NOTIFIER FIRE SYSTEMS
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AFP-100
Intelligent Fire Panel

Installation, Programming and Operating Manual

Document 51010
12/15/98 **Revision** A
PN 51010:A **ECN 99-012**

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

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

CAUTION - *System Reacceptance Test after Software Changes:* To ensure proper system operation, this product must be tested in accordance with NFPA 72-1993 Chapter 7 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0-49° C/32-120° F and at a relative humidity of 85% RH (non-condensing) at 30° C/86° F. However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a nominal room temperature of 15-27° C/60-80° F.

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

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

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

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

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

This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation.

Fire Alarm System Limitations

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

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

Any fire alarm system may fail for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in walls, or roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second floor detector, for example, may not sense a first floor or basement fire. Furthermore, all types of smoke detectors - both ionization and photoelectric types, have sensing limitations. No type of smoke detector can sense every kind of fire caused by carelessness and safety hazards like smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches, or arson.

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

Audible warning devices such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building.

A fire alarm system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time.

Rate-of-Rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist.

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

Telephone lines needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled.

The most common cause of fire alarm malfunctions, however, is inadequate maintenance. All devices and system wiring should be tested and maintained by professional fire alarm installers following written procedures supplied with each device. System inspection and testing should be scheduled monthly or as required by National and/or local fire codes. Adequate written records of all inspections should be kept.

FCC Warning

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

Canadian Requirements

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

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

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1. Product Description

2. Installation

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SECTION 1 PRODUCT DESCRIPTION

Overview

The AFP-100 is a compact, cost effective, intelligent FACP (Fire Alarm Control Panel) with an extensive list of powerful features. The combination of Notifier's addressable devices and the AFP-100 offers the latest in fire protection technology. The power supply and all electronics are contained on a single circuit board housed in a metal cabinet, providing a complete fire control system for most applications. Optional modules, such as the Fire•Lite RTM-8F and ACM-8R,which plug into the main circuit board, are available for special functions. Available accessories include LED, graphic and LCD annunciators, digital communicator, local downloading software and remote power expansion.

Note Throughout this manual, the “control panel” refers to an AFP-100 FACP.

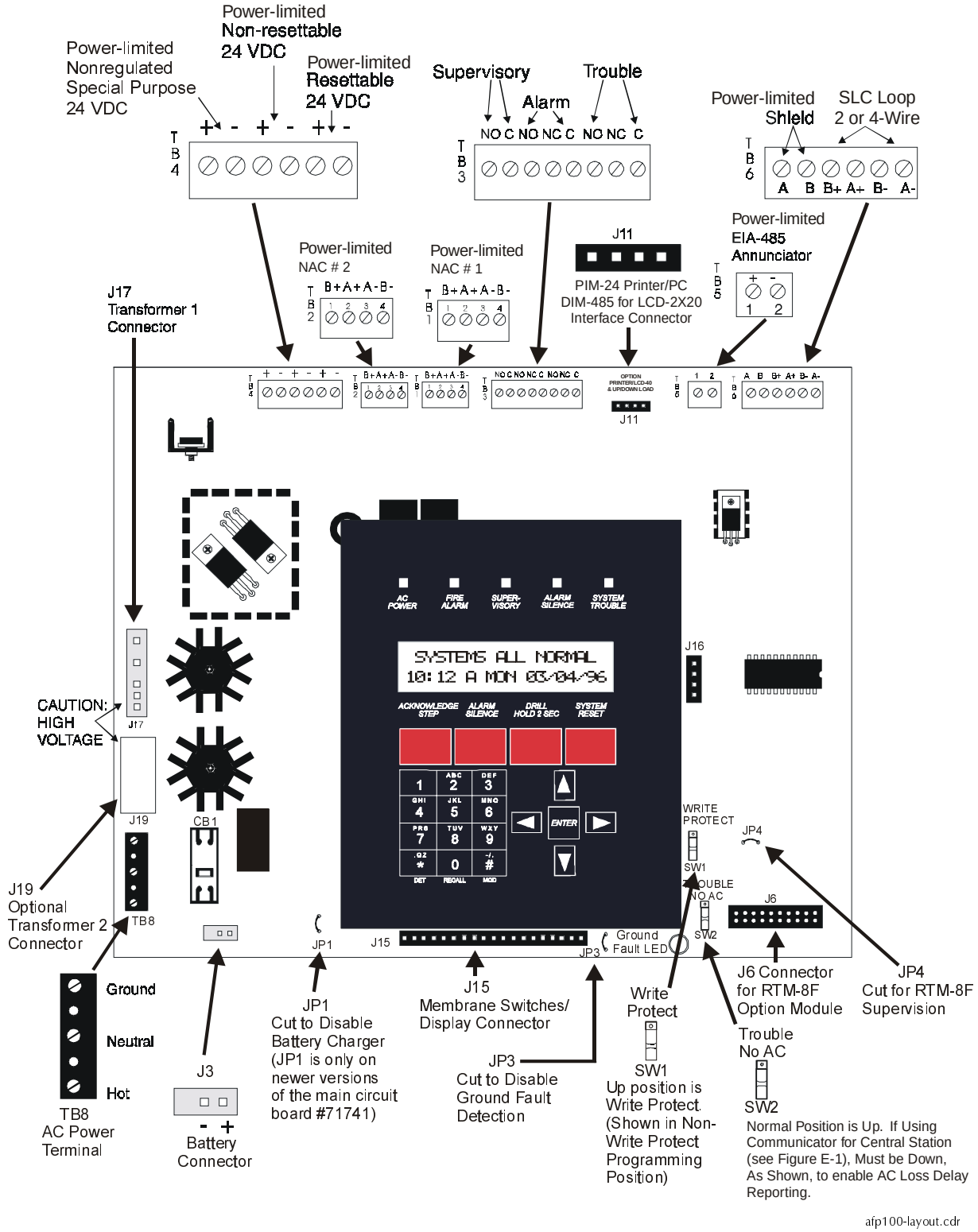
Features

The control panel features the following:

- Single standard SLC loop which meets NFPA Style 4, 6 and 7 requirements
- 198 addressable device capacity (99 detectors and 99 monitor/control modules)
- 56 software zones
- Two main circuit board NACs (Notification Appliance Circuits)
- Optional Fire•Lite RTM-8F eight zone relay module with local energy/reverse polarity transmitter
- Optional ACM-8R Relay Control Module
- Optional Printer/PC Interface Module
- 3.6 amps system power expandable to 6.6 amps
- 3.0 amps NAC power expandable to 6.0 amps
- 40 character LCD display (backlit)
- Real-time clock/calendar
- History file with 500 event capacity
- Advanced fire technology features:
    - ✓ Automatic device Type Code verification
    - ✓ Auto detector test
    - ✓ Maintenance alert
    - ✓ Point trouble identification
- Three levels of detector sensitivity
- Waterflow (nonsilenceable) selection per module point
- Supervisory (latching or nonlatching) selection per point
- System alarm verification selection
- Walktest with report of two devices set to same address
- Presignal per NFPA 72
- LED, LCD or Graphic Annunciators
- Silence inhibit timer option
- Autosilence timer option
- Continuous/March Time/Temporal or California code for main circuit board NACs
- Remote ACK/Silence/Reset/Drill via MMX-1, MMX-101 modules, AFM annunciators or LCD-2x20 Remote Fire Annunciator
- Autoprogram (learn mode) reduces installation time

- Password and key-protected nonvolatile memory
- User programmable password
- Fully programmable from panel keyboard or off-line PC
- Rapid poll algorithm for manual stations (U.S. Patent Pending)
- SLC operates up to 10,000 ft. (3,000 m) or 1,000 ft. (300 m) with untwisted, unshielded wire (U.S. Patent #5,210,523)
- Uses the following intelligent and addressable devices:
  - ✓ CPX Series - Ionization Smoke Detector
  - ✓ SDX Series - Photoelectric Smoke Detector
  - ✓ SDX Series T - Photoelectric Smoke Detector with 135^{o} Thermal Detection
  - ✓ CMX - Control Module
  - ✓ MMX-1 - Monitor Module
  - ✓ MMX-101 - Miniature Monitor Module
  - ✓ MMX-2 - two-wire Detector Module
  - ✓ ISO-X - Isolator Module
- All CMX and MMX Series devices feature decade code wheels for addressing
- UDACT Digital Communicator, reports up to 56 zones or 198 points (all intelligent and addressable devices) to a UL-listed Central Station

Terminal Layout



Specifications

Overview

This section contains specifications for the control panel.

AC Power – TB8

120 VAC, 50/60 Hz, 2.3 amps

Wire size: minimum #14 AWG (2.00 mm^2) with 600 VAC insulation

Battery (Lead Acid Only) – J3

- Specifications for batteries are:

Maximum Charging Circuit	Normal Flat Charge — 27.6V @ 0.8 amp
Maximum Battery Capacity	**12 AH** batteries in the cabinet. Batteries greater than 12 AH, up to 18 AH, require Notifier BB-17 or other UL-listed battery cabinet). For 25 to 120 AH batteries, use the CHG-120 Battery Charger.

Note Jumper JP1, on the main circuit board, must be cut to disable FACP battery charger when using the CHG-120.

Signaling Line Circuit (SLC) – TB6

The SLC is supervised and power-limited. It can leave the protected premises, provided an appropriate surge suppressor is used (refer to the Notifier Device Compatibility Document for a list of UL-listed compatible surge suppressors).

Voltage	15 VDC nominal, 27.6 VDC maximum
Maximum length	10,000 ft. (3,000 m) total twisted pair length
Maximum loop current	250 mA (short circuit) or 100 mA (normal)
Maximum loop resistance	40 ohms

Notification Appliance Circuits (NACs) – TB1 and TB2

The control panel provides two NACs that provide nonregulated, special purpose power with the following:

- Power-limited circuitry
- Nominal operating voltage: 24 VDC
- Current-limit: Fuseless, electronic, power-limited circuitry
- End-of-line resistor: 4.7K ohms, ½ watt (PN 71252 UL-listed) for NACs
- Maximum voltage drop in wiring: 2.0 VDC
- Current for all external devices: 3.0 amps expandable to 6.0 amps (
- Maximum signaling current per circuit: 2.50 amps

Alarm, Trouble and Supervisory Relays – TB3

Specifications for the relays available from TB3 are:

Contact rating:	2.0 amps @ 30 VDC (resistive) 0.5 amps @ 30 VAC (resistive)
Alarm and Trouble relays	Form-C
Supervisory relay	Form-A

Note Refer to Figure 10 on page 29 for information on power-limited wiring for relay circuits.

DC Power for Output Circuits (TB4)

TB4 provides three types of DC power circuits (power-limited) as listed below.

Type of Power	**TB4 Terminals**	**Specifications**
Four-wire smoke detector power – 24 VDC nominal	TB4-5 (+) TB4-6 (–)	Maximum ripple voltage: 10 mV_{RMS} Maximum standby current: 50 mA Up to 300 mA is available for powering four-wire smoke detectors [1 2 3]
Nonresettable, filtered 24 VDC power (24 VDC nominal)	TB4-3 (+) TB4-4 (–)	Maximum ripple voltage: 10mV_{RMS} Maximum standby current: 150 mA Total DC current available from this output is up to 300 mA [1 2 3]
Nonregulated special purpose 24 VDC power	TB4-1 (+) TB4-2 (–)	Operating voltage range: 18 VDC to 30 VDC Total DC current available for powering external devices is 2.5 amps [2] Note: This power is not recommended for AFM, LDM or LCD-2x20 annunciators

1. For power supply calculations, refer to Appendix A.
2. Total current for special purpose power, nonresettable power, four-wire smoke power, and the two NACs, must not exceed 6.0 amps. Total external system current in excess of 3.6 amps requires the XRM-24 transformer and 12 AH or 18 AH batteries, not 7 AH batteries.
3. Total current for resettable four-wire smoke detector power and nonresettable power must not exceed 600 mA.

Controls and Indicators

The control panel controls and indicators include the LCD display, the five system status LED indicators, the membrane panel, and the panel sounder.

LCD Display

The control panel uses a 40-character (2 lines x 20 characters) high viewing angle LCD display with a character height of 3/16 inches. The display includes a long-life LED backlight that remains illuminated. If AC power is lost and the system is not in alarm, the LED backlight will turn off to conserve batteries.

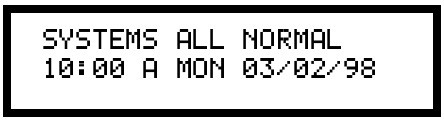


Figure 1 Sample Systems Normal Screen

System Status LED Indicators

System Status LED Indicators are provided to annunciate the following conditions:

- AC Power (green)
- Fire Alarm ((red)
- System Trouble (yellow)
- Supervisory (yellow)
- Alarm Silence (yellow)
- Ground Fault (yellow) – located on the bottom of the main circuit board (refer to Figure 3 on page 14)

Membrane Panel

Mounted on the main circuit board, the membrane panel includes a window for the LCD display and five system status LED indicators. The membrane panel, which is visible with the cabinet door closed, has 21 keys, including a 12 key alphanumeric pad similar to a telephone keypad.

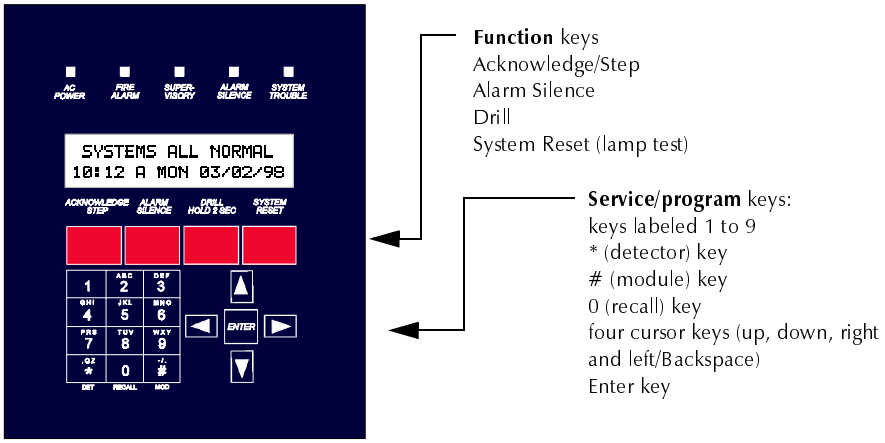


Figure 2 AFP-100 Membrane/Display Panel

Local Sounder

The control panel has a local sounder to provide separate and distinct pulse rates for alarm, trouble, and supervisory conditions.

Circuits

Signaling Line Circuit (SLC) TB6

One SLC, configurable for NFPA Style 4, 6 or 7, is provided for communication to addressable monitor (initiating device) and control (output device) modules.

Output Circuits TB4

The following output circuits are available on the FACP:

- 24 VDC Resettable Power Output 300 mA
- 24 VDC Nonresettable Power Output 300 mA
- 24 VDC Battery Charger (up to 18 AH batteries)

Notification Appliance Circuits (NACs) TB1 and TB2

Two NACs, configurable for Style Y (Class B) or Style Z (Class A), are provided with various programmable features.

Relays TB3

Three dry contact relays are provided for System Alarm and System Trouble (Form-C contacts) and Supervisory (Form-A contacts). Contacts are rated 2.0 amps @ 30 VDC (resistive) and 0.5 amps @ 30 VAC (resistive).

Components

Main Circuit Board

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

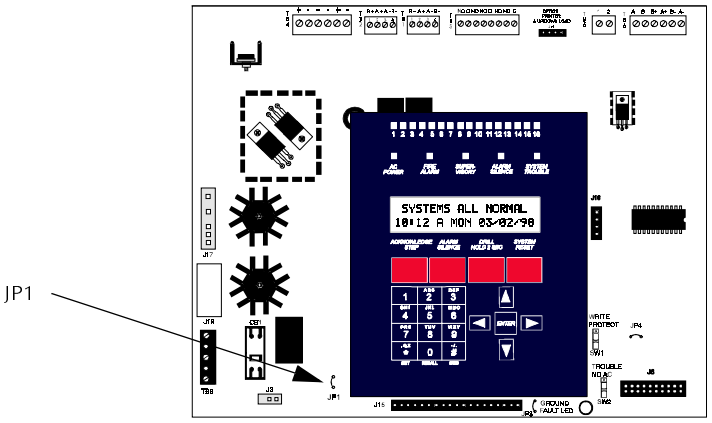


Figure 3 Main Circuit Board

Cabinet

The AFP-100 cabinet is gray with a **navy blue** front overlay. The backbox provides space for two batteries (up to 12 AH). Refer to “AFP-100 Cabinet Mounting” on page 26 for information on dimensions. Ample knockouts are provided for system wiring. Also available is an optional dress panel (DP-1-R), which mounts to the inside of the cabinet (required and included on the ULC version)

Figure 4 Cabinet

Transformer Assembly

One 100VA transformer is provided standard with the panel (3.6 amps maximum). An optional 100 VA transformer (XRM-24) is available to provide maximum accessory power (6.6 amps total). Transformers mount horizontally (as shown) in the cabinet.

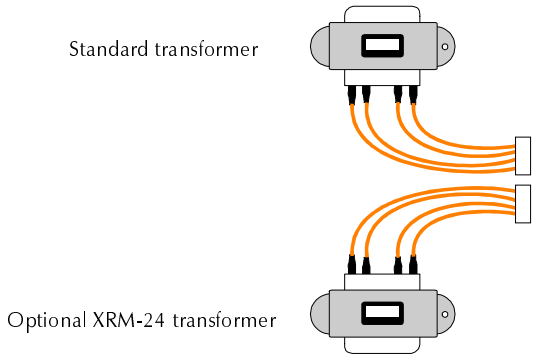
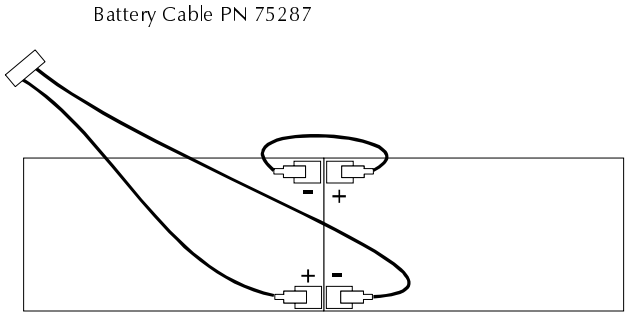


Figure 5 Transformers

Batteries

The cabinet provides space for two batteries (up to 12 AH). 18 AH batteries require use of the Notifier BB-17 or similar UL-listed battery cabinet. The main circuit board provides jumper JP1 for disabling the onboard battery charger to allow use of the CHG-120 battery charger for charging 25 AH to 120 AH batteries (25 AH to 120 AH batteries must be mounted in the Notifier BB-55 UL-listed battery cabinet). Batteries must be ordered separately.



Addressable Devices

Addressable devices include intelligent detectors and modules.

Intelligent Detectors

Intelligent detectors consist of the photoelectric smoke detector, photoelectric smoke detector with thermal sensor and the CPX Series ionization smoke detector. The detectors communicate with the main circuit board CPU through the SLC. The control panel determines the alarm, maintenance or normal status of each device. Each detector responds to an address that is manually set via built-in rotary decimal switches. Each detector head has a removable plug-in connector for ease of wiring and maintenance (or service), as well as a single LED and test connections.

voltage range: 15-28 VDC peak	diameter: 5.0 inches (12.7 cm)
standby current: 50 uA at 24 VDC	height: 3.0 inches (7.6 cm)
LED current: 7 mA @ 24 VDC (latched 'ON')	temperature: 0^o to 49^o C (32^o to 120^o F
SLC resistance: 40 ohms maximum	relative humidity: 10% to 85% non-condensing
air velocity: CPX series = 1,500 ft./minute (7.6 m/S) maximum SDX series = 3,000 ft./minute (15 m/S) maximum	

Table 1 Detector Specifications

All intelligent detectors sends a unique Type Code to aid the automatic programming feature in the control panel. Table 2 shows the intelligent detectors and associated devices

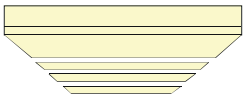
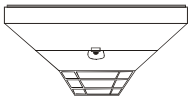
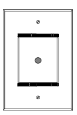
Detector	Description
SDX-751 	SDX Series addressable photoelectric smoke detectors provide smoke sensing utilizing optical sense technology. The **SDX-751TH** includes a 135^o F fixed thermal sensor.
CPX-751 	CPX series detectors are addressable ionization smoke detectors that measure the level of combustion products in its chamber using the ionization principle.
FDX-551 	FDX series detectors are intelligent heat smoke detectors.
RA400Z 	The RA400Z is a remote single LED annunciator that can be wired directly to an addressable detector for annunciation of that detector's alarm status.

Table 2 Intelligent Detectors

CMX and MMX Series Modules

The CMX Control Module plus the MMX-1, MMX-101 and MMX-2 Monitor Modules provide an interface between the control panel and conventional initiating devices and notification appliances. All modules respond to an address that is set by the installer via two built-in rotary decimal switches. A flashing LED indicates power is applied to the modules (except for MMX-101). A thermoplastic cover is provided with all modules, except the MMX-101, for mounting to a 4 inch square mounting box.

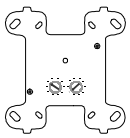
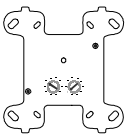
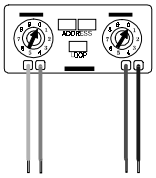
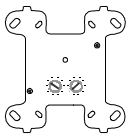
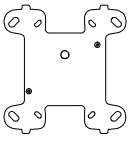
	Device	Description
	MMX-1	The MMX-1 module is an addressable monitor module that can be used to monitor conventional normally open contact alarm initiating devices, such as manual pull stations, four-wire smoke detectors, heat detectors, waterflow and supervisory devices. The supervised circuit can be wired NFPA Style B (Class B) or Style D (Class A). *The MMX-1 module will not support two-wire smoke detectors.* The MMX-1 modules can be tested with a test magnet available from Notifier (M02-04-00). The magnet test checks the module electronics and connections to the control panel. The module mounts to a 4 inch square electrical box with a minimum depth of 2-1/8 inches.
	MMX-2	The MMX-2 is an addressable monitor module used to interface and monitor conventional two-wire smoke detectors. All two-wire detectors being monitored must be UL compatible with the module (refer to the Notifier Device Compatibility Document). The supervised circuit can be wired NFPA Style B or D. The MMX-2 module can be tested with a test magnet available from Notifier (PN M02-04-00). Separate filtered switched 24 VDC power is required. The module mounts to a 4 inch square electrical box with a minimum depth of 2-1/8 inches.
	MMX-101	The MMX-101 is a miniature version of the MMX-1 that connects with wire pigtails (Style B [Class B] only) and mount directly in the electrical box of the monitored device. Dimensions of 2.75 inches (6.985 cm) L x 1.30 inches (3.302 cm) W x 0.50 inches (1.27 cm) D, allow for mounting in existing single-gang electrical boxes, the device being monitored or similar locations.
	CMX	The CMX module is an addressable control module that can be used as an NAC or speaker circuit for powering and supervising compatible, UL-listed notification appliances. The module's supervised circuit can be wired NFPA Style Y or Z. A 47K ohm ELR is provided. By breaking two built-in tabs, the CMX can be employed as a Form-C control relay. The module mounts to a 4 inch square electrical box with a minimum depth of 2-1/8 inches.
	BG-10LX	The BG-10LX is an addressable manual pull station featuring a key-lock reset. The pull station responds to an address set by the installer using the built-in rotary decimal switches on the pull station. The manual pull station includes a Notifier key.
	ISO-X	The ISO-X is a loop isolator module is an automatic switch which opens the circuit voltage to the SLC branch(es) whenever a wire-to-wire short circuit is detected on that SLC. The remainder of the communications loop leading up to the ISO-X module will continue to operate, unaffected by the short. The isolator module is bi-directional, meaning that it can detect a fault condition between the input SLC terminals or output SLC terminals. The ISO-X is required to meet NFPA Style 7 requirements.

Table 3 Addressable Modules

Addressable Device Accessories

Table 1-4 contains descriptions of accessories used with addressable devices:

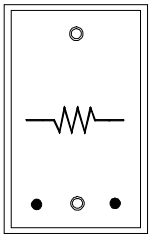
Device	Description
EOL Resistor Assembly Notifier PN R-47K 	The 47K End-of-Line Resistor Assembly is used to supervise the MMX-1 module and CMX module circuits. The resistor is included with each MMX-1 and CMX module.
EOL Power Supervision Relay 	The UL-listed End-of-Line Power Supervision Relay is used to supervise the power to four-wire smoke detectors and notification appliances.
N-ELR Mounting Plate 	The N-ELR is a single End-of-Line resistor plate which is required for use in Canada. An ELR, which is supplied with each module and fire alarm control panel, is mounted to the ELR plate. Resistors mounted to the N-ELR plate can be used for the supervision of an MMX-1 and MMX-101 module and CMX module circuit.

Table 4 Accessories for Addressable Devices

Optional Modules

The AFP-100 main circuit board includes option module connectors which are located on the right side of the board. Available option modules include the following:

ACM-8R Relay Control Module

The ACM-8R Relay Control Module contains eight high current (5 amps) Form-C relays. The module interfaces to host fire alarm control panels which employ an EIA-485 communications bus. ACM-8R modules may be connected to the EIA-485 bus up to 6,000 feet (1,800 m) away from the host control panel. Power-limited, filtered, nonresettable power must be supplied by the host FACP or a UL-listed power supply such as the FCPS-24. Figure 41, “Wiring the ACM-8R,” on page 60, for wiring details.

Fire•Lite RTM-8F Relay Module

The Fire•Lite RTM-8F Relay/Transmitter Module plugs into connector J6 and mounts on the bottom right side of the AFP-100 main circuit board. When the module is installed, jumper JP4 must be cut in order to provide module placement supervision. The Fire•Lite RTM-8F provides eight high current (5 amps) Form-C relays. These relays track software zones 1 through 8. The Relay/Transmitter Module also provides Municipal Box or Remote Station transmitters. A control panel equipped with an Fire•Lite RTM-8F meets NFPA 72 codes for Auxiliary and Remote Station requirements. In remote station applications, the Fire•Lite RTM-8F can be configured to transmit alarm only or alarm and trouble signals. Disable switches and indicators are provided on the Fire•Lite RTM-8F module. Refer to Figure 42, “Fire•Lite RTM-8F Module Installation,” on page 61 and Figure 43, “Fire•Lite RTM-8F Relay Transmitter Module Components,” on page 62, for additional information.

PIM-24 Printer/PC Interface Module

The Printer/PC Interface Module may be used to permanently connect a printer to the control panel for the purpose of printing a history report, walktest file or program listing. Printers require separate primary AC power. The PIM-24 module connects to the serial EIA-232 port on the printer using cable PN 75267. The module mounts to the J11 connector on the AFP-100 main circuit board. The PIM-24 is also used to connect a computer for upload/download of programming data. Refer to Figure 44 on page 64, for information on connections and "System Edit" on page 79, for information on programming the control panel for use with a printer or PC.

Note The PIM-24 option cannot be used simultaneously with the DIM-485/LCD-2x20 option.

Veri•Fire 100 Software for Local Downloading

You can use the Veri•Fire 100 Upload/Download Software to program the control panel directly from most IBM PC/XT/AT or compatible computers, including laptops and portables, equipped with a serial port. Typically, you program files can also be created and stored on the PC, then downloaded to the control panel. The software is on four 3½ inch disks, and requires separate purchase of the PIM-24 Printer/PC Interface Module with cable PN 75267 and DB9F/25 connectors PN 46029.

UDACT (Universal Digital Alarm Communicator/Transmitter)

The UDACT transmits system status to UL-listed Central Station receivers through the public switched telephone network. The UDACT is compact in size and may be mounted inside the host control panel or may mount externally in a separate cabinet. EIA-485 annunciator communications bus and filtered 24 VDC connections are required. The UDACT transmits 198 points or 56 zones when connected to the AFP-100. Refer to Figure 38 on page 57 and Figure 39, “External UDACT Connections,” on page 58, for wiring details and "System Edit" on page 79, for information on programming the AFP-100 for use with the UDACT.

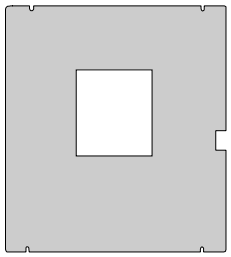
DIM-485 Display Interface Module

The Display Interface Module is required to connect an LCD-2x20 Series Remote Fire Annunciator to the control panel. The DIM-485 plugs into connector J11 located on the top right side of the AFP-100 main circuit board. Refer to “Annunciator Wiring” on page 117, for wiring details and "System Edit" on page 79, for information on programming the control panel for use with the LCD-2x20.

Note The the DIM-485 and LCD-2x20 cannot be used simultaneously with the PIM-24 module.

Dress Panel

A gray dress panel (DP-1-R) is available as an option (required for Canadian installations) and included with the AFP-100. The dress panel restricts access to the system wiring while allowing access to the membrane panel.



Battery Boxes

The BB-17 battery box may be used to house two 12 AH or 18 AH (required with older or newer backbox) batteries. The battery box mounts directly below the AFP-100 cabinet. The box is ~~red~~ gray and is provided with knockouts.

The BB-55 battery box may be used to house two 25 AH batteries, two 60 AH batteries or one 100 AH battery. When the CHG-120 is mounted in the BB-55, two 25 AH or one 60 AH battery may also be housed in the battery box.

CHG-120 Battery Charger

The CHG-120 is capable of charging 25 AH to 120 AH lead-acid batteries with the newer version of the AFP-100 main circuit board which allows disabling of the FACP battery charger. The batteries and charger can be housed in the Notifier BB-55 Battery Box which can be mounted up to 20 feet away from the control panel. Note that when using the BB-55 for housing the charger and batteries, a maximum 25 AH battery can be accommodated. For larger Amp Hour batteries, use multiple BB-55s. Refer to the CHG-120 Manual for additional information.

WARNING: **Do not apply AC power or batteries until the system is completely wired and ready for testing. Set the CHG-120 Voltage Select switch (SW1) to match the AC power source voltage (120VAC or 240 VAC). With the breaker at the main power distribution panel turned off, connect AC power wires to CHG-120 TB1 as shown below.**

Wire the CHG-120 to the AFP-100 as shown. You must disable the main circuit board battery charger when using the CHG-120. Do so by cutting jumper JP1 as shown in Figure 3 on page 14.

Annunciators

ACS Series LED Zone Type Annunciators

The ACS Series Annunciators remotely display system status. The ACM/AEM-16AT annunciators display zone alarm and trouble status. In addition, they provide remote Acknowledge, Silence, Reset and Drill functions. The ACM/AEM-32 annunciators display zone alarm status only and provide no remote system switch functions. For more detailed information, refer to the appropriate ACM Annunciator manual. Refer to “Annunciator Wiring” on page 117, for wiring details and "System Edit" on page 79, for information on programming the AFP-100 for annunciator use.

ACM-16AT and AEM-16AT The Annunciator Control Module-16AT contains 16 red alarm and 16 yellow trouble LEDs, a System Trouble LED, an On Line/Power LED and a local piezo sounder with switches for AFP-100 Acknowledge, Silence, Reset and Drill. The ACM-16AT will accept up to three AEM-16AT Expanders.

The Annunciator Expander Module-16AT connects to the ACM-16AT and adds 16 sets of red alarm LEDs and yellow trouble LEDs. Three AEM-16ATs may be added to an ACM-16AT.

AFM-16AT The Annunciator Fixed Module-16AT contains 16 red alarm and 16 yellow trouble LEDs, a System Trouble LED, an On Line/Power LED and a local sounder with switches for AFP-100 Acknowledge, Silence, Reset and Drill. The AFM-16AT is fixed at address 1 and communication is via the EIA-485 data line.

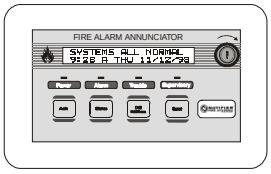
ACM-32A and AEM-32A The Annunciator Control Module-32A contains 32 red alarm LEDs, a System Trouble LED, an On Line/Power LED and a local sounder with a local Silence/Acknowledge switch. The ACM-32A will accept one AEM-32A Expander.

The Annunciator Expander Module-32A connects to the ACM-32A and adds 32 red alarm LEDs. The AEM-32A is identical in frontal appearance to the ACM-32A. Only one expander module is allowed.

AFM-32A The Annunciator Fixed Module-32A has 32 red alarm LEDs. Multiple annunciators may be used by setting all annunciators to Receive Only, except the last AFM-32A in line. Each annunciator's address is internally fixed at '1', and communication is via the EIA-485 data line. The Local Silence/Acknowledge switch functions as local lamp test and silence for annunciator piezo. LEDs include On Line and System Trouble indicators.

AFM-16A The same as the AFM-32A except it has 16 red alarm LEDs.

LCD-2x20 Series Remote Fire Annunciators



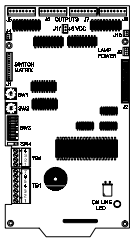
Consists of the LCD-2x20 and LCD-2x20L, are compact, 40-character backlit LCD fire annunciators that are capable of displaying English-language text. The LCD-2x20 mimics the display on the control panel and annunciates device type, point alarm, trouble or supervisory condition, zone assignment plus any custom alpha labels programmed into the control panel. They also provide system status LEDs to display power, alarm, trouble and supervisory conditions. Additionally, the LCD-2x20 is capable of performing critical system functions such as acknowledge, silence, reset and drill, remotely from the host control panel.

Communication between the control panel and the LCD-2x20 Series is accomplished over a serial interface employing the EIA-485 communication standard (DIM-485 option module is required). Up to 32 LCD-2x20 Series Annunciators may be connected to the EIA-485 circuit. The annunciators may be powered from the host FACP or a remote UL-listed filtered power supply such as the FCPS-24. Refer to “Annunciator Wiring” on page 117 for wiring details and "System Edit" on page 79 for information on programming the AFP-100 for annunciator use.\

LDM Series Lamp Driver Modules – Graphic Annunciator

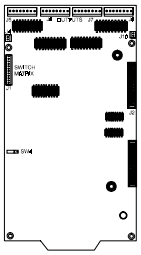
The LDM Series Lamp Driver Modules, which consist of the LDM-32 master and LDM-E32 expander modules, are used to provide an interface to a custom graphic LED annunciator. The master module provides power and control for a maximum of three expander modules. The LDM-32 and LDM-E32 have output connectors which are used to drive lamps or LEDs and input connectors which are used for remote switch functions. Refer to the LDM Series Lamp Drive Modules Manual for a complete description. Refer to “Annunciator Wiring” on page 117 for wiring details and "System Edit" on page 79 for information on programming the AFP-100 for annunciator use.

The LDM-32



The Lamp Drive Module LDM-32 has 32 alarm lamp/LED driver outputs which sink current to system common (–) on activation. A single positive (+) voltage is required to supply total operating power for all lamps or LEDs when all drivers are activated. The LDM-32 provides a separate driver for system trouble and inputs for a local lamp test switch. A maximum of 16 external control switches may be wired to the LDM-32F. DIP switch SW3 is used to enable or disable the onboard piezo sounder, enable remote switch functions, select a flashing LED function for new alarms and troubles and other functions. Switch SW4 is used to configure the module to annunciate 32 alarms or 16 alarms and 16 troubles. A green On Line LED flashes to indicate ongoing communications with the host FACP. One LDM-32 supports up to three LDM-E32 modules. The LDM-32 is supplied with four standoffs and screws for mounting to a CHS-4L chassis or custom backbox.

The LDM-E32

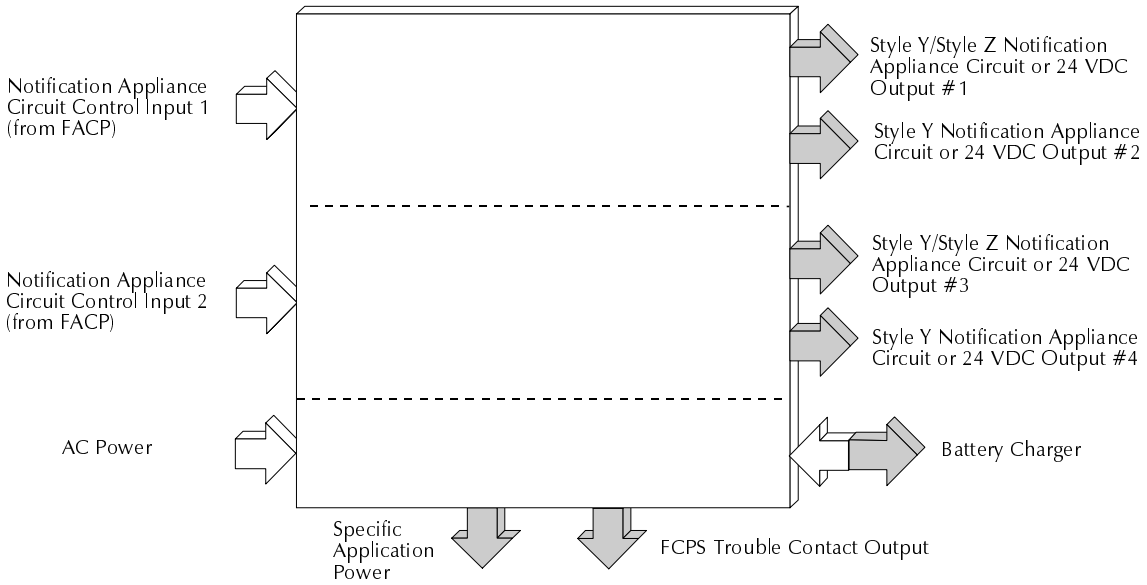


Each LDM-E32 expander module provides 32 additional lamp/LED driver outputs from J5, J6, J7 and J8. The expander module has a slide switch, SW4, for selecting alarm only or alarm and trouble annunciation and an input for a local lamp test switch. In alarm only mode, use only one LDM-32 and one LDM-E32 for a maximum of 56 alarm indicators and 8 system status indicators. In alarm/trouble mode, use one LDM-32 and three LDM-E32Fs for a maximum of 56 alarm indicators, 56 trouble indicators, 16 status indicators and 64 optional control switch inputs. Multiple sets of LDM-32Fs with LDM-E32 expanders increase the system annunciation capabilities beyond 56 zones or points. This is possible by various settings of address switches SW1 and SW2 on the LDM-32 (refer to Appendix D). Each LDM-E32 is supplied with a 26-conductor expander ribbon cable, four standoffs and screws.

FCPS-24 Remote Field Charger Power Supply

The FCPS-24 is a compact, remote power supply with battery charger for expanding system power. This remote power supply consists of a filtered 24 VDC output that may be configured to drive up to four Notification Appliance Circuits [four Style Y (Class B) or two Style Z (Class A) and two Style Y (Class B)]. Alternately, the four Notification Appliance Circuits may be used as auxiliary filtered power configured for resettable or nonresettable operation.

The FCPS-24 may be used in a number of different applications. For instance, you can use the FCPS-24 as a remotely-mounted power supply and battery charger to power four, coded or noncoded, Notification Appliance Circuits. Alternately, any or all of these circuits may be used as 24 VDC output circuits capable of powering four-wire smoke detectors or any device that requires filtered power. These circuits may be configured as resettable or nonresettable outputs to expand FACP auxiliary system power.



One of the most common applications for the FCPS-24 remote power supply includes the NAC expander mode. In this application, you can connect one or two NACs from the main control panel NAC output(s) to the remote power supply control Input circuits. When these Control Input circuits activate (due to reverse polarity of the NAC output), the power supply will activate its corresponding outputs. NAC Control Input #1 controls power supply output circuits 1 and 2. NAC Control Input 2 controls output circuits 3 and 4.

During the inactive state, the remote power supply supervises its NAC field wiring for short and open circuits. If a fault is detected, the supply will enter a trouble condition and illuminate the corresponding NAC trouble LED (Output Circuits 1-4). However, once the NACs are activated, the supervision is disabled and the circuits are no longer supervised. Supervision of other power supply faults such as low battery, earth fault, AC loss and battery charger failure will continue and may be monitored via the independent trouble relay contact.

If a specific application requires that all four outputs activate at the same time, only one NAC control input from the FACP is necessary. For this application, the NAC from the FACP is wired into NAC Control Input #1 of the remote supply and then a pair of wires are connected from NAC Control Output #1 to NAC Control Input #2. Refer to the FCPS-24 Installation, Operation and Application Manual for a complete description and examples of applications.

A CMX module, which can be located up to 10,000 feet (3,000 m) from the FACP, may be used to activate the FCPS power supply. The module can be powered from the FCPS auxiliary 24 VDC power output (TB3 Terminals 8 and 9) and supervised by an EOL relay.

SECTION 2 INSTALLATION

Overview

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the control panel. Locate the top of the cabinet approximately 5 feet (1.5 m) above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

Backbox Mounting

1 Mark and predrill holes for the top two keyhole mounting bolts using the dimensions shown in Figure 6 on page 26.

2 Install two upper fasteners in the wall with the screw heads protruding.

3 Using the upper “keyholes,” mount the backbox over the two screws.

4 Mark and drill the lower two holes.

5 Secure backbox by installing the remaining fasteners and tightening all screws.

Figure 6 shows the cabinet dimensions for the control panel.

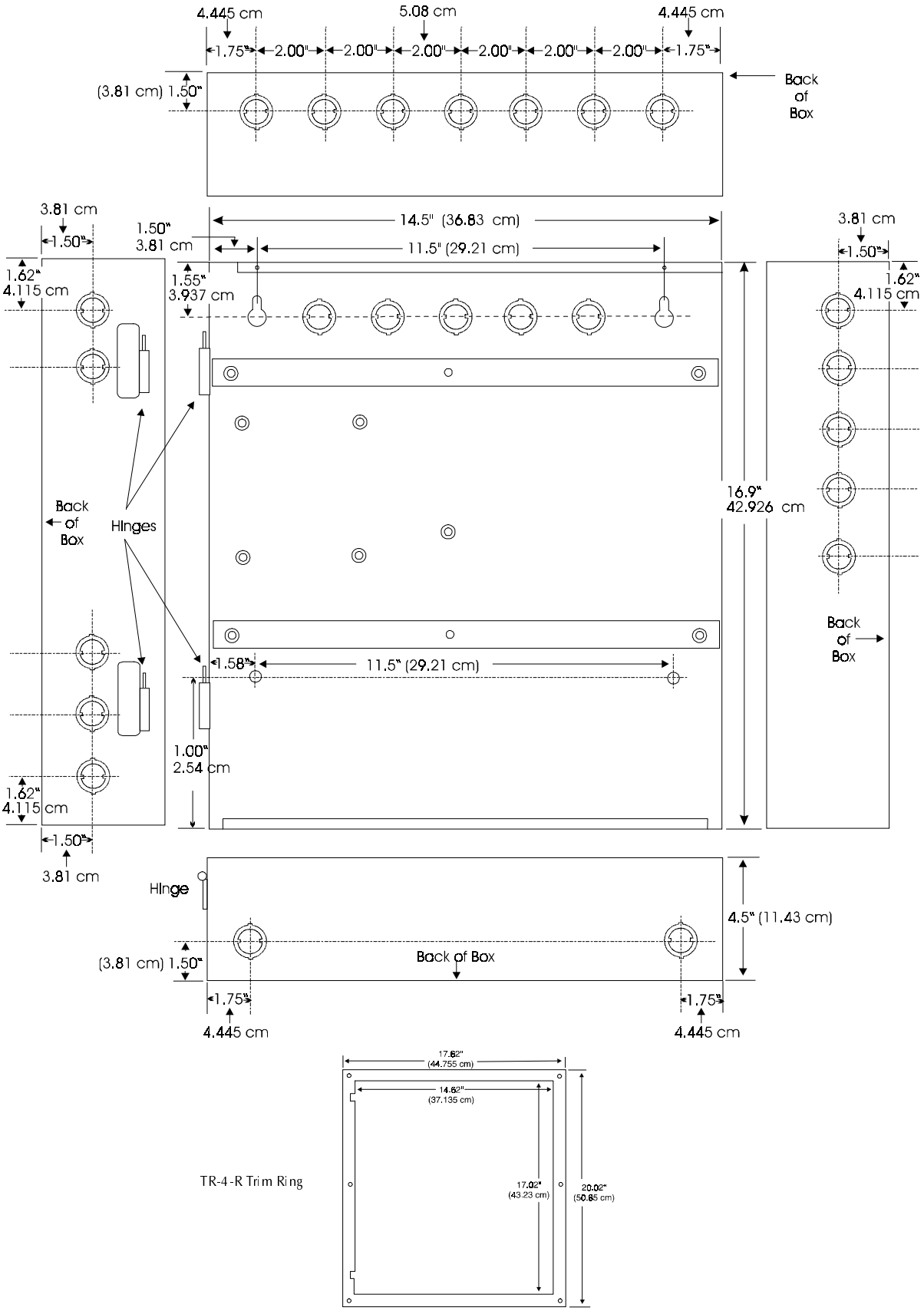


Figure 6 AFP-100 Cabinet Mounting

Component Installation

1 Ascertain that backbox area is dry and free of construction dust.

2 Mount the transformer(s) to the backbox studs as shown in Figure 7.

3 Using the nuts supplied, secure transformer(s) to studs.

4 Position the Main Circuit Board over the backbox rails, aligning mounting holes, as shown in Figure 7.

5 Secure in place with four (4) screws. Tighten securely.

6 Plug transformer leads into circuit board connectors:

- Top transformer (supplied) to J17
- Bottom transformer (optional) to J19

Figure 7 shows transformer and main circuit board mounting into backbox.

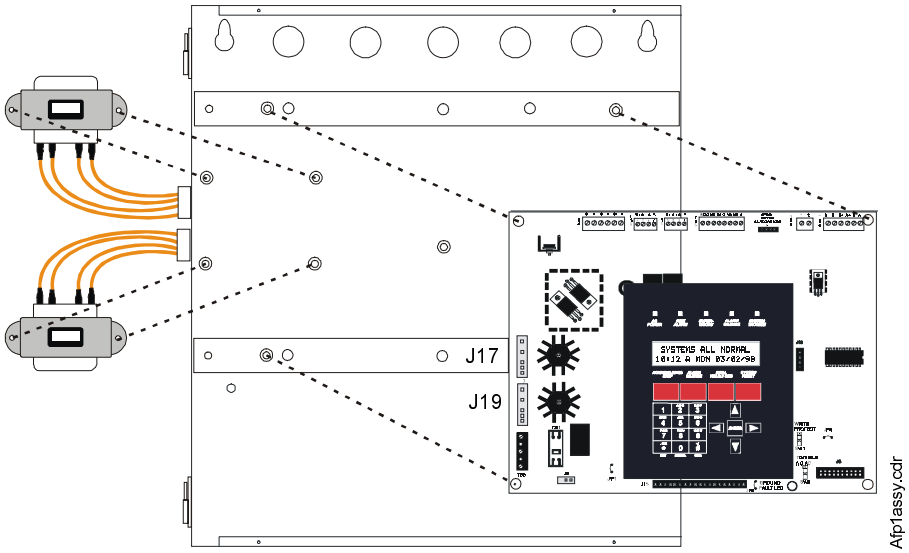


Figure 7 Component Mounting

AC and DC Power

WARNING **You can connect different sources of power to the control panel. Before servicing, disconnect all sources of power. Damage to the control panel and associated equipment can result when removing and/or inserting cards, modules or interconnecting cables while the control panel is energized.**

AC Power and Earth Ground Connections

Primary power required for this control panel is 120 VAC, 50/60 Hz, 2.3 amps. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Code (NEC) and/or local codes. Use #14 AWG (2.00 mm^2) or larger wire with 600 VAC insulation rating.

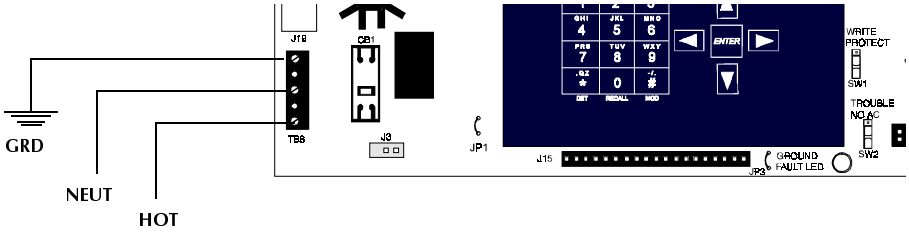


Figure 8 AC Power Connections

Note Connect a wire from one of the mounting screws for the system transformer to a known solid earth ground. This connection is vital for maintaining the control panel's immunity to unwanted transients generated by lightning and electrostatic discharge.

Battery Power

Observe polarity when connecting the battery. Connect the battery cable to J3 on the main circuit board using the plug-in connector provided. See "Power Supply Calculations" on page 103, for calculation of the correct battery rating.

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

DC Power Output Connections

Note All DC power outputs are power-limited.

Figure 9 shows the connections for DC power outputs available from TB4 on the control panel.

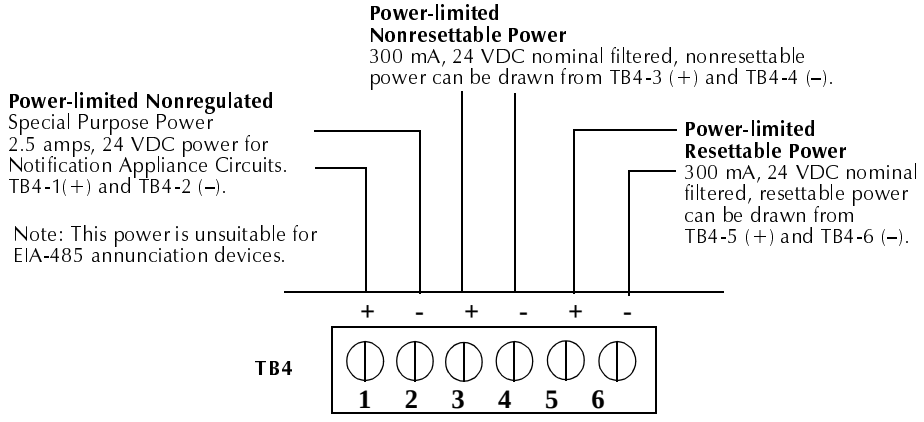


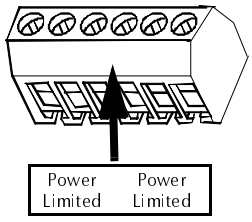
Figure 9 DC Power Outputs (TB4)

Standard Relays (TB3)

The AFP-100 provides a set of Form-C alarm and Form-C trouble contacts rated for 2.0 amps @ 30 VDC (resistive). The control panel also provides a Form-A supervisory contact rated for 2.0 amps @ 30 VDC (resistive). Refer to Figure 10 forUL power-limited wiring requirements.

Note Relay connections may be power-limited or nonpower-limited, provided that 0.25 inch spacing is maintained between conductors of power-limited and nonpower-limited circuits.

If using both power-limited and nonpower-limited circuits, leave one unused terminal between power-limited and nonpower-limited circuits.



Note: If relays are used as power-limited circuits, paste supplied label to terminal block to indicate use of power-limited wiring.

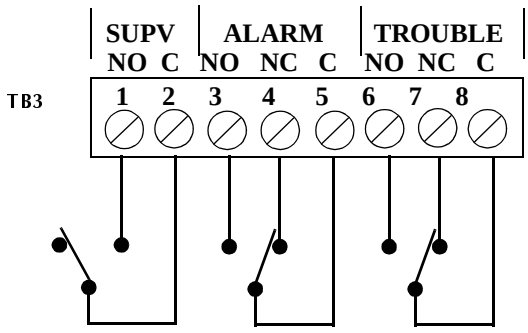


Figure 10 Relay Connections (TB3)

Notification Appliance Circuits

The AFP-100 provides two Notification Appliance (bell) Circuits configurable for Style Y or Style Z. Each circuit is capable of 2.5 amps of current. Total current drawn from these as well as other DC power outputs cannot exceed 6.0 amps. Use UL-listed 24 VDC notification appliances only. Circuits are supervised and power-limited. Refer to the Notifier Device Compatibility Document for a listing of compatible notification appliances. The two NACs (Notification Appliance Circuits) located on the main circuit board may be expanded using the FCPS-24 Field Charger/Power Supply. Surge protection for notification appliances may be provided by using one of the UL-listed compatible surge suppressors listed in the Notifier Device Compatibility Document.

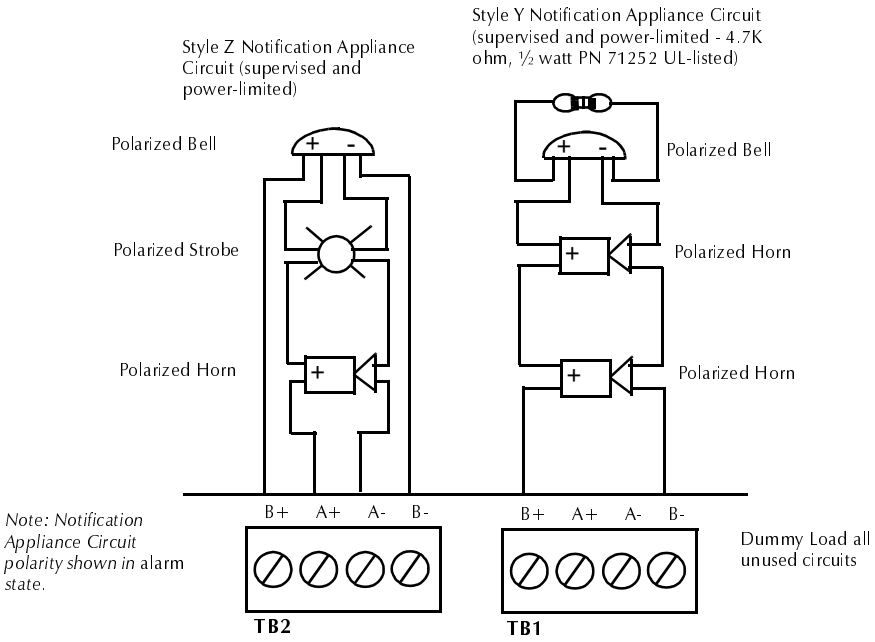


Figure 11 NAC Connections

UL Power-limited Wiring Requirements

General UL Power-Limited Wiring Requirements

Power-limited and nonpower-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25 inches (6.35 mm) away from any nonpower-limited circuit wiring. Furthermore, all power-limited circuit wiring and nonpower-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. A typical wiring diagram for the AFP-100 is shown in Figure 12.

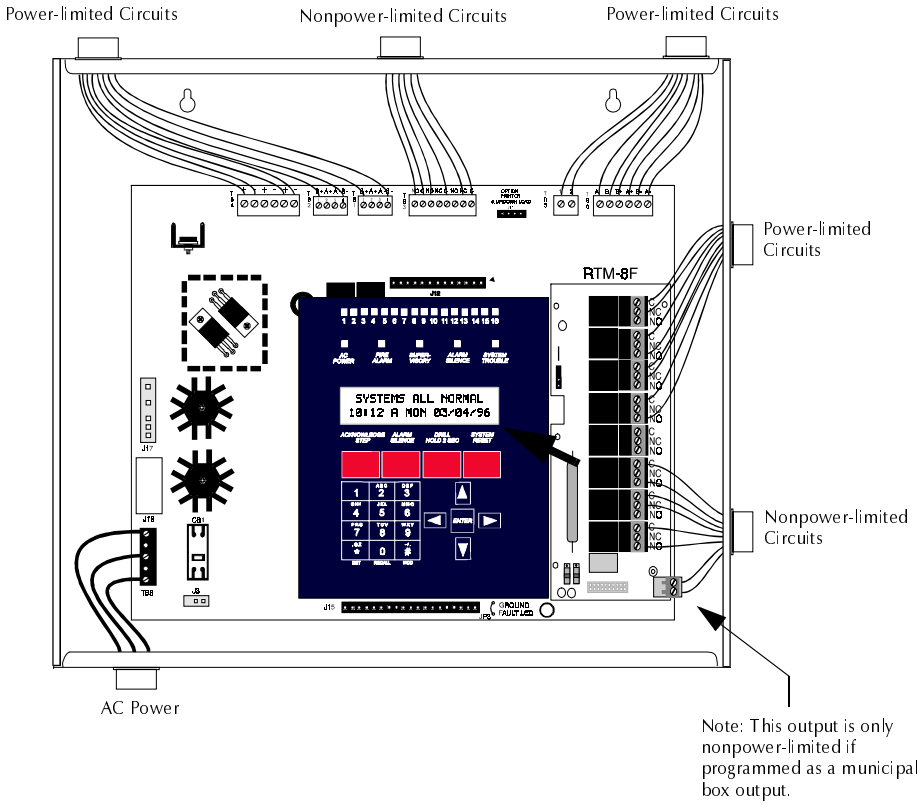


Figure 12 Typical UL Power-limited Wiring Requirements

Fire•Lite RTM-8F UL Power-limited Wiring Requirements

Nonpower-limited and power-limited wiring must have a minimum distance of 0.25 inches wire-to-wire. If this module is used to drive nonpower-limited and power-limited circuits, follow the instructions below:

1. Skip a set of dry contacts to maintain the 0.25 inches required space between power-limited and nonpower-limited circuits.
2. If this module is needed to drive power-limited and nonpower-limited relays that are next to each other, make no connection to the Normally Open contact which separates the two groups of relays. Refer to the wiring diagram in Figure 13.

Note Refer to "Fire•Lite RTM-8F Option Module Installation" on page 61, for additional information on the Fire•Lite RTM-8F.

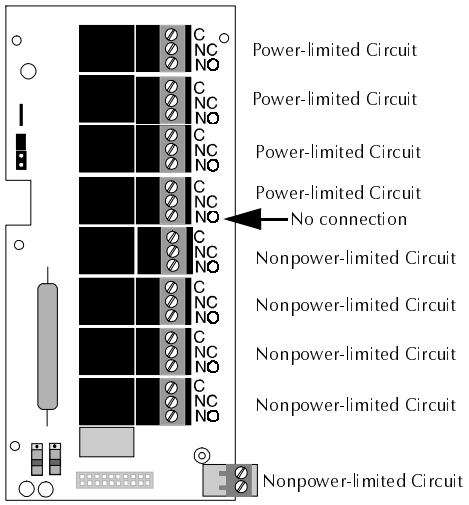


Figure 13 Fire•Lite RTM-8F UL Wiring

Wiring the Signaling Line Circuit (TB6)

Overview

The AFP-100 communicates with addressable initiating, monitor and control devices through a Signaling Line Circuit (SLC). You can wire the SLC to meet the following NFPA requirements:

- Style 4 (see Figure 18 on page 37)
- Style 6 (Figure 19 on page 39)
- Style 7 (Figure 20 on page 40)

Notes Note the following when wiring the SLC:

Surge protection for the SLC may be provided by using one of the UL-listed compatible surge suppressors listed in the Notifier Device Compatibility Document. The SLC is allowed to leave the building only with the use of a UL-listed surge suppressor found in the Notifier Device Compatibility Document.

Setting detector and module addresses Make sure to change the decade wheels on all detectors and modules from the factory setting of “00.” For instructions for setting decade addresses, refer to Figure 25 on page 42.

SLC Devices

You can connect the following devices on the SLC:

ISO-X Modules

ISO-X Modules permit a zone of detectors and modules to be electrically 'isolated' from the remainder of the SLC, allowing critical SLC components to function in the event of a short circuit on the SLC wiring (see Figure 18, Figure 19 and Figure 20). These are required to meet the requirements of NFPA Style 7.

MMX Series Modules

Addressable Monitor Modules allow the control panel to monitor entire circuits of conventional normally-open contacts, alarm initiating devices, manual pull stations, four-wire smoke detectors, heat detectors, waterflow, supervisory devices (see Figure 28 and Figure 29) and conventional detectors (see Figure 30 and Figure 31). The BG-10LX is an addressable manual pull station which contains a miniature monitor module providing point annunciation (see Figure 18, Figure 19 and Figure 20).

CMX Series Modules

Through addressable Control Modules, the control panel can selectively activate Notification Appliance Circuits or Form-C output relays (see Figure 32 on page 49 and Figure 33 on page 51).

Intelligent Detectors

Through the SLC, the control panel communicates with addressable ionization, photoelectric and photoelectric/thermal detectors (see Figure 36 on page 54).

Device Capacity

The capacity of each AFP-100 includes up to 99 addressable detectors and an additional combination of up to 99 addressable pull stations, CMX modules, and MMX modules. In addition, the control panel supports two NACs.

Note Refer to Appendix A and the installation drawings supplied with each SLC device for rating and specifications.

Table 5 SLC Performance

Single Open on SLC	**Single Ground on SLC**	**Shorted SLC**	**SLC Shorted and Opened**	**SLC Shorted and Grounded**	**SLC Opened and Grounded**	**Communications Loss**
Style 4 (two-wire) SLC Operation (meets NFPA 72 Style 4 requirements)						
Trouble	Alarm Capability and Trouble	Trouble	Trouble	Trouble	Trouble	Trouble
Style 6 (four-wire) SLC Operation (meets NFPA 72 Style 6 requirements)						
Alarm Capability and Trouble	Alarm Capability and Trouble	Trouble	Trouble	Trouble	Alarm Capability and Trouble	Trouble
Style 7 (four-wire) SLC Operation (meets NFPA Style 7 requirements)						
Alarm Capability and Trouble	Alarm Capability and Trouble	Alarm Capability and Trouble	Trouble	Alarm Capability and Trouble	Alarm Capability and Trouble	Trouble
Trouble indicates that a trouble signal will be generated at the control panel during the abnormal condition Alarm Capability indicates an alarm signal can be transmitted to the control panel during the abnormal condition. SLC operation meeting Style 7 requirements isolates entire physical zone on the SLC from faults that occur within other areas of the SLC.						

Style 4 Wiring and T-tapping

T-tapping of the SLC wiring is allowed for two-wire (Style 4) configurations. The total resistance of any branch cannot exceed 40 ohms. Measure the resistance as illustrated below. The total wire length of all combined branches cannot exceed 10,000 feet (3,000 m).

How to Calculate Branch Resistance

With power removed, short the termination point of one branch at a time and measure the DC resistance f*rom the beginning of the SLC to the end of that particular branch.* The total resistance from control panel to each branch end cannot exceed 40 ohms. Repeat this procedure for all remaining branches.

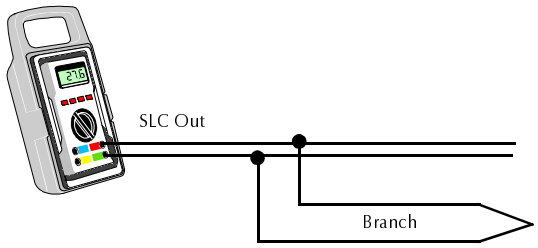


Figure 14 Measuring Resistance on a Two-Wire SLC

For Each SLC, Add the lengths of all the branches on one SLC. This sum cannot exceed 10,000 feet (3,000 m) using 12 AWG (3.25 mm^2) twisted, shielded wire.

Figure 15 shows an example for calculating five branches (Branch A + Branch B + Branch C + Branch D + Branch E = 10,000 feet (3,000 m) or less)

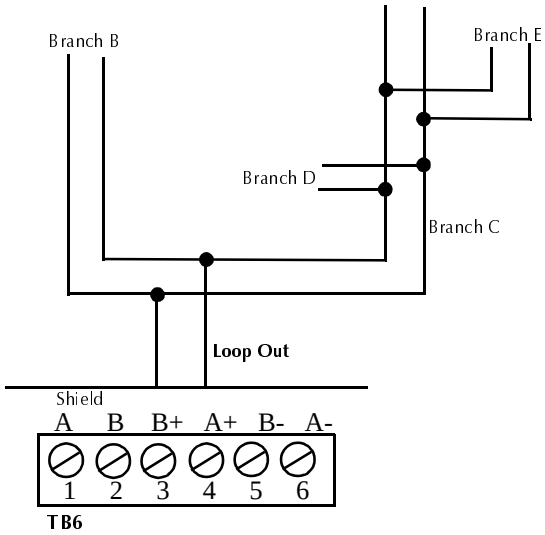


Figure 15 Style 4 T-tapping and Branch Resistance

Style 6 Wiring

T-tapping of the SLC wiring is not allowed for Style 6 configuration. The total resistance of the complete wire run cannot exceed 40 ohms and total length cannot exceed 10,000 feet (3,000 m).

- Total length of the SLC cannot exceed 10,000 feet (3,000 m) using 12 AWG (3.25 mm^2) wire.
- DC Resistance of the SLC pair cannot exceed 40 ohms.

Measuring Resistance of the SLC

With power removed, do the following:

1. Disconnect SLC Out and SLC Return at the control panel.
2. Short the two leads of SLC Retupn and c`nnect tbe meter to SLC Out.
3. Measure the resistance as shown in Figure 16.

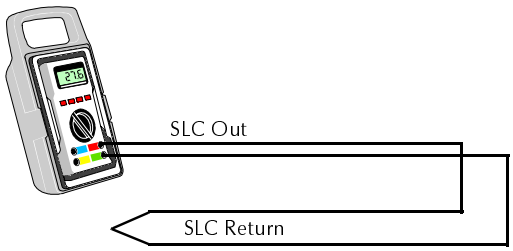


Figure 16 Measuring Resistance for a Four-Wire SLC

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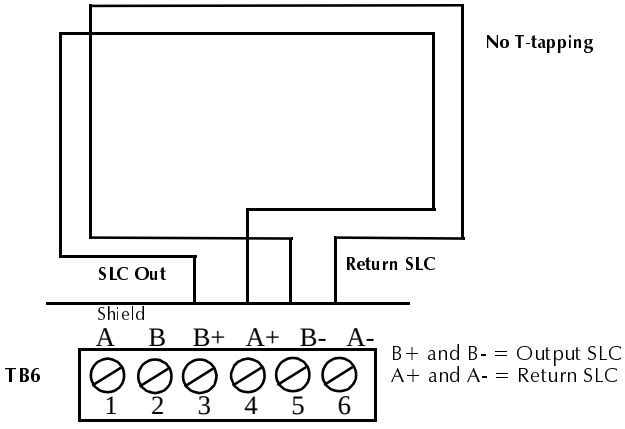


Figure 17 Style 6 Wiring Requirements

Wiring a Style 4 Two-Wire SLC (supervised and Power-limited)

A two-wire SLC meets NFPA 72 Style 4 requirements. A maximum of 25 addressable devices can be connected to an SLC branch protected by an Isolator Module or Isolator Base if relay or sounder bases are not used. When relay or sounder bases are used, the maximum number of addressable devices that can be connected to an Isolated SLC branch is reduced to seven. When more than 100 Isolator Modules/Isolator Bases are connnected to an SLC Loop, decrease the 198 address capacity by two addresses for every isolator in excess of 100.

Note ISO-X devices are not required to meet NFPA Style 4. You can also T-tap branches.

Caution Do not loop wiring under any terminals. To maintain supervision, break the wire run.

Figure 18 shows typical wiring for an Style 4 two-wire SLC:

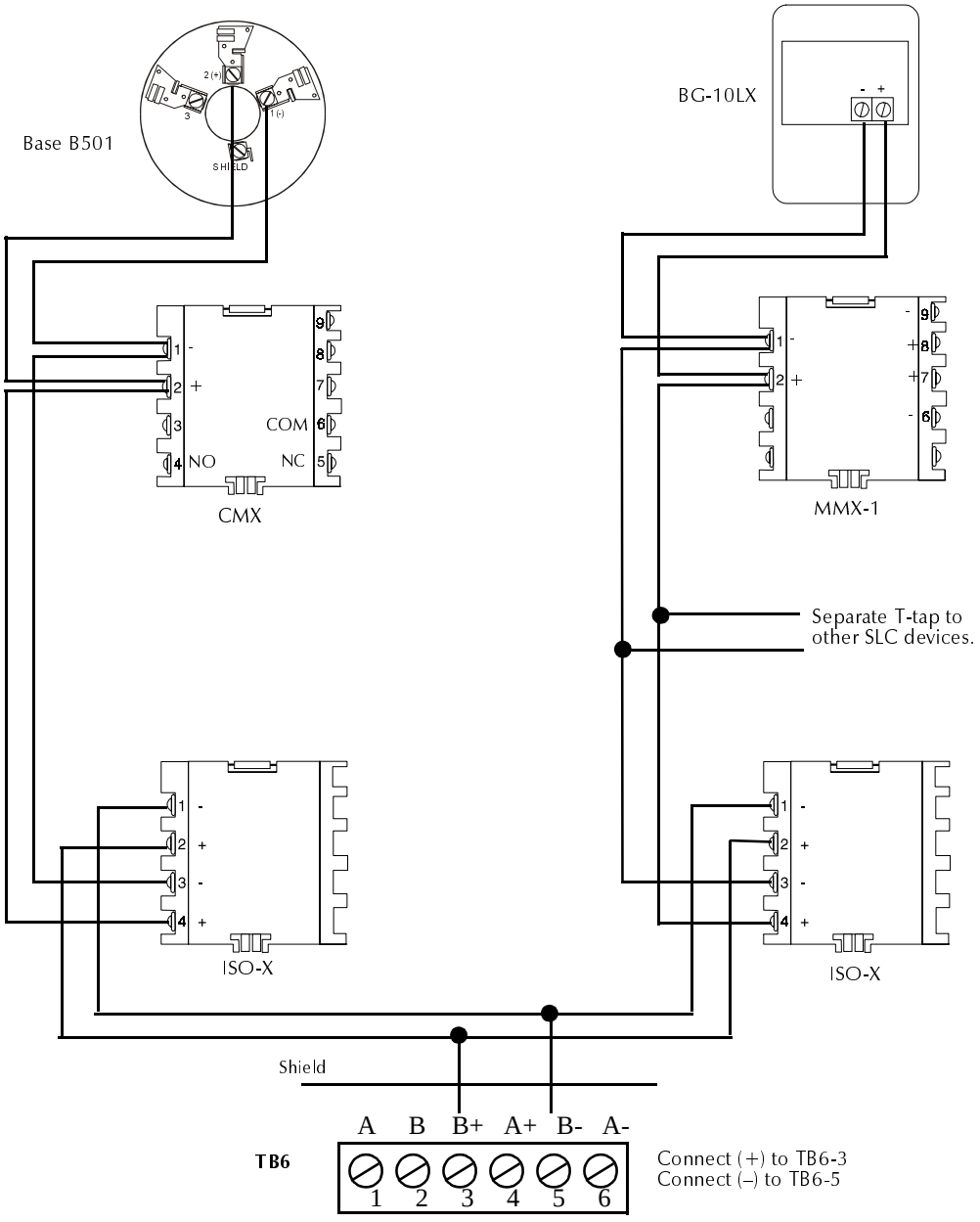


Figure 18 Two-Wire SLC

Style 6 Four-Wire SLC (Supervised and Power-limited)

The four-wire SLC meets NFPA 72 Style 6 requirements. A maximum of 25 addressable devices can be connected to an SLC branch protected by an Isolator Module or Isolator Base if relay or sounder bases are not used. When relay or sounder bases are used, the maximum number of addressable devices that can be connected to an Isolated SLC branch is reduced to seven. When more than 100 Isolator Modules/ Isolator Bases are connnected to an SLC Loop, decrease the 198 address capacity by two addresses for every isolator in excess of 100.

Note: You cannot T-tap a Style 6 SLC.

Caution Do not loop wiring under any terminals. To maintain supervision, break the wire run.

Figure 19 shows typical wiring for an Style 6 four-wire SLC:

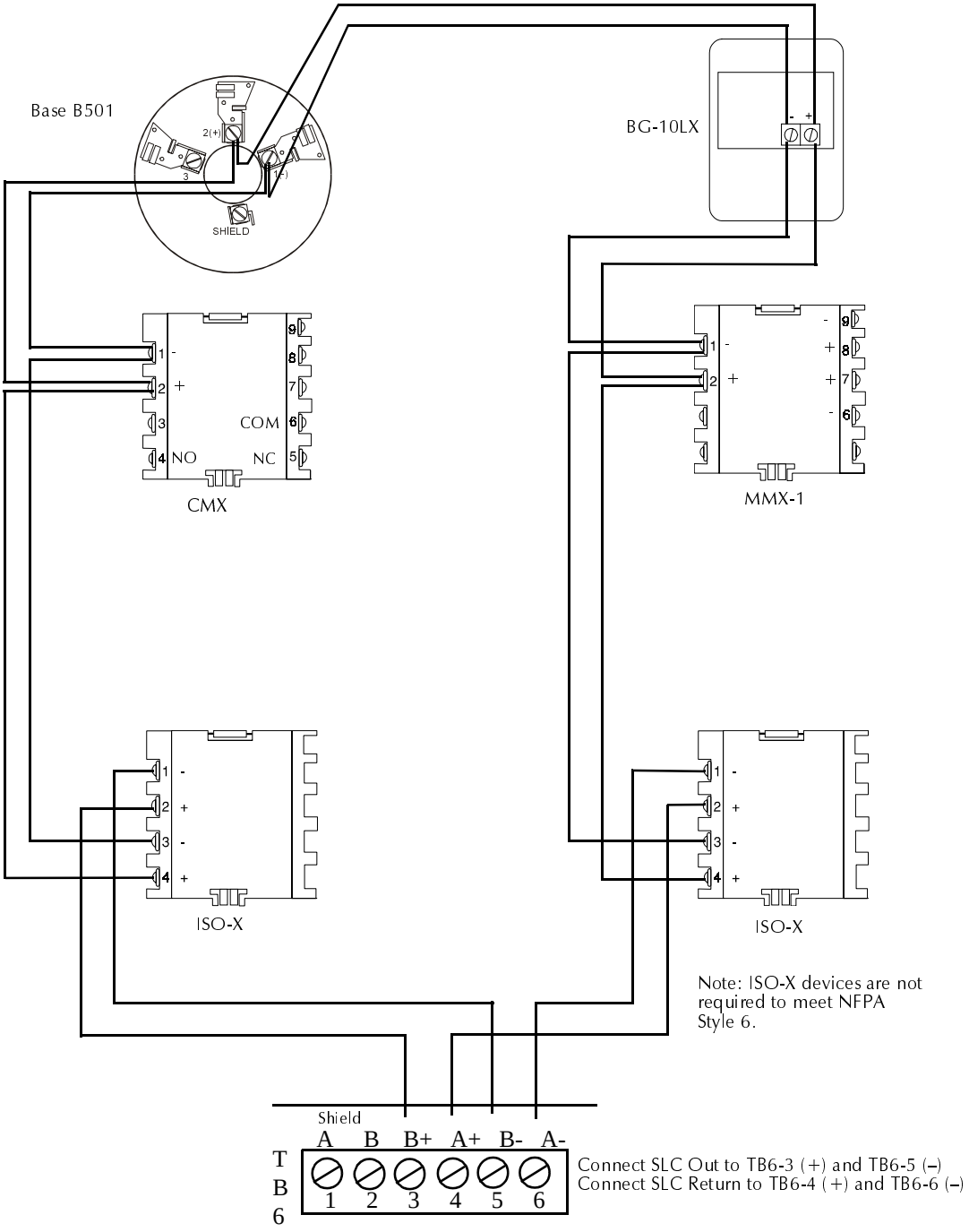


Figure 19 Four-Wire SLC

Style 7 Four-Wire SLC (Supervised and Power-limited)

The four-wire SLC meets NFPA 72 Style 7 requirements. By flanking each SLC device with a pair of ISO-X modules, each device is protected from short circuit faults that may occur on other SLC devices. For example, a fault on zone 02 will not affect zones 01 and 03. The ISO-X modules on either side of Zone 02 will open the SLC. Zone 01 will still operate from power on SLC Out and Zone 03 will operate from SLC Return. Because the AFP-100 will no longer be able to communicate with Zone 02, a trouble signal(s) will be generated for that device. The ratings and characteristics are the same as for a four-wire circuit meeting NFPA Style 6 requirements. When more than 100 Isolator Modules/Isolator Bases are connnected to an SLC Loop, decrease the 198 address capacity by two addresses for every isolator in excess of 100.

Note No T-tapping or branching is allowed on this circuit.

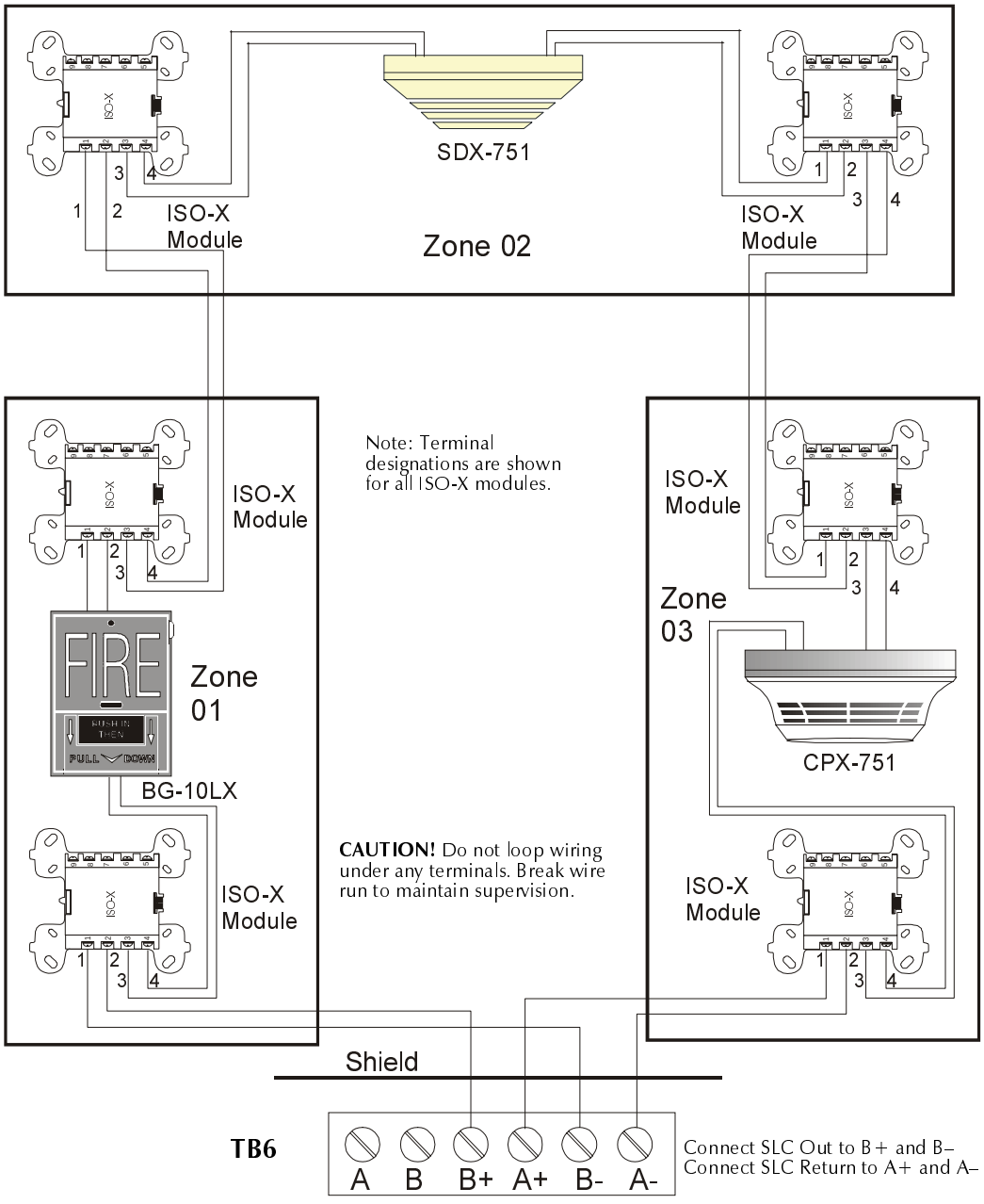
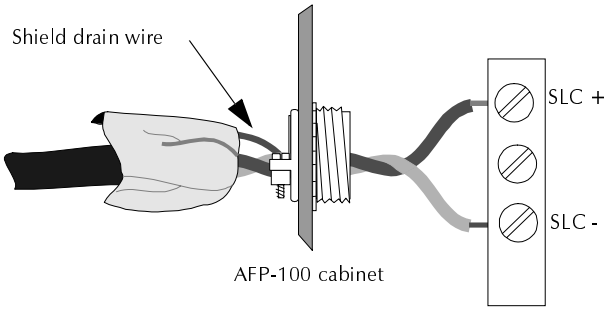


Figure 20 Four-Wire SLC

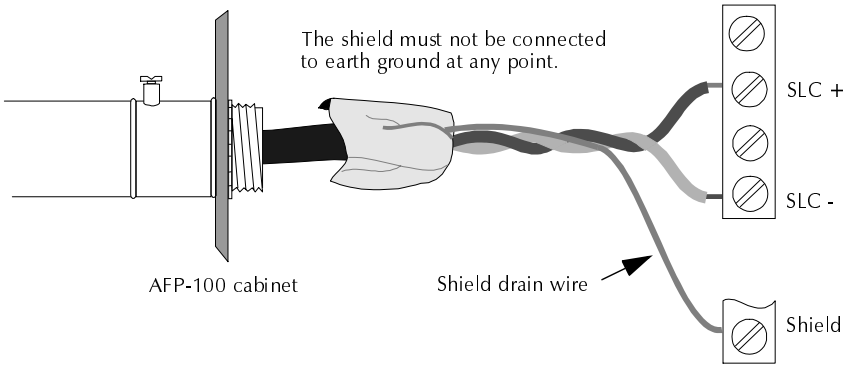
Shielded Wire Termination Requirements

Shielded wire is recommended for use on the SLC, EIA-485, and EIA-232 circuits (refer to "Wire Requirements" on page 129, for additional wiring information). Proper termination of the shield is shown below for various applications such as no conduit, partial conduit and full conduit. Nonshielded wire may be used on the SLC, however, the maximum length should not exceed 1,000 feet (300 m) and full conduit is recommended for optimum EMI and RFI protection.



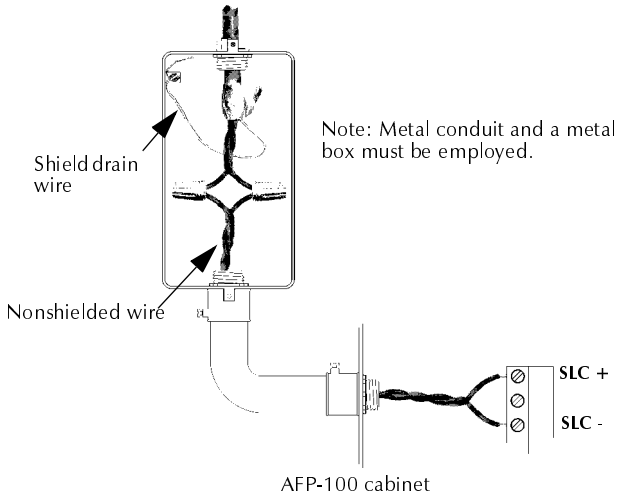
All Styles of Wiring
Do not allow the shield drain wire to enter the system cabinet. Connect the drain wire to the outside of the cabinet via a BX-type connector.

Figure 21 Shield Termination in No Conduit



All Styles of Wiring
The shield drain wire must be connected to the shield terminal TB6, terminal 1 or 2. Do not allow the shield drain wire or the shield foil to touch the system cabinet. *For Style 6 or 7, connect only one end of the shield to TB6.*

Figure 22 Shield Termination in Full Conduit



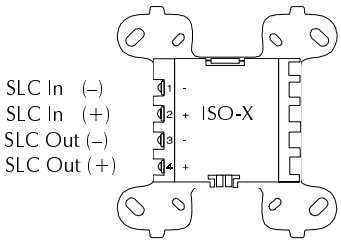
All Styles of Wiring
Do not allow the shield drain wire to enter the system cabinet or the conduit. Connect the drain wire to the termination point of the conduit run (such as a single-gang box as illustrated in Figure 23. *The conduit cannot be longer than 20 feet (6 m).*

Figure 23 Shield Termination in Partial Conduit

The ISO-X Module

Purpose

The ISO-X module is used to protect critical elements of the SLC from faults on other branches or sections of the SLC. The ISO-X module continuously monitors the SLC connected to terminal 1(–), 3 (–), 2 (+) and 4 (+). Upon power-up, an integral relay is latched on. The ISO-X periodically pulses the coil of this relay. A short circuit on either side of the SLC resets the relay. The ISO-X senses the short and disconnects the faulty branch by opening the positive side of the SLC (terminal 2 or 4). This effectively isolates the shorted branch from the remainder of the SLC. Once the fault is removed, the ISO-X automatically reapplies power to the SLC branch. Figure 18, "Two-Wire SLC," on page 37, illustrates the use of an ISO-X on a two-wire SLC meeting NFPA Style 4 requirements. Figure 20, "Four-Wire SLC," on page 40, illustrates a four-wire SLC meeting NFPA Style 7 requirements.



Note During a fault condition, the AFP-100 will register a trouble for each device isolated on the SLC branch.

Wiring an ISO-X Module

In Figure 24, a short on any T-tapped branch off an ISO-X module on the SLC meeting NFPA Style 4 wiring requirements, is isolated from all devices installed both upstream of the ISO-X module (SLC In) and on the continuation of the SLC (shown as a dotted line). For example, if a short occurs on Branch A of the first ISO-X shown, the ISO-X module would disconnect Branch A and its devices from the rest of the SLC, allowing all devices connected before and after that ISO-X module to operate normally.

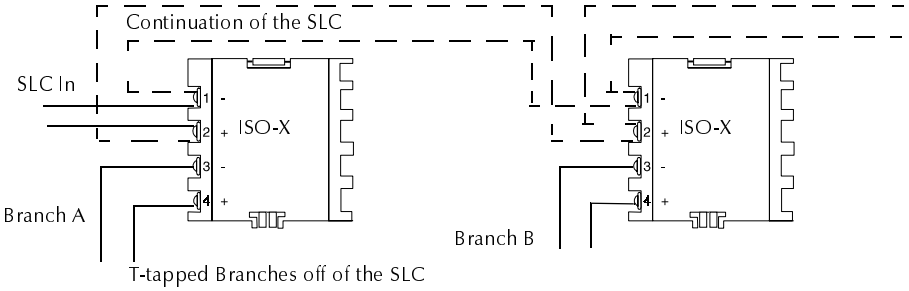


Figure 24 Isolating Two-Wire SLCs

How to Set a Module Address

MMX and CMX modules provide two rotary decimal switches that you can use to set the SLC address of the module. Addresses from 01 to 99 may be set by positioning the left rotary switch to the value of the '10s' digit and the right switch to the value of the '1s' digit. For example, in Figure 25, address 31 is set by turning the left switch to 3 and turning the right switch to 1.

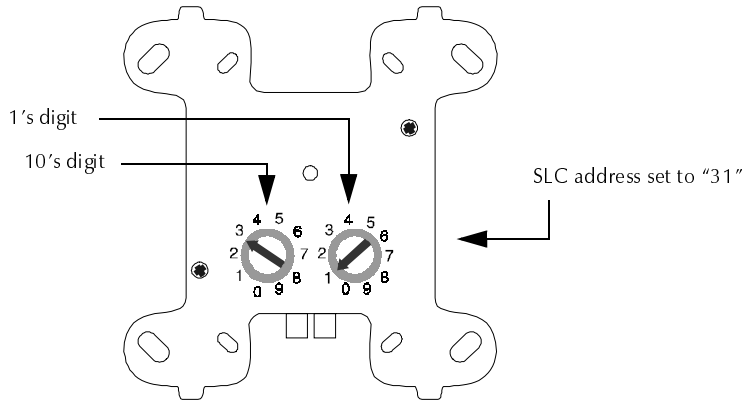


Figure 25 Module Addressing Switches

The MMX-1 Monitor Module

The MMX-1 Monitor Module is an addressable module that monitors normally-open contacts and shorting-type alarm initiating devices. The supervised module circuits can be wired as NFPA Style B or Style D Initiating Device Circuits. There is no limit to the number of contact-type devices installed on a monitor module circuit. Refer to Figure 28, "Style B Circuit using an MMX-1 Module," on page 45 and Figure 29, "Style D IDC using an MMX-1 Module," on page 46, for wiring diagrams.

SLC Connections Connect the AFP-100 SLC to MMX-1 terminals 1 (–) and 2 (+). The MMX-1 occupies one module address on the SLC. Use the rotary switches on the MMX-1 to set the module to the required SLC address.

NFPA Style B Initiating Device Circuit Connect the normally-open contacts of the alarm initiating devices to a single two-wire circuit as illustrated in Figure 28, "Style B Circuit using an MMX-1 Module," on page 45. Connect the circuit to MMX-1 terminals 6(–) and 7(+).

Note A Style B circuit cannot be T-tapped or branched in any manner and must be terminated across the last device by a UL-listed ELR.

NFPA Style D Initiating Device Circuit Connect the alarm initiating devices to a single four-wire circuit as illustrated in Figure 29, "Style D IDC using an MMX-1 Module," on page 46. Connect the four-wire circuit to MMX-1 terminals 6(–) and 9(–), then 7(+) and 8(+).

Note A Style D circuit cannot be T-tapped or branched in any manner.

Test Switch The MMX-1 includes a magnetic test switch located near the center front of the module (shown in Figure 27, "MMX-2 Module," on page 44). Activation of this switch will cause an open circuit indication in the Style B and Style D SLC.

Wiring MMX-101 Monitor Modules

The MMX-101 module is an addressable module that is functionally and electrically identical to an MMX-1 Monitor Module (Style B circuits only), but offered in a smaller package for mounting directly in the electrical box of the contact-type device being monitored.

Set the SLC address is set with these switches. The SLC address is the factor default "00" which must be changed.

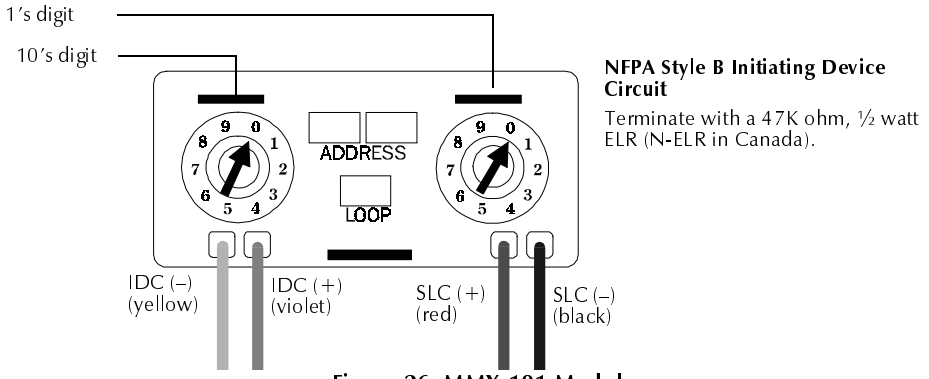


Figure 26 MMX-101 Module

MMX-1 and MMX-101 modules incorporate the following features:

1. The Initiating Device Circuit is supervised and current-limited to 230 uA @ 24 VDC (nominal).
2. The Initiating Device Circuit wiring may be up to 2,500 feet (760 m) or a maximum of 40 ohms for the MMX-1 and 20 ohms for the MMX-101.
3. The Initiating Device Circuit provides the following services (DO NOT MIX):
   Fire Alarm Service
   Automatic/Manual Waterflow Alarm Service with normally-open contact devices
   Sprinkler Supervision with normally-open contact devices
4. The maximum SLC resistance, due to wiring, is 40 ohms.

Wiring MMX-2 Monitor Modules

The MMX-2 Monitor Module is an addressable module that interfaces and monitors UL compatible conventional two-wire smoke detectors. Refer to the Notifier Device Compatibility Document. The supervised circuit may be wired as NFPA Style B or Style D.

SLC Connections Connect the AFP-100 SLC to MMX-2 terminals 1 (–) and 2 (+). The MMX-2 occupies one module address on the SLC. To set a module to the required SLC address, use rotary switches on the MMX-2 as shown in Figure 25, “Module Addressing Switches,” on page 42.

Power Connections Test Switch The MMX-2 includes a magnetic test switch sensor located near the center front of the module. Activation of this switch by test magnet PN M02-04-00 will cause an open circuit indication in the Style B/D SLC.

NFPA Style B Initiating Device Circuit Connect two-wire smoke detectors to MMX-2 terminals 6 (B-) and 7 (B+) as illustrated in Figure 30, “Style B IDC using an MMX-2 Module,” on page 47. IDC installation wiring must not exceed 25 ohms, 12-18 AWG (0.75 - 3.25 mm^2) wire. Use a 3.9K ohm ELR across the last initiating device.

NFPA Style D Initiating Device Circuit Connect two-wire smoke detectors to MMX-2 terminals 6 (B-) and 9 (D-), 7 (B+) and 8 (D+) as illustrated in Figure 31, “Style D Circuit using MMX-2,” on page 48. IDC installation wiring must not exceed 25 ohms, 12-18 AWG (0.75 - 3.25 mm^2) wire.

MMX-2 Monitor Module Notes

1. IDC and power connections are supervised by the MMX-2 and reported to the AFP-100.
2. Maximum current in alarm is 90 mA power-limited.
3. See "Power Supply Calculations" on page 103, for power supply calculations.

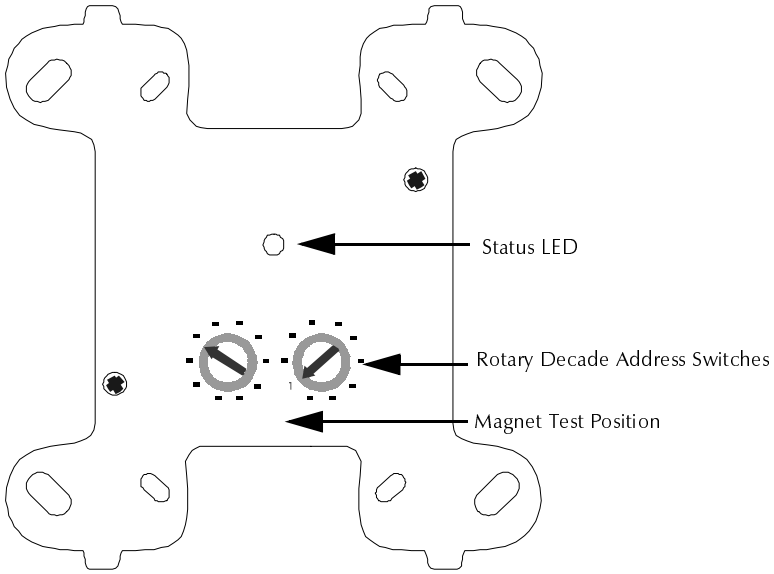


Figure 27 MMX-2 Module

Wiring a Style B IDC with MMX-1 Modules

The NFPA Style B IDC (Initiating Device Circuit), using an MMX-1 module, is supervised and power-limited. Figure 28 shows typical wiring for a Style B IDC:

Caution Do not loop wiring under any terminals. To maintain supervision, break the wire run.

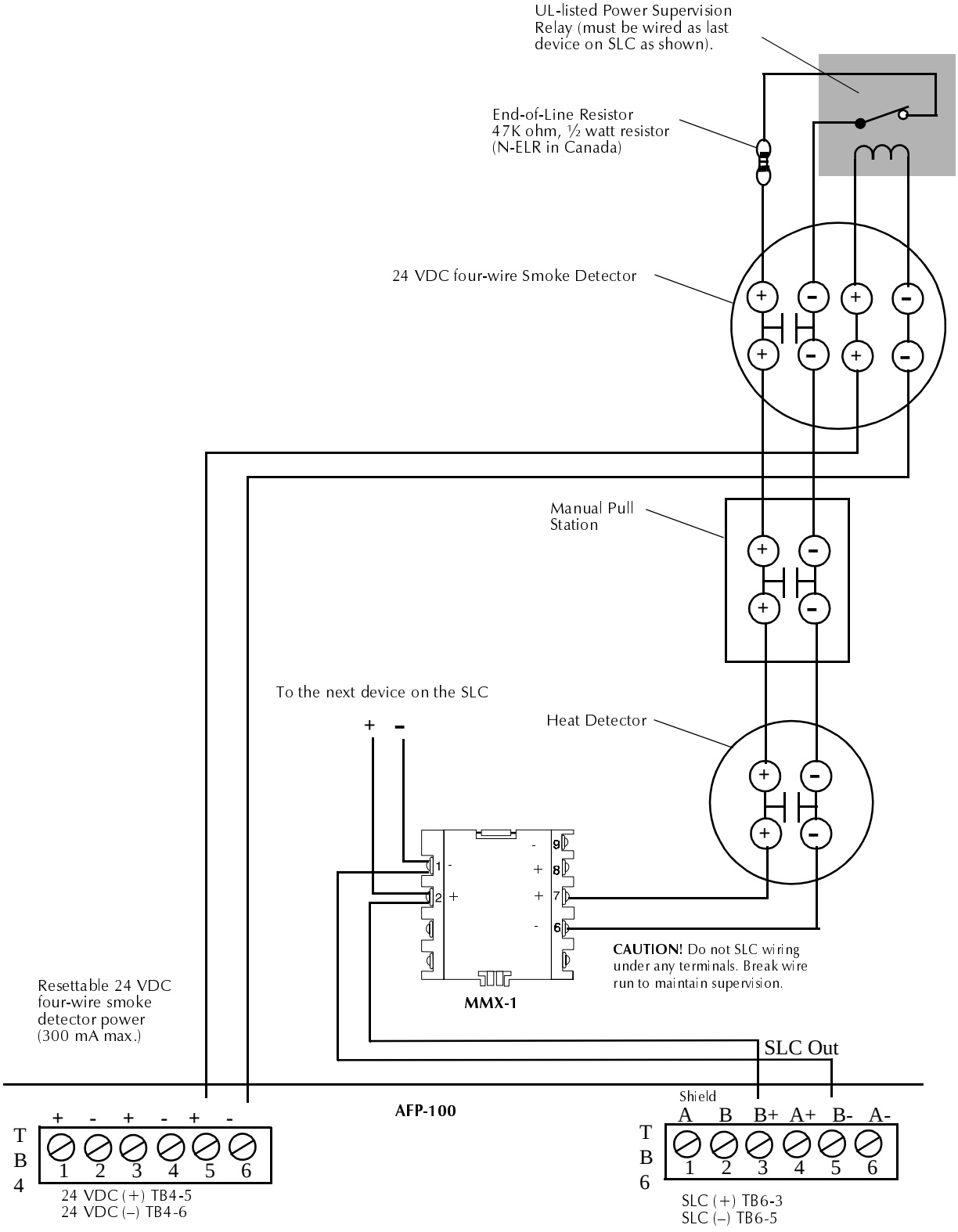


Figure 28 Style B Circuit using an MMX-1 Module

Wiring a Style D IDC with MMX-1 Modules

The Style D IDC (Initiating Device Circuit), using an MMX-1 module, is supervised and power-limited.

Note An ELR is not required when wiring Style D (Class A).

Caution Do not loop wiring under any terminals. To maintain supervision, break the wire run.

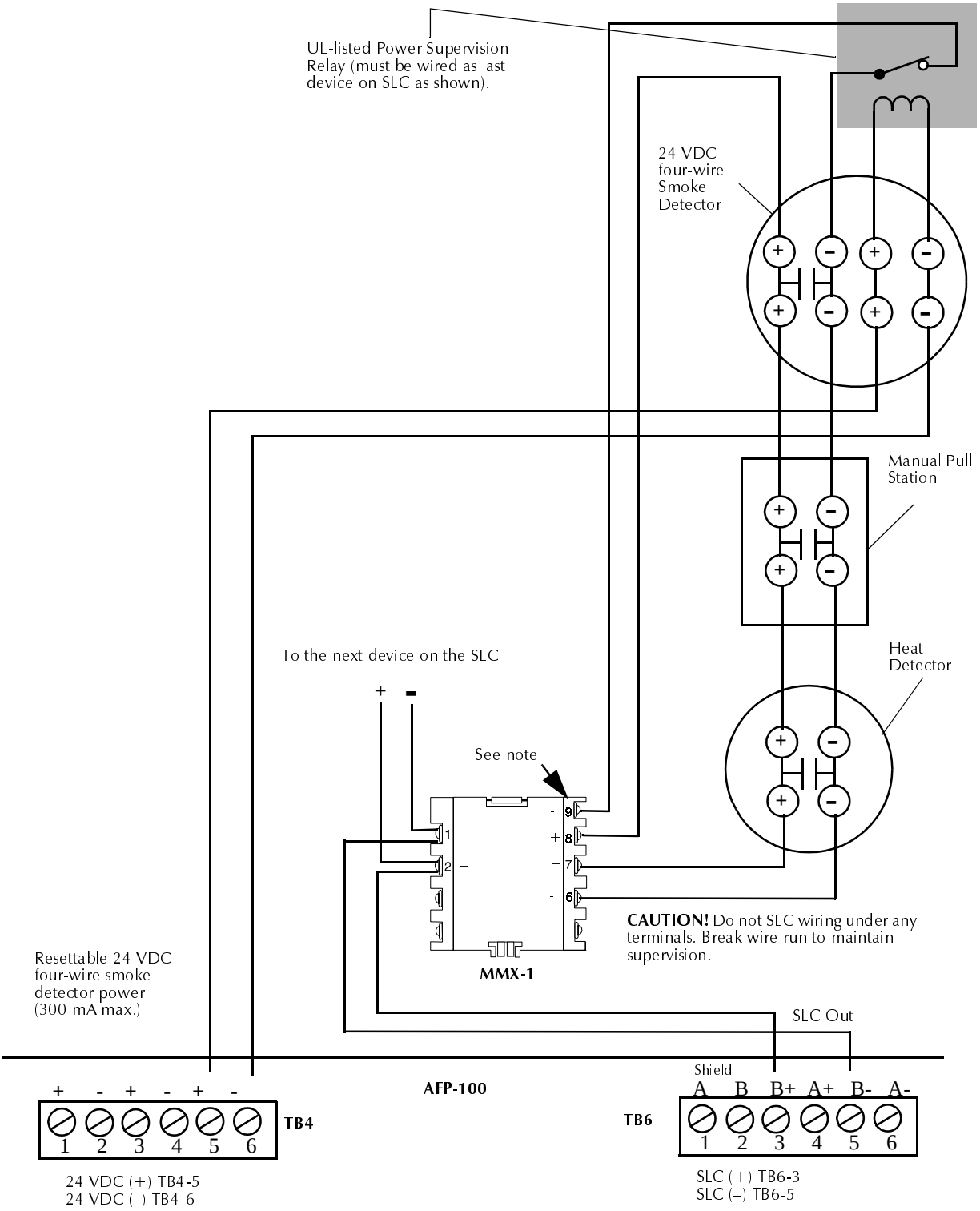


Figure 29 Style D IDC using an MMX-1 Module

Wiring a Style B IDC with MMX-2 Modules

Caution The NFPA Style B IDC (Initiating Device Circuit) is supervised and power-limited. Do not loop wiring under any terminals. To maintain supervision, break the wire run.

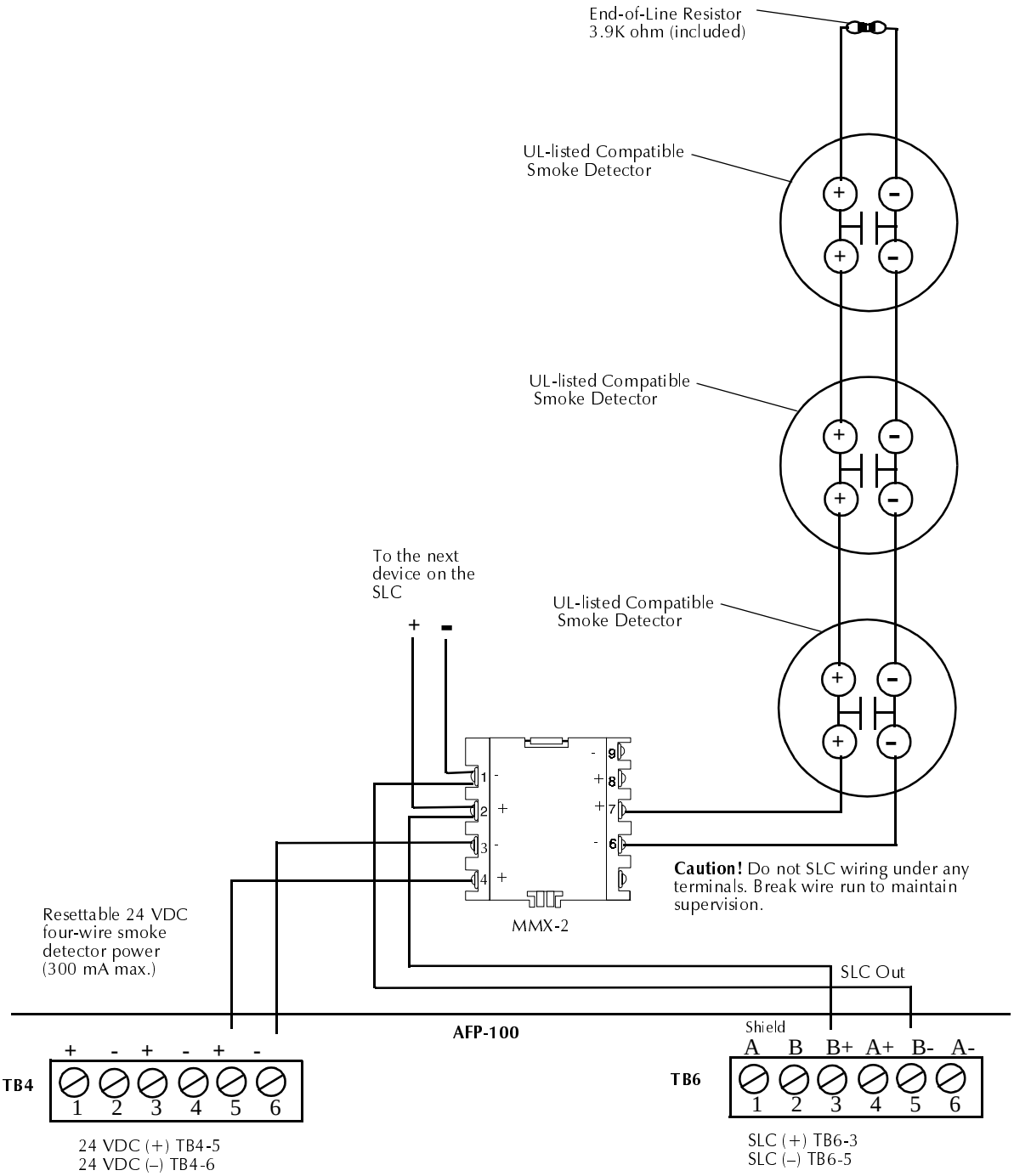


Figure 30 Style B IDC using an MMX-2 Module

Wiring a Style D IDC with MMX-2 Modules

Caution The NFPA Style D IDC (Initiating Device Circuit) is supervised and power-limited. Do not loop wiring under any terminals. Break wire run to maintain supervision.

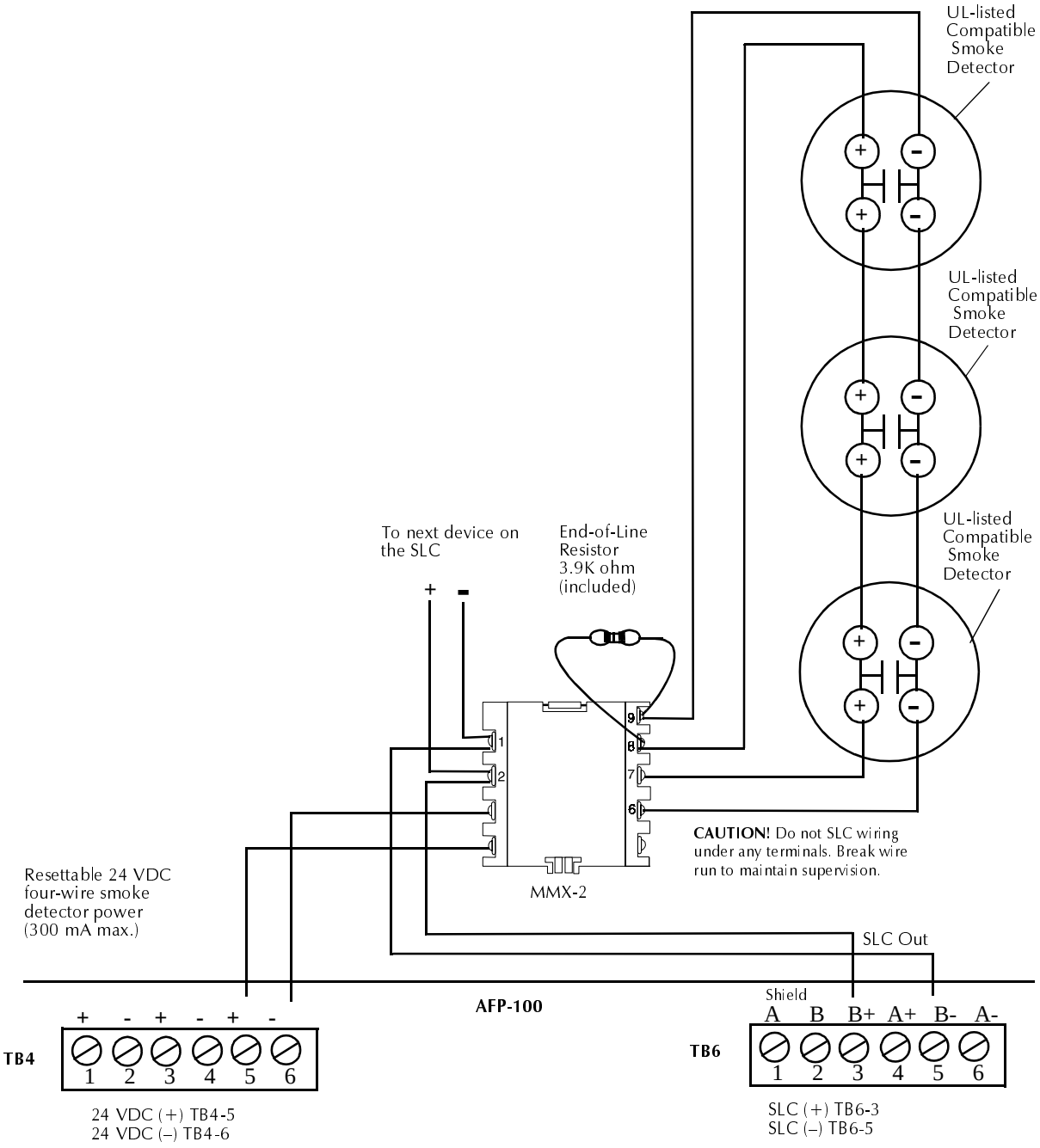


Figure 31 Style D Circuit using MMX-2

Wiring CMX Modules

Overview

The CMX module is an addressable module that supervises and switches power to a Notification Appliance Circuit. You can wire a CMX module for NFPA Styles W, X, Y or Z NACs or for speaker circuits. You can also use a CMX module as a Form-C control relay.

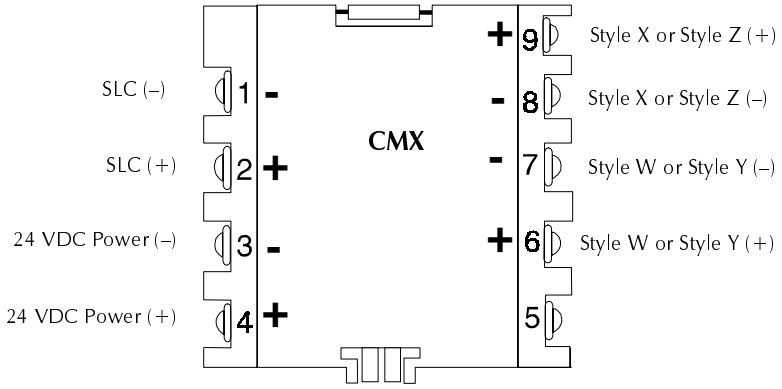


Figure 32 CMX Module – Alarm Polarity

SLC Connections

Connect the SLC (TB6) to CMX module terminals 1 (–) and 2 (+). A CMX module occupies one module address on the SLC. Set the rotary switches on the CMX module to the applicable SLC address.

NFPA Style W or Y Notification Appliance Circuit or Speaker Circuit

Connect polarized alarm notification appliances or speakers to a single two-wire circuit. Connect the circuit to CMX module terminals 6 (+) and 7 (–). See Figure 34 on page 52.

Note A Style W or Style Y circuit cannot be T-tapped or branched in any fashion and must be terminated across the last device by a 47K ohm, ½ watt ELR (PN A2143-00).

NFPA Style X or Z Notification Appliance Circuit or Speaker Circuit

Connect polarized alarm notification appliances or speakers to a single four-wire circuit. Connect the circuit to CMX terminals 6 (+), 9 (+), 7 (–) and 8 (–).

Note When wiring a Style Z circuit, do not install an ELR since one is built into the CMX module.

Notification Appliance Power

Connect notification appliance power from AFP-100 TB4 terminal 1 to CMX module terminal 4 (+24 VDC) and AFP-100 TB4 terminal 2 to CMX module terminal 3 (-24 VDC). Notification appliance power must be supervised by a UL-listed Power Supervision Relay, wired as shown in Figure 34 on page 52.

Coded Operation

Connect notification appliance power from either TB1 (NAC 01 Output) terminals 1 and 4 or TB2 (NAC 02 Output) terminals 1 and 4 to CMX module terminals 3 and 4. Make sure to place one ELR across the last device on the module for Style B wiring. Set NAC 01 or NAC 02, which is now being used to drive the CMX module, for appropriate coded function. Refer to "System Edit" on page 79, for additional information.

Test Switch

The CMX module includes a magnetic test switch sensor located near the center front of the module. Activation of this switch by test magnet PN M02-04-00 will cause a short circuit indication for the Style W/X/Y/Z circuit connected to the module.

Wiring a CMX Module as a Form-C Relay Module

To configure a CMX module as a Form-C relay, the two break-off tabs (J1 and J2), illustrated in Figure 33 on page 51, must be broken off of the CMX module. To break off each tab, use a pair of needle-nose pliers.

Caution: Failure to break the tabs when configuring the module for Form-C operation can cause damage to the CMX module.

SLC Connections

Connect the AFP-100 SLC to CMX terminals 1(–) and 2(+). The CMX occupies one module address on the SLC. Set the rotary switches on the module to the particular SLC address required.

Contact Connections

Wire the common and the normally-open or normally closed contacts to the CMX module as needed.

Contact Ratings

Contact ratings for the CMX module are:

Resistive	2 amps @ 30 VDC
Inductive	amp @ 30 VDC (0.6 PF)
Pilot Duty	0.6 amps @ 30 VDC (0.35 PF) 0.3 amps @ 110 VDC (0.35 PF) 0.3 amps @ 120 VAC (0.35 PF)

Certain electromechanical devices exhibit inductive loading characteristics. For these types of devices, derate the outputs to 1 amp. Refer to the Device Compatibility Document for load characteristics by device.

Caution Figure 33 shows wiring connections for a CMX module configured as a Form-C relay
Do not loop wiring under any terminals. Break wire run to maintain supervision

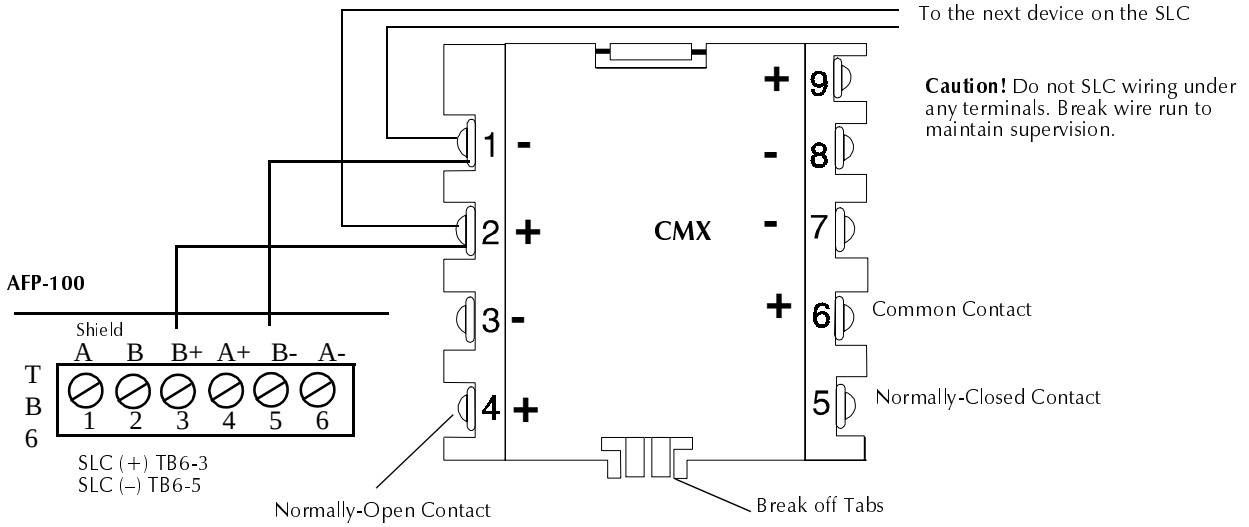


Figure 33 CMX Module - Used as Form-C Relay

Wiring an NFPA Style Y NAC with a CMX Module

Figure 34 shows typical wiring for Style Y NAC, where all circuits are supervised and power-limited

Caution Do not loop wiring under any terminals. Break wire run to maintain supervision.

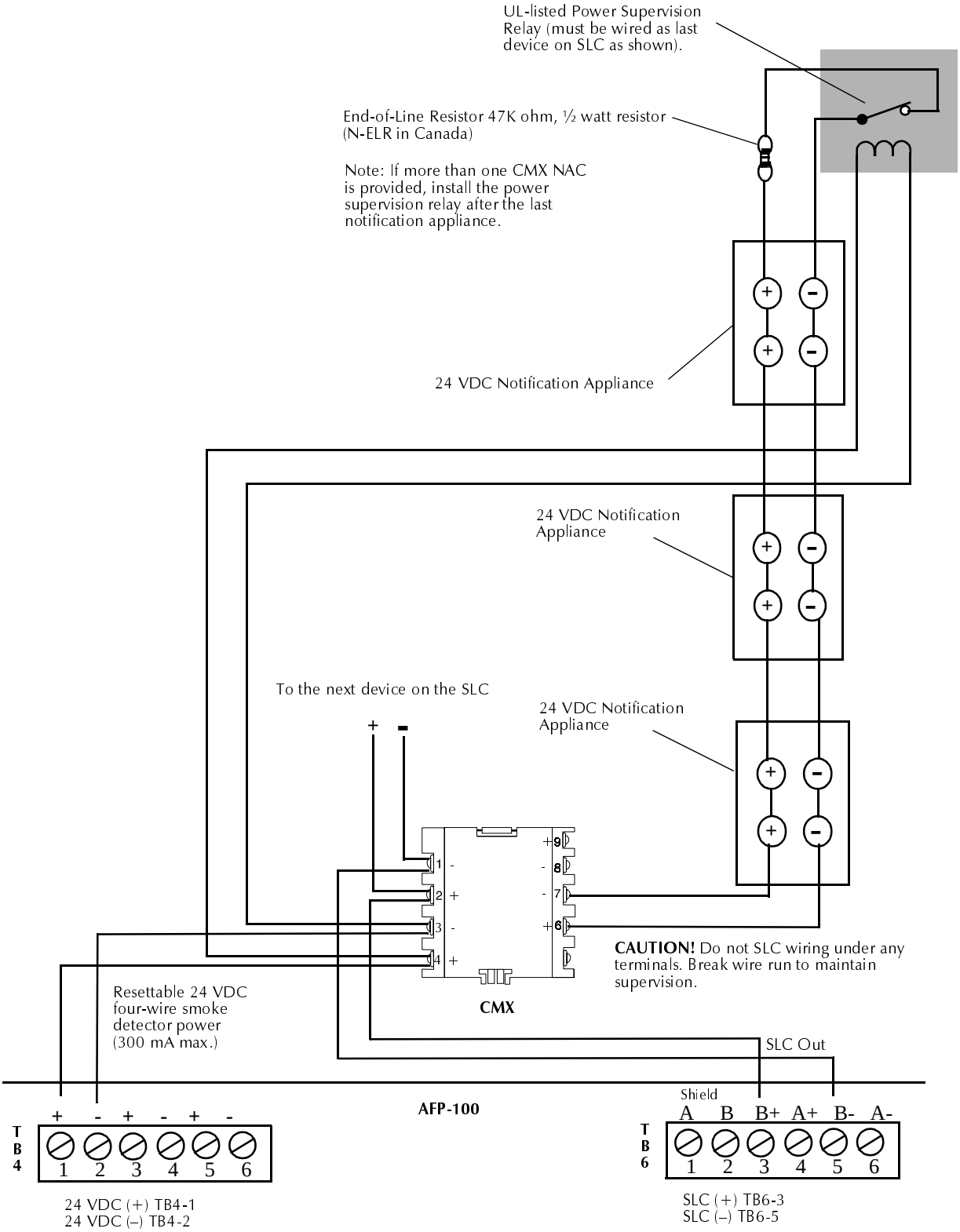


Figure 34 Style Y NAC using a CMX Module

Wiring an Addressable Manual Pull Station

The BG-10LX is an addressable manual pull station with a Notifier key-lock reset feature.

To install a BG-10LX pull station:

1. Connect the SLC (TB6) to terminal screws (+) and (–) on the BG-10LX.
2. The BG-10LX is factory preset to address “00.” Set the address by using a screwdriver to turn the rotary address switches on the back of the unit to the SLC address of the pull station.

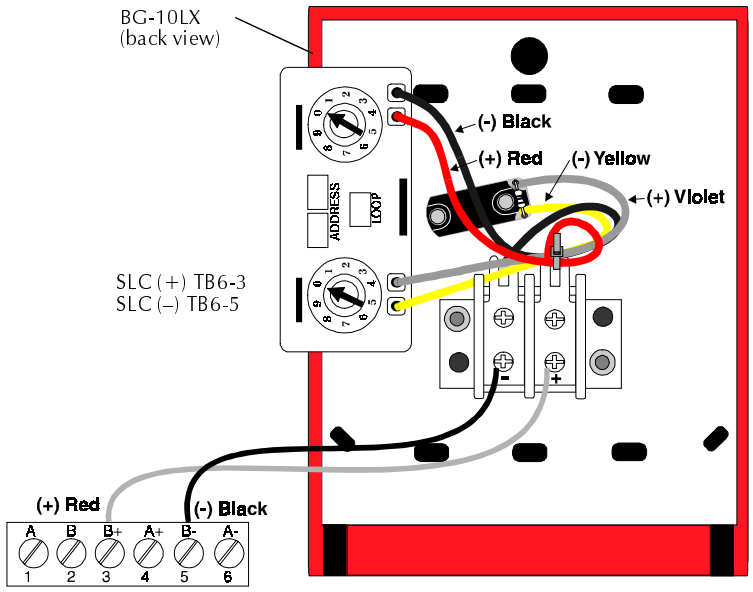


Figure 35 Wiring a BG-10LX

Wiring Detectors

To install addressable detectors:

1. Connect the SLC to terminal (–) and (+) on the removable terminal block.
2. If using an RA400Z Remote LED Annunciator, connect the RA400Z positive terminal to the RA (+) terminal on the removable terminal block and the negative terminal to the RA (–) terminal on the removable block.
3. Before installing the appropriate addressable detector head, set the detector's SLC address on the head with a small flathead screwdriver. Mark this address on the head.
4. Place the removable terminal block into the connector in the detector head. Be certain to properly align and snap-in securely.

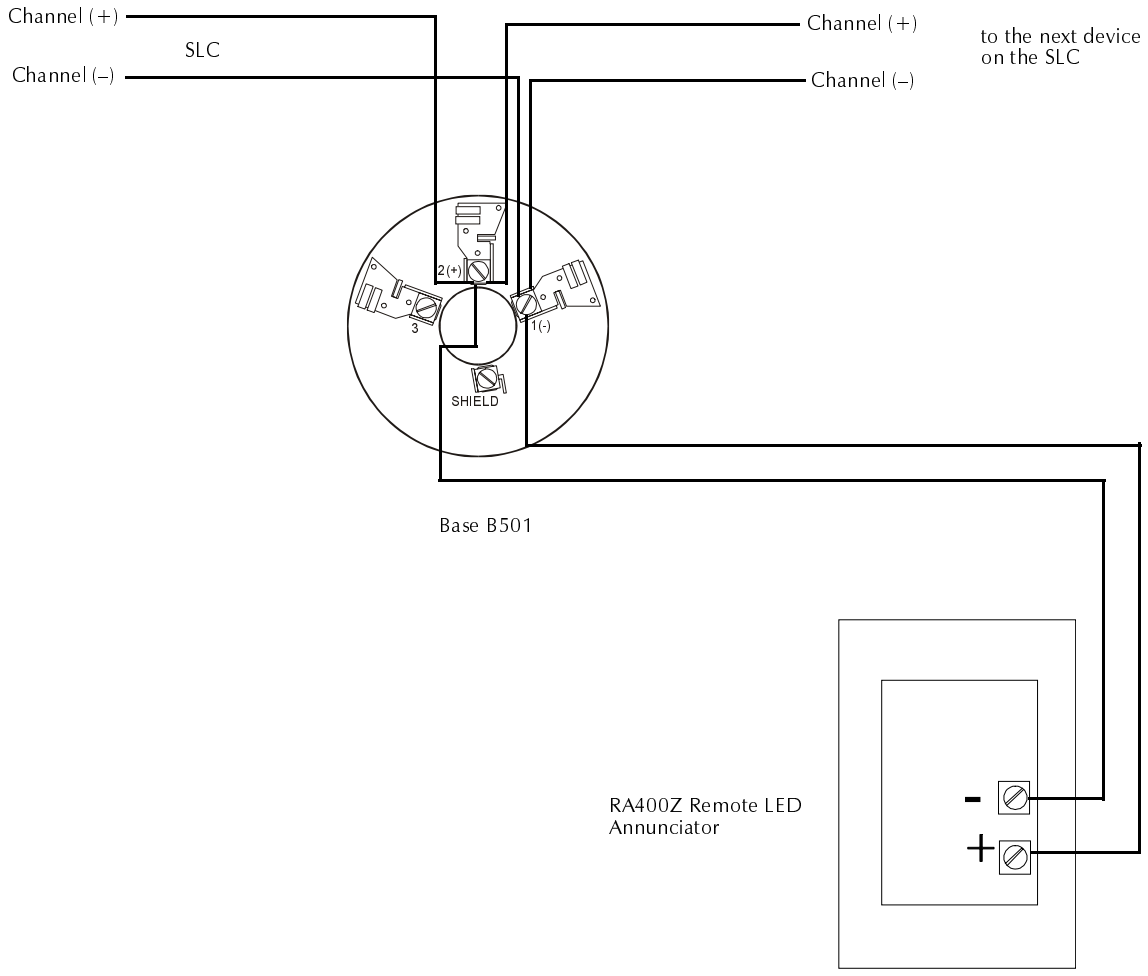


Figure 36 Wiring Detector with Removable Plug-in Connector

Wiring Optional Modules

Overview

The control panel supports the following optional modules:

- Fire•Lite RTM-8F Relay/transmitter Module
- PIM-24 Printer/PC Interface Module
- UDACT Universal Digital Alarm Communicator/Transmitter
- DIM-485 Display Interface Module (for use with LCD-2x20 Series annunciators)

Installing an Fire•Lite RTM-8F Module

To install an Fire•Lite RTM-8F module, follow these steps:

1. Cut jumper JP4 (to enable module placement supervision) on the main circuit board.
2. Plug the Fire•Lite RTM-8F module into plug J6 on the main circuit board.

Note Devices connected to the standard EIA-485 connector, the optional EIA-232 connector, the optional EIA-485 connector via the PIM-24 or DIM-485 modules or SLC may be protected from voltage transients by using one of the UL-listed compatible surge suppressors listed in the Notifier Device Compatibility Document.

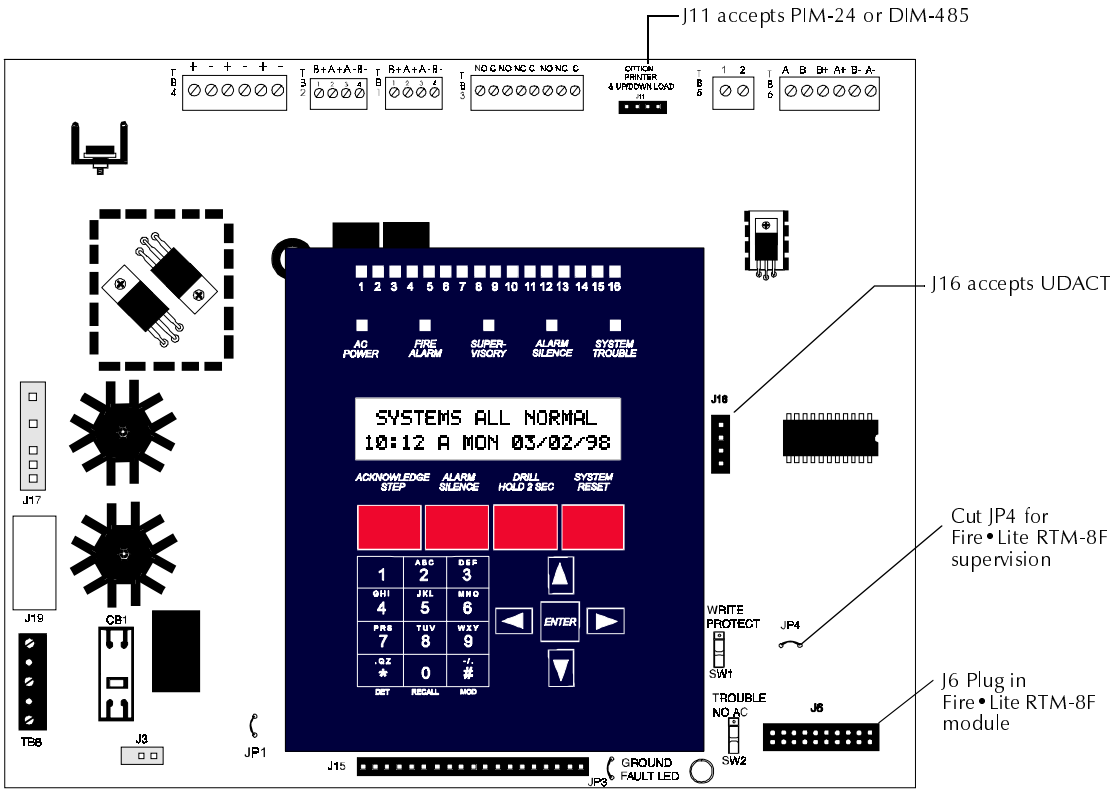


Figure 37 Option Module Locations

UDACT Universal Digital Alarm Communicator/Transmitter

The UDACT transmits system status to UL-listed Central Station receivers via the public switched telephone network. It is capable of reporting up to 56 software zones or up to 198 addressable points. The UDACT may be mounted directly to the AFP-100 main circuit board or remotely in a UBS-1 or ABS-8R enclosure. For additional information, refer to the UDACT Manual.

WARNING Disconnect all sources of power (AC and DC) before installing or removing any modules or wiring.

UDACT Mounting Options

The UDACT may be mounted as follows:

- Directly to the main circuit board in the cabinent **or**
- Remotely in an ABS-8R or UBS-1 enclosure up to 6,000 feet (1,800 m) away fromthe control panel.

All power must be removed from the control panel before making any connections to prevent circuit damage. The EIA-485 serial interface is connected between the control panel and UDACT, using twisted shielded pair wire. Power should be wired from the control panel's 24 VDC (nominal) filtered, nonresettable output to TB1 on the UDACT (except when mounted in the AFP-100).

Mounting a UDACT into an AFP-100 Cabinet

Remove all power from the AFP-100 by disconnecting AC and batteries. Install the supplied standoffs (three nylon and one aluminum) in the appropriate holes located on the right side of the main circuit board. Carefully connect the ribbon cable provided to connector J16 on the main circuit board and to connector J10 on the UDACT. Refer to Figure 38 on page 57. Secure the UDACT to the aluminum standoff with screw provided.

The EIA-485 circuit and 24 VDC power are provided directly from connector J16 of the AFP-100. Note that a 120 ohm EOL resistor is not required on the UDACT EIA-485 terminals when it is installed inside the AFP-100 cabinet. The EOL resistor is required at the last device (if any are installed) on the EIA-485 line external to the control panel.

Programming

Refer to “System Edit” on page 79, for information on programming the AFP-100 to function with the UDACT.

Figure 38 shows connections between the UDACT and the control panel:

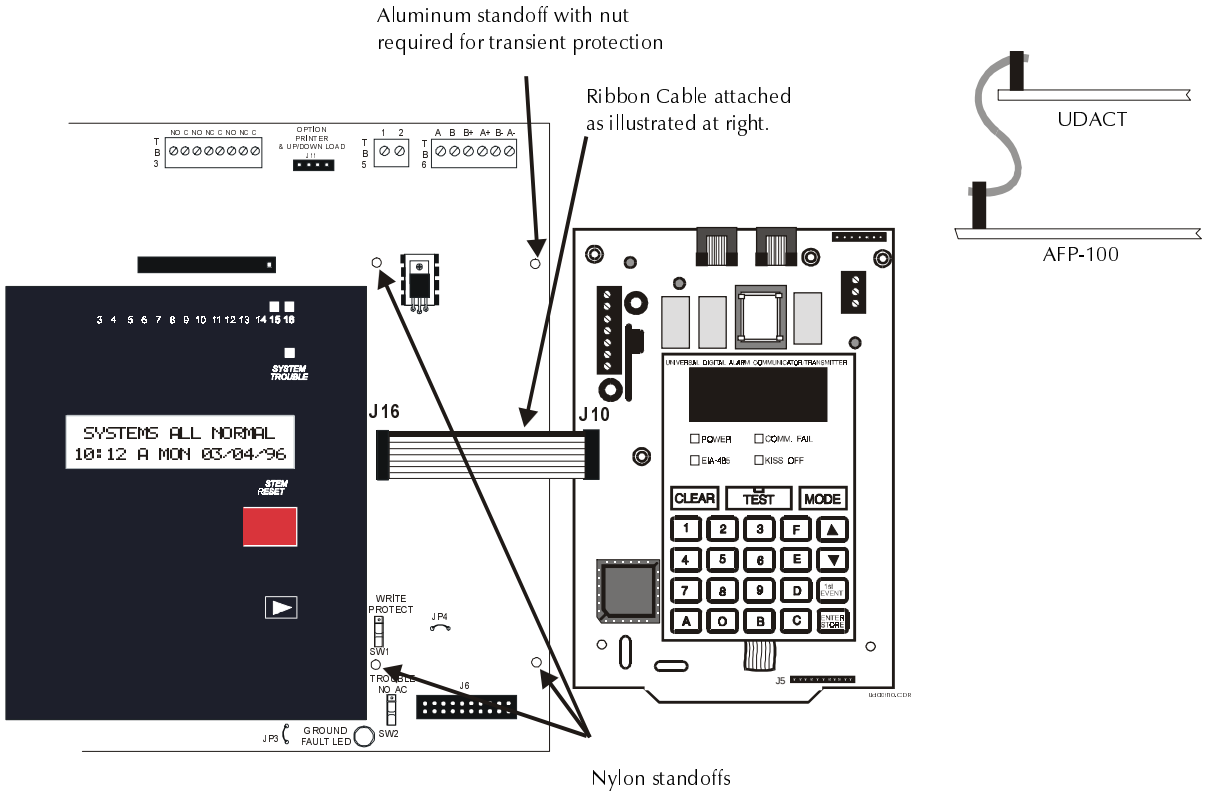


Figure 38 UDACT Mounting to AFP-100

External Mounting

Figure 39 shows how to connect a UDACT mounted in an ABS-8R to the control panel. The UDACT is supervised and power-limited. Surge protection can be provided by using one of the UL-listed compatible surge suppressors listed in the Notifier Device Compatibility Document.

Notes:

1. This arrangement allows use of the UDACT simultaneously with the Fire•Lite RTM-8F module.
2. Ferrite cores (PN FBD-1) are recommended for all applications.
3. Recommended wire is 12 AWG to 18 AWG (0.75 to 3.25 mm^2) twisted, shielded pair.
4. If shielded wire is used, connect only one end of the shield:
   - ✓ shield may be connected to cabinet (earth ground) at fire alarm control panel, or
   - ✓ shield may be connected to TB1 terminal 5 (shield) at UDACT. *Note that the shield end that is not connected should be insulated to prevent accidental grounding. Do not connect both ends of shield under any circumstances since a ground fault may result.*
5. Conduit is recommended for external wire runs (consult local building codes).
6. Connect ground strap (supplied with ABS-8R enclosure) from Earth Ground terminal on the UDACT to a solid building earth ground. Conduit alone will not provide a reliable earth ground.

7. The UDACT can be located up to 6,000 feet (1,800 m) away from the host control panel.
8. Refer to "Specifications" on page 10 for power requirements.
9. UDACT TB1 terminals 6 and 7 are for future use. Make no connections to these terminals.

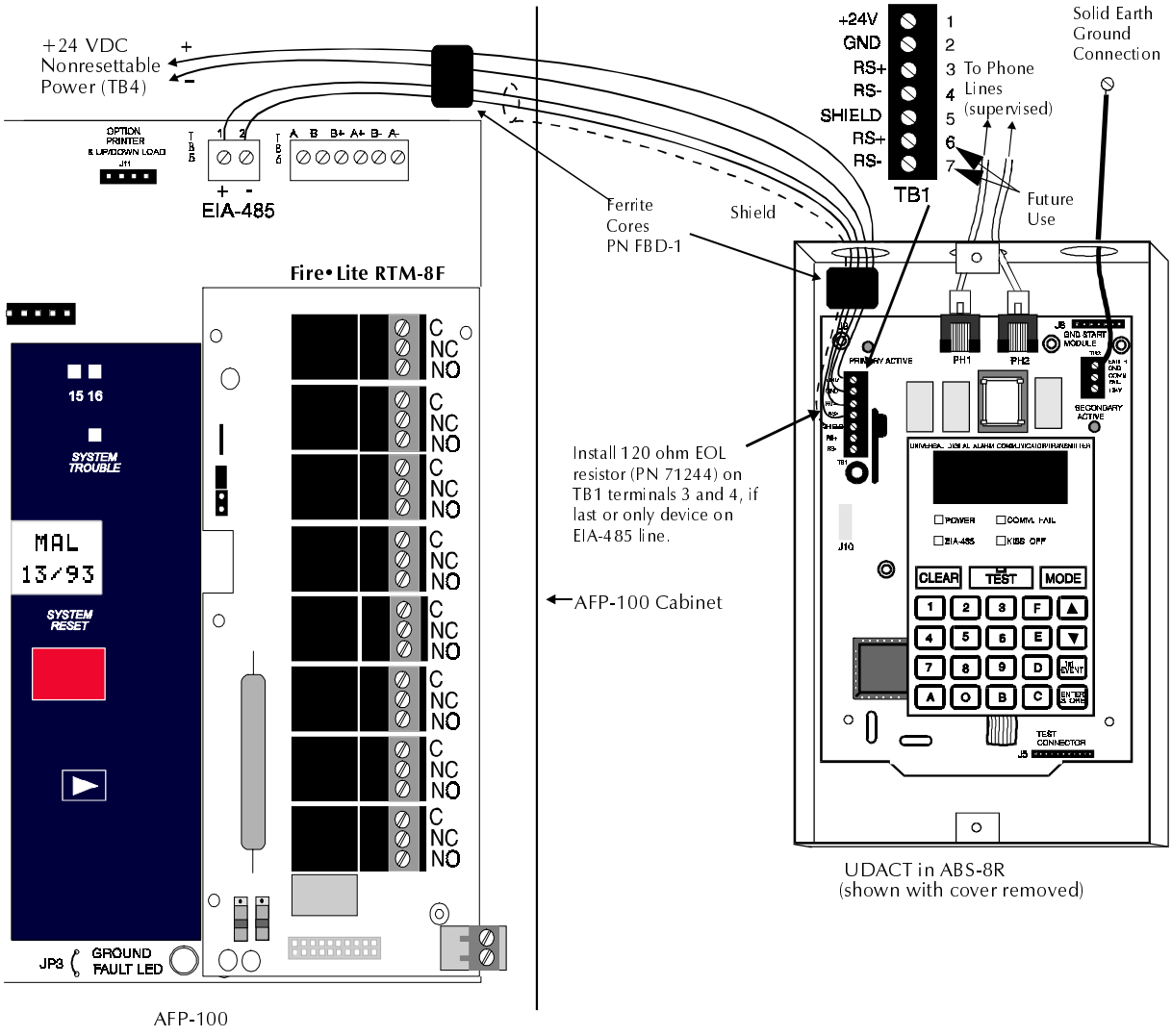


Figure 39 External UDACT Connections

ACM-8R Relay Control Module

WARNING **Disconnect all sources of power (AC and DC) before installing or removing any modules or wiring.**

The ACM-8R module provides eight Form-C relays with contacts rated for 5 amps. When installed with an AFP-100, the ACM-8R modules provide relay activation for each of the 56 possible FACP zones plus special functions. Options exist to allow for alarm only or alarm and trouble activations per zone. Output activation for general alarm, general trouble, general supervisory, NAC fault, AC fail, walktest start and battery trouble are also available. Refer to the ACM-8R Manual Appendix for information on setting module switches for addressing and relay functions.

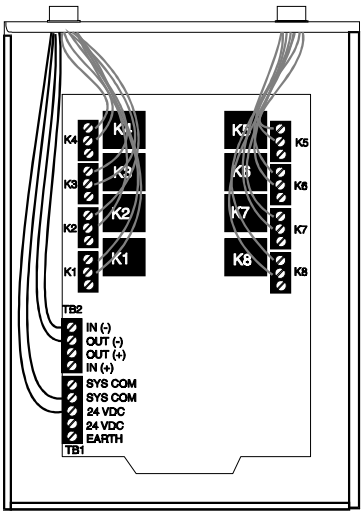


Figure 40 ABS-8R Enclosure

The ACM-8R is installed on the standard EIA-485 communication bus and wiring is supervised by the FACP. Power for the module must be power-limited and may be provided by the FACP or a UL-listed power supply such as the FCPS-24. Up to 32 ACM-8R Relay Control Modules may be placed onto the EIA-485 communication bus (if no other devices are installed on the bus). Removable terminal blocks are provided for ease of wiring installation and servicing. Refer to the ACM-8R Manual for UL power-limited wiring requirements and switch SW4 receive/transmit selection options. The ACM-8R module can be mounted remotely in an ABS-8R annunciator surface-mount backbox.

CAUTION It is vitally important that, following relay programming, all relays be tested for correct activation by triggering zones and/or special functions at the FACP. It should also be noted:

- ACM-8R relays *will activate* during the Alarm Presignal sequence
- ACM-8R relays *will not activate* during the Alarm Verification Retard and Reset Periods

Figure 41 shows how to mount an ACM-8R

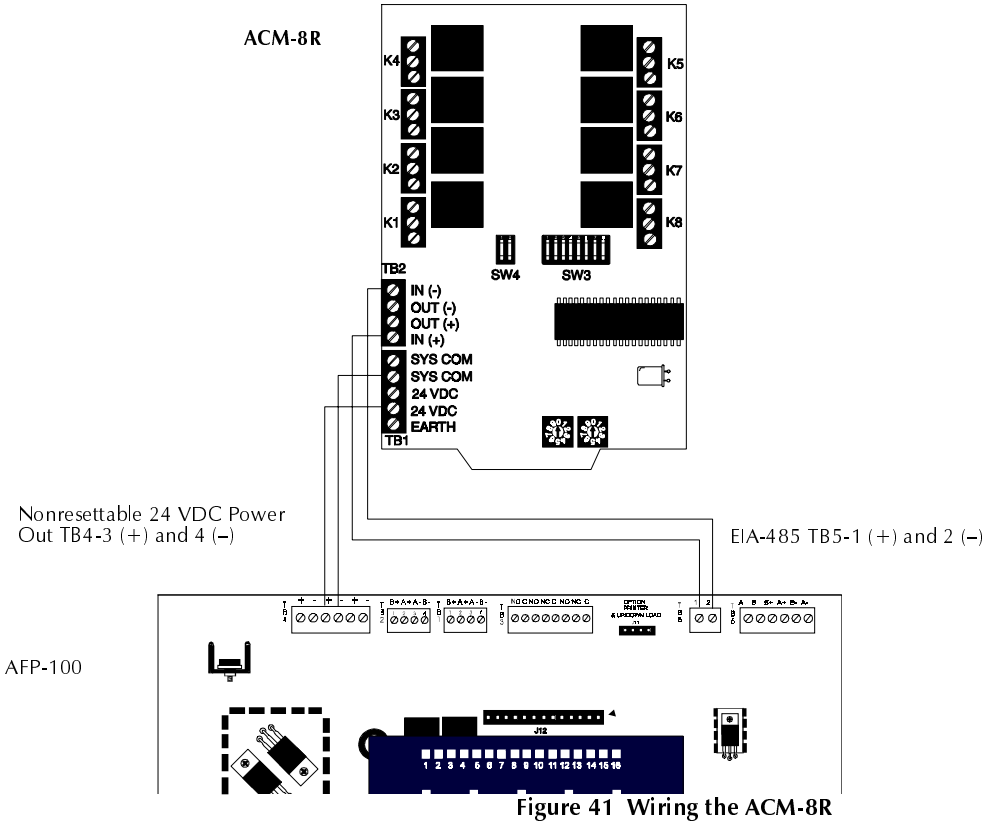


Figure 41 Wiring the ACM-8R

Fire•Lite RTM-8F Option Module Installation

WARNING **Disconnect all sources of power (AC and DC) before installing or removing any modules or wiring.**

Insert the three supplied nylon standoffs into the holes located on the right-side edge of the AFP-100 main circuit board. Insert the supplied metal standoff on the lower-right corner. Carefully align the pins of J6 on the main circuit board with connector J1 on the Fire•Lite RTM-8F option board. Press firmly on the Fire•Lite RTM-8F until it locks in place on the standoffs. Affix the terminal identification labels provided with the option module.

Note Be certain to tighten the screw into the metal standoff on the lower-right corner. This is critical to the Fire•Lite RTM-8F transient protection.

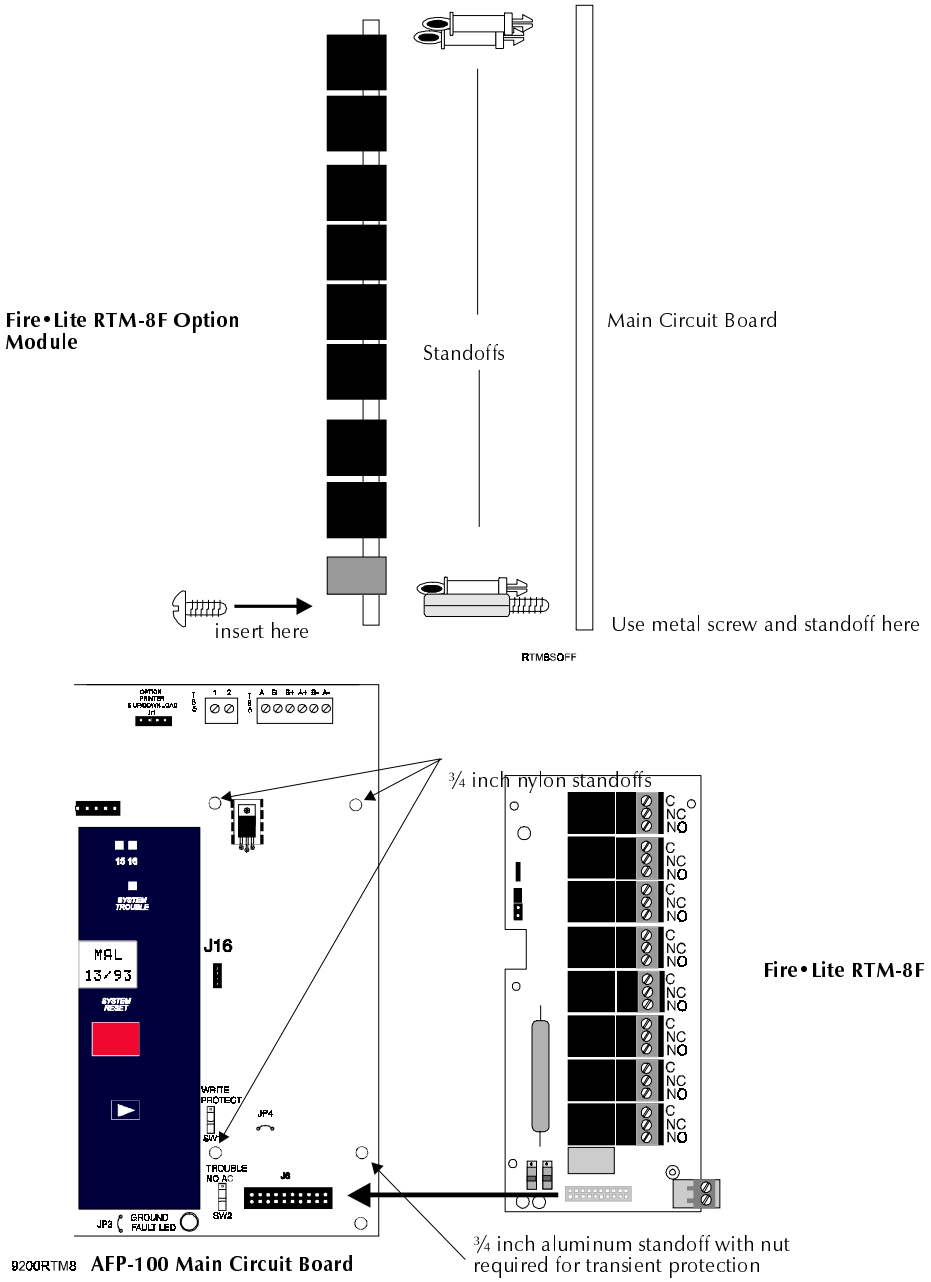


Figure 42 Fire•Lite RTM-8F Module Installation

Figure 43 shows the components on the Fire•Lite RTM-8F board:

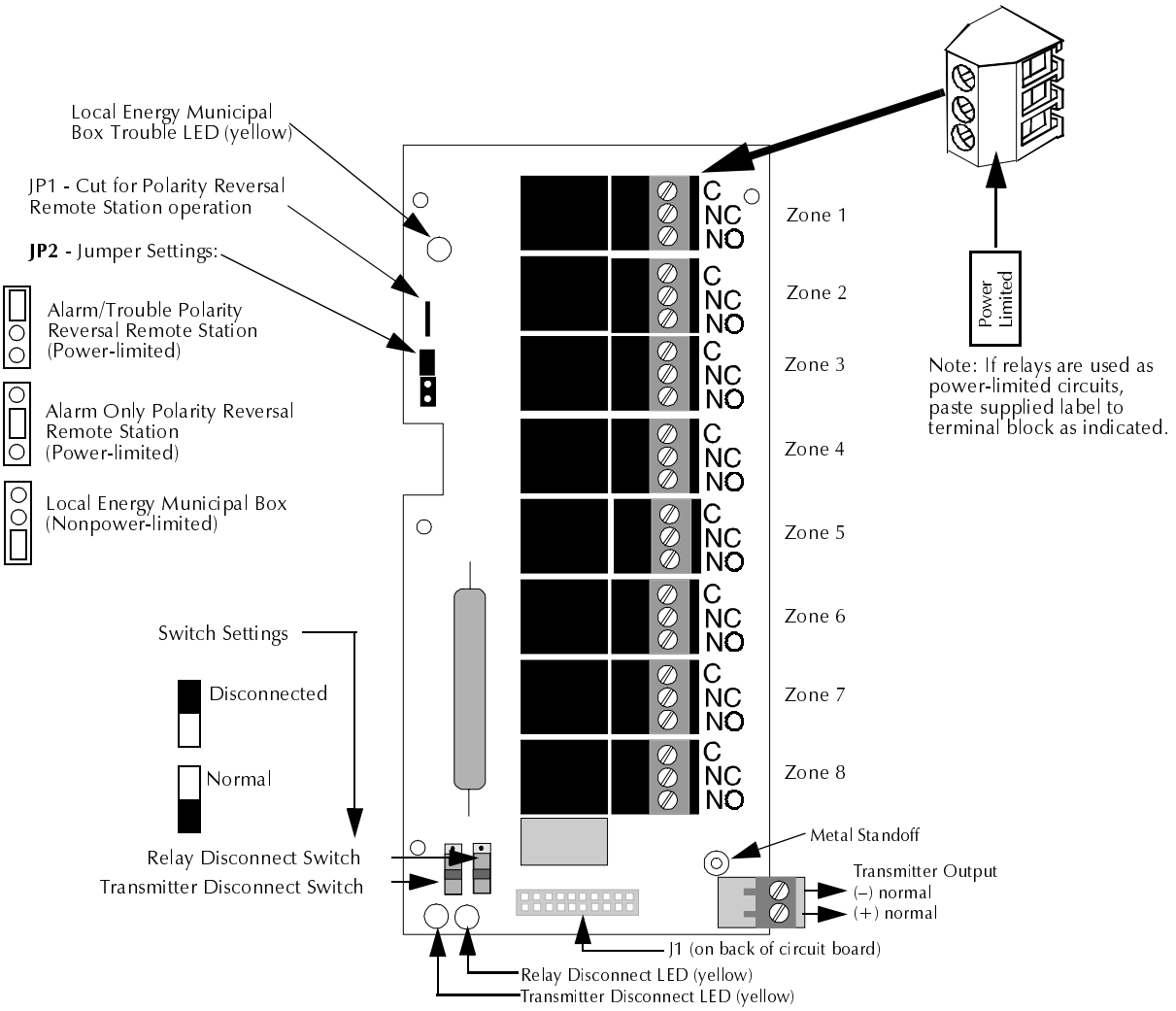


Figure 43 Fire•Lite RTM-8F Relay Transmitter Module Components

Notes:

1. Zone Relay Contact Ratings:
   - ✓ Maximum Switched Power is 170W or 1800 VA
   - ✓ Maximum Switched Current is 6 amps
   - ✓ Maximum Switched Voltage is 30 VDC or 300 VAC
   - ✓ UL Rating is 6 amps @ 28 VDC or 120/300 VAC 1/8 HP @ 120/240 VAC (100,000 CYC) 1.5/0.8 A @ 120/240 VAC Pilot Duty is 30,000 CYC
   - ✓ Contact Material is Silver Nickel, Gold Plated

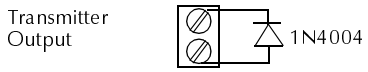
2. Polarity Reversal Output: 24 VDC (nominal), 18.5 mA maximum rated current. Internal Resistance: 1,200 ohms (nominal). Intended for connection to the polarity reversal circuit of a remote station receiving circuit (such as the Notifier RS-82) having compatible ratings. The Fire•Lite RTM-8F is not suitable for separate transmission of both alarm and trouble signals simultaneously to a remote station. Output is power-limited and wiring can leave the building.

Continued on the next page...

3. Municipal box output: Supervised for open circuit. Output is nonpower-limited and wiring can leave the building. Yellow Trouble LED, when on, indicates open circuit condition. Check wiring and make certain Municipal Box is reset according to local codes. Maximum current (short circuit) is 0.6 amps. Maximum Voltage (open circuit) is 30.0 V. Maximum Wire Resistance is 3 ohms.

4. To prevent the yellow Trouble LED from turning on when the Transmitter Output is not used (no connections), move jumper JP2 to the Local Energy Municipal Box position (bottom two pins) and install a dummy load across the Transmitter Output terminals as shown below. The dummy load is a 1N4004 diode. The cathode must be connected to the terminal labeled '(–) normal' in Figure 43, and the anode must be connected to the terminal labeled '(+) normal'. Polarity must be observed or the Trouble LED will remain on.

Caution The diode must be removed when using the Transmitter Output to properly supervise the connections.



Printer/PC Interface Module

Overview

A remote serial printer may be permanently connected to provide a hardcopy printout of program entries, history file and walktest data. The Printer/PC Interface Module PN PIM-24 provides an EIA-232 conversion to adapt to most 40 and 80 column printers and most IBM PC/XT/AT or compatible computers including laptops and personal computers. The PIM-24 module cannot be used simultaneously with the DIM-485/ LCD-2x20 option.

Caution Circuit damage may result if a ground fault exists on the control panel. **Do not** connect a printer or PC to the control panel if a ground fault exists on the control panel. Remove all power (AC and DC) before installing or removing any modules or wiring.

Note For printer programming instructions, refer to "System Edit" on page 79.

Installation

Remote printers and PCs require 120 VAC, 50/60 Hz primary power. Also required is the PIM-24 which includes the Printer/PC Interface Module, interface cable prewired to a DB9 connector as shown in Figure 44 and a DB25 adapter. Connect the Printer/PC Interface board to J11 on the AFP-100 main circuit board and the attached cable to the serial EIA-232 port on the printer or PC. Use the DB25 adapter if a nine pin connector is not available on your printer or PC. Note that a ground fault may occur on the AFP-100 control panel, dependent on the printer used, when this connection is made. For this reason, it is important that there be no preexisting ground fault on the control panel. Consult the factory for recommended printers.

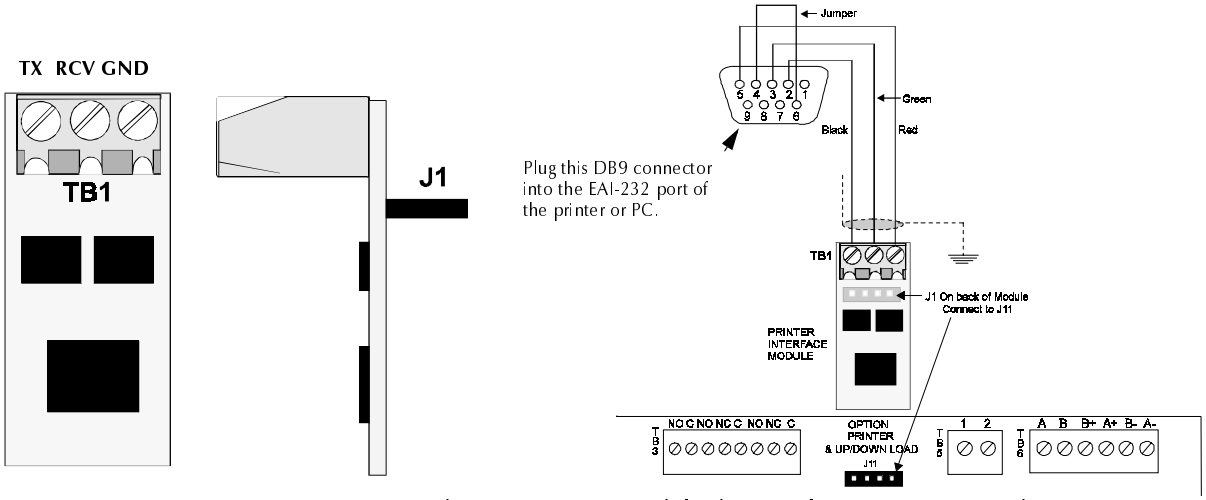


Figure 44 Remote Serial Printer and Computer Connections

Printer Configuration

The PIM-24 is required when connecting a printer. Refer to the documentation supplied with the printer for additional pertinent information. Set the printer's options as listed in the following table.

COMMUNICAT. SETUP	
BUFFER:	LARGE
DATA BITS:	7
PARITY:	EVEN
STOP BIT:	1 STOP
BAUD RATE:	2400

Table 6 Typical Printer Settings

PC Configuration

Connecting the control panel to a PC requires the following:

- The Windows-based Veri•Fire 100 Upload/Download Software which contains four 3.5 inch floppy disks.
- The PIM-24 (Printer/PC Interface Module with cable and DB9F/25 connectors).

Notes

SECTION 3 PROGRAMMING AND READ STATUS

Overview

This section provides detailed instructions for programming the control panel. For your convenience, a Programming Flowchart has been included in "Screen Options Flowchart" on page 131. It may be helpful to follow along with the flowchart as this section is reviewed.

The control panel is completely field programmable and requires no special software skills. Programming may be accomplished in one of three ways:

- The Autoprogram Feature - this method is very convenient for quickly bringing the control panel on-line or for program editing
- Manual Programming or editing, using the control panel keypad
- The Off-Line Programming Feature - this method allows creation of site-specific custom programs using a Windows-based computer. For programs requiring a large amount of data entry, this method may be preferred. You can order the Veri•Fire 100 Off-Line Programming Utility kit for off line programming.

When a programmed system is normal with no active alarms, troubles or supervisories, the 'SYSTEMS ALL NORMAL' screen will be displayed as shown below:

```
SYSTEMS ALL NORMAL
10:00 A MON 03/02/98
```

To (1) program the system, (2) read system status, (3) print, (4) edit or (5) Walktest, the ENTER key must first be pressed. After pressing the ENTER key, the following screen displays:

```
  1 = PROGRAMMING
2=RD.STATUS 3=AC/BAT
```

Pressing the **1** key will select system Programming, which may only be accomplished by an authorized user. Before attempting to program the system, place the SW1 Write Protect switch in the down position. SW1 is located on the lower-right side of the main circuit board. If the switch is in the up 'Write Protect' position while attempting to enter the Programming Mode, the following message appears in the LCD display:

```
WRITE PROTECT!!!
PRESS BACKSPACE
```

To program the system (Program Level 1 and Program Level 2), you must first enter a valid password. Once the correct password is entered, the you can select Autoprogram

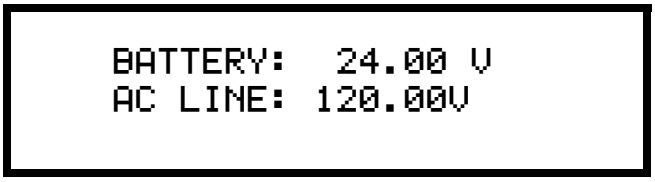
or Program Edit. After programming is completed, return switch SW1 to the Write Protect position.

1 = Programming: There are two programming levels.

- **Program Level 1** is for system configuration in which data relating to device types, zoning, messages, etc. is entered into the system memory.
- **Program Level 2** is where a qualified operator can access features such as Disable, Clear History, Walktest, Time Change and Program Check. For Program Level 2, the SW1 Write Protect switch should remain in the up 'Write Protect' position.

2 = Read Status: Entering Read Status allows the user to read the status of any point/ zone in the system plus display or print the history file or print the entire user program. The Read Status feature is NOT password protected. Read Status is explained in "Read Status" on page 101.

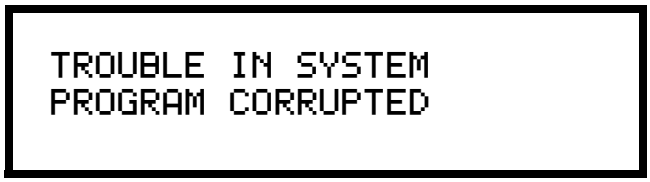
3 = AC/BAT: Entering AC/BAT allows the user to read the battery voltage and the AC line voltage. The AC/BAT feature is NOT password protected. The following screen is displayed upon entering AC/BAT:



"Initial Power-up" on page 69 describes initial programming procedures for a new system. The same procedures are used to modify programming in an existing system. Make certain the SW1 Write Protect switch is in the down position before attempting any Level 1 Programming functions.

Initial Power-up

After completing the wiring of addressable devices to the SLC, power up the fire alarm system. Because the addressable devices are not programmed into the control panel, their LEDs will not flash, the System Trouble LED will be on and the LCD display will alternate between the following two displays:



If the system remains unprogrammed, the panel sounder will activate after two minutes. It can be silenced by pressing the ACKNOWLEDGE/STEP switch, but it will continue to resound until the system is programmed.

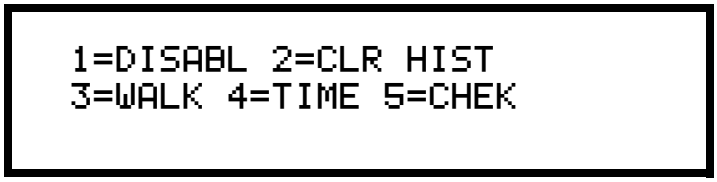
Programming

Press the ENTER key. The screen below will appear:

To enter the programming mode, press '1'. The display will read as follows:

Entering the Level 1 password (default 00000) will cause the following screen to appear (refer to "Program Change – Level One" on page 72):

Entering the Level 2 password (default 11111) will cause the following screen to appear (refer to "Program Change – Level 2" on page 83):



Passwords

There are two factory set programming passwords, '00000' and '11111', which will access two different screens as indicated in the preceding section. From either of the screens, access to specific system and device programming may be obtained. All programming entries are stored in nonvolatile memory. The factory set passwords can be changed by the user and a method exists to clear one or both passwords. If an invalid password is entered, the display will read 'INCORRECT PASSWORD'. To exit from Programming operations at any time, press the Backspace (left arrow) key repeatedly.

Note For Canadian applications, both passwords must be changed from the factory settings.

Program Change – Level One

When the correct password is entered, the control panel will enter Level 1 program mode. In this mode, the trouble relay is activated and the System Trouble LED flashes and cannot be changed to steady and the panel sounder is off. The following display will appear:

Clear

The Clear function is useful when the control panel is first installed, before autoprogramming. Pressing the **0** key clears all general system programming options described in "System Edit" on page 79, and all programmed addressable devices from the nonvolatile memory of the control panel. Before executing the Clear command, the display will prompt the user to press the ENTER key to verify the command before the system actually clears programming data.

Note It is necessary to autoprogram the control panel after using the clear function.

Autoprogram

The first time the system is brought on-line, it must be autoprogrammed. Pressing the **1** key enters the Autoprogramming mode. The main purpose of autoprogramming is to allow the installer a fast and easy way to bring the system on-line as quickly as possible.

Note Autoprogram is also the only way to add or delete devices.

Once Autoprogram is selected, the control panel automatically polls all devices installed/wired to the SLC. The control panel communicates with each individual addressable device and displays the type of device at each address location starting with detectors and then modules.

While autoprogramming the system, the control panel will display the following:

Verification of each device address and type installed on the SLC may now occur. If information is correct, press the ENTER key to save the device in the program; if incorrect, press the left arrow key to delete the device. In addition, adjective and noun descriptors plus zone assignments may be added to the display field per device address. If the SYSTEM RESET key is pressed at this time or the control panel is allowed to time-out after 10 minutes of inactivity, a “System Corrupted” message will appear. Be certain to step through all devices, using the ENTER or left arrow key.

The first time that autoprogramming is selected, **all points** installed on the SLC are identified. Default device type (monitor, smoke detector, control) and software zone assignments for each device are displayed. On any successive enabling of the

autoprogram feature, the LCD display only displays the newly installed, deleted, or changed devices on the SLC.

Devices which match the program already in memory are not changed and are not shown to the operator. Devices which do not match the program (not the same address and/or type) are shown to the operator. Devices inadvertently set to the same address are identified and displayed on the screen.

New Detectors

For each new detector, the Autoprogram feature selects default program values and presents the information to the user. A typical example follows:

In the preceding example:

- "P" in "P01" represents the actual Type Code (photoelectric) of the detector found at address 01. ('I' would represent an Ionization detector).
- The ADJ (adjective) and NOUN fields are blank, but may be user programmed.
- "MZ00" is the default detector sensitivity and zone selection where "M" indicates medium sensitivity and "Z00" indicates "general alarm" (main circuit board NAC outputs 1 and 2). Refer to "Software Zones" on page 107, for software zone assignments. Sensitivity setting sincludes (H)igh, (M)edium, and (L)ow where "H" indicates the highest sensitivity to smoke. The zone and detector sensitivity can be user-programmed.

After the new detector is displayed, press the ENTER key to accept the default information shown or press the left arrow (triangle to the left of the ENTER key) to reject the autoprogram information and not enter it into memory. In most cases, adjective, noun descriptors and zone assignments will be added by using the following procedure.

The control panel will lead you through the program editing process. A blinking cursor moves through the fields as you press the right arrow key (triangle to the right of the ENTER key). After moving into other fields, you may return to a previous field by pressing the left arrow. Change the blinking fields by pressing the up arrow key, the down arrow key or by pressing the appropriate numeric key.

Custom words may be entered via the keypad. The alphanumeric operation of the keypad changes a blinking letter in the ADJ and NOUN fields. For example, to enter the letter "R," repeatedly press the **7** key to step through 7, P, R and S, stopping when R is displayed. Press the right arrow key (do not press the ENTER key at this time) to move to the next letter display position.

The ADJ field serves one of two puposes:

- Allow a second zone to be associated with the detector. For example, entering "Z10" associates the detector with zone 10. Because the ADJ field can be five characters long, the last two characters should not be used when associating a second zone.
- Provide an adjective portion of the description for the detector.

To reduce the number of key presses, the user may also select from a library of stored words. The ADJ field library provides five-character words selected by the up arrow or

down arrow keys from the following list of available words:

_____ (default of blanks)	FIRST
NORTH	__2ND
SOUTH	__3RD
_EAST	__4TH
_WEST	__5TH
FRONT	FLR_1
CENTR	FLR_2
_REAR	FLR_3
UPPER	FLR_4
LOWER	FLR_5
_MAIN	RM___

Table 7 Adjective Library

The ADJ (adjective) field may be loaded from the library list above and then modified letter-by-letter if desired. Pressing the up or down arrow keys steps through the library. Once the up or down arrow keys are pressed, the blinking cursor moves to the last character of the ADJ field, assuming that the user will next want to move beyond this field.

Pressing a key on the 12-key pad changes the letter indicated by the blinking cursor. Any alphanumeric character may be entered. Pressing the right or left arrow key moves the blinking cursor one letter right or left. When the right arrow key is pressed with the blinking cursor on the last letter of the ADJ label, the cursor will move to the first letter of the NOUN field.

Altering the NOUN field is done in a similar way. Use the up or down arrow keys to step through the NOUN library which is listed below:

_____ (default of blanks)	HVAC_ROOM
BASEMENT_	KITCHEN__
BOILER_RM	LOBBY____
CLASSROOM	OFFICE___
CLOSET___	PATIENT__
CORRIDOR_	RESTROOM_
ELECT._RM	ROOM_____
ELEVATOR_	STAIRWAY_
ENTRANCE_	STOREROOM
FLOOR____	WING_____
GARAGE___	ZONE_____
HALLWAY__	

Table 8 Noun Library

In addition, the user may use the Recall/Increment function at any time when the cursor is on the first letter of the ADJ or NOUN field as follows:

- If the **0** key is pressed, a '0' is placed in the first letter position.
- If the zero key is then pressed a second time with no intervening key actions, the entire ADJ field is replaced with the field entered *for the previous device programmed*, and the cursor moves to the last character of the field (Recall function). The Recalled ADJ or NOUN field may now be changed letter-by-letter.
- If the **0** key is pressed again with no other intervening key actions and the last character in the field is a number '0-9', the number is incremented by one. If the last character is a letter, it changes to a '0'. If the last character goes from 9 to 0 and the characters to the left of the last character are also numbers, they are also incremented (overflow).

- The above increment function may be repeated with each press of the **0** key

As an example, the user could quickly enter 'FLR_3_ROOM_305' as follows:

1. The cursor is on the first letter of the ADJ field. Press the **0** key twice to display 'FLR_3'.
2. With the cursor on the first letter of the NOUN field, press the **0** key twice to recall the display 'ROOM_304'. The cursor automatically jumps from the first to the last letter of the NOUN field.
3. With the cursor on the last letter of the NOUN field, press the **0** key again to increment the room number to '305'.
4. Press the right arrow key to advance to the Zone field.
5. Select a zone number from 00 to 56. Z00 (default zone) is the general alarm zone. Z01 through Z56 may be selected to link software zones.

To load the addressable device's program into memory at any time, press the ENTER key. After pressing the ENTER key, autoprogram displays the next new detector. If a detector was previously entered into memory, but is missing (no answer), the LCD display shows the following:

If the ENTER key is pressed, the device is deleted from memory and autoprogram displays the next new device. If the left arrow is pressed, the program is unchanged and the next new device is displayed.

After all new detectors are presented for editing, the autoprogram feature displays the modules on the SLC starting with the device found at the lowest address.

MMX Module Autoprogram

MMX module Autoprogram is similar to Detector Autoprogram. When a new MMX module is presented, a typical display might be:

The major program editing for MMX modules is the selection of the Type Code on the first line. To change this selection, use the up and down arrow keys as the entire field blinks. The default selection is monitor as shown in the screen above. Note that selection of a Type Code may change the functional operation of the addressable device as shown in Table 9.

Type Code Label	Special Function
MONITOR	none (default)
PULL BOX	none
HEAT DET	none
SMOKE ZON	none
WATERFLOW	causes a nonsilenceable alarm
SUPERVISY	becomes supervisory point (see Section 4, Operation)
AUTO SUPV	becomes supervisory point (nonlatching supervisory)
TAMPLER_SW	becomes supervisory point (see Section 4, Operation)
_____	none (blank label for use when no other Type Code applies)
ACK_SW___	functions like the ACKNOWLEDGE switch
SILENC SW	functions like the SILENCE switch
RESET SW	functions like the RESET switch
DRILL___	functions like the DRILL switch

Table 9 MMX Module Type Codes

Follow the same procedure as described in New Detectors section, for editing of the ADJ and NOUN fields. The default zone selection is Z00 (main circuit board NAC outputs 1 and 2) and may be set to Z01 through Z56 if desired. See "Software Zones" on page 107.

The ADJ field for MMX modules can also be used to associate a second zone as described in "New Detectors" on page 73.

CMX Module Autoprogramming

A typical CMX module Autoprogram screen is shown below:

CMX modules default to Zone 00 (general alarm). All Type Code options are silenceable except Relay and Strobes. The selection of CMX module Type Codes may change their function. Select the Type Code from the library list shown in Table 10, using the arrow keys as described in "New Detectors" on page 73.

Type Code	Special Function
CONTROL	none (default)
BELL CKT	silenceable
HORN CKT	silenceable
SOUNDERS	silenceable
_____	none (blank label for use when no other Type Code applies), silenceable
RELAY	ignore open circuit (nonsilenceable)
STROBES	nonsilenceable

Table 10 CMX Module Type Codes

Select an adjective descriptor from the library list shown in Table 7 on page 74. Use the arrow keys as described in the New Detectors section. CMX modules may be assigned to a maximum of three software zones (refer to "Software Zones" on page 107). Zone Z00 represents general alarm. All CMX modules are assigned to Zone Z00 upon initial power-up.

Point Edit

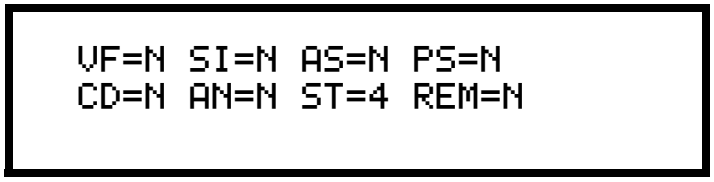
While displaying the Program Level 1 Menu screen (see "Program Change – Level One" on page 72), pressing the **2** key allows for editing of the point (addressable device) descriptor screens. These screens show the device type, the device address, adjective and noun field descriptors and the software zone locations that the point is assigned to. Point editing is performed *after autoprogramming* and may be done at any time, except during an alarm condition. The following display will appear:

```
POINT PROG.   EDIT
PRESS */#, AA,ENTER
```

For example, select Detector address 3 program edit by pressing * key (* = detector), followed by numeric key '3', followed by the ENTER key. To select module address 3 for program edit, press the # key (# = module), press the **3** key, then press the ENTER key. If there is no device installed at this address, the control panel displays the next higher address where a device is installed. After finished editing, press the ENTER key, the display returns to the above menu. *Rather than reentering the next point number, the user may press the up or down arrow key to display the next lower or higher existing point*. Using software PN #AFP100V1.0 or greater, to edit NAC 1 or NAC 2, press the * key, then the # key, the press '1' for NAC 1 or '2' for NAC 2. Select either 'BELL_CKT' for silenceable functionality or 'STROBE' for nonsilenceable functionality. Use the system edit menu described in "System Edit" on page 79, to select coding. Coding is only possible if the NAC is programmed as 'BELL_CKT'. The point display formats and the method of editing are described in "Autoprogram" on page 72.

System Edit

The System Edit function is selected by pressing the **3** key. *The system edit screen appears as shown below.* This software does not support the LCD-2x20 Annunciator.



Use the up and down arrow keys to scroll through the choices for each option and the left and right arrow keys to move from option to option.

There are eight system function options for software releases prior to PN #AFP100V1.0. The factory default selections and user option selections are shown below:

Function	Default	Selection
VF = Alarm Verification	(N)one	(Y) 120 seconds
SI = Silence Inhibit	(N)one	(Y) 60 seconds[1]
AS = Autosilence	(N)one	(Y) 10 minutes[1]
PS = Presignal	(N)one	(Y) 3 minutes with 15 second Acknowledge[1]
CD = Bell Code 1 Note: Bell 2 is fixed steady	(M)arch Time	(N)one (T) = Temporal (C) = California
AN = Annunciators	(N)one	(Z) = 56 Zones (ZU) = 56 Zones Annunciator with UDACT[2] (P) = 198 Points (PU) = 198 Points Annunciator with UDACT[2]
ST = SLC style	(4) = Style 4	(6) = Style 6
REM = Alarm/Trbl Reminder	(N)o	(Y)es = Sound onboard piezo every 15 seconds during alarm and every two minutes during trouble after pressing the ACKNOWLEDGE or SILENCE key.

1 Requires prior approval of Local Authority Having Jurisdiction.

2 When the UDACT has a fault, this entry allows the FACP to display 'DACT Trouble' on the LCD display and printer hardcopy. The history file will also be updated with this information. For zone annunciation, up to 56 zones, use AFM Series Annunciators or LDM Series Annunciators. For 198 point annunciation, use the LDM Series Annunciators.

Table 11 System Function Options

The system edit screen appears as shown below for software PN #AFP100V1.0 or greater. This software is required to support the LCD-2x20 Series Annunciators.

There are nine system function options for software PN #AFP100V1.0 or greater. The factory default selections and user option selections are shown below:

Function	Default	Selection
V = Alarm Verification	(N)one	(Y) 120 seconds
I = Silence Inhibit	(N)one	(Y) 60 seconds[1]
A = Autosilence	(N)one	(Y) 10 minutes[1]

Function	Default	Selection
P = Presignal	(N)one	(Y) 3 minutes with 15 second Acknowledge[1]
C = Bell Code	(N)one	(M) = March Time (T) = Temporal (C) = California
A/U = Annunciators with or without UDACT	(N)one	(Z) = 56 Zones (ZU) = 56 Zones Annunciator with UDACT[2] (P) = 198 Points (PU) = 198 Points Annunciator with UDACT[2]
L/P = LCD-2x20 or Printer/PC in use	(N)one	L = LCD-2x20 Series installed (requires DIM-485) P = Printer or local PC installed (requires PIM-24)
S = SLC style	(4) = Style 4	(6) = Style 6
R = Alarm/Trbl Reminder	(N)o	(Y)es = Sound onboard piezo every 15 seconds during alarm and every 2 minutes during has been pressed

1 Requires prior approval of Local Authority Having Jurisdiction.

2 When the UDACT has a fault, this entry allows the FACP to display 'DACT Trouble' on the LCD display and printer hardcopy. The history file will also be updated with this information. For zone annunciation, up to 56 zones, use AFM Series Annunciators or LDM Series Annunciators. For 198 point annunciation, use the LDM Series Annunciators.

Password Change

While displaying the Program Menu, press the **4** key to change either of two passwords. One high level password, defaulted to '00000', allows for point and system programming. A second lower level password, defaulted to '11111', allows for status changes such as:

- Disable points/zones
- Clear history file
- Walktest enable
- Time and date set
- Program check

Pressing the **4** key will display the following:

```
*,NNNNN, E=LEVEL 1 PW
#,NNNNN, E=LEVEL 2 PW
```

Select the password to change by typing * or #, then enter the new password. As the new program or status password is entered, it is displayed. When the enter key is pressed, the display reads PRESS ENTER IF OK, NNNNN=NEW PROGRAM PW. After the ENTER key is pressed, the new password is stored in EEPROM memory and the program returns to the program change screen. If BACKSPACE is entered, the password remains unchanged and the program returns to the program change screen.

Load

WARNING **Changes to program entries occur as a result of the downloading process. After successful downloading, make sure to perform the following steps:**

1. Print out all programmed data via the print mode or manually view programmed enteries and compare to intended program data.
2. Test all affected control panel operations.
3. Immediately corrent any problems that you find.

While displaying the Program Menu, program selection '5' sets up the control panel for transfer of its application database from/to a Window-based computer. This may be used to save the program that exists in an control panel for security and future service reasons; or may be used to transfer a program created off-line to the control panel. Refer to the AFP-100 Off-Line Programming Manual for additional information. When the Load option is selected, the following screen will be displayed:

```
CONNECT COMPUTER NOW
RUN PROGRAM FROM PC
```

The left arrow key may be used to return to the program change screen. The PC connects to the EIA-232 printer interface (instructions provided with the Upload/ Download software kit). Continue to press the left arrow key to return to the main program screen.

While the control panel is normal with no active alarms, troubles or supervisories, the screen shown below will be displayed:

```
SYSTEMS ALL NORMAL
10:00A MON 03/02/98
```

To access the programming mode, the ENTER key must be pressed, causing the following screen to be displayed:

```
  1=PROGRAMMING
2=RD STATUS 3=AC/BAT
```

Pressing '1' will cause the following screen to appear:

```
KEY PASSWORD, ENTER
```

Enter the Level 2 password (default = 11111) then press the ENTER key to access Programming Change Level 2. The screen shown below will appear:

```
1=DISABL 2=CLR HIST
3=WALK 4=TIME 5=CHEK
```

From this screen, the available function choices include point Disable, Clear History, Walktest, Set Time and Check programming.

Disable

Press the **1** key to display the following screen:

```
DISABLE/ENABLE
PRESS */#,AA,ENTER
```

Press the * key to display detectors, the # key to display modules, enter the device

address, then press the ENTER key. A typical display is shown below:

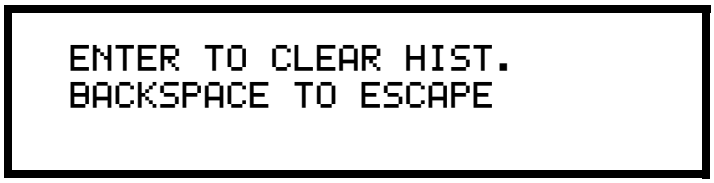
A point is then displayed on the screen similar to a Point Edit display but with the current status label (ENABLE) blinking. The current status label may show: NORMAL, TROUBL, DISABL, ALARM, ACTIVE, PROGRM, TEST 01, ON, OFF. The status label can be changed to DISABL or back to its present status by pressing the up or down arrow keys. The disable status is entered/stored in memory by pressing the ENTER key. The display then returns to the DISABLE/ENABLE screen shown above. The operator may then enter a new point number, or may press up/down to bring up the next lower/higher address point.

Note The control panel only disables initiating devices that are in alarm or control points that are ON occurs after the SYSTEM RESET key is pressed.

All disabled points will scroll on the LCD display and the system will remain in trouble until all programmed points are enabled.

Clear History

Press the **2** key to display the following screen:



Press the ENTER key to clear the 500-event History file. Press the left arrow key (backspace) to exit without clearing the History file.

Caution Pressing the ENTER key will clear all History events associated with this control panel. Care should be taken to ensure this is the appropriate action.

Walktest

From the Program Menu, press the **3** key, then press the ENTER key to display the following:

Press the **1** key to perform a silent Walktest with all sounding devices, CMX modules and the NAC 1 and NAC 2 outputs OFF. Press the **2** key to perform an audible Walktest which sounds all silenceable CMX modules and NAC 1 and NAC 2 (if programmed as BELL_CKT as explained in "Point Edit" on page 78) output during Walktest. Disabled NAC outputs will not activate during Walktest. Each alarm and trouble condition (short and open) will be printed in real-time and stored in the 500 event history buffer. After

pressing either '1' or '2', the screen shown below will appear:

If the ENTER key is pressed, the second line goes blank and the control panel is in Walktest mode. Walktest may be stopped at any time by pressing the left arrow key (backspace), which returns the control panel to the “All Systems Normal” display. A one hour time-out automatically returns the system to normal operation.

Shorted/Alarm Condition

When in Walktest, the control panel responds to each new alarm and activates its programmed control outputs for four seconds, if those control outputs have been programmed for silenceable activation. It also stores each alarm in the history file and printer with a 'TEST XX' status label. XX is a count of the number of times a device with this address has been tested. Note that this is a convenient way to identify two detectors that are erroneously set to the same address. A complete Walktest will cause a 'TEST 02' indication for the addresses to which both devices are set and no TEST report for the address that one of the devices should have been set to.

Note If the system under Walktest includes one or more enabled MMX-2 modules, the following may apply:

If the MMX-2 module is used for a supervised, two-wire smoke zone, alarming any MMX module in the system will result in the activation of programmed control outputs for an additional 8 seconds or less. This is caused by the temporary removal of 24 VDC resettable power from the MMX-2. The MMX-2 reports this loss of power as an open condition in addition to the alarm condition.

Open Condition

All intelligent devices on the SLC, as well as the two main circuit board NACs, are monitored for fault conditions during Walktest mode. When a new trouble condition occurs, it activates all CMX modules programmed for Walktest and Bell Circuit 1, then shuts them off after an 8 second interval (4 seconds longer than alarms). The trouble status label is 'TEST T'.

While in Walktest, the trouble relay is on and the System Trouble LED flashes (as in all of Program and Status change operations). The alarm relay is not activated. The LCD displays the following:

Set Time and Date

From the Program Menu, press the **4** key to display the following screen:

The first digit of the hours is flashing and may be changed with the numeric pad. The right arrow moves to the next digit. The up and down arrows select (A)M or (P)M, day of the week, month, day and year. Pressing the ENTER key stores the time and date and returns to the Level 2 screen.

Check

Program selection '5' performs a check on software zone assignments. The control panel looks for output devices assigned to a software zone that does not contain any input devices (detectors, monitor modules). If multiple devices fail the check, the up and down arrow keys are used to step through the list of devices. The user *must* return to point editing to correct any errors.

Note The system continues monitoring alarm conditions during all Programming and Read Status operations with the exception of Walktest.

At the completion of system programming, switch SW1 (Write Protect) should be set to the Write Protect position to prevent inadvertent changes to programmed features. Slide the switch to the up position to select the Write Protect feature.

SECTION 4 OPERATION

Control Keys

Introduction

Figure 45 shows the control keys on the control panel:

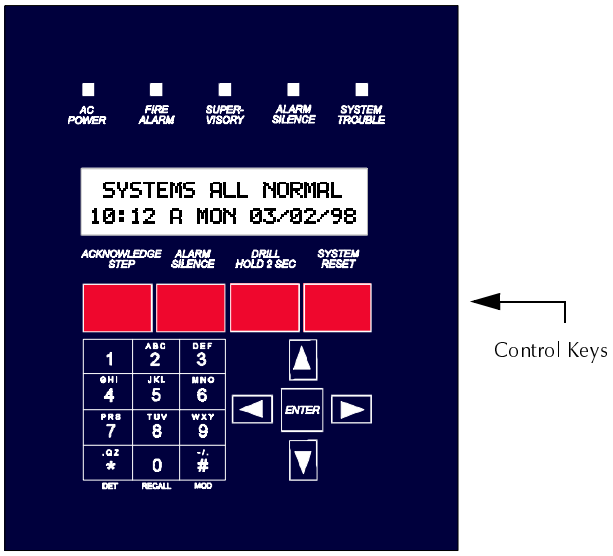


Figure 45 Control Keys

Acknowledge/Step

The ACKNOWLEDGE/STEP key silences the control panel sounder and changes all flashing LEDs to steady. Only one key press is necessary regardless of the number of new alarms, troubles or supervisory signals. When the panel sounder is silenced, an "Acknowledge" message is sent to the printer and the history file. Multiple active events are scrolled on the display at a three second rate. Acknowledge also automatically sends a "Silence Piezo" command to the LCD-2x20, AFM and LDM Series annunciators.

When more than one event exists, the first press of the ACKNOWLEDGE/STEP key silences the panel sounder and changes all flashing LEDs to steady. The second key press stops the scrolling and holds the event on the display for 1 minute. Subsequent pressing of the key "steps" through each active event.

Alarm Silence

The ALARM SILENCE key performs the same functions as ACKNOWLEDGE/STEP key. In addition, if an alarm exists, it turns off all silenceable circuits and causes the Alarm Silence LED to turn on. It also sends an "Alarm Silenced" message to the printer, the history file and the LCD-2x20. A subsequent new alarm will resound the system.

Note The ALARM SILENCE key operates on *silenceable* NAC outputs only.

Drill Hold 2 Sec.

When the DRILL key is held for 2 seconds (time required to prevent accidental activations), the control panel turns on both control panel NAC outputs and all silenceable circuits (all control modules/NACs that are programmed silenceable) and turns off the ALARM SILENCE LED. The “Manual Evacuate” message is shown on the LCD display. The same message is sent to the printer and history file.

System Reset

Pressing the SYSTEM RESET key turns off all control modules and NACs, temporarily turns off resettable power to 4-wire detectors, causes an “All Systems Normal” message to be displayed on the LCD and stores “System Reset” in the printer and history file. It also turns on all LEDs, panel sounder and LCD display segments as long as the SYSTEM RESET key is held (lamp test). Any alarm or trouble that exists after pressing the SYSTEM RESET key will resound the system.

System Status LED Indicators

Introduction

The control panel has five System Status LED Indicators on the front of the control panel. Figure 46 shows the system status LED indicators on the control panel:

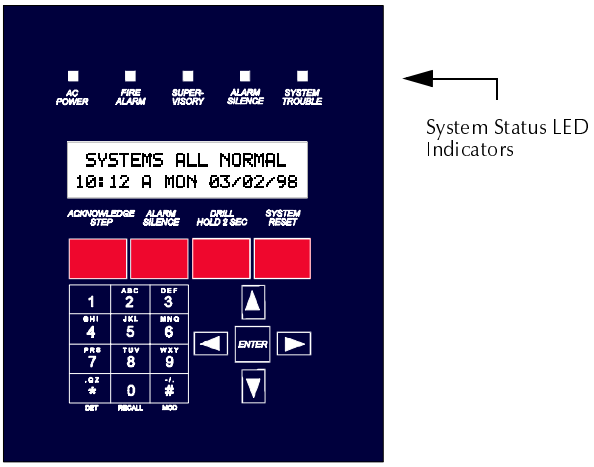


Figure 46 System Status LED Indicators Keys

AC Power

This is a green LED which illuminates if 120 VAC power is applied to the control panel.

Fire Alarm

This is a red LED that flashes when one or more alarms occur. The FIRE ALARM LED illuminates steady when you press the ACKNOWLEDGE/STEP key or the ALARM SILENCE key. The FIRE ALARM LED turns off when you press the SYSTEM RESET key.

Supervisory

This is a yellow LED that flashes when one or more supervisory conditions occur, such as a sprinkler valve tamper condition. It illuminates steady when you press the ACKNOWLEDGE/STEP key or the ALARM SILENCE key. The SUPERVISORY LED turns off when you press the SYSTEM RESET key.

Alarm Silence

This is a yellow LED that turns on after the ALARM SILENCE key is pressed (preceded by a fire alarm condition). It turns off when you press the DRILL key or the SYSTEM RESET key.

System Trouble

This is a yellow LED that flashes when one or more trouble conditions occur. It stays on steady when the ACKNOWLEDGE/STEP key or ALARM SILENCE key is pressed. The LED turns off when all trouble conditions are cleared. This LED will also illuminate if the microprocessor watchdog circuit is activated.

Normal Operation

With no alarms or troubles in the system, the display message is 'Systems All Normal' along with the current time and date as shown below. To set the time and date, refer to "Set Time and Date" on page 86.

The control panel performs the following functions at regular intervals while in normal mode:

- Polls all devices on the SLC, checking for valid reply, alarms, troubles, etc.
- Monitors the AC input voltage and the battery capacity
- Refreshes the LCD display and updates the system time
- Scans the keypad for entries
- Performs detector auto test
- Tests memory
- Update and reads the EIA-485 communications bus

With no alarms, the detection of a trouble in the system will cause the panel sounder to sound, the System Trouble LED to flash and the trouble relay to activate. A message will appear on the LCD display indicating the trouble condition. The same message is sent to the printer and history file along with time and date. A ground fault will also cause the yellow Ground Fault LED, located on the bottom of the main circuit board, to turn on.

Addressable Smoke Detectors

For addressable Ionization or Photoelectric smoke detectors, the following is a typical message that could appear on the LCD display for a detector in trouble.

The information displayed in the first line in the example above provides the following information:

- The type of event – in this example, TRBL indicates Device Trouble
- The Specific Device Trouble for a Detector - the # symbol will be replace by a digit representing a specific trouble condition (refer to the list of Specific Device Troubles listed below)
- Type of device – in this example, SMOKE DET indicates smoke detector
- Point type and address – in this example, P01 indicates Photoelectric detector assigned to address 01

The information displayed in the second line in the example above provides the following information:

- <ADJ> – user programmed adjective descriptor from library list or custom entry (five characters maximum)
- <NOUN> – user programmed noun descriptor from library list or custom entry (ten characters maximum)
- Zone – zone to which the point is assigned

The # symbol in the display will be replaced by a digit that represents the Specific Device Troubles as listed in Table 12.

#	Specific Device Troubles
1	An Invalid Reply may be due to: (1) incorrect pulse width received from a detector (2) no answer from a detector due to either a complete device failure or removal from the SLC loop (3) an incorrect identification code received, i.e. a photo detector replaced by an ion detector or vice-versa
2	Maintenance Alert - indicates that a detector has been within 80% of its alarm threshold for 24 hours, indicating that the detector needs cleaning
3	Fail Automatic Test - indicates that a detector's sensing chamber and electronics (which are tested for normal safe operation every two hours) has failed the test

Table 12 Specific Device Troubles for a Detector

Monitor and Control Modules

The following is a typical message that could appear on the LCD display for monitor modules and control modules in trouble.

The information displayed in the first line in the previous example provides the following information:

- The type of event – in this example TRBL indicates Device Trouble
- The Specific Device Troubles for a module – the # symbol will be replaced by a digit representing a specific trouble condition (refer to the list of Specific Device Troubles for a module below)
- Type of device – in this example, MONITOR indicates a monitor module
- Point type and address – in this example, M01 indicates monitor module assigned to address 01

The information displayed in the second line in the previous example provides the following information:

- <ADJ> – user programmed adjective descriptor from library list or custom entry (five characters maximum)
- <NOUN> – user programmed noun descriptor from library list or custom entry (ten characters maximum)
- Zone – zone to which the point is assigned

The # symbol in the display will be replaced by a digit that represents the Specific Device Troubles as listed in Table 13:

#	**Specific Device Troubles**
1	An Invalid Reply may be due to: (1) incorrect pulse width received from a module (2) no answer from a module due to either a complete device failure or removal from the SLC loop (3) an incorrect identification code received, i.e. a monitor module replaced by a control module or vice-versa
2	Short Circuit Control Module - indicates a short circuit exists across a control module's NAC
3	Open Circuit Monitor/Control Module - indicates an open circuit exists on a control module's NAC or the monitor module's Initiating Device Circuit

Table 13 Specific Device Troubles for a Module

Pressing the ACKNOWLEDGE/STEP key will cause the panel sounder to silence and the System Trouble LED to turn on steady. This occurs regardless of the number of troubles, alarms and supervisory events active in the system (block acknowledge). When you press the ACKNOWLEDGE/STEP key, and at least one new alarm or trouble exists in the system, the "Acknowledge" message is sent to the printer and history file. If the trouble clears, either before or after Acknowledge, the "Clear Trouble" message is sent to the printer as illustrated by the following example:

```
CLR TRBL_# SMOKE DET P01 <ADJ><NOUN> ZONE# TIME and DATE
```

If all troubles clear and there are no supervisory or fire conditions active in the system, the system returns to normal operation status and the “Systems All Normal” message is shown on the LCD display and stored in the history and printer files. Trouble restore occurs even if the troubles were never acknowledged (auto-restore).

If the ALARM SILENCE key is pressed when only troubles exist, it will have the same effect as the ACKNOWLEDGE/STEP key. The Alarm Silence LED will not be illuminated unless there was also an alarm in the system.

Note If a combination of alarms, troubles and/or supervisory conditions occur in the system simultaneously, only the alarms are scrolled on the display.

If multiple trouble conditions exist in the system, they scroll on the LCD display automatically at a 3-second rate. If the ACKNOWLEDGE/STEP key is pressed, the display stops on the present item for one minute or until the Acknowledge/Step key is pressed again. As the ACKNOWLEDGE/STEP key is pressed, the control panel displays events in the following priority order:

6. Alarms in address order
7. Supervisories in address order
8. Troubles in address order

Alarm Operation

Alarm operation is similar to trouble operation, but with the following differences:

- The panel sounder produces a steady output, not pulsed
- The System Alarm (not Trouble) LED flashes
- ALARM: device name, type and address are displayed
- Alarms latch and *are not allowed to clear automatically*
- Alarms activate software zones (control-by-event logic) if so programmed
- Timers (Silence Inhibit, Auto-silence, Trouble Reminder) are started
- Alarms activate the general alarm relay and zone Z00 (NAC 01 and NAC 02)
- The trouble relay is not activated

A typical alarm display would be:

Supervisory Operation

Supervisory operation is similar to alarm operation but with the following differences:

- The panel sounder is a warbling sound
- The Supervisory LED (not Alarm) flashes
- The Display Status label is Active
- Supervisory relay is activated
- Silenced alarms are not resounded
- Timers are not started
- The alarm relay is not activated

A typical Supervisory event would display:

Note that, like alarms, supervisory signals latch and can be assigned to a software zone. Supervisory alarms do not cause resound as do other alarm conditions. Open circuits in supervisory wiring are processed by the control panel the same way as other trouble conditions.

NAC (Notification Appliance Circuit) Operation

The control panel has two NACs: NAC 01 and NAC 02.

NAC 01 and NAC 02 are programmable. Both NACs may be either silenceable or nonsilenceable and may be programmed as steady or coded operations. Coded operation includes March Time, Temporal or California types. Refer to "Coded Operation - NAC 01 and NAC 02" on page 96, for additional information on coding.

Control-By-Event (CBE)Operation

Each addressable detector and monitor module can be assigned to one software alarm zone. Control modules may be assigned to a maximum of three software zones. A general alarm zone (Z00) may be listed for output (control) points, but it is not necessary to list Z00 for input points, as this is the default zone. Z00 is not activated by supervisory points.

When an input device (detector, MMX series modules) alarms and is not disabled, it activates all software zones assigned to it. An output device (CMX module or NAC) that is not disabled is turned on when any of the software zones, to which it is mapped, become active.

Note For more information on CBE operation, refer to Appendix B, “Software Zones.”

Detector Functions

Maintenance Alert

Each detector is monitored by the control panel for its maintenance status. If a detector is within 80% of its alarm threshold for a 24-hour period, a “maintenance alert” message will be automatically displayed, signaling that the detector needs servicing.

Automatic Test Operation

An automatic test of each detector is performed every 2 hours. The detector's sensing chamber and electronics are functionally tested for normal, safe operation. A trouble message is displayed upon failure of this test. You can also clear this trouble by pressing the SYSTEM RESET key.

Type Code Supervision

The control panel monitors hardware device type codes (CPX, SDX, and FDX, MMX-1, MMX-101, MMX-2 and CMX) at slow intervals. Mismatch of any type code, compared to the system program, will cause a device trouble.

System Alarm Verification

You can also program the control panel to perform alarm verification to detectors. Refer to "Alarm Verification (None or Two Minutes)" on page 98, for a description of the Alarm Verification Timer.

Time Functions: Real-time Clock

The control panel includes a crystal-based clock that provides time of day, date and day of week. Time is displayed as 12 hour time with month/day/year and is stored in RAM. If both AC and battery power are lost, the time must be reset.

Coded Operation - NAC 01 and NAC 02

Shown below are the pulse rate outputs via NAC 01 or NAC 02 when coded operation is selected.

Code Selection	Pulse Rate
Continuous	Continuous
March Time	Pulses at 120 ppm (pulses per minute)
Temporal Code	Pulses at ½ second On, ½ second Off, ½ second On, ½ second Off, ½ second On, 1½ seconds Off
California Code	10 seconds On, 5 seconds Off

Table 14 Pulse Rates for NAC Coded Selections

Presignal

Presignal is used to delay output activation (control modules and NACs) while allowing for visual verification by a person. Once a detector or monitor module triggers an alarm, the panel sounder immediately, but the Notification Appliance Circuits are not activated for 15 seconds. During this time, if the Acknowledge key is pressed, the panel sounder is silenced and the notification appliances will not activate for up to three minutes. After three minutes, the NACs will activate if the source of the alarm is not cleared. This does not affect monitor modules programmed as waterflow or supervisory. *Presignal operation requires the approval of the local Authority Having Jurisdiction.*

Special System Timers

Silence Inhibit Timer (None or 60 Seconds)

This option, if selected, prevents the ALARM SILENCE key from functioning for 60 seconds after an alarm. A new alarm during the initial 60 seconds will cause the timer to restart with a new 60 seconds.

Note Silence Inhibit operation requires the approval of the local Authority Having Jurisdiction.

Auto-silence Timer (None or 10 Minutes)

If Auto-silence is selected, the notification appliances are silenced automatically after 10 minutes of activation. Pressing the DRILL key will restart the timer with a new 10 minutes.

Note Auto-silence operation requires the approval of the local Authority Having Jurisdiction.

Trouble Reminder

If selected, this feature causes a reminding “beep” tone every 15 seconds during an alarm (after the Silence key is pressed) and every 2 minutes during a trouble condition (after the ACKNOWLEDGE/STEP key or ALARM SILENCE key is pressed). The “beep” tones from the panel sounder will occur until the alarm or fault is cleared.

Alarm Verification (None or Two Minutes)

If alarm verification is selected, an addressable smoke detector's alarm is ignored for a Retard period of 13 seconds and the detector's alarm condition is automatically reset. There will be no alarm indication at the control panel during the Retard period. A Confirmation period of 1 minute and 47 seconds follows, during which a subsequent alarm from the same detector will cause the control panel to immediately activate the appropriate outputs and indicate the alarm condition at the control panel. If a different detector alarms any time during the first detector's verification period, the control panel will immediately activate all appropriate outputs and indicate the alarm condition at the control panel. If no additional detector alarms occur within two minutes of the first alarm (13 second retard plus 1 minute and 47 second confirmation), the timer resets and the control panel is ready to verify any new detector alarms which may occur.

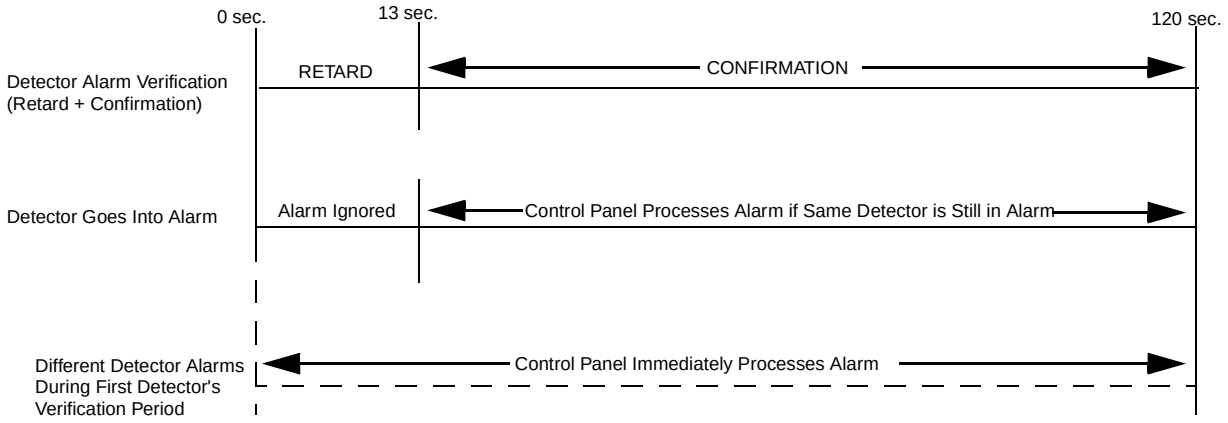


Figure 47 Alarm Verification Timing

Waterflow Circuits Operation

If an alarm exists from a monitor module point that has a WATERFLOW type code, the Alarm Silence key will not function.

Disable/Enable Operation

Input points which are disabled do not cause an alarm or any CBE (Control-By-Event) activity. Disabled output points are held in the off state. All disabled points are treated as if they were in trouble, with the exception being the status label that displays is DISABL.

Style 6 Wiring

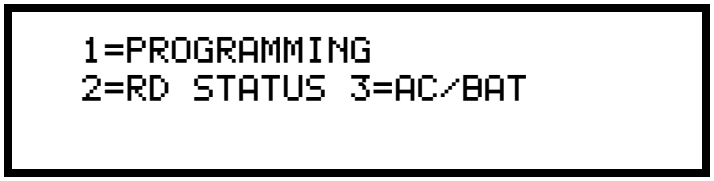
If the SLC is wired and programmed for Style 6 and a single fault occurs, the control panel will detect the fault and drive both ends of the line, fully recovering from the fault. The control panel latches the trouble and displays it until the SYSTEM RESET key is pressed. The display shows **Style 6** trouble type.

Read Status

Read Status functions do not require a password. The control panel will continue to provide fire protection while in Read Status mode. Read Status may be entered while the control panel is in alarm or trouble. If a new alarm or trouble occurs during these functions, the Read Status is exited to prevent confusion.

Read Status Entry

Press the ENTER key to display the programming menu on the LCD display:



To enter Read Status, press the **2** key. The control panel displays the following:

From the display shown above, you can take any of the functions listed in Table 15:

To	Do this
Display Point Status	Identify the type of device to be read by pressing the ***** key for a detector or the **#** key for a module. Key in the two-digit device address, then press the ENTER key.
Display Zone status	Press the ***** key two times, key in the zone number (1–56), then press the ENTER key. To view the next or previous zone, press the Up or Down arrow keys.
Display System Parameters	Press the ***** key two times, then press the ENTER key.
Display Bell Circuit status	Press the ***** key, press the **#** key, press the **1** or **2** key, then press the ENTER key.
To display the 500-event History file one event at a time	Press the **1** key then press the ENTER key. Use the Up and Down arrow keys to step through the entries in the history file.
Print the program contents and current system status or the history file	Press the **2** key, then press the ENTER key. A new menu appears which prompts the user to press '1' to print Program/ Status or '2' to print History file

Table 15 Read Status Operations

During all Read Status operations, except print operations, a 2-minute timer starts that causes the control panel to return to the previous display if no key is pressed within 2 minutes. Each key press restarts the 2-minute timer. Pressing the left arrow (backspace) key deletes the previous entry. (If there is no previous entry, it will cancel the Read Status operation and return to the previous display.) To cancel Read Status, press the SYSTEM RESET key.

Display Point

Display Point operations display addressable device status on the LCD display. After the status of the device displays, press the Up arrow key to display the status of the next highest addressable device or press the Down arrow key to display the status of the previous addressable device. The sequence of display point is 1) Detector points 01-99, 2) Module points 01-99, 3) NAC bell circuits 01 and 02, 4) System Parameters, and 5) Zones 1-56.

A typical Read Status display is as follows:

In the preceding display:

- **NORMAL** is the present status (could be ALARM, TRBL_#, DISABL, etc.)
- **SMOKE (DET)** is the device type; **P** indicates that this is a photoelectric detector (could be **I** if ionization or PULL BOX, HORN CKT, etc.) and **01** is the device address
- **WEST HALLWAY** is the custom label programmed for this device
- **MZ56** is the assigned software zone

If the point is not installed, a Read Status command to that point will result in a **NOT INSTALLED** message on the display.

Read History

The control panel provides a history file that can store up to 500 events, such as Point Status, System Troubles, and Acknowledge/Step, Alarm Silence, Drill and System Reset key presses. All history events are recorded with the time and date.

History events are stored in volatile memory, therefore, removal of primary AC power and secondary battery power will clear the history buffer. To clear the History file without removing power, see"Clear History" on page 84. To view events in the history file, use the Up and Down arrow keys to step through the events.

Print Program

You can use Print Program function to print all user-programmed options, including device types, software zone assignments, system parameters, and current system status.

Note For instructions on connecting a printer, refer to “Printer/PC Interface Module” on page 64.

Print History

You can use Print Program function to print the entire 500-event history file.

Note For instructions on connecting a printer, refer to“Printer/PC Interface Module” on page 64.

APPENDIX A POWER SUPPLY CALCULATIONS

The AC Branch Circuit

The control panel requires connection to a separate dedicated 120 VAC branch circuit, which must be labeled “Fire Alarm.” The branch circuit must connect to the line side of the main power feed of the protected premises. No other equipment may be powered from the fire alarm branch circuit. The branch circuit wire must run continuously, without any disconnect devices, from the power source to the fire alarm control panel. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Code as well as local codes. Use #14 AWG (2.00 mm^2) wire with 600 volt insulation for this branch circuit.

Use Table 16 to determine the total amount of current, in AC amps, that must be supplied to the fire alarm system.

Table 16 AC Branch Circuit Requirements @ 120VAC

Unit Type	Number of Units		Current Draw (amps)		Total Current per Device
AFP-100	1	X	2.3	=	2.3
CHG-120 Charger	[ ]	X	2.0	=	
Total AC Branch Current Required				**=**	**amps**

The Main Power Supply

The AFP-100 provides filtered power for operating the fire alarm control panel, operating external devices and operating the standby battery. The power for operating external devices is limited. Use Table 1 (standby or nonalarm) and Table 2 (alarm) to determine if external loading is within the capabilities of the AFP-100 power supply.

Concerning smoke detectors: refer to the manufacturer's data sheet packaged with each smoke detector to find the standby and alarm current draws to use in the following tables. Make sure to power detectors from TB4, terminals 5 and 6.

Device Type	**# of Devices**		**Standby Current (amps)**		**Total Current (amps)**
Main Circuit Board	1	X	0.08	=	0.08
Fire•Lite RTM-8F	[ ] one max.	X	0.009	=	
ACM-8R	[ ]	X	0.030	=	
AFM-16AT AFM-32A	[ ] one max.	X	0.04	=	
AEM-16AT AEM-32A	[ ]	X	0.002	=	
AFM-16AT AFM-32A	[ ]	X	0.04	=	
AFM-16A	[ ]	X	0.025	=	
UDACT	[ ] one max.	X	0.04	=	
LDM-32	[ ]	X	0.04	=	
LDM-E32	[ ]	X	0.002	=	
LCD-2x20 Series	[ ]	X	0.054	=	
4-Wire Smoke Detector	[ ]	X	[ ]	=	
Power Supervision Relay	[ ]	X	0.025	=	
CPX Series detectors	[ ]	X	0.00015	=	
SDX Series detectors	[ ]	X	0.00015	=	
FDX Series detectors	[ ]	X	0.0002	=	
MMX-1	[ ]	X	0.0002	=	
MMX-101	[ ]	X	0.0002	=	
MMX-2	[ ]	X	0.007	=	
BG-10LX	[ ]	X	0.0002	=	
CMX	[ ]	X	0.0002	=	
ISO-X	[ ]	X	0.0004	=	
Auxiliary Devices Powered from TB4	[ ]	X	[ ]	=	
Sum Column for Standby Load				=	

Table 1 Filtered Load in Standby - External Devices Connected to TB4 Only

Notes:

1. TB4, terminals 1 and 2; nonregulated 24 VDC, 2.5 amps
2. TB4, terminals 3 and 4; filtered 24 VDC +/-5% 120Hz ripple @ 10 mV_{RMS}
3. TB4, terminals 5 and 6; filtered 24 VDC +/-5% 120Hz ripple @ 10 mV_{RMS}
4. TB4, terminals 3 and 4; nonresettable auxiliary power, 300 mA

5. TB4, terminals 5 and 6; resettable smoke detector power, 300 mA
6. Refer to Current Limitations on following page

Device Type	**# of Devices**		**Alarm Current (amps)**		**Total Current[1] (amps)**
Main Circuit Board	1	X	0.168	=	0.168
Fire•Lite RTM-8F	[ ] one max.	X	0.146[2]	=	
ACM-8R	[ ]	X	0.158[3]	=	
AFM-16AT AFM-32A	[ ] one max.	X	0.056[4]	=	
AEM-16A AEM-32A	[ ]	X	0.018d	=	
AFM-16AT AFM-32A	[ ]	X	0.056[4]	=	
AFM-16A	[ ]	X	0.065[4]	=	
UDACT	[ ] one max.	X	0.075[5]	=	
LDM-32	[ ]	X	0.056[6]	=	
LDM-E32	[ ]	X	0.018s	=	
LCD-2x20 Series	[ ]	X	0.054	=	
4-Wire Smoke Detector	[ ]	X	[ ]	=	
Power Supervision Relay	[ ]	X	[ ]	=	
Addressable Devices	maximum draw for all devices	X	0.2[7]	=	0.2
Notification Appliances	[ ]	X	[ ]	=	
Auxiliary Devices Powered from TB4	[ ]	X	[ ]	=	
Sum Column for Alarm Load				**=**	**amps[8]**

1. Current limitations of terminals:
   TB4, terminals 1 and 2 = 2.5 amps
   TB4, terminals 3 and 4 = 0.3 amps
   TB4, terminals 5 and 6 = 0.3 amps
   TB1 and TB2, any one circuit = 2.5 amps
   Total current draw from all terminals cannot exceed 3.6 amps with standard XRM-1 transformer installed; 6.0 amps with both standard XRM-1 transformer and optional XRM-24 transformer installed. Note that total current from TB4, terminals 3 and 4 and terminals 5 and 6 must not exceed 0.600 amps.
2. All Fire•Lite RTM-8F Relays activated.
3. All eight ACM-8R Relays activated on a single module.
4. All annunciator LEDs on.
5. UDACT actively making phone call to Central Station. If the normally open contact is used, current consumption increases to 100 mA.
6. LDM-32 with LEDs on
7. MMX-2 Monitor Module current-limited at 90 mA in alarm.
8. This column must not exceed total system current draw of 6.6 amps.

Table 2 Filtered Load in Alarm - External Devices Connected to TB2 and TB4 Only

Standby Load Current (amps) [ ]	X	Required Standby Time in Hours (24 or 60 Hours) [ ]	=	_____
Alarm Load Current (amps) [ ]	X	Required Alarm Time in Hours (5 minutes = 0.084) [ ]	=	_____
Add Standby and Alarm Load for Required Ampere Hour Battery			=	_____
Multiply by the Derating Factor or 1.2			X 1.2	_____
Total Ampere Hours (AH) Required			=	_____

Table 19 Battery Calculations

Notes:

1 Up to 12 AH batteries can be located in the AFP-100 backbox.

2 12 AH to 18 AH batteries require the Notifier BB-17 battery box.

3 The AFP-100 main circuit board allows disabling of AFP-100 battery charger if using the CHG-120 Battery Charger for 25 AH to 100 AH batteries (requires separate housing).

APPENDIX B SOFTWARE ZONES

Overview of Software Zones

Setup and configuration of an addressable system differs from a conventional system. In a conventional system, assignment of input devices (smoke detectors, pull stations, heat detectors, etc.) to zones is straightforward. Wiring is direct from clearly marked control panel terminals to any device assigned to a particular zone. Connection of output devices (horns, bells, strobes, etc.) in a conventional system is done by direct wiring of the output device to terminals marked 'bell'.

With addressable systems, the same pair of wires is used to connect to all addressable input and output devices. Communications between the control panel and all addressable devices takes place over one pair of wires originating from the control panel. *Software programming is used to configure the system, versus direct wiring.* Zone assignment is created via software means, hence the term 'software zones'.

Setup of an AFP-100 software zone is straightforward. Any zone may have a minimum of one and a maximum of 99 addressable input devices. Each detector is automatically assigned to a general alarm output (zone Z00). A zone may also have a minimum of one and a maximum of 99 addressable output devices. CMX modules can be assigned to a maximum of three software zones. Detectors and MMX modules can be assigned to a maximum of two software zones.

Use the charts on the following pages to help in 'zoning' the system. Note that monitor and control modules make up one group of 99 addresses. It is critical that addresses of detectors are not duplicated and that monitor and control module addresses are not duplicated.

Examples of Software Zones

In the example in Figure 48 on the following page, Software Zones are zoned as follows:

Software Zone 1 has the following addressable devices assigned to it:

- Two SDX photoelectric detectors with addresses “01” and “02”
- One MMX-1 module with address “01”
- Three CMX modules with addresses “03”, “04” and “05”

Software Zone 2 has the following addressable devices assigned to it:

- Two CPX ionization detectors with addresses “03” and “04”
- One MMX-101 module with address “02”
- Three CMX modules with addresses “03”, “06” and “07”
- One SDX photoelectric detector with address “05”

Software Zone 3 has the following addressable devices assigned to it:

- Two SDX photoelectric detectors with addresses “05” and “06”
- One CPX ionization detector with address “07”
- Three CMX modules with addresses “03”, “08” and “09”

Figure 48 shows some of the key assignment features of the control panel:

- Addresses of detectors and addresses of MMX and CMX modules are not duplicated
- The CMX module at address “03” is assigned to the maximum three software zones (providing for floor above and floor below).
- The SDX photoelectric detector at address “05” is assigned to the maximum of two software zones (providing a special action like elevator recall)
- Detectors and MMX modules are assigned to one software zone

Note Make sure to properly plan the installation before installing any devices.

Correlation of Inputs and Outputs to Zones

Figure 48 shows examples of software zones for inputs and outputs.

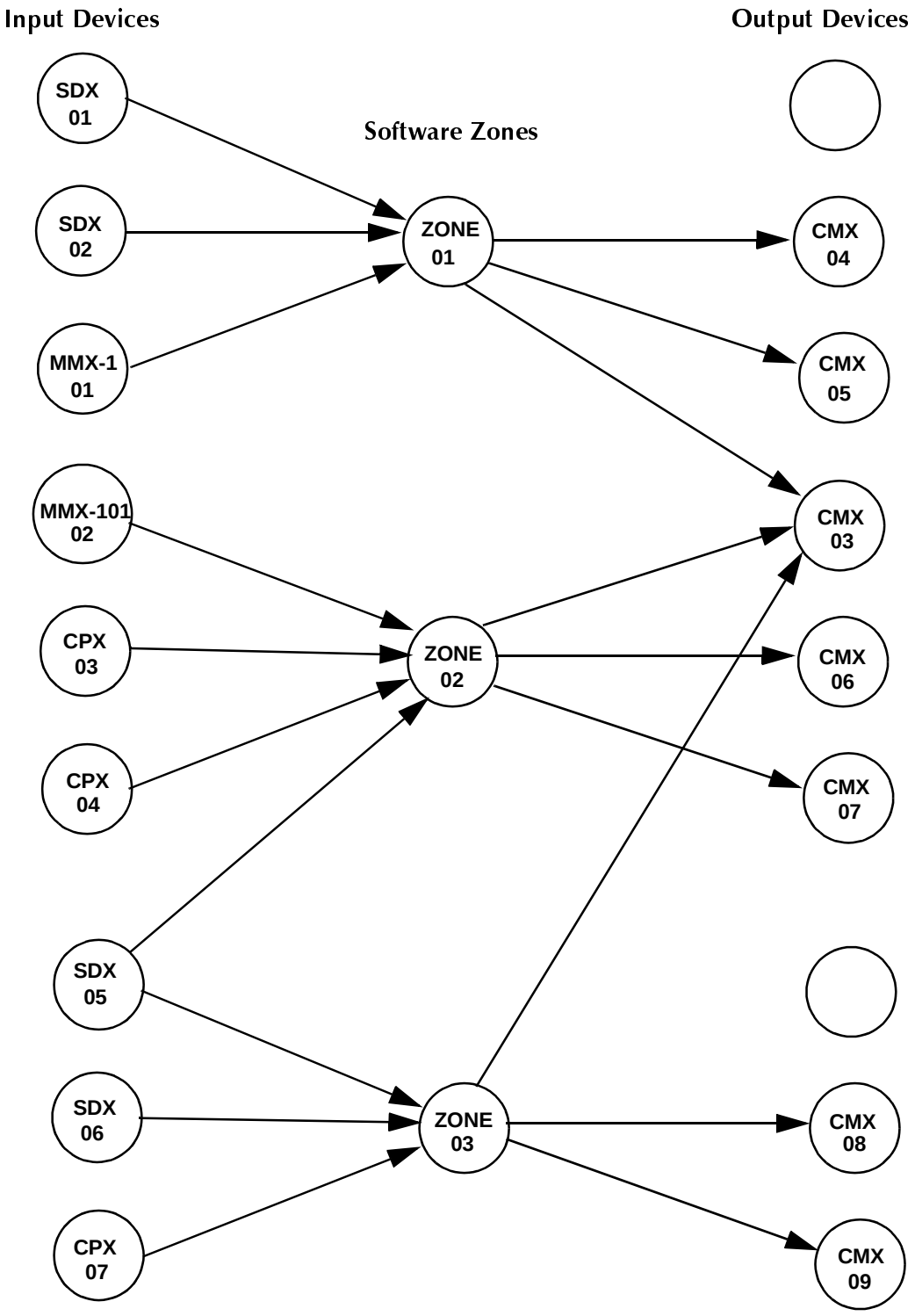


Figure 48 Software Zoning Examples

Sample Programming Sheets

Table 20 contains a sample programming sheet for detectors.

DETECTOR ZONE ASSIGNMENT								
Address	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**		**Address**	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**
01	SDX	1	FIRST HALL		51			
02	SDX	1	ELEV. LOBBY		52			
03	CPX	2	2ND FLOOR		53			
04	CPX	2	ROOM 210		54			
05	SDX	3	3RD FLOOR		55			
06	SDX	3	MEZZANINE		56			
07	CPX	3	MECH. ROOM		57			
08	SDX	1, 2	Z02 OFFICE		58			
09					59			
10					60			
11					61			
12					62			
13					63			
14					64			
15					65			
16					66			
17					67			
18					68			
19					69			
20					70			
21					71			
22					72			
23					73			
24					74			
25					75			
26					76			
27					77			
28					78			
29					79			
30					80			
31					81			
32					82			
33					83			
34					84			
35					85			
36					86			
37					87			
38					88			
39					89			
40					90			
41					91			
42					92			
43					93			
44					94			
45					95			
46					96			
47					97			
48					98			
49					99			
50								

Table 20 Detector Programming Sheet Example

Table 21 contains a sample programming sheet for modules:

MONITOR/CONTROL MODULE ZONE ASSIGNMENT								
Address	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**		**Address**	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**
01	MMX-1	1	WEST HALL		51			
02	MMX-101	2	EAST STAIRWELL		52			
03	CMX	1, 2, 3	2ND FLOOR		53			
04	CMX	1	1ST FLOOR		54			
05	CMX	1	EAST HALL		55			
06	CMX	2	ELEV. LOBBY		56			
07	CMX	2	MEZZANINE		57			
08	CMX	3	3RD FLOOR		58			
09	CMX	3	MECH. ROOM		59			
10	MMX-101	2, 3	Z03 CLOSET		60			
11					61			
12					62			
13					63			
14					64			
15					65			
16					66			
17					67			
18					68			
19					69			
20					70			
21					71			
22					72			
23					73			
24					74			
25					75			
26					76			
27					77			
28					78			
29					79			
30					80			
31					81			
32					82			
33					83			
34					84			
35					85			
36					86			
37					87			
38					88			
39					89			
40					90			
41					91			
42					92			
43					93			
44					94			
45					95			
46					96			
47					97			
48					98			
49					99			
50								

Table 21 Module Programming Sheet Example

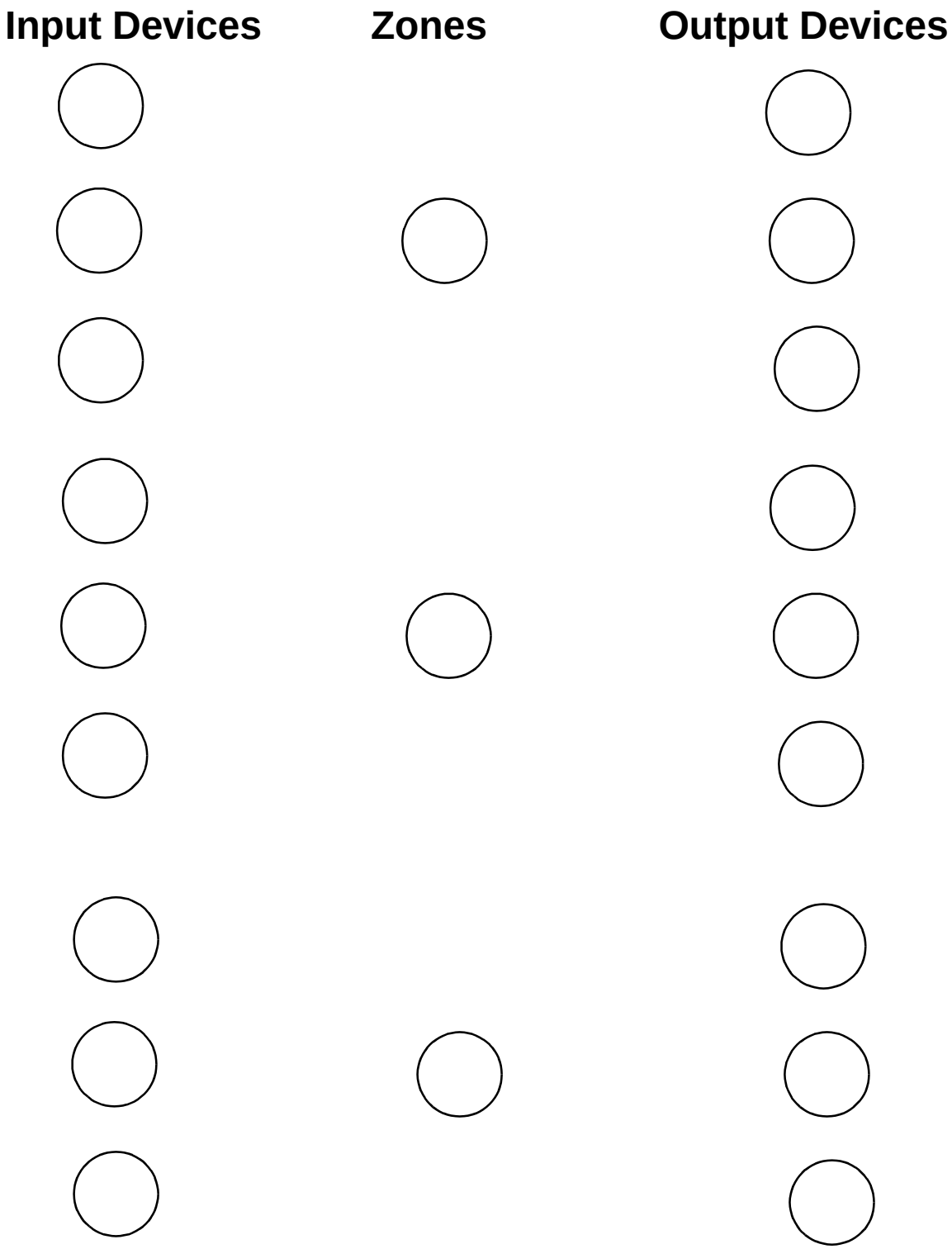


Figure 49 Blank Zoning Sheet

DETECTOR ZONE ASSIGNMENT								
Address	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**		**Address**	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**
01					51			
02					52			
03					53			
04					54			
05					55			
06					56			
07					57			
08					58			
09					59			
10					60			
11					61			
12					62			
13					63			
14					64			
15					65			
16					66			
17					67			
18					68			
19					69			
20					70			
21					71			
22					72			
23					73			
24					74			
25					75			
26					76			
27					77			
28					78			
29					79			
30					80			
31					81			
32					82			
33					83			
34					84			
35					85			
36					86			
37					87			
38					88			
39					89			
40					90			
41					91			
42					92			
43					93			
44					94			
45					95			
46					96			
47					97			
48					98			
49					99			
50								

MONITOR/CONTROL MODULE ZONE ASSIGNMENT								
Address	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**		**Address**	**Device Type**	**Zone Number**	**ADJ (5 charact. max) NOUN (9 charact. max)**
01					51			
02					52			
03					53			
04					54			
05					55			
06					56			
07					57			
08					58			
09					59			
10					60			
11					61			
12					62			
13					63			
14					64			
15					65			
16					66			
17					67			
18					68			
19					69			
20					70			
21					71			
22					72			
23					73			
24					74			
25					75			
26					76			
27					77			
28					78			
29					79			
30					80			
31					81			
32					82			
33					83			
34					84			
35					85			
36					86			
37					87			
38					88			
39					89			
40					90			
41					91			
42					92			
43					93			
44					94			
45					95			
46					96			
47					97			
48					98			
49					99			
50								

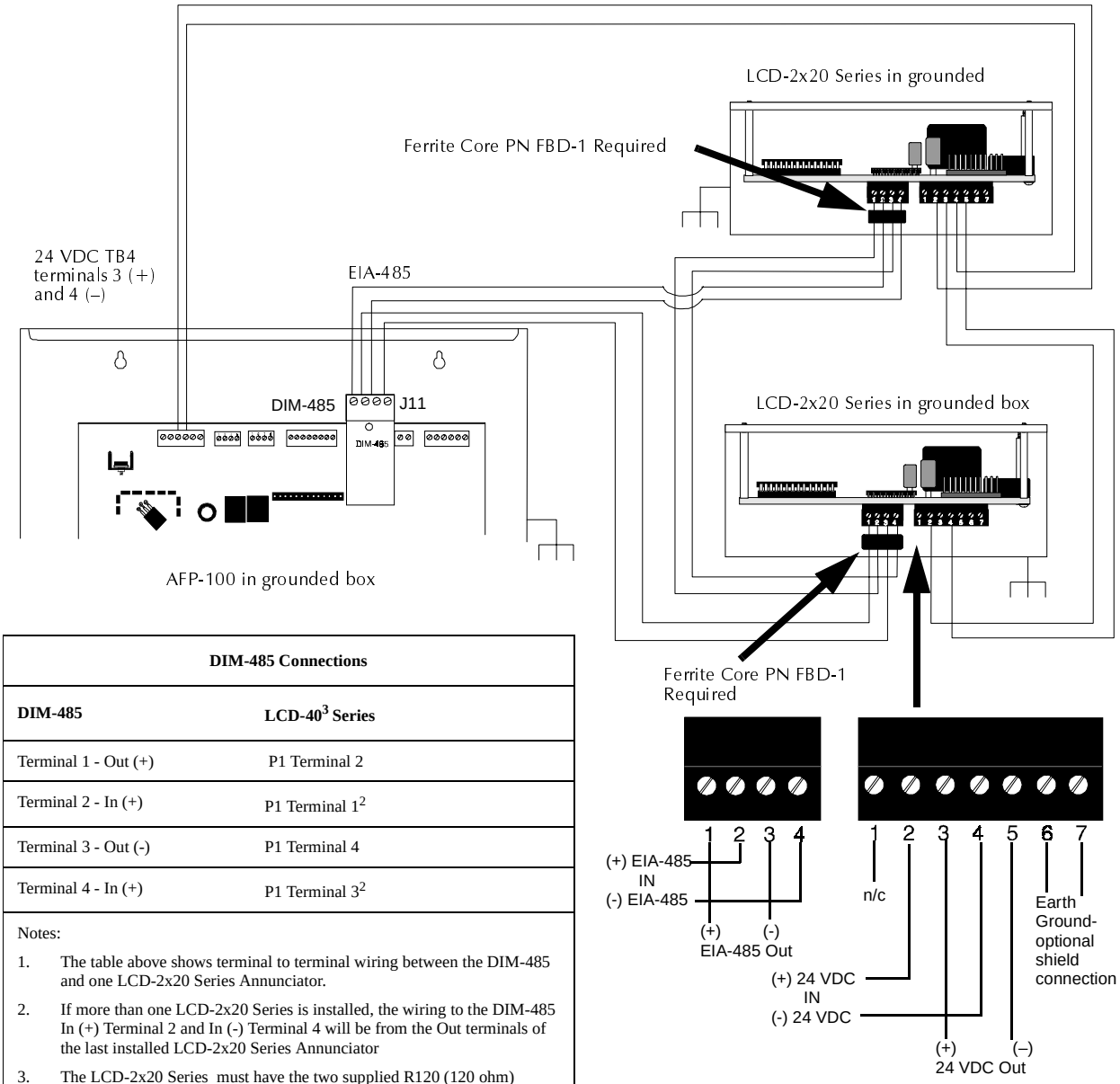
APPENDIX C LCD-2X20 SERIES ANNUNCIATOR WIRING

Overview

Figure 50 illustrates the wiring of two LCD-2x20 Series Remote Annunciators to an AFP-100. A maximum of 32 LCD-2x20 Series annunciators may be connected to a single control panel. The EIA-485 wiring must pass through a ferrite core (PN FBD-1) in each LCD-2x20 Series. Figure 50 also shows power supplied to the annunciators by the AFP-100. For system applications requiring greater than the 300 mA of nonresettable power the AFP-100 can supply or for remote locations, use the Notifier FCPS-24 Field Charger Power Supply.

Wiring

The DIM-485 interface module is required when using the LCD-2x20 Series. Insert the plastic standoff, supplied with the DIM-485, into the hole located near the J11 connector on the top right side of the AFP-100 main circuit board. Align the connector on the DIM-485 board with J11 on the AFP-100 main circuit board and align the hole on the DIM-485 with the standoff inserted into the main circuit board. Carefully seat the DIM-485 connector on the main circuit board J11 connector and press to seat the DIM-485 on the standoff.



DIM-485 Connections	
DIM-485	**LCD-40[3] Series**
Terminal 1 - Out (+)	P1 Terminal 2
Terminal 2 - In (+)	P1 Terminal 1[2]
Terminal 3 - Out (-)	P1 Terminal 4
Terminal 4 - In (+)	P1 Terminal 3[2]

Notes:

1. The table above shows terminal to terminal wiring between the DIM-485 and one LCD-2x20 Series Annunciator.
2. If more than one LCD-2x20 Series is installed, the wiring to the DIM-485 In (+) Terminal 2 and In (-) Terminal 4 will be from the Out terminals of the last installed LCD-2x20 Series Annunciator
3. The LCD-2x20 Series must have the two supplied R120 (120 ohm) resistors installed across the In Terminals 2 and 4 and Out terminals 1 and 3. These resistors are required for impedance matching.
4. Refer to the LCD-2x20 Series Technical Manual Document 51105 for detailed wiring information.

Figure 50 LCD-2x20 Series Wiring

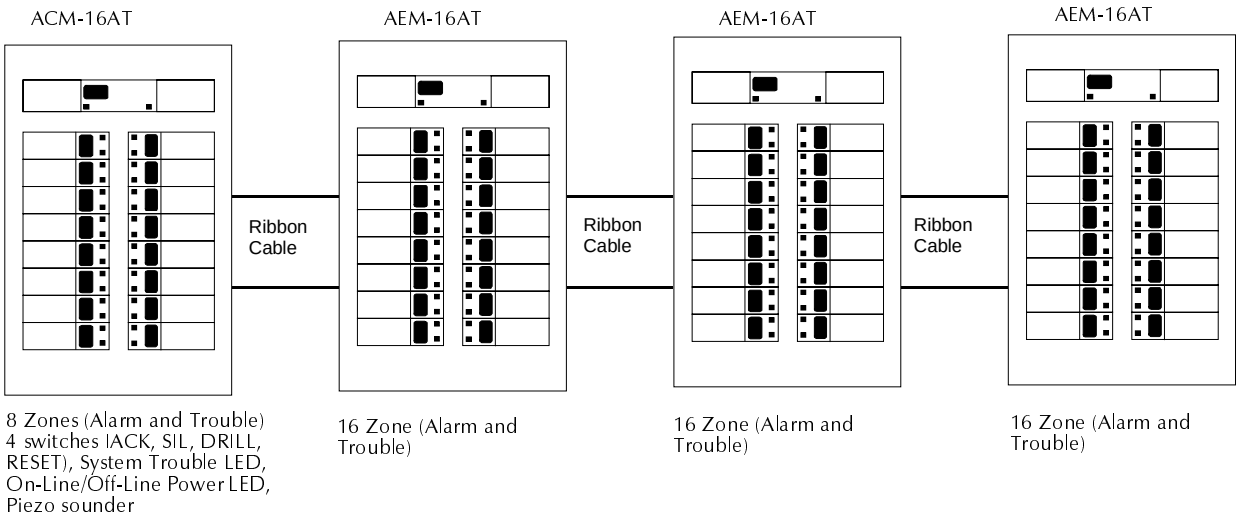
APPENDIX D ANNUNCIATOR WIRING

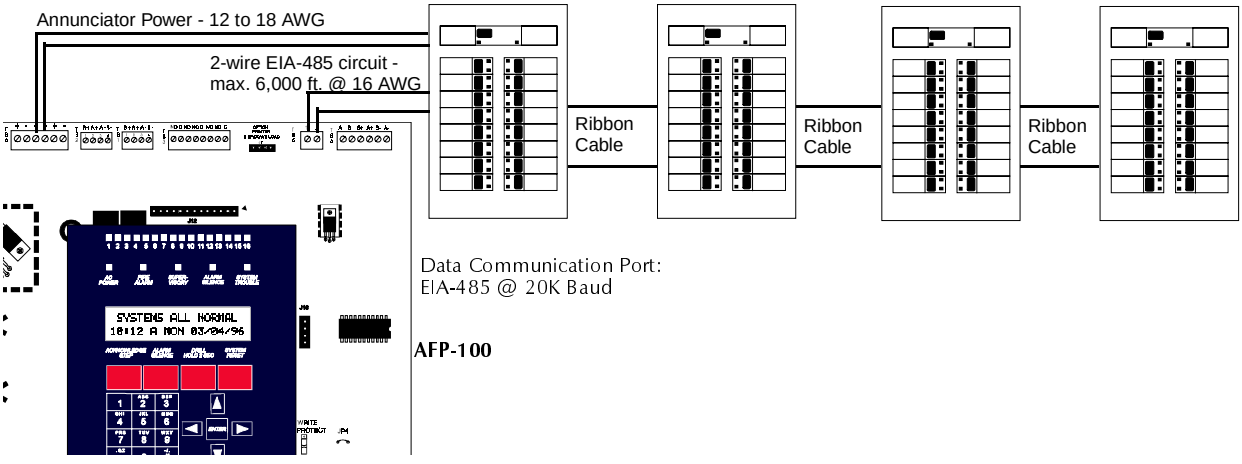
Overview

The following illustrations show the various configurations which may be wired using AFM and ACM Series Annunciators. LDM Series Annunciators may be used in a similar manner. All illustrations show power supplied to annunciators by the AFP-100. For system applications requiring greater than the 300 mA of nonresettable power the AFP-100 can supply, use the Notifier FCPS-24 Field Charger Power Supply.

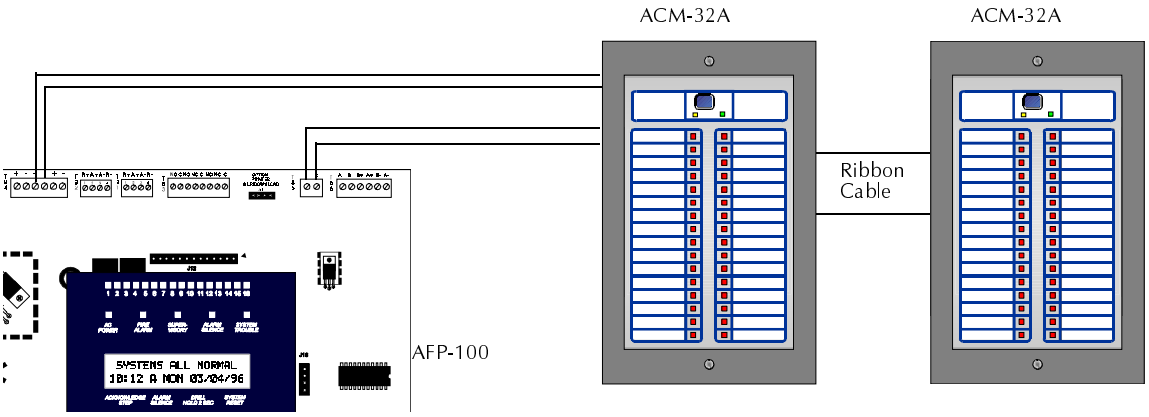
Wiring Diagrams

The following figure shows a configuration which provides 56 zones of alarm and trouble indications, remote Acknowledge/Step, Alarm Silence, Drill and System Reset keys, System Supervisory, AC Fail, and Trouble indications. Use AKS-1 keyswitch to prevent unauthorized actuation of control switches. Refer to the ACS Manual for further details.

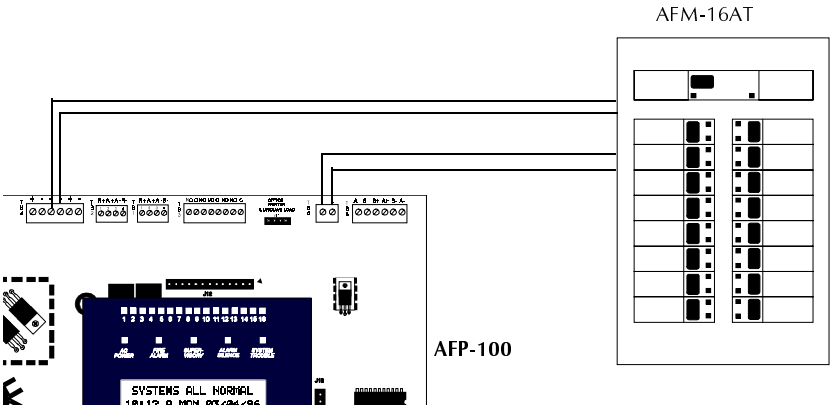




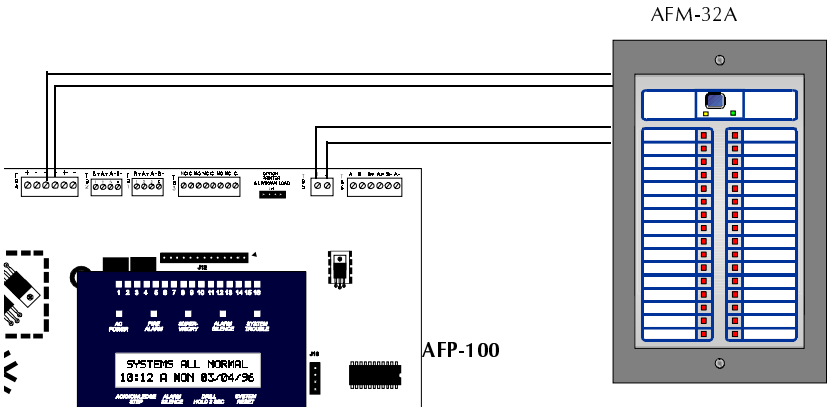
The following configuration provides 56 zones of alarm indication, a System Trouble LED, an On Line/Power LED, local panel sounder and a local Silence/Acknowledge switch.



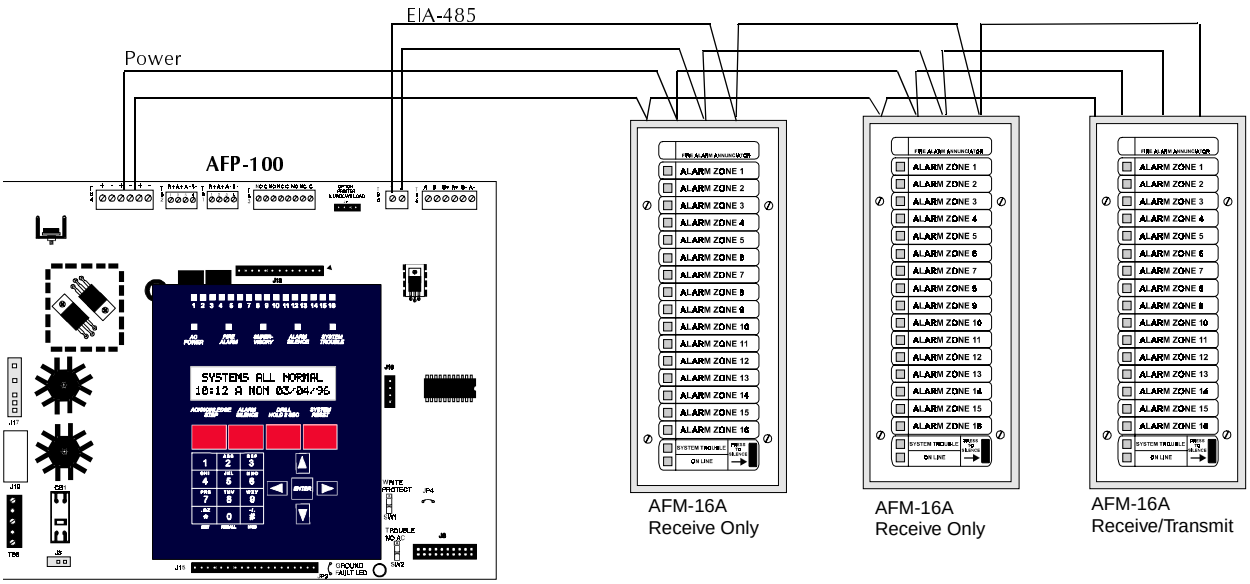
The following configuration provides 16 alarm and trouble LEDs, System Trouble LED, On Line/Power LED, local Silence/Acknowledge, Drill and Reset remote switches and panel sounder. *Only one per system*.



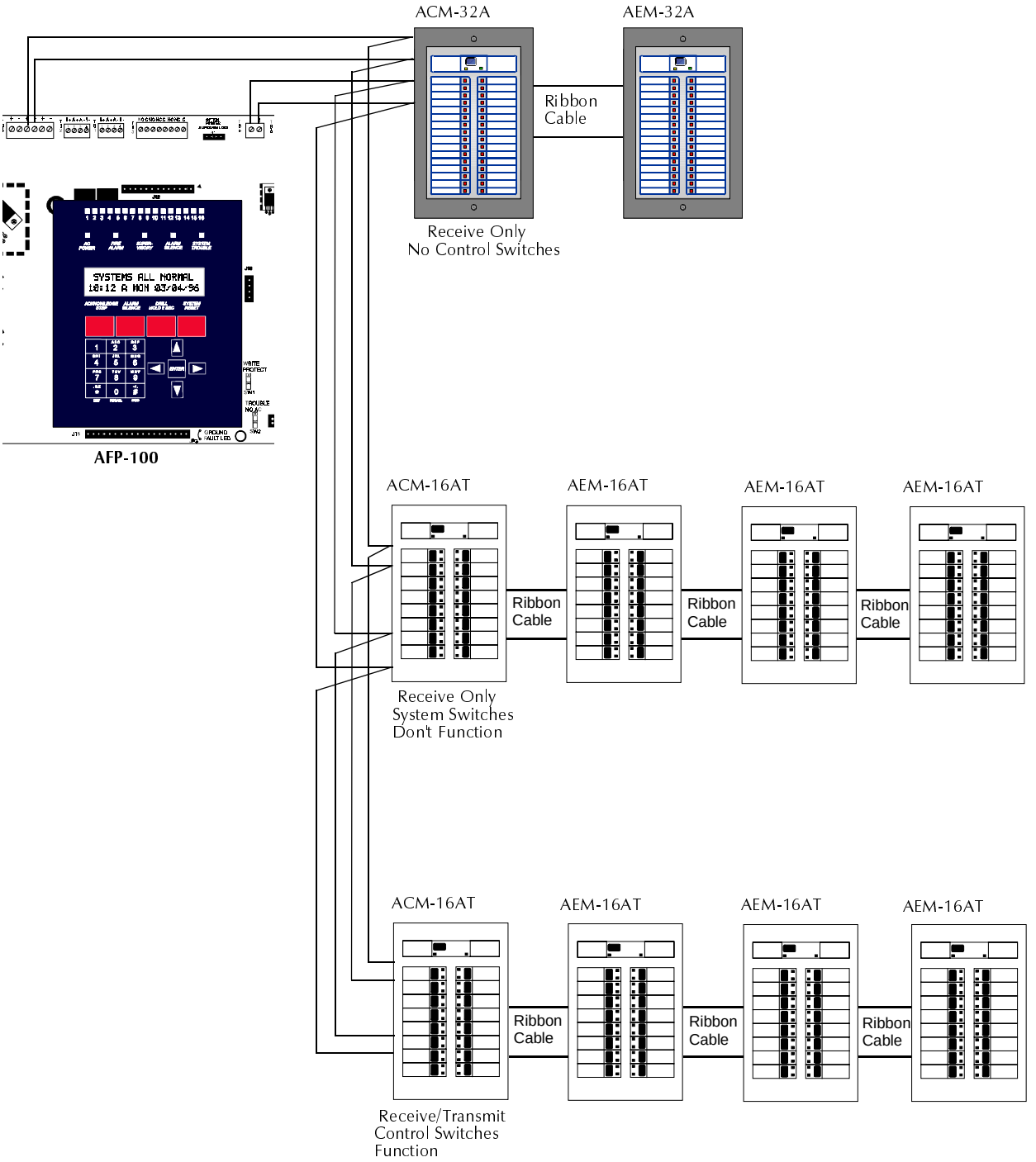
The following configuration provides 32 alarm LEDs, On Line/Power LED, System Trouble LED and local Silence/Acknowledge switch. *Only one per system*.



The following configuration provides 16 red alarm LEDs, System Trouble LED, On Line/Power LED, local Silence/Acknowledge switch and panel sounder. All AFM-16A annunciators will show the same information.



The following configuration allows the annunciation of 56 zones on the first two annunciators. 56 zones are annunciated on the second four annunciators. The same 56 zones are annunciated on the last four annunciators (which duplicate the previous set).



Notes

APPENDIX E NFPA STANDARD-SPECIFIC REQUIREMENTS

Overview

The AFP-100 is designed for use in commercial, industrial and institutional applications and meets the requirements for service under the National Fire Protection Association (NFPA) Standards outlined in this Appendix. The minimum system components required for compliance with the appropriate NFPA standard are listed below:

- **AFP-100 Control Panel** Contains the main control board, cabinet (backbox and door), main power supply transformer and power supply.
- **Batteries** Refer to “Appendix A”, for Standby Power Requirements.
- **Initiating Devices** Connected to one of the control panel's Initiating Device Circuits.
- **Notification Appliances** Connected to the control panel's Notification Appliance Circuit via a control module.

The following additional equipment if needed for compliance with the NFPA 72 standards listed below:

NFPA 72 National Fire Alarm Standards for: Fire Alarm Systems for Central Station Service (Protected Premises Unit) and Remote Station Service requires:

- MS-5012 for connection to a compatible listed Central Station DACR or Protected Premises Receiving Unit. This unit must be installed as outlined in Figure 51, “Central Station Service Using MS-5012,” on page 125.

OR

- UDACT may be installed as illustrated in Figure 39, “External UDACT Connections,” on page 58.

NFPA 72 Auxiliary Fire Alarm System Fire•Lite RTM-8F Relay/Transmitter Module for connection to a compatible listed Local Energy Municipal Box. This unit must be installed as outlined in Figure 52, “Municipal Box Connected to Fire•Lite RTM-8F Relay Transmitter Module,” on page 126.

NFPA 72 Remote Station Fire Alarm System Fire•Lite RTM-8F Relay/Transmitter Module for connection to the Notifier RS82 Remote Station Receiver. See Figure 53, “NFPA 72 Remote Station Protective Signaling System,” on page 127, for installation instructions for this unit.

NFPA 72 Proprietary Fire Alarm System AFP-100 Alarm, Trouble and Supervisory contacts connected to Transmitter(s). See Figure 54, “Proprietary Protective Signaling System,” on page 128, for installation instructions for this unit.

The following figure illustrates the use of an MS-5012. The UDACT may also be used. For information on installation, see Figure 39, “External UDACT Connections,” on page 58.

Notes:

1 Reference the MS-5012 Manual for additional information

2 Program the MS-5012 for slave operation

3 SW2 Trouble/No AC switch located on the bottom right of the AFP-100 main circuit board, must be positioned in the down position for this application. This prevents the transmission of a trouble on the loss of AC power

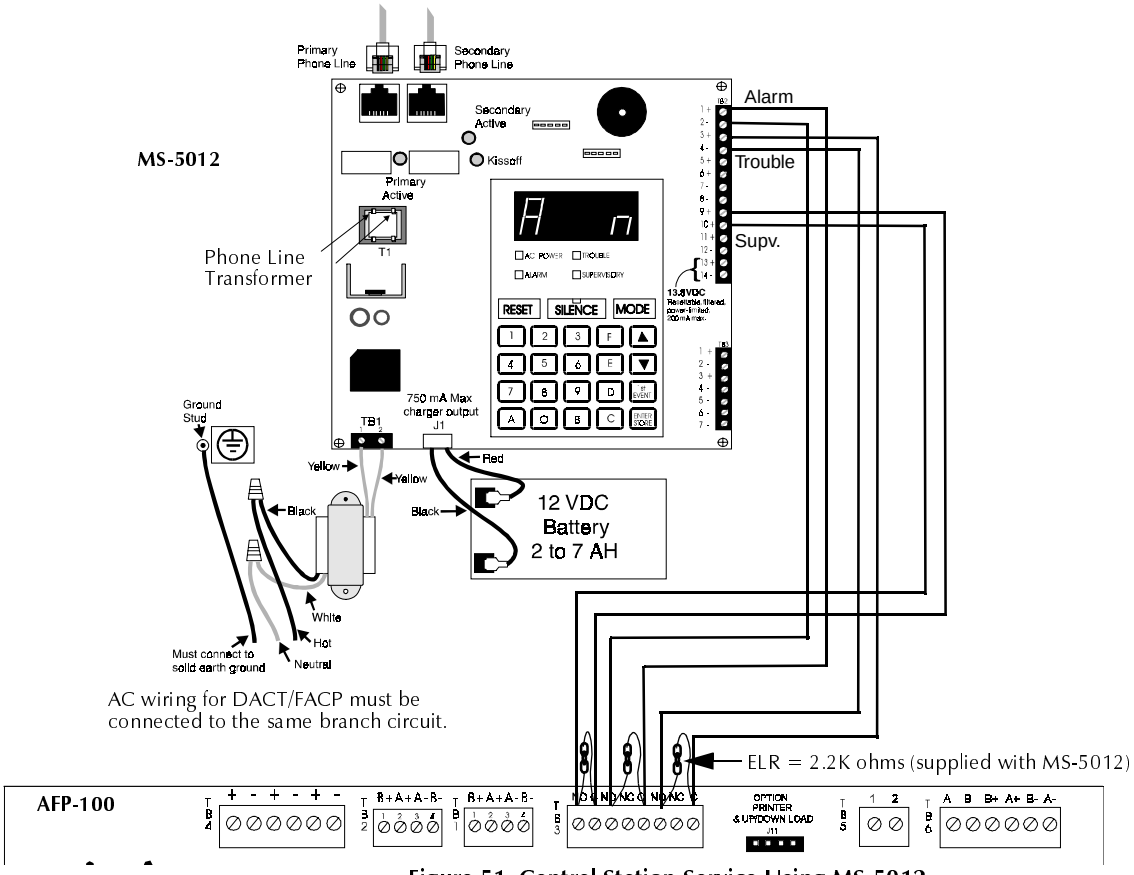


Figure 51 Central Station Service Using MS-5012

Table 22 MS-5012 Connections to the AFP-100

	MS-5012	AFP-100
Alarm	TB2-1	TB3-5
	TB2-2	TB3-3
Trouble	TB2-3	TB3-8
	TB2-4	TB3-6
Supervisory	TB2-9	TB3-2
	TB2-10	TB3-1

NFPA 72 Auxiliary Fire Alarm System

All connections are power-limited and supervised. This applications is not suitable for separate transmission of sprinkler supervisory or trouble conditions.

Notes:

1. The maximum loop resistance allowed for wiring from the AFP-100 to Municipal Box is 3 ohms.
2. Cut JP4 on the AFP-100 main circuit board to supervise placement of Fire•Lite RTM-8F module and circuit.
3. For information on UL power-limited wiring requirements, see Figure 12, “Typical UL Power-limited Wiring Requirements,” on page 31, and Figure 13, “Fire•Lite RTM-8F UL Wiring,” on page 32, .

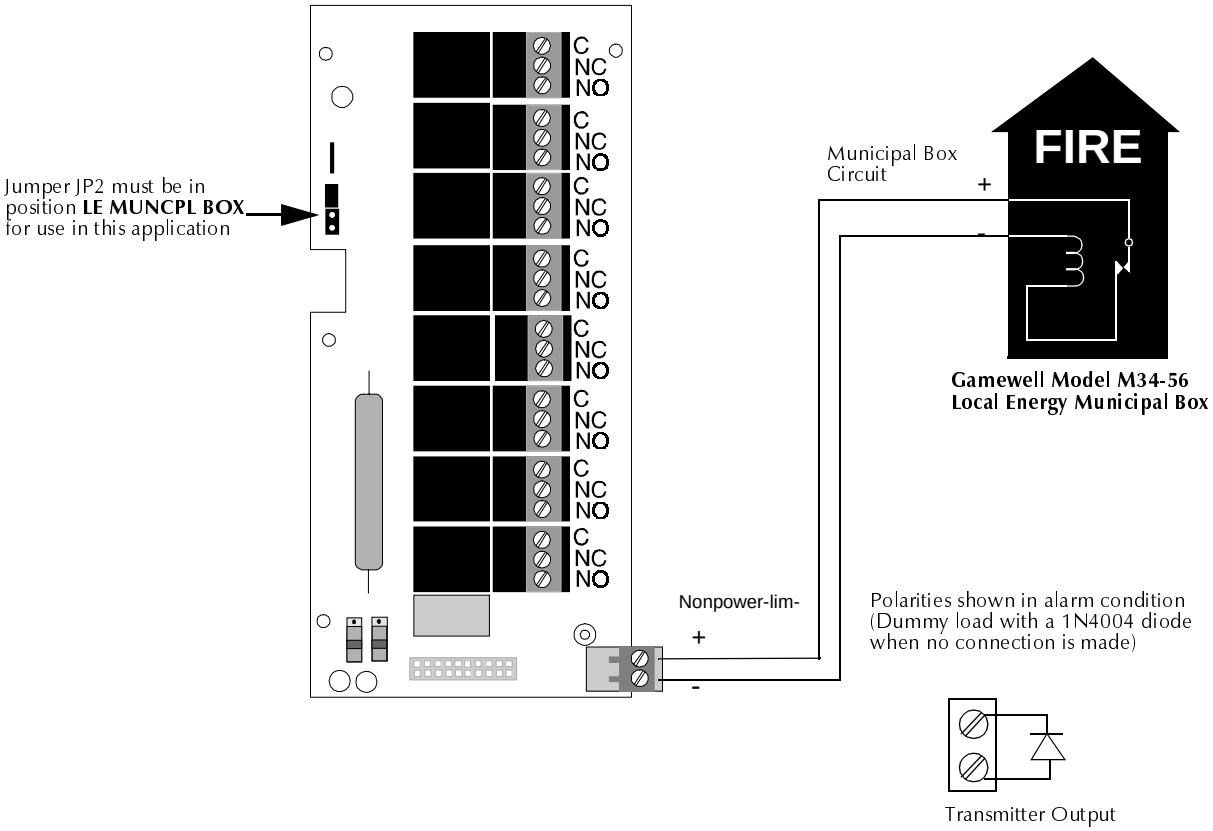


Figure 52 Municipal Box Connected to Fire•Lite RTM-8F Relay Transmitter Module

Notes:

1. Cut Jumper JP4 on the AFP-100 main circuit board to supervise placement of the Fire•Lite RTM-8F module.
2. For information on UL Power-limited wiring requirements, see Figure 12, “Typical UL Power-limited Wiring Requirements,” on page 31, and Figure 13, “Fire•Lite RTM-8F UL Wiring,” on page 32,

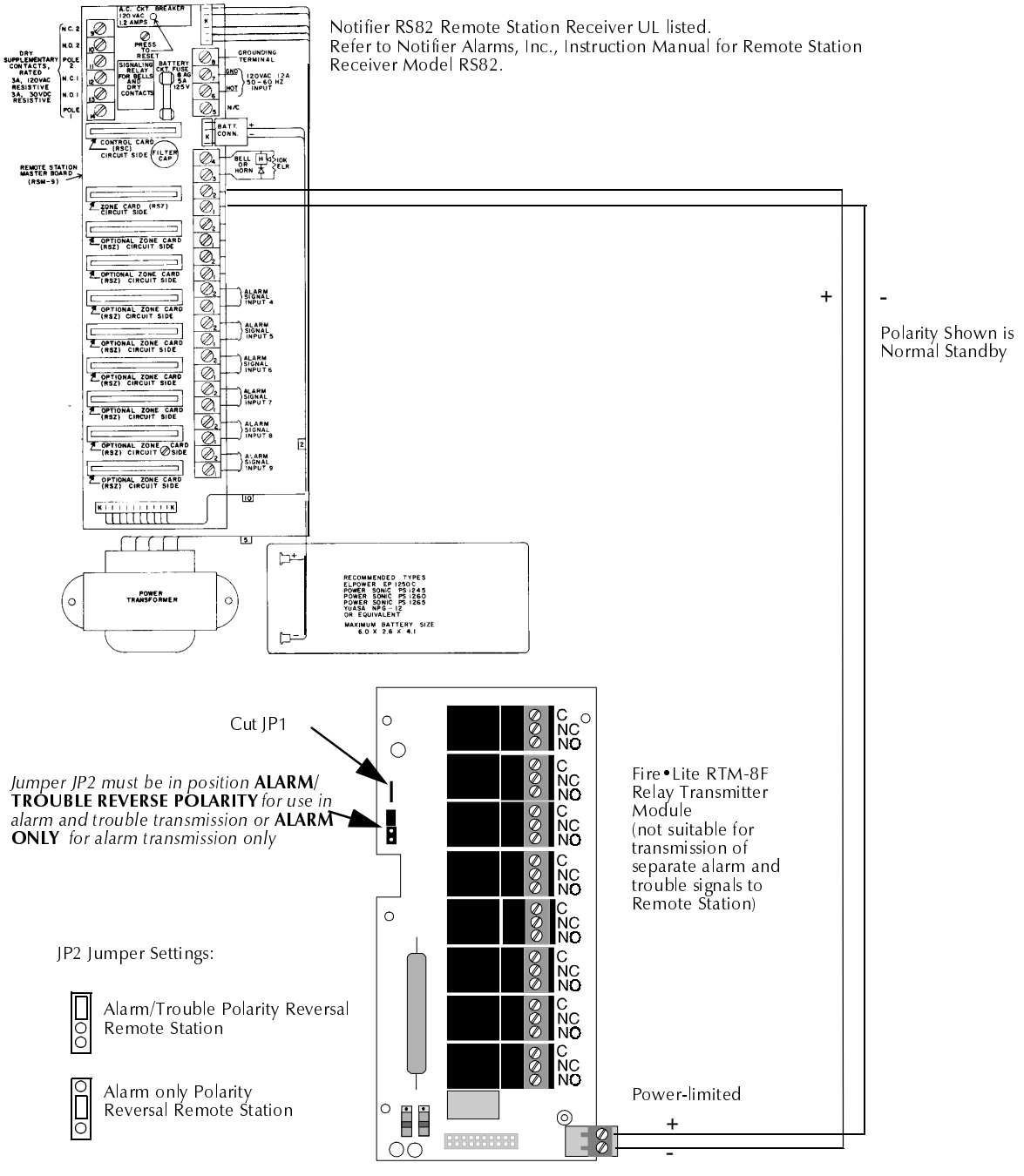


Figure 53 NFPA 72 Remote Station Protective Signaling System

NFPA 72 Proprietary Protective Signaling Systems

Notes:

1. Connection between the AFP-100 and the transmitter are supervised by the transmitter.
2. This AFP-100/Transmitter arrangement can be employed for NFPA 72 Proprietary Protective Signaling System.

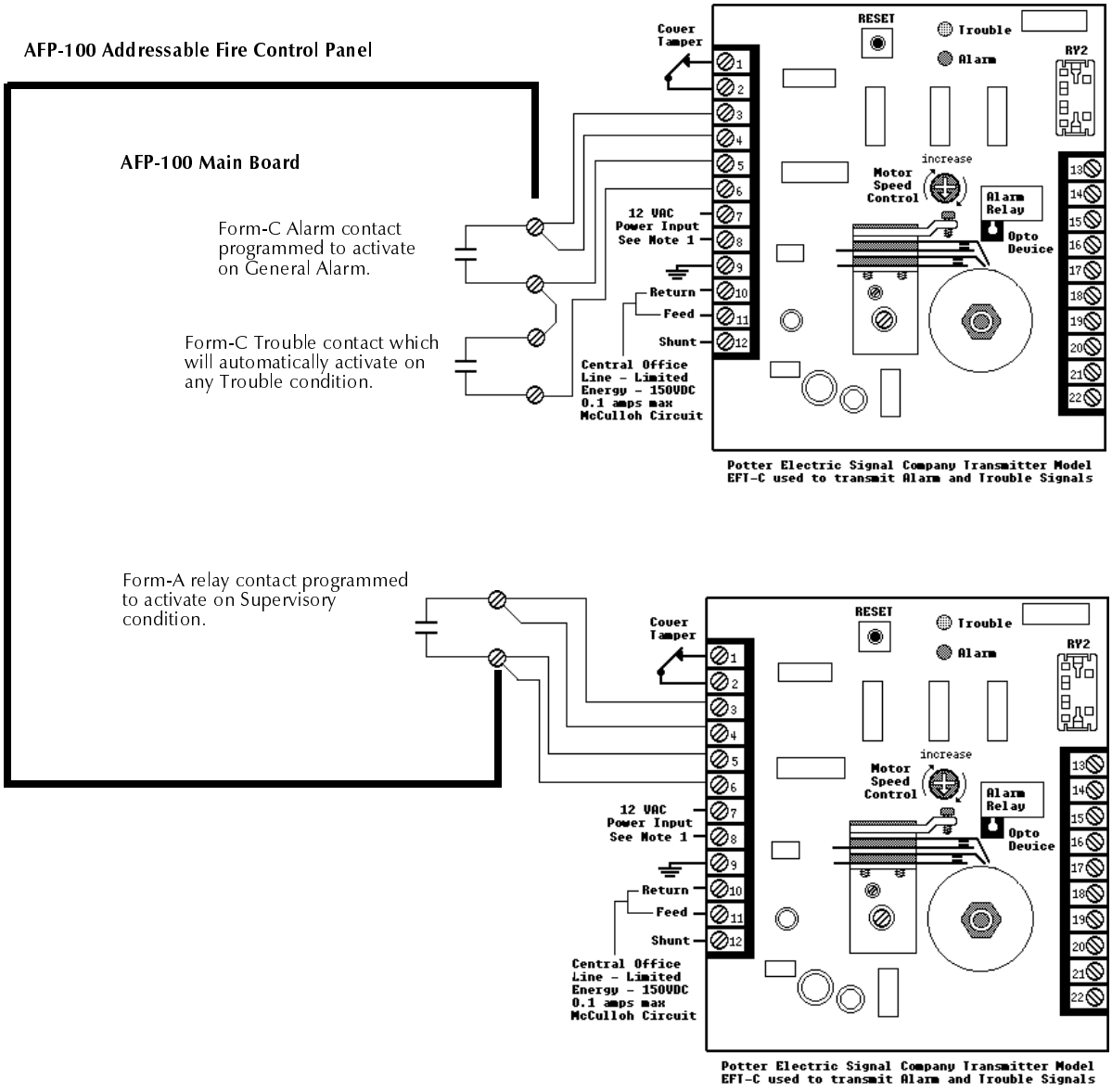


Figure 54 Proprietary Protective Signaling System

APPENDIX F WIRE REQUIREMENTS

Overview

T-tapping of the SLC wiring is allowed for 2-wire (Style 4) configurations. The total resistance of any branch cannot exceed 40 ohms. The total wire length of all branches cannot exceed 10,000 feet (3,000 m).

Connecting external system accessories to the AFP-100 main circuits must be carefully considered to ensure proper operation. It is important to use the correct type of wire, wire gauge and wire run length for each AFP-100 circuit. Reference the chart below to specify wire requirements and limitations for each AFP-100 circuit.

Note If the SLC is to be run in conduit with Notification Appliance Circuits, the risk of encountering problems can be greatly reduced by exclusively employing electronic sounders (such as MA/SS-24D) instead of more electronically noisy notification appliances such as electromechanical bells or horns.

The following table contains wire requirements for the AFP-100:

CIRCUIT CONNECTIONS		WIRE REQUIREMENTS		
Circuit Type	**Circuit Function**	**Wire Type and Limitations**	**Recommended Max. Distance Feet (meters)**	**Wire Gauge and Compatible Brands**
SLC (power-limited)	Connects to Addressable Devices	Twisted, shielded pair, 40 ohms maximum per length of Style 6 and 7 loops. 40 ohms per branch maximum for Style 4 loops[1]	10,000 (3,000 m) 8,000 (2,400 m) 4,875 (1,450 m) 3,225 (980 m)	12 AWG (3.25 mm^2): Genesis 4410, Signal 98230, Belden 9583, WPW999 14 AWG (2.00 mm^2):Genesis 4408 & 4608 Signal 98430, Belden 9581, WPW995 16 AWG (1.30 mm^2):Genesis 4406 & 4606 Signal 98630, Belden 9575, WPW991 18 AWG (0.75 mm^2):Genesis 4402 & 4602 Signal 98300, Belden 9574, WPW975
		Untwisted, unshielded pair	1,000 (300 m)	12-18 AWG (3.25 - 0.75 mm^2)
EIA-485 (power-limited)	Connects to annunciator modules	Twisted, shielded pair with a characteristic impedance of 120 ohms	6,000 (1,800 m)	18 AWG (0.75 mm^2)
EIA-232 (power-limited)	PIM-24 output connects to remote printer and PC computer	Twisted, shielded pair	50 (15 m)	18 AWG (0.75 mm^2) minimum
MMX-1 and MMX-101 (power-limited)	Initiating Device Circuit	Maximum loop wire resistance is 40 ohms for the MMX-1 and 20 ohms for the MMX-101	2,500 (760 m)	12-18 AWG (3.25 - 0.75 mm^2)
MMX-2 (power-limited)	Initiating Device Circuit	No more than a 2.4 volt drop allowed at end of circuit. Maximum loop wire resistance is 25 ohms	2,500 (760 m)	12-18 AWG (3.25 - 0.75 mm^2)
CMX (power-limited)	Notification Appliance Circuit	In alarm, no more than a 1.2 volt drop allowed at end of circuit	Distance limitation set by 1.2 volt maximum line drop	12-18 AWG (3.25 - 0.75 mm^2)
24 VDC filtered resettable and nonresettable (power-limited)	Connects to annunciators and other accessories	No more than 1.2 volt drop allowed from supply source to end of any branch	Distance limitation set by 1.2 volt maximum line drop	12-18 AWG (3.25 - 0.75 mm^2)
24 VDC nonregulated (power-limited)	Connects to CMX control modules and accessories	No more than 1.2 volt drop allowed from supply source to end of any branch	Distance limitation set by 1.2 volt maximum line drop	12-18 AWG (3.25 - 0.75 mm^2)
CHG-120	Remote secondary power source	12 AWG (3.25 mm^2) in conduit	20 (6 m)	12-18 AWG (3.25 - 0.75 mm^2)

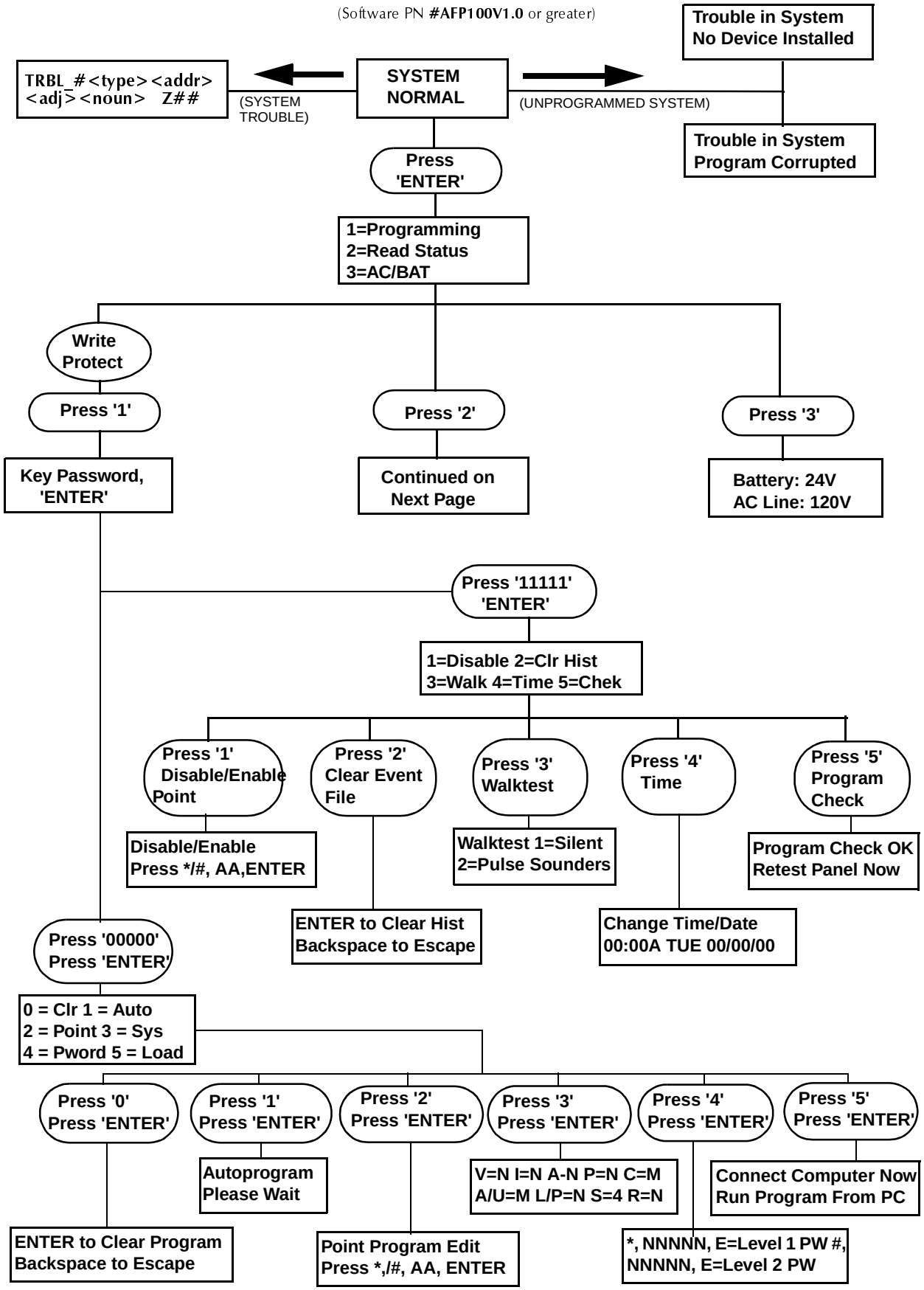
1. When using untwisted, unshielded wire, full conduit is recommended for optimum EMI/RFI protection.

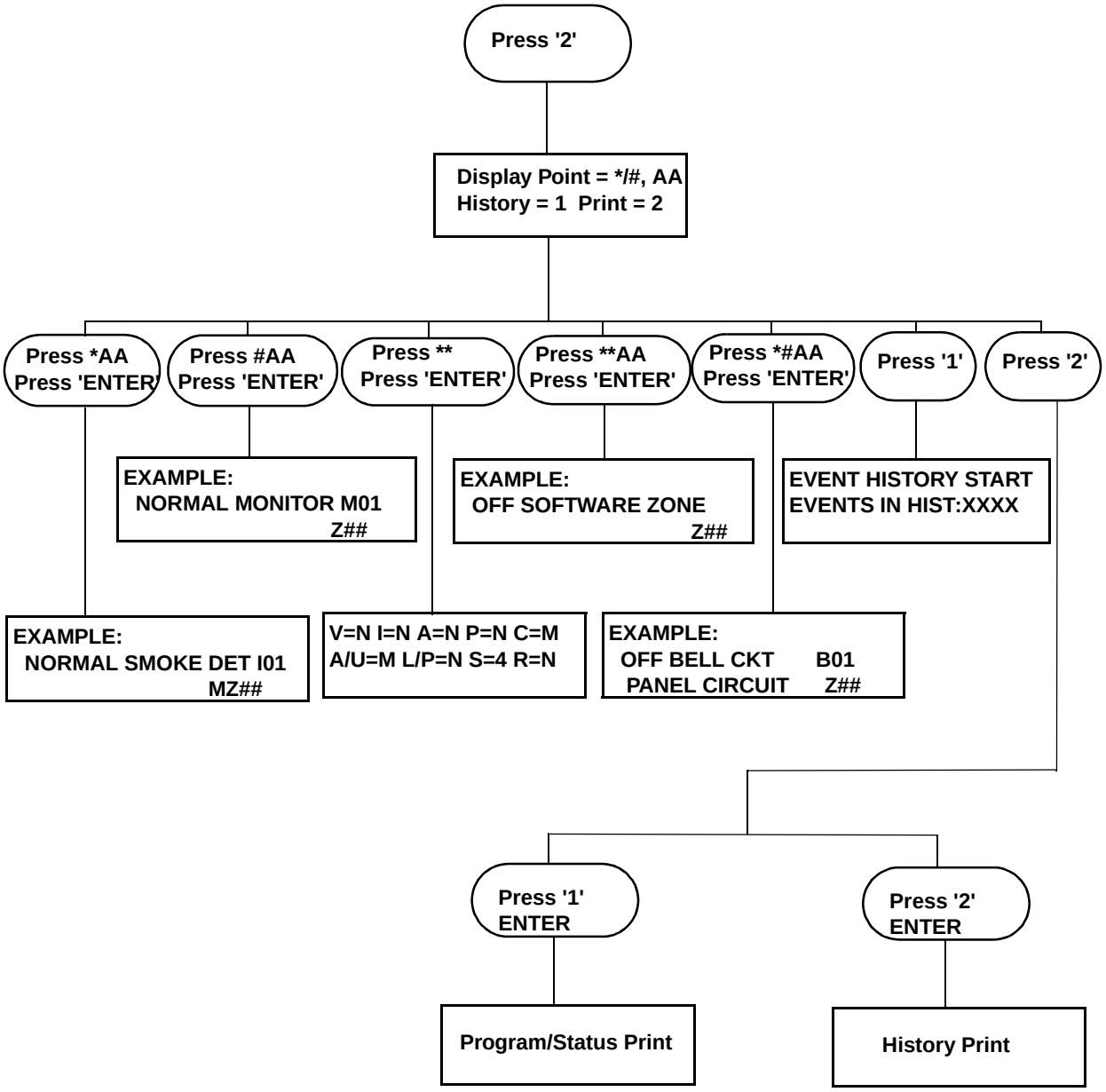
Table 23 AFP-100 Wire Specifications

APPENDIX G SCREEN OPTIONS FLOWCHART

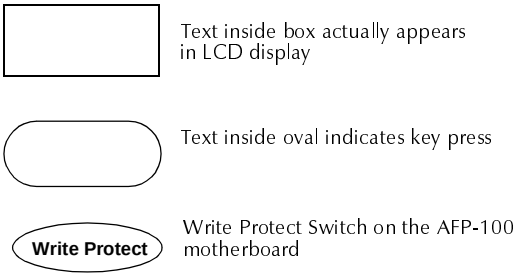
Overview

The figures on the following pages contain diagrams of the programming options..


(Software PN #AFP100V1.0 or greater)
Trouble in System
No Device Installed
TRBL_#<type><addr>
<adj><noun> Z##
(SYSTEM TROUBLE)
SYSTEM NORMAL
(UNPROGRAMMED SYSTEM)
Trouble in System
Program Corrupted
Press 'ENTER'
1=Programming
2=Read Status
3=AC/BAT
Write Protect
Press '1'
Press '2'
Press '3'
Key Password, 'ENTER'
Continued on Next Page
Battery: 24V
AC Line: 120V
Press '11111' 'ENTER'
1=Disable 2=Clr Hist
3=Walk 4=Time 5=Chek
Press '1' Disable/Enable Point
Press '2' Clear Event File
Press '3' Walktest
Press '4' Time
Press '5' Program Check
Disable/Enable
Press */#, AA,ENTER
Walktest 1=Silent
2=Pulse Sounders
Program Check OK
Retest Panel Now
ENTER to Clear Hist
Backspace to Escape
Change Time/Date
00:00A TUE 00/00/00
Press '00000'
Press 'ENTER'
0 = Clr 1 = Auto
2 = Point 3 = Sys
4 = Pword 5 = Load
Press '0' Press 'ENTER'
Press '1' Press 'ENTER'
Press '2' Press 'ENTER'
Press '3' Press 'ENTER'
Press '4' Press 'ENTER'
Press '5' Press 'ENTER'
Autoprogram
Please Wait
V=N I=N A-N P=N C=M
A/U=M L/P=N S=4 R=N
Connect Computer Now
Run Program From PC
ENTER to Clear Program
Backspace to Escape
Point Program Edit
Press *,/#, AA, ENTER
*, NNNNN, E=Level 1 PW #,
NNNNN, E=Level 2 PW


Press '2'
Display Point = */#, AA
History = 1 Print = 2
Press *AA
Press 'ENTER'
Press #AA
Press 'ENTER'
Press **
Press 'ENTER'
Press **AA
Press 'ENTER'
Press *#AA
Press 'ENTER'
Press '1'
Press '2'
EXAMPLE:
NORMAL MONITOR M01
Z##
EXAMPLE:
OFF SOFTWARE ZONE
Z##
EVENT HISTORY START
EVENTS IN HIST:XXXX
EXAMPLE:
NORMAL SMOKE DET I01
MZ##
V=N I=N A=N P=N C=M
A/U=M L/P=N S=4 R=N
EXAMPLE:
OFF BELL CKT B01
PANEL CIRCUIT Z##
Press '1'
ENTER
Press '2'
ENTER
Program/Status Print
History Print

LEGEND


Text inside box actually appears in LCD display
Text inside oval indicates key press
Write Protect
Write Protect Switch on the AFP-100 motherboard

Notes

N

O

P

R

S

T

U

V

W

X

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