

ECN 97-192

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.

Fire Alarm System Limitations

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

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.

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.

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

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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NFPA Standards

This control panel complies with the following NFPA standards:

NFPA 72-1993 Central Station Signaling Systems (Automatic, Manual, and Waterflow). Protected Premises Unit (Requires NOTI-FIRE 911A/911AC DACT or MS5012 Slave Communicator).

NFPA 72-1993 Local (Automatic, Manual, Waterflow and Sprinkler Supervisory) Protective Signaling Systems.

NFPA 72-1993 Auxiliary (Automatic, Manual, and Waterflow) Protective Signaling Systems. (Requires 4XTM.)

NFPA 72-1993 Remote Station (Automatic, Manual, and Waterflow) Protective Signaling Systems. (Requires 4XTM or NOTI+FIRE 911A/911AC DACT.)

NFPA 72-1993 Proprietary (Automatic, Manual, and Waterflow) Protective Signaling Systems. (Requires Potter EFT-C McCulloh Transmitter.)

II Additional Information

Note: Before proceeding, the installer should be familiar with the following documents and standards:

NFPA 72 National Fire Alarm Code

Underwriters Laboratories Documents:

UL 38 Manually Actuated Signaling Boxes UL 217 Smoke Detectors, Single and Multiple Station

UL 217 Shloke Delectors, Single and Multiple Station

UL 228 Door Closers - Holders for Fire Protective Signaling Systems

UL 268 Smoke Detectors for Fire Protective Signaling Systems

UL 268A Smoke Detectors for Duct Applications

UL 346 Waterflow Indicators for Fire Protective Signaling Systems

UL 464 Audible Signaling Appliances

UL 521 Heat Detectors for Fire Protective Signaling Systems

UL 864 Standard for Control Units for Fire Protective Signaling Systems

UL 1481 Power Supplies for Fire Protective Signaling Systems

UL 1638 Visual Signaling Appliances

UL 1971 Signaling Devices for the Hearing Impaired

CAN/ULC-S524-M91 Standard for Installation of Fire Alarm Systems

CAN/ULC-S527-M87 Standard for Control Units for Fire Alarm Systems

Other:

NEC Article 300 Wiring Methods NEC Article 760 Fire Protective Signaling Systems Applicable Local and State Building Codes Requirements of the Local Authority Having Jurisdiction Notifier Device Compatibility Document,15378. ADA Americans with Disabilities Act

1.0 The SFP-400B

1.1 Features

Microprocessor-controlled. Power-limited on all circuits except Municipal Box Output. Alarm and trouble resound. Four Style B Initiating Device Circuits. Two Style Y Notification Circuits. General alarm and trouble relays. Optional module for 4 zone relays (4XZM). Optional transmitter module (4XTM). Com- plies with NFPA 72 Auxiliary and Remote Station Protective Signaling systems. Optional supervised remote annunciator (RZA-4X). Requires LED Interface Module	Complies with NFPA 72 Proprietary Protective Signaling System (requires Potter EFT-C McCulloh Transmitter). One Man Walk Test. Disable/enable controls per Initiating Device Circuit. Last Event Recall. Battery/Earth fault supervision. Fuse protection on all Notification Appliance Circuits. Unregulated output power, 2.25 amperes. 7 AH to 15 AH battery options, up to 90 hours standby.
(4XLM). Optional digital communicator (NOTI-FIRE 911A/911AC). Complies with NFPA 72- 1993 Central Station and Remote Station Protective Signaling systems. Waterflow Input Option. Supervisory Input Option.	Resettable and non-resettable regulated power outputs. Extensive transient protection. Watchdog timer to supervise microprocessor (includes MICRO FAIL LED). Output circuits protected against false activa- tions. Slide-in zone identification labels. Steel cabinet 14.5" wide by16" high by 5" deep. Dead-front dress panel option (DP-400B). Alarm verification option.

1.2 Circuits

Input Circuits

Initiating Device Circuit 1 (Style B) Initiating Device Circuit 2 (Style B) Initiating Device Circuit 3 (Style B) Initiating Device Circuit 4 (Style B)

Output circuits

Notification Appliance Circuit 1 (Style Y) Notification Appliance Circuit 2 (Style Y)

Front Panel Control Switches

- Switch 1 Tone Silence
- Switch 2 Alarm Silence
- Switch 3 Alarm Activate
- Switch 4 System Reset



Figure 1.0-1: SFP-400B Installation Diagram

1.3 Optional Boards

The SFP-400B has mounting slots for two option boards. Two of the three option modules may be installed. (see Section "Optional Modules")

Transmitter Module (4XTM)

The Transmitter Module provides a supervised output for local energy municipal box transmitter (for NFPA 72-1993 Auxiliary Protective Signaling System) and alarm and trouble reverse polarity circuits (for NFPA 72-1993 Remote Station Protective Signaling System). Also included is a DISABLE switch and disable trouble LED. As a jumper option, the alarm reverse polarity circuit will open on trouble if no alarm exists.

For Local Energy Municipal Box service (NFPA 72-1993 Auxiliary Fire Alarm System)

Supervisory current: 5.0 mA.

Trip current: 0.35 amps (subtracted from Notification Appliance power). Coil Voltage: 3.65 VDC.

Coil resistance: 14.6 ohms.

Maximum allowable wire resistance between panel and trip coil: 3 ohms. Municipal Box wiring can leave the building.

For Remote Station service (NFPA 72-1993 Remote Station Fire Alarm System):

Maximum load for each circuit: 10 mA.

Reverse polarity output voltage: 24 VDC.

Remote Alarm and Remote Trouble wiring can leave the building.

LED Interface Module (4XLM)

The LED Interface Module supports the RZA-4X Remote Annunciator module. Annunciator wiring is supervised for open conditions by this module. The Annunciator Driver Module mounts to the main board, occupying one of the two option connectors.

Notes:

Maximum voltage/current, each output: 27.6V/8mA. Outputs are power limited.

Zone Relay Module (4XZM) **The Zone Relay module provides Form-C contacts for the following:**

As a jumper option, the first four relays described below can be made silenceable.

- Alarm Zone 1
- Alarm Zone 2
- Alarm Zone 3
- Alarm Zone 4 or Supervisory (see Section "Output Circuits")
- System Alarm
- System Trouble

Dry Form-C contacts rated:

2.0 amps @ 30 VDC (resistive), 0.5 amps @ 30 VAC (resistive).







Note: Use the Disconnect Switch located below the relays to disconnect the relays.

911AC Digital Communicator

The Noti•Fire 911AC is a stand-alone, three channel Digital Alarm Communicator Transmitter (DACT) designed to provide for off-premises monitoring of a fire alarm control panel. The 911AC is triggered by the alarm, trouble, and/or supervisory contacts received from the control panel and converts them into digital transmission format. It communicates with a digital receiver by means of one of two transmission formats, BFSK or Pulsed Fast Signal Round format.

		NOTI 🗞 FI	RE 911AC	Phone Fault LED
ന	12VAC 20VA ANHZ or +24VD/C	Finite Alarm Communicator Tracentiter Listed for	Central Statics of Remote Statics Service	0
Ø.	12VAC, 20VA, 60Hz or -24VDC	Side Cover Back to Access Prog	ramming Jack and Balays 🕸 🕸	•
€	(Refer to menual)			
Ø.	BATTERY	Battery Repairs bettery every 3 to 5 years.	This equipment should be installed in acc Standard 71 or 72C. Printed Information	endance with NFPA describing proper
8	BATTERY + + Battery	Blem Initiation Crowit	I installation oppretton, programming and r provided for this equipment in the 611 inc Programming Maximit A15053.	taliation and
8		Connect to alarm Mitating devices, or lo a dry slarm putput of an axisting FACP	For testing, regulation services, and	
ക്		Sea the Installation Manual. Waterflow relax/reset times: C-50 sec	evecuation pranning, refer to your Fire Alarm System constition instructions	
ŏ	INITIATING B2 +	Supervisory Circuit	Brittery capacity for emergency standay	Alternitie RJ31X Telco Jack
₫.		Connect up to 20 supervisory devices, or to c. dry trouble output of an existing CACE See the longing Manual for white	NFPA 72C: At least 24 hours, plus 5 minutes of sterm operation	
Ø.		& programming instructions.		
8		Telephone Trouble Relay Must have a d 136 rates in stocket K5 km	Alarm Inflating Circuit =	
Ж.	TROUBLE RELAY NO	optional remote trouble indication.		
Ğ	ALARM RELAY NO	Alarm Relay for Initiating	 All input/output connections are innerently low voltage, power limited. Use UL listed power lighted cable gold. 	^y Primary BJ31X Telco Jack
Đ.	ALARM RELAY COM	Must herve to di 136 relay in socket KB for noticual nomenin alerni Indicativo	Use palipingli relay module No. 136	f
ക	ALABM RELAY NO	aprovabile no se en pravanto e	(max rating 2 A. 36 VCIC).	

Install the Noti•Fire 911AC Digital Communicator in accordance with the 911AC Installation Manual. Interconnections between the control panel and the digital communicator are illustrated in Figure B-3.

Power Requirements: 24 VDC, 30 mA in Normal; 138 mA while communicating; 166.8 mA with alarm and trouble relays while communicating.

Retard time and Reset time must be programmed for zero seconds when connecting the alarm initiating circuit to an existing control panel.

For more detailed instructions, refer to the Noti•Fire 911AC manual, P/N 74-06200-005-A.

Note: 12V panels (SFP-400B) must use the 911AC.

1.4 Remote Annunciator

Notifier Remote Annunciator (RZA-4X)

The Remote Annunciator mounts on a standard single-gang box, and provides LED indication of the following:

- Alarm Zone 1 (red)
- Alarm Zone 2 (red)
- Alarm Zone 3 (red)
- Alarm Zone 4 (red)
- System Trouble LED (yellow)

A Local Trouble Sounder and Silence Switch are also provided. All LED wiring is supervised for open conditions. Any open condition will cause the System Trouble LED to illuminate. Slide-in paper labels permit an easy change of zone information.

Note: The Remote Annunciator requires the use of an LED Interface module (4XLM).



1.5 Specifications

AC Power

For the SFP-400B: 120 VAC, 50/60 Hz, 1.2 amps For the SFP-400BE: 220/240 VAC, 50 Hz, 0.6 amps Wire size: minimum #14 AWG with 600V insulation

Battery (lead acid only)



Maximum Charging Circuit: 27.6V, 1.5 amps Maximum Battery Capacity: 15 AH (Batteries larger than 7 AH require Notifier BB-17 or similar UL listed battery cabinet).

Initiating Device Circuits

Power-limited circuitry Operation: Style B (Class B) Normal Operating Voltage: 24 VDC (ripple = 1.0V peak-to-peak) Alarm current: 15 mA minimum Short circuit current: 40 mA maximum Maximum detector current in standby: 2 mA (max) per zone Maximum loop resistance: 200 ohms End-of-line resistor: 4.7K, 1/2-Watt Detector loop current is sufficient to ensure operation of one alarmed detector per zone. Supervisory current: 5 mA (including end-of-line resistor)

Notification Appliance Circuits

Power-limited circuitry Maximum allowable voltage drop due to wiring: 2 VDC Normal Operating Voltage: 24 VDC Total current available to all external devices: 2.25 amps.

Maximum signaling current per circuit: 1.5 amps End-of-line resistor: 4.7K, 1/2-Watt (part # 71252 UL listed)

Alarm and Trouble Relays

Dry Form-C contacts rated: 2.0 amps @ 30 VDC (resistive), 0.5 amps @ 30 VAC (resistive). All relays must be connected to a power-limited power supply.

Four-wire Smoke Detector Power

Up to 200 mA is available for powering 4-wire smoke detectors. Maximum ripple voltage: 1.0 V p/p

Non-resettable Power

Total DC current available from this output is up to 200 mA (subtracted from four-wire smoke power). Maximum ripple voltage: 1.0 V p/p

Unregulated Power

Total DC current available for powering external devices is 0.5 amp (subtracted from 2.25 amps available to notification appliance circuits). Maximum ripple voltage: 100 mV p/p

Note: For device compatibility data, refer to the Device Compatibility Chart.





Figure 1.5-1: Cabinet Dimensions

2.0 System Operation

2.1 System Status LEDs

Alarm, Trouble and Supervisory LEDs will flash on and off until the event(s) has been acknowledged (TONE or ALARM SILENCE), at which point the LED will illuminate steadily.

AC POWER

Green LED that illuminates steadily to indicate presence of AC power.

SYSTEM ALARM

Red LED that flashes when an alarm occurs.

ALARM TEST

Red LED that illuminates during Walk Test.

SUPERVISORY

Yellow LED that flashes upon activation of a supervisory device (such as tamper switch) on Zone 4.

SYSTEM TROUBLE

Yellow LED that flashes for any trouble condition, including those associated with option boards.

CIRCUIT TROUBLE

Yellow LED that flashes for trouble conditions on output circuits (notification).

ALARM SILENCED

Yellow LED that illuminates steadily when the ALARM SILENCE switch has been pushed after an alarm.

POWER TROUBLE

Yellow LED that flashes for low or disconnected batteries and earth fault conditions.

BATT

Yellow LED that illuminates steadily on motherboard when battery is low or not detected (not visible through door).

EARTH

Yellow LED that illuminates steadily on motherboard during a ground fault condition (not visible through door).

MICRO FAIL

Yellow LED that illuminates on motherboard when watchdog timer detects microprocessor failure (not visible through door).



BATT EARTH

MICRO FAIL

2.2 Control Switches

Tone Silence

Acknowledge alarms, troubles and supervisories. The panel has alarm and trouble resound with LED flash of new conditions. The flashing trouble LED(s) illuminate steadily on TONE SILENCE and the piezo sounder silences. A second trouble will resound the piezo. The piezo has three distinct sounds for alarm, trouble, and supervisory. Trouble conditions are self restoring. Alarms and supervisories latch and require RESET to clear.

Alarm Silence

Acknowledge for alarms and supervisories. The ALARM SILENCE switch will silence the local piezo, change any flashing alarm LEDs to steady, and turn off the notification appliance circuits. The "ALARM SILENCED" LED will illuminate. Alarm silence is a latching function and requires a RESET to clear.

Note: If Silence Inhibit has been selected (SW1, DIP switch #4 set to "ON"), the Alarm Silence will not function until 60 seconds after the initiation of the alarm.

Alarm Activate

The ALARM ACTIVATE switch may be used to activate Notification Appliance Circuits. ALARM ACTIVATE also activates the System Alarm relay. ALARM ACTIVATE is a latching function. Pressing ALARM SILENCE silences the notification appliance circuits and System Alarm Relay and lights the Alarm Silenced LED. Pressing RESET returns the system to normal.

System Reset

The RESET switch breaks power to all initiating device circuits, 4-wire smoke power and option boards and will clear any activated output circuits. If any alarm or trouble still exists after reset, they will reactivate the panel. Holding RESET down will perform a LAMP TEST function and will activate the piezo sounder.

2.3 Zone Status LEDs

The alarm and/or trouble LED(s) will flash until the event(s) has been acknowledged (TONE or ALARM SILENCE), at which point the LED(s) will illuminate steadily.

Note: If zone 4 is set for supervisory, the red alarm LED is not used.





2.4 Supervisory

Zone 4 is always used for monitoring supervisory devices (such as valve tamper switches) by setting SW1 DIP switch 3 to "ON" (see Sections "*Output Circuits*" and "*Dip Switch Location and Descriptions*"). A short circuit on this zone (activation of a N.O. contact) will cause the supervisory LED and the zone 4 yellow LED to flash. The piezo sounder will generate a unique sound. Pressing TONE SILENCE will silence the piezo and cause the supervisory LED to illuminate steadily, *but the Zone 4 Trouble LED will continue to flash*. Supervisory signals latch and require RESET to clear. The ALARM SILENCE switch will silence the piezo, cause the supervisory LED to illuminate steadily and turn off the Supervisory Notification Appliance Circuit. An open circuit on Zone 4 will be reported as a zone trouble.

2.5 Zone Disable

If a zone has been disabled, an alarm that occurs on that zone will flash the red zone LED, but neither the piezo nor any output circuit will activate. If both power sources are removed from the system, all zones will be reenabled upon restoration of power. Disable status will be lost.

The Zone Disable routine makes use of the four panel switches as follows;

1) Press and hold in the TONE SILENCE switch.

- S:
- With the TONE SILENCE switch held in, press (in sequence) the ALARM SILENCE switch, the ALARM ACTIVATE switch, and then the RESET switch.
- 3) The Zone 1 Alarm LED will flash.
- 4) To disable Zone 1, press the RESET switch. The Zone 1 yellow LED will light to show that the zone is disabled.

Note: The RESET switch toggles disable status for the selected zone.

- 5) To select the next zone, press the ALARM SILENCE switch.
- 6) To select the previous zone, press the ALARM ACTIVATE switch.
- 7) When disable selections are complete, release the TONE SILENCE switch.

If any zone has been disabled, the trouble relay will activate and System Trouble LED will flash.

2.6 Last Event Recall

Last Event Recall allows the user to display the previous panel status. The last event recall uses the four panel switches as follows:

- 1) Press and hold in the TONE SILENCE switch.
- 2) With the TONE SILENCE switch held in, press (in sequence) the RESET switch, the ALARM ACTIVATE switch, and then the ALARM SILENCE switch.
- 3) Last Event is displayed.
- 4) Release the TONE SILENCE switch to return to normal operation.
- 5) To clear the Last Event buffer, press RESET twice.

3.0 Installation Procedure

3.1 General

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibrationfree area in which extreme temperatures are not encountered. The location should be readily accessible with sufficient room for easy installation and maintenance. Locate the top of the cabinet approximately five feet above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be employed. Pull required conductors into the box through the knockout provided. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

UL Power Limited Wiring Requirements

Power limited and non-power limited circuit wiring must remain separated in the cabinet. All power limited circuit wiring must remain at least 0.25" away from any non-power limited circuit wiring. Furthermore, all power limited circuit wiring and non-power limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. A typical wiring diagram for the SFP-400B is shown below.





3.2 Initiating Device Circuits

Zones

Wire all alarm initiating devices sequentially for proper supervision. Initiating devices include: manual pull stations, heat, photoelectric, and ionization type detectors; and waterflow alarm devices. Refer to the Device Compatibility Chart.

Notes:

- 1) Observe polarity when connecting polarized devices.
- 2) All circuits are supervised and power limited.
- 3) Leave Dummy Load (provided) on all unused circuits.



Figure 3.2-1: Example of Initiating Device Circuits

3.3 4-Wire Smoke Detector Connections

Refer to the Device Compatibility Document, for suitable 4-wire smoke detectors.



Figure 3.3-1: Diagram of Connections for a 4-Wire Smoke Detector

Notes on Style B and Style D field wiring:

- 1) The Power Supervision Relay coil leads must be connected to the last detector base 24V screw terminals.
- 2) Calculation of the maximum allowable resistance in the 24VDC detector power wiring:

$$R_{MAX} = (20.6 - V_{OM}) + (N_X I_X) + (I_D)$$

Where:

- $\mathbf{R}_{_{\text{MAX}}}$ is the maximum resistance of the 24V wires.
- V_{om} is the minimum operating voltage of the detector or end-of-line relay, whichever is greater, in volts.
- **N** is the total number of detectors on the 24V supply loop.
- I is the detector current in standby.
- **N**_A is the number of detectors on the 24V power loop which must function at the same time in alarm.
- I_{A} is the detector current in alarm.
- I is the end-of-line relay current.

3.4 Output Circuits

Notification Appliance Circuits

The SFP-400B can provide two Notification Appliance Circuits (Style Y). Each circuit is capable of providing up to 1.5 amps of current. Total current for both circuits and the unregulated power cannot exceed 2.25 amps. Refer to the Device Compatibility Chart for suitable devices. Circuits are supervised and power-limited.

Supervisory Appliance Circuit

If Supervisory Input is selected (see Section *"Dip Switch Location and Descriptions"*), both Notification Appliance Circuits will activate for supervisory conditions (either the SUPV1 or SUPV2 jumper must be cut). To activate only one Notification Appliance Circuit (Circuit 2), cut jumper **SUPV 1**. To disable both Notification Appliance Circuits, cut jumper **SUPV 2** for supervisory conditions. (See figure below for jumper location.)

If a 4XZM Relay Module is used, Relay 4 will activate for supervisories. If an RZA-4X is used, the red LED 4 will annunciate supervisories.



Figure 3.4-1: Notification Appliance Circuits

Alarm Relay

One Form-C dry alarm contact is provided in the basic panel for controlling supplementary devices. It is rated 2 amps at 30 VDC and 0.5 amps at 30 VAC (resistive) and is non-silenceable when an alarm occurs. See the following page for terminal location.

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Trouble Relay

One Form-C dry trouble contact is provided in the basic panel for controlling supplementary devices. It is rated 2 amps at 30 VDC, 0.5 amps at 30 VAC (resistive) and will silence when trouble condition is cleared. See below for terminal location.

Note: The alarm and trouble Form-C dry contact relays must be power limited relays. Any Form-C dry contact relay that may be used must be wired from one of the 24V power limited terminals as shown in the figure below or a comparable UL listed power limited power supply.





3.5 Power



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

This output is not suitable for powering devices requiring filtered, regulated DC power. The combined current draws from the Resettable and Non-Resettable outputs cannot exceed 200 mA.



Unregulated Power 24 VDC power for inductive-type devices such as door holders can be connected to TB2 terminals 1(+) and 2 (-).



+24VR |+24VNR



24 VDC filtered, regulated, nonresettable power can be drawn from TB2 Terminals 5(+) and 6(-).

Figure 3.5-1: Diagram of Power Terminals

TB2

AC Power

Primary power required for the SFP-400B panel is 120 VAC, 50/60 Hz, 1.2 amps and primary power required for the SFP-400BE panel is 220/240 VAC, 50 Hz, 0.6 amps. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Code (NEC) and/or local codes. Use #14 AWG or larger wire with 600 volt rating.

Battery Power

Observe polarity when connecting battery. Connect battery cable to J9 on the main board using the plugin connector provided. See Appendix A for calculation of correct battery rating.



CAUTION: Batteries contain 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 skin or eyes with water for 15 minutes and seek immediate medical attention.

3.6 **Optional Modules**

This fire control panel has two module connectors - J5 and J8. Three modules are available for the panel and they can be used in any combination, including duplicate modules (see notes below). The corresponding option jumper must be cut before installation of an optional module, to enable module supervision.





Notes: Optional 4XLM module for an RZA-4X Annunciator must be installed on J7 and J8 **only**. 4XTM and 4XZM modules can be installed in either location.

Installing Option Modules

Insert the two nylon standoffs (provided) into the holes located on the right-side edge of the main board. Carefully align the pins on the main board with J1 and/or J2 on the option board. Press firmly on the option board until it locks in place on the standoffs. Affix the terminal identification labels provided with the option modules as shown below.



Figure 3.6-2: Installing Option Modules

Transmitter Module -- 4XTM

Polarities shown in activated positions. The wiring of this module must follow the requirements as specified in the "General" Section "UL Power Limited Wiring Requirements."



Push the disconnect switch down to prevent unwanted activation of the Municipal Box during testing of the control panel. The Disconnect LED will remain illuminated while the Municipal Box is disconnected. The System Trouble LED will indicate disconnected and/or Open Circuit conditions on the Municipal Box. *Cutting the TBL jumper will allow the alarm reverse polarity circuit to open on trouble, if no alarm exists.*

Note: Remote Alarm, Remote Trouble and Municipal Box wiring can leave the building.

Zone Relay Module -- 4XZM

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



Relay #1 through #4 will activate with Output #1 through #4 and remain latched unless jumper "LATCH" is cut.

- Skip a set of dry contacts to maintain the 0.25" required space between power limited and non-power limited circuits. The wiring of this module must follow the requirements as specified in the "General" Section "UL Power Limited Wiring Requirements." OR
- 2) If this module is needed to drive power limited and non-power limited relays that are next to each other, refer to the figure below showing a typical connection:



Note: Refer to the Protected Premises Unit label, located on the door of the control panel, to indicate if any dry contacts are to be used as non-power limited dry contacts.

LED Interface Module -- 4XLM

The wiring of this module must follow the requirements as specified in the "General" Section, "UL Power Limited Wiring Requirements."



Front View

Figure 3.6-3: LED Interface Module--4XLM

Note:

Make wiring connections with system power off. Maximum wire impedance is 50 ohm per wiring connection.

3.7 Dip Switch Location and Descriptions



Note: The Reset key must depressed after any switch configuration has been made.

Appendix A: Power Calculations

Table A-1: Standby Battery Requirements

The Standby Battery Current figure obtained in Table A - 1 represents the amount of current that must be supplied by the secondary power source (batteries) to sustain control panel operation for one hour.

Basic Control Panel	ouble LED and audible trouble sounder on.	80 mA			
If using a 4XZM Zone Relay	Module [] X 8 mA =				
If using a 4XTM Transmitter Module, add 11 mA					
If using a 4XLM/RZA-4X Driv	er/Annunciator combination: [1] X 19 mA =				
Auxiliary Power					
If using a <i>911A</i> , add 30 mA					
	Number Device Total in use Current Current (see Device Compatibility Document for data)				
a. Two-wire detector heads	X =				
b. Four-wire detector heads	X =				
c. End of Line Relays	X 25.0 mA =				
d	Add lines a, b, & c for subtotal				
Place subtotal here :					
Add last column for Standby Battery Current and continue to Table A-2. (113 mA for 60 hours of standby)					

Table A-2: Ampere-Hour (AH) Calculations



Select a battery with an equal or greater AH rating than the figure obtained in Table A-2. Batteries must be lead-acid type.

Batteries available from Notifier:

PS-1270 - 12-volt, 7 AH (two required) PS-12120 - 12 volt, 12 AH (two required)

Notes:

- 1) Alarm AH assumes a maximum system draw of 2.4 amps in alarm for 5 minutes (0.2 AH) or for 10 minutes (0.4 AH)
- 2) NFPA 72-1993 Central Station, Local and Proprietary Protective Signaling Systems require 24 hours of standby.
- 3) NFPA 72-1993 Auxiliary and Remote Station Protective Signaling Systems require 60 hours of standby.
- 4) The battery charger in this panel will charge a maximum of 15 amp/hours of batteries within 48 hours (7 amp/hour minium). Batteries larger than 12 amp/hour will require a UL listed battery cabinet (e.g. Notifier BB-17).

Appendix B: NFPA Standard-Specific Requirements

The Notifier SFP-400B has been 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.

SFP-400B Control Panel containing the main control board, cabinet (backbox and door), main 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 one of the control panel's Notification Appliance Circuits.

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

NFPA 72-1993 Signaling Systems for Central Station Service (Protected Premises Unit)

NOTI-FIRE 911A/911AC DACT - for connection to a compatible listed Central Station DACR or Protected Premises Receiving Unit. This unit must be installed as outlined in Figure B-3A/B.

NFPA 72-1993 Auxiliary Protective Signaling System

4XTM Transmitter Module for connection to a compatible listed Local Energy Municipal Box. This unit must be installed as outlined in Figure B-1.

NFPA 72-1993 Remote Station Protective Signaling System

4XTM Transmitter Module for connection to the Fire•Lite RS82-9 Remote Station Receiver. See Figure B-2 for installation instructions for this unit

OR

NOTI-FIRE 911A/911AC DACT - For connection to a compatible listed remote station DACR. This unit must be installed as outlined in Figure B-3A/B.

NFPA 72-1993 Proprietary Protective Signaling System Potter EFT-C McCulloh Transmitter. See Figure B-4 for installation instructions for this unit .

Figure B-1: NFPA 72-1993 Auxiliary Protective Signaling System

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

Note: Maximum loop resistance allowed for wiring from control panel to Municipal Box is 3 ohms.



(activated polarities shown)

Figure B-2: NFPA 72-1993 Remote Station Protective Signaling System

Intended for connection to a polarity reversal circuit of a remote station receiving unit having compatible ratings. All connections are power limited and supervised with the exception of the reverse polarity loop. Supervision of the loop is the responsibility of the receiver.





4XTM Transmitter Module (activated polarities shown)

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Figure B-3A: NFPA 72-1993 Signaling Systems for Central Station Service (Protected Premises Unit) and Remote Station Protective Service

NOTI-FIRE 911A DACT - for connection to a Central Station Receiver or Protected Premises Receiving Unit. This unit must be installed as illustrated below. For additional information on the 911A, refer to document 74-06200-005.

If the NOTI-FIRE 911A is not mounted in the SFP-400B backbox all connections must be in conduit, less than 20' in length in the same room.

Notes: The Maximum standby load shall be 125 mA. The Standby by Battery Requirement: 24VDC, 7AH Max.



+27.6 VDC

(+) battery lead

1

Figure B-3B: NFPA 72-1993 Signaling Systems for Central Station Service (Protected Premises Unit) and Remote Station Protective Service

NOTI-FIRE 911AC DACT - for connection to a Central Station Receiver or Protected Premises Receiving Unit. This unit must be installed as illustrated below. For additional information on the 911AC, refer to document 74-06200-005.

All connections between the FACP and 911AC must be in conduit, less than 20' in length in the same room.



Figure B-3C: Using an MS-5012 as a Slave Communicator

Program the MS-5012 for slave application. Reference the Installation Manual for additional information.



Figure B-4: NFPA 72-1993 Proprietary Protective Signaling System

Notes:

- 1) Connection between control panel and the transmitter are supervised by the transmitter.
- Use transformer model ULT STK. NO. 1000391 (listed, Class 2, 12 V, 10 VA.). See Potter Electric Signal Company Bulletin # 748.
- 3) This control panel/transmitter arrangement can be employed for NFPA 72-1993 Proprietary Protective Signaling System.



Notes:

Form-C Trouble contact which will automatically activate on any Trouble condition. Form-C Alarm contact programmed to activate on General Alarm.

Trouble Shooting Table

SYMPTOM			PROBLEM		SOLUTION
	System trouble LED on	Circuit trouble LED on	Notification appliance circuit trouble		 Check TB2 for proper connections.(TB3 for 4XB panels) Remove all field wiring and install dummy ELR at output circuit. Check for supervisory voltage across it, (Normal -2.3 V), if problem persist, replace circuit board. Removed dummy ELR, reconnect field wiring and measure voltage across output; (trouble -5V, short OV). Check for ELR at last device. Check field wiring.
		Any of the right column yellow LEDs flashing	Initiating zone open circuit trouble		 Check TB4 for proper connections. Remove field wiring for zone in trouble and install dummy ELR (4.7K for 24V; 2.2K for 12V). If problem persist, replace circuit board. Check for ELR at last device. Check field wiring.
		Any of the right column yellow LEDs steady on	Zone disable		1. Check installation manual.
		Power trouble LED on	Battery trouble Batt yellow LED on	Missing or Disconnected	1. Check battery connections.
AC Power LED on				Low or damage battery	 Remove batteries, check voltage across charger output (17 to 19V for 24V; 8-10V for 12V), otherwise replace circuit board. Reconnect batteries, measure battery voltage at battery terminals. If voltage is less than 85% of rated voltage, allow them to charge for 48 hours. If problem persist, replace batteries.
			Ground fault trouble Earth yellow LED on		 Remove field wiring from main panel and optional module(s) (if installed). Install dummy ELR (4.7K for 24V; 2.2K for 12V). Remove both battery leads. If trouble clears, connect one circuit at the time to pin point the problem. If trouble doesn't clear, replace circuit board.
		Yellow LED on 4XTM on	4XTM		1. Move Municpal Box disconnect switch SW1 up.
			OPT1, OPT2 jumper cut		1. Install optional module(s) or replace jumper if module(s) is not used.
			Municipal Box open circuit		 Install dummy load if Municpal Box option isn't used. Check Municpal Box wiring.
	Any of the right column red LEDs on		Short on initiating circuit wiring		1. Remove field wiring and install ELR. If trouble clears, look for faulty or incorrectly wired devices.
	Disconnecting Municipal Box switch on 4XTM does not create a trouble		Jumper for optional modules isn't cut		1. Cut associated jumper OPT1 or OPT2.
	4XZM: associated LED doesn't activate for alarm, trouble or supervisory conditions		Optional module trouble		 Make sure module is properly installed. Move disable switch SW1 on 4XZM to the left.
	RZA-4X piezo doesn't sound for alarm, trouble or supervisory conditions		4XLM		 Make sure that 4XLM module is installed on J7 and J8. Check field wiring.
	Micro Fail yellow LED on		Microprocessor damaged		1. Replace circuit board.
	All RZA-4X LEDs stay on		Power wasn't removed prior installation		1. Hit system reset.
AC Dower I ED off	System trouble LED on		Loss of main power		1. Check incoming power (TB5). (TB1 for 4XB panels)
AC FUNCE LED OIL			Damaged circuit breaker		1. Replace circuit board.
	Micro Fail yellow LED on		Microprocessor damaged		1. Replace circuit board.

NOTES

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