NOTIFIER®
by Honeywell

Intelligent Control Panel

FireWarden SLC

Wiring Manual

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Fire Alarm & Emergency Communication System Limitations

While a life safety system may lower insurance rates, it is not a substitute for life and property 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 panel (FACP) 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.

An emergency communication system—typically made up of an automatic fire alarm system (as described above) and a life safety communication system that may include an autonomous control unit (ACU), local operating console (LOC), voice communication, and other various interoperable communication methods—can broadcast a mass notification message. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire or life safety event.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premises following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. This document can be found at http://www.systemsensor.com/appguides/. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or "smoke" from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, chimneys, even wet or humid areas may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets, such as air conditioning vents.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

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

Audible warning devices such as bells, horns, strobes, speakers and displays may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol, or medication. Please note that:

- An emergency communication system may take priority over a fire alarm system in the event of a life safety emergency.
- Voice messaging systems must be designed to meet intelligibility requirements as defined by NFPA, local codes, and Authorities Having Jurisdiction (AHJ).
- Language and instructional requirements must be clearly disseminated on any local displays.
- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond to or comprehend the meaning of the signal. Audible devices, such as horns and bells, can have different tonal patterns and frequencies. It is the property owner's responsibility to conduct fire drills and other training exercises to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A life safety system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

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

Telephone lines needed to transmit alarm signals from a premises to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

The most common cause of life safety system malfunction is inadequate maintenance. To keep the entire life safety system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of NFPA 72 shall be followed. Environments with large amounts of dust, dirt, or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled as required by National and/or local fire codes and should be performed by authorized professional life safety system installers only. Adequate written records of all inspections should be kept.

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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 manuals are read and understood.

CAUTION - System Re-acceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Re-acceptance 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 0-49º C/32-120º F and at a relative humidity 93% ± 2% RH (non-condensing) at 32°C ± 2°C (90°F ± 3°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 normal room temperature of 15-27º C/60-80º 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 interference, 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, or printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Overtightening 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.

Units with a touchscreen display should be cleaned with a dry, clean, lint free/microfiber cloth. If additional cleaning is required, apply a small amount of Isopropyl alcohol to the cloth and wipe clean. Do not use detergents, solvents, or water for cleaning. Do not spray liquid directly onto the display.

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.

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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 devices pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when devices are 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 or her 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.

Software Downloads

In order to supply the latest features and functionality in fire alarm and life safety technology to our customers, we make frequent upgrades to the embedded software in our products. To ensure that you are installing and programming the latest features, we strongly recommend that you download the most current version of software for each product prior to commissioning any system. Contact Technical Support with any questions about software and the appropriate version for a specific application.

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Your feedback helps us keep our documentation up-to-date and accurate. If you have any comments or suggestions about our online Help or printed manuals, you can email us.

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Table of Contents

Section 1: Introduction

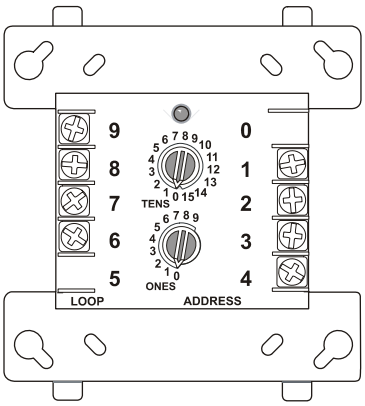
1.1 Scope

This document describes the operation, installation and wiring of various Signaling Line Circuit (SLC) devices when used with the FireWarden-50X (NFW-50X), FireWarden-100X (NFW-100X), FireWarden-100 (NFW-100), FireWarden-100-2 (NFW2-100), and FireWarden-50 (NFW-50) control panels. It also provides basic information that applies to FireWarden-compatible SLC loops in general, such as the branch resistance measurements.

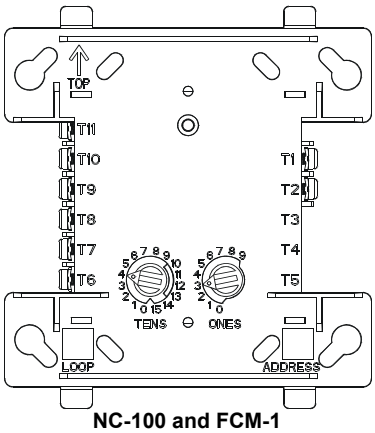
NOTE: Any reference in this manual to the FireWarden-100-2 (NFW2-100), FireWarden-100 (NFW-100), and FireWarden-50 (NFW-50) includes the FireWarden-100-2E (NFW2-100E), FireWarden-100-2C (NFW2-100C), FireWarden-100E (NFW-100E), FireWarden-100C (NFW-100C), FireWarden-50E (NFW-50E), and FireWarden-50C (NFW-50C) respectively unless otherwise specified.

Additional information about the specific control panel and the modules and detectors referenced in this document can be found in the respective installation manual as listed in Section 1.1.1, “Reference Documentation”.

Currently, there are two styles of modules available, legacy version and newer version. The obvious difference between the two styles is the orientation of the rotary dials. Refer to the diagram below for an example of each.



NC-100 and FCM-1
Legacy Version Module
(Vertical Rotary Dial)



NC-100 and FCM-1
Newer Version Module
(Horizontal Rotary Dial)

NOTE: Only the **NMM-100**, **NZM-100**, **NC-100R**, **NC-100**, **NDM-100, FMM-1, FZM-1, FCM-1, FRM-1,** and **FDM-1** modules are available as newer type modules. Both the legacy and newer versions share the same part numbers. The newer version modules will be phased in, replacing the legacy version. This manual contains information and wiring diagrams for the newer version of the modules. Refer to “Terminal Conversion Charts for New & Legacy Devices” on page 65 for additional information.

Currently, there are two styles of detector bases available, legacy version and newer version. The obvious difference between the two styles is the orientation of the screw terminals. Refer to Section 8 and Appendix D for an illustration of each.

NOTE: Only the B501 Detector Base, B210LP Detector Base (replacement base for B710LP), B224RB Relay Base, and B224BI Isolator Base are available as newer type bases. Both the legacy and newer versions share the same part numbers. The newer version bases will be phased in, replacing the legacy version. This manual contains information and wiring diagrams for the newer version of the bases. Refer to “Intelligent Detector Base Layouts for Legacy Devices” on page 68 for additional information.

1.1.1 Reference Documentation

The table below accommodates a list of document sources containing additional information regarding the devices used on a Signaling Line Circuit:

Compatible Devices	**Document Number**
Device Compatibility Document (for Conventional Devices)	15378
Fire Alarm Control Panel (FACP) and Main Power Supply Installation	**Document Number**
FireWarden-100 Installation Manual	52299
FireWarden-100-2 Installation Manual	52778
FireWarden-50 Installation Manual	52911
FireWarden-100X Installation Manual	LS10131-001NF-E
FireWarden-50X Installation Manual	LS10129-001NF-E
Power Supplies, Auxiliary Power Supplies & Battery Chargers	**Document Number**
FCPS-24 Field Charger/Power Supply Manual	50059
FCPS-24S6/FCPS-24S8 Field Charger/Power Supply	51977
System Components	**Document Number**
RA100Z Remote LED Annunciator Installation Document	I56-0508
SLC Loop Devices	**Document Number**
B224BI Legacy Isolator Base Installation Document	I56-0725

B224BI-WH, B224BI-IV Isolator Bases Installation Document	I56-3736
B224RB Legacy Relay Base Installation Document	I56-2815
B224RB-WH, B224RB-IV Relay Bases Installation Document	I56-3737
B501 Legacy Base Installation Document	I56-0357
B501-WHITE, B501-IV, and B501-BL Detector Bases	I56-3738
B501BH Sounder Base Installation Document	I56-0491
B501BH-2 UL 864 Ninth Compliant Sounder Base Installation	I56-2813
B501BHT Temporal Sounder Base Installation Document	I56-1367
B501BHT-2 UL 864 Ninth Compliant Temporal Sounder Base Installation	I56-2819
B200S-WH, B200S-IV Sounder Base Installation document	I56-3387
B200S-LF-WH, B200S-LF-IV Low Frequency Sounder Base Installation Document	I56-4151
B200SR-WH, B200SR-IV Sounder Base Installation document	I56-3392
B200SR-LF-WH, B200SR-LF-IV Low Frequency Sounder Base Installation Document	I56-4152
B210LP Flanged Base Installation Document	I56-3739
B710LP Flanged Base Installation Document	I56-637
B300-6, B300-6-IV Installation Document	I56-6566
DNR/W Innovair Flex intelligent, non-relay, low-flow photoelectric duct detector housing	I56-3051
NC-100 Control Module	I56-2592
FCM-1 Control Module	I56-3500
NDM-100 Dual Monitor Module	I56-2589
FDM-1 Dual Monitor Module	I56-1463/I56-3531
NMM-100 Monitor Module Installation Document	I56-2588
FMM-1 Monitor Module	I56-3506
NMM-100-10 Monitor Module Installation Document	I56-3403
XP10-M Multi-Monitor	I56-1803
NMM-100P Mini Monitor Module Installation Document	I56-2590
FMM-101 Mini Monitor Module	I56-3508
NC-100R Relay Module Installation Document	I56-2593
FRM-1 Relay Module	I56-3502
ND-100 Low-flow Duct Detector Installation Document	I56-2583
FSD-751PL Low-Flow Duct Detector	I56-1978
ND-100R Duct Detector with Relay	I56-2584
FSD-751RPL Duct Detector with Relay	I56-1979
NI-100 Ion Detector Installation Document	I56-2585
FSI-851 Ion Detector	I56-3516
NP-100/NP-100T Photoelectric Detectors Installation Document	I56-2586
FSP-851/FSP-851T Photoelectric Detectors	I56-3524
NH-100/NH-100R Thermal Detectors Installation Document	I56-2587
NP-200/-IV Photoelectric Detectors Installation Document	I56-6547
NP-200R/-IV Photoelectric Detectors Installation Document	I56-6548
NP-200T/-IV Photoelectric Detectors Installation Document	I56-6550
NH-200/-IV, NH-200R/-IV, NH-200H/-IV Thermal Detectors Installation Document	I56-6549
FSP-951/-IV Intelligent Photo Smoke Detector Document	I56-6519
FSP-951R/-IV Intelligent Photo Smoke w/Remote Test Capability Document	I56-6520
FST-951T/-IV Intelligent Photo/Temperature Detector Document	I56-6521
FST-851/FST-851R Thermal Detectors	I56-3518
FST-951/-IV, FST-951R/-IV, FST-951H/-IV Intelligent Heat Detectors Document	I56-6522
FS-OSI-RI(A) Intelligent Beam Detector Document	I56-6571
NZM-100 Zone Interface Module Installation Document	I56-2591
FZM-1 Zone Interface Module	I56-3504
NZM-100-6 Zone Interface Module Installation Document	I56-2990
XP6-MA Zone Interface Module	I56-1806
N100-ISO Isolator Module Installation Document	I56-2595
ISO-X Isolator Module	I56-1380/I56-3624
ISO-6 Isolator Module Installation Document	I56-4096
NP-A100 Multi-criteria Detector	I56-3526
FAPT-851 Multi-criteria Detector	I56-3524

NH-100H Heat Detector (190º)	I56-3519
FST-851H Heat Detector	I56-3518
NOT-BG12LX Pull Station Installation Document	I56-2594
NBG-12LX Pull Station	I56-3511

1.2 Overview

Communication between the control panel and intelligent addressable monitor and control devices takes place through a Signaling Line Circuit (SLC), which can be wired to meet the requirements of NFPA Style 4, Style 6, or Style 7.

At least one secondary surge protector must be used with each SLC wiring pair whenever SLC wiring runs outside the building. For detailed information refer to “Surge Suppression” on page 62.

1.3 Polling Protocols

The FireWarden100-2, FireWarden-100X, and FireWarden-50X support FlashScan (LiteSpeed) protocol or Classic Loop Interface Protocol (CLIP). The FireWarden-100and FireWarden-50 support Classic Loop Interface Protocol (CLIP) only.

The number of devices connected to the FireWarden-100, FireWarden-100-2, and FireWarden-100X is limited to 99 detectors and 99 modules per loop. The FireWarden-50 and FireWarden-50X can support up to 50 addressable devices. These devices can be in any combination of modules and detectors. SLC devices are limited to addresses 1-99 only.

1.3.1 Available Protocols

FlashScan (LiteSpeed) is a communication protocol that greatly enhances the speed of communication between analog intelligent devices. Only the The FireWarden100-2, FireWarden-100X, and FireWarden-50X are capable of operating in FlashScan (LiteSpeed) mode. This is the default mode of operation for these FACPs.

CLIP (Classic Loop Interface Protocol) polls devices in sequential order. All FireWarden addressable fire alarm control panels can operate in CLIP mode. This is the default mode of operation for the FireWarden-100 and FireWarden-50.

1.3.2 Protocol Use

Use one of the following options with FlashScan (LiteSpeed)/CLIP mode:

1. Program all modules and detectors on an FACP as FlashScan (LiteSpeed).
2. Program all modules and detectors on an FACP as CLIP.

When switching between polling protocols, the loop circuit must be powered down for at least 30 seconds to reset the devices.

1.4 Devices

1.4.1 Isolator Modules

Isolator Modules permit a zone of detectors and modules to be fault isolated from the remainder of the SLC loop, allowing critical components to function in the event of a circuit fault. Isolator modules are required to meet the requirements of an NFPA Style 7 circuit.

N100-ISO and ISO-X - Single fault isolator modules

ISO-6 - Six fault isolator module

1.4.2 Monitor Modules

Addressable modules that allow the control panel to monitor entire circuits of conventional alarm initiating devices, such as manual pull stations, smoke detectors, heat detectors, waterflow and supervisory devices.

NMM-100 and FMM-1 - Monitor a Style B (Class B) or Style D (Class A) circuit of dry-contact input devices.

NMM-100-10 and XP10-M - Monitor ten (10) Style B (Class B) or five (5) Style D (Class A) normally open contact device circuits.

NMM-100P and FMM-101 - Same as the **NMM-100 and FMM-1** except offered in a smaller package for mounting with Style B wired devices. These modules do not have an LED.

NZM-100 and FZM-1 - Monitor a single IDC of two-wire smoke detectors.

NZM-100-6 and XP6-MA - Addressable modules that provide an interface between the control panel and six (6) Style B (Class B) or three (3) Style D (Class A) IDCs of two-wire smoke detectors.

NDM-100 and FDM-1 - Similar to **NMM-100 and FMM-1**, but provide for two independent Style B IDCs.

1.4.3 Control Modules

Through the **NC-100 and FCM-1** addressable control modules, the control panel can selectively activate a Notification Appliance Circuit (NAC).

XP6-C - Similar in operation to the NC-100 and FCM-1, except it can activate six (6) Style Y (Class B) or three (3) Style Z (Class A) NACs.

1.4.4 Relay Modules

The **NC-100R and FRM-1** addressable relay modules provide the control panel with a dry-contact output for activating a variety of auxiliary devices.

XP6-R - Similar in operation to the NC-100R and FRM-1, except it provides six (6) Form-C relays.

1.4.5 Intelligent Detectors

NP-A100 and FAPT-851 - Multi-criteria smoke sensors that combine a photoelectric sensing chamber and 135°F (57.2°C) fixed temperature heat detection. The sensors use addressable communication to transmit smoke density and other information to the control panel. They adjust their detection parameters and alarm threshold depending on the ambient conditions they sample in its environment.

NI-100 and FSI-851 - Addressable ionization smoke detectors which measure the level of combustion products in their chamber using the 'ionization principle'.

ND-100 and FSD-751PL -Addressable low flow photoelectric duct detectors (**ND-100A and FSD-751PLA** for Canada). The **ND-100R and FSD-751RPL** include an alarm relay (**ND-100RA and FSD-751RPLA** for Canada). Low Flow refers to the air velocity rating of 100 to 4,000 feet per minute (0.5 to 20.32 m/sec). (Discontinued, use DNR(W) with NP-100R or FSP-851R.)

ND-200 - An addressable photoelectric low flow smoke detector. Low Flow refers to the air velocity rating of 100 to 4,000 feet per minute (0.5 to 20.32 m/sec). Includes a DNR Duct Detector Housing and an NP-100R. (Discontinued, use DNR(W) with NP-100R or FSP-851R.)

NH-100 and FST-851 - Addressable 135° fixed temperature heat detectors using a thermistor sensing circuit for fast response. **NH-100R and FST-851R** incorporate a thermal rate of rise of 15° F (9.4° C)/minute.

NH-100H and FST-851H - Addressable 190° fixed temperature heat detectors using a thermistor sensing circuit for fast response.

NH-200 and FST-951 - Addressable 135° fixed temperature heat detectors using a thermistor sensing circuit for fast response. **NH-200R and FST-951R** incorporate a thermal rate of rise of 15° F (9.4° C)/minute. These models are available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in FlashScan (LiteSpeed) only.

NH-200H and FST-951H - Addressable 190° fixed temperature heat detectors using a thermistor sensing circuit for fast response. These models are available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in FlashScan (LiteSpeed) only.

NP-100 and FSP-851 - Addressable photoelectric smoke detectors which provide smoke sensing utilizing optical sense technology. The **NP-100T and FSP-851T** include a 135° F fixed thermal sensor. The **NP-100R and FSP-851R** are low profile, intelligent, photoelectric sensors that are remote test capable. For use with DNR(W).

NP-200 and FSP-951 - Addressable photoelectric smoke detectors which provide smoke sensing utilizing optical sense technology. The **NP-200T and FSP-951T** include a 135° F fixed thermal sensor. The **NP-200R and FSP-951R** are a low profile, intelligent, photoelectric sensors that are remote test capable. For use with DNR(W). These models are available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in FlashScan (LiteSpeed) only.

DNR(W) - Innovair Flex, intelligent, non-relay, low flow, photoelectric duct detector housing. This requires the NP-100R or FSP-851R photoelectric smoke detector. Accommodates the installation of the NC-100R or FRM-1 relay module. The **DNRW** is a watertight housing.

FS-OSI-RI - An addressable long range projected beam smoke detector designed to provide open area protection. Operates in FlashScan or CLIP mode.

1.4.6 Manual Pull Station

The **NOT-BG12LX and NBG-12LX** are dual-action pull stations that, when activated, provide an addressable identification and its location to the control panel. An addressable monitor module is mounted inside the pull station to facilitate servicing and replacement.

1.4.7 Wireless Gateway

FWSG: The Wireless Gateway acts as a bridge between a group of wireless fire devices and a LiteSpeed SLC loop on the NFW-100X or NFW-50X. It is powered by the SLC loop or by a regulated, external 24VDC UL listed power supply. Available wireless devices include a photo detector, an Acclimate detector, a fixed-temperature heat detector, a rate-of-rise heat detector, and a monitor module. For details about wireless devices, system setup, and operation, see the *SWIFT™ Smart Wireless Integrated Fire Technology Instruction Manual*.

NOTE: The FWSG, as part of the wireless network, has been tested for compliance with the Federal Communications Commission (FCC) requirements of the United States Government. It has not been evaluated for use outside the USA. Use of this system outside the USA is subject to local laws and rules to which this product may not conform. It is the sole responsibility of the user to determine if this product may be legally used outside the USA.

1.5 SLC Capacity

The protocol selected for an SLC loop determines the maximum number of devices that can be handled by the loop. See Section 1.3, "Polling Protocols". Within those limits, the individual control panel may have additional restrictions. See the specific installation manual for this information.

1.6 SLC Performance

SLC performance depends on the type of circuit (Style 4, Style 6, or Style 7) and the components on the circuit.

NOTE: SLC operation meeting Style 7 requirements isolates each device on the SLC from faults that may occur within other areas of the SLC.

Wiring style requirements are determined by national and local codes. Consult with the Authority Having Jurisdiction before wiring the SLC. The table below (derived from NFPA 72-1999) lists the trouble conditions that result when a fault exists on an SLC.

Type of Fault	Style 4	Style 6	Style 7
Single Open	Trouble	Alarm, Trouble	Alarm, Trouble
Single Ground	Alarm, Trouble (ground)	Alarm, Trouble (ground)	Alarm, Trouble (ground)
Short	Trouble	Trouble	Alarm, Trouble
Short and open	Trouble	Trouble	Trouble
Short and ground	Trouble	Trouble	Alarm, Trouble
Open and ground	Trouble	Alarm, Trouble	Alarm, Trouble
Communications loss	Trouble	Trouble	Trouble
• Trouble - The control panel will indicate a trouble condition for this type of fault. • Alarm - The control panel must be able to process an alarm input signal in the presence of this type of fault.			

Table 1.1 SLC Performance

1.7 Surge Suppression

One primary surge protector must be used with each SLC wiring pair whenever SLC wiring runs outside the building. For detailed information refer to “Surge Suppression” on page 62.

1.8 LED Operation

The table below lists the LED operation on the various devices on an SLC.

Device	Standby	Activated
Monitor Module	Blinks RED	Steady RED
Control Module	Blinks GREEN	Steady GREEN
Detector	Blinks RED	Steady RED

Table 1.2 LED Operation

Section 2: Wiring Requirements

2.1 Wire Sizing

The SLC requires use of a specific wire type, depending on the mode of operation, to ensure proper circuit functioning. Wire size should be no smaller than 18 AWG (0.75 mm^2) and no larger than 12 AWG (3.25 mm^2) wire. The wire size depends on the length of the SLC circuit. It is recommended that all SLC wiring be twisted-pair to minimize the effects of electrical interference.

2.1.1 CLIP (Classic Loop Interface Protocol) Mode

All addressable FACPs can operate in CLIP (Classic Loop Interface Protocol) mode. It is recommended that all SLC wiring be twisted-pair and shielded when operating in CLIP mode to reduce the effects of electrical interference. Use the table below to determine the specific wiring requirements for the SLC. .

Wire Requirements	Distance in Feet (meters)	Wire Size	Wire Type
Twisted-pair, shielded	10,000 feet (3,048 m)	12 AWG (3.1 mm^2)	Belden 9583, Genesis 4410, Signal 98230, WPW D999
	8,000 feet (2,438 m)	14 AWG (2.0 mm^2)	Belden 9581, Genesis 4408, Signal 98430, WPW D995
	4,875 feet (1,486 m)	16 AWG (1.3 mm^2)	Belden 9575, Genesis 4406, & 4606, Signal 98630, WPW D991
	3,225 feet (983 m)	18 AWG (0.75 mm^2)	Belden 9574, Genesis 4402 & 4602, Signal 98300, WPW D975
Untwisted, unshielded wire, inside conduit or not in conduit	3,000 feet (914 m)	12 to 18 AWG	

Table 2.1 SLC Wiring Requirements in CLIP Mode

2.1.2 LiteSpeed Mode

The NFW-50X, NFW-100X, and NFW2-100 SLC can be programmed to operate in LiteSpeed mode for a quicker device response time. While shielded wire is not required, it is recommended that all SLC wiring be twisted-pair to minimize the effects of electrical interference. Use the following table to determine the specific wiring requirements for the SLC.

Wire Requirements	Distance in Feet (meters)	Wire Size	Wire Type
Twisted-pair, unshielded	10,000 feet (3,048 m)	12 AWG (3.1 mm^2)	Belden 5020UL & 6020UL, Genesis WG-4315 & WG-4515
	8,000 feet (2,438 m)	14 AWG (2.0 mm^2)	Belden 5120UL & 6120UL, Genesis WG-4313 & WG-4513
	4,875 feet (1,486 m)	16 AWG (1.3 mm^2)	Belden 5220UL & 6220UL, Genesis WG-4311 & WG-4511
	3,225 feet (983 m)	18 AWG (0.75 mm^2)	Belden 5320UL & 6320UL, Genesis WG-4306 & WG-4506

Table 2.2 SLC Wiring Requirements in LiteSpeed Mode

2.2 Measuring Resistance & Length

2.2.1 Two-Wire SLC - Style 4 (Class B)

Loop Resistance

T-tapping of the SLC wiring is permitted for 2-wire Style 4 configurations. The total DC resistance from the control panel to each branch end cannot exceed 40 ohms. Measure DC resistance as detailed and shown below:

1. With power removed, short the termination point of one branch at a time and measure the DC resistance from the beginning of the SLC to the end of that particular branch.

2. Repeat this procedure for all remaining branches in the SLC.

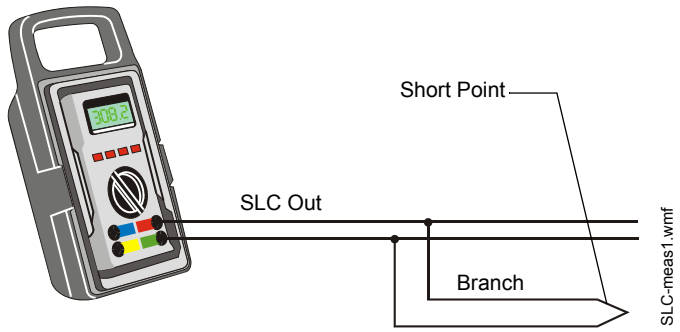


Figure 2.1 Measuring DC Resistance of a Two-Wire SLC

Total Wire Length

The total wire length of all combined branches of one SLC cannot exceed the limits set forth in each system's instruction manual. Determine the total length in each SLC by summing the wire lengths of all branches of one SLC.

In the following figure, the total length of the SLC is determined by adding the lengths of Branch A plus Branch B plus Branch C.

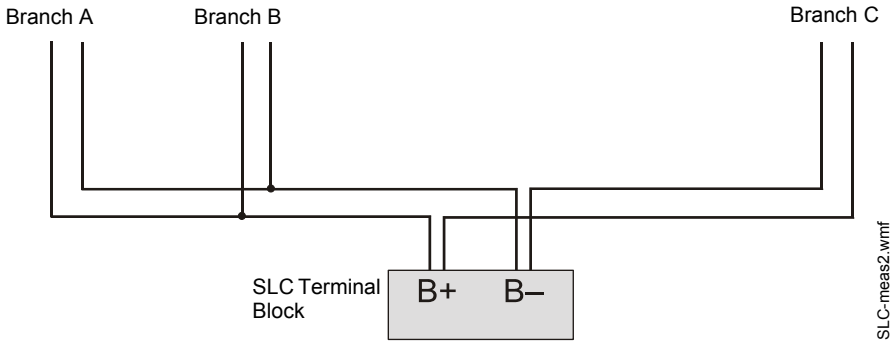


Figure 2.2 Measuring the Total Wire Length - Two-Wire SLC

2.2.2 Four-Wire SLC Style 6 & 7 (Class A)

Loop Resistance

The total DC resistance of the SLC pair cannot exceed 40 ohms. Measure DC resistance as detailed and shown below.

1. Disconnect the SLC channel B (Out) and SLC channel A (Return) at the control panel.
2. Short the two leads of SLC channel A (Return).
3. Measure the resistance across the SLC channel B (Out) leads.

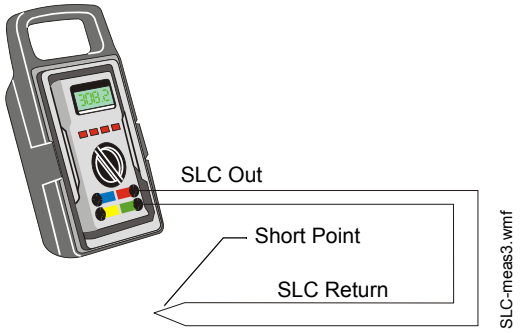


Figure 2.3 Measuring DC Resistance of a Four-Wire SLC

Total Wire Length

The total wire length in a four-wire SLC cannot exceed the limits set forth in each system's instruction manual. The figure below identifies the output and return loops from SLC terminal on the control panel:

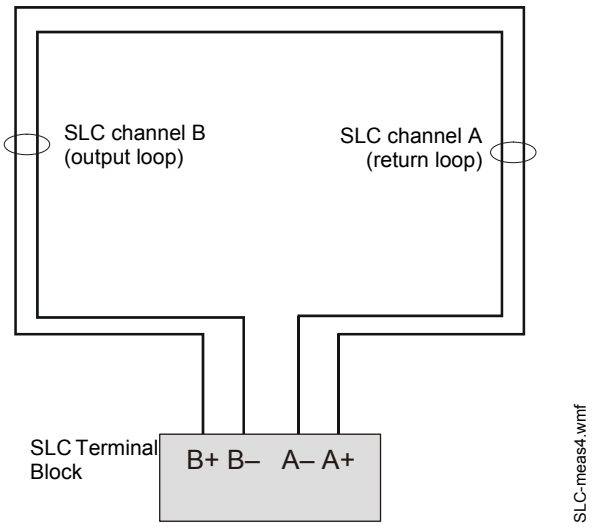


Figure 2.4 Measuring the Wire Length – Four-Wire SLC

2.3 Shield Wire Termination

The drawing below shows the method of proper termination of the shield.

Connect the metal conduit to the cabinet by using the proper connector. Feed the shielded wire through the conduit, into the control box. The shield drain wire must be connected to the "shield" terminal on the SLC terminal block.

NOTE: Use of good wiring practice consistent with local electrical codes is expected.

CAUTION:

DO NOT LET THE SHIELD DRAIN WIRE OR THE SHIELD FOIL TOUCH THE SYSTEM CABINET OR BE CONNECTED TO EARTH GROUND AT ANY POINT.

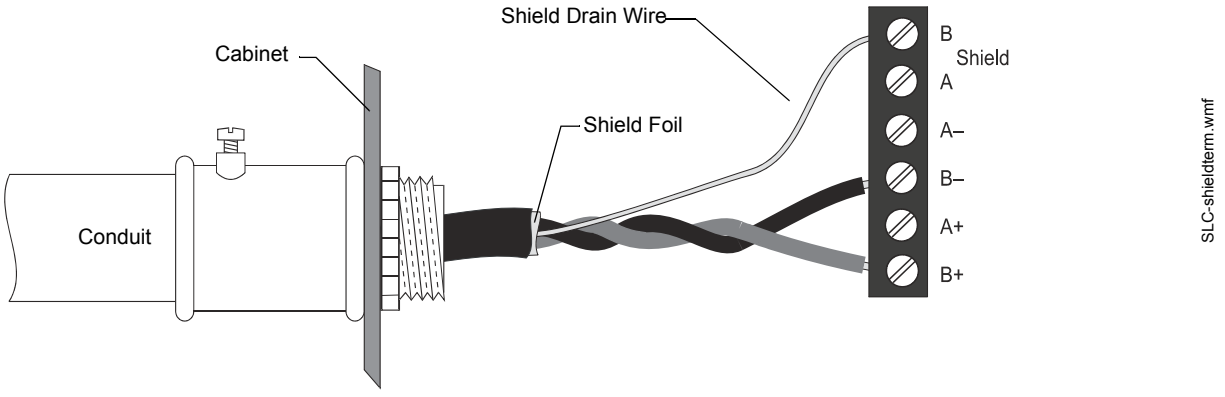


Figure 2.5 Shield Termination

2.4 Control Panel Terminal Blocks

The terminal blocks on the control panel circuit board that concern the SLC circuit are described below. For more information on this subject refer to the control panel's Instruction Manual.

2.4.1 Fire-Warden-100-2 (Software Version 3.0)

TB1 provides two types of 24 VDC power; Nonresettable and Resettable, jumper selectable by JP4 and JP6.

TB10 provides connections for the SLC wiring.

198 addresses are available per loop (99 detectors and 99 modules).

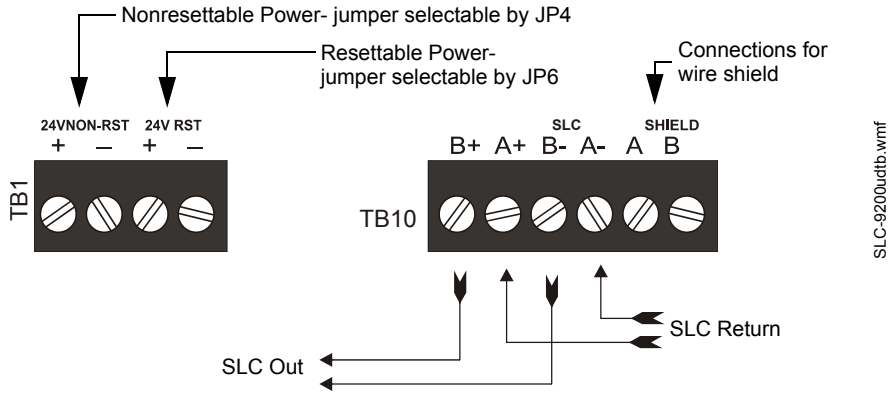


Figure 2.6 FireWarden-100-2 (Rev 3) Terminal Blocks

2.4.2 FireWarden-100 & Fire-Warden-100-2 (Versions 1 and 2)

TB1 provides two types of 24 VDC power; Nonresettable and Resettable.

TB10 provides connections for the SLC wiring.

198 addresses are available per loop (99 detectors and 99 modules).

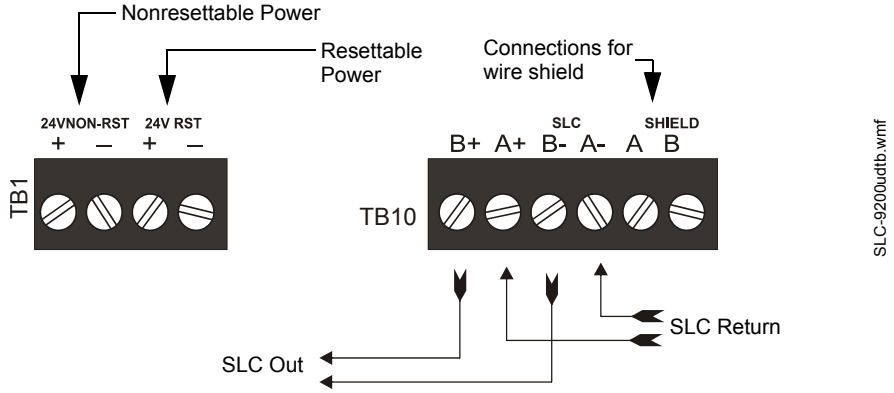


Figure 2.7 FireWarden-100 & FireWarden-100-2 (Rev 1 & 2) Terminal Blocks

2.4.3 FireWarden-50

24 VDC power may be supplied by a remote power supply such as the Notifier FCPS-24S6/8.

TB2 provides connections for the SLC wiring.

50 addresses are available (any combination of detectors and modules).

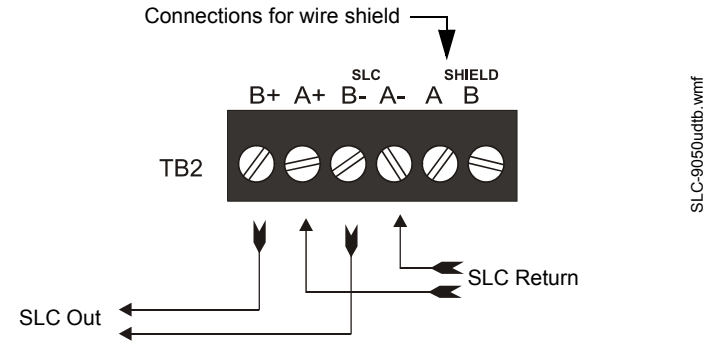


Figure 2.8 FireWarden-50 Terminal Block

2.4.4 FireWarden-50X

TB11 provides two types of 24 VDC power; Nonresettable and Resettable, user programmable.

TB12 provides connections for the SLC wiring.

50 addresses are available (any combination of detectors and modules).

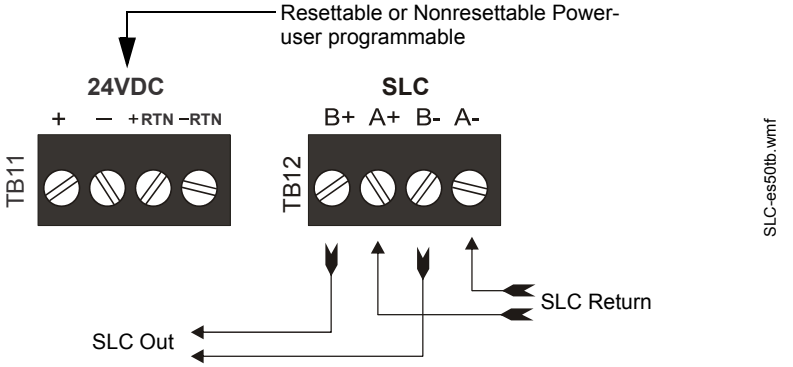


Figure 2.9 FireWarden-50X Terminal Block

2.4.5 Fire-Warden-100X

TB11 provides two types of 24 VDC power; Nonresettable and Resettable, user programmable. PWR1 has a user programmable Class A wiring option.

TB12 provides connections for the SLC wiring.

198 addresses are available per loop (99 detectors and 99 modules).

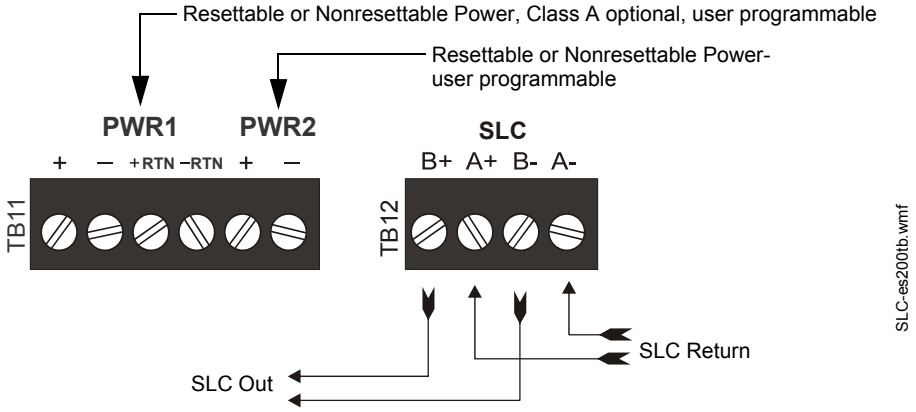


Figure 2.10 FireWarden-100X Terminal Blocks

Section 3: SLC Circuits without Isolators

3.1 Overview

This chapter concerns itself with the two styles of circuits that do not require isolation devices:

- NFPA Style 4
- NFPA Style 6

3.2 NFPA Style 4 SLC

NFPA Style 4 requirements can be met by using the diagram below.

- T-tapping of the SLC wiring is allowed for Style 4 configuration.

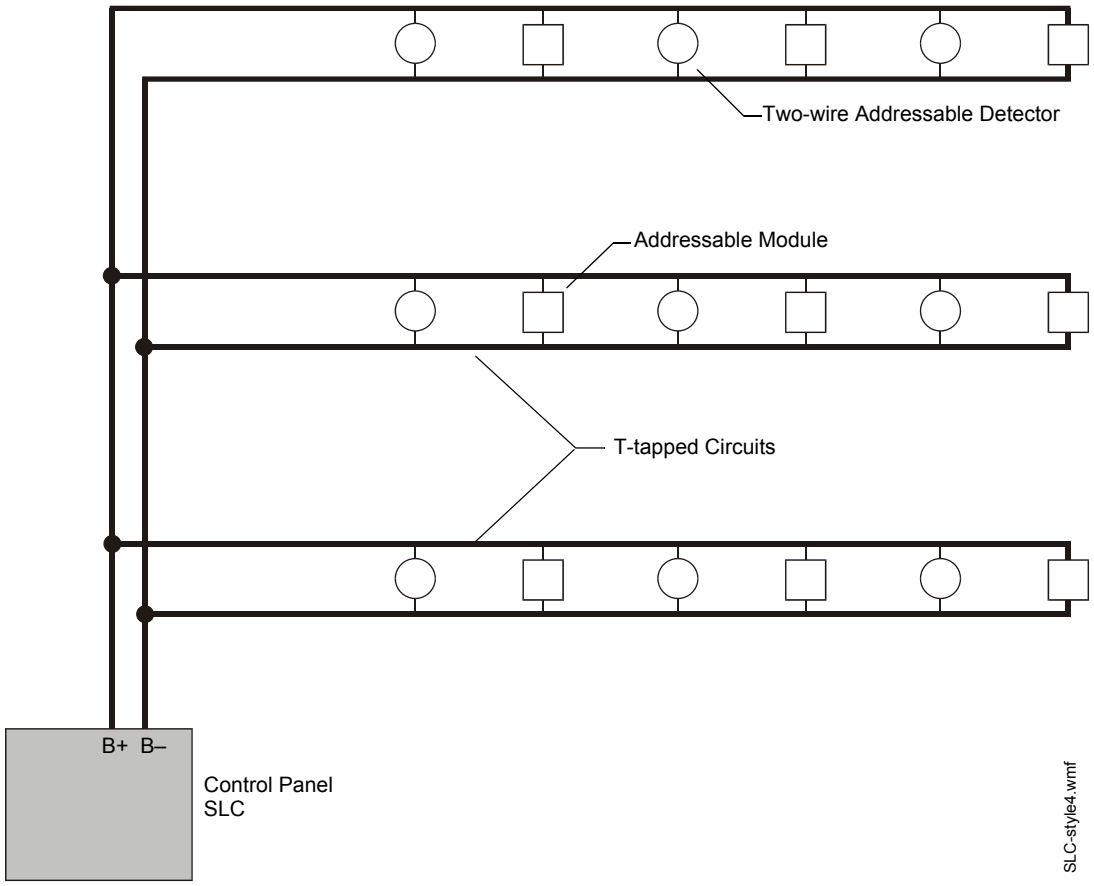


Figure 3.1 Basic NFPA Style 4 SLC

3.3 NFPA Style 6 SLC

NFPA Style 6 requirements can be met by using the diagram below.

- T-tapping of the SLC wiring is NOT allowed for Style 6 configuration.

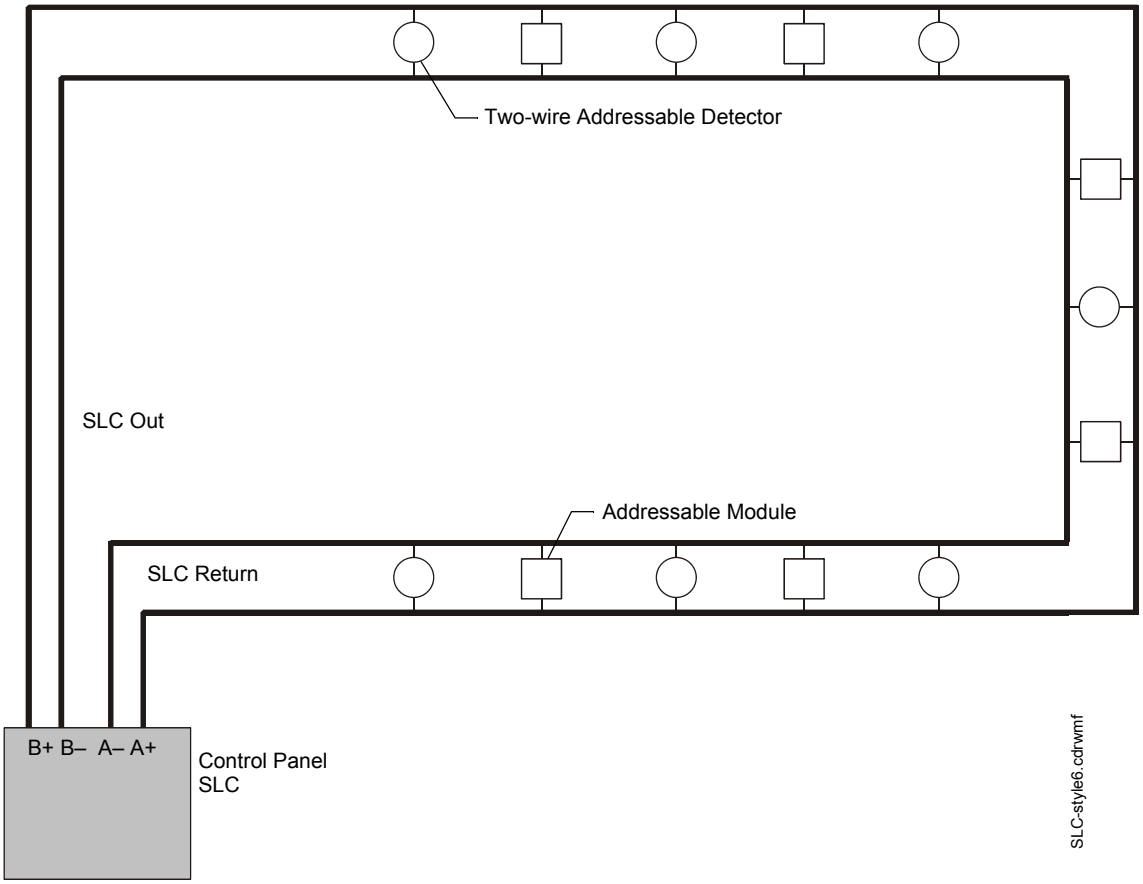


Figure 3.2 Basic NFPA Style 6 SLC

Section 4: SLC Circuits with Isolators

4.1 Fault Isolator Devices

There are three isolator devices used to protect critical elements of the SLC from faults on other SLC branches or segments.

- Fault Isolator Modules **N100-ISO and ISO-X**
- Six Fault Isolator Module **ISO-6**
- Isolator Detector Base **B224BI**

A Fault Isolator Module on both sides of a device, or the combination of Isolator Base and Isolator Module is required to comply with NFPA Style 7 requirements.

CAUTION: MAXIMUM ADDRESSABLE DEVICES

- If relay or sounder bases are not used, a maximum of 25 addressable devices can be connected between Isolator Modules and/or Bases. When relay or sounder bases are used, the maximum number of addressable devices that can be connected between Isolators is reduced to seven. Isolator modules will not function properly when these limits are exceeded.
- When more than 100 Isolator Modules are connected to an SLC loop, the address capacity of the loop is reduced by two (2) addresses for every isolator device in excess of 100.

4.1.1 Isolating an SLC Branch

The module continuously monitors the circuit connected to terminals 3(–) and 4(+). Upon power-up, an integral relay is latched on. The module periodically pulses the coil of this relay. A short circuit on the SLC resets the relay. The module detects the short and disconnects the faulted SLC branch or segment by opening the positive side of the SLC (terminal 4). This isolates the faulty branch from the remainder of the loop preventing a communication problem with all other addressable devices on the remaining branches (labeled "Continuation of the SLC" in the figure below). During a fault condition, the control panel registers a trouble condition for each addressable device which is isolated on the SLC segment or branch. Once the fault is removed, the module automatically reapplies power to the SLC branch or segment.

4.1.2 Wiring an Isolator Module

The figure below shows typical wiring of an N100-ISO and ISO-X Isolator Module:

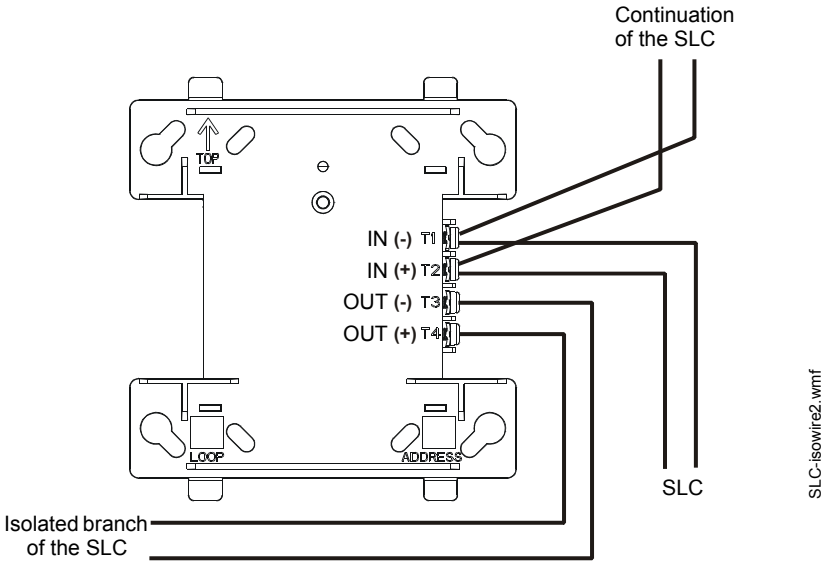


Figure 4.1 Wiring N100-ISO and ISO-X Modules

The figure below shows typical wiring of an ISO-6 Isolator Module:

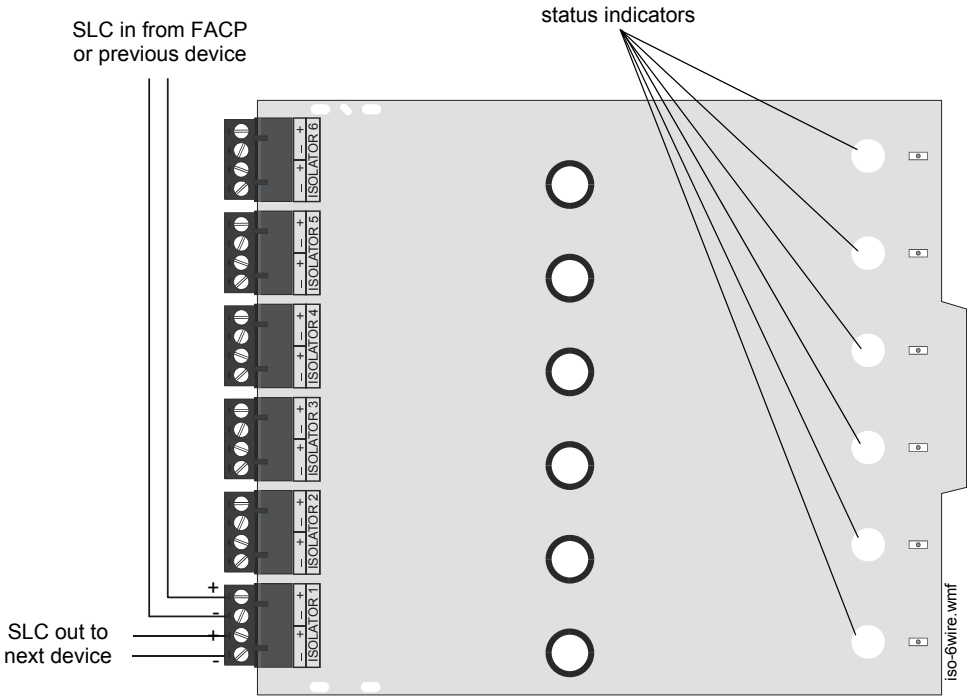


Figure 4.2 Wiring an ISO-6 Module

4.2 NFPA Style 4 SLC Using Isolator Modules

A variation of a Style 4 operation using N100-ISO and ISO-X isolator modules to protect each branch of the SLC is shown below. Refer to Figure 4.1 for N100-ISO AND ISO-X wiring and to Section 4.1 for limitations.

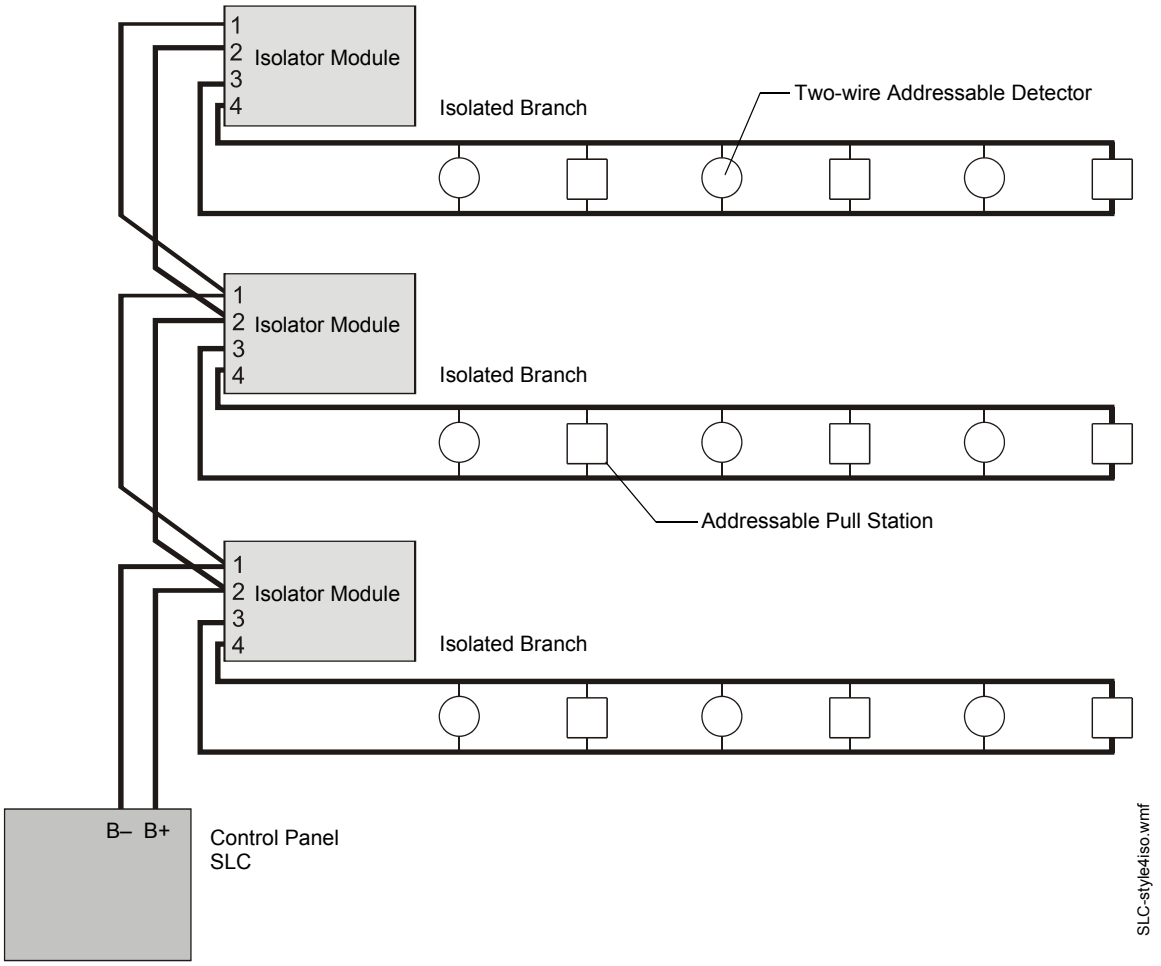


Figure 4.3 NFPA Style 4 SLC Using N100-ISO and ISO-X Isolator Modules

A variation of a Style 4 operation using an ISO-6 isolator module to protect each branch of the SLC is shown below. Each terminal on the ISO-6 acts as a single N100-ISO or ISO-X module. Refer to Figure 4.2 for ISO-6 wiring and to Section 4.1 for limitations. Note that the ISO-6 cannot accept two wires at one pin. Wire Style 4 SLC loops as shown in the figure below.

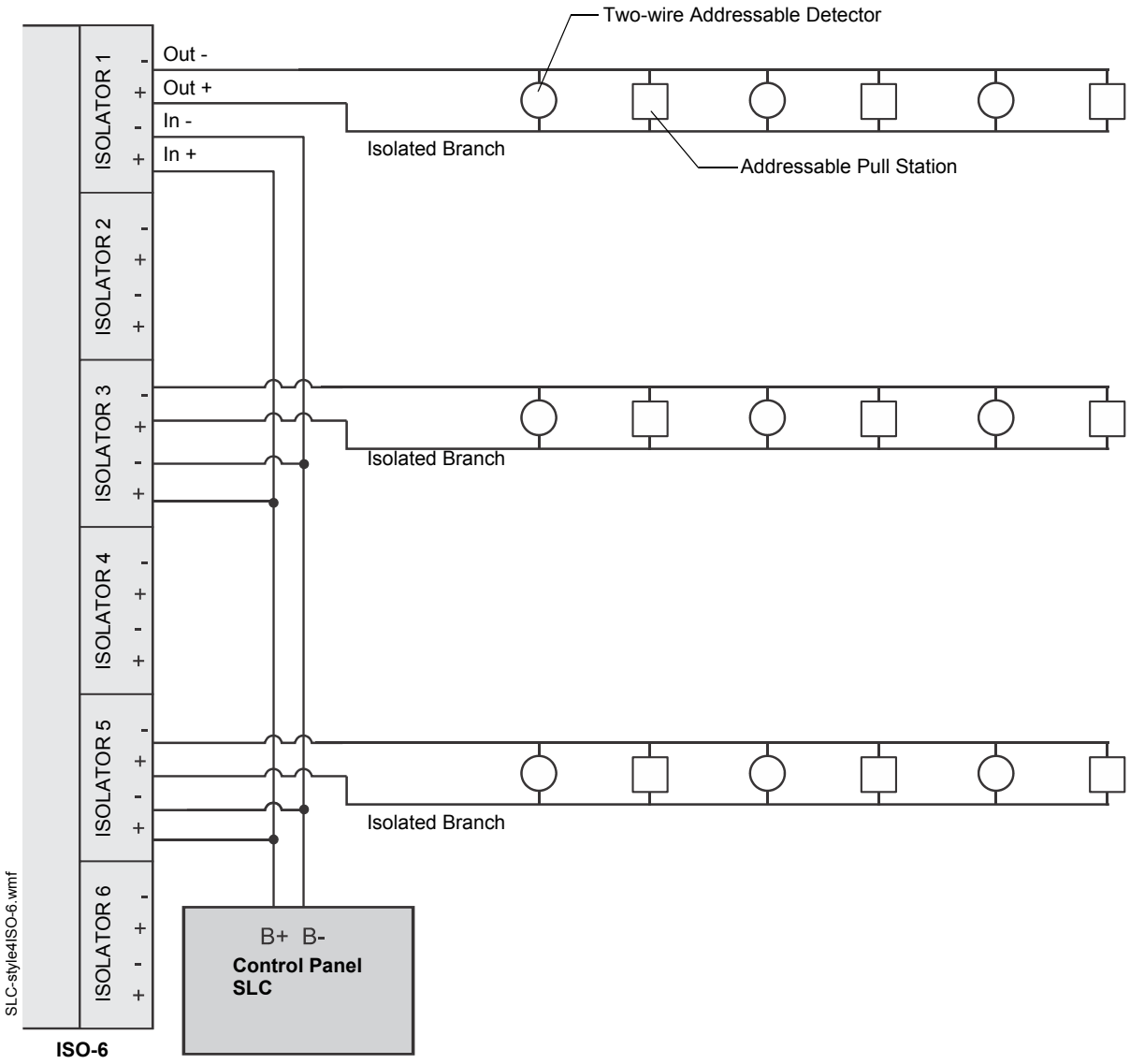


Figure 4.4 NFPA Style 4 SLC Using an ISO-6 Isolator Module

4.3 NFPA Style 6 SLC Using Isolator Modules

A variation of Style 6 operation using isolator modules to protect a section of the SLC. By flanking each group of devices with an N100-ISO or ISO-X fault isolator module, each group is protected from faults that may occur in the other groups. For example, a fault in Section B will not effect Sections A & C. The isolator modules on either side of Section B will open the loop. Section A will still operate from power on the SLC Out side and Section C will operate from the SLC Return side.

- A combination of isolator modules and isolator bases may be used.
- T-tapping is NOT allowed within the Style 6 configuration.
- Isolator modules shall be within 20 feet (6.1 meters) of device and must be enclosed in metal conduit.

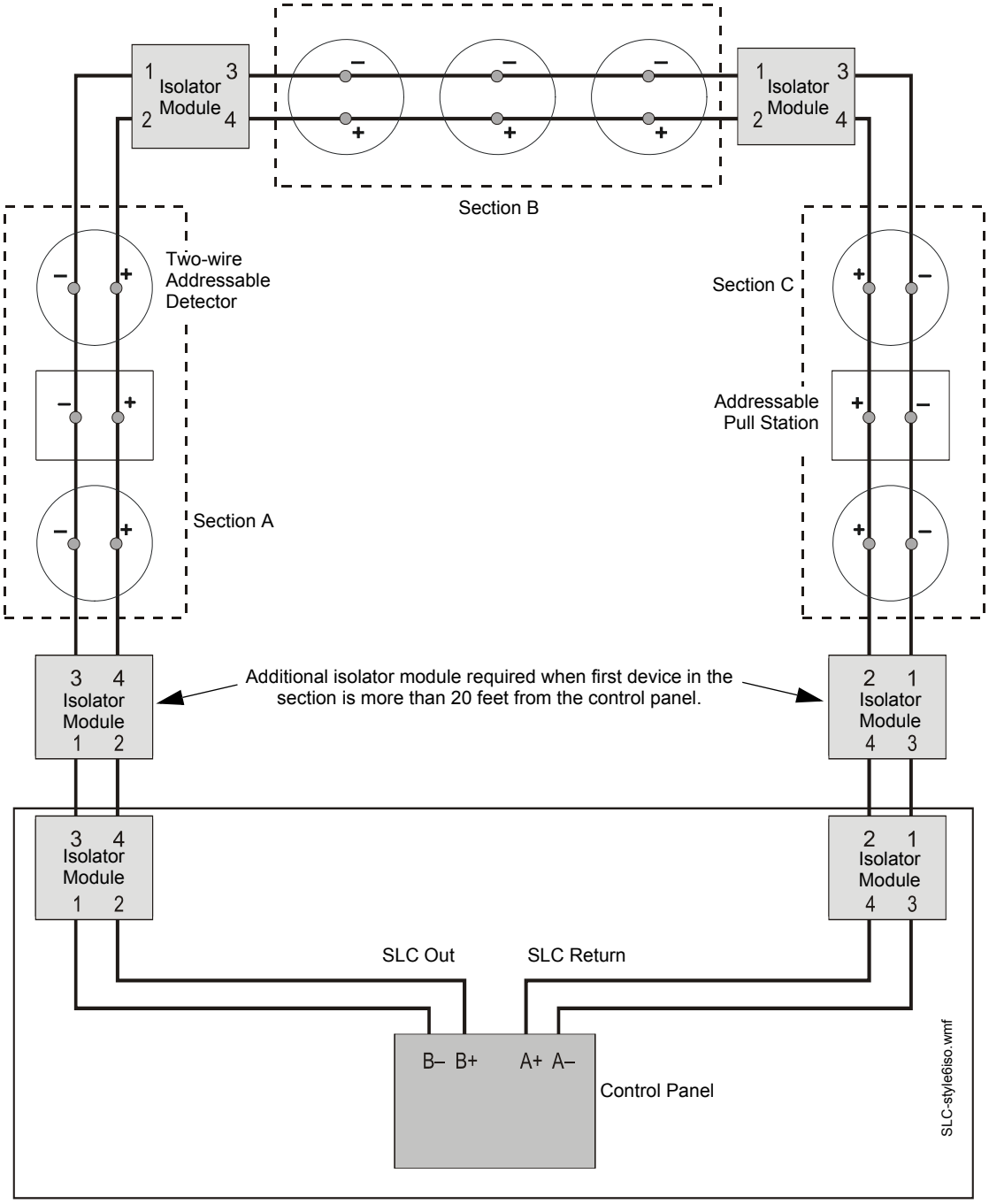


Figure 4.5 NFPA Style 6 SLC Using Isolator Modules

4.4 NFPA Style 7 SLC Using Isolator Modules

Style 7 operation requires using isolator modules (or a combination of isolator modules and isolator bases) before and after each device. Flanking each device with an isolator provides fault protection to all other devices on the loop.

- T-tapping is NOT allowed within the Style 7 wiring configuration.
- When a detector base or pull station is used, install isolator modules on both sides of the device.
- Connections between isolator modules and the device they isolate must be "close-nippled" conduit, within 3 feet (91.44 cm).

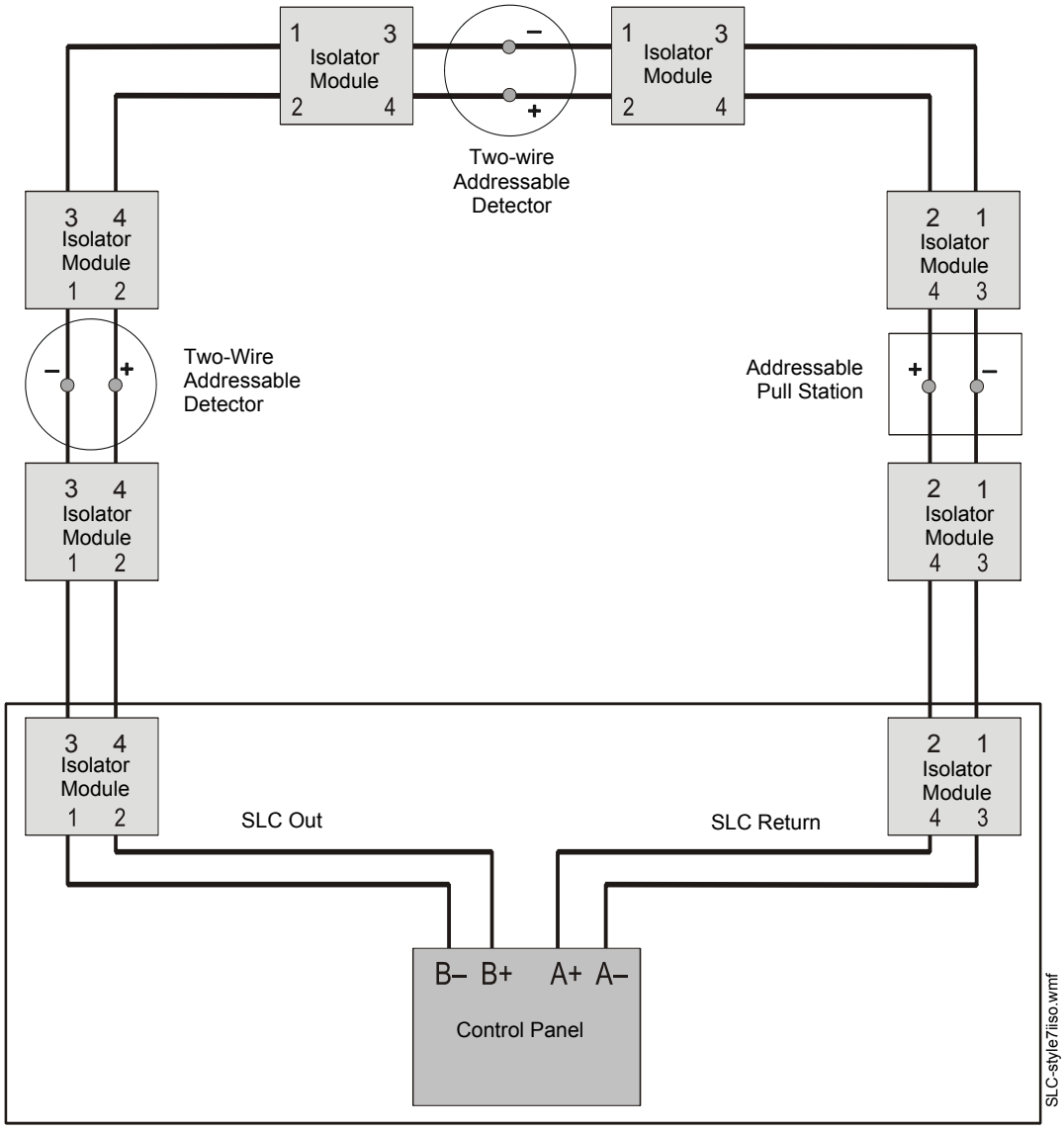


Figure 4.6 NFPA Style 7 SLC Using Isolator Modules

Section 5: Monitor Modules

5.1 Descriptions

These addressable modules monitor conventional contact-type alarm initiating devices. You can configure module circuits as an NFPA Style B (Class B) or Style D (Class A) Initiating Device Circuits (IDC). There is no limit to the number of contact-type devices installed on a monitor module circuit.

NOTE: For more information on the individual module specifications refer to the Installation Instructions that are provided with these devices.

5.1.1 Addressable Monitor Modules

NMM-100 and FMM-1 Monitor Modules

These are addressable modules that monitor either a Style B (Class B) or Style D (Class A) circuit of dry-contact input devices. These modules are capable of participating in degraded mode where supported by the FACP.

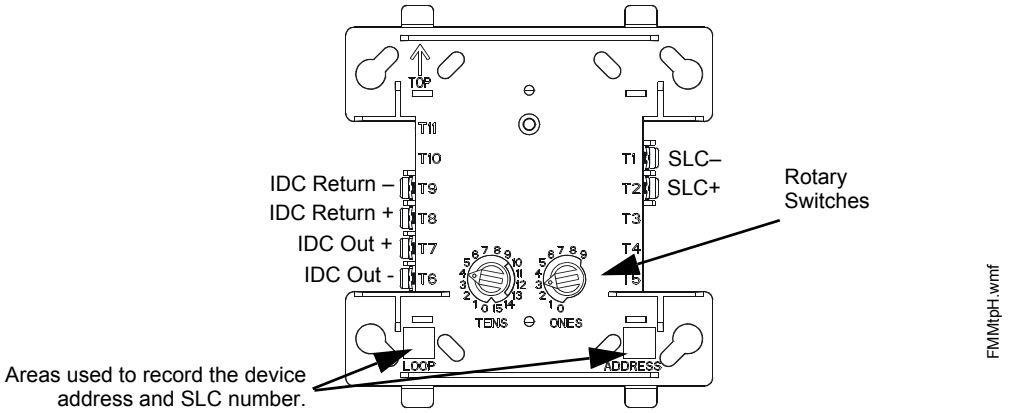


Figure 5.1 NMM-100 and FMM-1 Monitor Modules

NMM-100-10 and XP10-M Monitor Modules

These are addressable monitor modules intended to interface between the FACP and up to ten (10) Style B (Class B) or five (5) Style D (Class A) IDCs containing normally open contact devices.

These types of modules are contained in either a BB-XP or BB-25 cabinet. The BB-XP can accommodate up to 2 modules and the BB-25, which requires the CHS-6 chassis, can accommodate up to 6 modules.

See the *Installation Instructions* provided with module for proper installation into a cabinet.

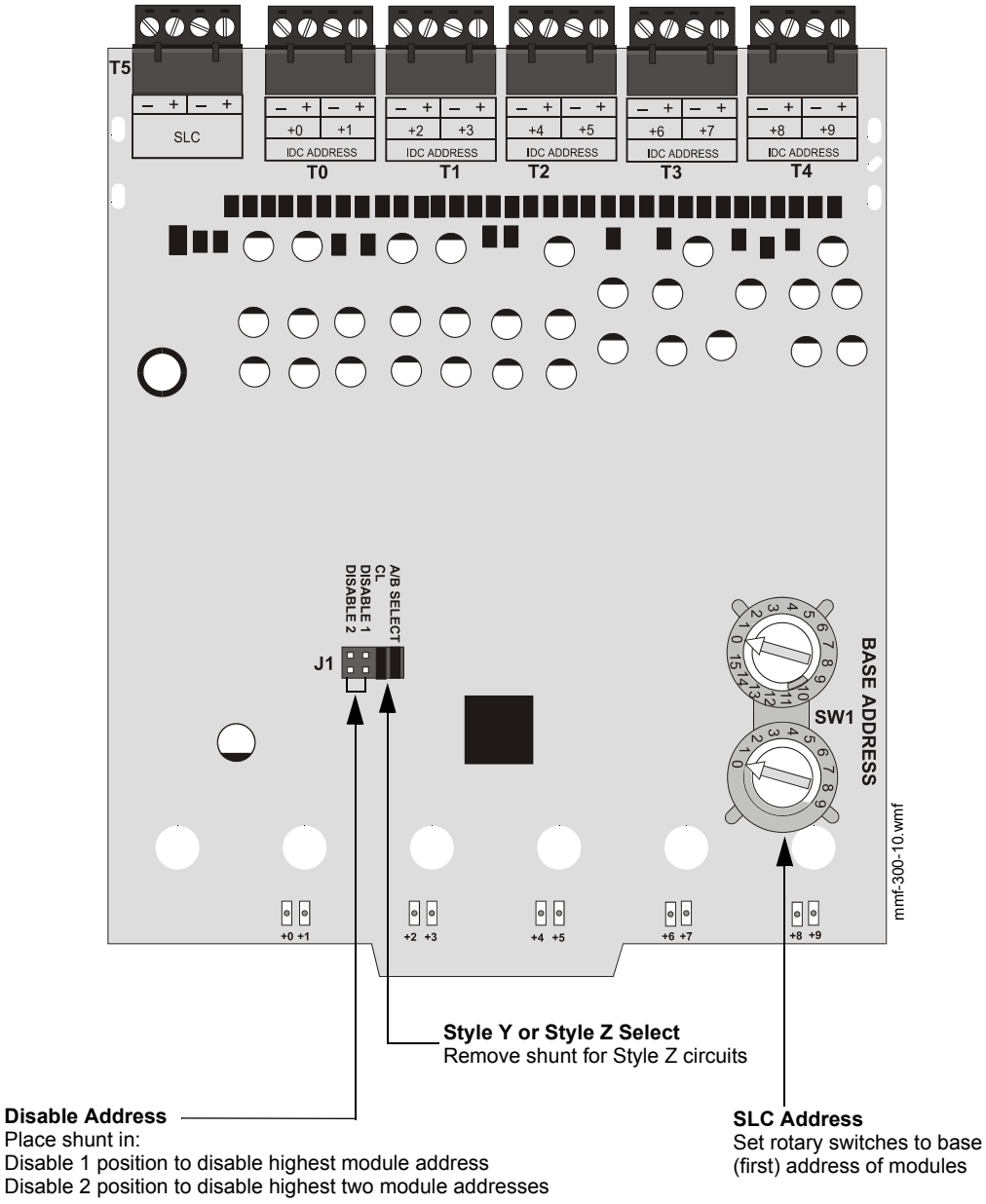


Figure 5.2 NMM-100-10 and XP10-M Monitor Modules

5.1.2 Zone Interface Modules

NZM-100 and FZM-1 Module

Similar to the NMM-100 and FMM-1, these modules are used to monitor a single IDC of UL listed compatible two-wire 24 volt conventional smoke detectors. Refer to the *Device Compatibility Documents*.

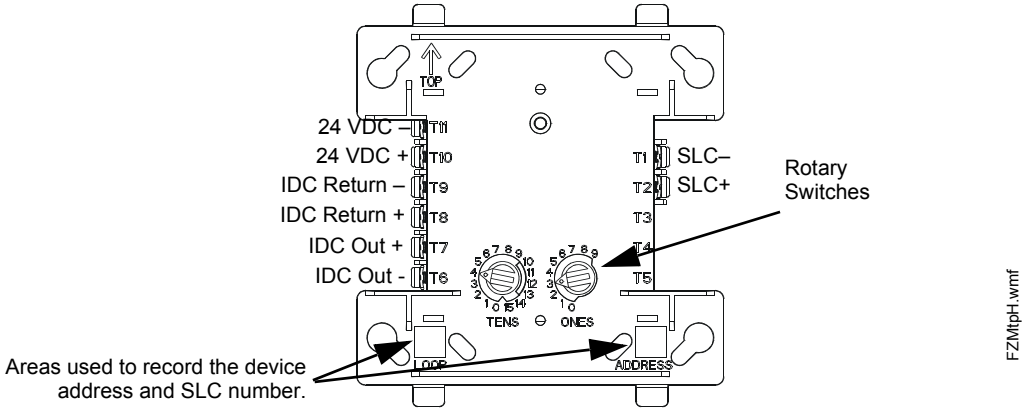


Figure 5.3 NZM-100 and FZM-1 Interface Modules

NZM-100-6 and XP6-MA Interface Modules

These monitor modules are intended to interface between the FACP and a conventional alarm system with up to six (6) Style B (Class B) or three (3) Style D (Class A) IDCs containing normally open contact devices.

These monitor modules are contained in either a BB-XP or BB-25 cabinet. The BB-XP can accommodate up to 2 modules and the BB-25, which requires the CHS-6 chassis, can accommodate up to 6 modules.

See the *Installation Instructions* provided with module for proper installation into cabinet.

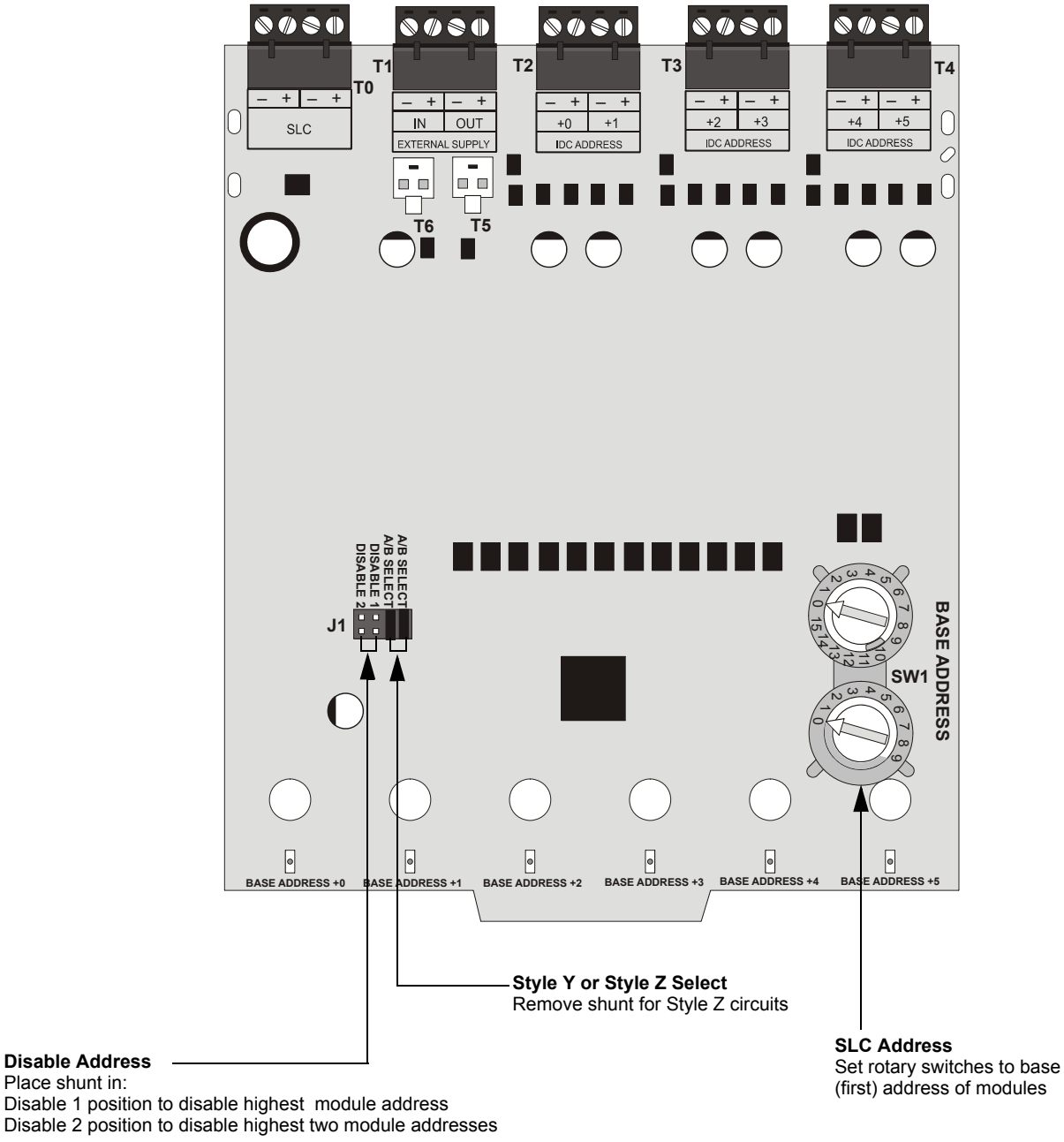


Figure 5.4 NZM-100-6 and XP6-MA Interface Modules

5.1.3 Dual Monitor Module

NDM-100 and FDM-1 Module

The NDM-100 and FDM-1 are similar to the NMM-100 and FMM-1 but provide for two independent 2-wire IDCs at two separate, consecutive addresses.

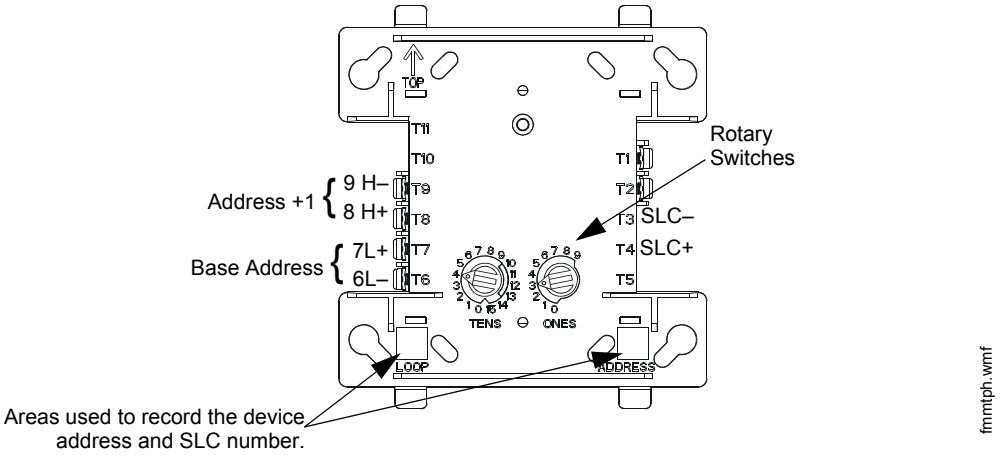


Figure 5.5 NDM-100 and FDM-1 Dual Monitor Modules

5.1.4 Mini Monitor Modules

NMM-100P and FMM-101 Monitor Modules

The NMM-100P and FMM-101 are functionally and electrically identical to an NMM-100 and FMM-1, but are offered in smaller packages for mounting directly in the electrical box of the Style B (Class B) device being monitored.

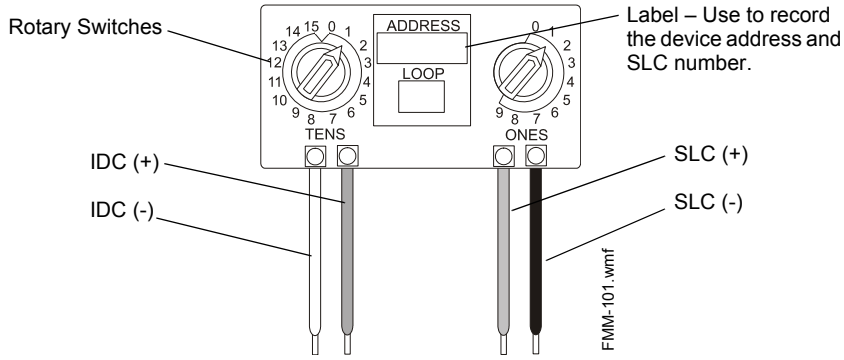


Figure 5.6 NMM-100P and FMM-101 Mini Monitor Modules

5.2 Installation

When installing any of these modules DO NOT mix the following services that the IDC provides:

- Fire alarm service
- Automatic and manual waterflow alarm service with normally open contact devices
- Sprinkler supervision with normally open contact devices

5.2.1 Setting an SLC address for a Single Point Module

Each module can be set to one of 99 addresses (01-99) and is factory preset with an address of "00".

NOTE: The NFW-50 and NFW-50X can support addresses 01 - 50. The NFW-100, NFW2-100, and NFW-100X can support module addresses of 01 - 99.

To set an SLC address, use a screwdriver to adjust the rotary switches on the module to the desired address. The module below is set at "35". When finished, mark the address on the module face in the place provided.

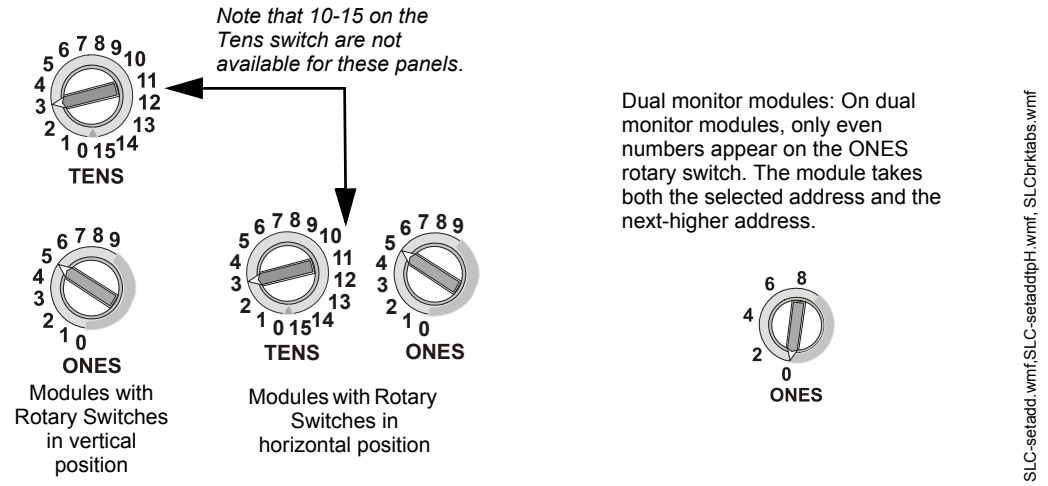


Figure 5.7 Setting an SLC Address on a Single Point Module

5.2.2 Setting an SLC address for a Multi-Point Module

The SLC address of a multi-point module is set in the same fashion as a single-point module.

In Class B operation, each NMM-100-10, NZM-100-6, XP10-M, XP6-MA, XP6-C, and XP6-R module is set to a base address. The remaining module points are automatically assigned to the next higher SLC addresses. For example, if the base address of an NMM-100-10 or XP10-M is set to 28, the next module points will be addressed to 29, 30, 31, 32, 33, 34, 35, 36 and 37.

In Class A operation, alternate module points are paired together, resulting in a total of five module points. For example, if the base address of an NMM-100-10 or XP10-M is set to 28, then 30, 32, 34 and 36 will be automatically assigned to the remaining module points and 29, 31, 33, 35 and 37 are available for use by other modules.

NOTE: The NFW-50 and NFW-50X can support addresses 01 - 50. The NFW-100, NFW2-100, and NFW-100X can support module addresses of 01 - 99.

To set an SLC address, use a common screwdriver to adjust the rotary switches on the module to the desired address. The module below is set at "28".

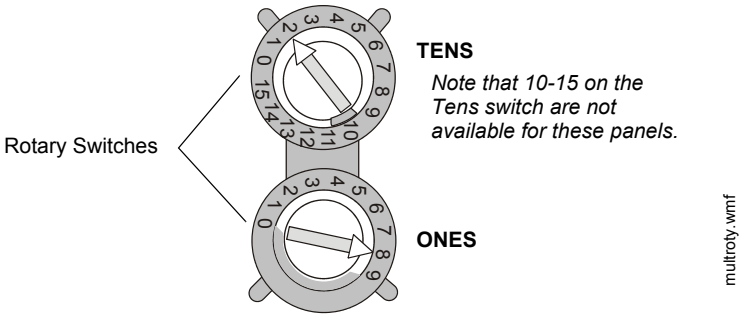


Figure 5.8 Setting an SLC Address on a Multi-Point Module

5.3 NMM-100 and FMM-1 Wiring Diagrams

Following are wiring diagrams that depict NFPA Style B (Class B) and D (Class A) Initiating Device Circuits (IDCs) using NMM-100 and FMM-1 monitor modules.

The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamperes @ 24 VDC (nominal).

5.3.1 Wiring a NFPA Style B IDC with an NMM-100 or FMM-1

Connect the SLC wiring to the module terminals 1 (–) and 2 (+).

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting an SLC address for a Single Point Module” on page 31.

The figure below shows typical wiring for a supervised and power-limited NFPA Style B IDC using an NMM-100 or FMM-1 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See “Power Considerations” on page 59 for information on supervising 24 VDC power.

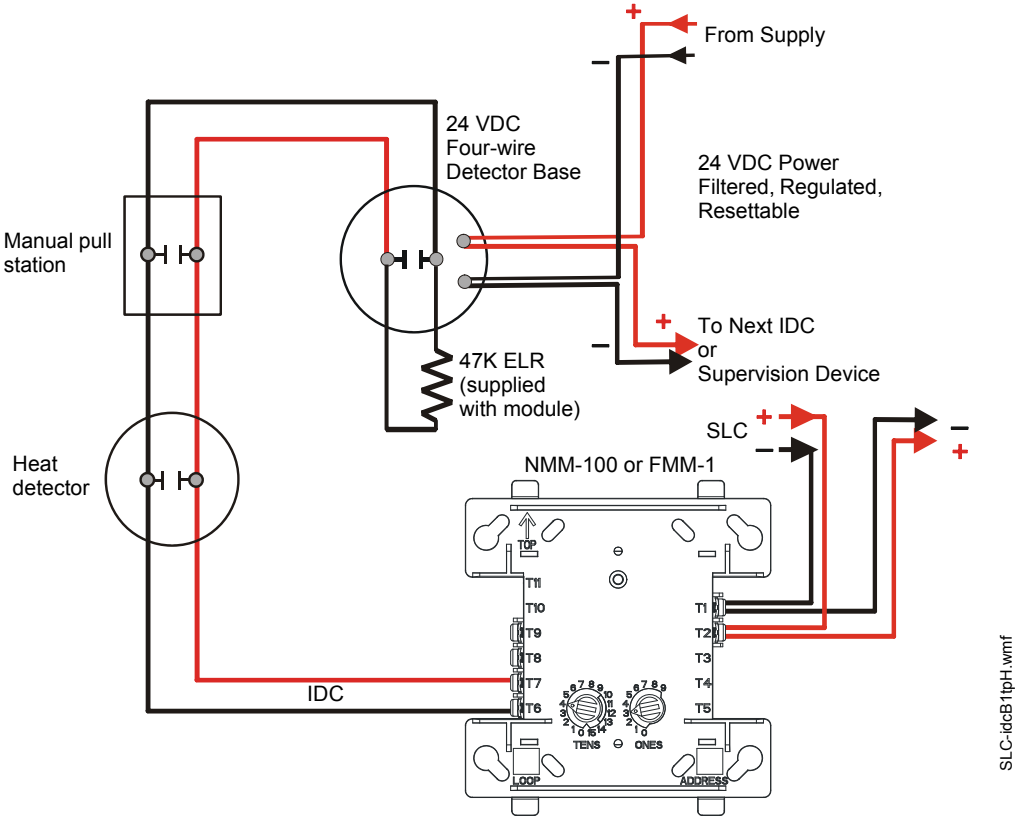


Figure 5.9 Typical Style B IDC Wiring with an NMM-100 or FMM-1

5.3.2 Wiring a NFPA Style D IDC with an NMM-100 or FMM-1

Connect the SLC wiring to the module terminals 1 (–) and 2 (+).

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to "Setting an SLC address for a Single Point Module" on page 31.

The figure below shows typical wiring for a supervised and power-limited NFPA Style D (Class A) IDC using an NMM-100 or FMM-1 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See "Power Considerations" on page 59 for information on supervising 24 VDC power.

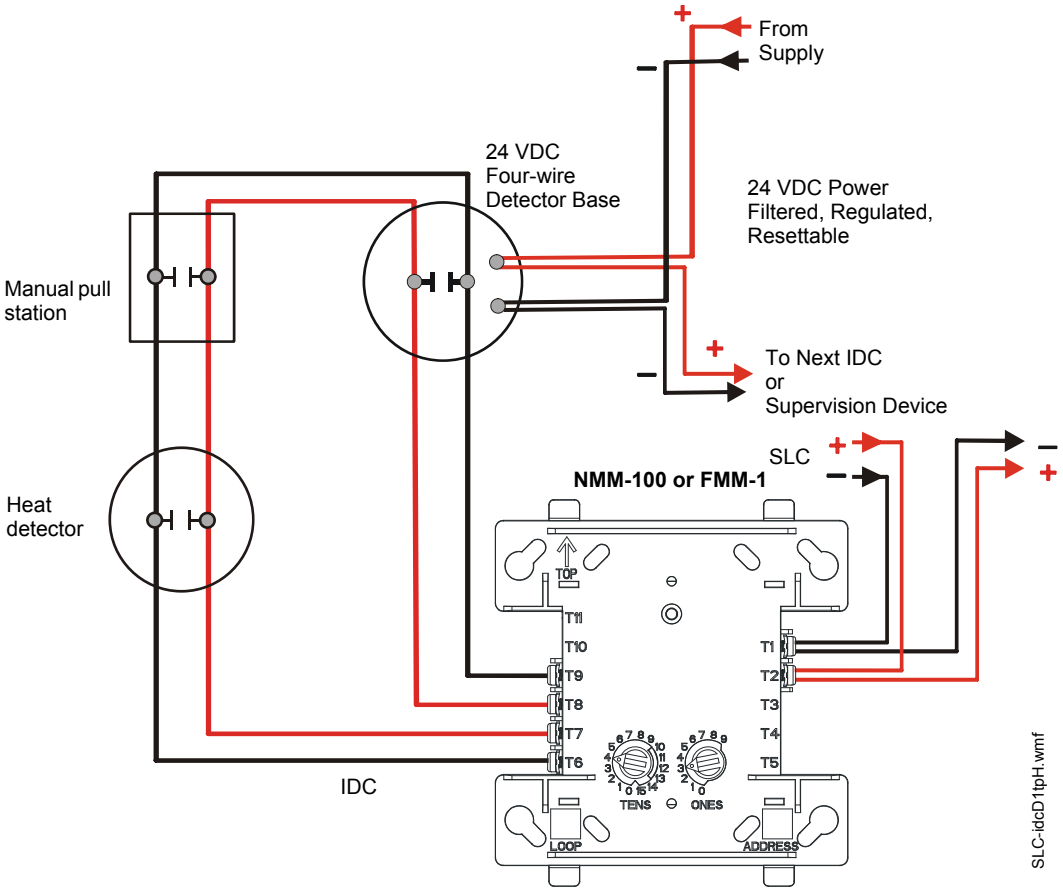


Figure 5.10 Typical Style D IDC Wiring with an NMM-100 or FMM-1

5.3.3 NMM-100 and FMM-1 Wiring for Emergency Alarm System Applications

Connect the SLC wiring to the module terminals 1 (–) and 2 (+).

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to "Setting an SLC address for a Single Point Module" on page 31.

The figure below shows typical wiring for a supervised and power-limited Emergency Signaling circuit using an NMM-100 or FMM-1 module.

- See "Power Considerations" on page 59 for information on supervising 24 VDC power.
- See Section 6, "Control Modules" for instructions on using control modules as NACs on an SLC.
- Refer to the *Device Compatibility Document* #15378 for compatible smoke detectors.

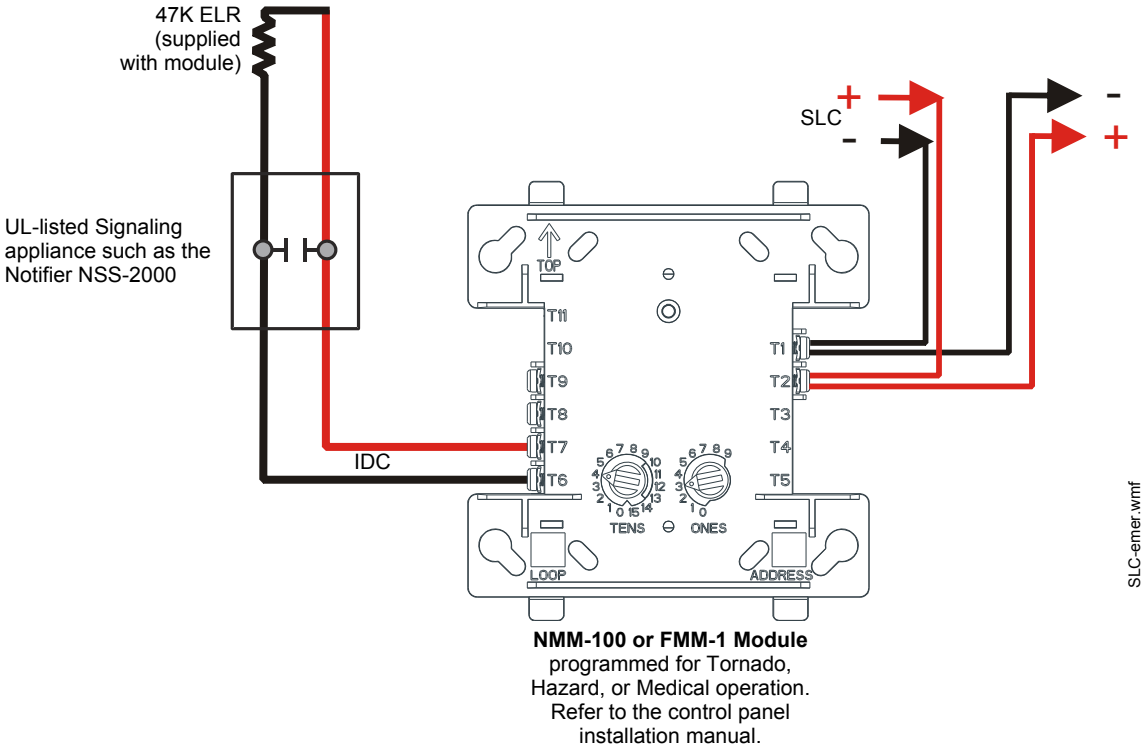


Figure 5.11 Emergency Signaling Wiring with an NMM-100 or FMM-1

5.4 NMM-100-10 and XP10-M Wiring Diagrams

Following are wiring diagrams that depict NFPA Style B (Class B) and D (Class A) Initiating Device Circuits (IDCs) using NMM-100-10 and XP10-M monitor modules.

The Initiating Device Circuit (IDC) is supervised and current-limited to 1.0 milliampere @ 24 VDC (nominal).

5.4.1 Wiring a NFPA Style B IDC with an NMM-100-10 or XP10-M

Connect the SLC wiring to the module terminals T5 as shown below.

Use the rotary switches on the module to set the base SLC address. Each module takes ten addresses on the SLC. The remaining module points are automatically assigned to the next nine higher addresses. Refer to "Setting an SLC address for a Multi-Point Module" on page 31.

DO NOT set the lowest address above 41 (for the NFW-50 or NFW-50X) or 90 (for the NFW-100, NFW2-100, or NFW-100X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Style B IDC using an NMM-100-10 or XP10-M module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See "Power Considerations" on page 59 for information on supervising 24 VDC power.

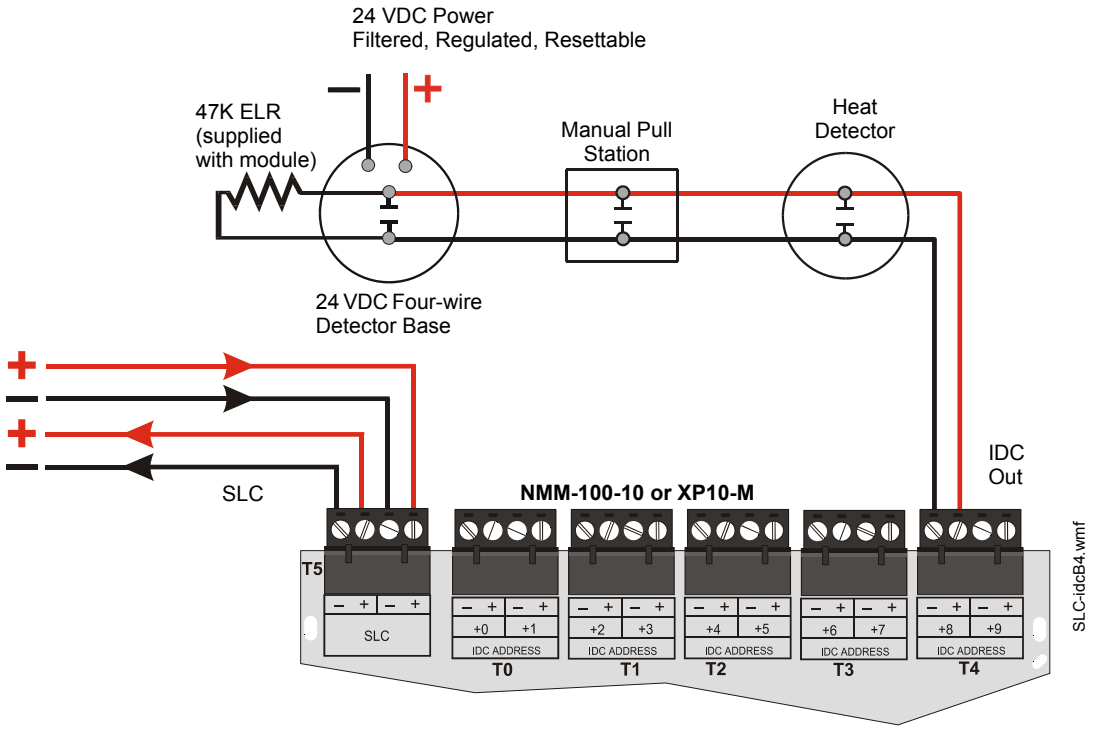


Figure 5.12 Typical Style B IDC Wiring with an NMM-100-10 or XP10-M

5.4.2 Wiring a NFPA Style D IDC with an NMM-100-10 or XP10-M

Connect the SLC wiring to the module terminals T5 as shown below.

Use the rotary switches on the module to set the base SLC address. Each module takes five alternating addresses on the SLC. The remaining module points are automatically assigned to the next four higher addresses. (Example: 28, 30, 32, 34 and 36). Refer to "Setting an SLC address for a Multi-Point Module" on page 31.

DO NOT set the lowest address above 41 (for the NFW-50 or NFW-50X) or 90 (for the NFW-100, NFW2-100, or NFW-100X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Style D (Class A) IDC using an NMM-100-10 or XP10-M module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See "Power Considerations" on page 59 for information on supervising 24 VDC power.

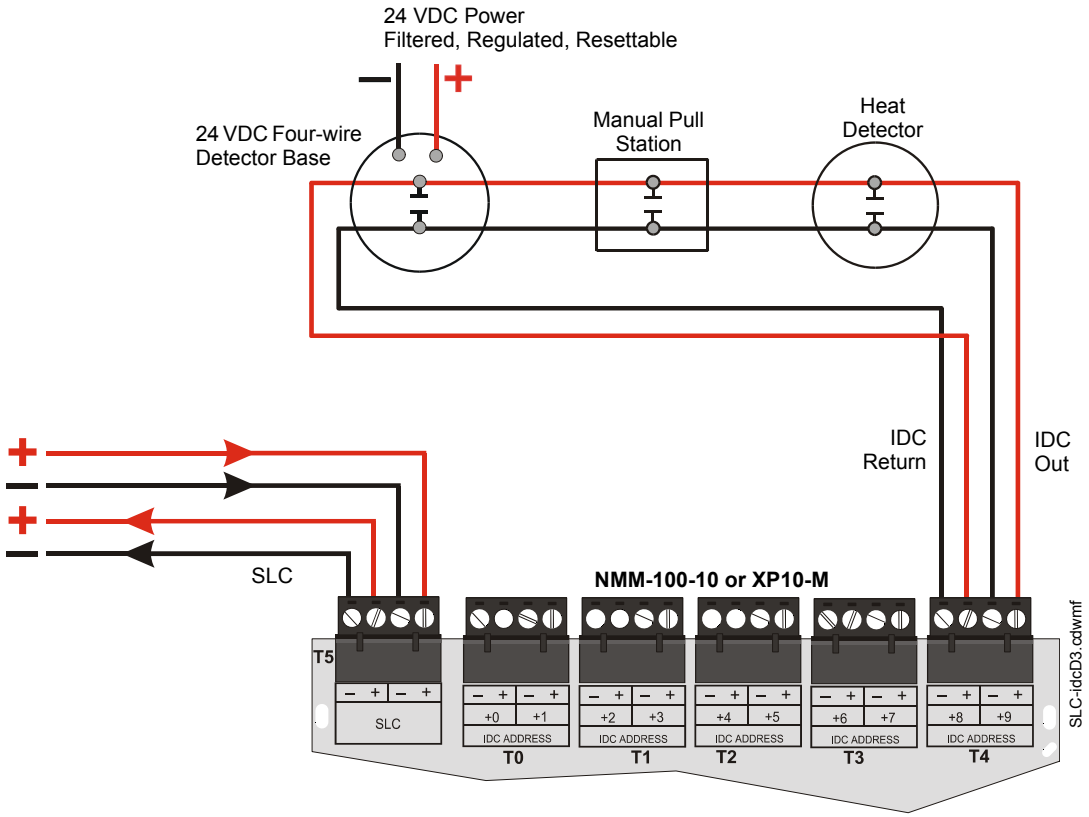


Figure 5.13 Typical Style D IDC Wiring with an NMM-100-10 or XP10-M

5.5 NDM-100 and XP6-C Wiring Diagrams

Following is a wiring diagrams that depict NFPA Style B (Class B) Initiating Device Circuits (IDCs) using NDM-100 and XP6-C Dual Monitor Modules.

5.5.1 Wiring a NFPA Style B IDC with an NDM-100 or XP6-C

Connect the SLC wiring to the module terminals 1 (–) and 2 (+).

Use the rotary switches on the module to set it to the SLC address. Each dual module takes two addresses on the SLC. Circuit 'L' corresponds to the address set on the rotary switches, which will be an even number. Circuit 'H' will automatically respond to the next higher address, which will be an odd number. Use caution to avoid duplicate addressing of modules on the system. Refer to "Setting an SLC address for a Single Point Module" on page 31.

Each IDC (H & L) is power limited to 230 microamperes @ 24 VDC.

The figure below shows typical wiring for a supervised and power-limited NFPA Style B IDC using an NDM-100 or XP6-C module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See "Power Considerations" on page 59 for information on supervising 24 VDC power.

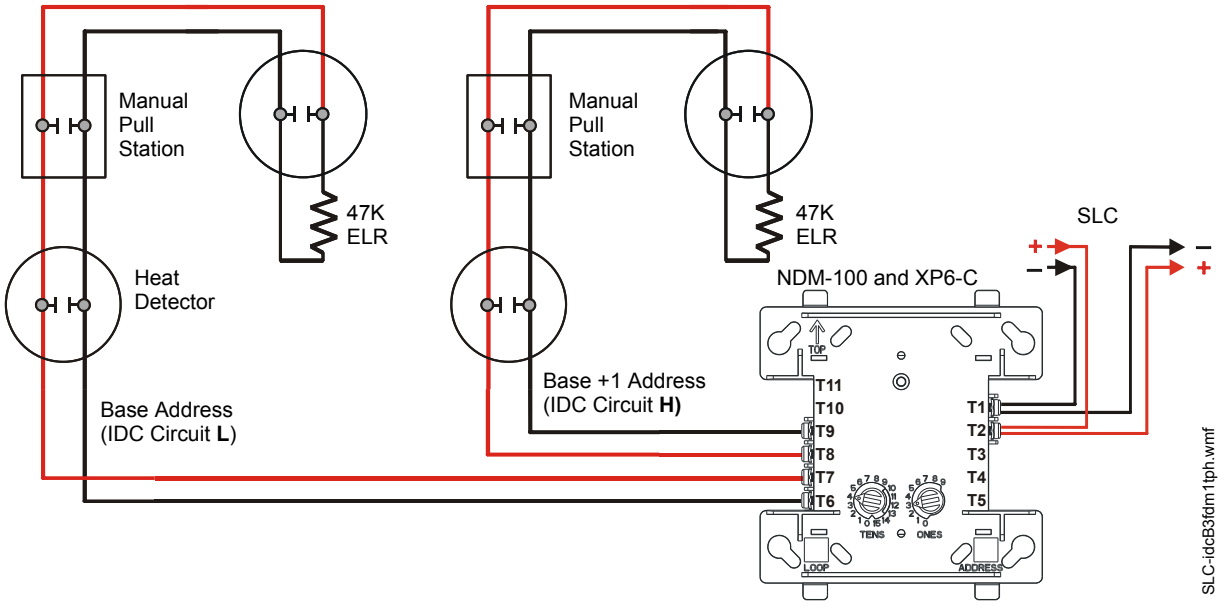


Figure 5.14 Typical Style B IDC Wiring with an NDM-100 or XP6-C

5.6 NZM-100 and FZM-1 Wiring Diagrams

Following are wiring diagrams that concern NFPA Style B (Class B) and D (Class A) Initiating Device Circuits (IDCs) using NZM-100 or FZM-1 Zone Interface Modules.

5.6.1 Wiring a NFPA Style B IDC with an NZM-100 or FZM-1

Connect the SLC wiring to the module terminals 1 (–) and 2 (+).

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting an SLC address for a Single Point Module” on page 31.

The IDC is supervised and power limited to 230 microamperes @ 24 VDC.

The figure below shows typical wiring for a supervised and power-limited NFPA Style B IDC using an NZM-100 or FZM-1 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See “Power Considerations” on page 59 for information on 24 VDC power.

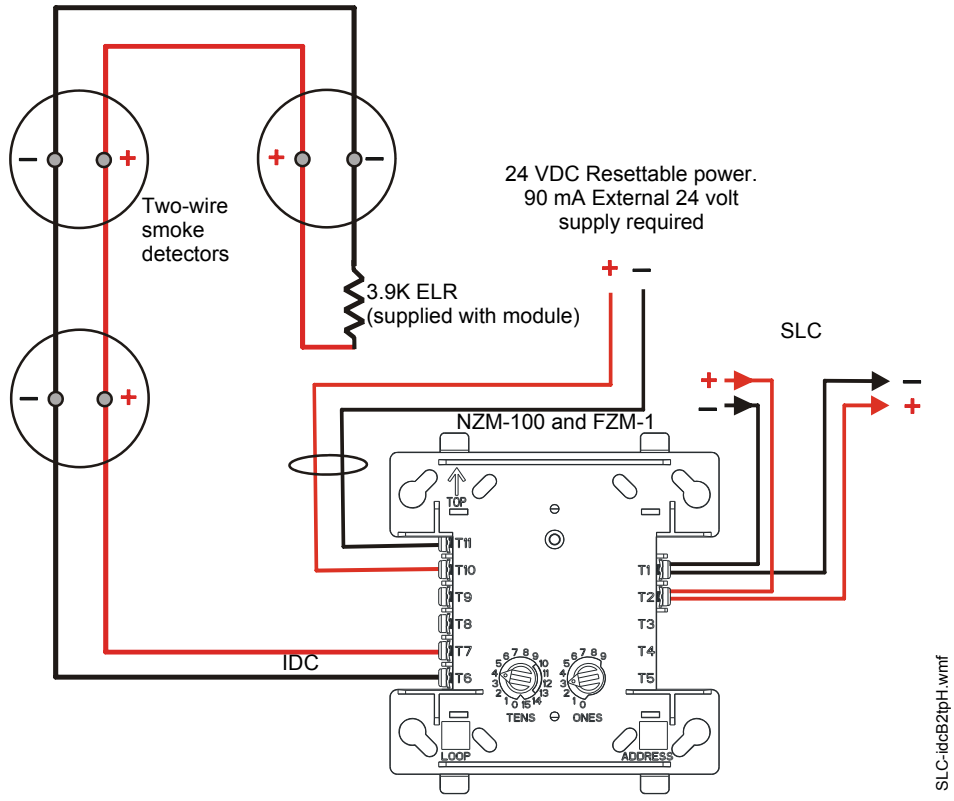


Figure 5.15 Typical Style B IDC Wiring with an NZM-100 or FZM-1

5.6.2 Wiring a NFPA Style D IDC with an NZM-100 or FZM-1

Connect the SLC wiring to the module terminals 1 (–) and 2 (+).

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to "Setting an SLC address for a Single Point Module" on page 31.

The figure below shows typical wiring for a supervised and power-limited NFPA Style D (Class A) IDC using an NZM-100 or FZM-1 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See "Power Considerations" on page 59 for information on 24 VDC power.

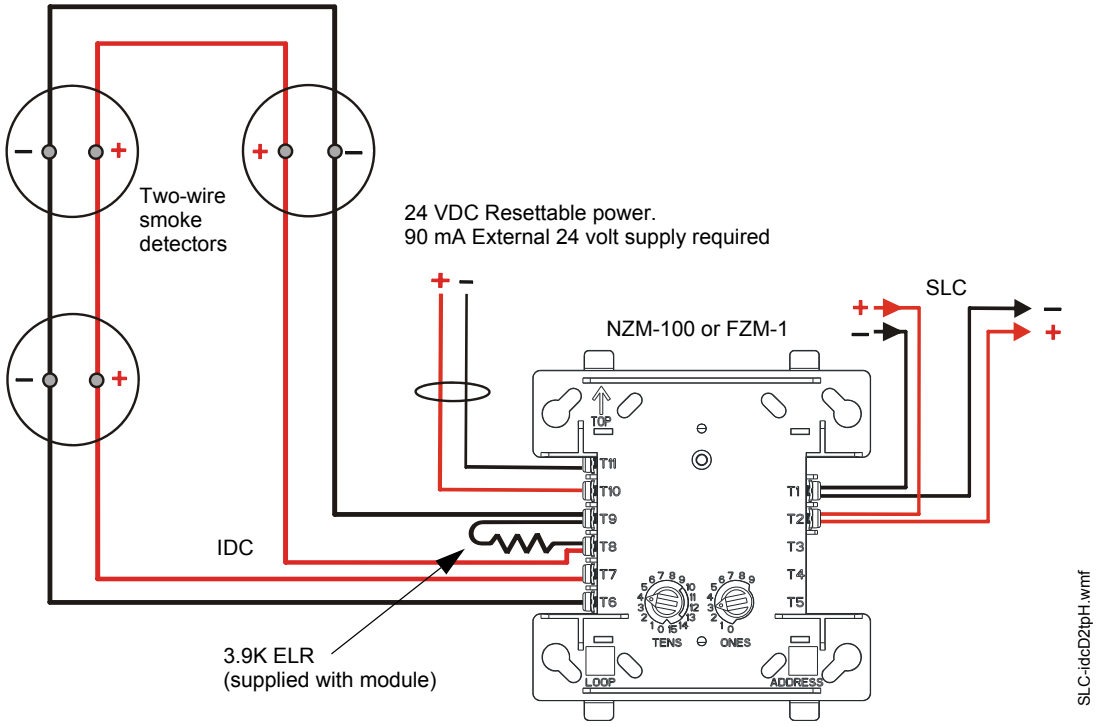


Figure 5.16 Typical Style D IDC Wiring with an NZM-100 or FZM-1

5.7 NZM-100-6 and XP6-MA Wiring Diagrams

Following are wiring diagrams that concern NFPA Style B (Class B) and D (Class A) Initiating Device Circuits (IDCs) using NZM-100-6 or XP6-MA monitor modules.

5.7.1 Wiring a NFPA Style B IDC with an NZM-100-6 or XP6-MA

Connect the SLC wiring to the module terminals T0 as shown below.

Use the rotary switches on the module to set the base SLC address. Each module takes six addresses on the SLC. The remaining module points are automatically assigned to the next five higher addresses. Refer to “Setting an SLC address for a Multi-Point Module” on page 31.

DO NOT set the lowest address above 41 (for the NFW-50 or NFW-50X) or 90 (for the NFW-100, NFW2-100, or NFW-100X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Style B IDC using an NZM-100-6 or XP6-MA module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See “Power Considerations” on page 59 for information on 24 VDC power.

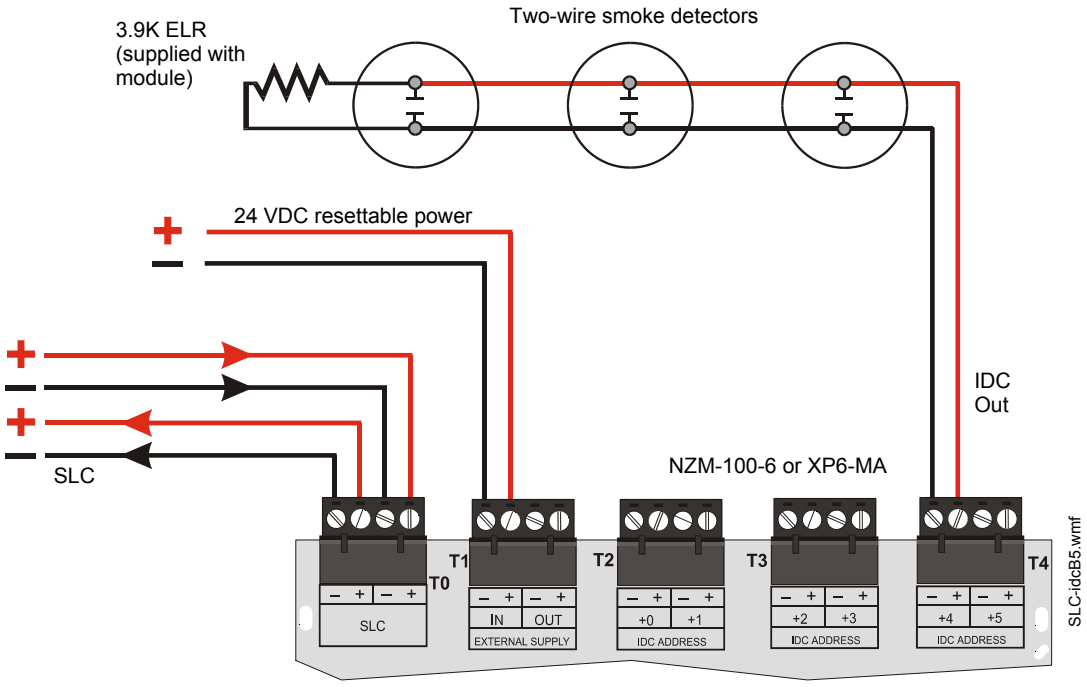


Figure 5.17 Typical Style B IDC Wiring with an NZM-100-6 or XP6-MA

5.7.2 Wiring a NFPA Style D IDC with an NZM-100-6 or XP6-MA

Connect the SLC wiring to the module terminals T0 as shown below.

Use the rotary switches on the module to set it to the SLC addresses. Each module takes three alternating addresses on the SLC. The remaining module points are automatically assigned to the next two higher addresses. (Example: 28, 30 and 32). Refer to "Setting an SLC address for a Multi-Point Module" on page 31.

DO NOT set the lowest address above 41 (for the NFW-50 or NFW-50X) or 90 (for the NFW-100, NFW2-100, or NFW-100X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Style D (Class A) IDC using an NZM-100-6 or XP6-MA module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See "Power Considerations" on page 59 for information on 24 VDC power.

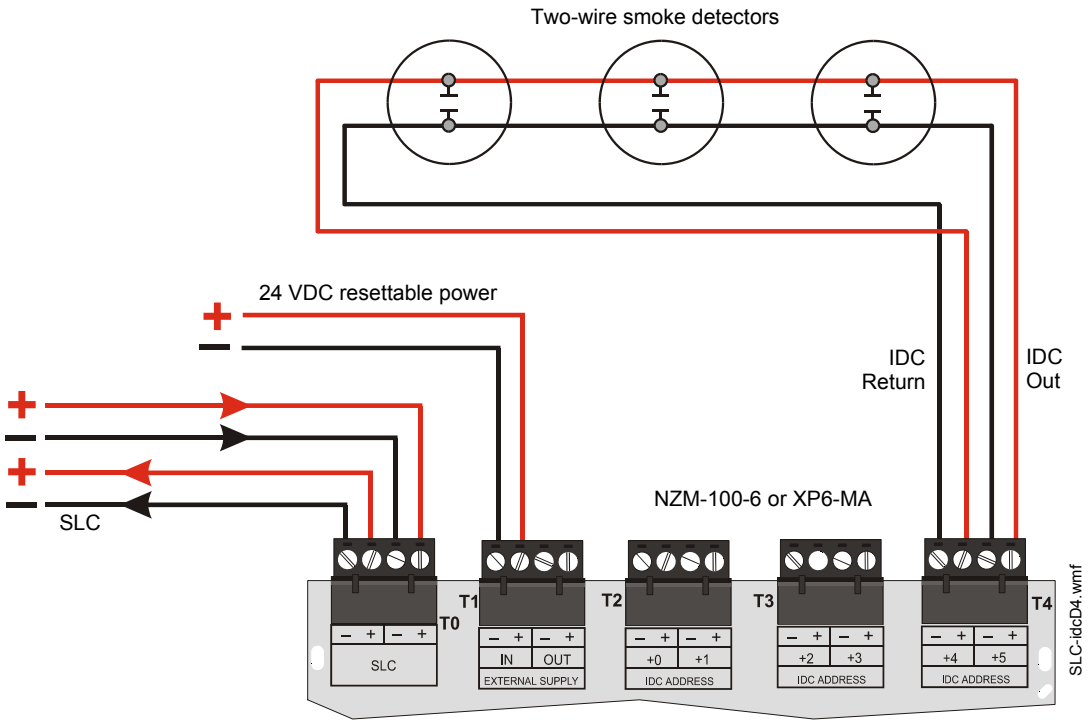


Figure 5.18 Typical Style D IDC Wiring with an NZM-100-6 or XP6-MA

Section 6: Control Modules

When using a Control Module as a Notification Appliance Circuit (NAC), the isolation described in the section titled Section 4, “SLC Circuits with Isolators” which begins on page 20, is required or Riser Conductors must be installed in accordance with the survivability from attack by fire requirements in National Fire Alarm Code, NFPA 72.

6.1 Description

The NC-100, FCM-1, and XP6-C modules are addressable module that can be used for monitoring and switching 24 VDC Notification Appliance Circuit (NAC) power for NFPA Style Y (Class B) and NFPA Style Z (Class A) circuits.

Ratings for the relay contacts on the module are:

Load Description	Application	Maximum Voltage	Current Rating
Resistive	Non-Coded	30 VDC	3.0 A
Resistive	Coded	30 VDC	2.0 A
Resistive	Non-Coded	110 VDC	0.9 A
Resistive	Non-Coded	125 VAC (NC-100 and FCM-1) 70.7 VAC (XP6-C)	0.9 A
Inductive (L/R = 5ms)	Coded	30 VDC	0.5 A
Inductive (L/R = 2ms)	Coded	30 VDC	1.0 A
Inductive (PF = 0.35)	Non-Coded	125 VAC (NC-100 and FCM-1) 70.7 VAC (XP6-C)	0.5 A

NOTE: For more information on module specifications, refer to the Installation Instructions provided with these devices.

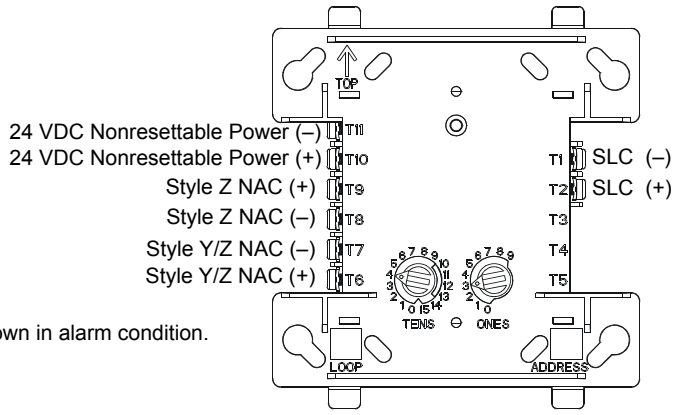
6.2 NC-100 and FCM-1 Installation

6.2.1 Setting an SLC address for NC-100 and FCM-1 Modules

Each module is factory preset with an address of “00”. To set an SLC address refer to “Setting an SLC address for a Single Point Module” on page 31.

6.2.2 Wiring a Notification Appliance Circuit (NAC) with NC-100 or FCM-1

The figure below shows the connections to wire a module for powering a 24 VDC NAC:



NOTE: Module polarities are shown in alarm condition.

Figure 6.1 NC-100 and FCM-1 Wiring Connections

6.3 Wiring NC-100 and FCM-1 Modules

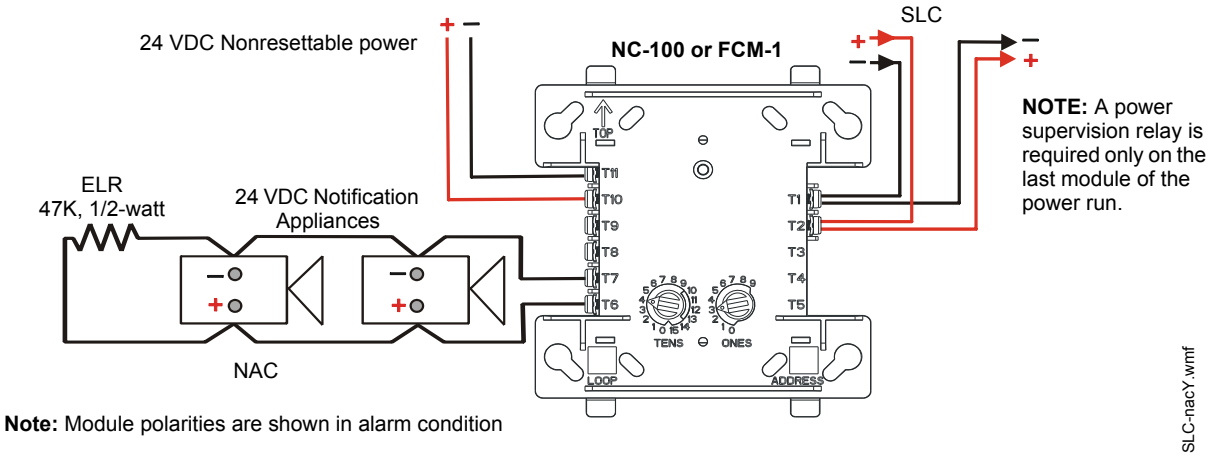
This section contains instructions and diagrams for wiring a Signaling Line Circuit with NC-100 or FCM-1 as a Notification Appliance Circuit (NAC).

6.3.1 Wiring a Style Y NAC (Two-Wire) with Addressable Control Modules

A supervised and power-limited NFPA Style Y (Class B) NAC using an NC-100 or FCM-1 module. Polarized alarm notification appliances are shown connected to the module in a two-wire configuration. Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

- See “Power Considerations” on page 59 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.

- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Style Y circuit.
- Terminate the circuit across the last device using an End-of-Line Resistor 47K, 1/2-watt, P/N SSD A2143-00 (ELR-47K in Canada).
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.



Note: Module polarities are shown in alarm condition

Figure 6.2 NFPA Style Y Notification Appliance Circuit

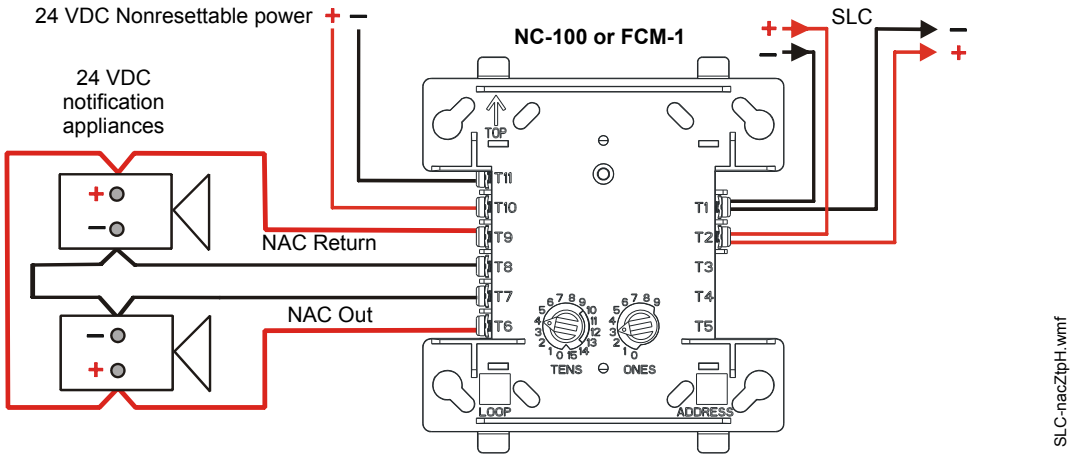
6.3.2 Wiring a Style Z NAC (Four-Wire) with Addressable Control Modules

A supervised and power-limited NFPA Style Z (Class A) NAC using an NC-100 or FCM-1 module. Polarized alarm notification appliances are shown connected to the module in a four-wire configuration.

NOTE: Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

- See "Power Considerations" on page 59 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Style Z circuit.
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.

NOTE: A power supervision relay is required only on the last module of the power.



Note: Module polarities are shown in alarm condition.

Figure 6.3 NFPA Style Z Notification Appliance Circuit

6.4 XP6-C Installation

6.4.1 Cabinet Installation

This type of module is contained in either a BB-XP cabinet. The BB-XP can accommodate up to 2 modules and the BB-25, which requires the CHS-6 can accommodate up to 6 modules.

See the *Installation Instructions* provided with module for proper installation into cabinet.

6.4.2 Setting an SLC address for an XP6-C Module

In "Style Y" operation each XP6-Cmodule can be set to one of 154 base addresses (01-154). The remaining module points are automatically assigned to the next five higher SLC addresses. For example, if the base address is set to 28, the next five module points will be addressed to 29, 30, 31, 32 and 33.

In "Style Z" operation alternate module points are paired together, resulting in a total of three module points. For example, if the base address is set to 28, then 30 and 32 will be automatically assigned to the remaining module points and 29, 31 and 33 are available to be used for other modules on the SLC.

DO NOT set the lowest address above 154 (45 for the NFW-50X or NFW-50, 94 for the NFW-100X, NFW2-100, or NFW-100), as the other module points will be assigned to nonexistent addresses.

NOTE: NFW-50X and NFW-50 can support addresses 01 - 50. The NFW-100X, NFW2-100, and NFW-100 can support module addresses of 01 - 99.

To set an SLC address, use a common screwdriver to adjust the rotary switches on the module to the desired address. See Figure 6.4 on page 45.

6.4.3 Setting NACs as Style Y or Style Z

To use this module for Style Y (Class B) operation ascertain that a small shunt is installed on the "A/B SELECT" set of pins. (As shipped).

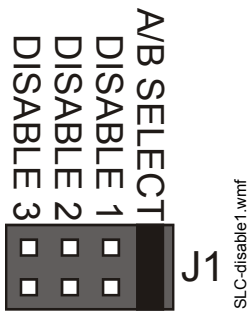
To use this module for Style Z (Class A) operation remove the small shunt from the "A/B SELECT" set of pins. See drawing below and Figure 6.4 on page 45.

6.4.4 Disabling Unused Module Addresses

A shunt is used, in conjunction with a pin block, to disable a maximum of three (3) unused module addresses. If two module addresses are disabled, the lowest four addresses will be functional, while the highest two will be disabled. For example, if the shunt is placed on 'DISABLE 2' and the base address is set to 28, the module addresses will be assigned to 28, 29, 30 and 31.

In Style Z operation, placing a small shunt on 'DISABLE 3' will disable all three addresses. Placing it on 'DISABLE 2' will disable two out of three addresses.

To disable addresses, securely place one of the supplied small shunts onto the desired set of pins. See drawing and Figure 6.4 on page 45.



6.4.5 Short Circuit Protection

Protection is disabled for each module address when there is a large shunt installed on the corresponding pins of the pin block (as shipped, all six addresses are disabled).

When enabled, the module will not switch power supply if a short circuit condition exists on a NAC.

To enable "Short Circuit Protection" for an address, remove the large shunt from the corresponding pins of the pin block. See Figure 6.4 on page 45. Place unused shunts on single pin to store on board for future use.

6.4.6 Features Not Supported

The "Synchronization" and "Power Supply Monitoring" features are not supported at this time.

6.4.7 Circuit Board Information

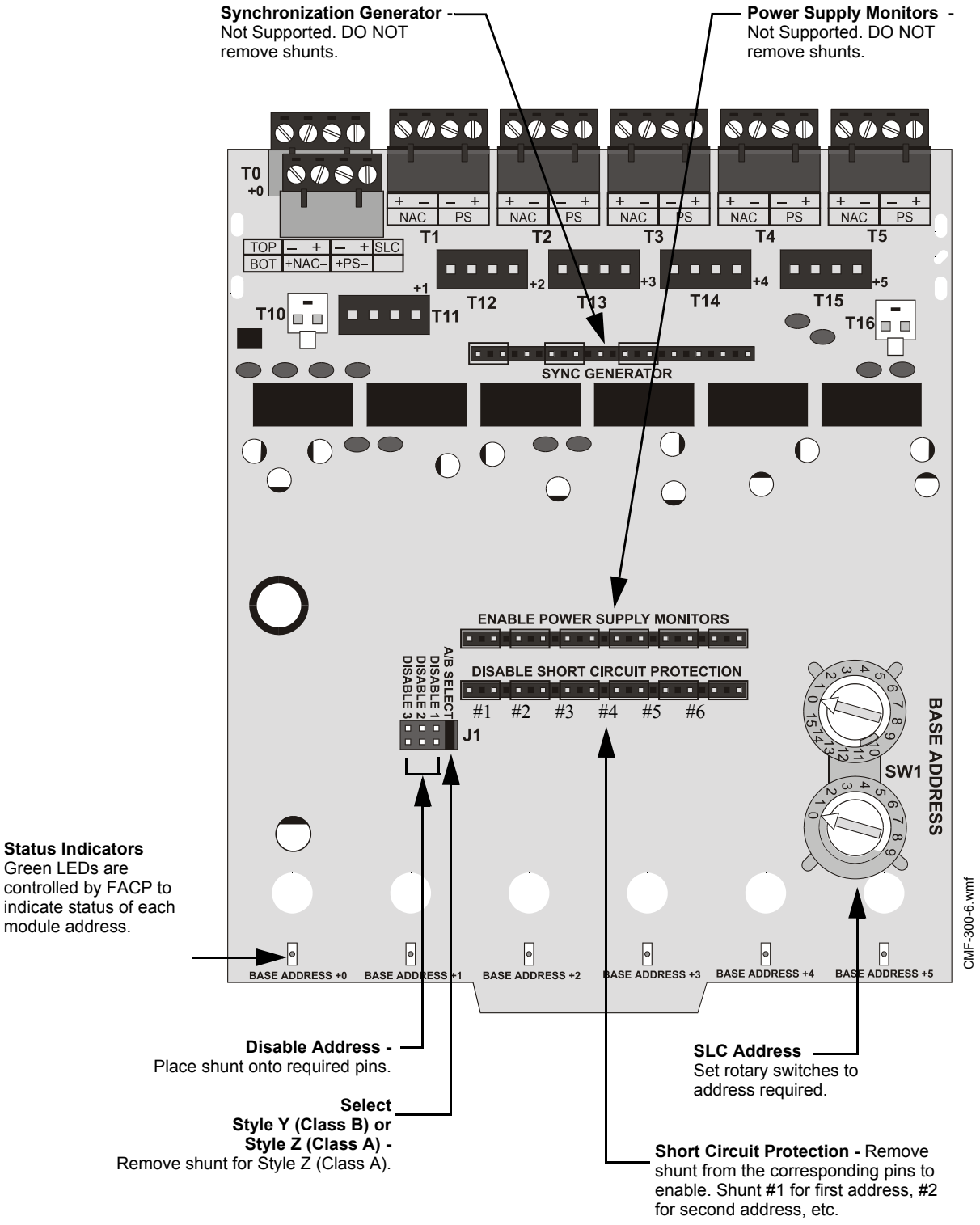


Figure 6.4 XP6-C Control Module Settings

6.5 Wiring an XP6-C Module

This section contains basic instructions and diagrams for wiring a Signaling Line Circuit with an XP6-C as a Notification Appliance Circuit (NAC).

For more detailed information on wiring an XP6-C Control Module, refer to the Installation Instructions provided with the module. Included in these instructions are wiring diagrams concerning a single power supply being shared by multiple NACs and audio NAC configurations.

6.5.1 Wiring a Style Y NAC (Two-Wire)

A supervised and power-limited NFPA Style Y (Class B) NAC with a single power supply dedicated to a single NAC usingan XP6-C module. Polarized alarm notification appliances are shown connected to the module in a two-wire configuration.

NOTE: Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

- See “Power Considerations” on page 59 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Style Y circuit.
- Terminate the circuit across the last device using an End-of-Line Resistor 47K, 1/2-watt, P/N SSD A2143-00 (ELR-47K in Canada).
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.

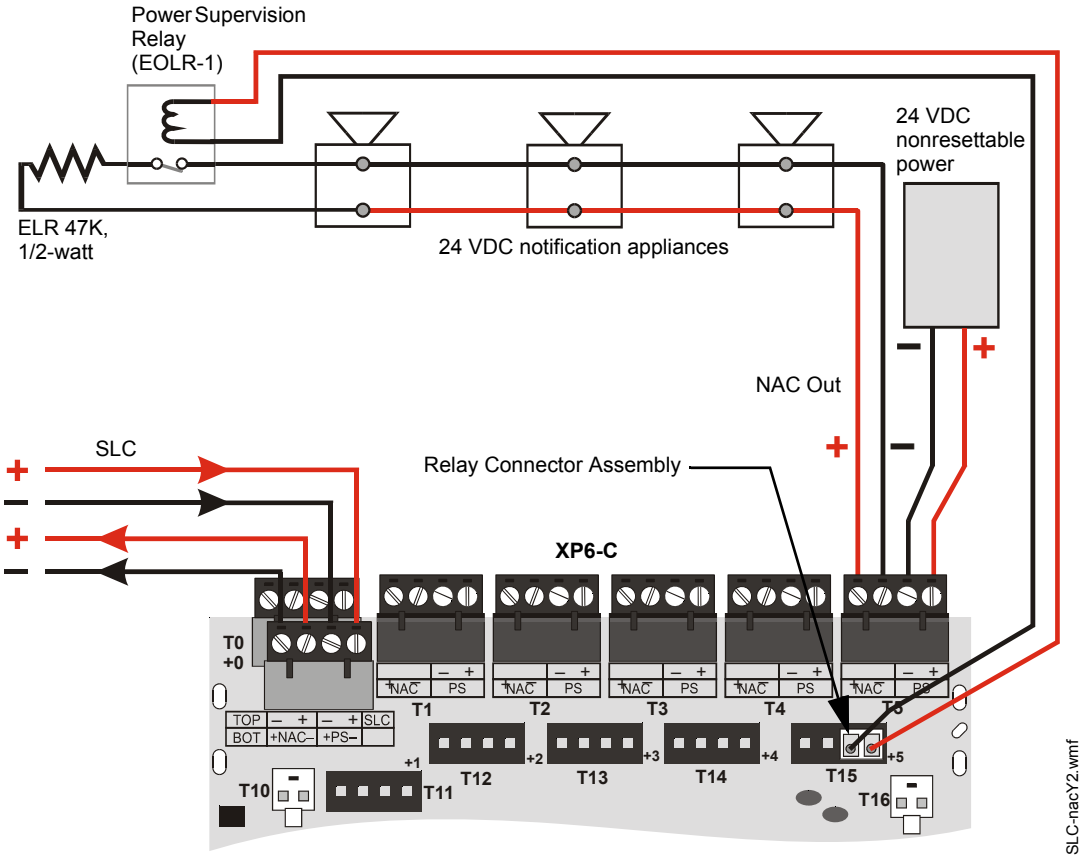


Figure 6.5 NFPA Style Y Notification Appliance Circuit

6.5.2 Wiring a Style Z NAC (Four-Wire)

A supervised and power-limited NFPA Style Z (Class A) NAC with a single power supply dedicated to a single NAC using an XP6-C module. Polarized alarm notification appliances are shown connected to the module in a four-wire configuration.

NOTE: Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

- See "Power Considerations" on page 59 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Style Z circuit.
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.

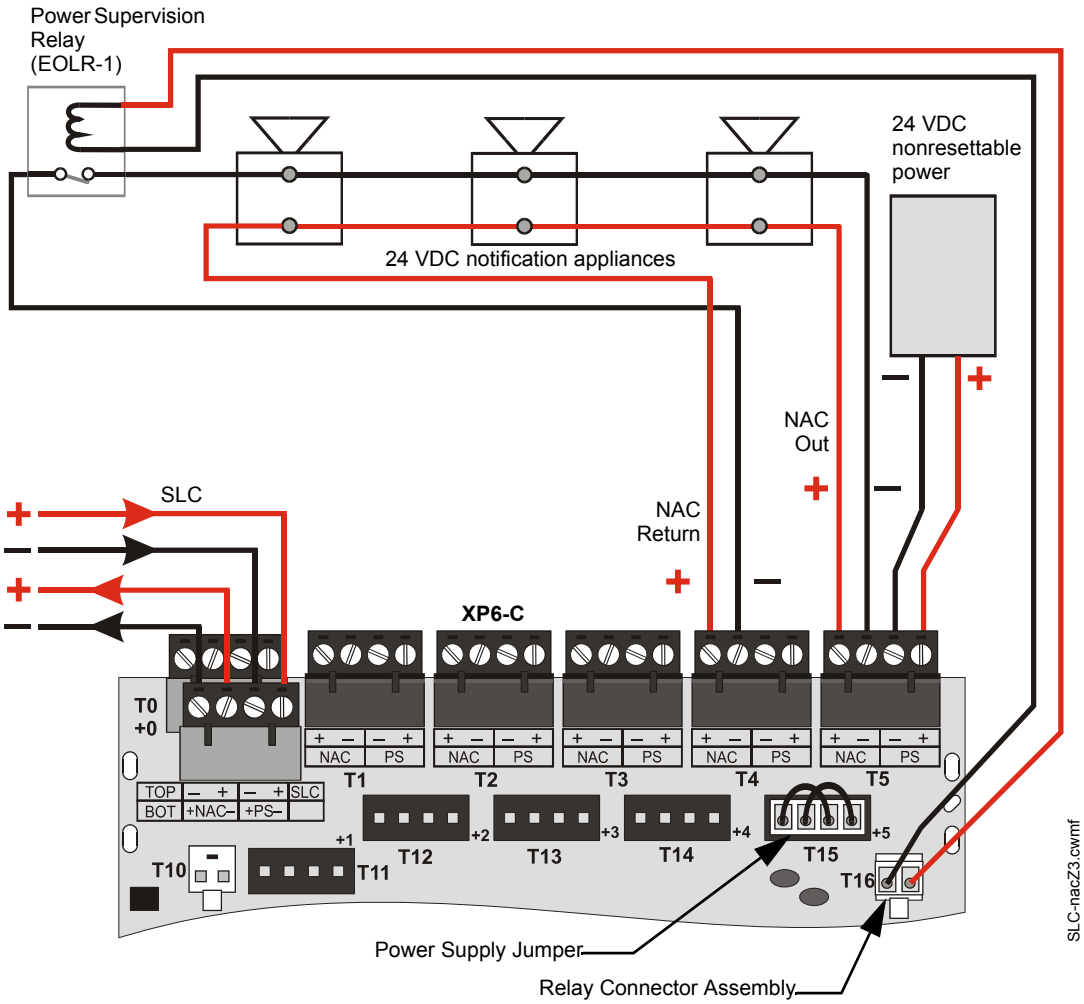


Figure 6.6 NFPA Style Z Notification Appliance Circuit

Section 7: Relay Modules

7.1 Description

The NC-100R, FRM-1, and XP6-R modules are addressable module that provide Form-C relay contacts.

Ratings for the relay contacts on the module are:

Load Description	Application	Maximum Voltage	Current Rating
Resistive	Non-Coded	30 VDC	3.0 A
Resistive	Coded	30 VDC	2.0 A
Resistive	Non-Coded	110 VDC	0.9 A
Resistive	Non-Coded	125 VAC	0.9 A
Inductive (L/R = 5ms)	Coded	30 VDC	0.5 A
Inductive (L/R = 2ms)	Coded	30 VDC	1.0 A
Inductive (PF = 0.35)	Non-Coded	70.7 VAC	0.7 A
Inductive (PF = 0.35)	Non-Coded	125 VAC	0.5 A

NOTE: For more information on the module specifications refer to the *Installation Instructions* provided with these devices.

7.2 NC-100R and FRM-1 Installation & Wiring

7.2.1 Setting an SLC address for NC-100R and FRM-1 Modules

Each module is factory preset with an address of “00”. To set an SLC address, refer to “Setting an SLC address for a Single Point Module” on page 31.

7.2.2 Wiring NC-100R and FRM-1 Modules (Form-C Relay)

The figure below shows NC-100R or FRM-1 modules wired to the Control Panel:

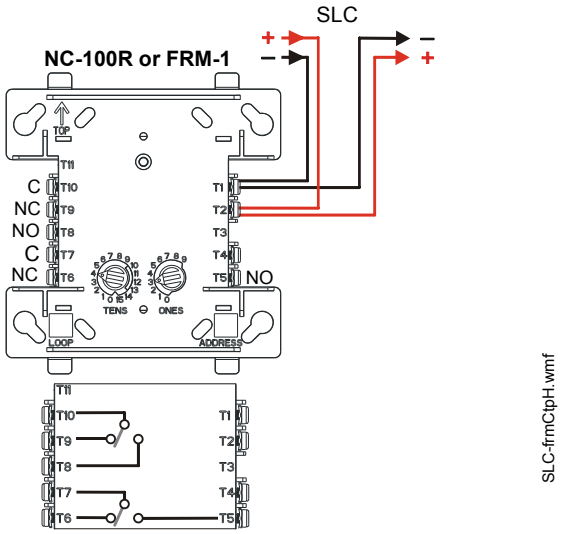


Figure 7.1 NC-100R and FRM-1 Wiring Connections

7.3 XP6-R Circuit Board Information

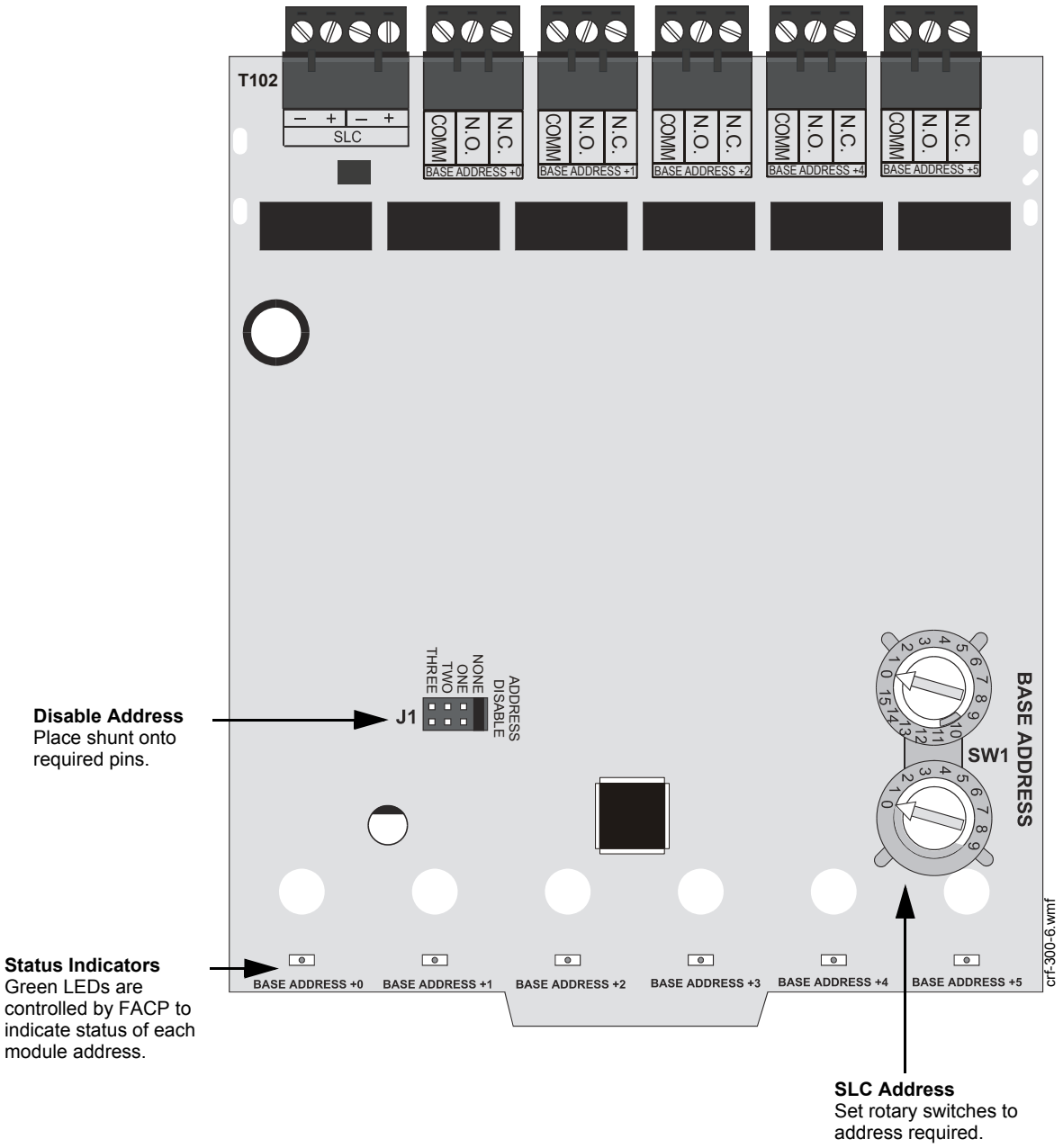


Figure 7.2 XP6-R Control Relay Module

7.4 XP6-R Installation & Wiring

7.4.1 Cabinet Installation

This type of module is contained in either a BB-XP or BB-25 cabinet. The BB-XPcan accommodate up to 2 modules and the BB-25, which requires the CHS-6 chassis, can accommodate up to 6 modules.

See the *Installation Instructions* provided with module for proper installation into cabinet.

7.4.2 Setting an SLC address for a XP6-R Module

Each XP6-R module can be set to one of 94 base addresses (01-94). The remaining module points are automatically assigned to the next five higher SLC addresses. For example, if the base address is set to 28, the next five module points will be addressed to 29, 30, 31, 32 and 33.

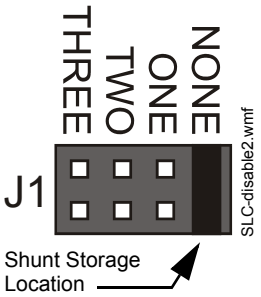
DO NOT set the lowest address above 94 (45 for the NFW-50X and NFW-50, 94 for the NFW-100X, NFW2-100, and NFW-100), as the other module points will be assigned to nonexistent addresses.

NOTE: The NFW-50X and NFW-50 can support addresses 01 - 50. The NFW-100X, NFW2-100, and NFW-100 can support module addresses of 01 - 99.

7.4.3 Disabling Unused Module Addresses

A shunt is provided on the circuit board to disable a maximum of three (3) unused module addresses. If two module addresses are disabled, the lowest four addresses will be functional, while the highest two will be disabled. For example, if the shunt is placed on 'TWO' and the base address is set to 28, the module addresses will be assigned to 28, 29, 30 and 31.

To disable addresses, remove the shunt from its storage location and securely place it onto the desired set of pins. See illustration.



7.4.4 Wiring an XP6-R Module (Form-C Relay)

The figure below shows an XP6-R module wired to the Control Panel.

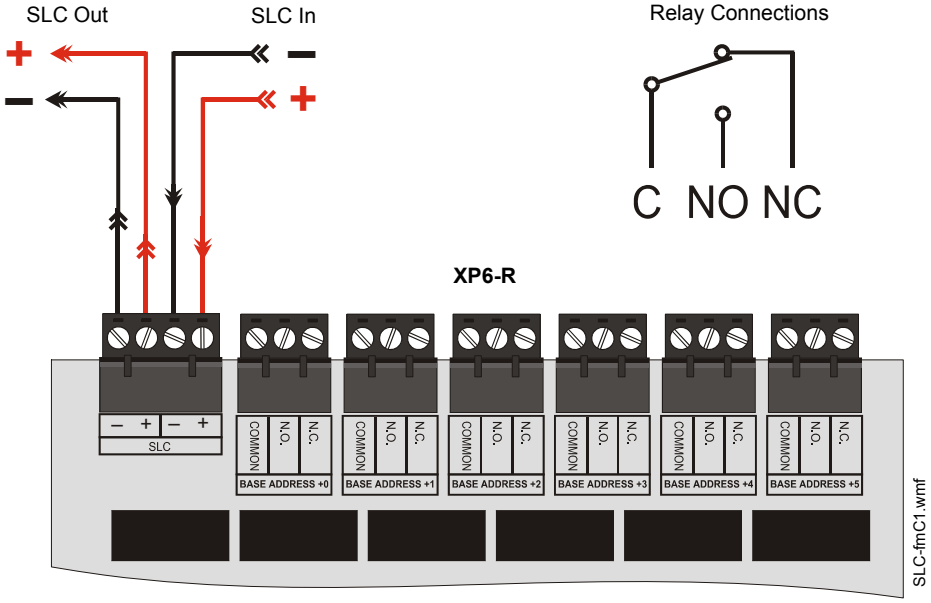


Figure 7.3 XP6-R Wiring Connections

Section 8: Intelligent Detector Bases and Wireless Gateway

8.1 Description

The following bases provide connection between the SLC and these detector heads:

- NP-A100 and FAPT-851 Multi-criteria Photoelectric Smoke Detectors
- NI-100 and FSI-851 Ionization Smoke Detectors
- NH-100, NH-100R, NH-100H, NH-200(-IV), NH-200R(-IV), NH-200H(-IV), FST-851, FST-851H, FST-851R, FST-951(-IV), FST-951H(-IV), and FST-951R(-IV) Thermal Detectors
- NP-100, NP-100T, NP-200(-IV), NP-200T(-IV), FSP-851, FSP-851T, FSP-951(-IV), and FSP-951T(-IV) Photoelectric Smoke Detectors

The **B501(-WHITE/-BL/-IV)**, **B210LP, and B300-6(-IV)** bases are standard plug-in detector bases.

The **B501BH, B501BHT, B501BH-2, B501BHT-2, B200S(-WH/-IV), B200S-LF(-WH/-IV), B200SR(-WH/-IV),** and **B200SR-LF(-WH/-IV)** Sounder Detector Bases include a horn that will sound when the sensor's visible LEDs are latched on for approximately 10 seconds.

If the FireWarden-100, FireWarden-100-2, FireWarden-50, FireWarden-100X, or FireWarden-50X Control Panel is set with Alarm Verification ON (enabled), the sounder will activate at the end of the verification cycle, providing an alarm is verified, approximately 10 seconds after the sensor's LEDs are latched on. If Alarm Verification is OFF (disabled), the sounder will activate when the sensor's visible LEDs are latched on for approximately 10 seconds.

The **B224RB(-WH/-IV)** Relay Detector Base includes Form-C latching relay contacts for the control of an auxiliary function. The relay operates 12 seconds (nominally) after activation of the sensor head remote annunciator output.

The **B224BI(-WH/-IV)** Isolator Detector Base prevents an entire communications loop from being disabled when a short circuit occurs.

The **FWSG** Wireless Gateway acts as a bridge between a group of wireless fire devices and a LiteSpeed SLC loop on the NFW-50X or NFW-100X. The gateway can be powered by the SLC loop or by a regulated, external UL-listed, 24VDC power supply. See Section 8.7.

NOTE: When using a Wireless Gateway on the SLC loop, the panel cannot have ANY modules (wired or wireless) in the address range from 140 to 159.

For details about the wireless network and its devices, see the *SWIFT™ Smart Wireless Integrated Fire Technology Instruction Manual #LS10036-001NF-E.*

8.2 Setting the Detector Address

Each intelligent detector is factory preset with an address of "00." To set an SLC address, use a common screwdriver to adjust the rotary switches on the detector to the desired address (see "Setting an SLC address for a Single Point Module" on page 31). When finished, mark the address in the place provided on the base and the detector.

8.3 Wiring a Detector Base

Typical wiring of a detector base (**B501** shown) connected to an SLC is shown in the figure below. An optional **RA100Z/RA400Z** Remote LED Annunciator is shown connected to the detector.

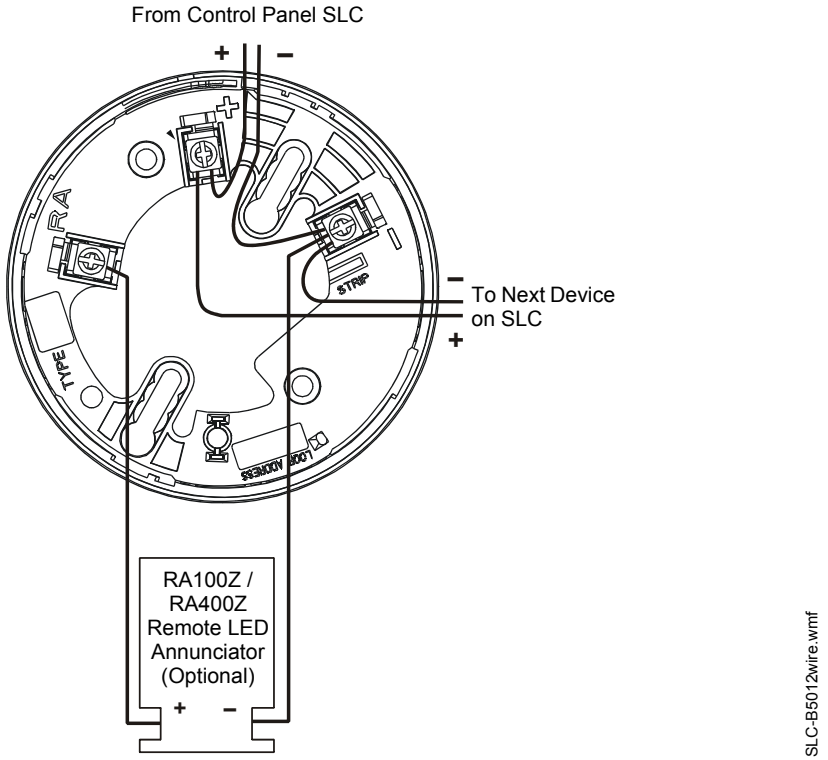


Figure 8.1 Wiring a B300-6, B210LP, or B501 Detector Base

NOTE: The B300-6 andd B210LP base wiring is identical to the B501. B501 is the flangeless model.

8.4 Wiring an Isolator Base

The **B224BI** Isolator Base will isolate its detector from short circuits that occur on the SLC connected at terminals 2 and 3. It will not isolate its installed detector from short circuits that occur on the SLC connected at terminals 1 and 2. In Style 7 applications, the loss of a single detector during a short circuit is not acceptable, and an isolator module must be installed as shown in the figure below.

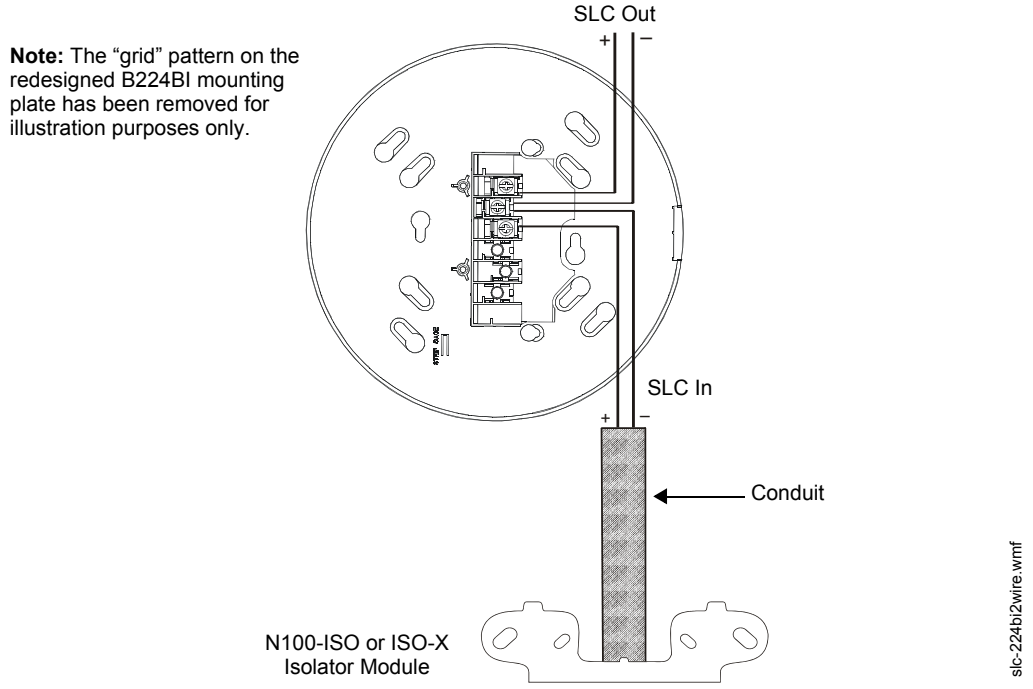


Figure 8.2 Wiring of a B224BI Isolator Base Mounting Plate

8.5 Wiring a Relay Base

Figure 8.3 shows typical wiring of a **B224RB** plug-in relay detector base connected to an SLC.

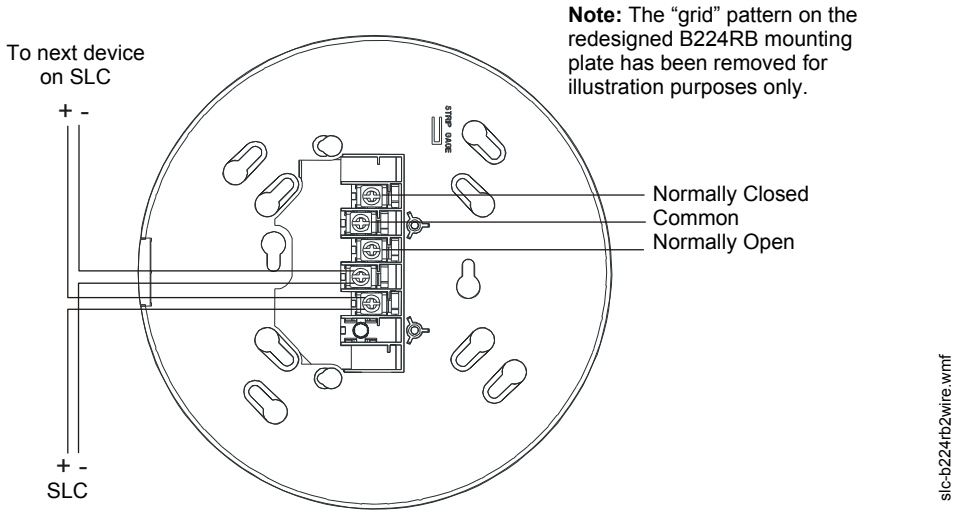


Figure 8.3 Wiring of a B224RB Relay Base Mounting Plate

8.6 Wiring a Sounder Base

Figure 8.4 shows typical wiring of the **B200S, B200S-LF, B200SR,** or **B200SR-LF** Sounder Base.

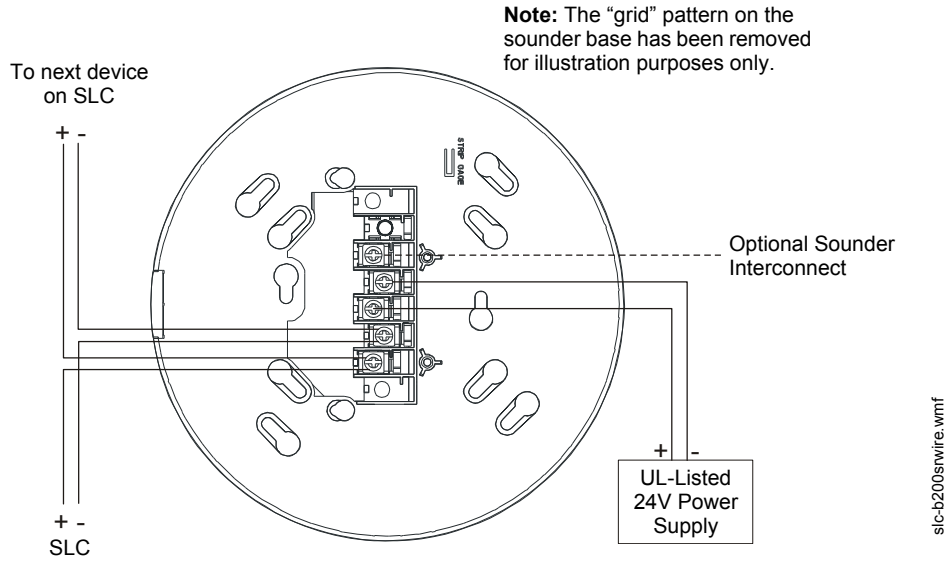


Figure 8.4 Wiring of a B200S(R)/B200S(R)-LF Sounder Base

NOTE: For more detailed wiring on the sounder base, refer to the device's installation instructions.

8.7 Wiring the FWSG

NOTE: The FWSG, as part of the wireless network, has been tested for compliance with the Federal Communications Commission (FCC) requirements of the United States Government. It has not been evaluated for use outside the USA. Use of this system outside the USA is subject to local laws and rules to which this product may not conform. It is the sole responsibility of the user to determine if this product may be legally used outside the USA.

NOTE: It is recommended to use the same wire gauge if there are multiple connections to the same terminal.

8.7.1 SLC Connections

The FWSG Wireless Gateway acts as a bridge between a group of wireless fire devices and a FlashScan SLC loop on the NFW-50X or NFW-100X. It is powered by the SLC loop or by a regulated, external 24VDC UL-listed power supply. Available wireless devices include a photo detector, a photo/heat detector, a fixed-temperature heat detector, a rate-of-rise heat detector, and a monitor module. For details about wireless devices, system setup, and operation, see the *SWIFT™ Smart Wireless Integrated Fire Technology Instruction Manual.*

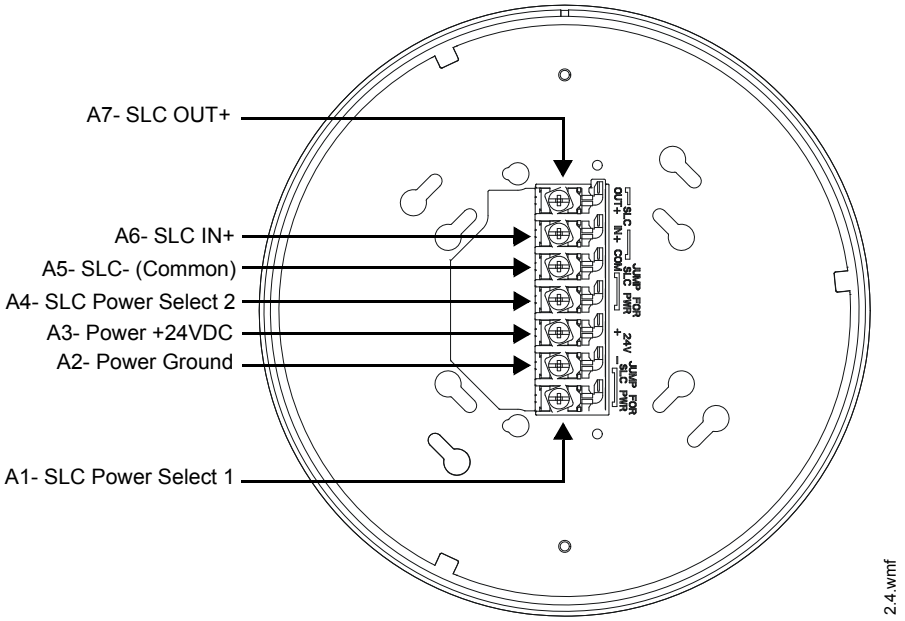


Figure 8.5 FWSG Mounting Plate - Terminal Layout

8.7.2 FWSG Powered by the SLC

The FWSG provides isolation of short circuits on the SLC in Class A (Style 6) installations. SLC connections are power-limited by the panel. An interruption in the SLC that causes a loss of power at the FWSG for more than 100ms may result in a trouble condition and loss of fire protection provided by the wireless devices for approximately 15 minutes. Use of a regulated, external +24VDC power source (not SLC power) is recommended for installations that require fire protection in the presence of short circuits, including Class A applications and applications that use isolator modules. Figure 8.6 shows typical wiring of a Wireless Network Gateway connected to an SLC when power is supplied by the SLC loop

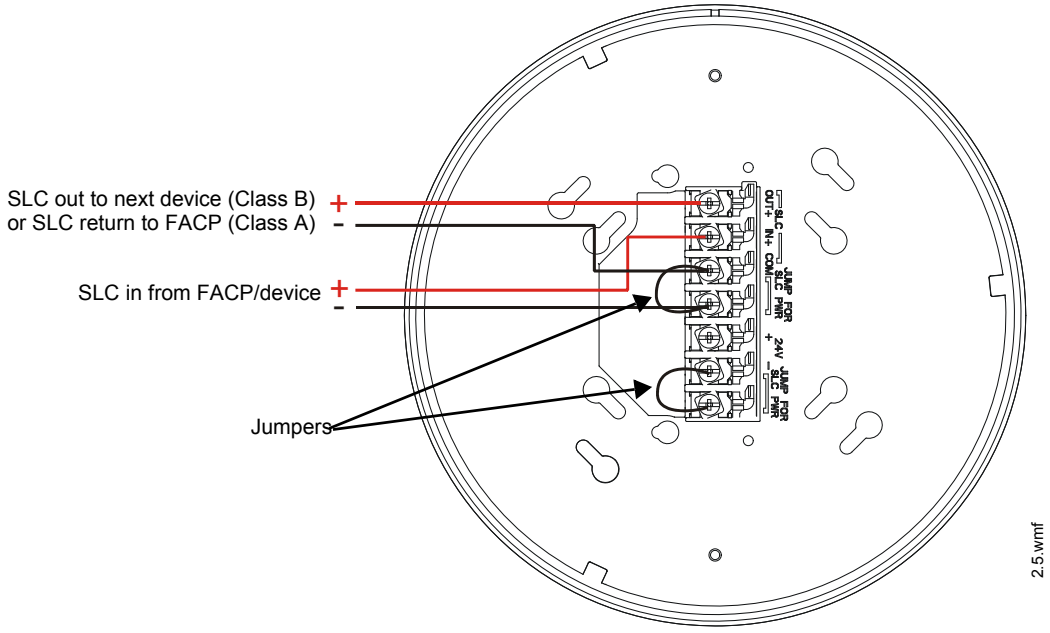


Figure 8.6 FWSG Powered by the SLC

8.7.3 FWSG Powered by a Regulated, External +24VDC Power Source

The FWSG provides isolation of short circuits of the SLC in Class A (Style 6) installations. SLC connections are power-limited by the panel. +24VDC must be power-limited by the source..

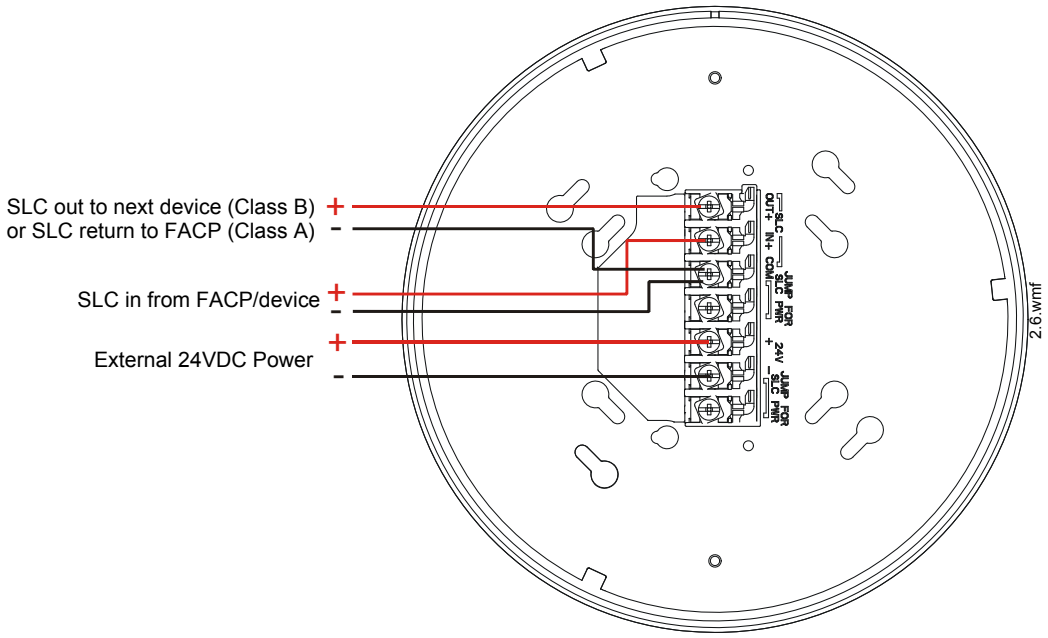


Figure 8.7 FWSG Powered by a Regulated, External Source

Section 9: Addressable Beam Detectors

9.1 Description

The **FS-OSI-RI(A)** is an intelligent, addressable projected beam smoke detectors, designed for protecting open areas with high and sloping ceilings and wide-open areas, where spot type smoke detectors are difficult to install and maintain.

NOTE: This section provides basic wiring and addressing information For **critical information** on device installation, operation and alignment, refer to the *Installation Instructions* provided with these devices.

9.2 Installation and Wiring

9.2.1 Setting an SLC Address for a Beam Detector

Each beam detector is factory preset with an address of "00." To set an SLC address, use a common screwdriver to adjust the address rotary code switches on the detector to the desired address (refer to 5.2.1"Setting an SLC address for a Single Point Module" on page 31).

9.2.2 Wiring a Beam Detector

Typical wiring of an FS-OSI-RI(A) beam detector connected to an SLC is illustrated in the figure below.

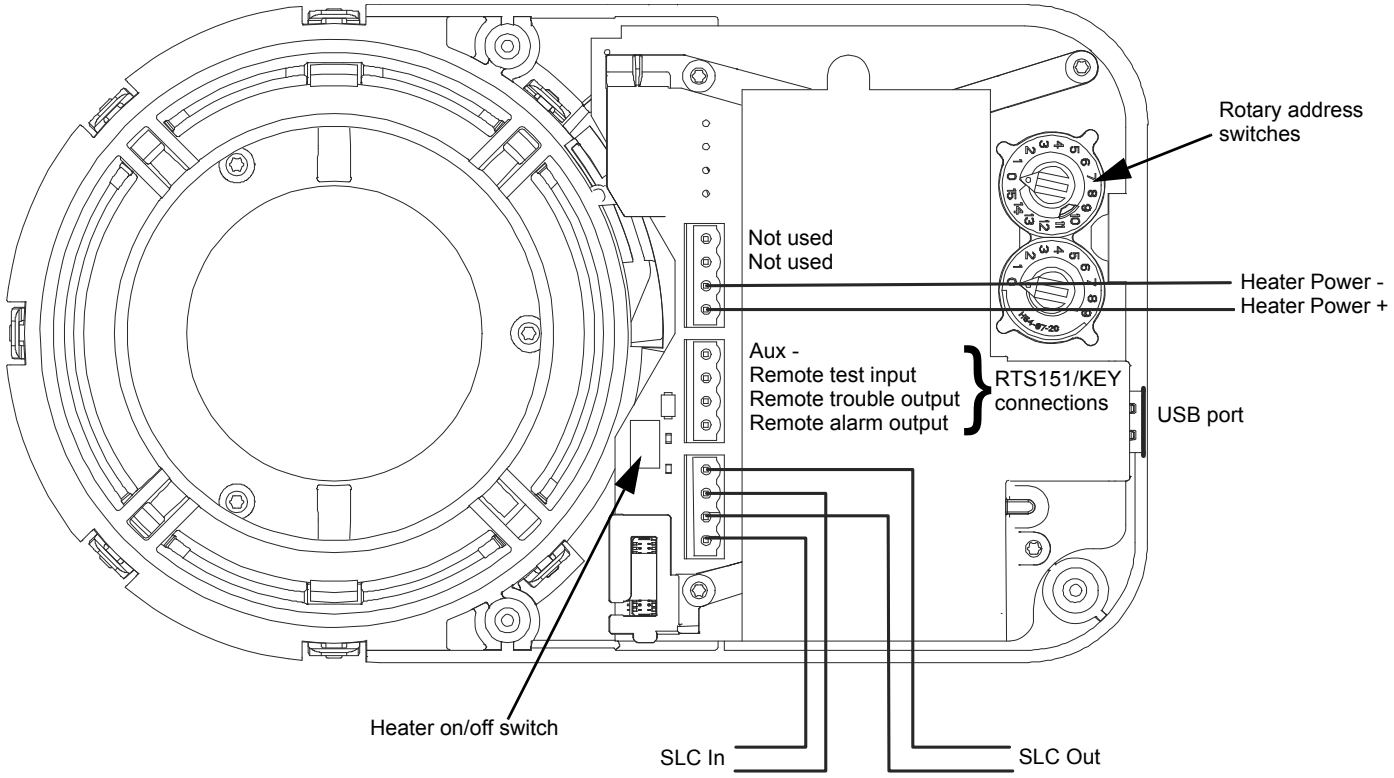


Figure 9.1 FS-OSI-RI Beam Detector Terminal Block Wiring

Section 10: Addressable Manual Pull Station

10.1 Description

The **NOT-BG12LX** and **NBG-12LX** are addressable manual pull stations with a key-lock reset feature.

NOTE: For more information refer to the *Installation Instructions* provided with this device.

10.2 Installation

10.2.1 Setting an SLC address

Each unit is factory preset with an address of "00." To set an SLC address refer to "Setting an SLC address for a Single Point Module" on page 31.

10.2.2 Wiring a Manual Pull Station

Figure 10.1 shows typical wiring for a NOT-BG12LX and NBG-12-LX Manual Pull Station to an SLC:

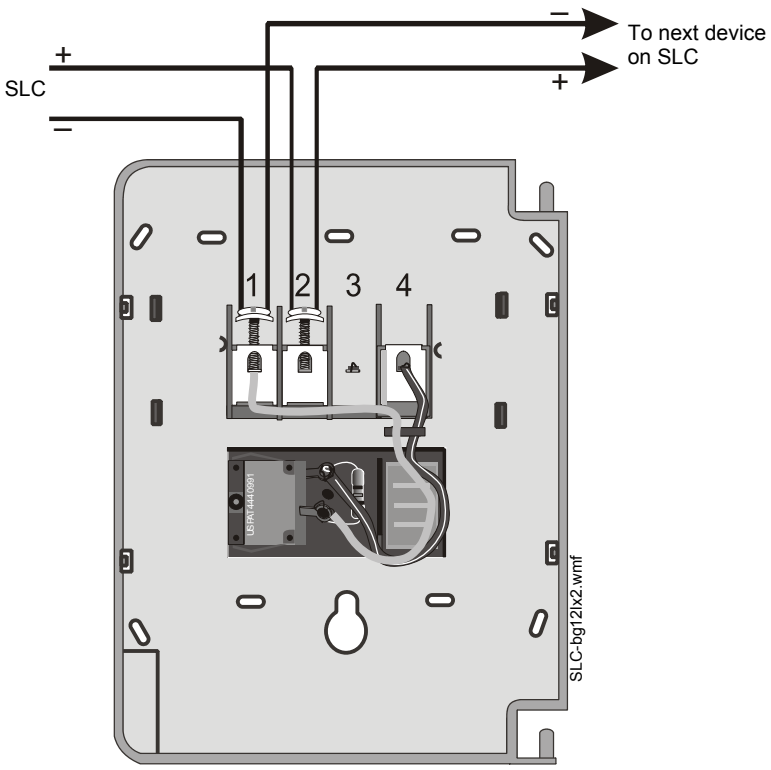


Figure 10.1 Wiring of a NOT-BG12LX and NBG-12LX Pull Station to an SLC

Appendix A: Power Considerations

A.1 Supplying Power to 24 VDC Detectors and NACs

A.1.1 Resistance and Size

To determine the minimum resistance that can be tolerated in supplying power to 24 VDC 4-wire devices and NACs, use the calculation below. Use this resistance to select the proper gauge wire for the power run from the manufacturer's specifications for the desired wire.

For Four-Wire Detectors:

$$Rmax = \frac{(Vms - Vom)}{(N)(Is) + (Na)(Ia) + (Ir)}$$

For NACs:

$$Rmax = \frac{(Vms - Vom)}{(Nb)(Ib)}$$

Where:

Rmax = maximum resistance of the 24 VDC wires
Vms = minimum supply voltage
Vom = minimum operating voltage of the detector or end-of-line relay, whichever is greater, in volts
N = total number of detectors on the 24 VDC supply circuit
Is = detector current in standby
Na = number of detectors on the 24 VDC power circuit which must function at the same time in alarm
Ia = detector current in alarm
Ir = end-of-line relay current
Nb = number of Notification Appliance Devices
Ib = Notification Appliance current when activated

NOTE: This simplified equation assumes that the devices are at the end of a long wire run.

The minimum supply voltages produced by Notifier power supplies are listed below:

FACP	Vms	Power Supply	Vms
FireWarden-100 & FireWarden-100-2	19.05	FCPS-24S6/FCPS-24S8	19.1
FireWarden-50	18.75	FCPS-24	19.1
FireWarden-100X	19.2		
FireWarden-50X	19.2		

Table A.1 Minimum Supply Voltage

A.2 Supervising 24 VDC Power

Power used to supply 24 VDC detectors, notification appliances (using the NC-100 or FCM-1), and two wire detectors (using the NZM-100 or FZM-1) can be supervised with a power supervision relay. This relay, energized by the 24 VDC power itself, is installed at the end of each respective power run and wired in-line with the supervised circuit of any intelligent module.

24 VDC power must be provided from a UL-listed power supply for fire protection use.

When power is removed from the relay, the normally closed contacts open the supervised circuit, generating a trouble condition. Therefore, the relay needs to be installed at the end of the supervised circuit, so it will not disrupt the operating capability of all the devices on that circuit. The relay can be installed in-line with any leg (+ or –) of the supervised NAC circuit, either a Style B (Class B) or a Style D (Class A) circuit.

The drawing below illustrates this concept.

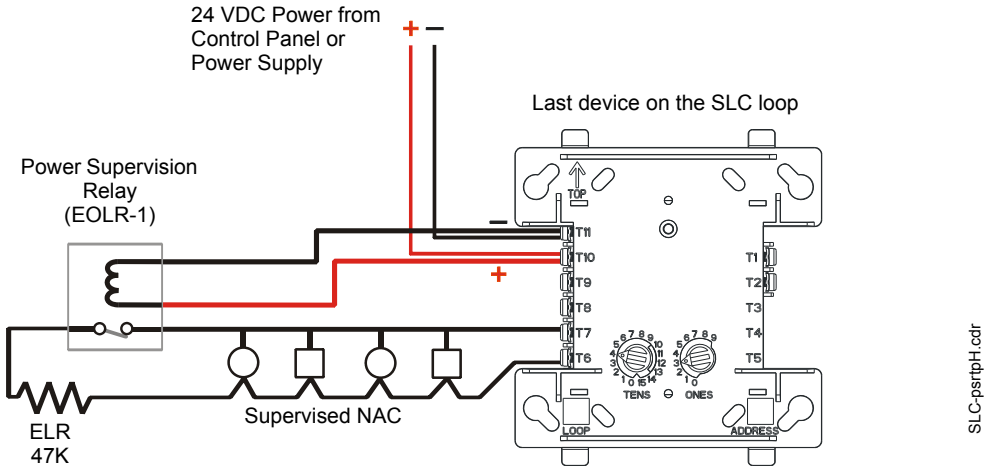


Figure A.1 Supervised 24 VDC Circuit

An alternate method is shown below.

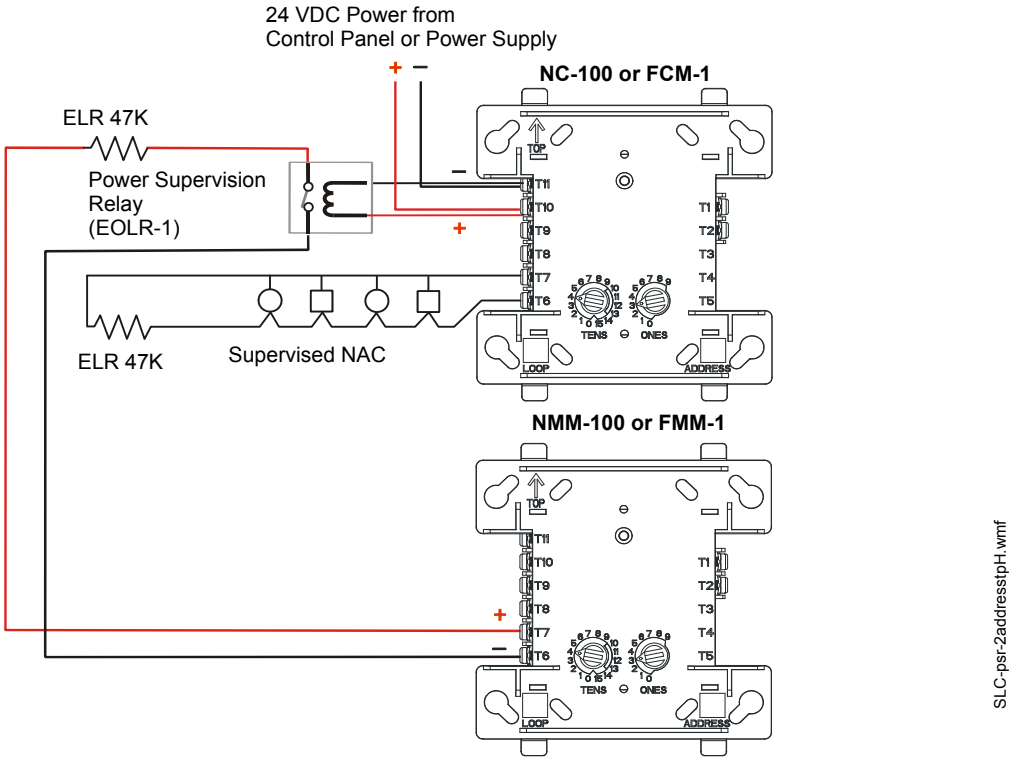


Figure A.2 Alternate: 2-Address Method of Supervising a 24 VDC Circuit

Notes

Appendix B: Surge Suppression

B.1 Introduction

NOTE: Surge protection is *not* required in Canadian applications.

There are three (3) primary surge protectors that are approved for use with the FireWarden-100-2, FireWarden-100, and FireWarden-50.

- **DTK-2LVLP-F** Diversified Technology Group, Inc. 1720 Starkey Rd. Largo, FL 33771 (727) 812-5000
- **SLCP-30** EDCO 1805 N.E. 19th Ave. Ocala, FL 34470 (352) 732-3029
- **PLP-42N** Northern Technologies, Inc. 23123 E. Madison Ave. Liberty Lake, WA 99019 (800) 727-9119

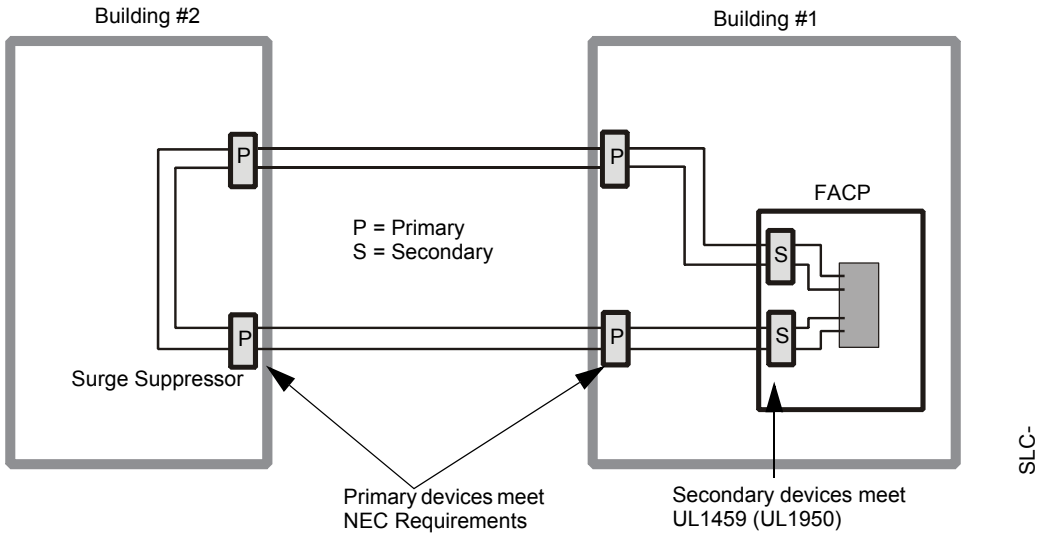
NOTE: For detailed information, refer to the *Installation Instructions* supplied with the unit.

One primary surge protector must be used with each SLC wiring pair whenever SLC wiring runs outside the building.

- Install primary protection only as shown in this document.
- Refer to NEC Article 800 and local building code requirements.

Additional primary surge suppressors may be added as required by the NEC. Add these additional suppressors in series with the SLC wiring at the building entry/exit.

Wiring connected to the surge suppressor output must remain within the building while wiring connected to the surge suppressor input may be routed outside the building as shown below.



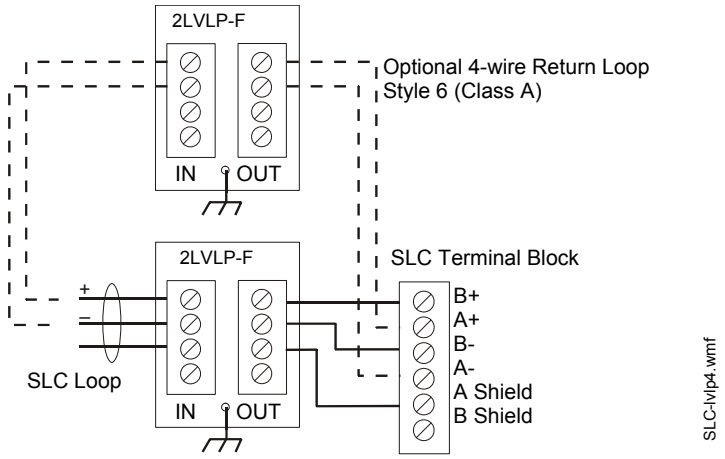
B.2 Installation

Mounting of the surge suppressor must be inside the FACP enclosure or in a separate enclosure listed for fire protective signaling use.

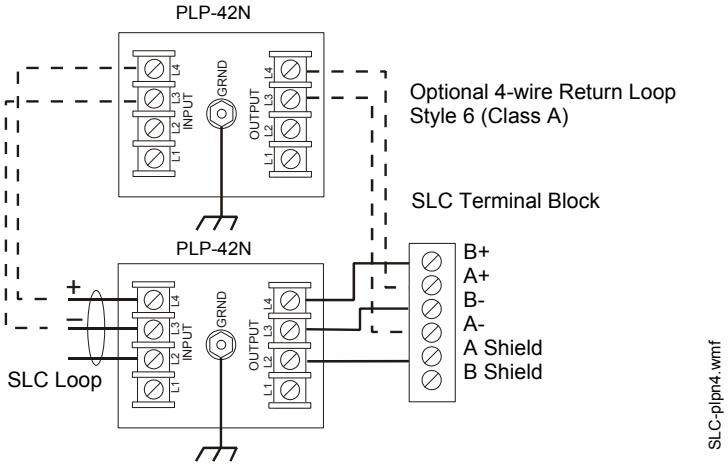
- Locate on an available stud and secure with nut.
- Unit is connected in series with the SLC Loop to protect the Control Panel.
- Provide a common ground to eliminate the possibility of a differential in ground potentials.

B.2.1 Wiring Diagram for , FireWarden-100-2, FireWarden-100, and FireWarden-50

DTK-2LVLP-F Connections

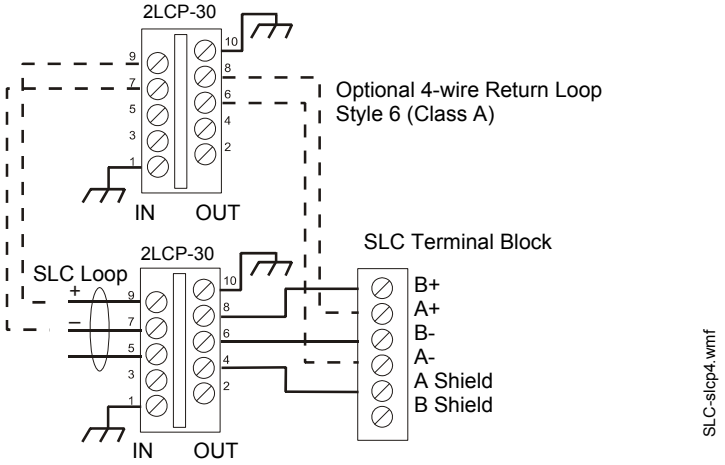


PLP-42N Connections



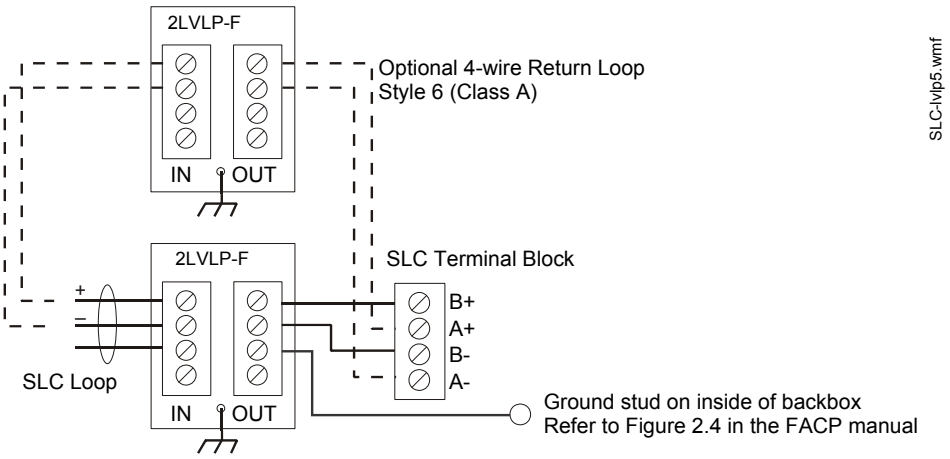
NOTE: Use 12AWG (3.25mm2) to 18AWG (0.75mm2) wire with crimp-on connectors to connect the unit's ground terminal to equipment ground. Wire length must be minimized to provide best protection.

SLCP-30 Connections

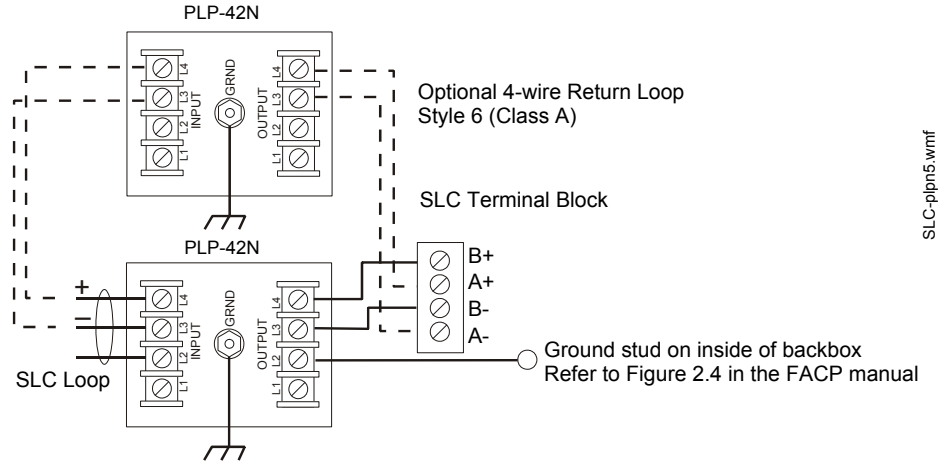


B.2.2 Wiring Diagram for FireWarden-50X and FireWarden-100X

DTK-2LVLP-F Connections

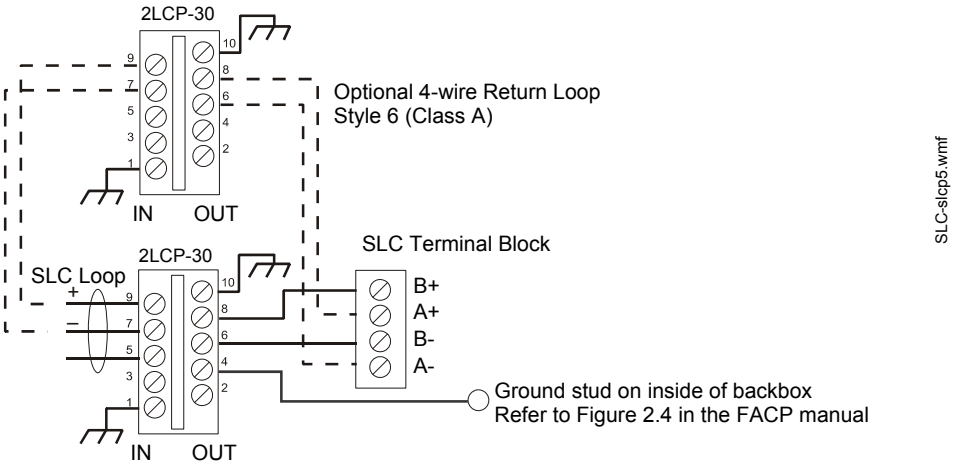


PLP-42N Connections



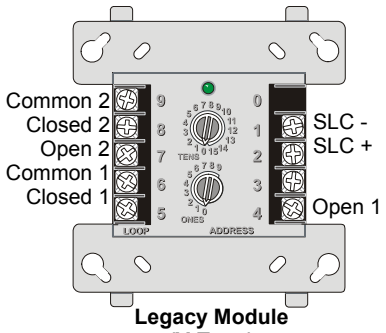
NOTE: Use 12AWG (3.25mm2) to 18AWG (0.75mm2) wire with crimp-on connectors to connect the unit's ground terminal to equipment ground. Wire length must be minimized to provide best protection.

SLCP-30 Connections

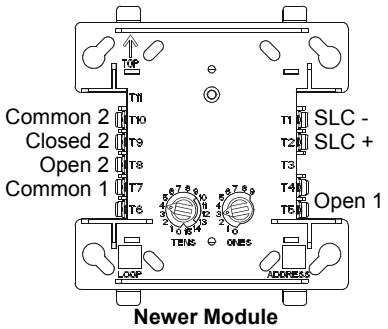


Appendix C: Terminal Conversion Charts for New & Legacy Devices

C.1 NC-100R and FRM-1



Legacy Module (V-Type)



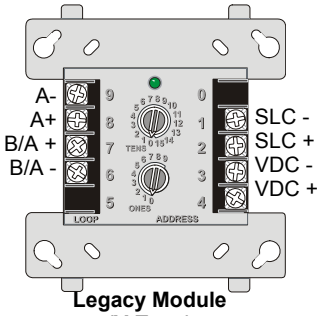
Newer Module (H-Type)

Legacy Module Terminal Number (V-Type)	Terminal Function	Newer Module Terminal Number (H-Type)
1	SLC -	1
2	SLC +	2
3	Unused	3
4	Normally Open (1)	5
5	Normally Closed (1)	6
6	Relay Common (1)	7
7	Normally Open (2)	8
8	Normally Closed (2)	9
9	Relay Common (2)	10
N/A	Unused	4
N/A	Unused	11

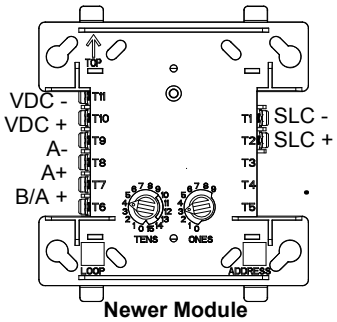
Table C.1 NC-100R and FRM-1 Terminal Conversions

C.2 NC-100, NZM-100, FCM-1, and FZM-1

All module polarities are shown in **standby** condition, which reflects the labels on the new modules.



Legacy Module (V-Type)

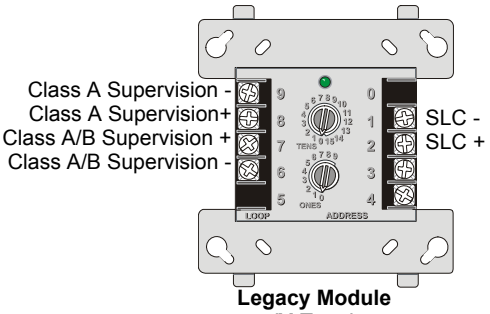


Newer Module (H-Type)

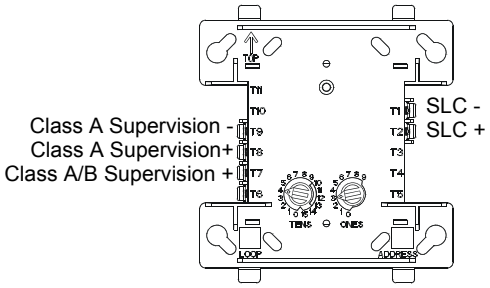
Legacy Module Terminal Number (V-Type)	Terminal Function	Newer Module Terminal Number (H-Type)
1	SLC -	1
2	SLC +	2
3	VDC -	11
4	VDC +	10
5	Unused	5
6	Solenoid B/A -	6
7	Solenoid B/A +	7
8	Solenoid A +	8
9	Solenoid A -	9
N/A	Unused	3
N/A	Unused	4

Table C.2 NC-100, NZM-100, FCM-1, and FZM-1 Terminal Conversions

C.3 NMM-100 and FMM-1



Legacy Module (V-Type)

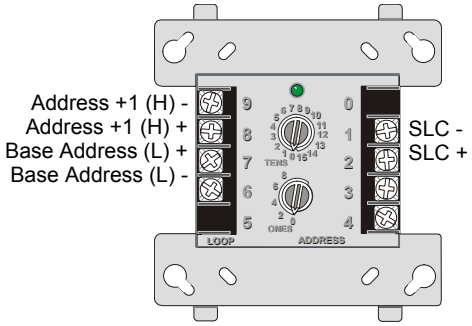


Newer Module (H-Type)

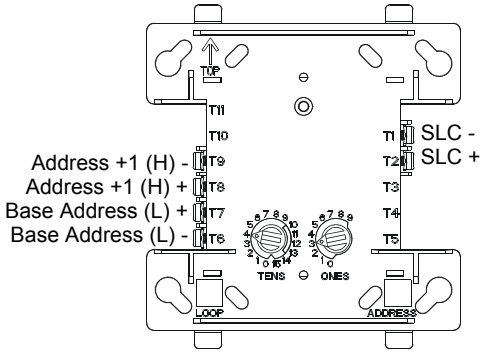
Legacy Module Terminal Number (V-Type)	Terminal Function	Newer Module Terminal Number (H-Type)
1	SLC -	1
2	SLC +	2
3	Unused	3
4	Unused	4
5	Unused	5
6	Class A/B Supervision -	6
7	Class A/B Supervision +	7
8	Class A Supervision +	8
9	Class A Supervision -	9
N/A	Unused	10
N/A	Unused	11

Table C.3 NMM-100 and FMM-1 Terminal Conversions

C.4 NDM-100 and FDM-1



Legacy Module (V-Type)



Newer Module (H-Type)

Legacy Module Terminal Number (V-Type)	Terminal Function	Newer Module Terminal Number (H-Type)
1	SLC -	1
2	SLC +	2
3	Unused	3
4	Unused	4
5	Unused	5
6	Base Address (L) -	6
7	Base Address (L) +	7
8	Address +1 (H) +	8
9	Address +1 (H) -	9
N/A	Unused	10
N/A	Unused	11

Table C.4 NDM-100 and FDM-1 Terminal Conversions

Appendix D: Intelligent Detector Base Layouts for Legacy Devices

D.1 B710LP or B501 Detector Base

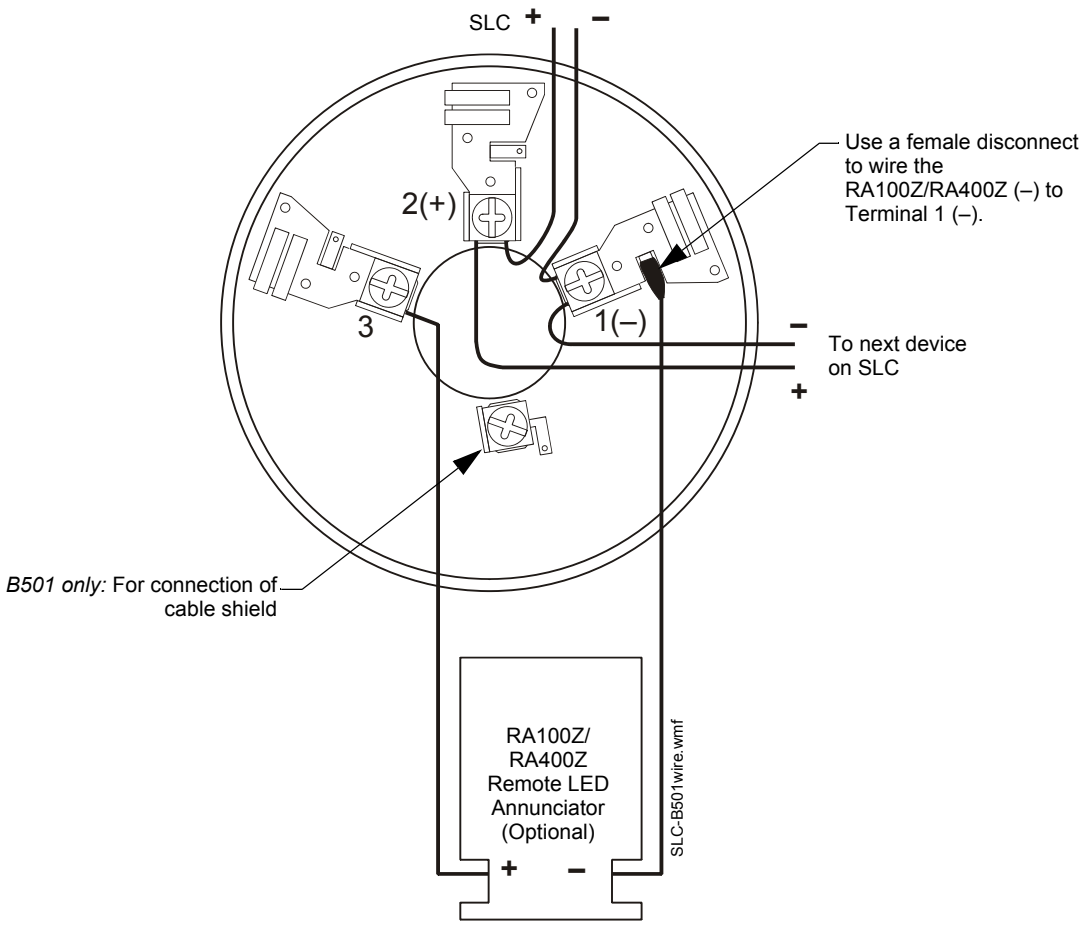


Figure D.1 Wiring the Legacy B710LP or B501 Detector Base

NOTE: The B710LP base wiring is identical to the B501, except there is no shield terminal.

D.2 B224BI Isolator Base

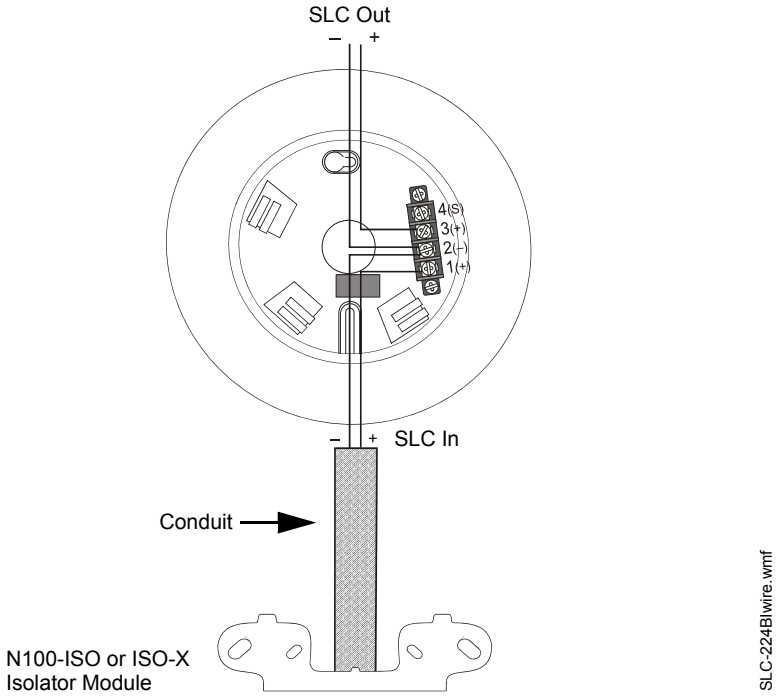


Figure D.2 Wiring the Legacy B224BI Isolator Base

D.3 B224RB Relay Base

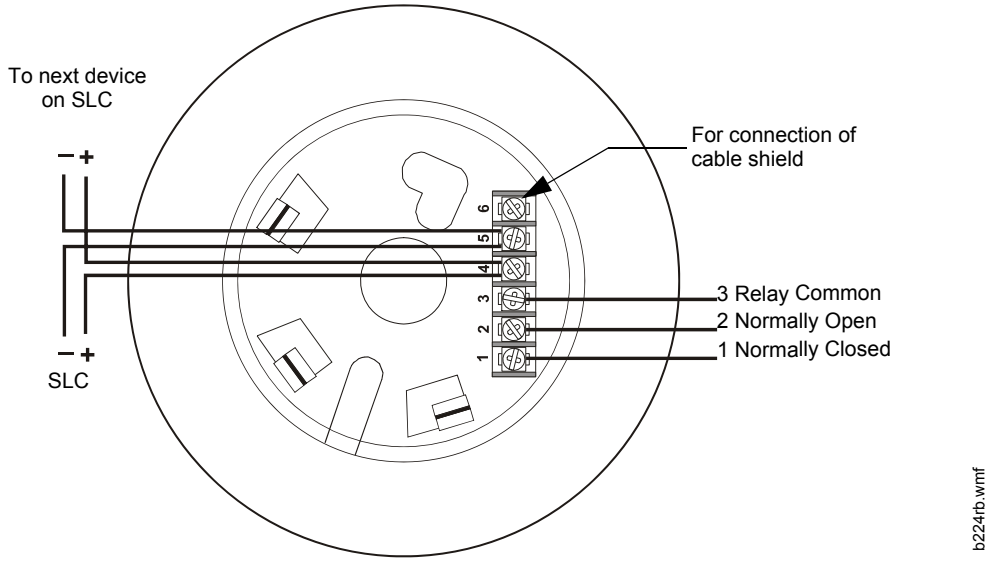


Figure D.3 Wiring the Legacy B224RB Relay Base

D.4 B501BH(-2) and B501BHT(-2) Sounder Bases

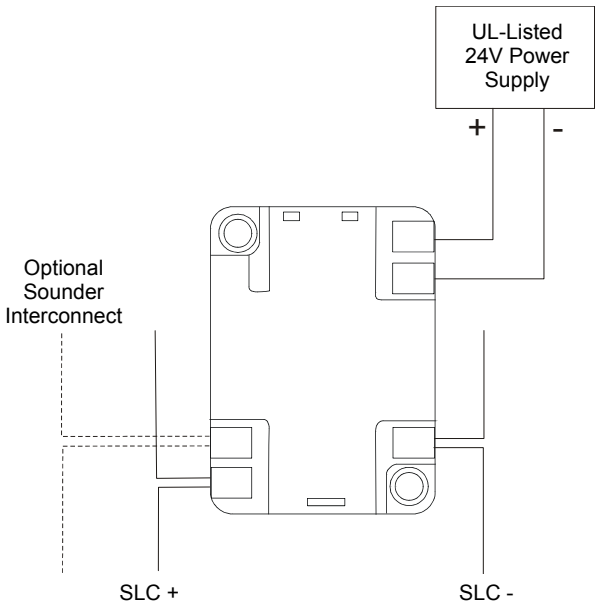


Figure D.4 Wiring the Legacy B501BH(-2) and B501BHT(-2) Sounder Bases

Appendix E: Canadian Versions of SLC Devices

UL-listed SLC Device	ULC-listed SLC Device	Description
Detectors		
NP-A100, FAPT-851	NP-A100A, FAPT-851A	Intelligent detector that combines a photoelectric sensing chamber and fixed temperature heat detection (135°F/57.2°C).
NI-100, FSI-851	NI-100A, FSI-851A	Addressable, intelligent smoke detector that incorporates an ionization sensing chamber. Designed to provide open area protection.
NP-100, NP-200(-IV), NP-200R(-IV), FSP-851, FSP-951(-IV), FSP-951R(-IV)	NP-100A, NP-200A(-IV), NP-200RA(-IV), FSP-851A, FSP-951A(-IV), FSP-951RA(-IV)	Addressable intelligent smoke detector that uses a photoelectric sensing chamber. Listed for use in ducts. Designed to provide open area protection. (-IV in model number indicates ivory color.)
NP-100T, NP-200T(-IV), FSP-851T, FSP-951T(-IV)	NP-100TA, NP-200TA(-IV), FSP-851TA, FSP-951TA(-IV)	Adds thermal sensors that will alarm at a fixed temperature of 135°F (57°C). (-IV in model number indicates ivory color.)
NH-100, NH-200(-IV), FST-851, FST-951(-IV)	NH-100A, NH-200A(-IV), FST-851A, FST-951A(-IV)	Intelligent thermistor sensing circuit for fast response. Designed to provide open area protection with 50 foot spacing capability. A fixed temperature sensor with 135°F fixed temperature alarm. (-IV in model number indicates ivory color.)
NH-100R, NH-200R(-IV), FST-851R, FST-951R(-IV)	NH-100RA, NH-200RA(-IV), FST-851RA, FST-951RA(-IV)	Incorporates a thermal rate of rise of 15°F (9.4°C). (-IV in model number indicates ivory color.)
NH-100H, NH-200H(-IV), FST-851H, FST-951H(-IV)	NH-100HA, NH-200HA(-IV), FST-851HA, FST-951HA(-IV)	High temperature sensor with 190°F (87.8°C) fixed temperature alarm. (-IV in model number indicates ivory color.)
FS-OSI-RI	FS-OSI-RIA	Addressable long range projected beam smoke detector designed to provide open area protection.
DNR	DNRA	Photoelectric Duct Detector, Low-flow. Requires NP-100(A), NP-200(-IV, A), FSP-851(A), or FSP-951(A) detector.
Bases		
B210LP	B210LPA	Standard U.S. Low-Profile base (6", 15.24 cm).
B501(-WHITE, -BL, -IV)	B501(-WHITE, -BL, -IV)	Standard European flangeless base (4", 10.16 cm) (-IV in model number indicates ivory color. -BL in model number indicates black color).
B501BH, B501BHT	B501BHA, B501BHTA	Sounder base, includes Sounder base with temporal sounder (UL 8th Edition).
B501BH-2, B501BHT-2	N/A	Sounder base, includes Sounder base with temporal sounder (UL 9th Edition).
B224RB, B224RB-WH, B224RB-IV	B224RBA, B224RBA-WH, B224RBA-IV	Low Profile Intelligent relay base.
B224BI, B224BI-WH, B224BI-IV	B224BIA, B224BIA-WH, B224BIA-IV	Low Profile Intelligent isolator base.
B710HD	B710HDA	Base.for a hostile environment detector.
B200S-WH B200S-IV	B200SA-WH, B200SA-IV	Intelligent sounder base, programmable, temporal or steady.
B200S-LF-WH, B200S-LF-IV	N/A	Intelligent sounder base, programmable, for low frequency applications
B200SR-WH B200SR-IV	B200SRA-WH, B200SRA-IV	Intelligent sounder base, temporal or steady.
B200SR-LF-WH, B200SR-LF-IV	N/A	Intelligent sounder base for low frequency applications
B300-6(-IV)	B300A-6(-IV)	Standard U.S. Low-Profile base (6", 15.24 cm). (-IV in model number indicates ivory color.)
Monitor and Zone Interface Modules		
NMM-100, FMM-1	NMM-100A, FMM-1A	Used for normally open contact alarm initiating devices, such as manual pull stations, four-wire smoke detectors, heat detectors, waterflow, and supervisory devices.
NZM-100, FZM-1	NZM-100A, FZM-1A	Used to interface with two-wire smoke detectors in addition to normally open contacts.
NDM-100, FDM-1	NDM-100A, FDM-1A	Two independent 2-wire Initiating Device Circuits (IDCs) at two separate, consecutive addresses. Wire supervised IDCs as NFPA Style B (Class B) or Style D (Class A) circuits. The modules come with a thermoplastic cover for mounting to a 4-inch (10.16 cm) square mounting box.
NMM-100P, FMM-101	NMM-100PA, FMM-101A	Functionally similar to the NMM-100(A) and FMM-1(A) Monitor Module, but offered in a smaller package for mounting directly in the electrical box of the device being monitored. (Class B input circuit only.)
NOT-BG12LX, NBG-12LX	NOT-BG12LX, NBG-12LX	An addressable manual pull station with key-lock reset feature. The addressable module is housed within the pull station.
Control Modules		

UL-listed SLC Device	ULC-listed SLC Device	Description
NC-100, FCM-1	NC-100A, FCM-1A	Control Module, NAC: Addressable Control Module used as Notification Appliance Circuits (NACs) to power and supervise compatible, UL-listed notification appliances. Wired supervised NACs as NFPA Style Y (Class B) or Style Z (Class A). The modules come with a thermoplastic cover for mounting to a 4-inch (10.16 cm) square mounting box.
NC-100R, FRM-1	NC-100RA, FRM-1A	Relay Control Module is similar to the NC-100(A) and FCM-1(A) except used as a Form-C control relay module.
Fault Isolator Module		
N100-ISO, ISO-X	N100-ISOA, ISO-XA	The Fault Isolator Module protects the system against wire-to-wire short circuits on the SLC. It should be placed between groups of sensors in a Style 6 or Style 7 SLC to isolate short- and open-circuit problems and protect the rest of the loop so it can continue to operate normally. It is not addressable, but listed here due to its use in an SLC.
ISO-6	ISO-6A	The Six Fault Isolator Module protects the system against wire-to-wire short circuits on six isolated SLC circuits. Functionally the same as six N100-ISO(A) and ISO-X(A) modules.
Multi-input/output modules		
NMM-100-10, XP10-M	NMM-100-10A, XP10-MA	Supervises ten Class-B addressable Initiating Device Circuits (IDC) which monitor normally open contact initiating devices.
NZM-100-6, XP6-MA	NZM-100-6A, XP6-MAA	Monitors six zones of conventional two-wire detectors.
XP6-C	XP6-CA	Similar in operation to the NC-100 or FCM-1, except it can activate six (6) Style Y (Class B) or three (3) Style Z (Class A) NACs.
XP6-R	XP6-R	Similar in operation to the NC-100R or FRM-1, except it provides six (6) Form-C relays.

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