT Relay/City-Tie Module with provisions for municipal box, reverse polarity, and dry relay contact operation. The 2400-DL1 Dialer Module provides a supervised connection to a Central Monitoring Station via dial-up telephone lines. The 2400-RTUDR provides a connection to a Remote Trouble Unit (RTU). All circuits external to the panel are transient protected; all circuits except the AC power wiring, municipal box, and relay contacts are power limited. The panel enclosure is constructed of #18 gauge steel with a textured, baked enamel finish. The enclosure has a Lexan™ viewing window, keylock, and is suitable for semi-flush or surface mounting. Space is provided in the enclosure for one option module and standby batteries. Conduit and nail hole knockouts, and key hole style mounting allow quick installation.

The panel is listed by ULI (UL 864) and ULC (ULC S527).

1.1 Components

2411(R)
One Zone Base Panel w/1 Option Module Expansion Space, Gray Enclosure (Cat.# 2411)
One Zone Base Panel w/1 Option Module Expansion Space, Red Enclosure (Cat.# 2411R)
This panel provides one Class B (Style B) Initiating Device Circuit (IDC) and two Class B (Style Y) Indicating Appliance Circuits (IACs) each rated at 24 VDC nominal @ 1.0 A with a total panel rating of 24 VDC @ 1.5 Amps. Form "C" alarm and trouble contacts are provided, each rated at 24 V AC/DC @ 1.0 A. A Relay/City-Tie output module or a Dialer output module is available for off-premise connections. Battery backup for a 24 hour standby period followed by 30 minutes of alarm is provided.

Table 1.1 shows the batteries suitable for the 2411 panel.

Table 1.1 - Base Panel Capacity

Accessory/Option Module	Base Panel 2411 Panel Capacity: 1 Option Module
Batteries	2 each P/N 12V4, 12 V @ 4 AH
Relay/City-Tie Module 2400-RCT (P/N 240459)	1 Max.
Dialer Module 2400-DL1 (240508)	
Remote Trouble Unit Driver 2400-RTUDR (P/N 46199-1133)	1 Max.

RTU Remote Trouble Unit (P/N 46199-1075)
The RTU Remote Trouble Unit is a remote trouble annunciator which displays fire alarm mormal and trouble conditions. The unit is provided with a power LED and an internal trouble buzzer. A trouble silence switch with ring-back is also provided. The RTU requires a 2400-RTUDR Driver for operation.

2400-RTUDR Remote Trouble Unit Driver (P/N 46199-1133)
The 2400-RTUDR driver provides 24 VDC @ 11 mA to power the Remote Trouble Unit.

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 master box, reverse polarity, or dry contact operation. Relay contacts are rated for nominal 24 V AC/DC @ 1A operation. The module has a disconnect switch and an amber trouble LED. The module requires one option module expansion space. Off-premise trouble signaling of a power failure using this module has a 6 hour delay.

Table 1.2 - 2411 Battery Standby Requirements

Feature	2411 w/o 2400-RTUDR	2411 w 2400-RTUDR
Dialer	Up to 60 Hrs.	Up to 24 Hrs.
Dry Contact (Shunt)	Up to 60 Hrs.	Up to 24 Hrs.
Municipal Box	Up to 60 Hrs.	Up to 24 Hrs.
Reverse Polarity	Up to 24 Hrs.	Up to 24 Hrs.

NOTES:

1. Refer to battery calculations.
2. N/A = Feature not supported.
3. 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 supported automatically. 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.

2.0 APPLICATION

The 2411 Fire Alarm Panel is suitable for small building fire alarm systems requiring one Initiating Device Circuit (IDC), 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 Circuit (IDC)

The 2411's IDC is designed to operate using compatible smoke detectors (Refer to the Appendix) and normally-open alarm initiating devices. The IDC may be programmed as an Alarm, Waterflow/Supervisory, or Supervisory zone. Alarm zones may be additionally set for verified (when high impedance smoke detecttors are used) or non-verified operation. Waterflow/Supervisory zones may be programmed with or without a 15 second retard period, and also supports a single supervisory input device with a 1.1 KΩ series resistor. IDC circuits may assume one of four operating states: Normal, Trouble, Alert, or Alarm. Table 3.1 defines the IDC zone states for the various IDC zone types.

Table 3.1 - IDC Operation

Zone Type	State of Operation			
	Alarm (Low Impedance)	Alert (High Impedance)	Normal (EOL Ω)	Open (∞ Ω)
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/Supervisory zone may be identified by a steady red zone LED on the module. Active IDCs defined as Supervisory zones may be identified by a rapid flashing amber zone LED on the module.

When an IDC is programmed as a waterflow/supervisory zone, the IACs DO NOT respond to the **ALARM SILENCE** switch or automatic alarm silence until the waterflow device is no longer active. Both alarm initiating devices and a *single* supervisory contact may co-exist on the same circuit by putting a 1.1KΩ resistor in series with the supervisory contact. When the waterflow/supervisory with retard option is programmed, a special algorithm samples the circuit continuously over a 15 seconds. 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. 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. 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.

NOTE

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

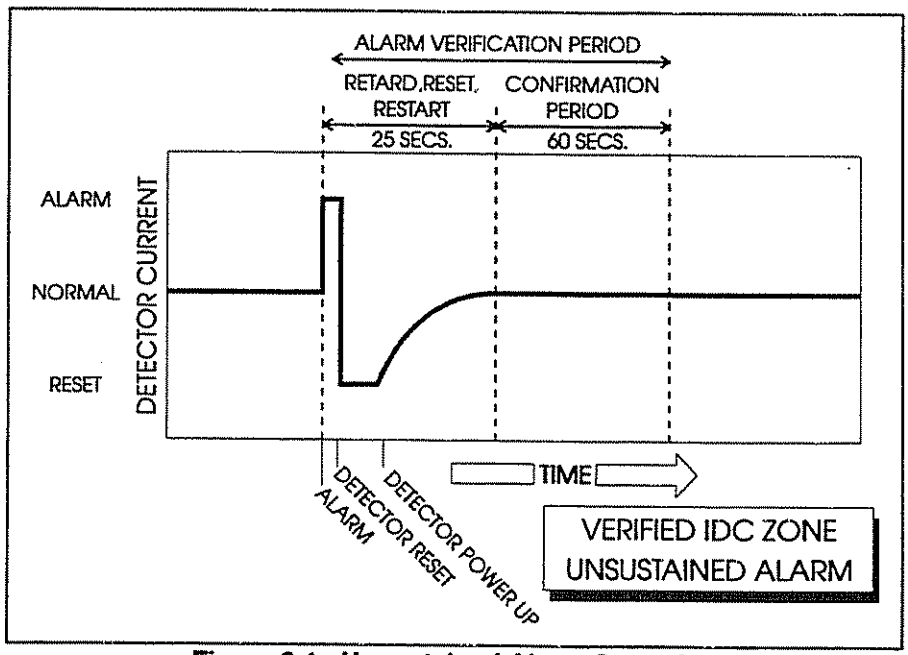


Figure 3.1 - Unsustained Alarm Operation

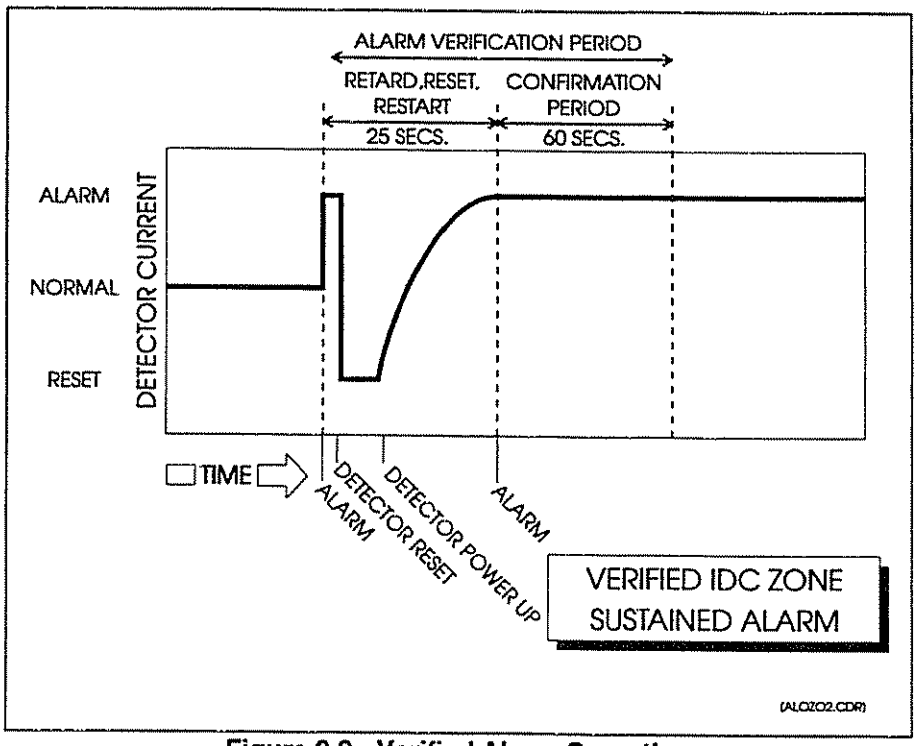


Figure 3.2 - Verified Alarm Operation

3.2 Indicating Appliance Circuits (IACs)

The two supervised Indicating Appliance Circuits (IACs) operate using compatible 24 VDC (nominal) polarized signaling appliances. Each circuit is rated at nominal 24 VDC @ 1.0 Amp, with a total of 1.5 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.

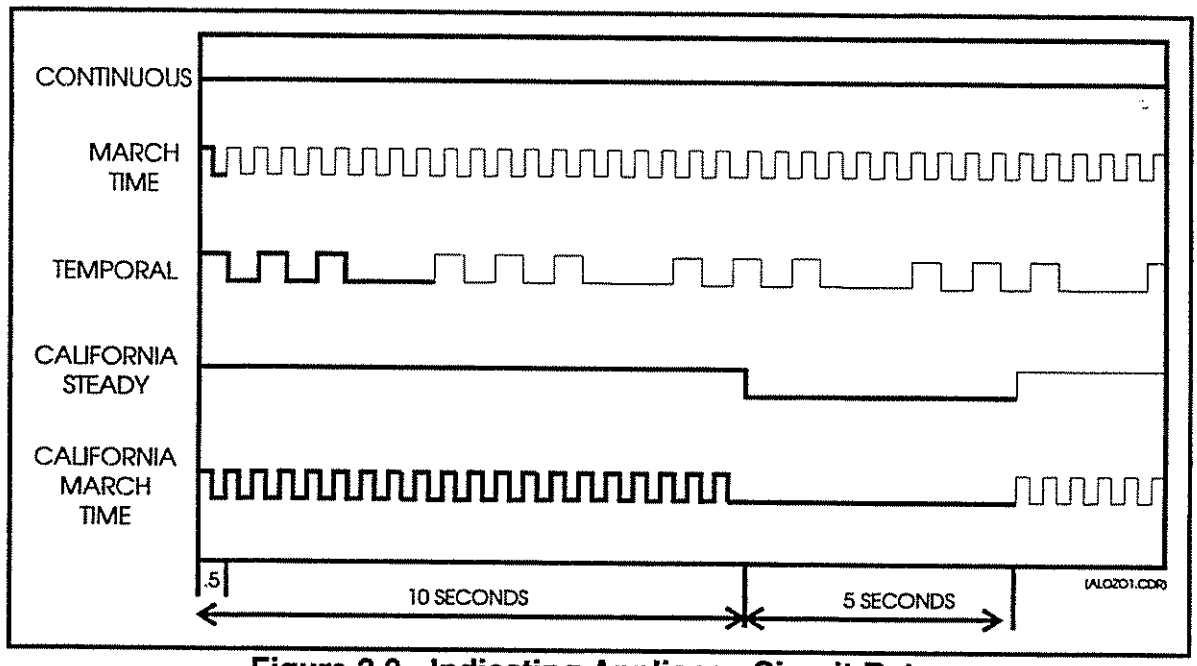


Figure 3.3 - Indicating Appliance Circuit Rates

Indicating Appliance Circuits generate a common trouble indication when the IAC field wiring is *open* or *shorted*. In an open fault condition, the panel will attempt to energize the indicating appliances by applying power to the circuit under alarm conditions. All indicating appliances up to the location of the circuit break will operate. However, there is no assurance that any of the indicating appliances 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 be automatically disconnected. These actions protect the power supply and other panel components from damage caused by the short circuit.

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 the base panel assembly from the backbox. Place the base panel assembly and extra module 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
Base Panel Circuits IAC Wiring Diagram IAC Wire Chart	CONTROL PANEL
Initiating Device Circuits IDC Wire Chart	INITIATING DEVICE CIRCUIT WIRING
Relay/City-Tie Module Applications. Connections and Jumper Settings	RELAY/CITY TIE MODULE or see the Installation Sheet supplied with the Relay/City-Tie Module
Dialer Installation & Programing	DIALER MODULE
Dialer Operation	DIALER OPERATIONS
Door Holder Wiring	CONTROL PANEL APPLICATIONS
Remote Trouble Unit / Driver	REMOTE TROUBLE UNIT
Panel Programming Instructions	PANEL PROGRAMMING
Panel Operations	PANEL OPERATION

4.4 Installation Instructions

Mounting the Backbox
Install backbox per drawing **CONTROL PANEL INSTALLATION.**

Utility or Primary Power Circuit

NOTE

Locate primary power conduit on *upper left side* or *top left* of backbox.

The panel requires a dedicated 120 VAC, 15A, 50/60 Hz branch circuit. Label the circuit breaker "Fire Alarm Control Panel." Locate the primary power conduit on the upper left side or top left side of the backbox. Within the fire alarm enclosure, route AC wiring 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 top right and right sides of the backbox. **At the panel, leave approximately 2ft (.6m) 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 EOL *test* resistors on 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 indicating device for installation details. Install the separately packaged End-Of-Line resistors at the end of all circuits

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

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

   IAC Circuit meter readings should show 4.7KΩ (EOL Resistor) between circuit pair. Each wire should show open to ground.

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 handles High Voltage when powered. DO NOT handle the base panel assembly with power on.

Option Module Installation

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

1. Refer to the **CONTROL PANEL INSTALLATION** drawing.
2. Place the Base Panel Assembly Display face down on a soft cloth. *Leave the factory installed test end-of-line resistors in place on the base panel until making final connections.*
3. Install the output module on the Base Panel. **Before installing the 2400-RCT Relay/City-Tie Module, refer to RELAY/CITY-TIE drawing for jumper settings.** Insert the ribbon connector into the base panel socket.

NOTE

The Dialer Module MUST be installed in position number 3 or higher due to a crowding problem with other modules.

4. **Do NOT connect the Dialer Module's ribbon cable to the base panel assembly until the rest of the system has been installed and tested.** The Dialer Module will be connected later.

Base Panel Assembly Installation

1. Refer to the **CONTROL PANEL INSTALLATION** drawing.
2. Plug the transformer into J1 on the left side of the Base Panel Assembly.
3. Lift wiring up and away from the backbox, and install the mounting tab on the right side of the Base Panel Assembly in the slot on the right side of the backbox. Use a # 6 screw to secure the left side of the base panel assembly to the backbox. **Do not connect control circuit wiring at this time.**
4. Install the panel door using two locknuts.

WARNING

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

5. Place the batteries in the bottom of the backbox.
6. Interconnect the cells per the **CONTROL PANEL INSTALLATION** drawing. **Connect panel battery leads from the base panel assembly to the batteries 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 and the programming switch is in the OFF position.
2. If an 2400-RCT module is installed and configured as a shunt or local Energy Dry contact, place a jumper between (+) and (-) to ensure proper supervision.
3. Connect primary power wires: **L**ine, **N**eutral, and **G**round to the input terminals of the base panel. Use electrical tape to cover the terminals.
4. Energize AC power to the system. *When you first apply power to the system it will follow an initialization procedure. This procedure programs the IDC as non-verified alarm input and identifies the configuration of the output module (it can take up to 10 seconds). You will see zone LEDs turning on and off in sequence. Allow the system to complete this procedure before touching any controls. At the end of the process, all LEDs should be off, and the Power LED should be ON. If the system trouble LED is flashing slowly and the trouble signal is sounding, refer to the trouble shooting procedures in this manual. If a module LED remains on steady, refer to the Programming section for additional information.*

Programming the Panel

1. 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.
2. 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.*
3. Identify the IDC and Relay/City-Tie circuits using the supplied stick on labels. Refer to the Panel Configuration Worksheets in this manual to assist in labeling.

Panel Functional 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 1.1KΩ resistor in parallel with the End-Of-Line resistor.
3. Reset the panel, allowing 20 seconds for the panel to return to normal.

Field Wiring Connections

1. Refer to the **CONTROL PANEL INSTALLATION, INITIATING DEVICE CIRCUIT WIRING, RELAY/CITY-TIE MODULE, & CONTROL PANEL APPLICATIONS** 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. Power limited wiring must be kept away from non-power limited wiring.
3. Leaving the system powered up, install the circuits one at a time. The system will go into Trouble mode. (For supervised IAC & IDC wiring connections, **remove** the factory installed End-of-Line resistor.)
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 base panel assembly. The panel and dialer 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 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 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 Dialer Module requires separate programming in order to operate.
Refer to the **DIALER MODULE** Drawing.

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

1. Clear any wiring faults as you install the field wiring. When a fault is cleared, the panel will automatically return to the Normal mode.
2. If an IAC is *shorted* (or a signal appliance connection is reversed) or *open*, the panel will continue to display trouble. If an IAC has a *ground fault*, the trouble signal will resound. If an IDC has a *short*, the zone LED will change to red and the system will go into Alarm mode (delayed 20 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 Trouble 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 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.

Install the Protective Cover

1. Install the protective cover's tab in the slot on the left side of the backbox, above the Base Panel Assembly. Use a #6 screw to secure the right side of the protective cover to the backbox.

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. Dialer programming os covered in section 5.5

CAUTION

The panel MUST be reprogrammed whenever permanently *adding* (or *removing*) an option module to (from) the system. Replacing a module with another module of the same type does NOT require reprogramming.

The panel is shipped from the factory with the default program denoted by ✡ in Table 5.1. The panel defaults may be re-entered any time during the programming sequence by simultaneously pressing the **TROUBLE SILENCE** and **RESET** switches for one second. This also returns you to the start of the programming process. The current panel programming step 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✡ IAC Affected by Alarm Silence Features
2 IAC 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 Alarm Silence Timer
1✡ No Timer
2 10 Minutes to Silence
3 20 Minutes to Silence
4 30 Minutes to Silence

*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 Circuit (IDC)	2 = ✸✸ PAUSE ✸✸PAUSE ✸✸...
Indicating Appliance Circuits (IAC)	3 = ✸✸✸PAUSE ✸✸✸PAUSE ✸✸✸...
Automatic Alarm Silence Timer	4 = ✸✸✸✸PAUSE✸✸✸✸ PAUSE ✸✸✸✸...
Alarm Silence Inhibit Timer	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 (up) 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 the option module, if installed in the panel, by lighting the module's amber trouble LED. This process can take up to 10 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 and programming changes are lost. 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. The IDC zone is programmed first as identified by the 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. No contact devices permitted.	✸✸ PAUSE ✸✸ PAUSE ✡✸... RED
Normally-Open Supervisory	Steady Amber
Waterflow/Supervisory	Steady Green
Waterflow/Supervisory 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. Both Indicating Appliance Circuits are operated when the IDC goes into alarm.

3. Press the **RESET** switch; the panel is now ready for programming the Indicating Appliance Circuits. (Step 5.2)

5.2 Programming Indicating Appliance Circuits

1. 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 being programmed is identified by the IDC Zone LED as shown in Table 5.4. The IAC circuit type may be identified by the status of the Alarm Silenced LED **and** by the flash pattern of the LEDs, as shown in Tables 5.5 and 5.6.

Table 5.4 - Active IAC Indicator LEDs

1 Zone Panel (-1Z1)
IAC #1 Zone #1 LED AMBER
IAC #2 Zone #1 LED GREEN

Table 5.5 - Panel Indicating Appliance Circuit Status

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

Table 5.6 - IAC Signal Output Rates

IAC Circuit Type	IAC Indicator LED (See Table 5.4)
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 5.5 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 5.5 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. (Step 5.3)

5.3 Configuring System Timers

Automatic Alarm Silence Timer
The program Automatic Alarm Silence Timer step is indicated by the 4-phase flashing green power LED.

1. Use the **ALARM 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 ✱✱..
30 Minutes	✱✱✱PAUSE✱✱✱ PAUSE ✱✱✱.

2. When the desired LED state is displayed, press the RESET switch to program the Alarm Silence Inhibit Timer.

Alarm Silence Inhibit Timer
The program Alarm Silence Inhibit Timer step is indicated by the 5-phase flashing green power LED.

1. Use the **ALARM 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 5.8.

Table 5.8 - Alarm Silence Inhibit Timer Status

Alarm Silence Inhibit Timer Setting	Alarm Silenced LED
Disabled	OFF
1 Minute	✱PAUSE ✱PAUSE ✱...
2 Minutes	✱✱PAUSE ✱✱PAUSE ✱✱...
3 Minutes	✱✱✱PAUSE ✱✱✱PAUSE ✱✱✱.

2. When the proper LED state is displayed, press the **RESET** switch to complete the programming.

When exiting the programming mode, return the programming 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.

5.4 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.

5.5 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).

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).

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	
Condition	**System Action**
Normal	Power On LED Green
Alarm	Alarm & Zone LED display red. Signal Appliances Operate. Alarm relays operate.
Supervisory Activation	Trouble & Zone LED flash rapidly, trouble signal sounds rapidly. Supervisory and trouble relays operate.
Supervisory Restore	Trouble signal resounds rapidly. Zone LED changes to steady amber.
System Trouble	Trouble and Zone LED flash amber at slow rate. Trouble signal sounds at slow rate. Trouble relays operate.
Alarms Silenced	System in trouble. Alarm Silenced LED steady amber.
Primary Power Trouble	System in trouble. Power On LED is off.
Zone Trouble	System in trouble. Zone LED flashes slow amber.
Other Trouble	System in trouble.

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. Zone Trouble and Supervisory LEDs not in conflict with the alarm LEDs remain ON. The trouble contact will remain active if the panel is in trouble.

WARNING

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

In the alarm mode, the Indicating Appliance Circuits operate. 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 dialer will transmit a zone specific 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/supervisory zones are no longer in the active alarm condition. Reactivation of the waterflow/supervisory zone will reactivate the IACs. Note that the operation of the alarm inhibit timer may prevent silencing the panel for up to 3 minutes.

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. Pressing the **RESET** switch automatically resets the smoke detectors and returns the panel to the normal 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, as indicated when the trouble LED extinguishes. The panel can NOT be reset while the alarm silence inhibit timer is active.

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.

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, 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. 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 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 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.

Press the **RESET** switch to exit the supervisory mode when all supervisory alarms have restored. The dialer will transmit a zone specific supervisory 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, press the **ALARM SILENCE** switch.

Dialer Operations
Refer to **DIALER OPERATIONS** drawing

Table 6.2 - 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 Operation
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 all sources of 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 - Panel Trouble

Condition	Possible Cause
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 causes 3 to 12, 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. Battery lead not connected or open 3. Battery fuse open 4. Defective batteries 5. Defective base panel 6. Battery lead poorly connected 7. Battery low and currently charging 8. New module installed on power/data bus 9. Unresponsive module on power/data bus 10. Programming Mode Switch in program mode 11. Ground fault on wiring
Slow flashing Amber TROUBLE LED	1. Electronic circuit breakers open 2. Circuit open, missing, or incorrect EOL resistor 3. Circuit shorted, improperly installed device

Table 7.2 - 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, waiting entry of 24 hour test call offset time.

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, 1W resistor
  12" (30.5cm) 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 or ULC S536 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. Activate mechanism 3. Verify proper IDC zone response
Non-Restorable Heat Detectors	Semi-annually	1. Visual inspection 2. Test mechanically and/or electrically 3. Verify proper IDC zone response
Restorable Heat Detectors	Semi-annually	1. Visual Inspection 2. 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. Functional test to verify proper IDC zone response 3. Check sensitivity 4. Clean as required
Waterflow Switches	2 Months	1. 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. Operate valve 2. Test pressure, temperature, and water level sensors per the sprinkler system test procedure
Alarm Indicating Appliances	Annually	1. Visual Inspection 2. Put panel in alarm or drill mode. Verify all indicating appliances operating properly
All Initiating Device Circuits Verified Non-Verified Waterflow Waterflow w/ Retard Supervisory	Annually	1. Short IDC zone (15 Sec. For waterflow w/ retard, up to 25 sec for verified smoke zones). IACs should activate, sounding the zone number. 2. Wait 15 seconds. Place 1.1KΩ across IDC. IACs should activate, sounding the zone number. 3. Wait 15 seconds, then open the IDC field wiring. IACs should activate, sounding a 1 second pulse. 4. Wait 15 seconds, then ground one side of the IDC field wiring. IACs should activate, sounding a 1 second pulse. 5. 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. 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
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, disconnect the zone wiring 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, disconnect the zone wiring 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
12V4A	12 V, 4 AH Battery (2 required)
46288-0017	Preventive Maintenance Tester
46071-0409	UL Listed series supervisory resistor (1.1KΩ) and UL Listed EOL resistor (3.6KΩ).
EOL-P1	ULC Listed End-Of-Line Resistor on 1-Gang Plate
46229-0107	4.7KΩ UL Listed End-Of-Line Resistor
46063-1045	2411 Replacement Door
46063-1046	2411R Red Replacement Door
46166-0144	CAT. #45 Lock and 2 Keys
46033-0075	Terminal Cover

9.0 SPECIFICATIONS

Table 9.1 - Specifications	
Base Panel Assemblies	
Dimensions (HWD) Back box Finished	 12.0" x 10.875" x 3.5" [34.5 cm x 27.6 cm x 8.9 cm] 13.75" x 12.7" x 1.0" [34.9 cm x 32.2 cm x 2.5 cm]
Weight (less battery)	12 Lbs. (5.5 Kg)
Input Power	120 VAC, 50 - 60 Hz @ 0.5 A
Output Power - Signals (total both circuits)	24 VDC (nominal) @ 1.5A Refer to compatibility listing section
Option Module Spaces	1 Output
Battery Type	2 x 12 V, 4.0 AH, Lead-Acid
Ground Fault Detection	10KΩ to earth, all field wiring except AC input and common relay contacts.
IDC Zones Style Configurations	 One Class B (Style B) Verified or non-verified alarm Waterflow/Supervisory or waterflow/Supervisory with retard Supervisory
IDC Circuit	Maximum alarm current 33 mA Circuit voltage 16.2 to 26.4 VDC. Max. Ripple = 400 mVDC Refer to Compatibility Listing Section **2-Wire Relay Bases are NOT supported.**
Supervisory Series Resistor (P/N 46071-0409 for ULI) (2 each P/N EOL-P1 for ULC)	1.1KΩ, 1 Watt supervisory resistor and 3.6KΩ, 1/2 W EOL
IDC End-Of-Line Resistor	4.7KΩ, 1/2 Watt (P/N 46229-0107)
Max. IDC Circuit Field Wiring Resistance	50Ω
IAC Circuits	Two Class B (Style Y)
IAC Output Power/Ckt	Nominal 24 VDC @ 1.0A; 1.5 Amp total for both zones
IAC EOL	4.7KΩ, 1/2 Watt (P/N 46229-0107)
System Alarm Relay	Form C, 24 VDC/VAC @ 1 A. Refer to Control Panel Application Drawing.
System Trouble Relay	Form C, 24 VDC/VAC @1 A. Refer to Control Panel Application Drawing.
Indicators	Power, System Trouble, Zone State, Alarm Silenced, and Zone LEDs
Controls	Trouble Silence, Alarm Silence, and Reset Switches
Battery Charger Current	0.350 mA, Max.
Environment Relative Humidity Operating Temperature	 85% @ 86°F (30°C) 32°F to 120°F (0°C to 49°)

Table 9.2 - 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/VAC @ 1 A Refer to Application section for proper installation.
Indicators and Controls	Trouble LED Enable/Disable Switch
Weight	0.4 lbs (0.18 Kg)

Table 9.3 - Specifications	
2400-RTUDR Remote Trouble Unit Driver (P/N 46199-1133)	
Circuit Rating	Nominal 24 VDC @ 15 mA., Max.
Weight	0.4 lbs (0.18 Kg)

Table 9.4 - Specifications	
RTU(C) Remote Trouble Unit)	
Wiring	22 AWG, Min.
Power	24 VDC, Nominal
Supervisory Current	10 mA
Alarm Current	10 mA
Weight	0.4 lbs (0.18 Kg)

(C) = French/English Bilingual version

Table 9.5- Specifications	
DL1 Dialer Module	
Expansion Space	1
Phone Line: Line Type Required 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, 3/2 or 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**
Zone 1	Alarm	11
	Supervisory Alarm	12
	Trouble	13
	Restore	14
	Supervisory Restore	15
Zone 2	Alarm	21
	Supervisory Alarm	22
	Trouble	23
	Restore	24
	Supervisory Restore	25
Panel	Normal 24 Hr. Check in	90
	Trouble	93
	Restore	94
	AC Power Fail	96
	Abnormal 24 Hr. Check in	97
	Telephone Line Trbl	98
	Dialer Disabled	99

10.0 APPENDICES

10.1 Appendix 1 - Compatible Devices

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

Table 10.1 - ULI Control Unit Compatibility Specifications - Edwards

Device	UL Smoke Detector Compatibility ID	Electrical Data			
		Standby Voltage @ Detector	Ripple Voltage	Maximum Standby Detector Load	EOL
2411 1 zone-1 space panel	0.0	16.2 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	4.7KΩ P/N 46229-0107

Table 10.2 - 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 10.3 - ULI Device & Panel Compatibility - Initiating Devices

Cat. #	Description	UL Identifier	Max. # Devices per IDC Zone	Notes
2420	Ionization Smoke Detector c/w Base	001	50	1
2430	Photoelectric Smoke Detector c/w Base	001	30	1
2432B	Photoelectric Smoke Detector c/w Base	001	30	1
2435P	Duct Housing w/Photoelectric Detector	NA	NA	1
AI 9850-4	Ionization Smoke Detector c/w Base ULI	001	50	
AI 9854-3	Photoelectric Smoke Detector w/Heat Detector c/w Base	001	30	
AI 9854-1	Photoelctric Smoke Detector c/w Base	001	30	

NOTES

1. Low impedance detectors. (Refer to Programming Section for proper operation.)
2. High Impedance detectors (Refer to Programming Section for proper operation.)

Table 10.4 - ULI Compatible Signaling Appliances

Cat.#	Description
2440S-15-R	Strobe, Red
2441S-15-R	Strobe, Red
2440S-15-W	Strobe, White
2441S-15-W	Strobe, White
2440S-30-R	Strobe, Red
2441S-30-R	Strobe, Red
2440S-30-W	Strobe, White
2441S-30-W	Strobe, White
2440S-60-R	Strobe, Red
2441S-60-R	Strobe, Red
2440S-60-W	Strobe, White
2441S-60-W	Strobe, White
2440S-15/75-R	Strobe, Red
2441S-15/75-R	Strobe, Red
2440S-15/75-W	Strobe, White
2441S-15/75-W	Strobe, White
2440S-110-R	Strobe, Red
2441S-110-R	Strobe, Red
2440S-110-W	Strobe, White
2441S-110-W	Strobe, White
2445-B	Horn, Beige
2445-R	Horn, Red
2447H-W	Horn, White
2447H-R	Horn, White
2450-H-B	110cd Strobe/Horn, Beige
2450-H-R	110cd Strobe/Horn, Red
2450-M-B	15 cd Strobe/Horn, Beige
2450-M-R	15cd Strobe/Horn, Red

Cat.#	Description
2452HS-15-R	Strobe/Horn, Red
2452HS-15-W	Strobe/Horn, White
2452HS-30-R	Strobe/Horn, Red
2452HS-30-W	Strobe/Horn, White
2452HS-15/75-R	Strobe/Horn, Red
2452HS-15/75-W	Strobe/Horn, White
2452HS-110-R	Strobe/Horn, Red
2452HS-110-W	Strobe/Horn, White
2453BSA-30-R	Bell/Strobe Adapter
2453BSA-15/75-R	Bell/Strobe Adapter
2453BSA-110-R	Bell/Strobe Adapter
2455C-W	Chime, White
2455C-R	Chime, Red
2457CS-15-R	Chime/Strobe, Red
2457CS-15-W	Chime/Strobe, White
2457CS-30-R	Chime/Strobe, Red
2457CS-30-W	Chime/Strobe, White
2457CS-15/75-R	Chime/Strobe, Red
2457CS-15/75-W	Chime/Strobe, White
2457CS-110R	Chime/Strobe, Red
2457CS-110W	Chime/Strobe, White
439D-6AW-R	6" Vibrating Bell, Red
439D-8AW-R	8" Vibrating Bell, Red
439D-10AW-R	10" Vibrating Bell, Red
439DEX-6AW	6" Explosionproof Bell
439DEX-8AW	8" Explosionproof Bell
439DEX-10AW	10" Explosionproof Bell

ULC Compatibility Listings

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

Table 10.5 - ULC Control Unit Compatibility Specifications - Edwards

Device	ULC Smoke Detector Compatibility ID	Electrical Data			
		Standby Voltage @ Detector	Ripple Voltage	Maximum Standby Detector Load	EOL
2411 1 zone-1 space panel	0.0	16.2 -26.4 VDC	400 mV	2.5 mA @ 22.3 VDC	4.7KΩ P/N EOL-P1

Table 10.6 - 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 10.7 - ULC Device & Panel Compatibility - Initiating Devices				
Cat. #	Description	UL Identifier	Max. # Devices per IDC Zone	Notes
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	3,4
6250C	Ionization Smoke Detector	001	50	1,4
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	1,2,4
6264C-005	Ionization Detector, Duct, Low Velocity	001	50	1,2
6266C-001	Photoelectric Detector, Duct	001	30	1,2,4
6269C	Photoelectric Smoke Detector c/w Base	001	30	3,4
6269C-003	Photoelectric/Heat Detector c/w Base	001	30	3,4
6270C	Photoelectric Smoke Detector	001	30	1,4
6270C-003	Photoelectric/Heat Detector	001	30	1,4

NOTES

1. These detectors plug into the following base: Cat.# 6251C-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. Low Impedance Detectors (refer to programming section for proper operation.)
5. High Impedance Detectors (refer to programming section for proper operation.)

Table 10.8 - ULC Compatible Signaling Appliances

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

Table 10.9 Mixed Ion/Photo Detector Maximum Devices per Circuit Refer to Compatibility Tables 10.2 & 10.5	
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	

10.2 Appendix 2 - 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 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.

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 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.

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.

10.3 Appendix 3 - 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).

10.4 Appendix 4 - Fire Alarm Trouble & Maintenance Log

Date	Time	Event	Initial

10.5 Appendix 5 - Panel Configuration & Programming Worksheet

Project Name: _____

IDC Programming Worksheet	
	Zone 1
ALARM, Non-verified Detector (Steady RED zone LED)	
ALARM, Verified Detector & Dry Contact Devices (✱ PAUSE ✱PAUSE✱.... RED zone LED) (Do NOT Select this Option. High Impedance Detectors are not presently available.	
ALARM, Verified Detector ONLY (✱✱PAUSE ✱✱PAUSE ✱✱. RED zone LED)	
Normally-Open SUPERVISORY (Steady Amber zone LED)	
WATERFLOW/SUPERVISORY (Steady Green zone LED)	
WATERFLOW/SUPERVISORY with Retard (✱ PAUSE ✱ PAUSE ✱. GREEN zone LED)	

IAC Programming Worksheet (Both IACs Activated by Either IDC)		
IAC Programming	**IAC #1**	**IAC #2**
Silenceable (Appropriate Zone LED ON **AND** Alarm Silenced LED = ✱PAUSE ✱PAUSE ✱.)		
Non-Silenceable (Appropriate Zone LED ON **AND** Alarm Silenced LED OFF)		
Continuous (Appropriate Zone LED ON Steady)		
120 SPM (Appropriate Zone LED 120 pulses/min)		
Temporal (Appropriate Zone LED Short-Short-Short-Long pulsing		
Continuous California Rate (Appropriate Zone LED ON for 10 seconds, off for 5 seconds....)		
March Time California Rate (Appropriate Zone LED ON for 10 seconds @ 120 SPM, off for 5 seconds....)		

Panel Configuration and Programming Worksheet

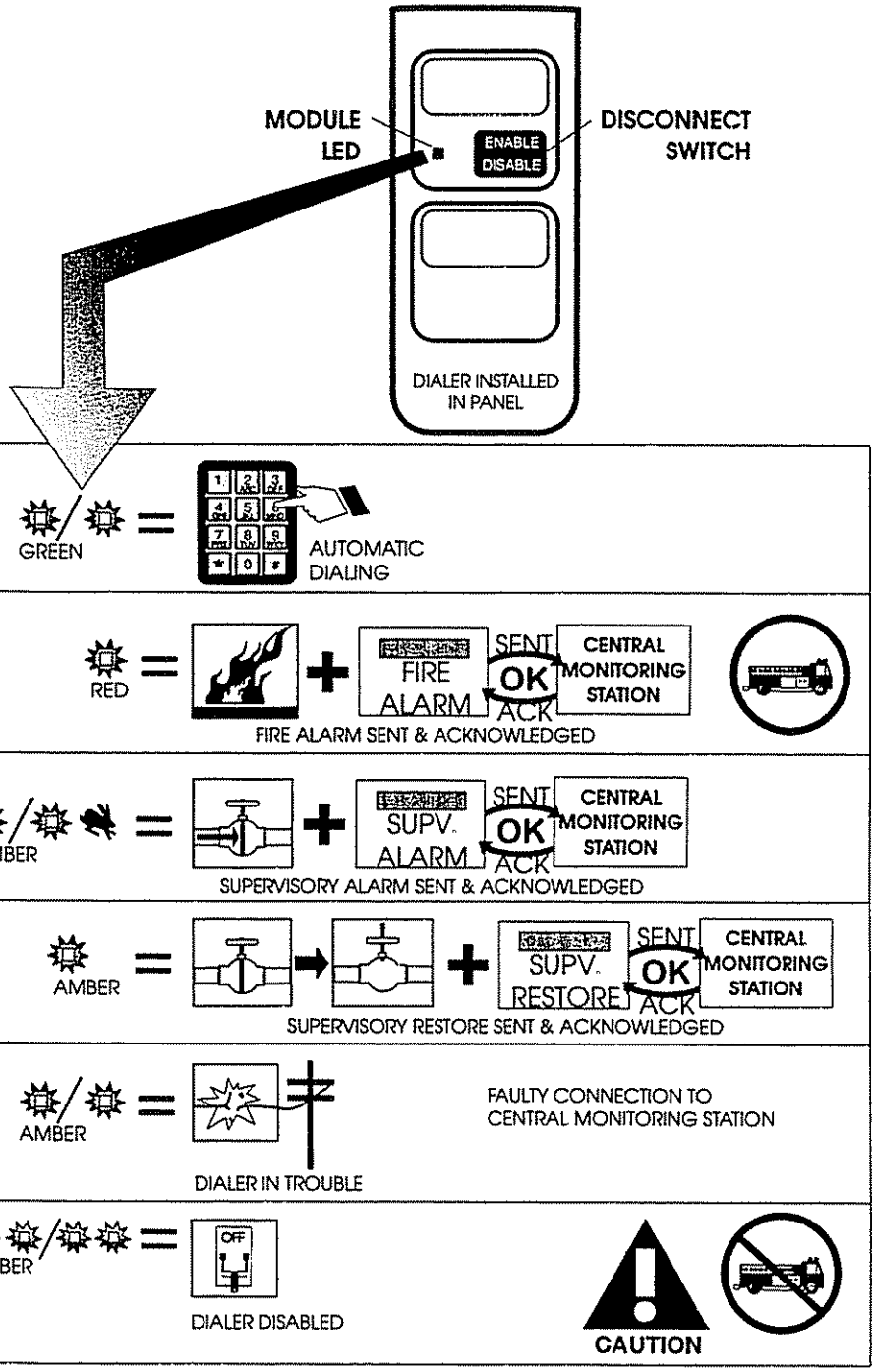
Project Name: _____

Timer Configuration	
❑ No Alarm Silence Inhibit	Alarm Silenced LED OFF
❑ 1 Minute Alarm Silence Inhibit	Alarm Silenced LED = ✱PAUSE ✱PAUSE ✱...
❑ 2 Minute Alarm Silence Inhibit	Alarm Silenced LED =✱✱ PAUSE ✱✱PAUSE ✱✱. ..
❑ 3 Minute Alarm Silence Inhibit	Alarm Silenced 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 ✱✱✱....

Option Modules
❑ 2400-RCT Relay/City-Tie Module (P/N 240459) O Municipal Box Operation O Dry Contact Operation
❑ 2400-RTUDR Remote Trouble Unit Driver
❑ 2400-DL1 Dialer Module

DL1 Dialer Module Worksheet	
Primary Phone # _____	Primary ID# _____
Secondary Phone # _____	Secondary ID# _____
Number of Retries _____	Retry Interval _____ Seconds
AC Power Failure Delay_____ Hours	

DIALER OPERATIONS



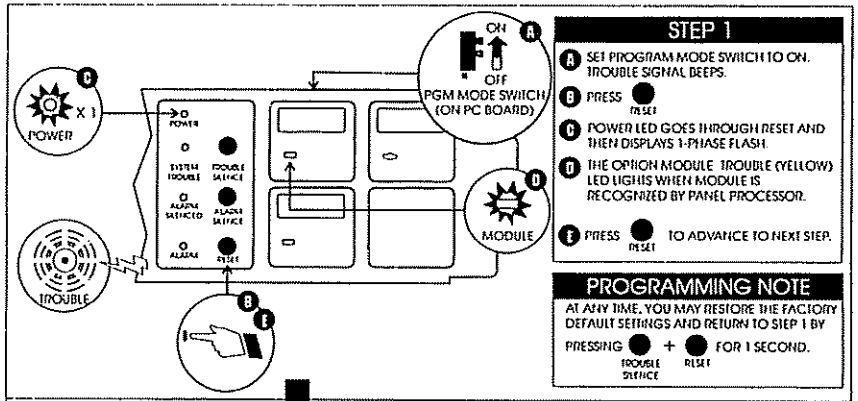
Dialer automatically contacts Central Monitoring Station (CMS) every 24 hours, verifying operation.
Dialer will automatically re-enable itself after being disabled for a 24 hour period, and report panel status to the Central Monitoring Station.

LED LEGEND

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

(DACTOPS1.CDR)
03/30/95

PANEL PROGRAMMING



STEP 1

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

B PRESS RESET

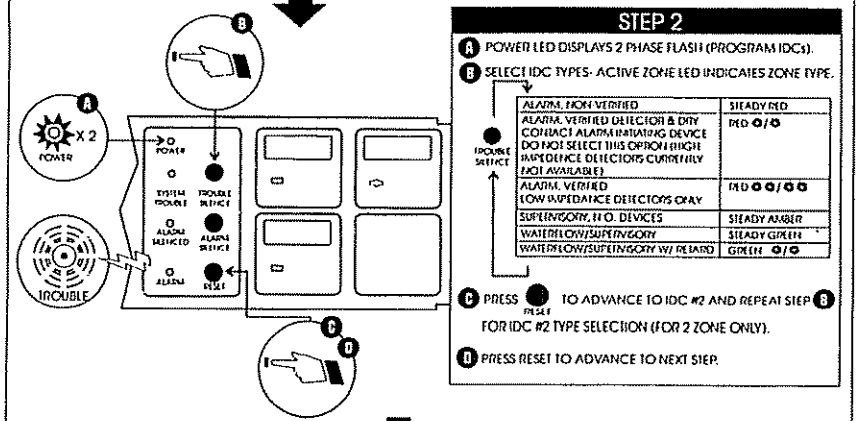
C POWER LED GOES THROUGH RESET AND THEN DISPLAYS 1-PHASE FLASH.

D THE OPTION MODULE TROUBLE (YELLOW) LED LIGHTS 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 FOR 1 SECOND.



STEP 2

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

B SELECT IDC TYPES- ACTIVE ZONE LED INDICATES ZONE TYPE.

TROUBLE SILENCE

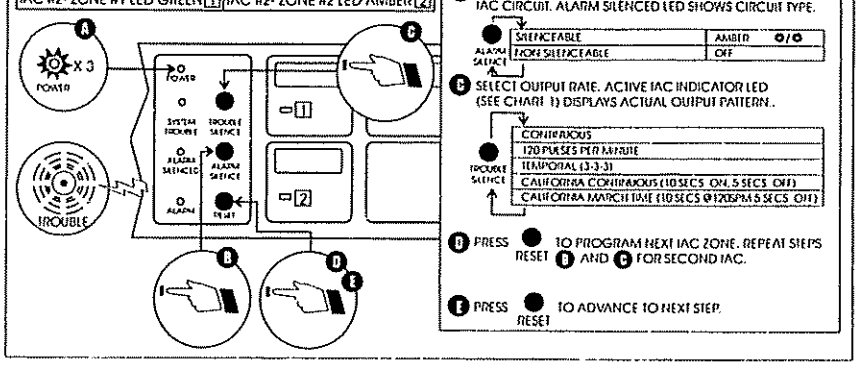
ALARM, NON VERIFIED	STEADY RED
ALARM, VERIFIED DETECTION & DRY CONTACT ALARM INITIATING DEVICE DO NOT SELECT THIS OPTION WHEN HIGH IMPEDENCE DETECTORS CURRENTLY NOT AVAILABLE)	RED ●/●
ALARM, VERIFIED LOW IMPEDANCE DETECTORS ONLY	RED ●●/●●
SUPERVISORY, NO. DEVICES	STEADY AMBER
WATERFLOW/SUPERVISORY	STEADY GREEN
WATERFLOW/SUPERVISORY W/ RETARD	GREEN ●/●

C PRESS RESET TO ADVANCE TO IDC #2 AND REPEAT STEP B FOR IDC #2 TYPE SELECTION (FOR 2 ZONE ONLY).

D PRESS RESET TO ADVANCE TO NEXT STEP.

CHART 1

1 ZONE PANEL (-1Z1)	2 ZONE PANEL (-2Z1)
IAC #1- ZONE #1 LED AMBER [1]	IAC #1- ZONE #1 LED AMBER [1]
IAC #2- ZONE #1 LED GREEN [1]	IAC #2- ZONE #2 LED AMBER [2]



STEP 3

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

B SELECT IAC TYPE. CHART 1 SHOWS INDICATIONS FOR ACTIVE IAC CIRCUIT. ALARM SILENCED LED SHOWS CIRCUIT TYPE.

ALARM SILENCE

SILENCEABLE	AMBER ●/●
NON SILENCEABLE	OFF

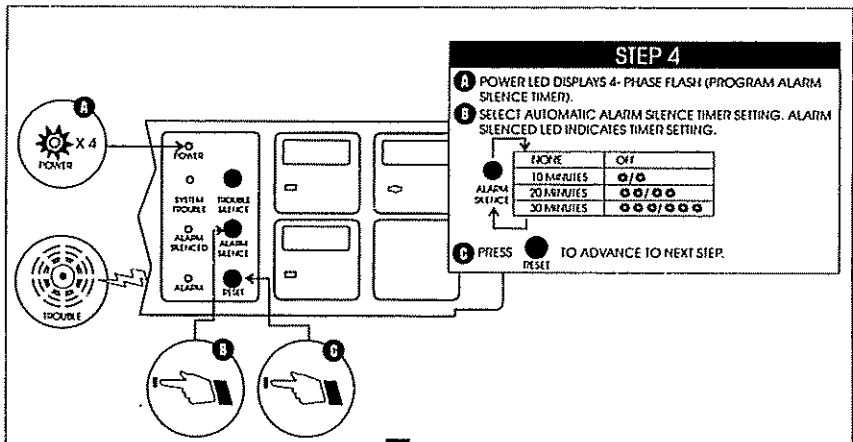
C SELECT OUTPUT RATE. ACTIVE IAC INDICATOR LED (SEE CHART 1) DISPLAYS ACTUAL OUTPUT PATTERN..

TROUBLE SILENCE

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

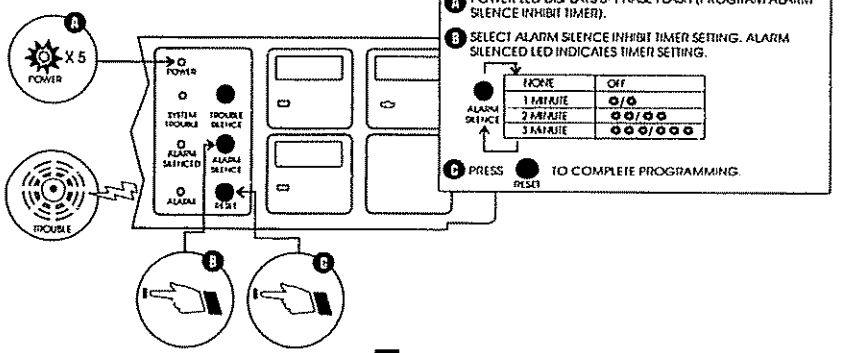
A POWER LED DISPLAYS 4- PHASE FLASH (PROGRAM ALARM SILENCE TIMER).

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

ALARM SILENCE

MORE	OFF
10 MINUTES	●/●
20 MINUTES	●●/●●
30 MINUTES	●●●/●●●

C PRESS RESET TO ADVANCE TO NEXT STEP.



STEP 5

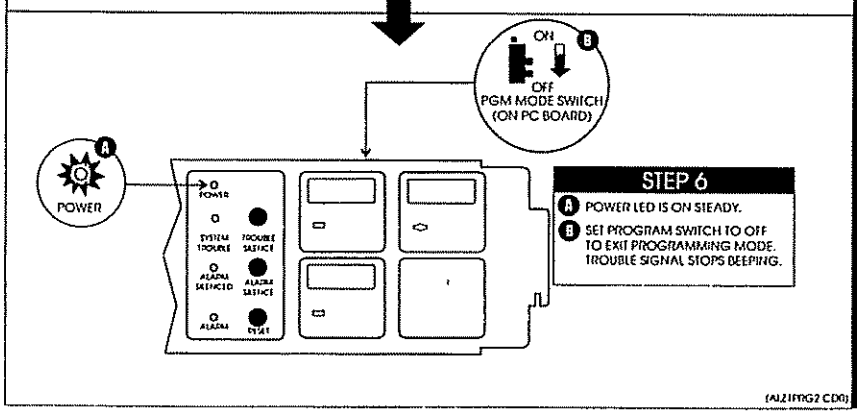
A POWER LED DISPLAYS 5- PHASE FLASH (PROGRAM ALARM SILENCE INHIBIT TIMER).

B SELECT ALARM SILENCE INHIBIT TIMER SETTING. ALARM SILENCED LED INDICATES TIMER SETTING.

ALARM SILENCE

MORE	OFF
1 MINUTE	●/●
2 MINUTE	●●/●●
3 MINUTE	●●●/●●●

C PRESS RESET TO COMPLETE PROGRAMMING.



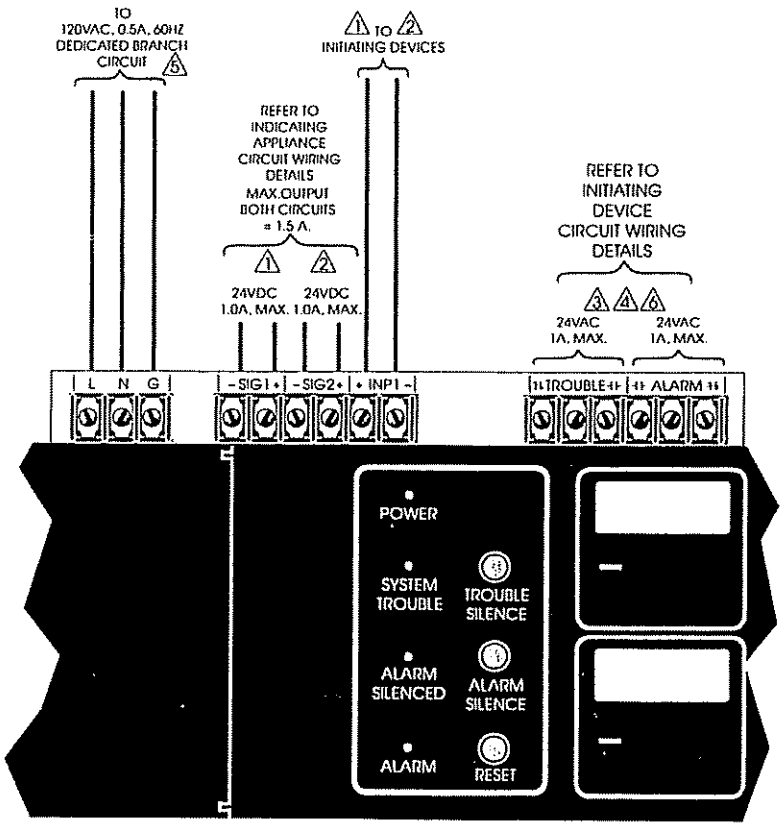
STEP 6

A POWER LED IS ON STEADY.

B SET PROGRAM SWITCH TO OFF TO EXIT PROGRAMMING MODE. TROUBLE SIGNAL STOPS BEEPING.

(AL2PRG2 CD0)

CONTROL PANEL



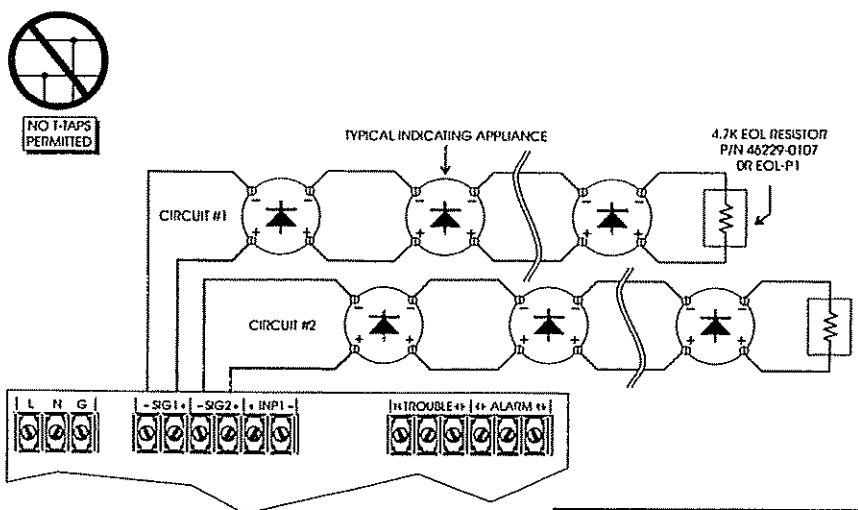
NOTES
1 POWER LIMITED
2 SUPERVISED
3 SHOWN IN NORMAL CONDITION.
4 NOT SUPERVISED
5 NOT POWER LIMITED
6 POWER LIMITED. (USE LISTED FIRE PROTECTIVE SIGNAL TRANSFORMER.)

ROUTE POWER WIRING AWAY FROM ALL POWER LIMITED CIRCUITS

INDICATING APPLIANCE CIRCUIT MAXIMUM WIRING RUNS

MAXIMUM STYLE Y (CLASS B) RUN TO EOL RESISTOR.

LOAD CURRENT	#12 AWG FEET (METERS)	#14 AWG FEET (METERS)	#16 AWG FEET (METERS)	#18 AWG FEET (METERS)
0.10	6289 (1917)	3869 (1180)	2515 (767)	1548 (472)
0.25	2515 (767)	1548 (483)	1006 (307)	619 (189)
0.50	1258 (384)	774 (236)	503 (153)	309 (94)
0.75	839 (256)	516 (157)	336 (102)	206 (63)
1.00	629 (192)	387 (118)	256 (77)	155 (47)

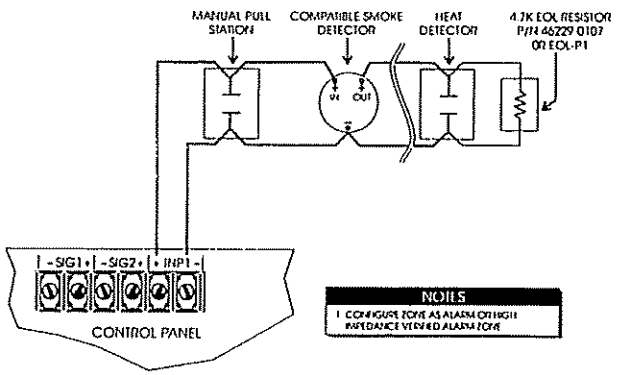


NOTES
1. ALL WIRING SUPERVISED AND POWER LIMITED.
2. POLARITY SHOWN IN ALARM CONDITION.
3. REFER TO APPENDIX FOR COMPATIBLE APPLIANCES.
4. MAXIMUM WIRE RESISTANCE SHOULD NOT EXCEED 50 OHMS PER CIRCUIT (SEE MAX. WIRING RUNS CHART).

INDICATING APPLIANCE CIRCUIT WIRING

INITIATING DEVICE CIRCUIT WIRING

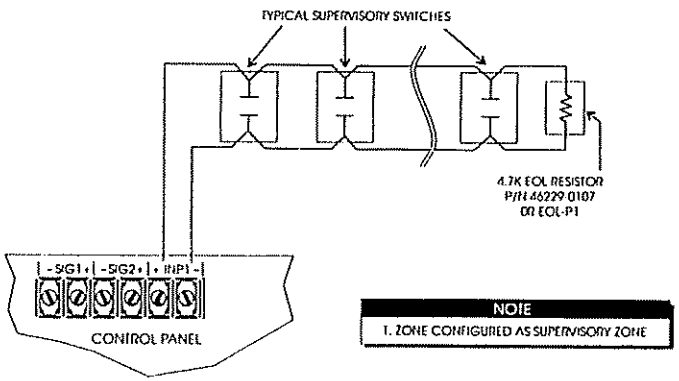
ALARM INITIATING DEVICE CIRCUIT WIRING



NOTES

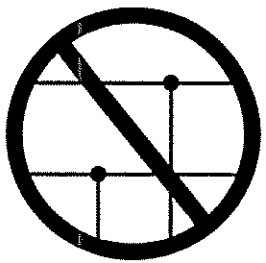
1. CONFIGURE ZONE AS ALARM OR HIGH IMPEDANCE VERIFIED ALARM ZONE

SUPERVISORY INITIATING DEVICE CIRCUIT WIRING



NOTE

1. ZONE CONFIGURED AS SUPERVISORY ZONE



NO T-TAPS PERMITTED

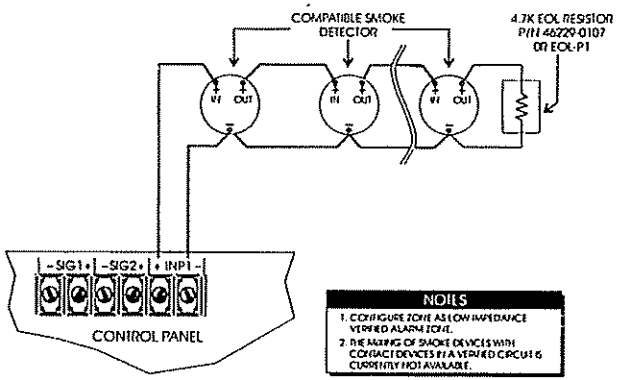
NOTES

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.

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)
20	2400 (732)
22	1500 (457)

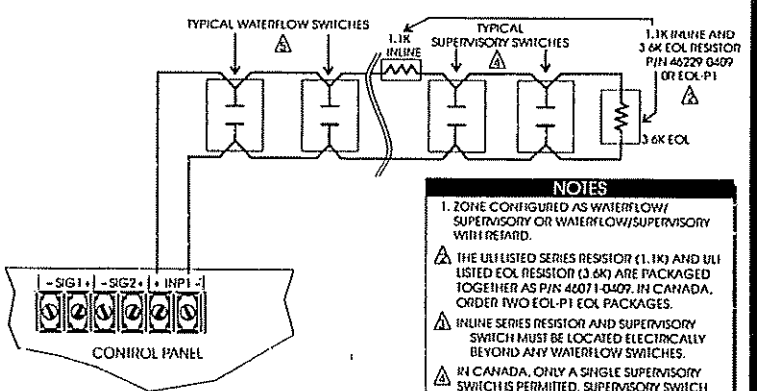
VERIFIED LOW IMPEDANCE IDC WIRING



NOTES

1. CONFIGURE ZONE AS LOW IMPEDANCE VERIFIED ALARM ZONE.
2. THE MIXING OF SMOKE DEVICES WITH CONTACT DEVICES IN A VERIFIED CIRCUIT IS CURRENTLY NOT AVAILABLE.

WATERFLOW/SUPERVISORY ALARM INITIATING DEVICE CIRCUIT WIRING

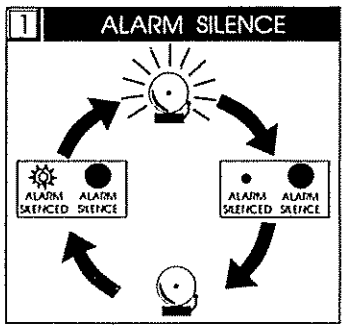


NOTES

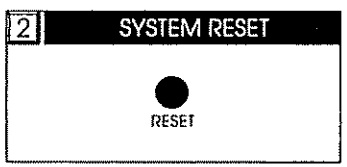
1. ZONE CONFIGURED AS WATERFLOW/SUPERVISORY OR WATERFLOW/SUPERVISORY WITH RETARD.
2. THE ULI LISTED SERIES RESISTOR (1.1K) AND ULI LISTED EOL RESISTOR (3.6K) ARE PACKAGED TOGETHER AS P/N 46071-0409. IN CANADA, ORDER TWO EOL-P1 EOL PACKAGES.
3. INLINE SERIES RESISTOR AND SUPERVISORY SWITCH MUST BE LOCATED ELECTRICALLY BEYOND ANY WATERFLOW SWITCHES.
4. IN CANADA, ONLY A SINGLE SUPERVISORY SWITCH IS PERMITTED. SUPERVISORY SWITCH MUST BE INSTALLED ON A GATE VALVE.
5. IN CANADA, ONLY ONE WATERFLOW SWITCH IS PERMITTED.

PANEL OPERATION

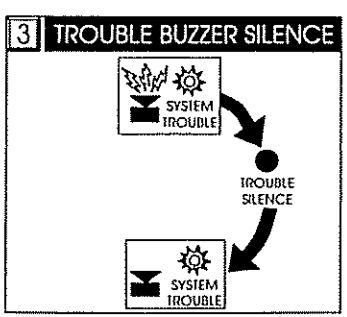
1 ALARM SILENCE



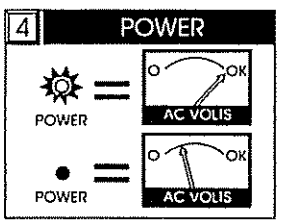
2 SYSTEM RESET



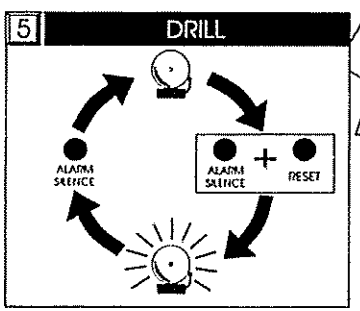
3 TROUBLE BUZZER SILENCE



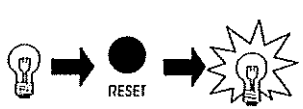
4 POWER



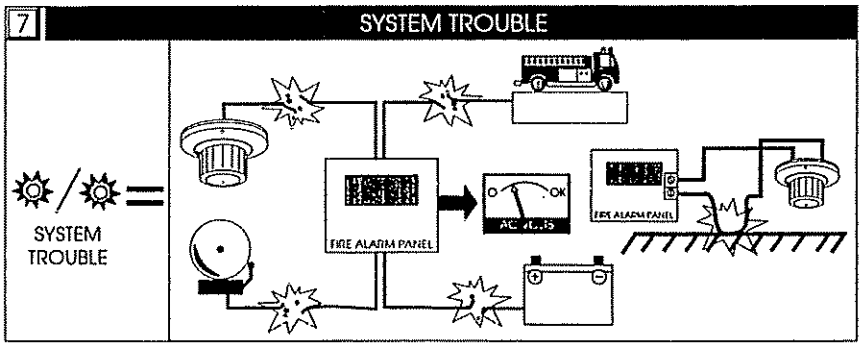
5 DRILL



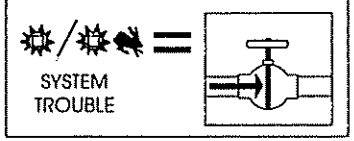
6 LAMP TEST



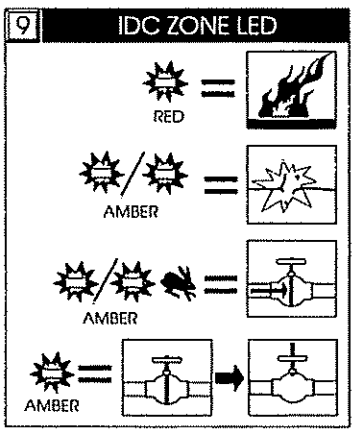
7 SYSTEM TROUBLE

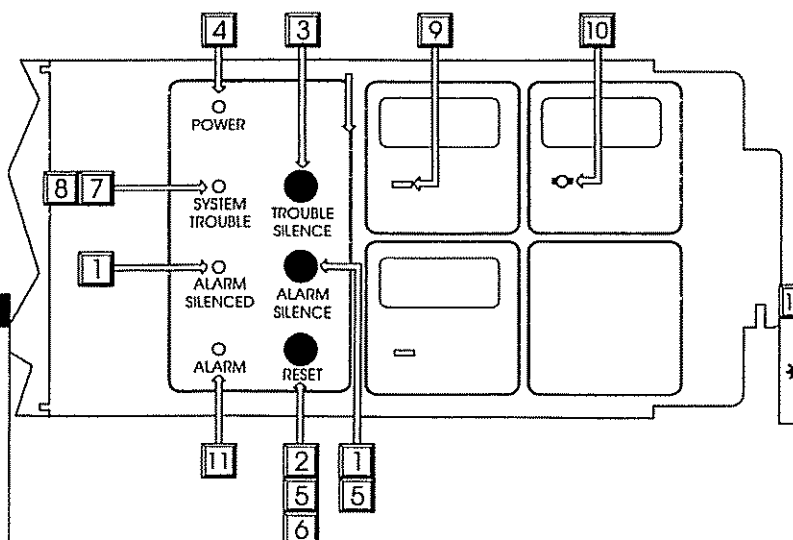


8 SUPERVISORY CONDITION

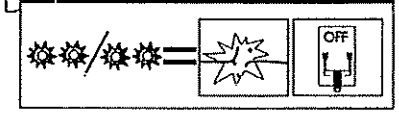


9 IDC ZONE LED

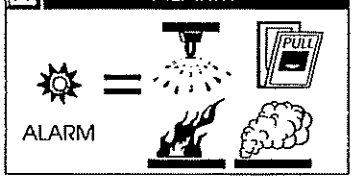




10 OPTION MODULE



11 ALARM

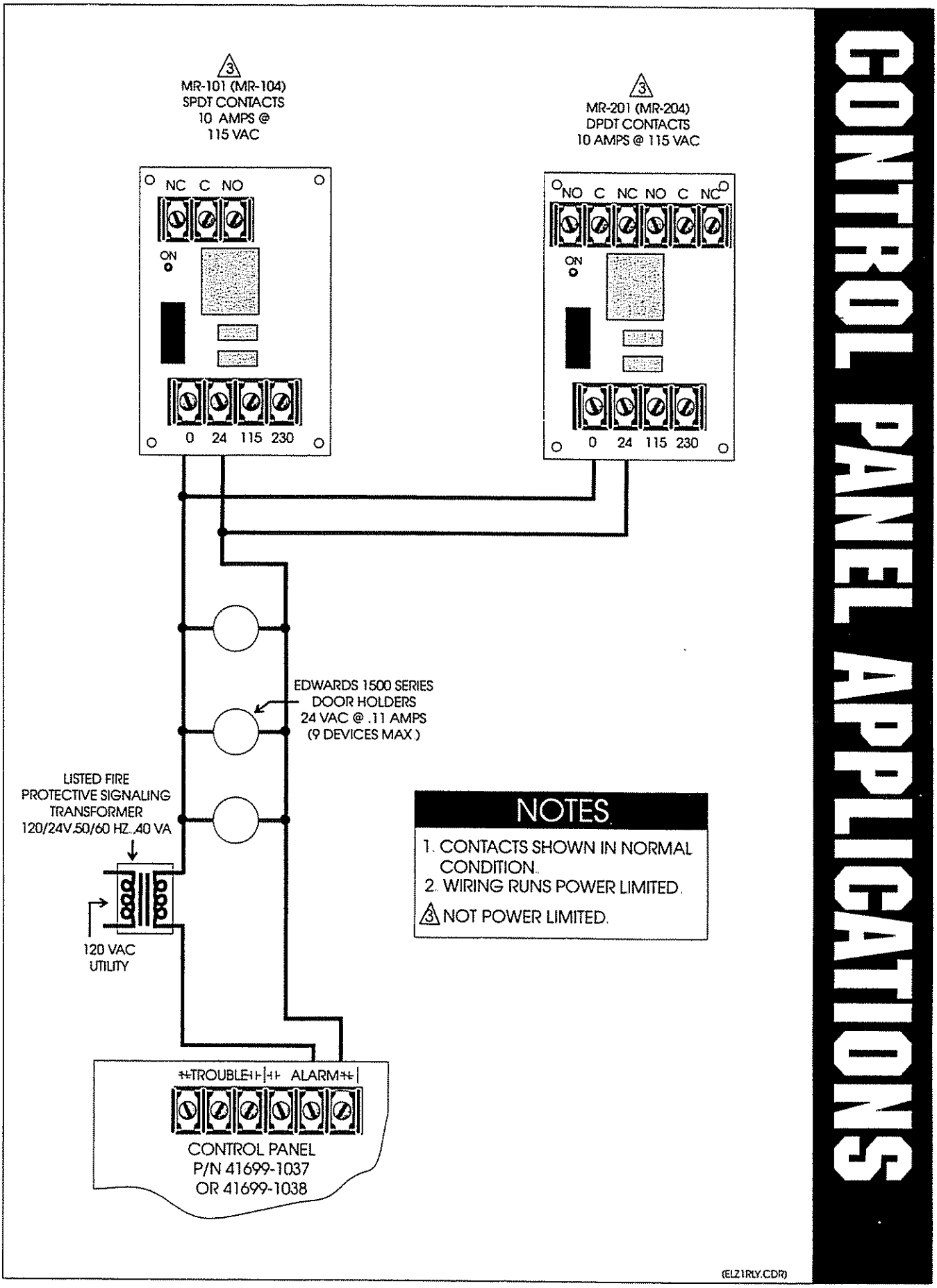


LED LEGEND

- ● = LED OFF
- ☼ = ON STEADY
- ☼☼/☼☼ = 2-PHASE FLASH
- ☼/☼ = SLOW FLASH
- ☼/☼ = RAPID FLASH

(EALIPO2.CDR)

CONTROL PANEL APPLICATIONS



NOTES

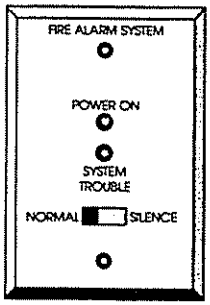
1. CONTACTS SHOWN IN NORMAL CONDITION.
2. WIRING RUNS POWER LIMITED.

3 NOT POWER LIMITED.

(ELZ1RLY.CDR)

REMOTE TROUBLE UNIT

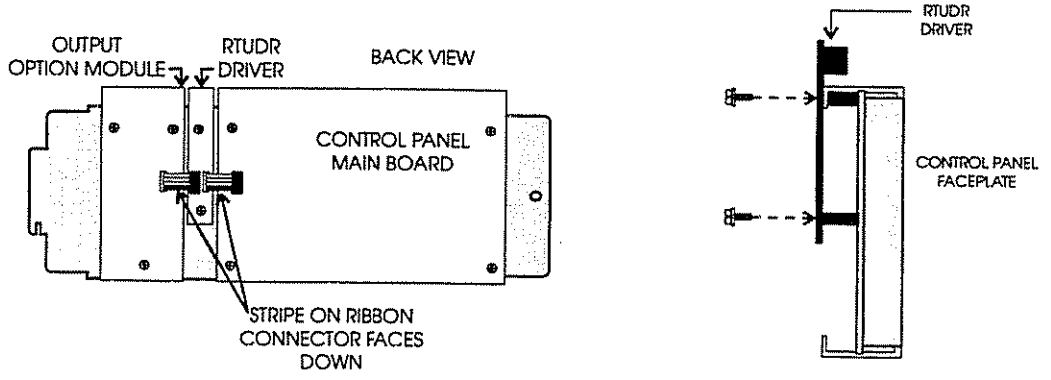
RTU FRONT VIEW



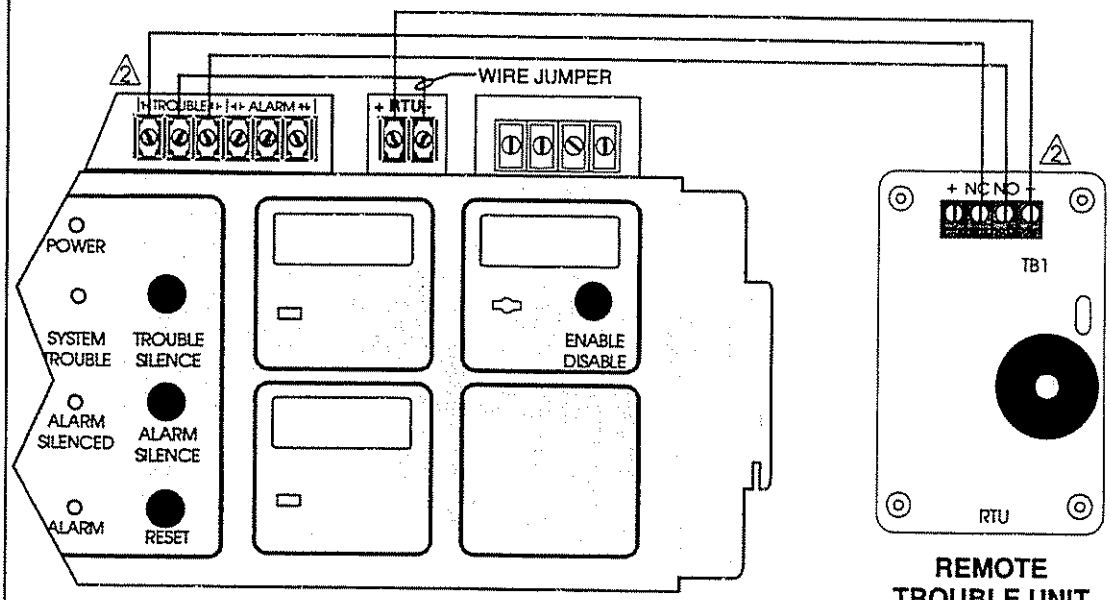
NOTES

1. ALL WIRING POWER LIMITED.
2. CONTACTS SHOWN IN NORMAL CONDITION.
3. ANNUNCIATOR WIRING: 22 AWG MIN =7,500' (2,300 M) MAX
4. NOT SUPERVISED.
5. 24VDC NOMINAL @ 15mA DC MAX.

RTUDR INSTALLATION



WIRING



(RTUDR1.CDR)
03/03/95

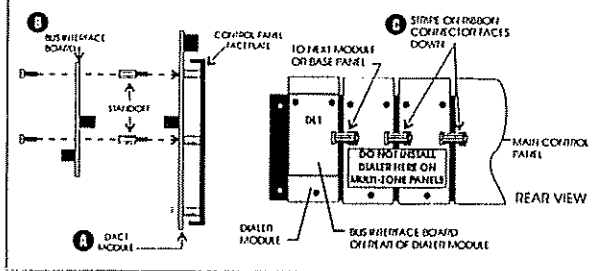
DIALER MODULE

INSTALLATION STEP 1

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

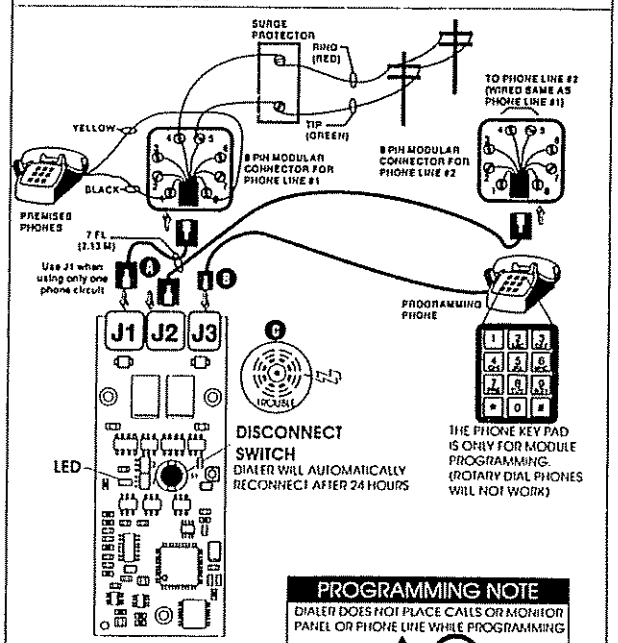
B. INSTALL BUS INTERFACE BOARD ON BACK OF DIALER MODULE.

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



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 — 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 → 3 OR 4 DIGIT ID NUMBER

PROGRAMMING ITEM 02 - PRIMARY CMS PHONE NUMBER

[*] → [0] → [2] → ☼/☼ AMBER ON RED → UP TO 24 DIGIT PHONE NUMBER

PROGRAMMING ITEM 03 - SECONDARY SITE ID NUMBER

[*] → [0] → [3] → ☼☼/☼☼ AMBER ON GREEN → 3 OR 4 DIGIT ID NUMBER

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 → 1, 2, 3, 4, 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] OR Code/Zone [2] (Default)

PROGRAMMING STEP D - EXIT PROGRAMMING MODE

DISCONNECT PHONE FROM 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 RE-PROGRAMMING.

DIALER LED OPERATION

☼/☼ GREEN = DIALING

☼ RED = FIRE ALARM SENT & ACKNOWLEDGED

☼/☼ AMBER = SUPERVISORY ALARM SENT & ACKNOWLEDGED

☼ AMBER = SUPERVISORY RESTORE SENT & ACKNOWLEDGED

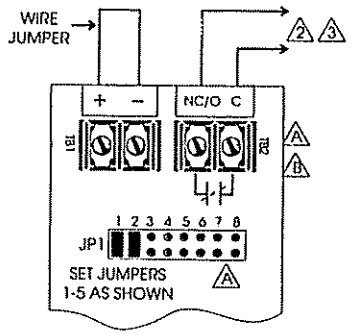
☼/☼ AMBER = MODULE / PHONE TROUBLE

☼☼/☼☼ AMBER = MODULE DISABLED

(DIALPRG1.CDR)
10/28/96

RELAY/CITY-TIE MODULE

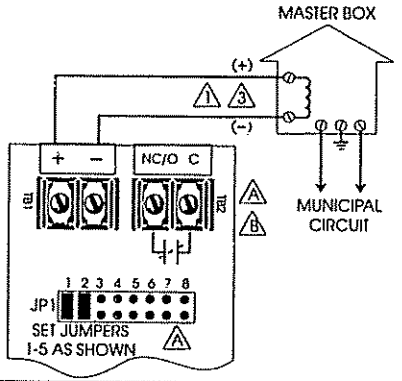
SHUNT CONNECTION/ DRY CONTACT



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

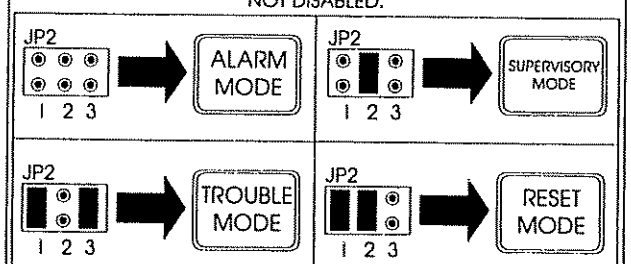


NOTES

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

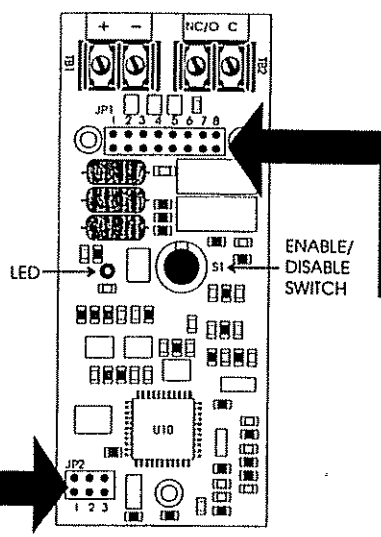
JUMPER JP2 1-3 CONFIGURES THE MODULE TO OPERATE IN EITHER ALARM, TROUBLE. SUPERVISORY. OR RESET MODES- WHEN MODULE NOT DISABLED.



INCORRECT JUMPER SETTINGS WILL RESULT IN IMPROPER OPERATION

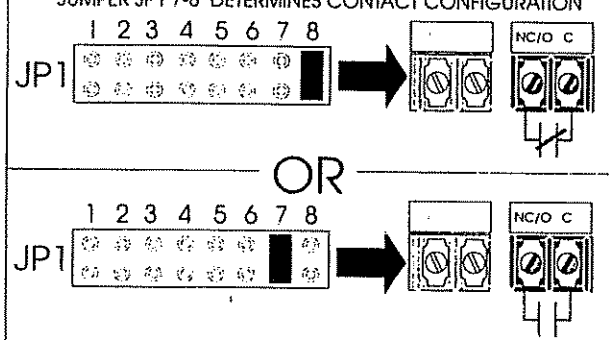
CAUTION

REMOVE ALL POWER BEFORE CHANGING JUMPERS



NOTE A

JUMPER JP1 7-8 DETERMINES CONTACT CONFIGURATION

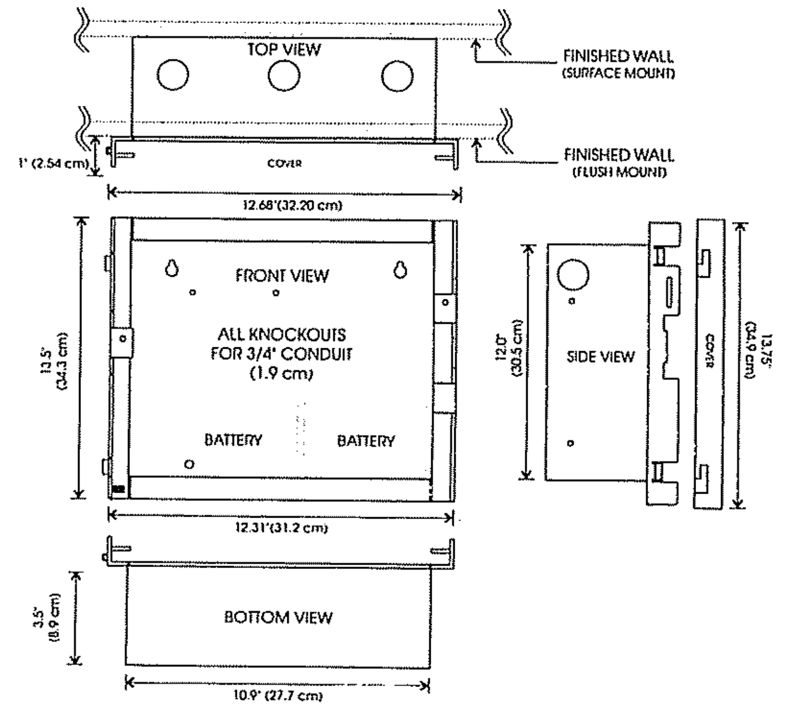


CONTACT OPERATES SIMULTANEOUSLY WITH REMOTE OUTPUT
CONTACT SHOWN IN NORMAL STATE-
WHEN CONFIGURED FOR TROUBLE OPERATION, RELAY IS ENERGIZED AND CONTACT STATE REVERSED.

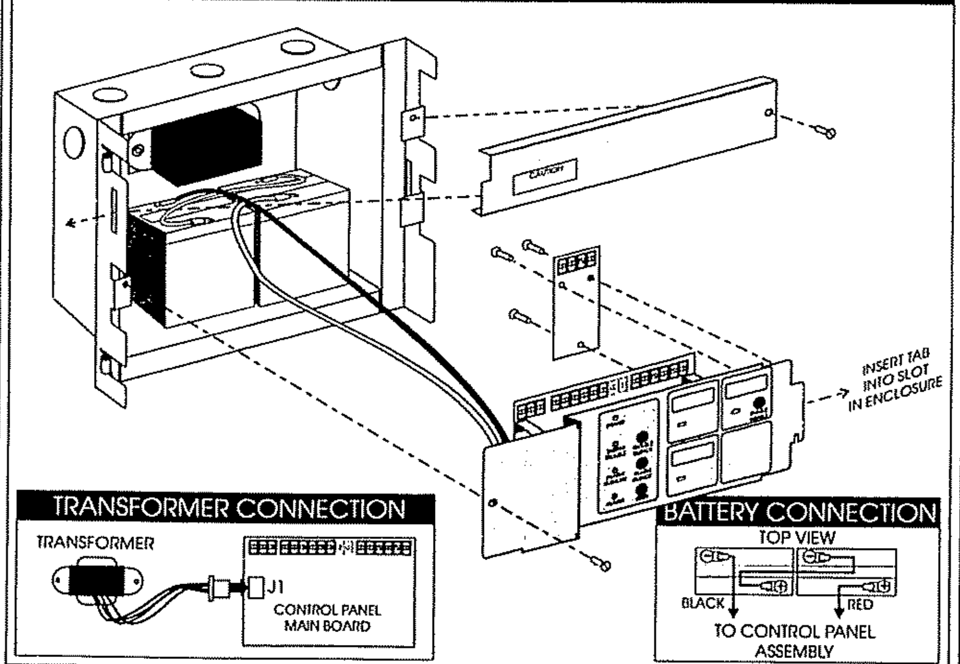
(CL2TRY4.COR)
10/28/98

CONTROL PANEL INSTALLATION

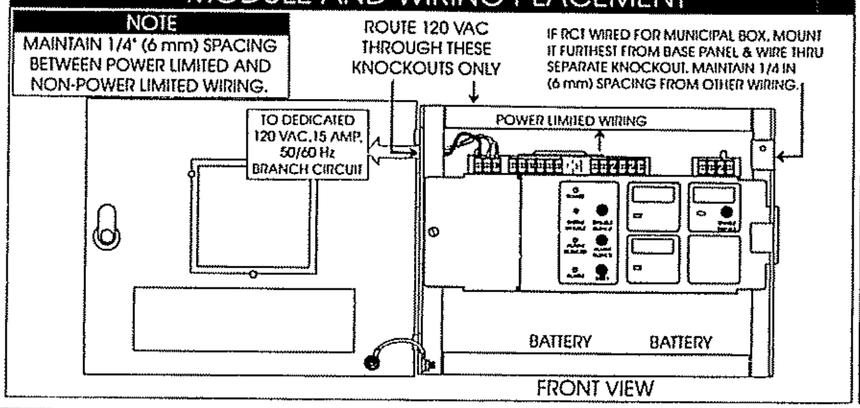
CONTROL PANEL DIMENSIONS



CONTROL PANEL ASSEMBLY



MODULE AND WIRING PLACEMENT



CONTROL PANEL ASSEMBLY DETAIL