NOTIFIER®
by Honeywell

Intelligent Control Panel
SLC
Wiring Manual

Document 51253 Rev: U9
5/3/2022 ECN: 00009566

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.

Alarm Signaling Communications:

- **IP connections** rely on available bandwidth, which could be limited if the network is shared by multiple users or if ISP policies impose restrictions on the amount of data transmitted. Service packages must be carefully chosen to ensure that alarm signals will always have available bandwidth. Outages by the ISP for maintenance and upgrades may also inhibit alarm signals. For added protection, a backup cellular connection is recommended.
- **Cellular connections** rely on a strong signal. Signal strength can be adversely affected by the network coverage of the cellular carrier, objects and structural barriers at the installation location. Utilize a cellular carrier that has reliable network coverage where the alarm system is installed. For added protection, utilize an external antenna to boost the signal.
- **Telephone lines** needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup alarm signaling connections 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.

Limit-F-2020

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. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

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

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.

Precau-D2-11-2017

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.

Documentation Feedback

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.

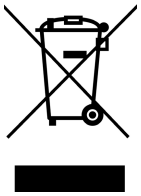
Please include the following information:

- Product name and version number (if applicable)
- Printed manual or online Help
- Topic Title (for online Help)
- Page number (for printed manual)
- Brief description of content you think should be improved or corrected
- Your suggestion for how to correct/improve documentation

Send email messages to:

FireSystems.TechPubs@honeywell.com

Please note this email address is for documentation feedback only. If you have any technical issues, please contact Technical Services.



This symbol (shown left) on the product(s) and / or accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, contact your local authorities or dealer and ask for the correct method of disposal.

Electrical and electronic equipment contains materials, parts and substances, which can be dangerous to the environment and harmful to human health if the waste of electrical and electronic equipment (WEEE) is not disposed of correctly.

Table of Contents

Section 1: Introduction

1.1 About This Manual

This document covers the installation and wiring of various Signaling Line Circuit (SLC) devices, when used with the following Fire Alarm Control Panels[1] (FACPs):

- AFP-100
- AFP-200
- AFP-300/AFP-400
- AM2020/AFP1010
- NOTIFIER INSPIRE™ N16 Series (initial release for UL applications)
- NFS-3030/NFS2-3030
- NFS-640/NFS2-640
- NFS-320/NFS-320SYS
- System 5000 with AIM-200
- NCA and NCA-2/C

This document also provides basic information that applies to Notifier SLC loops in general, such as the branch resistance measurements.

NOTE: This manual does not call out Canadian and Export versions of panels and devices where products are the same. The information presented applies to all versions of the base panel/device.

NOTE: The term N16 is used to refer to the NOTIFIER INSPIRE™ N16 Series panels, and the term FAAST is used to refer to the FAAST XS, FAAST XM, FAAST XT, and FAAST XT PRO unless otherwise noted.

See Section 2.4, “Control Panel Terminal Blocks”, on page 23 for basic panel-end SLC connections. Additional information about each control panel and the modules and detectors referenced in this document, and the part numbers for their manuals, can be found in the respective installation manual as listed in Section 1.3, “Reference Documentation”.

FlashScan modules are changing to a new format. Several models are now available in this new format and have replaced the old format illustrations in this manual. While the old format is no longer manufactured for these models, Appendix C has been provided for those who need that wiring information: it contains terminal conversion charts between the old and new formats. In this appendix, the modules are referred to as “h-type” (the new format, which has horizontal rotary dials) and “v-type” (the old format, which has vertical rotary dials). This naming convention is a convenient way to avoid confusion when referring to a particular model, as the name of the model does not indicate the format. Refer to Figure 1.1.

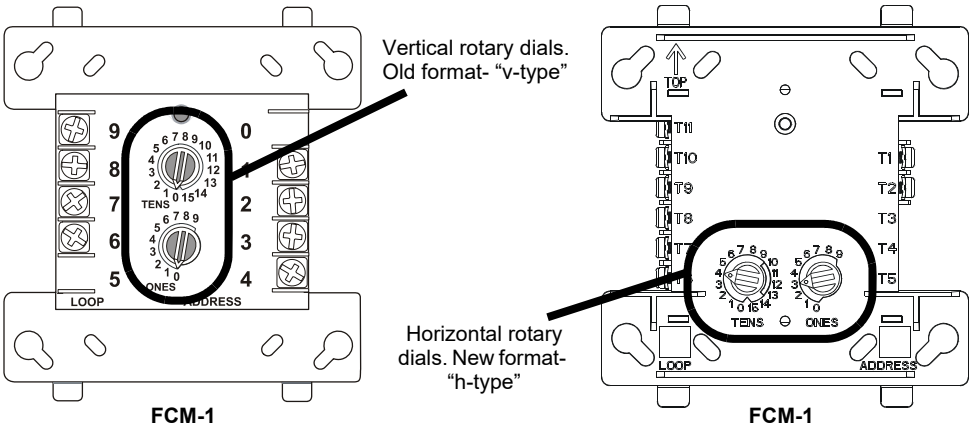


Figure 1.1 Example of Old and New Module Formats

1.2 UL 864 Compliance

1.2.1 Products Subject to AHJ Approval

This SLC Wiring Manual accompanies the user documents for various fire alarm control panels (FACPs). The N16, NFS2-3030, NFS2-640, NFS-320, and NFS-320SYS have been certified to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864 10th Edition.

UL 864 9th and 10th Edition

- Per the UL Continuing Certification Program, UL 864 9th edition fire alarm control equipment will retain certification after the rollout of UL 10th edition (12/2/2018).

1.The AFC-600 has been discontinued. To service existing installations, refer to the original AFC-600 manuals.

- Installations of UL 864 10th Edition certified equipment are permitted to use UL864 9th Edition certified equipment when approved by the local Authority Having Jurisdiction (AHJ).

For product compliance, refer to the UL/ULC listing cards located on the UL online certification directory.

https://iq.ulprospector.com/en/

The following products have not received UL 864 9th or 10th Edition certification and may only be used in retrofit applications. Operation with products not tested for UL 864 9th Edition has not been evaluated and may not comply with NFPA 72 and/or the latest edition of UL 864. These applications will require the approval of the local Authority Having Jurisdiction (AHJ).

- ACPS-2406
- AFP-100
- AFP-200
- AFP-300/AFP-400
- AIM-200
- AM2020/AFP1010
- CMX-1
- CMX-2
- FCPS-24/E
- LIB-400
- MMX-1
- MMX-101
- MMX-2
- MPS-24A/E
- MPS-24B/E
- MPS-400
- NCA
- NFS-3030 with CPU-3030
- NFS-640 with CPU-640
- System 5000
- XP Series (XPP-1, XPC-8, XPM-8 & XPR-8)
- XP5-C
- XP5-M

Wiring class designations changed between UL 9th and 10th edition to reflect changes in NFPA 72 descriptions. The changes are summarized here for users who are more familiar with the older descriptions.

Old Designations						New Designations
IDC	NAC	SLC	Smoke Control	Releasing Devices	Supplementary	
Style B and C (Class B)	Style Y (Class B)	Style 4 (Class B)				Class B
Style D and E (Class)	Style Z (Class A)	Style 6 (Class A)				Class A
		Style 7 (Class A)				Class X
			End to end verification			Class C
				Fail safe		Class D
					Non-supervised	Class E

Table 1.1 Wiring Designations - History of Changes

1.3 Reference Documentation

The table below provides a list of documents referenced in this manual, as well as documents for selected other compatible devices. The document series chart (DOC-NOT) provides the current document revision. A copy of this document is included in every shipment. See Appendix E, "Canadian Versions of SLC Devices" for Canadian part numbers. *Only N16 supports self-test devices. Current release of N16 is for UL applications.*

	Document Number
Compatible Conventional Devices (Non-addressable)	
Device Compatibility Document	15378
Fire Alarm Control Panel (FACP) and Main Power Supply Installation	
AFP-100 Instruction Manual	51010
AFP-200 Instruction Manual	15511
AFP-300/AFP-400 Installation, Operations, and Programming Manuals	50253, 50259, 50260
System 5000 with AIM-200: Refer to the AIM-200 Manual	15949
System 5000 Installation, Operations, and Programming Manuals	15583, 15581, 15584
AM2020/AFP1010 Installation Manual	15088
NFS-640 Installation, Operations, and Programming Manuals	51332, 51334, 51333
NFS-3030 FACP Installation, Operations, and Programming Manuals	51330, 51345, 51344
NFS-320 and NFS-320SYS UL Listing Document	52745LD
NFS2-640 UL Listing Document	52741LD
NFS2-3030 UL Listing Document	LS10006-051NF-E
N16 Inspire Series UL Listing Document	LS10234-051NF-E
SLM-318 Installation Document	LS10243-000NF-E
FireWarden SLC Wiring Manual (Use this manual for Notifier FireWarden series equipment	52304
Voice Alarm System Manual	51252
FireVoice-25/50 & FireVoice-25/50ZS Manual	52290

Table 1.2 Reference Documentation (1 of 4)

	Document Number
DVC Digital Voice Command Manual	52411
DAA2/DAX manual	53265
AA-series Audio Amplifier Manual	52526
Power Supplies, Auxiliary Power Supplies & Battery Chargers	
ACPS-2406 Installation Manual	51304
AMPS-24/E Power Supply Manual	51907
FCPS-24 Field Charger/Power Supply Manual	50059
ACPS-610/E Installation Manual	53018
FCPS-24S6/FCPS-24S8 Field Charger/Power Supply	51977
PMB-AUX Installation Manual	LS10242-000NF-E
System Components	
XP Transponder Manual	15888
XP5 Series Manual	50786
XP6-C Installation Document XP6-CA Canadian	I56-1805 I56-2224
XP6-MA Installation Document XP6-MAA Canadian	I56-1806 I56-2288
XP6-R Installation Document XP6-RA Canadian	I56-1804 I56-2225
XP10-M Installation Document XP10-MA Canadian	I56-1803 I56-2223
RA100Z and RA100ZA Remote LED Annunciator Installation Document RA100ZA (Canadian)	I56-0508 I56-3474
Intelligent Devices for SLC Loops	
FSP-951-SELFT	I56-6782
FSP-951T-SELFT	I56-6783
FST-951-SELFT	I56-6784
NCD Network Control Display	LS10210-0151NF-E
VEP/VEU Installation Sheet (VESDA-E) for ULC and UL 268 6th edition	LS10214-000NF-E
VEP/VEU Installation Sheet (VESDA-E) for UL 268 7th edition	LS10330-001NF-E
VEA Installation Sheet (VESDA-E) for ULC and UL 268 6th edition	LS10215-000NF-E
VEA Installation Sheet (VESDA-E) for UL 268 7th edition	LS10215-001NF-E
VES Installation Sheet (VESDA-E) for UL 268 7th edition	LS10251-001NF-E
SWIFT® Wireless Gateway Instruction Manual	LS10036-000NF-E
B224BI-WH, B224BI-IV Isolator Base Installation Document (FlashScan/CLIP) B224BIA-WH, B224BIA-IV Canadian	I56-3736-004 & higher I56-1045-002 & higher
Retrofit installations: B224BI B224BIA	I56-0725 / I56-3736-003, I56-1045-002
B224RB-WH, B224RB-IV Relay Base Installation Document B224RBA-WH, B224RBA-IV Canadian	I56-3737-005 & higher I56-1079-003 & higher
Retrofit installations: B224RB B224RBA	I56-2815 / I56-3737-004 I56-1079-002
B300-6 and B300-6-IV 6" Plug-in Detector Base B300-6A and B300-6A-IV Canadian	I56-6566 I56-9127
B501-WHITE, B501-IV and B501-BL 4" Plug-in Detector Base	I56-3738-003 & higher
Retrofit installations: B501 B501A	I56-3738-002 I56-1042-004
Retrofit installations: B501BH Sounder Base Installation Document B501BHA Canadian	I56-0491 I56-1044
Retrofit installations: B501BHT Temporal Sounder Base Installation Document B501BHTA Canadian	I56-1367
Retrofit installations: B501BH-2 UL 864 Ninth Compliant Sounder Base Installation	I56-2813
Retrofit installations: B501BHT-2 UL 864 Ninth Compliant Temporal Sounder Base Installation	I56-2819
B200S-WH, B200S-IV Addressable Sounder Base Installation document B200SA-WH, B200SA-IV Canadian B200SCOA-WH, B200SCOA-IV Canadian with CO Detection	I56-3392 I56-3469 I56-3824
Retrofit installations: B200S B200SA B200SCOA	I56-3392 I56-3469 I56-3824-000

Table 1.2 Reference Documentation (2 of 4)

	Document Number
B200SR-WH, B200SR-IV Sounder Base Installation document B200SRA-WH, B200SRA-IV Canadian	I56-3387-010 & higher I56-3470-001 & higher
Retrofit installations: B200SR B200SRA	I56-3387-009R I56-3470-000
B200S-LF-WH, B200S-LF-IV Intelligent Addressable Low-Frequency Sounder Base Installation document	I56-4151-004 & higher
Retrofit installations: B200S-LF	I56-4151-003R
B200SR-LF-WH, B200S-LF-IV Intelligent Addressable Low-Frequency Sounder Base Installation document	I56-3392-010 & higher
Retrofit installations: B200SR-LF	I56-3392-009R
Retrofit installations: B710HD HARSH™ Base Installation Document	I56-1252
Retrofit installations: B210LP Flanged Base Installation Document B210LPA Canadian	I56-0595 / I56-3739 I56-1033
DNR/W Innovairflex intelligent, non-relay, low-flow photoelectric duct detector housing DNRA Canadian	I56-3051 I56-3104
FAPT-751 Acclimate Plus™ Multi-Sensor Detector Installation Document	Replaced by FAPT-851
FAPT-851: See document for FSP-851, FSP-851T and FAPT-851 FAPT-851A: See document for FSP-851A, FSP-851TA and FAPT-851A	I56-3524 I56-2296
FCM-1 Control Module Installation Document FCM-1A Canadian	I56-1169 / I56-3500
FCM-1-REL/FCM-1-RELA Control Module Installation Document	I56-2992
FDM-1 Dual Monitor Module Installation Document FDM-1A Canadian	I56-1463 / I56-3531
FMM-1 Monitor Module Installation Document FMM-1A Monitor Module Installation Document	I56-1171 / I56-3056 I56-3165
FMM-4-20 Monitor Module Installation Document	I56-2991
FMM-101 Mini Monitor Module Installation Document FMM-101A Mini Monitor Module Installation Document	I56-1173 I56-3164
FRM-1 Relay Module Installation Document FRM-1A Relay Module Installation Document	I56-3502/I56-1170 I56-3188
FDRM-1 Dual Monitor/Dual Relay Module FDRM-1A Canadian	I56-3649
FS-OSI-RI and FS-OSI-RIA Intelligent Beam Detectors	I56-6571
FSB-200, FSB-200S Single-ended Reflected Type Projected Beam Smoke Detector FSB-200A, FSB-200SA Canadian	I56-2424 I56-2544
FCO-951, FCO-951-IV Carbon Monoxide Sensors	I56-6600
FCO-951A, FCO-951A-IV Carbon Monoxide Sensors	I56-9134
FPC-951 Multi-Criteria Photoelectric and CO Sensor	I56-4279
FPC-951A Multi-Criteria Photoelectric and CO Sensor	I56-9142
FPTI-951, FPTI-951-IV Multi-Criteria Photoelectric,Thermal and Infra-Red Sensor	I56-6616
FPTI-951A, FPTI-951A-IV Multi-Criteria Photoelectric,Thermal and Infra-Red Sensor	I56-9135
FSCO-951 Intelligent Carbon Monoxide Sensor	I56-4280
FSCO-951A Intelligent Carbon Monoxide Sensor	I56-9143
FSC-851 IntelliQuad Intelligent Photoelectric Multi-Criteria Smoke Sensor FSC-851A Canadian	I56-3038
FCO-851 IntelliQuad PLUS Intelligent Photoelectric Multi-Criteria Smoke/CO Detector FCO-851A Canadian	I56-3634
FSD-751PL Low-flow Duct Detector FSD-751PLA Canadian	I56-1978
FSD-751RPL Low-flow Duct Detector with Relay FSD-751RPLA Canadian	I56-1979
FSD-751P Duct Detector Installation Document FSD-751PA Canadian	I56-1523
FSD-751RP Duct Detector Installation Document FSD-751RPA Canadian	I56-1571
FSH-751 HARSH™ Installation Document FSH-751A Canadian	I56-054
FSI-751 Ion Detector Installation Document	I56-1249
FSI-851 Ion Detector Installation Document FSI-851A Canadian	I56-1924
FSV-951, FSV-951-IV Intelligent High-sensitivity Photoelectric Smoke Sensors, UL listed	I56-4281
FSV-951A, FSV-951A-IV Intelligent High-sensitivity Photoelectric Smoke Sensors, ULC listed	I56-9132

Table 1.2 Reference Documentation (3 of 4)

	Document Number
FSV-951R, FSV-951R-IV Intelligent High-sensitivity Photoelectric Smoke Sensors Intelligent High-sensitivity Photoelectric Smoke Sensors, Retrofit (Backwards compatible for use with older panels) UL-listed	I56-4289
FSV-951RA, FSV-951RA-IV Intelligent High-sensitivity Photoelectric Smoke Sensors Intelligent High-sensitivity Photoelectric Smoke Sensors, Retrofit (Backwards compatible for use with older panels) ULC-listed	I56-9130
FSL-751 Laser Detector Installation Document FSL-751A Canadian	I56-057
FSP-751 & FSP-751T Photo Installation Document	I56-1230
FSP-851, FSP-851T, and FAPT-851 Photoelectric Detectors Installation Document FSP-851A, FSP-851TA, and FAPT-851A	I56-3524, I56-1925 I56-2296
FSP-851R Photoelectric Smoke Sensor with Remote Test Capability in Duct Applications Installation FSP-851RA Canadian	I56-3549 I56-2231
FST-751 Thermal Detector Installation Document	I56-1234
FSP-951, FSP-951-IV Intelligent Photo Smoke Detector FSP-951A, FSP-951A-IV Canadian	I56-6519 I56-2230
FSP-951R and FSP-951R-IV Intelligent Photo Smoke w/Remote Test Capability FSP-951RA and FSP-951RA-IV Canadian	I56-6520 I56-2231
FSP-951T and FSP-951T-IV Intelligent Photo/Temperature Detector FSP-951TA and FSP-951TA-IV Canadian	I56-6521 I56-2232
FST-951/-IV, FST-951R/-IV, FST-951H/-IV Intelligent Heat Detector FST-951A/-IV, FST-951RA/-IV, FST-951HA/-IV Canadian	I56-6522 I56-2233
FST-751R Rate of Rise Sensor Installation Document	I56-1242
FST-851, FST-851R, and FST-851H Thermal Detectors Installation Document FST-851A, FST-851RA, and FST-851HA Thermal Detectors Installation Document	I56-3518, I56-1926 I56-2301
FTM-1 Firephone Control Module, FTM-1A Firephone Control Module FTM-1A Canadian	I56-3533, I56-2067
FZM-1 Zone Interface Module Installation Document FZM-1A Canadian	I56-3504 I56-3207
HPX-751 HARSH™ Installation Document	I56-1250
ISO-X Isolator Module Installation Document ISO-XA Canadian	I56-3624/I56-1380 I56-1070
ISO-6 Six Fault Isolator Module ISO-6A Canadian	I56-4096 I56-4160
LPX-751 Laser Detector Installation Document	I56-748
LPX-751L Laser Detector Installation Document	I56-1793
NBG-12LX Pull Station Installation Document	51093
NBG-12LXSP Spanish-/English-Labeled Addressable Manual Pull Station	I56-2769 (English) I56-2797 (Spanish)
NBG-12LXP Portuguese-Labeled Addressable Manual Pull Station	I56-2272
N-MPS and NFW-MPS Series Pull Stations Installation Document	53842-L8
SLC-IM Listing Document	LS10026-051NF
FSA-5000(A) Intelligent FAAST® XS Installation and Maintenance Instructions	I56-6008
FSA-8000(A) Intelligent FAAST® XM Installation and Maintenance Instructions	I56-3903
FSA-20000(A) Intelligent FAAST® XT Installation and Maintenance Instructions	I56-4217
FSA-20000P Intelligent FAAST® XT PRO Installation and Maintenance Instructions	I56-6507
Manual Releasing Disconnect Switch Product Installation Document	LS10231-000GE-E
Note: Refer to the Device Compatibility Document for compatible conventional devices.	15378

Table 1.2 Reference Documentation (4 of 4)

1.4 SLC 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 Class B, Class A, or Class X.

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 Appendix B, “SLC Surge Suppression”, on page 71.

1.5 Polling Protocols

1.5.1 Available Protocols

FlashScan

FlashScan® is a patented system (US Patent Number 5,539,389) that greatly enhances the speed of communication between analog intelligent devices. Communication is in a grouped fashion. If one of the devices within the group has new information, the panel CPU stops the group poll and concentrates on single points. Not all panels are FlashScan® capable; see "Protocol Use" below.

CLIP

CLIP (Classic Loop Interface Protocol) polls devices in sequential order. Many but not all Flash-Scan-capable devices can be set to run in CLIP mode; see installation sheet shipped with the device.

1.5.2 Protocol Use

Control panels can use more than one type of protocol, with some restrictions as discussed below.

SLM-318 loops on N16, LCM-320/LEM-320 loops on NFS2-640, NFS2-3030, NFS-3030 and NFS-640, and SLC loops on NFS-320 can run in FlashScan mode or CLIP mode. AFP-100, AFP1010, AFP-200, AFP-300/AFP-400, AM2020, and System 5000 with AIM-200 run in CLIP mode only.

Many FlashScan devices can be programmed to run in either CLIP or FlashScan mode. Use one of the following three options with SLC loops **on most panels**:

1. Program all modules and detectors on an SLC as FlashScan.
2. Program all modules and detectors on an SLC as CLIP.

CAUTION:

DO NOT PROGRAM MORE THAN 99 ADDRESSES ON A CLIP-MODE SLC LOOP, BECAUSE THIS WILL SLOW THE SYSTEM DOWN AND COMPROMISE THE RESPONSE TIME OF THE PANEL TO DISPLAY OFF-NORMAL EVENTS.

3. Program all detectors as CLIP and all modules as FlashScan on an SLC. (See Item#4 below.)

CAUTION:

DO NOT PROGRAM MODULES AS CLIP AND DETECTORS AS FLASHSCAN ON THE SAME SLC UNLESS SUPPORTED BY PANEL PROGRAMMING (SEE ITEM#4 BELOW). THIS COMBINATION DOES NOT WORK.

N16 and NFS2-3030/NFS-3030 support an additional option:

4. Program modules as CLIP and detectors as FlashScan.

1.6 Devices

NOTE: In this manual, UL-listed model numbers are used; the ULC-listed versions are specified in Section E, "Canadian Versions of SLC Devices", on page 78. *Only N16 supports self-test devices. Current* release of N16 *is for UL applications. If Self Test Smoke Detectors are installed on a SLM-318 loop card (CLP-2PCB), the maximum permissible long line resistance drops to 35 ohms; initial release of SLM-318 drops to 23 ohms (CLP-PCB).*

1.6.1 Monitor/Zone Interface Module

These addressable modules 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.

- **FMM-1** Monitor Module; FlashScan or CLIP mode. (An earlier module named MMX-1 was CLIP mode only.)
- **FMM-101** Addressable Mini-Monitor Module; FlashScan or CLIP mode. (An earlier module named MMX-101 was CLIP mode only.)
- **FMM-4-20** Four-to-Twenty Milli-Amp Monitor Module; FlashScan mode only. CLIP mode operation will generate a trouble message at the panel. This module is only compatible with the NFS2-3030.
- **FZM-1** Zone Interface Module; FlashScan or CLIP mode. (An earlier module named MMX-2 was CLIP mode only).
- **SLC-IM** SLC Integration Module communicates between the VHS-1420-HFS and a Fire Alarm Control Panel (FACP). It translates Modbus protocol to SLC protocol enabling events on the VESDAnet to be annunciated by an FACP.
- **XP5-M** Supervises five Class B addressable Initiating Device Circuits (IDC) which monitor normally open contact initiating devices. Supports FlashScan or CLIP mode. This module is capable of participating in degraded mode where supported by the FACP. (See the XP5 Series Manual.)
- **XP6-MA** Allows an intelligent alarm system to monitor six zones of conventional two-wire detectors; FlashScan or CLIP mode.
- **XP10-M** Supervises ten Class B addressable Initiating Device Circuits (IDC) which monitor normally open contact initiating devices; FlashScan or CLIP mode. This module is capable of participating in degraded mode where supported by the FACP.

1.6.2 Control Modules

Through these addressable modules, the control panel can selectively activate Notification Appliance Circuits (NAC).

- **FCM-1** Control Module; FlashScan or CLIP mode. (Earlier monitor modules named CMX-1 and CMX-2 were CLIP mode only.)

- **FCM-1-REL** Control Module for releasing applications; FlashScan mode only. CLIP mode operation will generate a trouble message at the panel. (For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS.)
- **XP5-C** Acts as a NAC or a speaker/telephone circuit (Class B only) or a Form-C relay. FlashScan capable. (See the XP5 Series Manual.)
- **XP6-C** Controls six NAC or speaker/telephone circuits; FlashScan or CLIP mode.
- **FTM-1** Firephone Control Module; FlashScan-only device for use with Fire Fighters Telephone on NFS-320, NFS2-640, NFS-640, NFS-3030, and NFS2-3030. (See the *Voice Alarm System Manual,* the *DVC Manual,* or the *DAA2/DAX Manual*.)

1.6.3 Isolator Modules

Isolator Modules permit a short-circuited section of the SLC 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 Class X circuit. *(For Isolator Bases see Section 1.6.7, "Plug-in Detector Bases".)*

- **ISO-X** Loop Fault Isolator Module; FlashScan or CLIP mode.
- **ISO-6** Six Fault isolator module provides six equivalent circuits that allow a portion of the communications loop to continue operating when a short circuit occurs on that loop.

1.6.4 Relay Modules

These addressable modules provides the control panel with a dry-contact output for activating a variety of auxiliary devices.

- **FRM-1** Relay Module with two Form-C relays; FlashScan or CLIP mode.
- **XP6-R** Controls six independent Form-C relays; FlashScan or CLIP mode.

1.6.5 Multiple Input/Output Modules

These addressable modules offer dual input and/or dual ouput in a single device.

- **FDM-1** Dual Class B Monitor Module; FlashScan or CLIP mode.
- **FDRM-1** Dual Monitor/Dual Relay Module; functions as two Class B monitor modules and two individual relay modules. FlashScan or CLIP mode.

1.6.6 Transponders

- **XP Series (XPP-1, XPC-8, XPM-8 & XPR-8)** Provides the FACP with an efficient multiplex subsystem capability. It communicates with the FACP and functions as a data-gathering panel for alarm Initiating Device Circuits and as a remote switching center for Notification Appliance Circuits (NAC), telephone circuits or relays. Not FlashScan capable.

For information on connecting these transponders to the SLC, refer to the *XP Transponder Manual*.

1.6.7 Plug-in Detector Bases

Plug-in detector bases provide a connection between the SLC and a variety of intelligent detectors which are snapped into place. Standard and isolator bases are used depending upon which NFPA SLC class is required. Sounder and relay bases are similar to standard bases, but have sound or relay capabilities.

Standard Base

- **B501 Series**. 4 inch (10.16 cm) standard small diameter base, commonly used in European installations. For white order **B501-WHITE**. For ivory, order **B501-IV**. For black, order **B501-BL.** Replaces legacy ivory **B501/B501A.**
  Note: UL/ULC listed as of January 2018 to replace B501A; compatible for use in Canadian retrofit installations.
- **B300-6** 6 inch (15.24 cm) plug-in detector base standard large diameter base, commonly used in US installations.
  White. For ivory, order **B300-6-IV.** Replacement model for B210LP.
- **B210LP** 6 inch (15.24 cm) standard large diameter base, commonly used in US installations. Replacement model for B710LP. Legacy ivory.
- **HARSH™ Base** - Model **B710HD**used with all HARSH™ detectors
- **Isolator Base B224BI-WH, B224BI-IV** isolator base. Replaces legacy ivory B224BI.

Sounder Base

- **B501BH** Standard sounder base.
- **B501BH-2** UL 864 9th edition compliant standard sounder base.
- **B501BHT-2** UL 864 9th edition compliant temporal sounder base, replaces **B501BHT**.
- **B200S-WH, B200S-IV**. Intelligent sounder base. (-WH is white; -IV is ivory). Replaces legacy ivory B200S.
- **B200SR-WH, B200SR-IV** Intelligent sounder base, designed to be compatible with existing installations of the B501-Series sounder bases. (-WH is white; -IV is ivory). Replaces legacy ivory B200SR.
- **B200S-LF-WH, B200S-LF-IV** A low-frequency version of the B200S-WH/-IV. (-WH is white; -IV is ivory). Replaces legacy ivory B200S-LF.
- **B200SR-LF-WH, B200S-LF-WH** A low-frequency version of the B200SR-WH/-IV. (-WH is white; -IV is ivory). Replaces legacy ivory B200SR-LF.

Relay Base

- B224RB-WH, B224RB-IV (-WH is white; -IV is ivory) Replaces legacy ivory B224RB.

1.6.8 Intelligent Detectors

NOTE:
The alarm and threshold limits determined by the control unit interconnected to detectors that employ a special application mode/configuration are designed and shipped from the factory with the detector sensitivity setting set to an acceptable open area protection sensitivity being the default mode of operation.
The special application mode/configuration shall not be activated at the control unit without a deliberate action by the user to initiate the special application mode through an alternate detector sensitivity selection setting.
Additionally, the extended label should be modified at this address to include the phrase 'SPECIAL APPLICATIONS' or 'SPECIAL APPS' for compliance with UL 864 requirements. Refer to the FACP programming/installation instructions for further instructions on altering extended labels.

- **FSP-951-SELFT** Self-test photo detector; FlashScan; N16 only; UL applications only.
- **FSP-951T-SELFT** Self-test photo/heat detector; FlashScan; N16 only; UL applications only.
- **FST-951-SELFT** Self-test heat detector; FlashScan; N16 only; UL applications only.
- **FCO-951, FCO-951-IV** Addressable intelligent multi-criteria smoke sensors: photo, carbon monoxide (CO), 135°F (57.2°C) fixed-temperature heat detector, and infra-red (IR). Transmits an alarm signal due to heat (135°F/57.2°C) per UL 521. (Main model is white; -IV is ivory.)
- **FPC-951** Multi-Criteria Photoelectric and CO Sensor. (White)
- **FPTI-951, FPTI-951-IV** Multi-Criteria Photoelectric, Thermal and Infra-Red Sensor. (Main model is white; -IV is ivory.)
- **FSCO-951** Intelligent Carbon Monoxide Sensor. (White)
- **FS-OSI-RI** Addressable, intelligent, single-ended beam smoke detector.
- **FSV-951, FSV-951-IV** Intelligent High-sensitivity Photoelectric Smoke Sensors, FlashScan. (-IV versions support FlashScan and CLIP.)
- **FSV-951R, FSV-951R-IV** Intelligent High-sensitivity Photoelectric Smoke Sensors, Retrofit (Backwards compatible for use with older panels). FlashScan. (-IV versions support FlashScan and CLIP.)

VESDA-E series aspiration smoke detectors provide fire protection for NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 in FlashScan mode. Address using VSC software.

VESDA-E, UL 268 6th edition/ULC:

- **VEP-A00-P-NTF** Addressable VESDA-E VEP with LEDs, UL 268 6th edition/ULC
- **VEP-A10-P-NTF** Addressable VESDA-E VEP with 3.5" Display, UL 268 6th edition/ULC
- **VEP-A00-1P-NTF** Addressable VESDA-E VEP 1 Pipe with LEDs, UL 268 6th edition/ULC
- **VEU-A00-NTF** Addressable VESDA-E VEU with LEDs, UL 268 6th edition/ULC
- **VEU-A10-NTF** Addressable VESDA-E VEU with 3.5" Display, UL 268 6th edition/ULC
- **VEA-040-A00-NTF** Addressable VESDA-E VEA-40 point with LEDs, UL 268 6th edition/ULC
- **VEA-040-A10-NTF** Addressable VESDA-E VEA-40 point with 3.5" Display, UL 268 6th edition/ULC

VESDA-E, UL 268 7th edition:

- **VEP-A00-P-NTF-UL** Addressable VESDA-E VEP with LEDs, UL 268 7th edition
- **VEP-A10-P-NTF-UL** Addressable VESDA-E VEP with 3.5" Display, UL 268 7th edition
- **VEP-A00-1P-NTF-UL** Addressable VESDA-E VEP 1 Pipe with LEDs, UL 268 7th edition
- **VEU-A00-NTF-UL** Addressable VESDA-E VEU with LEDs, UL 268 7th edition
- **VEU-A10-NTF-UL** Addressable VESDA-E VEU with 3.5" Display, UL 268 7th edition
- **VEA-040-A00-NTF-UL** Addressable VESDA-E VEA-40 point with LEDs, UL 268 7th edition
- **VEA-040-A10-NTF-UL** Addressable VESDA-E VEA-40 point with 3.5" Display, UL 268 7th edition
- **VES-A00-P-NTF-UL** Addressable VESDA-E VES scanning detector with LEDs, FlashScan, UL 268 7th edition
- **VES-A10-P-NTF-UL** Addressable VESDA-E VES scanning detector with 3.5" Display, FlashScan, UL 268 7th edition

FCO-851 IntelliQuad PLUS Intelligent Photoelectric Multi-Criteria Smoke/CO (Carbon Monoxide) detector. Plug-in type smoke sensor that is a photoelectric sensing chamber combined with Carbon Monoxide (CO), thermal, and infra-red (IR) sensors to help reduce false alarms. For CO, the detectors electromechanical sensing cell creates a separate indication of for life safety CO detection. The FCO-851 adds thermal sensors that will alarm at a fixed temperature of 135° F (57.2° C) and alarm sensitivity options with built-in alarm and pre-alarm time delay. FlashScan mode only.

FSB-200S Addressable, intelligent, single-ended beam smoke detector with built-in sensitivity testing. The FSB-200 is the same except that it does not provide sensitivity testing. Both models support FlashScan and CLIP mode.

FAPT-851 (Acclimate® Plus™**)** Addressable, intelligent detector that combines a photoelectric sensing chamber and fixed temperature heat detection (135°F / 57.2°C). FlashScan- and CLIP-mode capable. (An earlier version named FAPT-751 was also FlashScan capable. The model named IPX-751 was discontinued as of December 1, 2001.)

FSC-851 IntelliQuad Intelligent Photoelectric Multi-Criteria Smoke Sensor. Plug-in type smoke sensor that is a photoelectric sensing chamber combined with Carbon Monoxide (CO), thermal, and infra-red (IR) sensors to help reduce false alarms. The FSC-851 adds thermal sensors that will alarm at a fixed temperature of 135° F (57.2° C) and alarm sensitivity options with built-in alarm and pre-alarm time delay. Notifier panels offer different feature sets across different models. Certain features of the FSC-851 may not be available on some panels. The FSC-851 supports both FlashScan and CLIP modes. Read Status limitations may apply in CLIP mode.

FSI-851 Addressable, intelligent smoke detector that incorporates an ionization sensing chamber. Designed to provide open area protection. FlashScan- and CLIP-mode capable. (An earlier model named FSI-751 (discontinued) was also FlashScan- and CLIP-mode capable. Earlier models named CPX-751 and CPX-551 were CLIP mode only.)

FSP-951/FSP-951-IV Analog, addressable intelligent smoke detector that uses a photoelectric sensing chamber. Listed for use in ducts. Designed to provide open area protection. The **FSP-951T/FSP-951T-IV** adds thermal sensors that will alarm at a fixed temperature of 135° F (57.2°C). The **FSP-951R/FSP-951R-IV** is a low profile, intelligent photoelectric sensor that is remote test capable, for use with DNR(W). Basic models support FlashScan mode only; models ending in -IV support FlashScan and CLIP mode. These models update and replace FSP-851, FSP-851T, and FSP-851R, which all supported FlashScan or CLIP mode. (Earlier versions named FSP-751 and FSP-751T [both discontinued] also supported FlashScan or CLIP mode, but were not listed for use in ducts. Earlier models named SDX-551, SDX-751, and SDX-551TH were CLIP mode only.

FST-951/FST-951-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 (57.2°C) fixed temperature alarm. The **FST-951R/FST-951R-IV** incorporates a thermal rate of rise of 15°F (8.3°C). The **FST-951H/FST-951H-IV** is a high temperature sensor with 190°F (87.8°C) fixed temperature alarm. Basic models support FlashScan mode only; models ending in -IV support FlashScan and CLIP mode.These models update and replace FST-851 , FST-851R, and FST-851H, which all supported FlashScan or CLIP mode. (Earlier versions named FST-751 and FST-751R [both discontinued] also supported FlashScan or CLIP mode. Earlier models named FDX-551, and FDX-551R were CLIP mode only.)

FSD-751P Photoelectric Duct Detector. The FSD-751RP includes an alarm relay. All models support FlashScan or CLIP mode.

FSD-751PL Low-flow Photoelectric Duct Detector, with extended speed range of 100–4000 FPM (0.5 m/s to 20.3 m/s). FSD-751RPL adds a relay. Both models support FlashScan or CLIP mode.

DNR/W Innovairflex intelligent, non-relay, low-flow photoelectric duct detector housing. Low Flow refers to the air velocity rating of 100 to 4,000 feet per minute (0.5 to 20.32 m/sec). Use with FSP-851R/FSP-951/FSP-951-IV photoelectric smoke detector. Accommodates the installation of the FRM-1 addressable relay module. The DNRW is the same as the DNR with a watertight housing.

FSH-751 (HARSH™) A special smoke detector that provides early warning smoke detection in hostile environments where traditional smoke detectors are not practical. Supports FlashScan or CLIP mode. (An earlier model named HPX-751 was CLIP mode only.)

FSL-751 VIEW® An advanced intelligent photoelectric detector that uses a laser diode, special optics, and signal processing to obtain extremely high sensitivity. Supports FlashScan and CLIP mode; compatible with AFP-300/AFP-400, NFS-640, NFS2-640, NFS-320 and NFS-3030/NFS2-3030 only. LPX-751L is compatible with AFP-200 and AM2020/AFP1010; CLIP mode only. (An earlier version named LPX-751 was CLIP mode only and compatible with AFP-300/AFP-400.)

FSA-5000 Intelligent FAAST® XS aspiration smoke detector. Covers 5,000 square feet through one pipe. Supports FlashScan mode. Compatible with NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 only. Addressed using PipeIQ® software. *(Discontinued Dec. 2018)*

FSA-8000 Intelligent FAAST® XM aspiration smoke detector. Covers 8,000 square feet through one pipe. Supports FlashScan and CLIP mode. (An earlier model was CLIP mode only). Compatible with NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 only. Addressed using PipeIQ® software. *(Discontinued Dec. 2018)*

FSA-20000 Intelligent FAAST® XT aspiration smoke detector. Covers 28,800 square feet through one to four pipes. Supports FlashScan and CLIP mode. Compatible with NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 only. Addressed using PipeIQ® software. *(Discontinued Dec. 2018)*

FSA-20000P Intelligent FAAST® XT PRO aspiration smoke detector. Covers 28,800 square feet through one to four addressable pipes for higher resolution of location. Supports FlashScan and CLIP mode. Compatible with NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 only. Addressed using PipeIQ® software. *(Discontinued Dec. 2018)*

1.6.9 Addressable Manual Pull Stations

The NBG-12LX is a dual-action pull station that, when activated, provides 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. Supports FlashScan or CLIP mode. An earlier model named BGX-101L was CLIP mode only. The NBG-12LXSP is a Spanish/English labeled version; NBG-12LXP is a Portuguese-labeled version. Both support FlashScan or CLIP mode.

N-MPS series pull stations are labeled in English and French for ULC applications: N-MPS-SA/N-MPS-SAC (single-stage), N-MPS-2A/N-MPS-2AC (dual stage). They support FlashScan and CLIP. (NFW-MPS Series pull stations were equivalent; for ULC retrofit use only.)

1.6.10 Wireless Interface

FWSG(A): The Wireless Gateway acts as a bridge between a group of wireless fire devices, and a FlashScan SLC loop on NFS-320, NFS-320SYS, NFS2-640, NFS2-3030, and N16 (operating with firmware version 22.x or higher). The Gateway can be powered by the SLC loop or by an 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, a monitor module, and a relay module. For details about wireless devices, system setup, and operation, and device availability in Canada, see the *SWIFT® Wireless Gateway Manual*.

1.6.11 ACPS-610 Addressable Charger/Power Supply

The ACPS-610 is an addressable power supply and battery charger with 24 VDC outputs. It operates in FlashScan or CLIP mode and has built-in strobe synchronization. Its four outputs may be independently configured to drive Notification Appliance Circuits (NACs) or to provide auxiliary power.

1.6.12 ACPS-2406 Addressable Charger/Power Supply

The ACPS-2406 is an auxiliary power supply and battery charger. Each of its four Notification Appliance Circuits (NAC) is individually addressable, eliminating the need for control modules. In addition, each circuit can provide notification appliance synchronization. FlashScan and CLIP capable. This product has been discontinued.

1.6.13 AMPS-24 Addressable Power Supply

The AMPS-24 is a primary power supply and battery charger. Depending on its configuration, it can occupy either one or four addresses on an SLC. FlashScan capable.

1.6.14 PMB-AUX Addressable Charger/Power Supply

PMB-AUX is an addressable primary power supply and battery charger for N16. Each unit supports up to 5 SLM-318 SLC loop cards and provides four (4) Notification Appliance Circuits (NAC). NACs can provide notification appliance synchronization. FlashScan and CLIP capable.

1.7 SLC Capacity

The protocol selected for an SLC loop determines the maximum number of devices that can be handled by the loop (see Section 1.5, “Polling Protocols”, on page 13). Within those limits, the individual control panel may have additional restrictions. See the specific installation manual for this information.

1.8 SLC Performance

SLC performance (Class B, Class A, or Class X) depends on the configuration of the circuit, the components on the circuit (see Table 1.3), and the power supply if required for auxiliary power (see individual wiring diagrams). SLC operation meeting Class X requirements isolates each addressable device on the SLC from faults that may occur on the SLC.

NOTE: NFPA class configuration must be programmed into N16 Series panels. The panel will check that the physical wiring matches and generate a trouble message if there is a mismatch. See panel documentation for details.

Wiring class requirements are determined by national and local codes. Consult with the Authority Having Jurisdiction before wiring the SLC. The table below (derived from NFPA 72-2002 and NFPA 72-2013) lists the trouble conditions that result when a fault exists on an SLC. Items with asterisks are not applicable to NFPA 72-2013. Additional information is broken out in Section 2, “Wiring Requirements”, on page 19, and Section 3, “Shielded Wire Termination”, on page 26.

Type of Fault	Class B	Class A	Class X
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.			
*Removed from NFPA 72-2013; included for legacy support under NFPA 72-2002 only.			

Table 1.3 SLC Circuit Configuration and Performance: Class B, Class A, Class X

1.9 LED Operation

The table below lists the LED operation on the various devices of an SLC in CLIP (Classic Loop Interface Protocol) Mode and FlashScan® Mode. When switching from FlashScan® to CLIP mode, the loop circuit must be powered down for at least 30 seconds to reset devices to CLIP mode LED operation.

		CLIP Mode		FlashScan® Mode	
Control Panel	Device	Standby	Activated	Standby	Activated
AM2020 AFP1010	Monitor Module Control Module Detector	Blinks RED Blinks GREEN Blinks RED	RED continuous 2 sec. GREEN, then OFF RED continuous	N/A N/A N/A	N/A N/A N/A
AFP-300/AFP-400	Monitor Module Control Module Detector	Blinks RED Blinks GREEN Blinks RED	RED continuous GREEN continous RED continuous	N/A N/A N/A	N/A N/A N/A

Table 1.4 LED Operations

		CLIP Mode		FlashScan® Mode	
AFP-100 AIM-200	Monitor Module Control Module Detector	Blinks RED Blinks GREEN Blinks RED	RED continuous Blinks GREEN RED continuous	N/A N/A N/A	N/A N/A N/A
AFP-200	Monitor Module Control Module Detector	Blinks RED Blinks GREEN Blinks RED	RED continuous OFF RED continuous	N/A N/A N/A	N/A N/A N/A
N16, NFS-320, NFS2-640, NFS-640 NFS2-3030, NFS-3030	Monitor Module Control Module Detector	Blinks RED Blinks GREEN Blinks RED	RED continuous GREEN continuous RED continuous	Blinks GREEN Blinks GREEN Blinks GREEN	RED continuous GREEN continuous RED continuous

Table 1.4 LED Operations

NOTE: In CLIP mode, the LPX-751 and HPX-751 blink GREEN in standby and stay RED when activated.

Section 2: Wiring Requirements

2.1 Recommended SLC Wiring

Depending on the panel, there are two recommended options for SLC wiring:

- Twisted, unshielded pair: N16, NFS-320, NFS2-640, NFS-640, NFS2-3030, NFS-3030, LCM-320, LEM-320, LIB-200A, LIB-400.
  Maximum resistance 50 ohms per branch. See Table 2.1.
  Maximum capacitance: 0.5 µFarads per branch.
- Twisted-shielded pair: AFP-100, AFP-200, AFP-300/400, LIB-200, AIM-200.
  Maximum resistance 40 ohms per branch. See Table 2.2.

To maximize distance on the SLC loop, use the recommended type of wire. Using other wiring types makes the SLC circuit more susceptible to electrical interference and thus reduces its maximum loop length.

Refer to Appendix A for proper wiring means for Auxiliary Power.

FACP: Wire Type and Limitations	Recommended Max. Distance	Wire Gauge
LIB-200A or LIB-400 on AM2020/AFP1010 (See Table 2.2 for LIB-200.)		
RECOMMENDED: Twisted unshielded pair, 12 to 18 AWG (3.31 mm² to 0.82 mm²†). 50 ohms max per length of Class A and X loops. 50 ohms per branch max for Class B loops	12,500 ft. (3,810 m) 9,500 ft. (2,895.6 m) 6,000 ft. (1,828.8 m) 3,700 ft. (1,127.76 m)	12 AWG/3.31 mm² 14 AWG/2.08 mm² 16 AWG/1.31 mm² 18 AWG/0.82 mm²
NOTE: Twisted-shielded pair or untwisted unshielded wire is not recommended for use with LIB-200A or LIB-400.		
NFS-640 and LEM-320 on NFS-640		
RECOMMENDED: Twisted-unshielded pair, 12 to 18 AWG (3.31 mm² to 0.82 mm²). 50 ohms maximum per length of Class A and X loops. 50 ohms per branch maximum for Class B loop.	12,500 ft. (3,810 m) 9,500 ft. (2,895.6 m) 6,000 ft. (1,828.8 m) 3,700 ft. (1,127.76 m)	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)
Untwisted, unshielded wire, in conduit or outside of conduit.	1,000 ft. (304.8 m)	12 to 18 AWG (3.31 mm² to 0.82 mm²)
Note: Twisted-shielded pair is not recommended for use with this panel. **Note:** Maximum total capacitance of all SLC wiring (both between conductors and from any conductor to ground) should not exceed 0.5 microfarads.		
NFS-320, NFS-320SYS, NFS2-640, LEM-320 on NFS2-640, LCM-320/LEM-320 on NFS-3030/NFS2-3030, and N16/SLM-318 loops (with and without self-test detectors)		

Table 2.1 Wiring Recommendations: NFS-320, NFS2-640, NFS-640, NFS2-3030, NFS-3030, N16, SLM-318, LCM-320, LEM-320, LIB-200A, and LIB-400

FACP: Wire Type and Limitations	Recommended Max. Distance	Wire Gauge
RECOMMENDED: Twisted-unshielded pair, 12 to 18 AWG (3.31 mm² to 0.82 mm²). • 50 ohms, maximum per length of Class A and X loops. • 50 ohms per branch maximum for Class B loop. *N16 loops with self-test detectors:* • *35 ohms, maximum per length of Class A and X loops.* • *35 ohms per branch maximum for Class B loop.* *NOTE: This value was lower for first release SLM-318 "CLP-PCB": 23 ohms, maximum per length of Class A and X loops; 23 ohms per branch maximum for Class B loop.* *Current SLM-318 is silkscreened "CLP-2PCB"; initial release is silkscreened "CLP-PCB".*	12,500 ft. (3,810 m) 9,500 ft. (2,895.6 m) 6,000 ft. (1,828.8 m) 3,700 ft. (1,127.76 m) *SLM-318 (CLP-2PCB) loops with self-test detectors:* *12 AWG - 11000 ft (3353 m)* *14 AWG - 6900 ft (2103 m)* *16 AWG - 4350 ft (1326 m)* *18 AWG - 2700 ft (823 m)* *First release SLM-318 "CLP-PCB" with self-test detectors:* *12 AWG - 7200 ft (2195 m)* *14 AWG - 4500 ft (1372 m)* *16 AWG - 2800 ft (853 m)* *18 AWG - 1800 ft (549 m)*	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)
Untwisted, unshielded wire, in conduit or outside of conduit.	5,000 ft. (1,524 m) 3,700 ft. (1,127.76m) *SLM-318/N16 loops with self-test detectors:* *4350 ft (1326 m)* *2700 ft (823 ft)* *First release SLM-318 "CLP-PCB" with self-test detectors: 2800 ft (853m), 1800 ft (549m)*	12 to 16 AWG (3.31 mm² to 1.31 mm²) 18 AWG (0.82 mm²)
Twisted, shielded pair Note: • Shields must be isolated from ground. • Shields should be broken at each device.	5,000 ft. (1,524 m) 3,700 ft. (1,127.76m) *SLM-318/N16 loops with self-test detectors:* *4350 ft (1326 m)* *2700 ft (823 ft)* *First release SLM-318 "CLP-PCB" with self-test detectors: 2800 ft (853m), 1800 ft (549m)*	12 to 16 AWG (3.31 mm² to 1.31 mm²) 18 AWG (0.82 mm²)
Note: Maximum total capacitance of all SLC wiring (both between conductors and from any conductor to ground) should not exceed 0.5 microfarads.		

Table 2.1 Wiring Recommendations: NFS-320, NFS2-640, NFS-640, NFS2-3030, NFS-3030, N16, SLM-318, LCM-320, LEM-320, LIB-200A, and LIB-400

FACP: Wire Type and Limitations	Recommended Max. Distance	Wire Gauge
AFP-100		
Twisted, shielded pair, 40 ohms maximum per length of Class A and X loops. 40 ohms per branch maximum for Class B loops.	10,000 ft. (3,000 m) 8,000 ft. (2,400 m) 4,875 ft. (1,450 m) 3,225 ft. (980 m)	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)
Untwisted, Unshielded	1,000 ft. (300 m)	12-18 12 to 18 AWG (3.31 mm² to 0.82 mm²)
Note: Twisted-unshielded pair wire is not recommended for use with this panel.		
AFP-200		
Twisted-shielded pair. 40 ohms maximum per length of Class A and X loops. 40 ohms per branch maximum for Class B loops.	10,000 ft. (3,048 m) 8,000 ft. (2,438.4 m) 4,875 ft. (1,485.9 m) 3,225 ft. (982.98 m)	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)
Untwisted, unshielded wire, in conduit or outside of conduit.	1,000 ft. (304.8 m)	12 to 18 AWG (3.31 mm² to 0.82 mm²)
Note: Twisted-unshielded pair wire is not recommended for use with this panel. **Note:** Maximum total capacitance of all SLC wiring (both between conductors and from any conductor to earth) should not exceed 0.5 microfarads.		
AFP-300/AFP-400		

Table 2.2 Wiring: AFP-100, AFP-200, AFP-300/400, LIB-200, AIM-200 (1 of 2)

FACP: Wire Type and Limitations	Recommended Max. Distance	Wire Gauge
Twisted-shielded pair, 12 to 18 AWG. 40 ohms, maximum per length of Class A and X loops. 40 ohms per branch maximum for Class B loops.	10,000 ft. (3,048 m) 8,000 ft. (2,438.4 m) 4,875 ft. (1,485.9 m) 3,225 ft. (982.98 m)	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)
Untwisted, unshielded wire, in conduit or outside of conduit.	1,000 ft. (304.8 m)	12 to 18 AWG (3.31 mm² to 0.82 mm²)
Note: Twisted-unshielded pair wire is not recommended for use with this panel.		
LIB-200 on AM2020/AFP1010 (See Table 2.1 for LIB-200A or LIB-400.)		
Twisted-shielded pair. Maximum loop resistance is 40 ohms. Maximum length is 10,000 ft. per channel (NFPA Class B) or 10,000 ft. total twisted pair length (NFPA Class A and X loops). Maximum loop current is 200 mA (short circuit) or 100 mA (normal).	10,000 ft. (3,048 m) 8,000 ft. (2,438.4 m) 4,875 ft. (1,485.9 m) 3,225 ft. (982.98 m)	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)
	If the wiring connected to the LIB-200 leaves the building it must be in conduit. It can not exceed 1000 m (1093 yards), must not cross any power lines, and must not be in the vicinity of any high voltage. These outdoor wiring restrictions do not apply to the LIB-200A or the LIB-400.	
System 5000 with AIM-200		
Twisted-shielded pair. Maximum loop resistance: 40 ohms. Maximum loop voltage: 27.6 VDC. Maximum loop current: 200 mA (short circuit) or 100 mA (normal operation).	10,000 ft. (3,048 m) 8,000 ft. (2,438.4 m) 4,875 ft. (1,485.9 m) 3,225 ft. (982.98 m)	12 AWG (3.31 mm²) 14 AWG (2.08 mm²) 16 AWG (1.31 mm²) 18 AWG (0.82 mm²)

Table 2.2 Wiring: AFP-100, AFP-200, AFP-300/400, LIB-200, AIM-200 (2 of 2)

2.2 Two-Wire SLC - Class B

2.2.1 Measuring Loop Resistance

T-tapping of the SLC wiring is permitted for two-wire Class B configurations. The total DC resistance from the control panel to each branch end cannot exceed:

- NOTE: 35 ohms for SLM-318 (CLP-2PCB) with self-test detectors installed.50 ohms for SLM-318/N16, NFS-320, NFS2-640, NFS-640, LCM-320, LEM-320, LIB-200A, and LIB-400.
  NOTE: 35 ohms for current SLM-318 (CLP-2PCB) with self-test detectors installed; 23 ohms for initial release SLM-318 (CLP-PCB) with self-test detectors installed.
- 40 ohms for AFP-100, AFP-200, AFP-300/400, LIB-200, and AIM-200.

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.

In Figure 2.1, Branches A, B, and C all begin at the SLC terminal, even though Branch B is T-tapped.

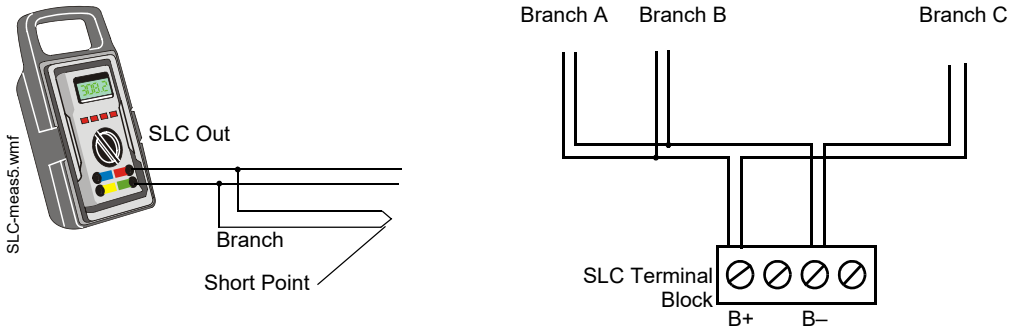


Figure 2.1 Measuring DC Resistance of a Two-Wire SLC

2.2.2 Measuring 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 all wire segments. In Figure 2.1 above, the picture on the right shows an SLC with 3 branches. Figure 2.2 below shows the same SLC divided into segments. The total length of the SLC is determined by adding the lengths of Segment 1 + Segment 2 + Segment 3 + Segment 4 + Segment 5. No segment should be summed twice.

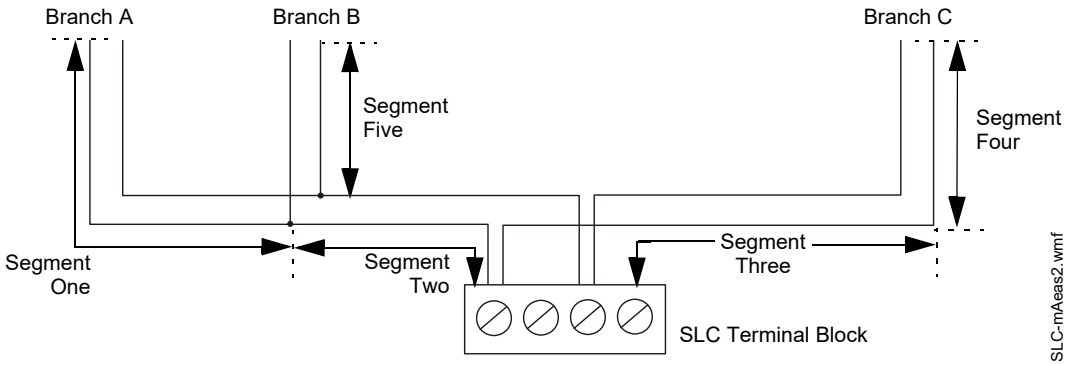


Figure 2.2 Measuring the Total Wire Length of a Two-wire SLC

2.3 Four-Wire SLC Class A and X

2.3.1 Measuring Loop Resistance

The total DC resistance of the SLC pair must not exceed:

NOTE: 35 ohms for SLM-318 (CLP-2PCB) with self-test detectors installed.

- 50 ohms for SLM-318/N16, NFS-320, NFS2-640, NFS-640, LCM-320, LEM-320, LIB-200A, and LIB-400.
  NOTE: 35 ohms for current SLM-318 (CLP-2PCB) with self-test detectors installed; 23 ohms for initial release SLM-318 (CLP-PCB) with self-test detectors installed.
- 40 ohms for AFP-100, AFP-200, AFP-300/400, LIB-200, AIM-200.

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 SLC at the last device and measure the resistance at SLC Out. Record resistance and remove the short. Refer to Figure 2.3.
3. Short the SLC at the first device and measure the resistance at SLC return. Record resistance and remove the short. Refer to Figure 2.3.

The maximum DC resistance of the SLC is the higher of 2 and 3.

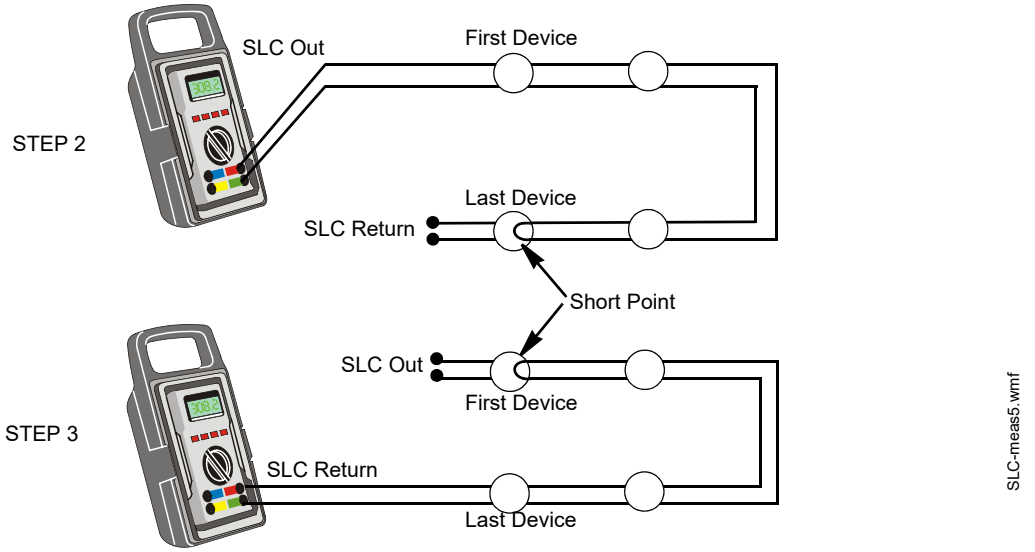


Figure 2.3 Measuring DC Resistance of a Four-Wire SLC

2.3.2 Measuring 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 or loop module:

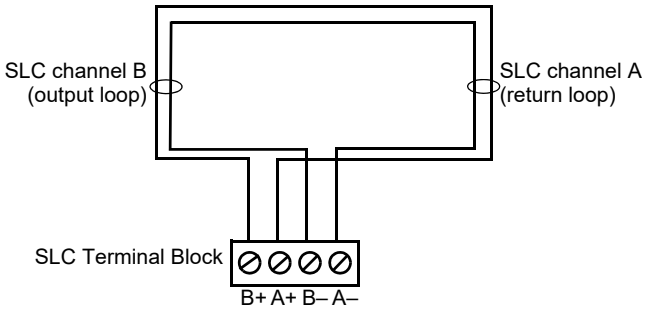
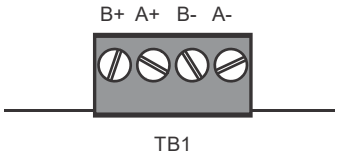


Figure 2.4 Measuring the Wire Length of a Four-Wire SLC

2.4 Control Panel Terminal Blocks

2.4.1 N16 with SLM-318 Signaling Loop Module

N16 supports from one to ten SLC loops. Connect from one to three PMB-AUX Power Module Boards to the panel, and connect from one to five SLM-318 Signaling Loop Modules to each PMB-AUX. Loops can be either CLIP mode or FlashScan mode. SLC Loops connect to TB1 on the SLM-318.



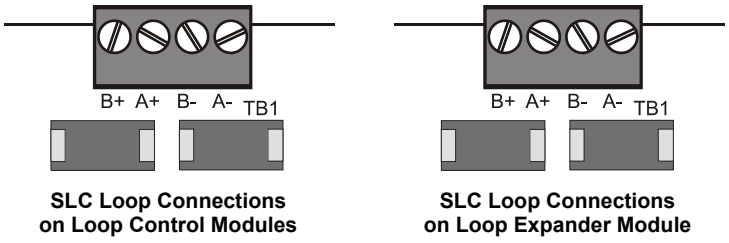
SLM318-SLC-TB.wmf

Figure 2.5 N16 with SLM-318: SLC Loop Connections and Wiring

Connections are the same on current SLM-318 (silkscreened "CLP-2PCB") and initial release (silkscreened "CLP-PCB").

2.4.2 NFS2-3030 and NFS-3030 with LCM-320, LEM-320

The NFS-3030/NFS2-3030 supports up to five pairs of loop control and expander modules, providing from one to ten SLC loops. Loops can be either CLIP mode or FlashScan mode. SLC loops connect to TB1 on the LCM-320 or LEM-320.



LEM320-SLC-TB.wmf

Figure 2.6 NFS2-3030, NFS-3030 SLC Loop Connections and Wiring

2.4.3 NFS2-640 with Loop Expander Modules, NFS-320 and NFS-320SYS

The NFS2-640 provide one SLC loop and supports a second using optional expander module LEM-320. The NFS-320 provides one SLC loop on the FACP's main circuit board. Terminal block designations are the same on the circuit board for both FACPs. Loops can be either CLIP mode or FlashScan mode. The SLC loop #1 connects to TB13 on the control panel. SLC loop #2 connects to TB1 on the LEM-320.

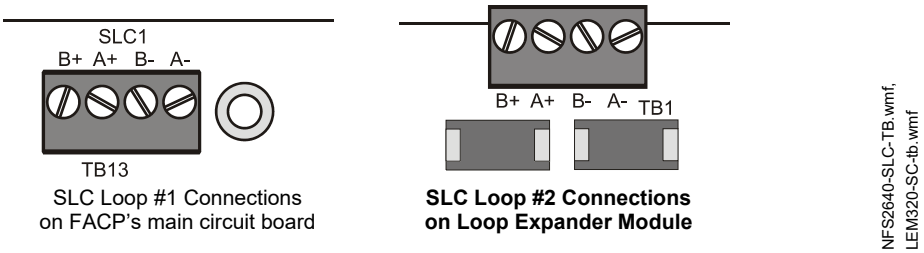


Figure 2.7 SLC Loop Connections and Wiring for NFS2-640, LEM-320, and NFS-320

2.4.4 NFS-640 with Loop Expander Modules

The NFS-640 provides one SLC loop and supports a second using optional expander module LEM-320. Loops can be either CLIP mode or FlashScan mode. SLC loop #1 connects to TB16 on the control panel; SLC loop #2 connects to TB1 on the LEM-320.

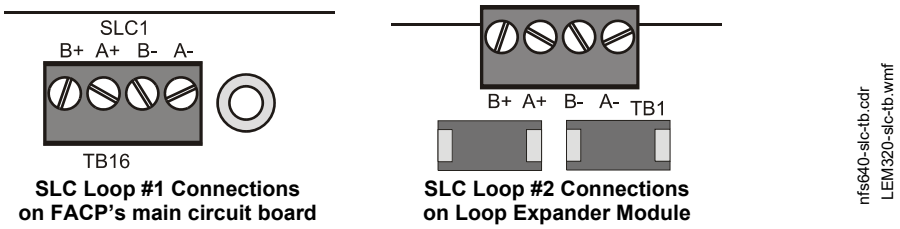


Figure 2.8 SLC Loop Connections and Wiring for NFS-640 and LEM-320

2.4.5 AFP-100

The AFP-100 supports one SLC loop; the loop is CLIP mode only. The SLC loop connects to TB6.

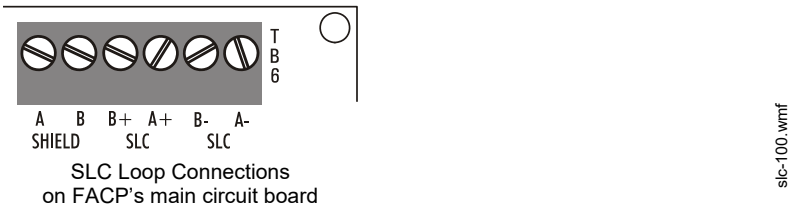


Figure 2.9 SLC Connections for AFP-100

2.4.6 AFP-200

The AFP-200 supports one SLC loop; the loop is CLIP mode only. The SLC loop connects to TB5.

Figure 2.10 SLC Connections for AFP-200

2.4.7 AFP-300/AFP-400

The AFP-300 supports one SLC loop; the AFP-400 supports two SLC loops. The loops are CLIP mode only. SLC loops connect to TB6 on the AFP-300; SLC loops connect to TB5 and TB6 on the AFP-400.

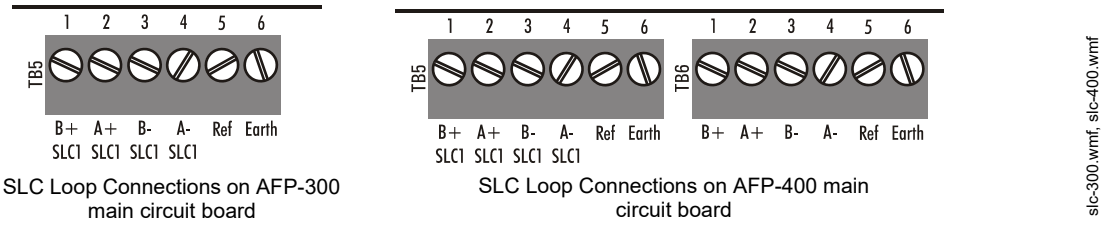


Figure 2.11 SLC Connections for AFP-300/AFP-400

2.4.8 AM2020/AFP1010 with LIB-200A or LIB-400

AM2020/AFP1010 supports up to ten SLC loops using LIB-200A (one SLC loop per board) and/or LIB-400 (one or two SLC loops per board). The loops are CLIP mode only. SLC loops connect to TB1 and TB2 on LIB-400, and TB1 on LIB-200A.

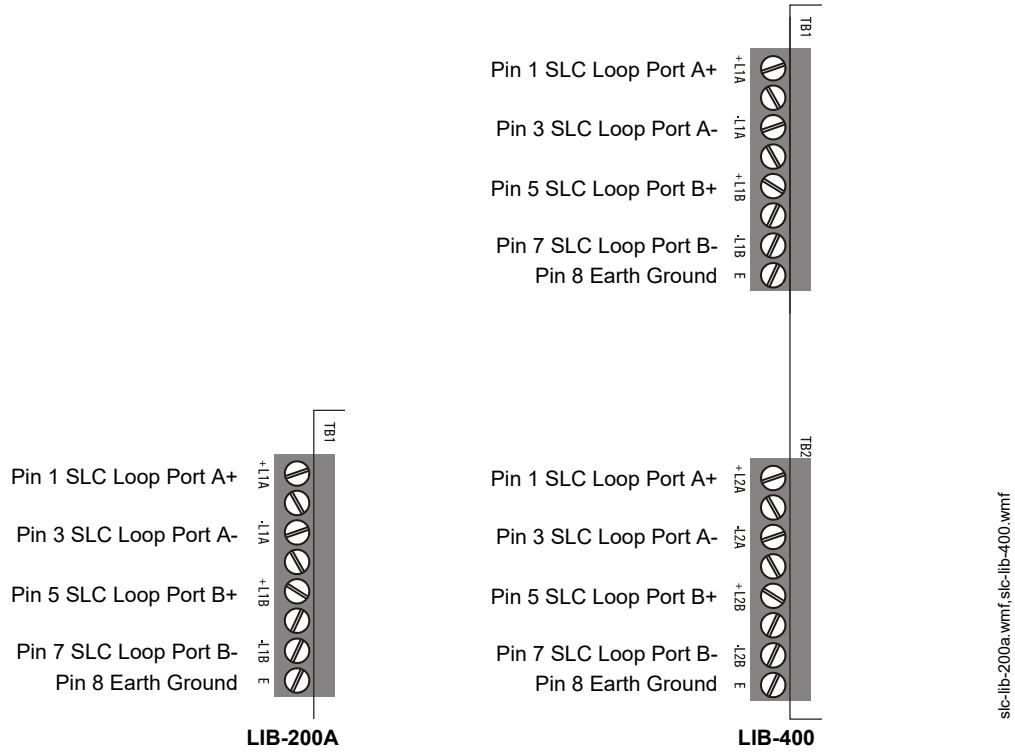


Figure 2.12 SLC Connections for LIB-200A & LIB-400

NOTE: LIB-200 has been replaced by LIB-200A.

2.4.9 System 5000 with AIM-200

System 5000 with AIM-200 supports one SLC loop; the loop is CLIP mode only. The SLC loop connects to P8 on AIM-200.

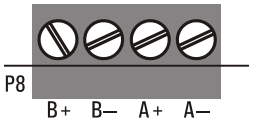


Figure 2.13 SLC Connections for AIM-200

NOTE: The AFC-600 has been discontinued; to service existing installations of this panel, refer to the original manuals shipped with the panel.

Section 3: Shielded Wire Termination

3.1 Overview

This section shows the proper termination of the shield, if used.

Shielding of the SLC is recommended for use with the AFP-100, AFP-200, AFP-300/400, LIB-200, and AIM-200. Proper termination of the shield depends on the type of conduit used:

- Section 3.2, “No Conduit”.
- Section 3.3, “Full Conduit” (Canadian requirement).
- Section 3.4, “Partial Conduit”.

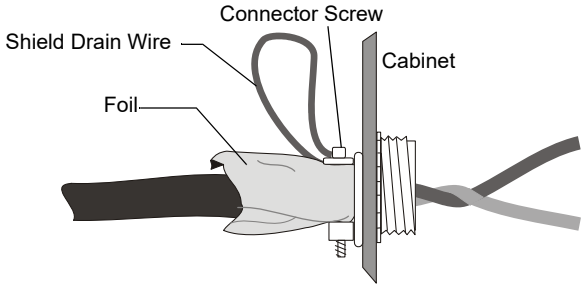
Shielding of the SLC is not recommended for use with the N16, NFS-320, NFS-320SYS, NFS2-640, NFS-640, NFS2-3030, NFS-3030, SLM-318, LCM-320, LEM-320, LIB-200A or LIB-400. If twisted-shielded wire is used in one of these installations, use a floating shield to terminate the wire as shown in Section 3.5, “Floating Shield”, on page 27.

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

3.2 No Conduit

For use with the AFP-100, AFP-200, AFP-300/400, LIB-200, and AIM-200 only

Scrape the paint on the cabinet to bare metal to provide a good electrical connection. Fold the foil and drain wire back over the cable jacket. Slide the cable into the connector clamp and secure. The drain wire should be connected to the connector screw. Do not allow the shield drain wire or foil to enter the system cabinet.



SLC-swterm1.wmf

Figure 3.1 Shield Termination – No Conduit

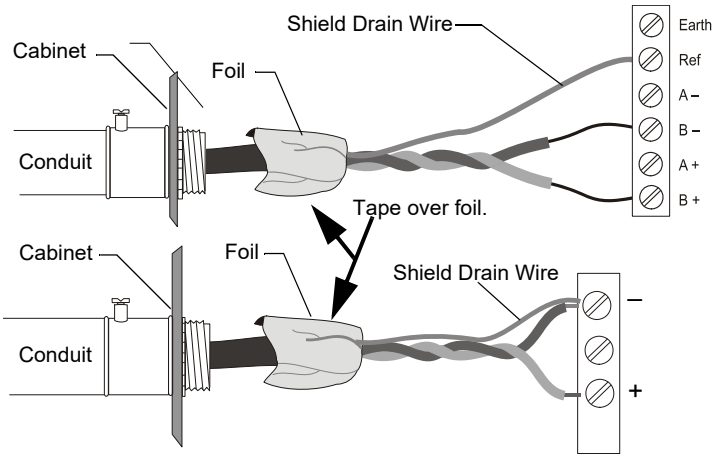
3.3 Full Conduit

For use with the AFP-100, AFP-200, AFP-300/400, LIB-200, and AIM-200 only

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 “reference” or “shield” terminal on the SLC terminal block, or connected to the negative side of the loop if there is no “reference” or “shield” terminal on the SLC terminal block. Do not let the shield drain wire or the shield foil touch the system cabinet or be connected to earth ground at any point.

Example at right illustrates shield drain wire connection to an SLC terminal block with a “reference” connection.

Example at right illustrates shield drain wire connection to an SLC terminal block without a “reference” or “shield” connection.



Shield2.wmf, SLC-swterm2a.wmf

Figure 3.2 Shield Termination – Full Conduit

NOTE: For Class A or Class X SLC wiring, connect one end of the shield to the reference/negative side of the respective channel.

3.4 Partial Conduit

For use with the AFP-100, AFP-200, AFP-300/400, LIB-200, and AIM-200 only

If the length of conduit from the control panel cabinet is less than 20 ft. (6.1 m), terminate the shield as shown. If using a metal box, you must use a metal conduit.

Connect the shielded wire to the junction box by using a proper connector. Scrape the paint on the cabinet to bare metal to provide a good electrical connection. Connect the metal conduit between the junction box and the cabinet by using the proper connectors.

Feed the twisted-pair wire into the junction box, through the conduit, into the cabinet box. Within the junction box, connect the appropriate wires together using wire nuts. Connect the shield drain wire to the junction box, at the end of the conduit run, as shown below.

Do not allow the shield drain wire to enter the system cabinet or the conduit.

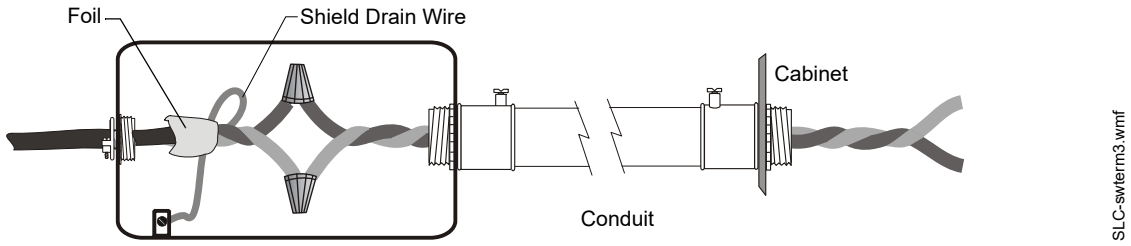


Figure 3.3 Shield Termination – Partial Conduit

3.5 Floating Shield

Twisted-**unshielded** wire is recommended for the N16, NFS-320, NFS-320SYS, NFS2-640, NFS-640, NFS2-3030, NFS-3030, SLM-318, LCM-320, LEM-320, LIB-200A and LIB-400SLM-318, .

If twisted-shielded pair wire is used in these installations, use a floating shield to terminate the wire. The following precautions must be met:

- If the SLC is more than 3,000 ft. (914.4 m), divide the shield into floating segments of less than 1,000 ft. (304.8 m). The shield should be broken at each device.
- To divide the shield wire into floating segments, cut shield even with jacket and tape as shown.

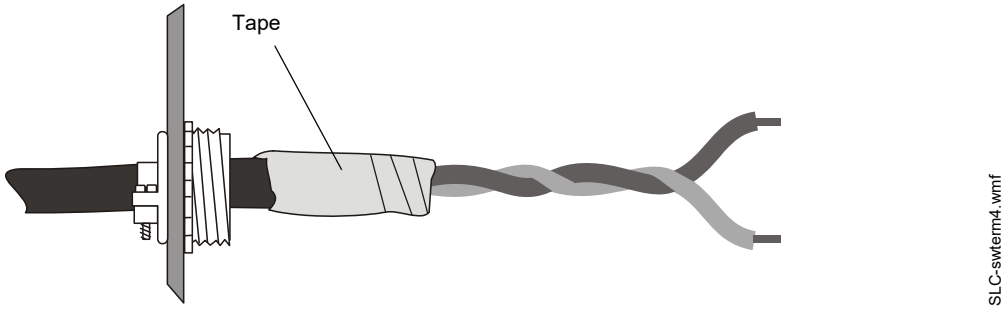


Figure 3.4 Floating the Shield

NOTE: Using shielded wire in applications where it is not recommended will reduce the maximum SLC length. If shielded wire must be used where not recommended, failing to float the ends will reduce the maximum SLC length even further.

Section 4: SLC Circuits without Isolators

4.1 Overview

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

- NFPA 72 Class B
- NFPA 72 Class A

4.2 NFPA Class B SLC

NFPA Class B requirements can be met by using the diagram below.

- T-tapping of the SLC wiring is allowed for Class B configuration.

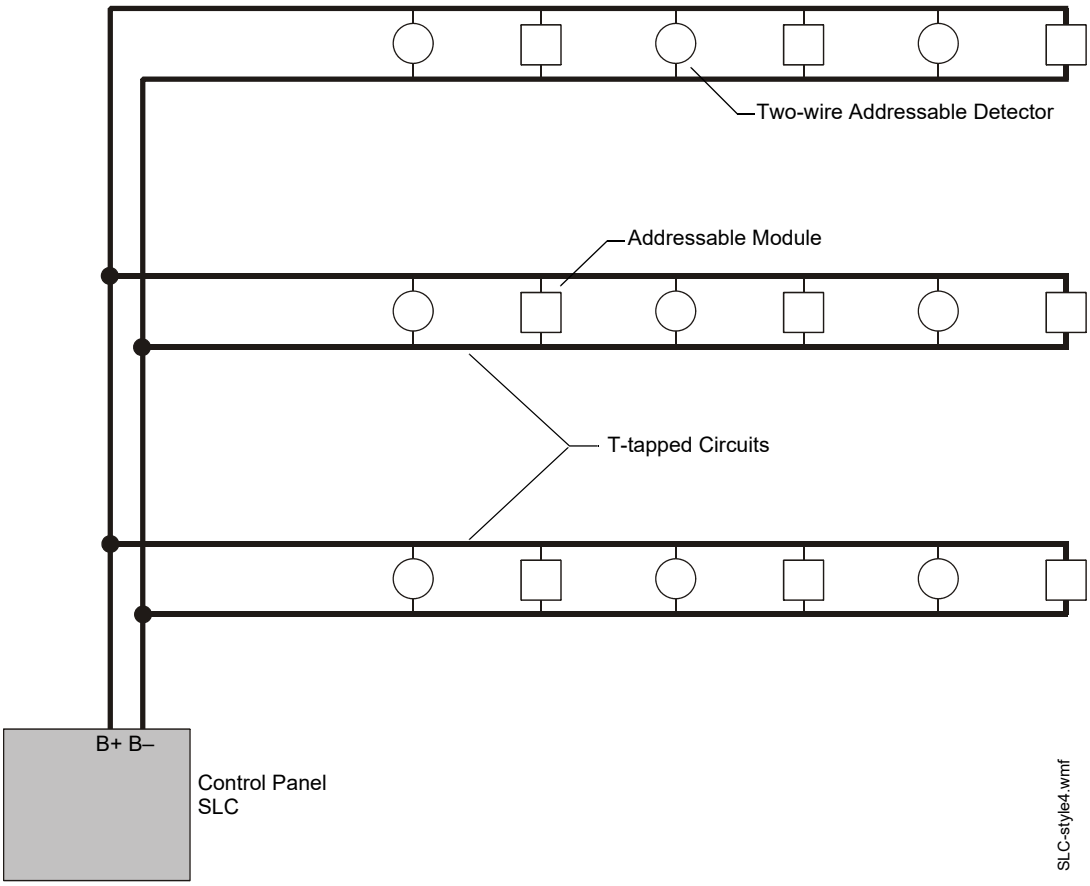


Figure 4.1 Basic NFPA Class B SLC

4.3 NFPA Class A SLC

NFPA Class A requirements can be met by using the diagram below.

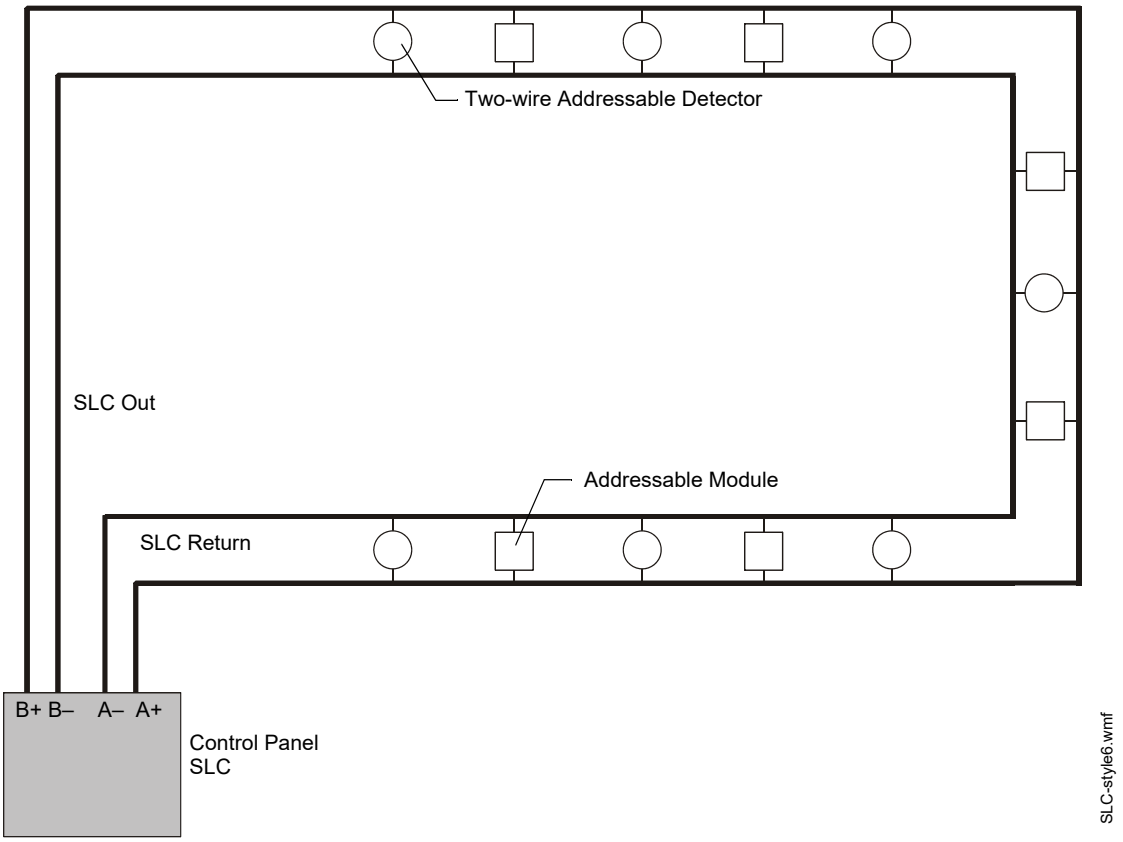


Figure 4.2 Basic NFPA Class A SLC

NOTE: T-tapping of the SLC wiring is NOT allowed for Class A configuration.

Section 5: SLC Circuits with Isolators

5.1 Overview

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

- Fault Isolator Module ISO-X
- Isolator Detector Base B224BI, B224BI-WH, B224BI-IV
- Six fault isolator module ISO-6

To comply with NFPA Class X requirements, one of these devices must be used on both sides of a device: one isolator base and one isolator module, two fault-isolator modules, or two circuits on a six-fault isolator module, for example.

A Fault Isolator Module on both sides of a device, or the combination of an Isolator and Isolator Module are required to comply with NFPA Class X requirements. One isolator of ISO-6 meets the Isolator Module requirements. To comply with NFPA Class X requirements, one of these devices must be used on both sides of a device: two fault isolator modules, one isolator base and one isolator module, for example.

CAUTION: ISOLATOR LIMITS

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 AND/OR ISOLATOR BASES ARE CONNECTED FROM THE AFP-300 OR AFP-400 TO AN SLC LOOP, THE ADDRESS CAPACITY OF THE LOOP IS REDUCED BY TWO (2) ADDRESSES FOR EVERY ISOLATOR DEVICE IN EXCESS OF 100. THE ADDRESS CAPACITY OF THE LOOP IS REDUCED BY TWO (2) ADDRESSES FOR EVERY ISOLATOR DEVICE IN EXCESS OF 200 WHEN THE ISOLATOR MODULES AND/OR ISOLATOR BASES ARE CONNECTED TO THE SLC LOOP FROM THE N16, NFS-320, NFS-320SYS, NFS2-640, NFS2-3030, NFS-3030, NFS-640, AFP-100, OR AFP-200.

5.2 Fault Isolator Modules

The ISO-X module continuously monitors the circuit connected to terminals 3(–) and 4(+). Upon powerup, 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 faulted 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. Figure 5.1 shows a Class B example for wiring of an Isolator Module. ISO-6 has the same functionality; see Figure 5.2.

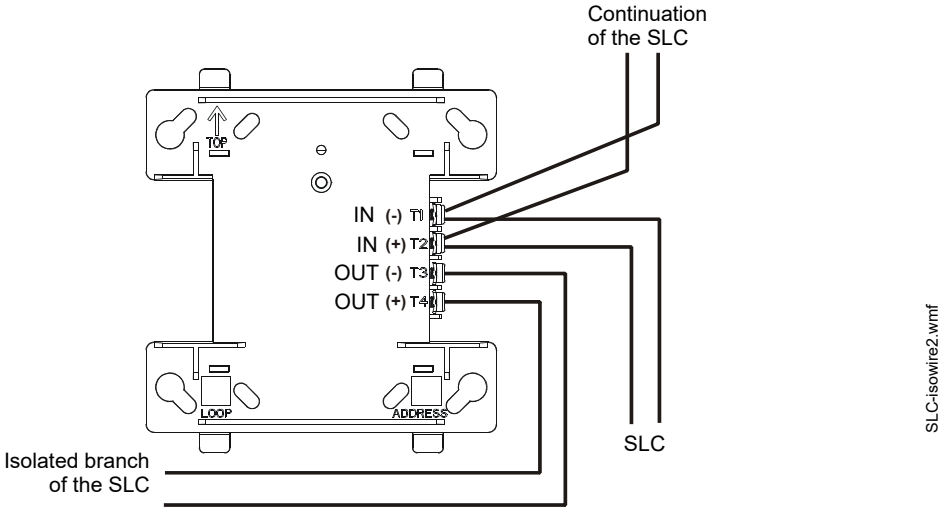


Figure 5.1 Wiring the ISO-X Isolator Module

Each of the ISO-6's six isolator terminals acts as a single ISO-X module. Figure 5.2 shows a Class B example for wiring the ISO-6. Terminal numbers are added for clarification; these do not appear on the physical device.

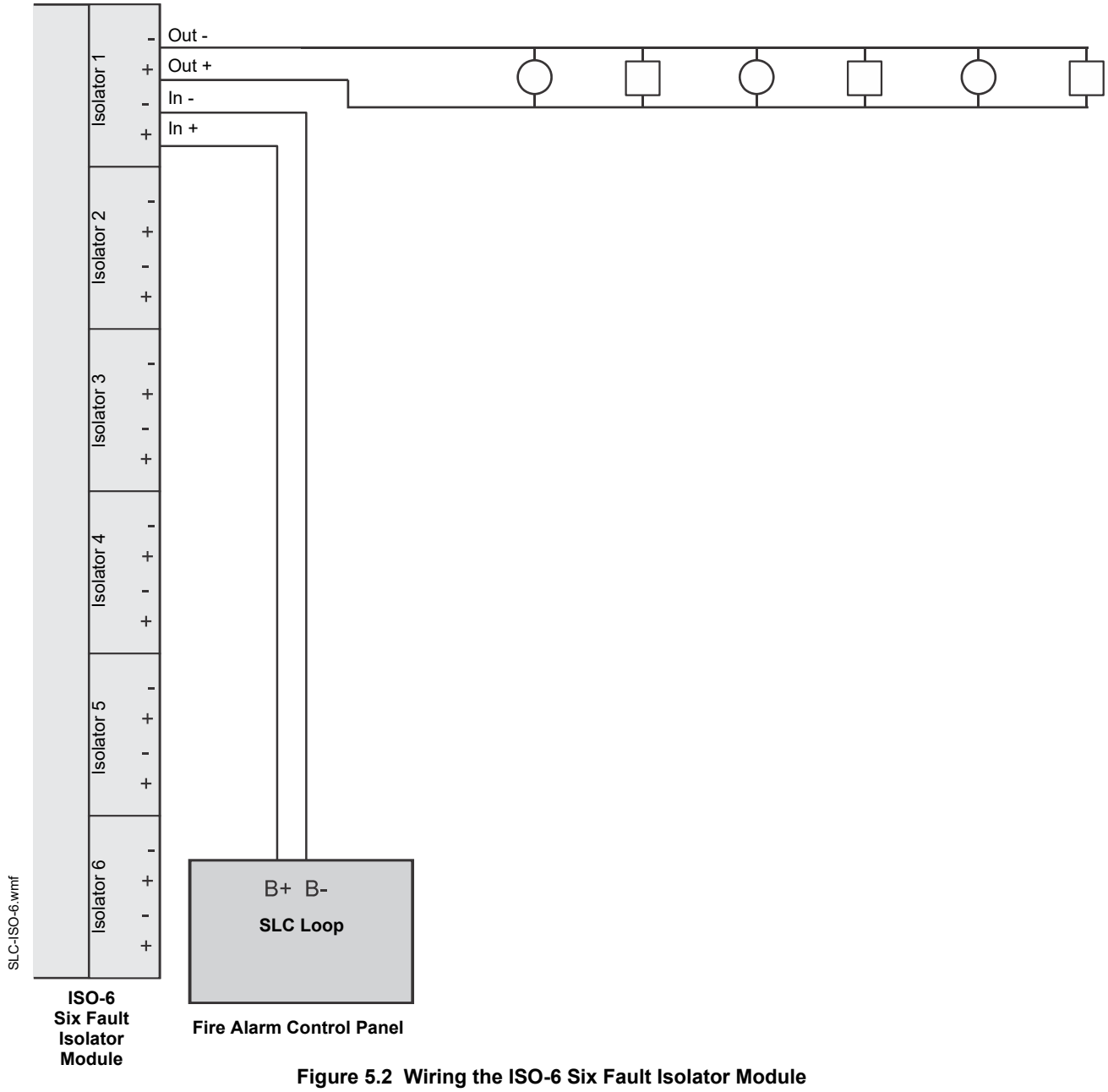


Figure 5.2 Wiring the ISO-6 Six Fault Isolator Module

5.3 Isolator Detector Bases

Isolator detector bases prevent an entire communications loop from being disabled when a short circuit occurs. This is accomplished by isolating that part of the loop containing the short from the remainder of the circuit. These bases also automatically restore the entire loop when the cause of the short circuit is corrected.

B224BI-WH/B224BI-IV is an intelligent isolator base used with FlashScan® detectors and most CLIP mode detectors. (An older version B224BI had fewer color options.)

5.3.1 How an Isolator Base Works

If a short circuit fault occurs at point "X", devices A, B, C & detector 2 will cease to function and display a trouble warning at the control panel. Devices D, E, F & detectors 1, 3, 4, and 5 will remain normal as they are served by 'SLC Return'.

If a short circuit fault occurs at point “Y”, all devices will continue to function. If a short circuit fault occurs at point “Z”, only detector 4 will cease to function.

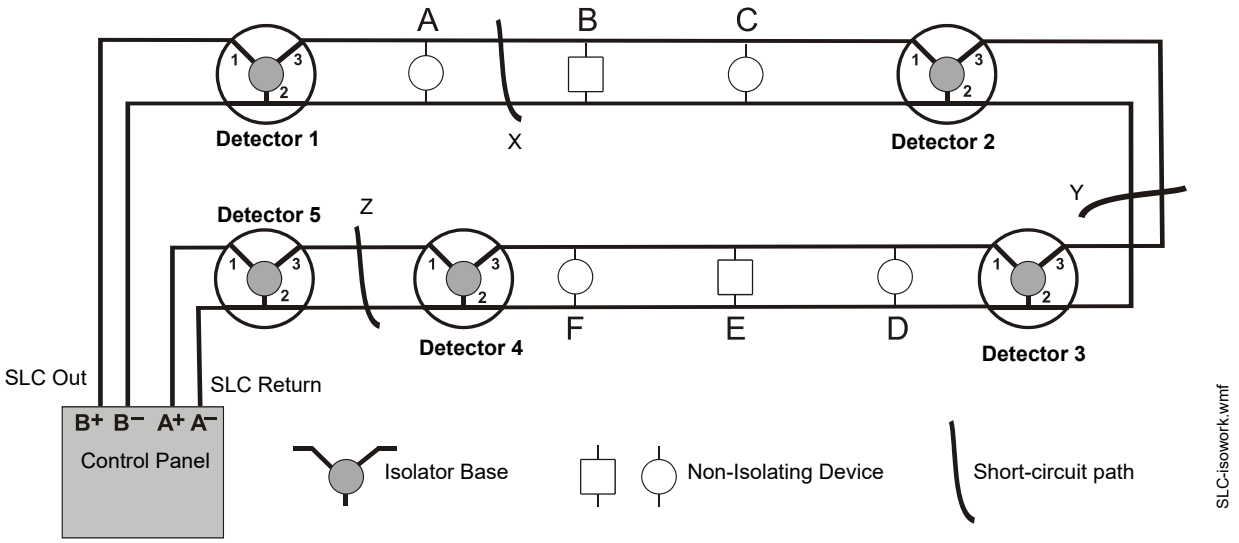


Figure 5.3 Isolator Base Circuit: Sample Class A Wiring

NOTE: For information on wiring an isolator base, refer to Figure 10.3, “Wiring a B224BI-WH/B224BI-IV Isolator Base Mounting Plate” on page 56.

5.4 NFPA Class B SLC Using Isolator Modules

A variation of a Class B operation using isolator modules to protect each branch of the SLC. Refer to Figure 5.1 on page 30 and Figure 5.2 on page 31 for isolator module wiring and to Section 5, “SLC Circuits with Isolators” for limitations.

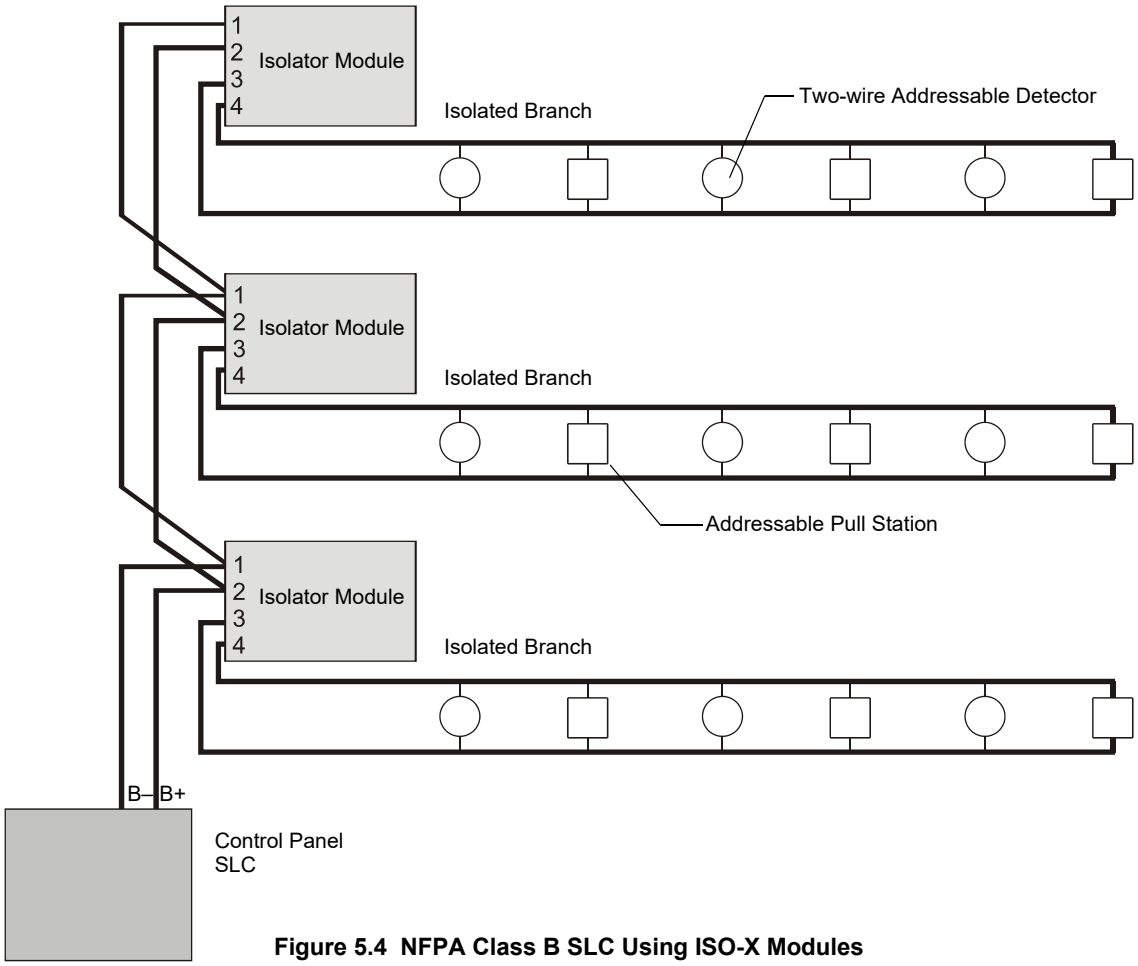


Figure 5.4 NFPA Class B SLC Using ISO-X Modules

Each of the six circuits on ISO-6 functions the same way as ISO-X (discussed earlier). However, ISO-6 cannot accept two wires at one pin. Wire Class B SLC loops as shown in Figure 5.5.

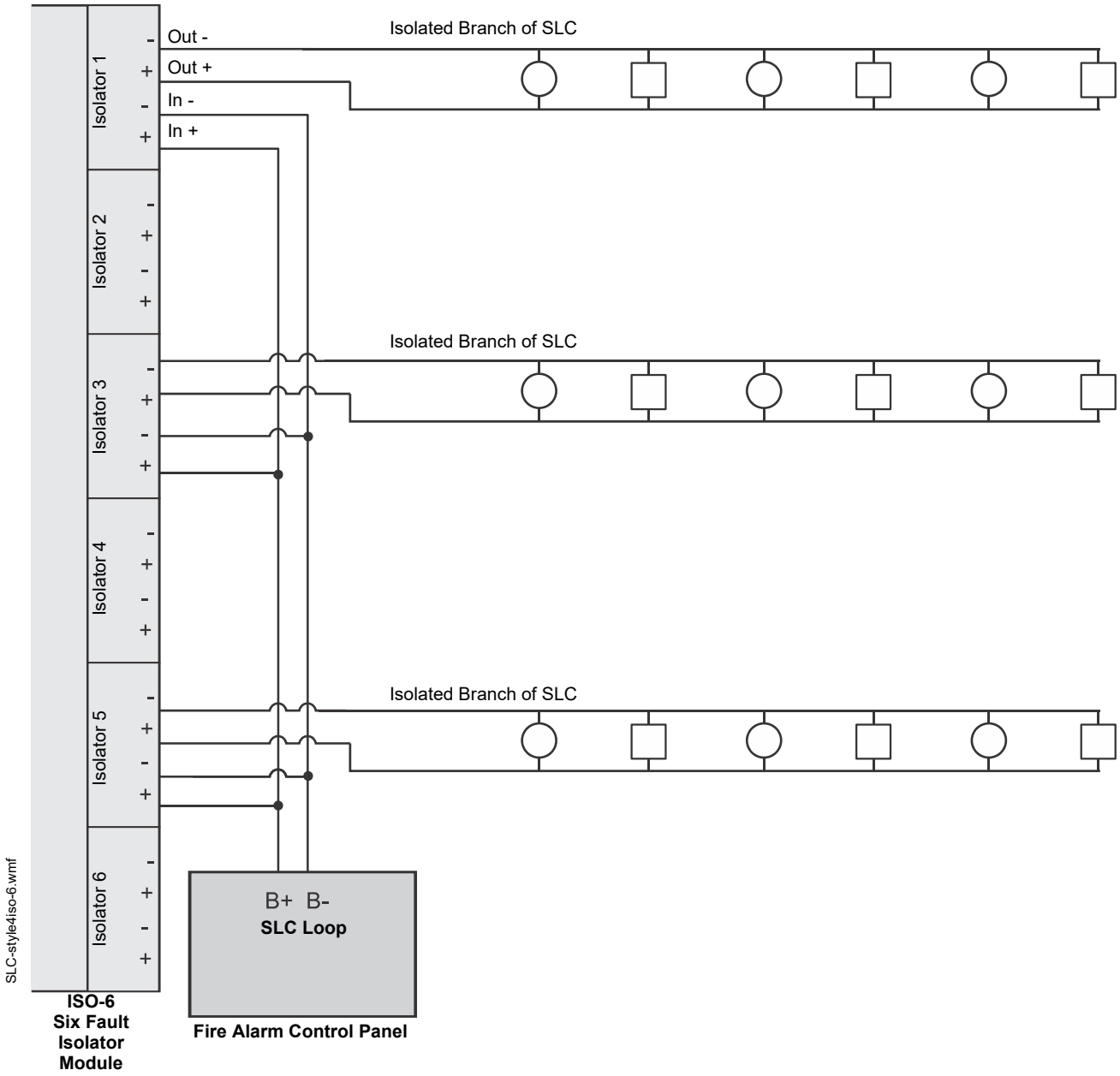


Figure 5.5 NFPA Class B SLC Using the ISO-6 Six Fault Isolator Module

5.5 NFPA Class A SLC Using Isolator Modules

A variation of Class A operation using isolator modules to protect a section of the SLC. By flanking each group of devices with fault isolator modules each group is protected from faults that may occur in the other groups. For example, a fault in Section B will not affect 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 Class A configuration.
- Isolator modules shall be within 20 ft. (6.1 m) of device and the wire must be enclosed in metal conduit.

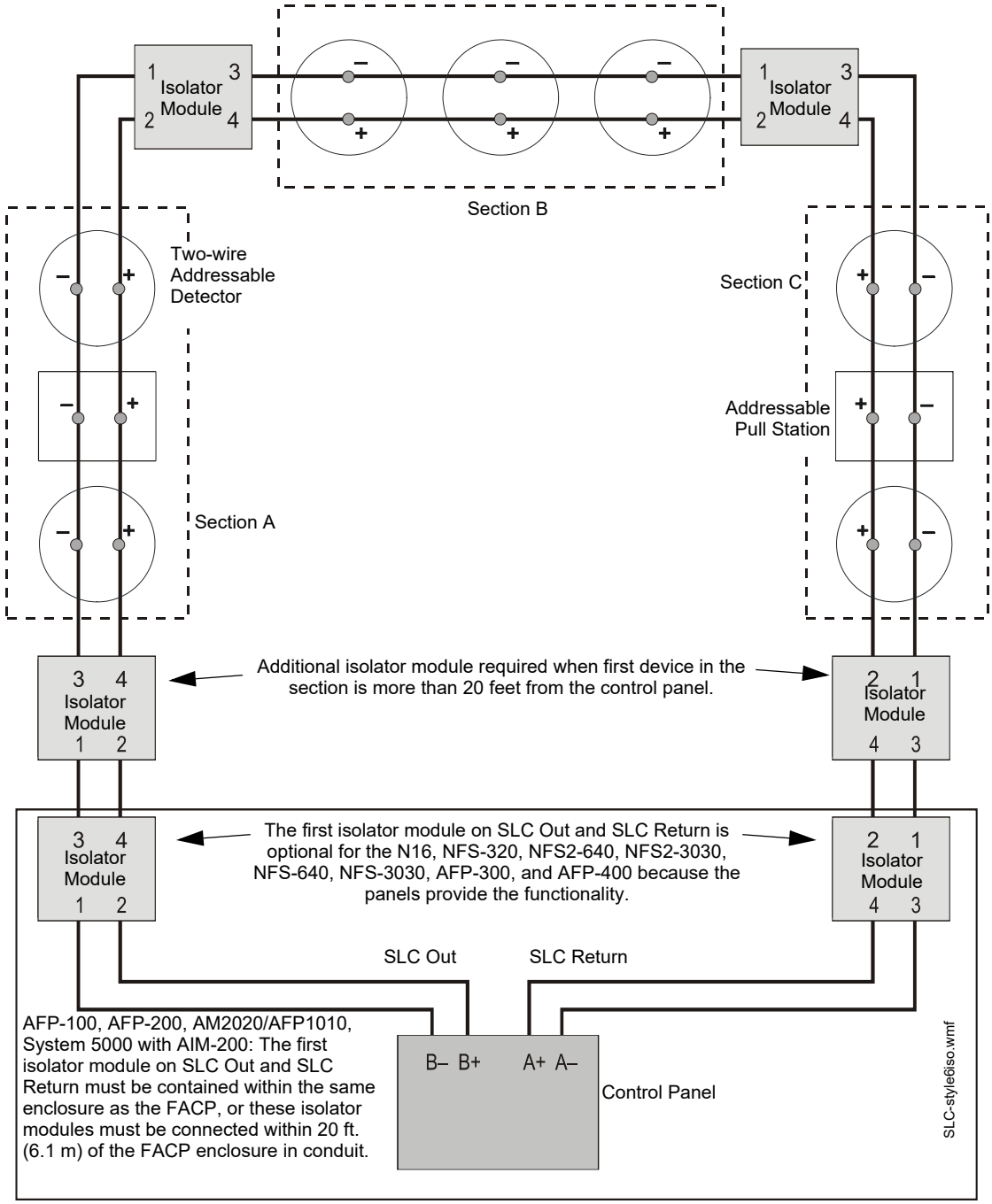


Figure 5.6 NFPA Class A SLC Using Isolator Modules

5.6 NFPA Class X SLC Using an Isolating Device

Class X operation requires using a combination of isolator detector bases and isolator modules or isolator modules before and after a non-isolator device. Flanking each device with an isolator provides fault protection to all other devices on the loop.

- T-tapping is NOT allowed within the Class X wiring configuration.
- When a non-isolator base or pull station is used, install isolator modules on both sides of devices.
- When an isolator base is used in conjunction with an isolator module, install the isolator module as shown in Figure 10.3.
- There must be a close-nipple connection between a device and the isolator bases or modules that protect it.

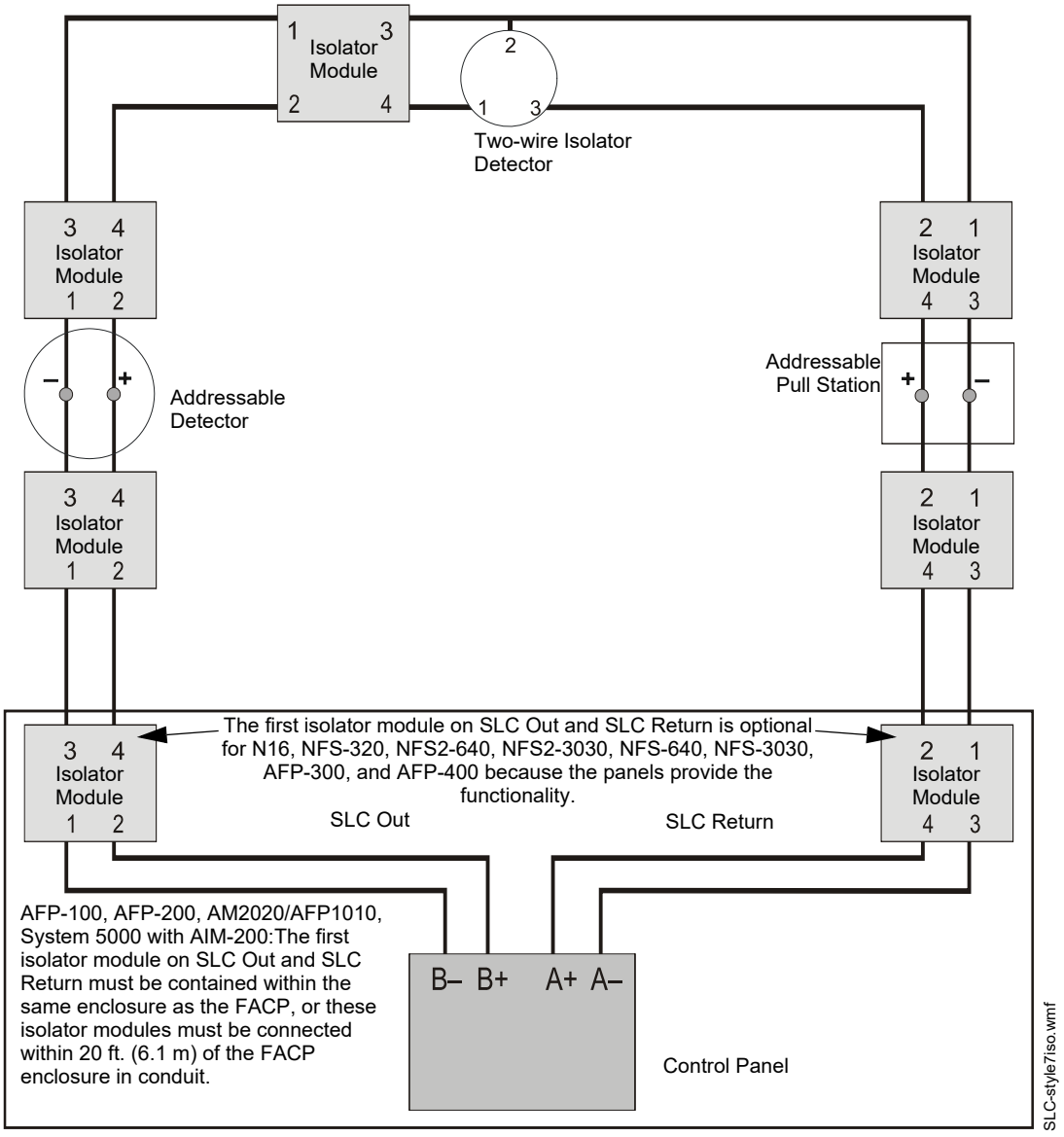


Figure 5.7 NFPA Class X SLC Using Isolator Modules

NOTE: See Figure 10.3, “Wiring a B224BI-WH/B224BI-IV Isolator Base Mounting Plate” on page 56.

Section 6: Monitor Modules

6.1 Description

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

For more information on the individual module specifications refer to the *Installation Instructions* that are provided with this device. For information on transponders, refer to the specific transponder manual.

For Class A power-supervision requirements, refer to Appendix A.2, “Supervising 24 VDC Power”, on page 66.

6.1.1 Addressable Monitor Module

The FMM-1 is an addressable module that monitors either a Class B or Class A IDC of dry-contact input devices. This module is capable of participating in degraded mode where supported by the FACP.

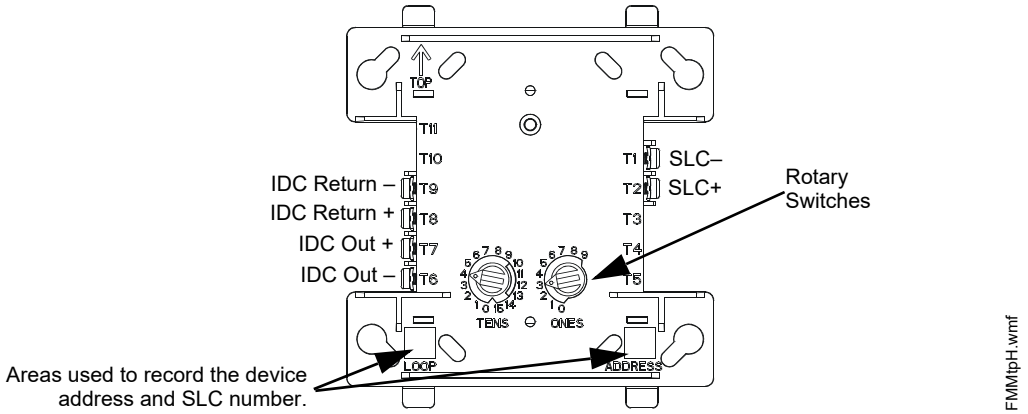


Figure 6.1 FMM-1 Monitor Module

6.1.2 Zone Interface Module

The FZM-1 is similar to the FMM-1, except it is used to monitor compatible two-wire, 24 volt, conventional (non-addressable) smoke detectors on a Class B or Class A IDC.

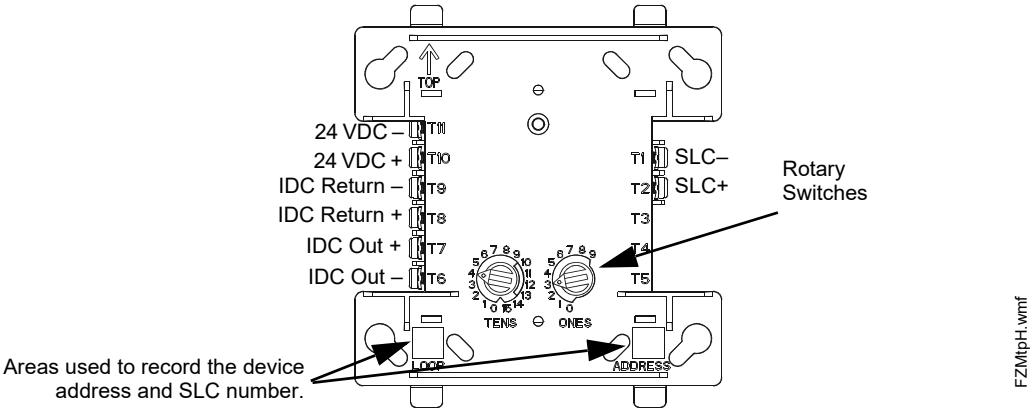


Figure 6.2 FZM-1 Zone Interface Module

6.1.3 Miniature Monitor Module

The FMM-101 is intended to monitor a Class B IDC; it is offered in a smaller package for mounting directly in the electrical box of the device being monitored.

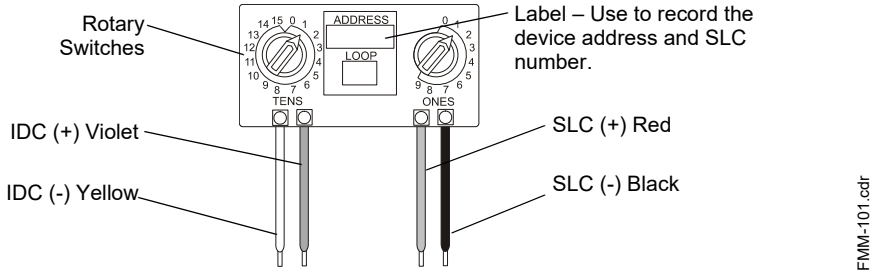


Figure 6.3 FMM-101 Mini Monitor Module

6.1.4 FMM-4-20 4-20mA Monitor Module

The FMM-4-20 is intended for use in intelligent, two-wire systems, allowing Control Panels to interface and monitor two-wire or three-wire sensors with a 4-20mA signal output. (For use with NFS2-3030 only.)

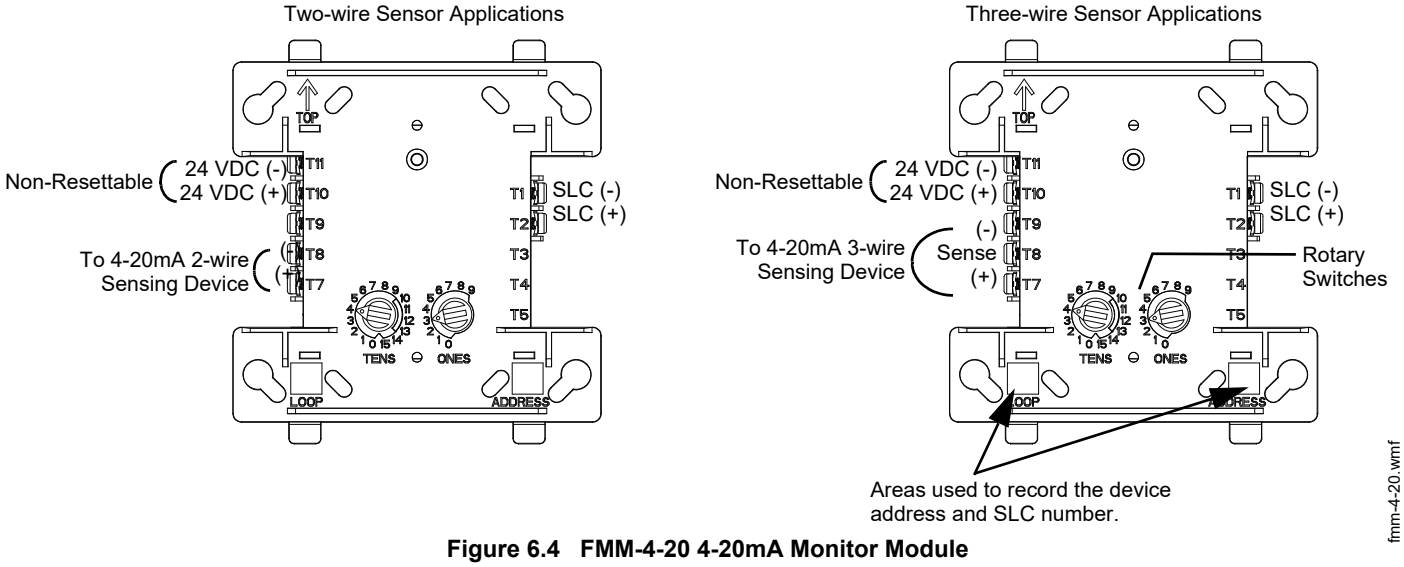


Figure 6.4 FMM-4-20 4-20mA Monitor Module

6.2 Setting an SLC Address for a Module

FlashScan capable control or relay modules, as well as detectors, can be set to one of 159 addresses (01-159) and are factory preset with an address of "00". CLIP mode detectors and panels are limited to addresses 01-99.

To set an SLC address, use a common screwdriver to adjust the rotary switches on the module to the desired address. The unit shown in Figure 6.5 is set at address “35”. When finished, mark the address on the module face in the place provided.

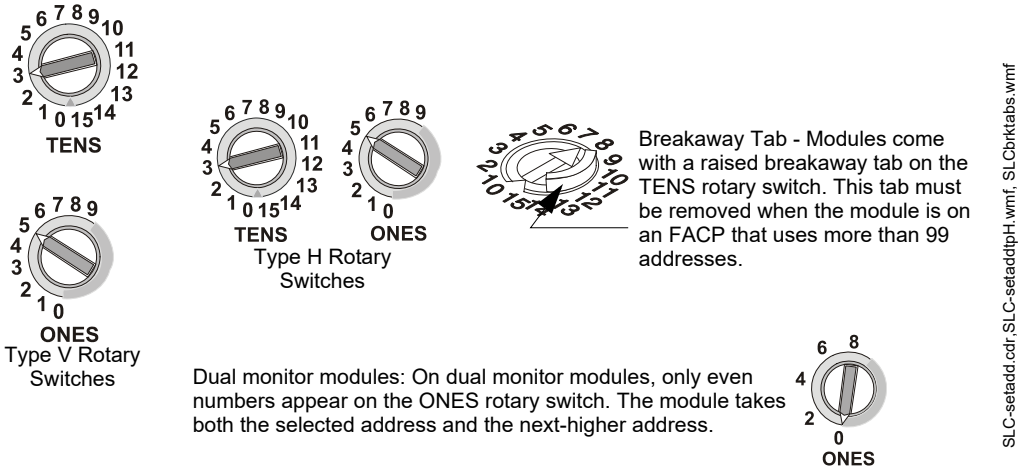


Figure 6.5 Setting the SLC Address on Modules

6.3 NFPA Class B IDC Using Monitor Modules

Connect the SLC wiring to the module terminals 1 (–) and 2 (+). Each FMM-1 module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address.

Figure 6.6 shows typical wiring for a supervised and power-limited NFPA Class B Initiating Device Circuit using the FMM-1 monitor module.

Module installation notes:

1. The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamps @ 24 VDC (nominal).
2. The IDC provides the following services (do not mix):
   - Fire alarm service
   - Automatic and manual waterflow alarm service with normally open contact devices
   - Sprinkler supervisory service with normally open contact devices
   - Security service
3. Refer to the *Device Compatibility Document* for compatible smoke detectors.
4. See Appendix A, “Power Considerations”, on page 66 for information on supervising 24 VDC power.

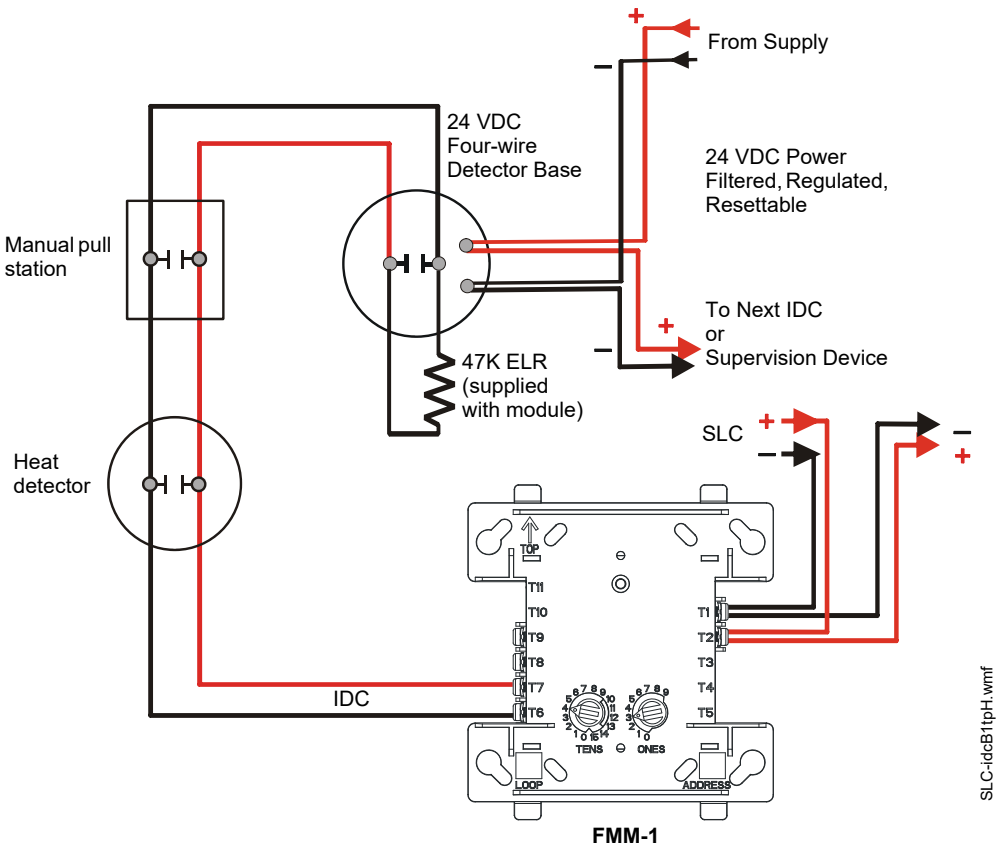


Figure 6.6 Typical Class B IDC Wiring with FMM-1

6.4 NFPA Class A IDC Using Monitor Modules

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

Each FMM-1 module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address.

Figure 6.7 shows typical wiring for a supervised and power-limited NFPA Class A IDC using the FMM-1 module.

Module installation notes:

1. The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamps @ 24 VDC (nominal). See Appendix A, “Power Considerations”, on page 66 for information on monitoring 24 VDC power.
2. The IDC provides the following services (do not mix):
   - Fire alarm service
   - Automatic and manual waterflow alarm service with normally open contact devices
   - Sprinkler supervisory service with normally open contact devices
   - Security service
3. Refer to the *Device Compatibility Document* for compatible smoke detectors.

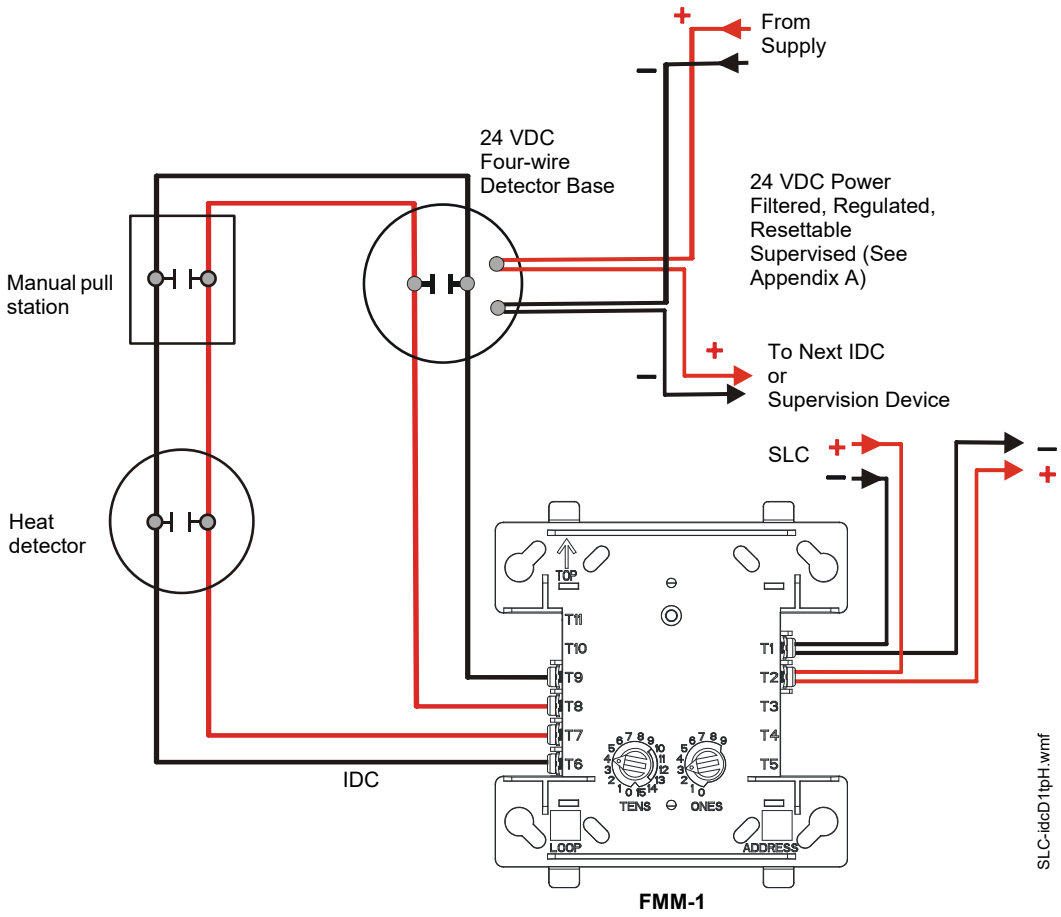


Figure 6.7 Typical Class A IDC Wiring with FMM-1

6.5 NFPA Class B IDC Using Zone Interface Modules

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

Each FZM-1 module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address.

Figure 6.8 shows typical wiring for a supervised and power-limited NFPA Class B IDC using the FZM-1 module.

Module installation notes:

1. The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamps @ 24 VDC (nominal).
2. The IDC provides the following services (do not mix):
   - Fire alarm service
   - Automatic and manual waterflow alarm service with normally open contact devices
   - Sprinkler supervisory service with normally open contact devices
   - Security service
3. Refer to the *Device Compatibility Document* for compatible smoke detectors.

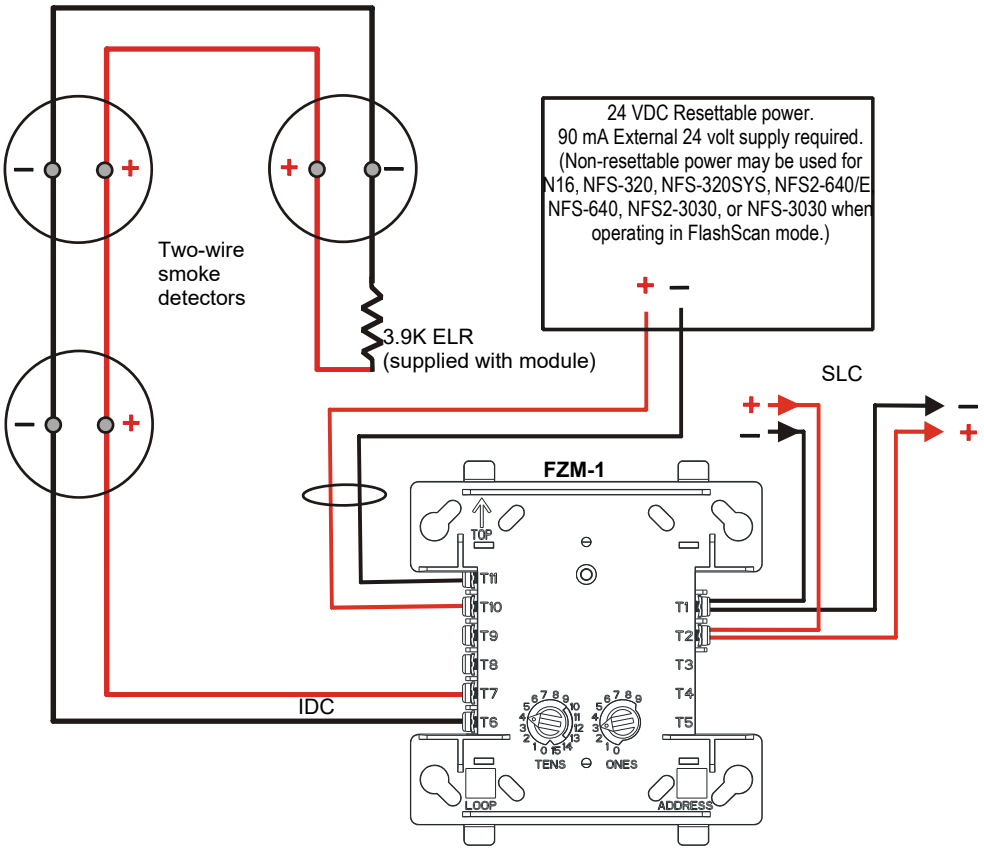


Figure 6.8 Typical Class B IDC Wiring with FZM-1

6.6 NFPA Class A IDC Using Zone Interface Modules

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

Each FZM-1 module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address.

Figure 6.9 shows typical wiring for a supervised and power-limited NFPA Class A IDC using the FZM-1 module.

Module installation notes:

1. The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamps @ 24 VDC (nominal). See Appendix A, “Power Considerations”, on page 66 for information on monitoring 24 VDC power.
2. The IDC provides the following services (do not mix):
   - Fire alarm service
   - Automatic and manual waterflow alarm service with normally open contact devices
   - Sprinkler supervisory service with normally open contact devices
   - Security service
3. Refer to the *Device Compatibility Document* for compatible smoke detectors.

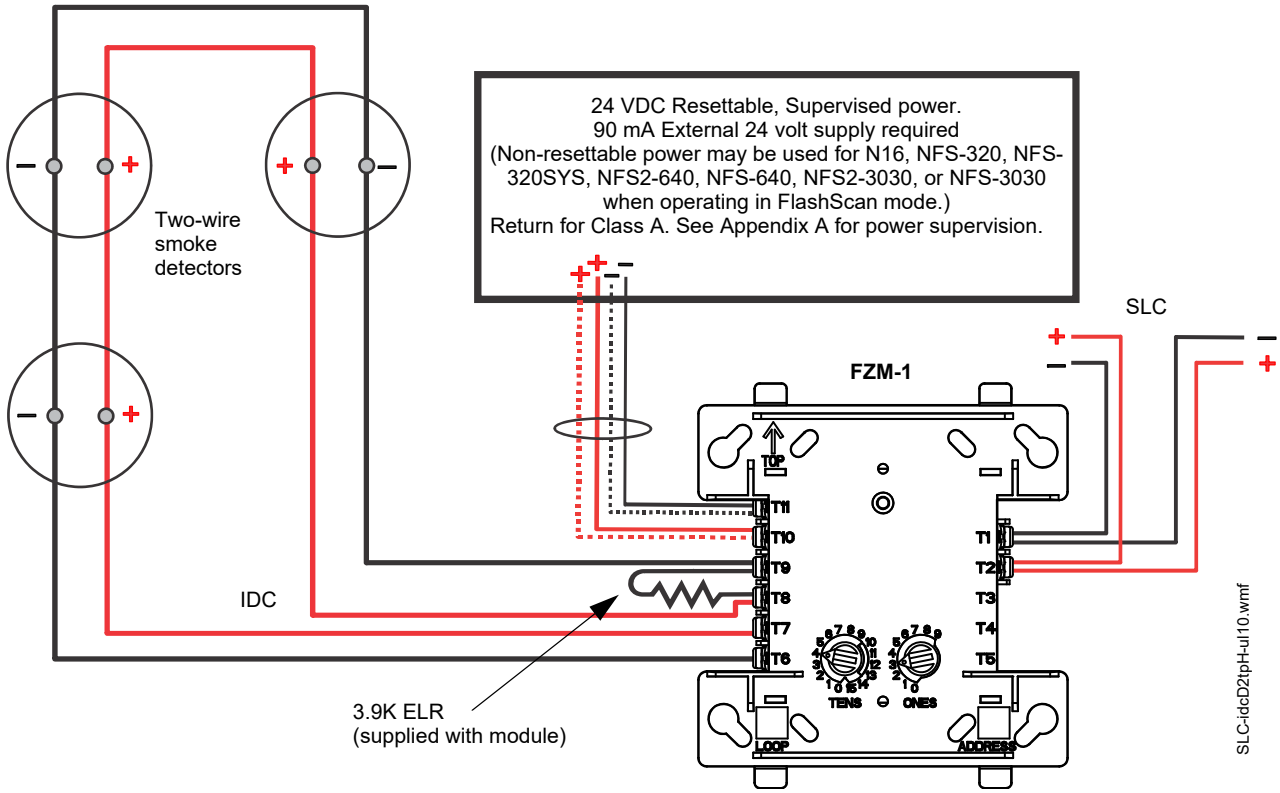


Figure 6.9 Typical Class A IDC Wiring with FZM-1

Section 7: Control Modules

7.1 Description

The FCM-1 module is an addressable module that can be used for monitoring and switching 24 VDC Notification Appliance Circuit (NAC) power for NFPA Class B and NFPA Class A circuits.

The FCM-1-REL is an addressable module used to switch an external power supply to a solenoid. The FCM-1-REL can be configured for NFPA Class B or Class A wiring. When using the FCM-1-REL for Class B applications, remove jumper J1 on the back. Refer to Figure 7.2. (For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS.)

Refer to the *Device Compatibility Document* for a list of compatible UL Listed Fire Alarm Releasing Solenoids. For more information on the module specifications refer to the *Installation Instructions* provided with these devices.

For Class A power-supervision requirements, refer to Appendix A.2, “Supervising 24 VDC Power”, on page 66.

7.1.1 Setting an SLC Address

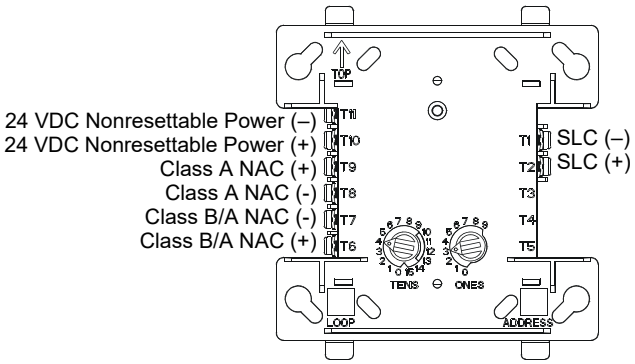
Each module is factory preset with an address of “00.” To set an SLC address refer to “Setting an SLC Address for a Module” on page 38.

7.2 Wiring a NAC with Addressable Control Modules

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

Each FCM-1 module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address.

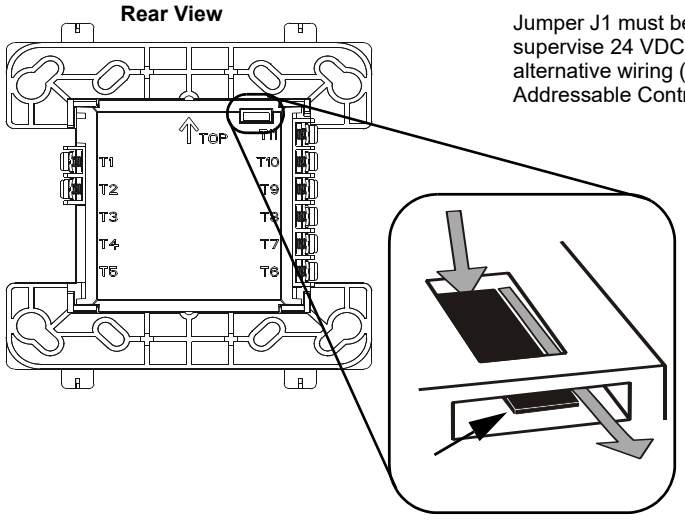
Figure 7.1 shows the connections to wire the FCM-1 module for powering a 24 VDC NAC



FZMFCMtph.wmf

Figure 7.1 FCM-1 Wiring Connections

To remove jumper J1 from the back of the control module, follow the instructions below.



Jumper J1 must be removed when using the FCM-1 to supervise 24 VDC NAC power using the no-relay alternative wiring (see Appendix A.2.3, “Using the Addressable Control Module Without Relay”).

To remove J1 from the FCM-1:

1. Insert a small prying tool, such as a screwdriver or probe, behind J1.
2. Using the tip of the prying tool, slide J1 toward the rear of the FCM-1 module so that it exits from the slot in the back.

J

FCMBackJump.wmf, FCMBackJumpcl.wmf

Figure 7.2 FCM-1 Jumper Location

NOTE: When using NFS2-3030/NFS-3030 and the “Control” type ID, do **not** remove jumper J1.

7.2.1 Wiring a Solenoid with the FCM-1-REL

(For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS.) Figure 7.3 shows the connections to wire the FCM-1-REL to a solenoid. For UL 864 10th edition applications requiring a manual disconnect switch on the releasing device, see Section 7.5, "Connecting a Releasing Device to the Addressable Control Module".

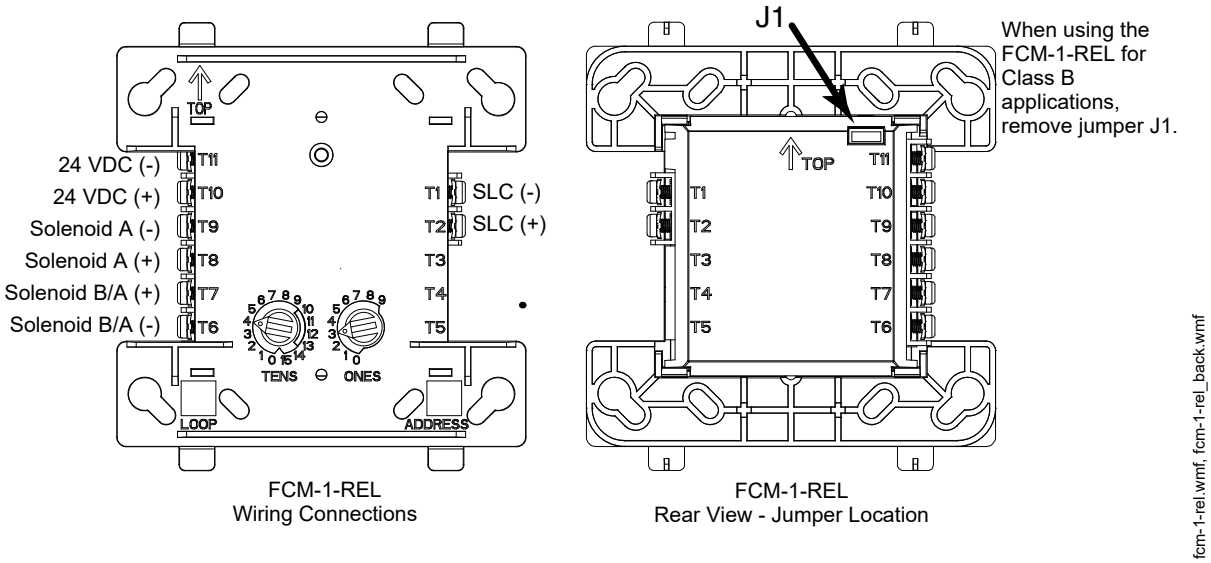


Figure 7.3 FCM-1-REL Wiring Locations and Rear View - Jumper Location

NOTE: *FlashScan mode only:* The FCM-1-REL will not function on an SLC loop that is programmed for CLIP mode.

7.3 Wiring a Class B NAC (Two-Wire) with Addressable Control Modules

Figure 7.4 depicts a supervised and power-limited NFPA Class B Notification Appliance Circuit (NAC) using the FCM-1 module. In the sample wiring drawing below, polarized alarm notification appliances are shown connected to the module in a two-wire configuration.

1. See Appendix A, "Power Considerations", on page 66 for information on monitoring 24 VDC power.
2. Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
3. A power supervision relay is required only on the last module of the power run unless:
   - using the no-relay alternative wire method; see Figure A.2, "Alternate: 2-Address Method of Supervising a 24 VDC Circuit - Class B".
   - using a panel with FlashScan type IDs that provide built-in power supervision. Refer to the panel's installation documentation for a list of type codes.
4. Do not T-tap or branch a Class B circuit.
5. Terminate the circuit across the last device using a UL-listed End-of-Line Resistor 47K, 1/2-watt, SSD P/N A2143-00 (ELR-47K in Canada).
6. Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.

7. Refer to *Device Compatibility Document* for compatible notification appliances and relays.

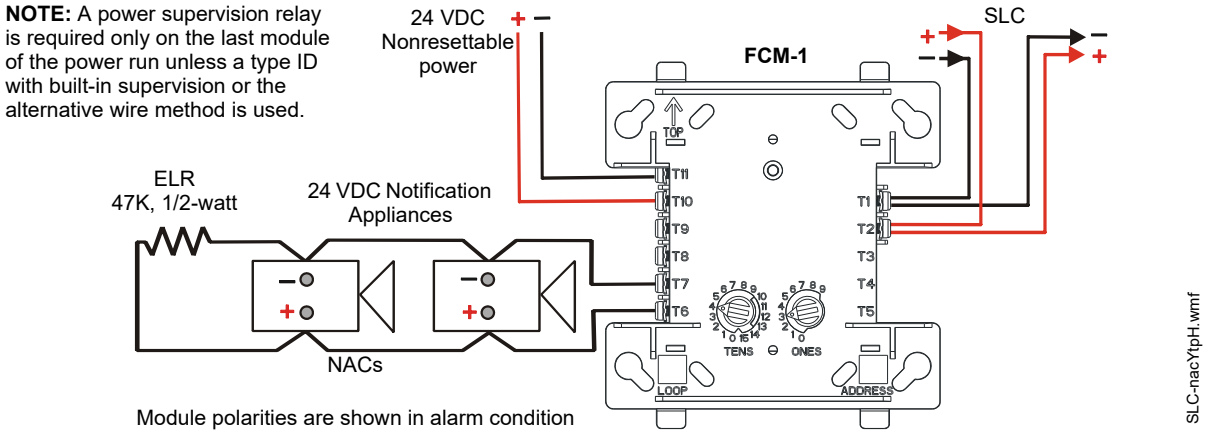


Figure 7.4 NFPA Class B Notification Appliance Circuit with FCM-1

7.4 Wiring a Class A NAC (Four-Wire) with Addressable Control Modules

Figure 7.5 depicts a supervised and power-limited NFPA Class A Notification Appliance Circuit (NAC) using the FCM-1 module. In the sample wiring drawing below, polarized alarm notification appliances are shown connected to the module in a four-wire configuration.

1. See Appendix A, “Power Considerations”, on page 66 for information on supervising 24 VDC power.
2. Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
3. A power supervision relay is required only on the last module of the power run unless:
   - using the no-relay alternative wire method; see Figure A.2, “Alternate: 2-Address Method of Supervising a 24 VDC Circuit - Class B”.
   - using a panel with FlashScan type IDs that provide built-in power supervision. Refer to the panel installation documentation for a list of type codes.
4. Do not T-Tap or branch a Class A circuit.
5. Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.
6. Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

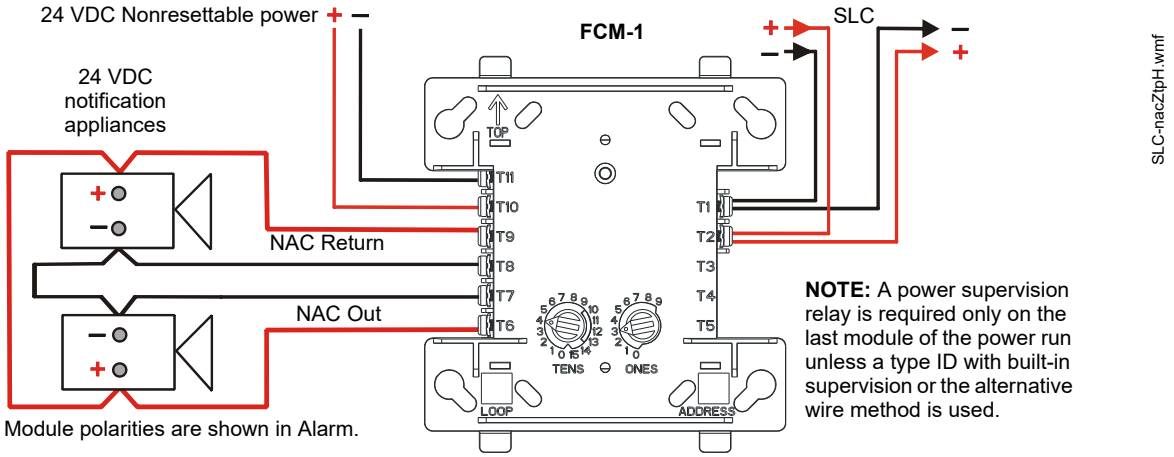


Figure 7.5 NFPA Class A Notification Appliance Circuit with FCM-1

7.5 Connecting a Releasing Device to the Addressable Control Module

For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS

The FCM-1-REL module can control 1 A of current. Make sure to keep total system current within the limits of the power supply. Power for the module must come from the FACP's main power supply or any UL 864-listed 24 VDC regulated, power-limited power supply for Fire Protective Signaling. For more information, refer to the Device Compatibility Document. See critical notes below wiring diagrams.

Critical Requirements. When connecting a releasing device to the FCM-1-REL module, note the following:

1. See Appendix A, "Power Considerations", on page 66 for information on monitoring 24 VDC power.
2. Do not T-tap or branch a Class B or Class A circuit.
3. Only one (1) 24V solenoid or two (2) 12V solenoids in series can be connected to the FCM-1-REL.
4. Do not loop wiring under the screw terminals. Break the wire run to provide supervision of connections.
5. All applications using the FCM-1-REL are power-limited:
   - Program the releasing circuit for Type Code REL CKT ULC or RELEASE CKT.
   - Circuits are supervised against opens and shorts.
6. Refer to your FACP's listing documents for instructions on setting the Soak Timer. (* For legacy panels, refer to FACP programming manual.)
7. The FCM-1-REL module must be programmed with the correct releasing type code listed in your FACP's listing documents. (* For legacy panels, refer to FACP programming manual.)
8. Manual releasing disconnect switch and monitor module required for UL 864 10th Edition.

Figure 7.6 shows Class B wiring of the FCM-1-REL with a manual releasing disconnect switch. (For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS.) See Installation Document LS10231-000GE-E for MRD-1 wiring.

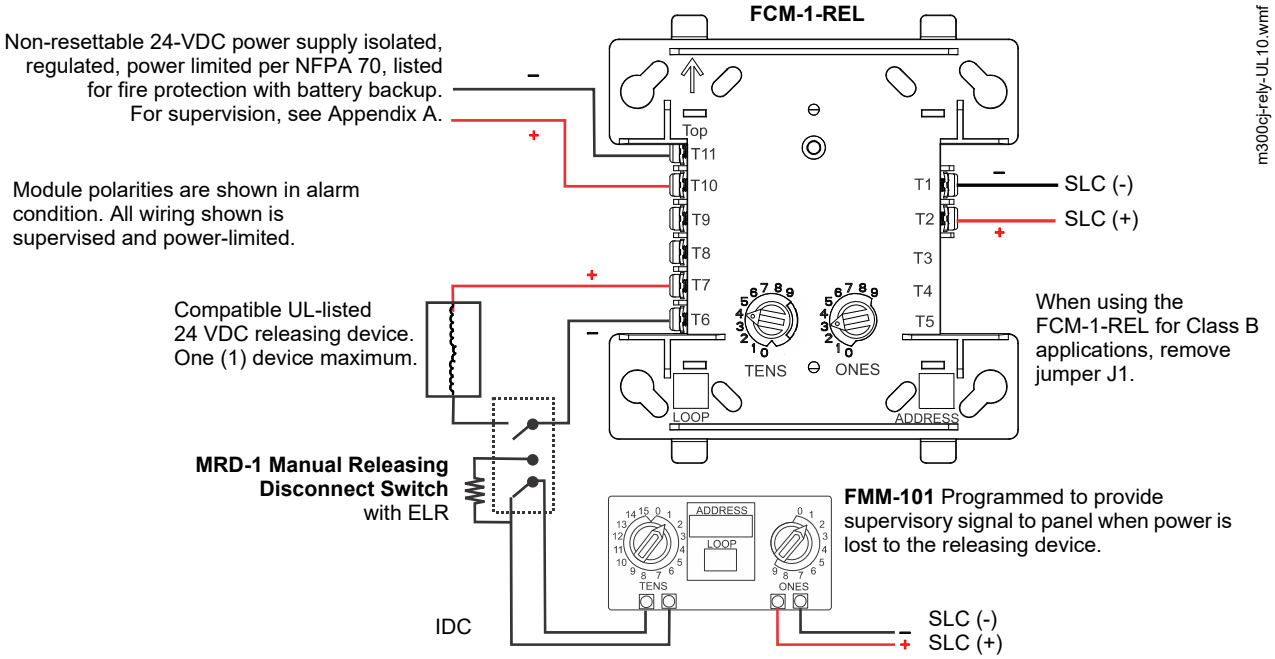


Figure 7.6 NFPA Class B Wiring of the FCM-1-REL with MRD-1 Manual Releasing Disconnect Switch and FMM-101

Figure 7.7 shows Class A wiring of the FCM-1-REL with a double-pull/single-throw manual releasing disconnect switch. (For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS.) See Installation Document LS10231-000GE-E for MRD-1 wiring.

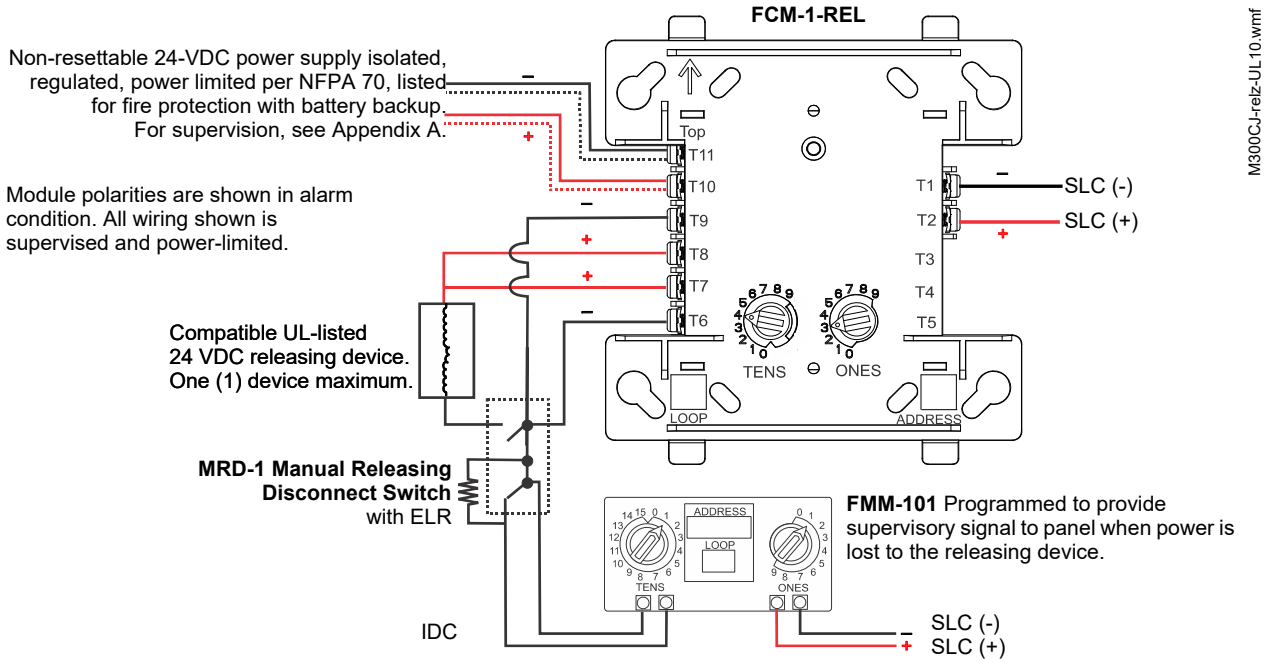


Figure 7.7 NFPA Class A Wiring of the FCM-1-REL with MRD-1 Manual Releasing Disconnect Switch and FMM-101

Section 8: Relay Module

8.1 Description

The FRM-1 is an addressable module that provides two isolated sets of Form-C relay contacts.

Ratings for the dry relay contacts on a Form-C module are:

- Resistive – 2 amps @ 30 VDC (e.g. Electronic devices and strobes.)
- Inductive – 1 amp @ 30 VDC (0.6pF) (e.g. Mechanical bells and horns.)
- Pilot Duty – 0.5 amp @ 125 VAC (0.35pF) (e.g. Using a smaller relay to trip another relay.)

For more information on the module specifications refer to the installation instructions provided with this device. For information on transponders, refer to the specific transponder manual.

8.1.1 Setting an SLC Address

Each relay module is factory preset with an address of "00." To set an SLC address refer to Section 6.2, "Setting an SLC Address for a Module", on page 38.

8.2 Wiring the Addressable Relay Module (Form-C Relay)

The figure below shows the FRM-1 module wired to the Control Panel.

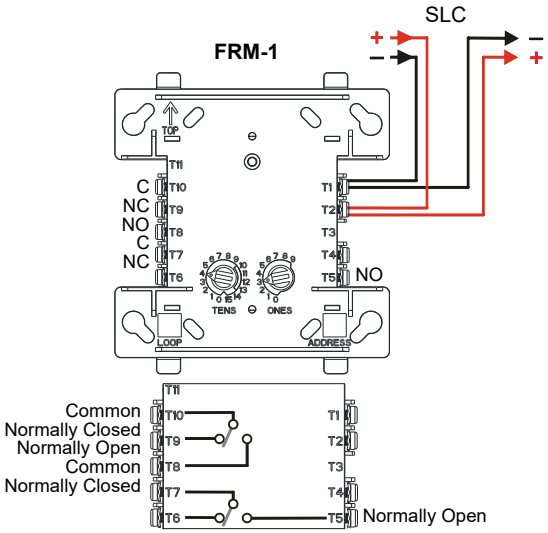


Figure 8.1 FRM-1 Relay Module Wiring Connections

Section 9: Multiple Input/Output Modules

9.1 Description

9.1.1 FDM-1

The FDM-1 is similar to the FMM-1, except intended for use in intelligent two-wire systems providing two independent Class B IDCs at two separate, consecutive addresses. Addresses can start using either an even or odd number.

9.1.2 FDRM-1

The FDRM-1 is an addressable module that functions as two individual relay control modules (two isolated sets of Form-C relay contacts) and two Class B monitor modules.

Ratings for the dry relay contacts on a Form-C module are:

Load Description	Application	Maximum Voltage	Current Rating
Inductive (PF = 0.35)	Non-Coded	25 VAC	2.0 A
Resistive	Non-Coded	30 VDC	3.0 A
Resistive	Coded	30 VDC	2.0 A
Inductive (L/R = 20ms)	Non-Coded	30 VDC	0.46 A
Inductive (PF = 0.35)	Non-Coded	70.7 VAC	0.7 A
Resistive	Non-Coded	125 VDC	0.9 A
Inductive (PF = 0.75)	Non-Coded	125 VAC	0.5 A
Inductive (PF = 0.35)	Non-Coded	125 VAC	0.3 A

Table 9.1

For more information on the module specifications refer to the installation instructions provided with this device.

9.2 Setting the SLC Address

Each multiple input/output module is factory preset with an address of "00". To set an SLC address, use a screwdriver to adjust the rotary switches on the module to the desired address.

9.2.1 FDM-1

Each FDM-1 module can use up to two (2) addresses. The base address selected via the rotary address switches will be assigned to the first monitored input. The next consecutive address will be assigned to the second monitored input.

9.2.2 FDRM-1

Each FDRM-1 module can use up to four (4) addresses. The base address selected via the rotary address switches will be assigned to relay output #1 from 00 to 156. The module will automatically assign the next three addresses as appropriate to monitored input #1, relay output #2, and monitored input #2.

9.3 Wiring the Dual Monitor Module

The figure below shows the FDM-1 wired to the control panel.

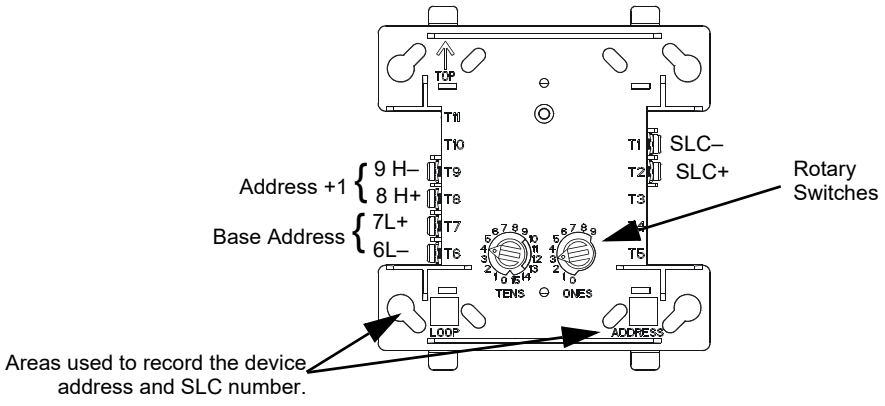


Figure 9.1 FDM-1 Dual Monitor Module

9.4 Wiring the Addressable Dual Monitor/Dual Relay Module

The figure below shows the FDRM-1 module wired to the control panel.

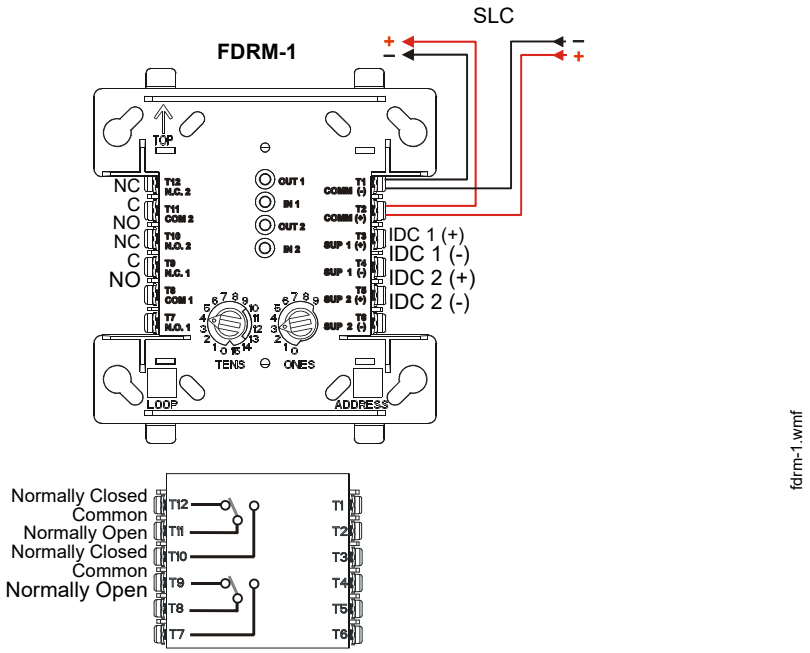


Figure 9.2 FDRM-1 Multiple Input/Output Module Wiring Connections

9.5 NFPA Class B IDC Wiring Using Dual Monitor Modules

Connect the FlashScan or CLIP SLC wiring to the FDM-1 module terminals 1 (–) and 2 (+).

Use the rotary switches on the module to set it to the required SLC address. Each dual module takes two addresses on the SLC. Circuit 'L' corresponds to the address set on rotary switches. Circuit 'H' will automatically respond at the next higher address. The Circuit L "base address" is always an even number; the lowest possible address is 02. The Circuit H "base + 1" address is always odd. Use caution to avoid duplicate addressing of modules on the system.

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

Figure 9.3 shows typical wiring for a supervised and power-limited NFPA Class B Initiating Device Circuit using the FDM-1 dual monitor.

Module installation notes:

1. The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamps @ 24 VDC (nominal).
2. The IDC provides the following services (do not mix):
   - Fire alarm service
   - Automatic and manual waterflow alarm service with normally open contact devices
   - Sprinkler supervisory service with normally open contact devices
   - Security service

Refer to the *Device Compatibility Document* for compatible smoke detectors.

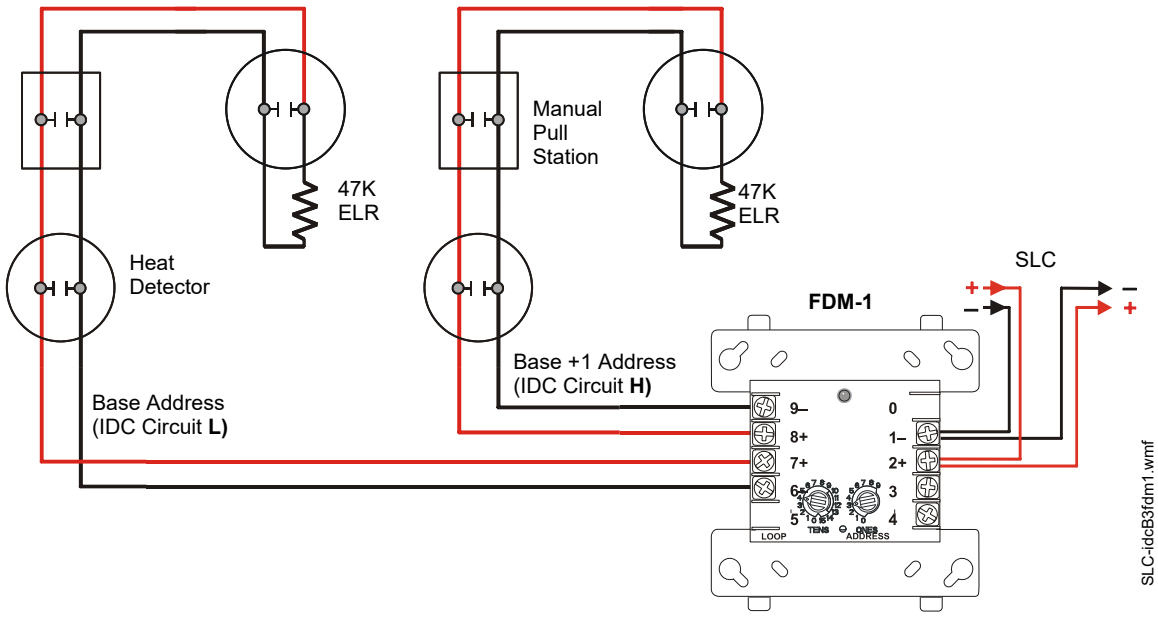


Figure 9.3 Typical Class B IDC Wiring with FDM-1

Section 10: Intelligent Detectors, Intelligent Detector Bases, and Wireless Gateway

10.1 Description

For Class A power-supervision requirements, refer to Appendix A.2, “Supervising 24 VDC Power”, on page 66.

10.1.1 Intelligent Detector Bases

- B501 Series: 4-inch flangeless plug-in detector base. (FlashScan/CLIP; Figure 10.1) For white order B501-WHITE. For ivory, order B501-IV. For black, order B501-BL.
- B300-6: 6-inch plug-in detector base. White. For ivory, order B300-6-IV. Replacement model for B210LP. (FlashScan/CLIP; Figure 10.1)
- B210LP: 6-inch flanged plug-in detector base. (FlashScan/CLIP; Figure 10.1)
- B710HD Detector Base - used with all HARSH™ detectors. See Sections 10.2 – 10.5. *(Discontinued)*
- B224BI-WH, B224BI-IV Isolator base (Figure 10.3). (-WH is white; -IV is ivory). (Replaces B224BI, legacy ivory)
- B224RB-WH, B224RB-IV (FlashScan/CLIP, plug-in relay detector base; Figure 10.4). (-WH is white; -IV is ivory).
- B200S-WH, B200S-IV: Intelligent sounder base (See Figure 10.5). (-WH is white; -IV is ivory).
- B200S-LF-WH, B200S-LF-IV: Intelligent low-frequency sounder base (See Figure 10.5). (-WH is white; -IV is ivory).
- B200SR-WH, B200SR-IV: Intelligent programmable sounder base (See Figure 10.6). (-WH is white; -IV is ivory).
- B200SR-LF-WH, B200SR-LF-IV: Intelligent programmable low-frequency sounder base (See Figure 10.6). (-WH is white; -IV is ivory).
- B501BH Standard sounder base. *(Discontinued)*
- B501BH-2 UL 864 9th edition compliant standard sounder base. *(Discontinued)*
- B501BHT-2 UL 864 9th edition compliant temporal sounder base, replaces B501BHT. *(Discontinued)*

For more information refer to the *Installation Instructions* documents provided with these devices.

NOTE: White/Ivory/Black bases are color variations only and use the wiring diagrams provided in the SLC Wiring Manual.

10.1.2 Intelligent Aspiration Detectors

VESDA-E series aspiration smoke detectors provide fire protection for NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 in FlashScan mode. Address using VSC software.

VESDA-E, UL 268 6th edition/ULC:

- **VEP-A00-P-NTF** Addressable VESDA-E VEP with LEDs, UL 268 6th edition/ULC
- **VEP-A10-P-NTF** Addressable VESDA-E VEP with 3.5" Display, UL 268 6th edition/ULC
- **VEP-A00-1P-NTF** Addressable VESDA-E VEP 1 Pipe with LEDs, UL 268 6th edition/ULC
- **VEU-A00-NTF** Addressable VESDA-E VEU with LEDs, UL 268 6th edition/ULC
- **VEU-A10-NTF** Addressable VESDA-E VEU with 3.5" Display, UL 268 6th edition/ULC
- **VEA-040-A00-NTF** Addressable VESDA-E VEA-40 point with LEDs, UL 268 6th edition/ULC
- **VEA-040-A10-NTF** Addressable VESDA-E VEA-40 point with 3.5" Display, UL 268 6th edition/ULC

VESDA-E, UL 268 7th edition:

- **VEP-A00-P-NTF-UL** Addressable VESDA-E VEP with LEDs, UL 268 7th edition
- **VEP-A10-P-NTF-UL** Addressable VESDA-E VEP with 3.5" Display, UL 268 7th edition
- **VEP-A00-1P-NTF-UL** Addressable VESDA-E VEP 1 Pipe with LEDs, UL 268 7th edition
- **VEU-A00-NTF-UL** Addressable VESDA-E VEU with LEDs, UL 268 7th edition
- **VEU-A10-NTF-UL** Addressable VESDA-E VEU with 3.5" Display, UL 268 7th edition
- **VEA-040-A00-NTF-UL** Addressable VESDA-E VEA-40 point with LEDs, UL 268 7th edition
- **VEA-040-A10-NTF-UL** Addressable VESDA-E VEA-40 point with 3.5" Display, UL 268 7th edition
- **VES-A00-P-NTF-UL** Addressable VESDA-E VES scanning detector with LEDs, FlashScan, UL 268 7th edition
- **VES-A10-P-NTF-UL** Addressable VESDA-E VES scanning detector with 3.5" Display, FlashScan, UL 268 7th edition

The FSA-5000 Intelligent FAAST XS, FSA-8000 Intelligent FAAST XM, FSA-20000 Intelligent FAAST XT, and FSA-20000P Intelligent FAAST XT PRO aspiration smoke detectors may be used to provide early warning fire protection using aspiration sensing technology.

- FSA-5000 covers 5,000 square feet through one pipe.
- FSA-8000 covers 8000 square feet through one pipe.
- FSA-20000 covers 28,800 square feet through one to four pipes
- FSA-20000P covers 28,800 square feet through one to four addressable pipes

These detectors are listed with UL for use with the NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030. They support FlashScan mode only (an early version of FSA-8000 supported CLIP only). See Section 10.6.

10.1.3 Wireless Gateway

The FWSG(A) Wireless Gateway acts as a bridge between a group of wireless fire devices, and a FlashScan SLC loop on N16, NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030 (version 22 and above). The gateway can be powered by the SLC loop or by an external 24 VDC, UL-listed power supply. See Section 10.7.

NOTE: When a wireless relay is in use, modules device count must be limited to 109 modules per loop. This includes wired and wireless modules that are on the same loop. The module address range must be within 1-109.

For details about the wireless network itself, see the *SWIFT® Wireless Gateway Manual.*

10.2 Wiring a Detector Base

Figure 10.1 shows typical wiring of a standard detector base (B501 is shown) connected to an SLC. An optional RA100Z Remote LED Annunciator is shown connected to the base.

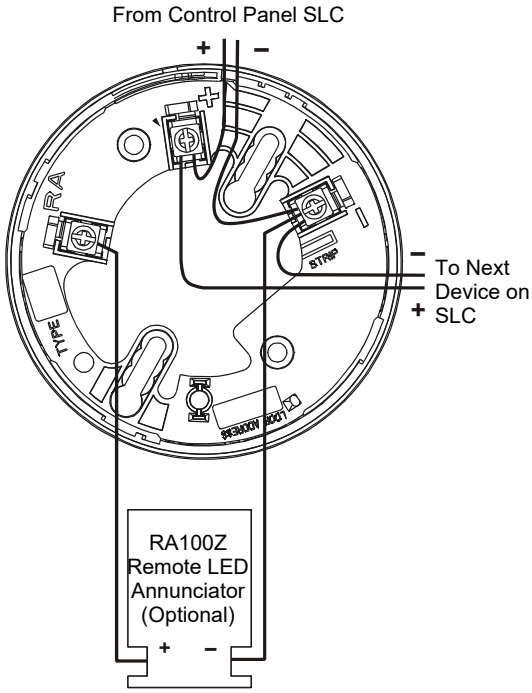


Figure 10.1 Wiring Detector Base B300-6/-IV, B210LP, or B501

NOTE: The base wiring is identical for the flanged B300-6, B210LP, flangeless B501, and color variations.

Figure 10.2 shows typical wiring of the B710HD detector base (for use with a HARSH™ detector) connected to an SLC. An optional RA100Z Remote LED Annunciator is shown connected to the base.

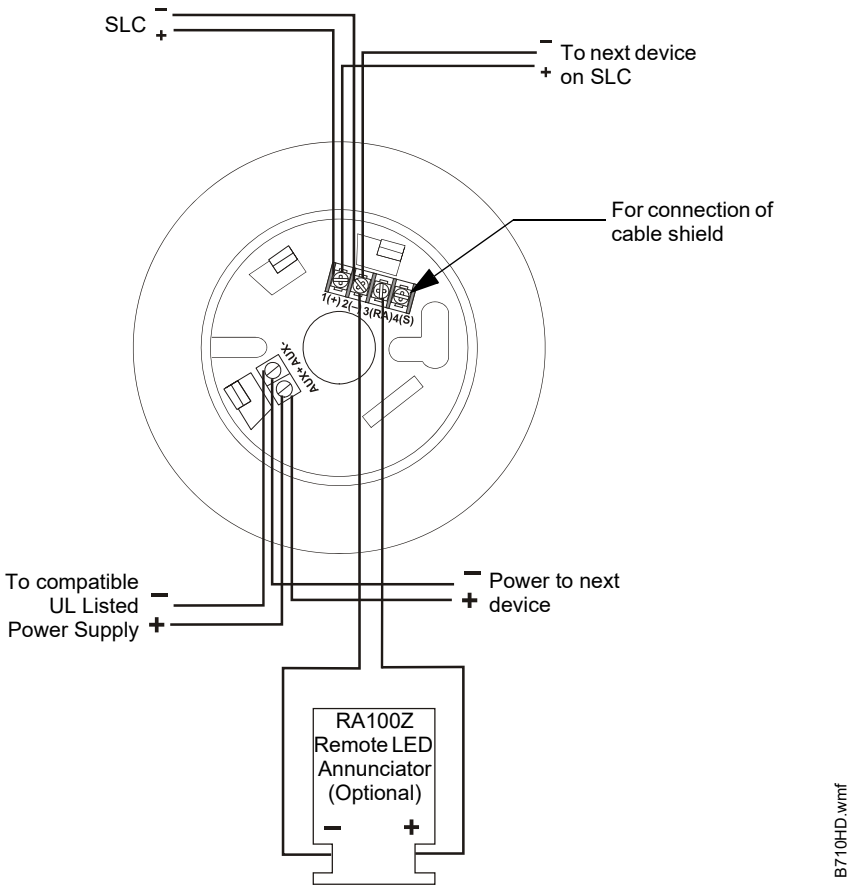


Figure 10.2 Wiring of the B710HD Detector Base

NOTE: Use a spade lug to wire the Remote LED Annunciator (–) to Terminal 2 (–).

10.3 Wiring an Isolator Base

The Isolator base will isolate its detector from short circuits that occur on the SLC connected at terminals 3 and 2. It will not isolate its installed detector from short circuits that occur on the SLC connected at terminals 1 and 2. In Class X 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.

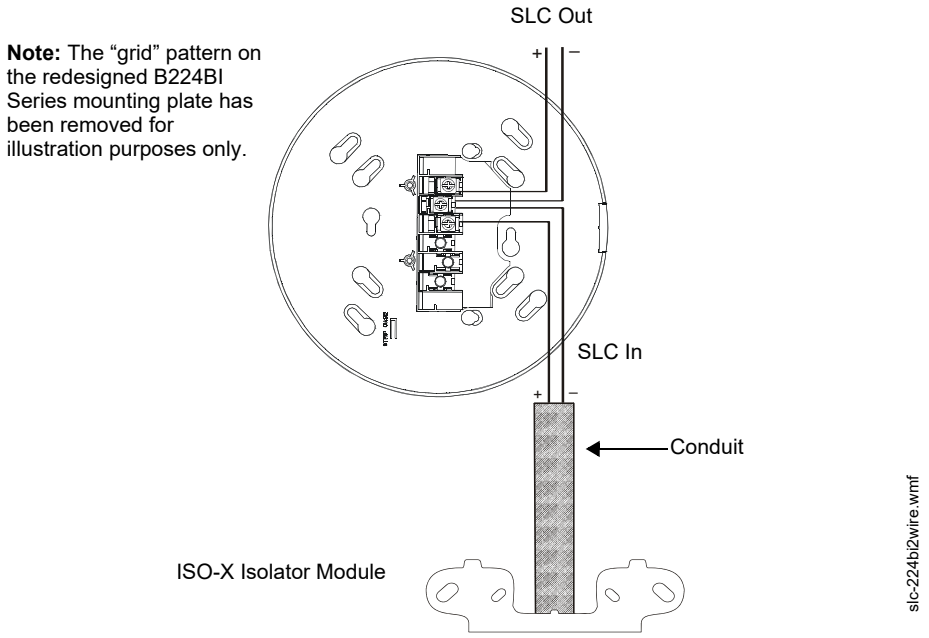


Figure 10.3 Wiring a B224BI-WH/B224BI-IV Isolator Base Mounting Plate

NOTE: The base wiring is identical for color variations.

10.4 Wiring a Relay Base

Figure 10.4 shows typical wiring of the B224RB plug-in relay detector base connected to an SLC.

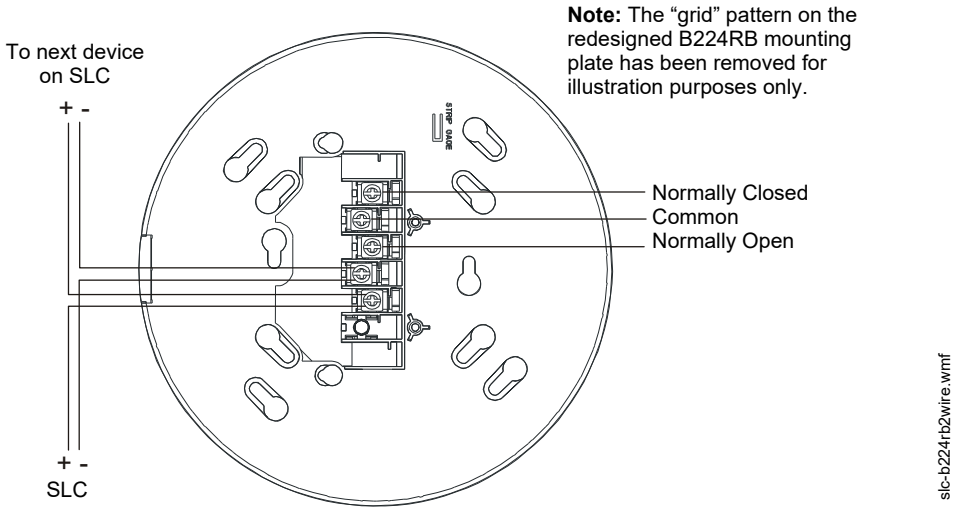


Figure 10.4 Wiring of a B224RB Relay Base Mounting Plate

NOTE: The base wiring is identical for color variations.

10.5 Wiring a Sounder Base

Figure 10.5 shows typical wiring of the B200S and B200S-LF Sounder Bases.

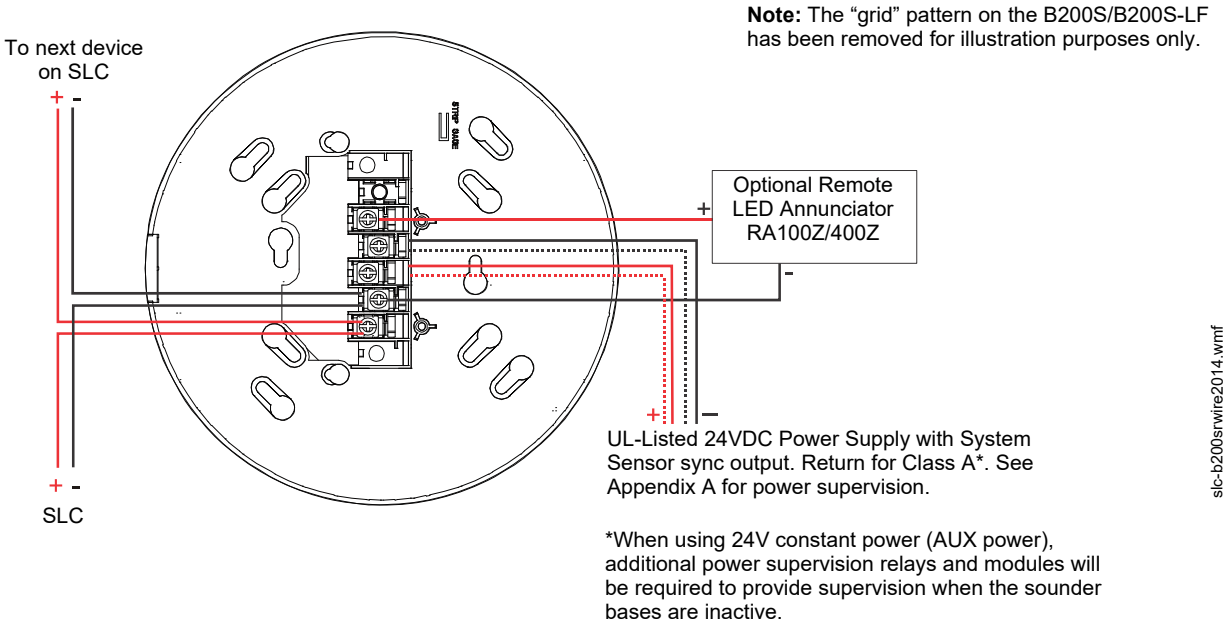


Figure 10.5 Wiring of the B200S/B200S-LF Sounder Base

Figure 10.6 shows typical wiring of the B200SR and B200SR-LF Sounder Base.

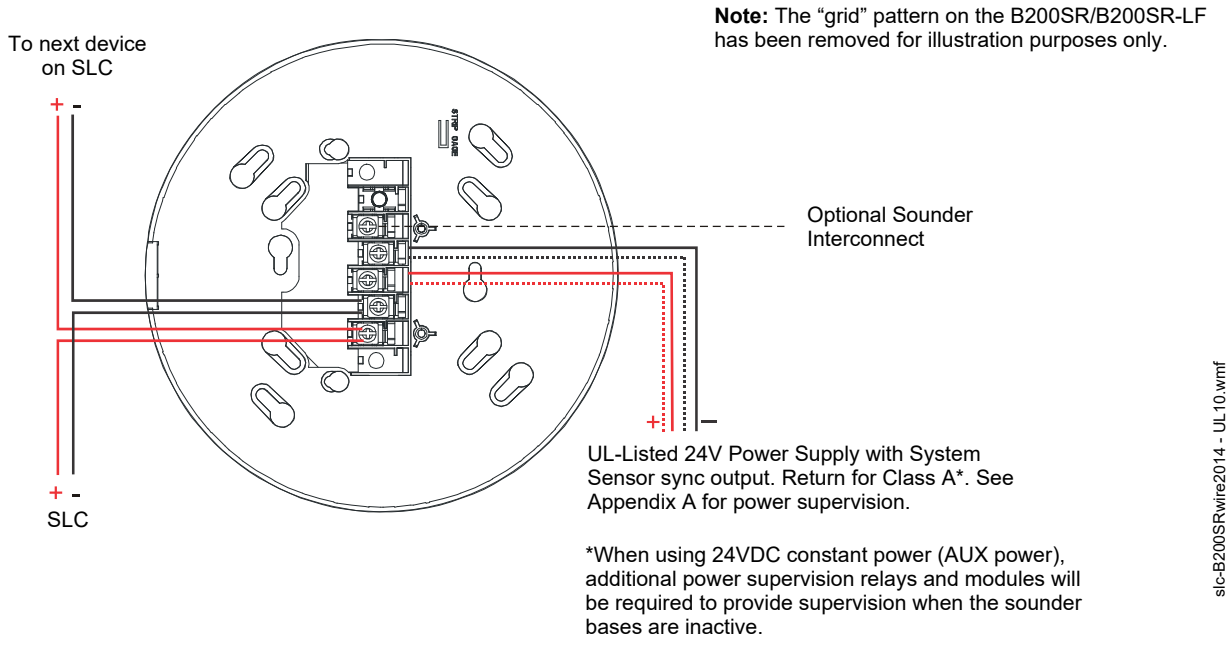
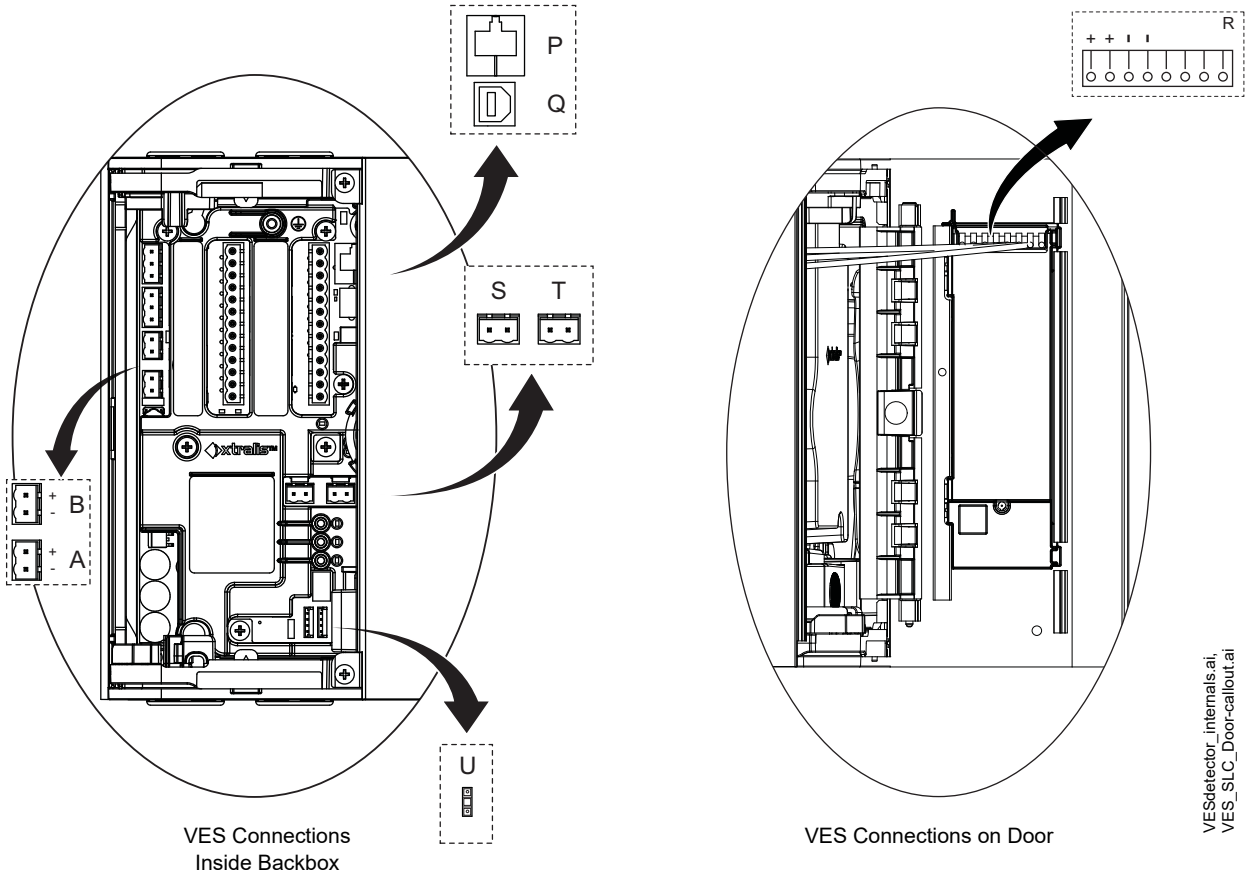


Figure 10.6 Wiring of the B200SR/B200SR Sounder Base

NOTE: The base wiring is identical for color variations. For more detailed wiring on sounder bases, refer to the device’s installation instructions.

10.6 Wiring and Programming Aspiration Detectors

VESDA-E VES Wiring (Class B)



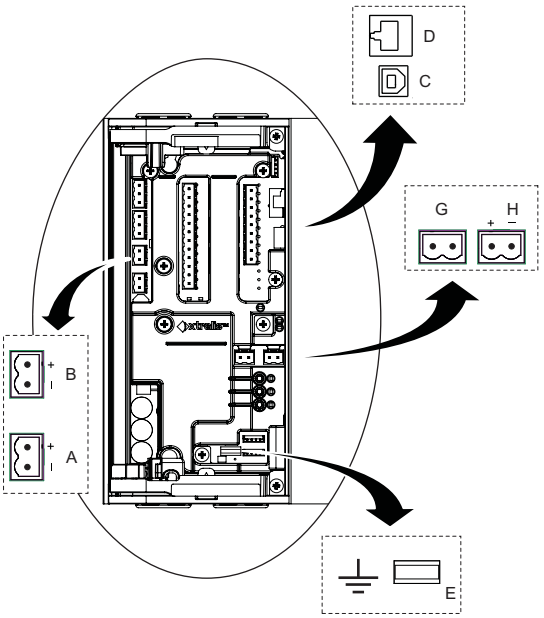
NOTE: VESDA-E VES supports Class B power wiring.

Power	
A	Power Out
B	Power In

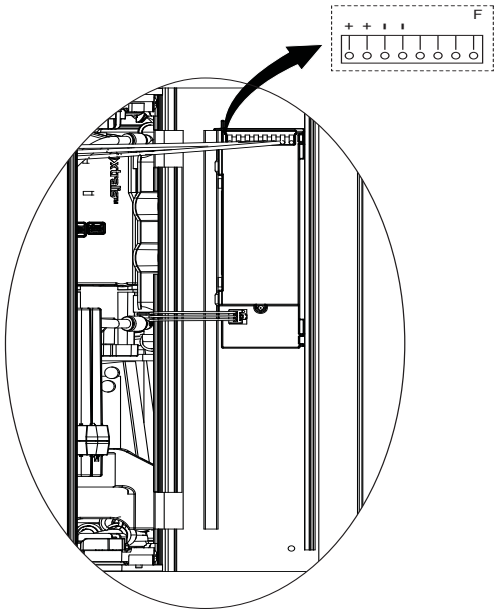
Communications	
P	Ethernet
Q	USB
R	SLC
GPI	
S	Monitored GPI
T	Unmonitored GPI
Chassis Ground	
U	Jumper for ground fault monitoring
O	Chassis Ground Terminal

Figure 10.7 VESDA-E VES: FACP Connections

VESDA-E VEU and VEP Wiring



VEP & VEU Connections Inside Backbox



VEP & VEU Connections on Door

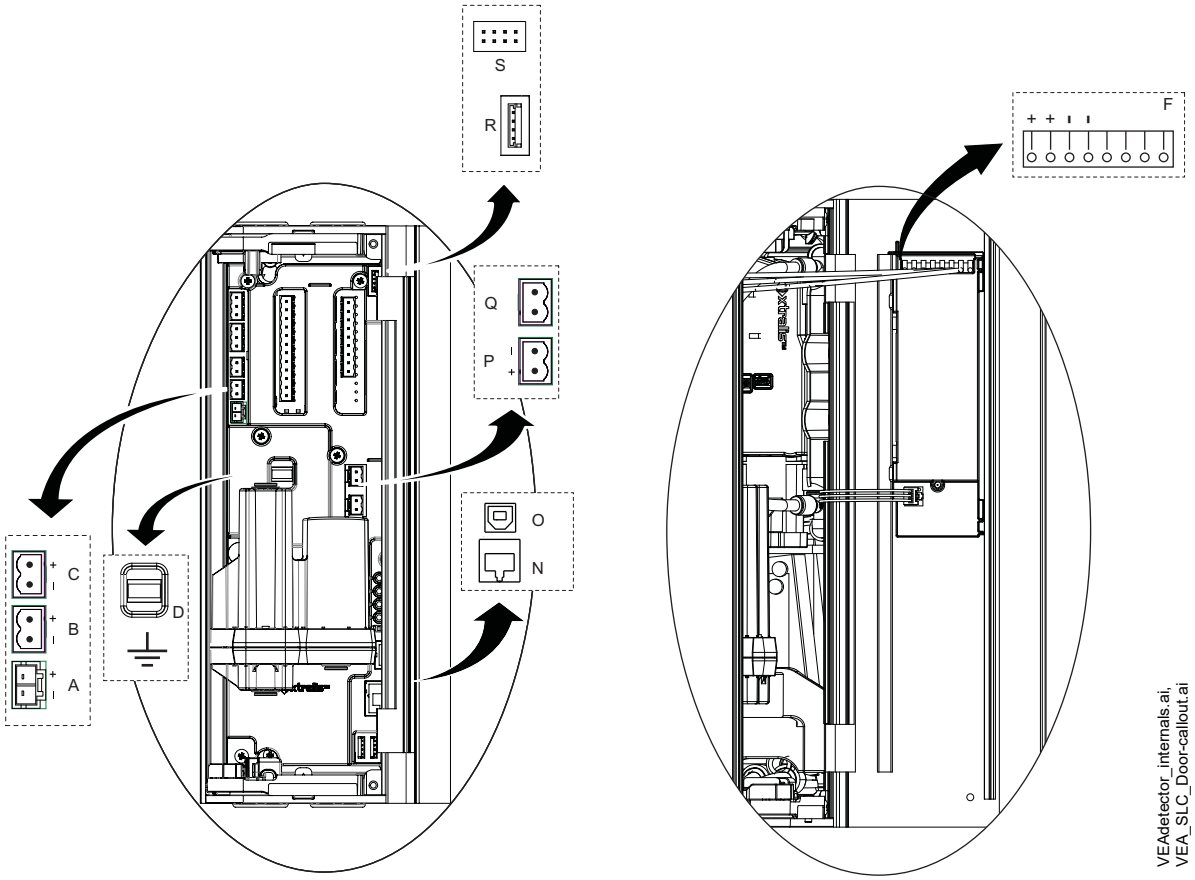
VEP-VEUdetector_internals.ai;
VEP_SLC_Door-callout.ai

Power	
A	Power Out
B	Power In
Communications	
C	USB
D	Ethernet
E	Ground Reference Terminal For UL/ULC installations connect to local ground to enable ground fault detection on VESDAnet.
F	SLC
GPI	
G	Monitored GPI
H	Unmonitored GPI

NOTE: VESDA-E VEU and VEP support Class B or Class A power wiring.

Figure 10.8 VESDA-E VEU and VEP: FACP Connections

VESDA-E VEA Wiring (Class B)



VEA Connections Inside Backbox

VEA Connections on Door

Power	
A	EXP (Expansion)
B	RV (Rotary Valve)
C	Power In
D	Ground Reference Terminal
F	SLC

Communications	
N	Ethernet
O	USB
GPI	
P	Unmonitored GPI
Q	Monitored GPI

Internal Components	
R	Smoke Sensor
Expansion	
S	Data

NOTE: VESDA-E VEA supports Class B power wiring.

Figure 10.9 VESDA-E VEA: FACP Connections

Intelligent FAAST Detectors

The **FSA-5000 Intelligent FAAST XS, FSA-8000 Intelligent FAAST XM, FSA-20000 Intelligent FAAST XT,** and **FSA-20000P Intelligent FAAST XT PRO** aspiration smoke detectors may be used to provide early warning fire protection using aspiration sensing technology. These detectors are listed with UL for use with the NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030. *Discontinued December 2018.*

Figure 10.10 shows how to wire the FSA-5000 detector on an SLC loop. Figure 10.11 shows how to wire the FSA-8000 detector on an SLC loop. Figure 10.12 shows how to wire the **FSA-20000/FSA-20000P** detectors on an SLC loop. To program the addressable pipes on the Intelligent FAAST XT PRO, use VeriFire Tools. For additional installation information for these detectors, refer to the Installation and Maintenance Instruction documents. (See Section 1.3, "Reference Documentation" for part numbers.)

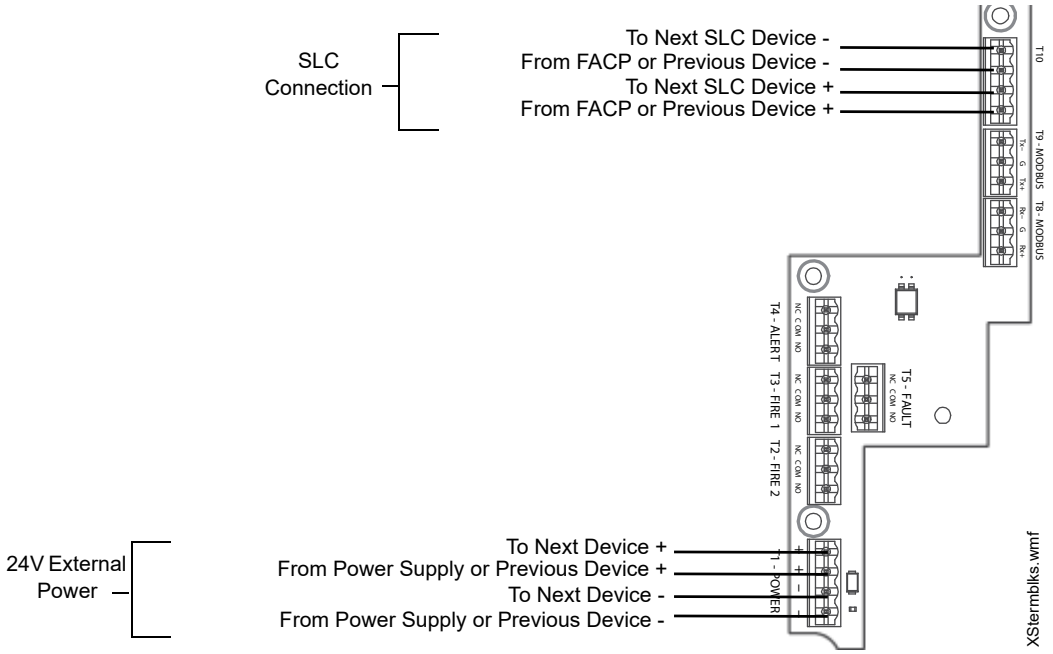


Figure 10.10 FSA-5000 Connection to the FACP

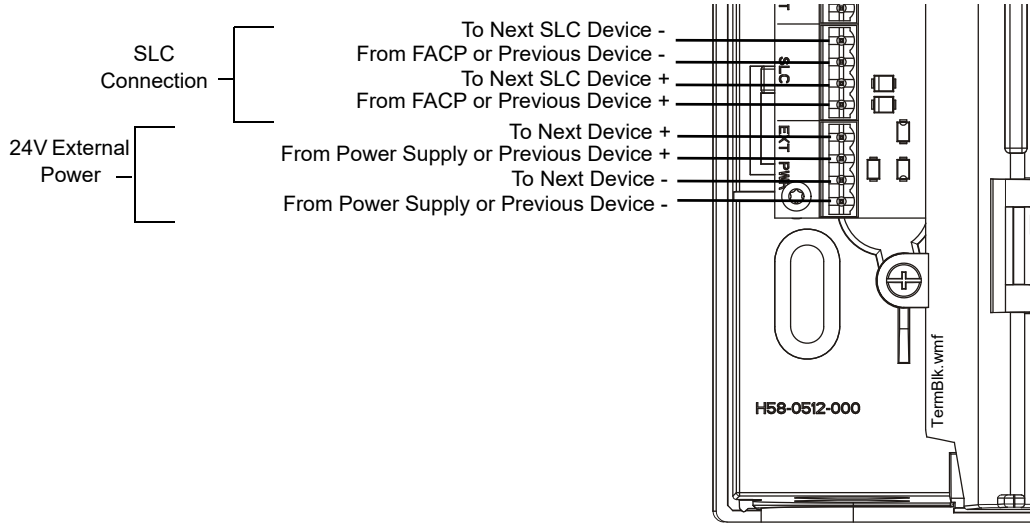


Figure 10.11 FSA-8000 Connection to the FACP

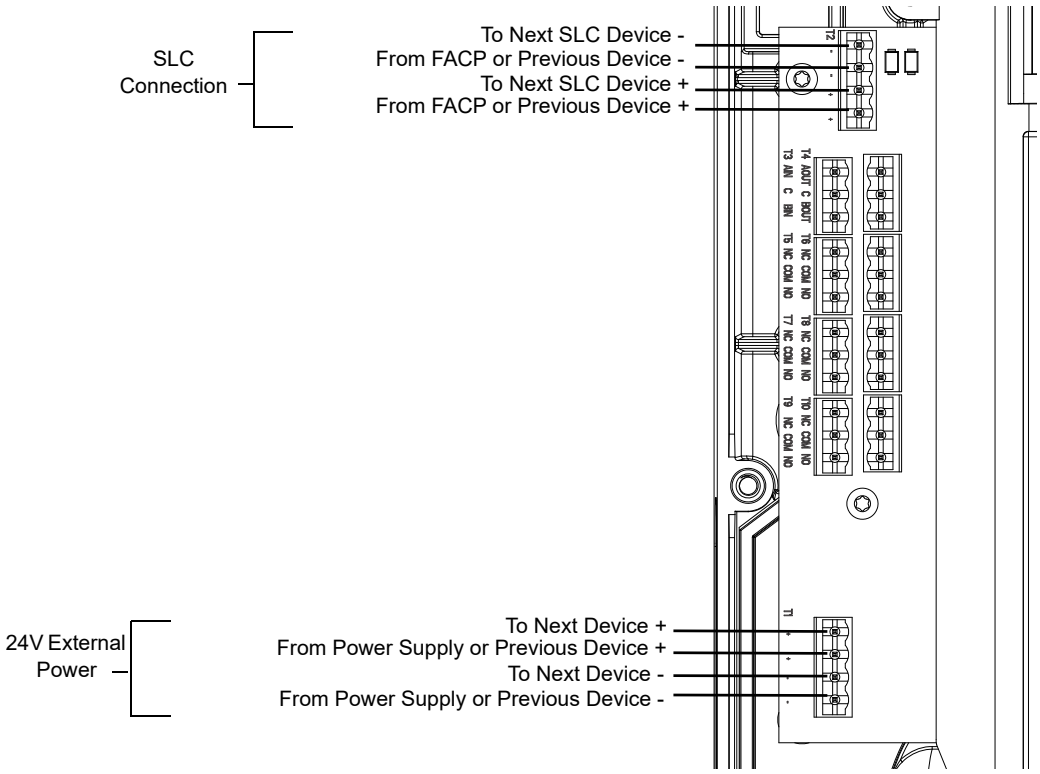


Figure 10.12 FSA-20000/FSA-20000P Connection to the FACP

Installation, Programming, and Addressing FAAST Detectors

	FSA-5000 Intelligent FAAST XS	FSA-8000 Intelligent FAAST XM	FSA-20000 Intelligent FAAST XT	FSA-20000P Intelligent FAAST XT PRO
CLIP loop limitations –Detectors per CLIP loop –Modules per loop	Not available	–Up to 75 total –Up to 45 total	Not available	Not available
Power supply	FACP AUX or use a power supply ULC listed for fire protective signaling use with regulated outputs			
FlashScan Loop Protocol –Type ID –FlashScan Type ID	–Aspiration –FAASTX	–Aspiration –FAAST	–Aspiration –FAASTX	–Aspiration –FAASTX
CLIP Loop Protocol. –Type ID	Not available	–Acclimate	Not available	Not available
Setting an SLC Address	The SLC loop address for this product is set using PipeIQ®; for information on this program, refer to the *FAAST Comprehensive User Guide* on http://www.systemsensor.com. To program the addressable pipes on the Intelligent FAAST XT PRO, use VeriFire Tools.			

Table 10.1 Installation Considerations and Programming Options

10.7 Wiring the FWSG(A)

NOTE: The FWSG(A) as part of the wireless network has been tested for compliance with the Federal Communications Commission (FCC) requirements of the United States Government. This product 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.

10.7.1 SLC Connections

The Wireless Gateway acts as a bridge between a group of wireless fire devices and a FlashScan SLC loop on N16, NFS-320, NFS-320SYS, NFS2-640, and NFS2-3030. It is powered by the SLC loop or by an external 24 VDC 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® Wireless Gateway Manual*.

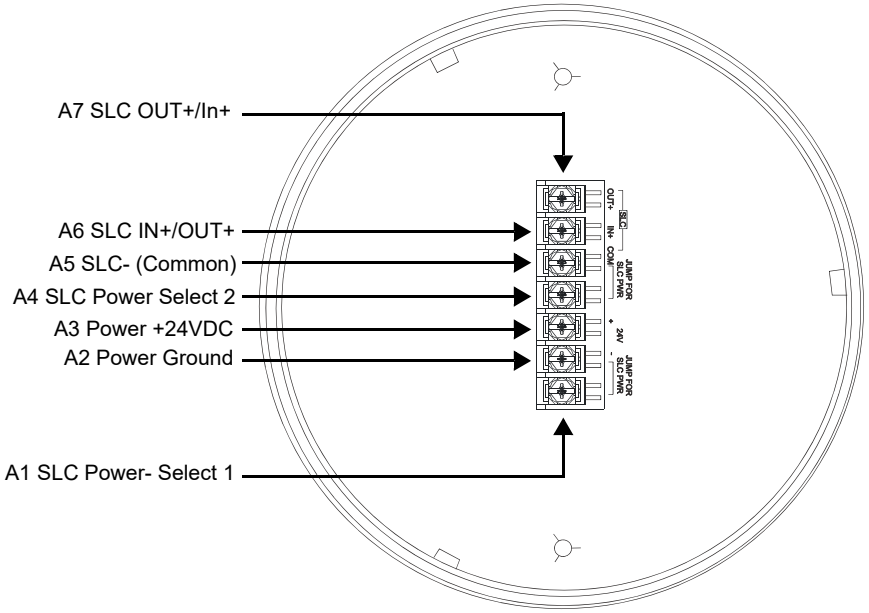


Figure 10.13 FWSG Mounting Plate - Terminal Layout

10.8 Power Connections: Powered by the SLC

The FWSG(A) provides isolation of short circuits on the SLC in Class A installations. SLC connections are power-limited by the panel. An interruption in the SLC that causes a loss of power at the FWSG(A) 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 an external +24V 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 10.14 shows typical wiring of a Wireless Network Gateway connected to an SLC when power is supplied by the SLC loop.

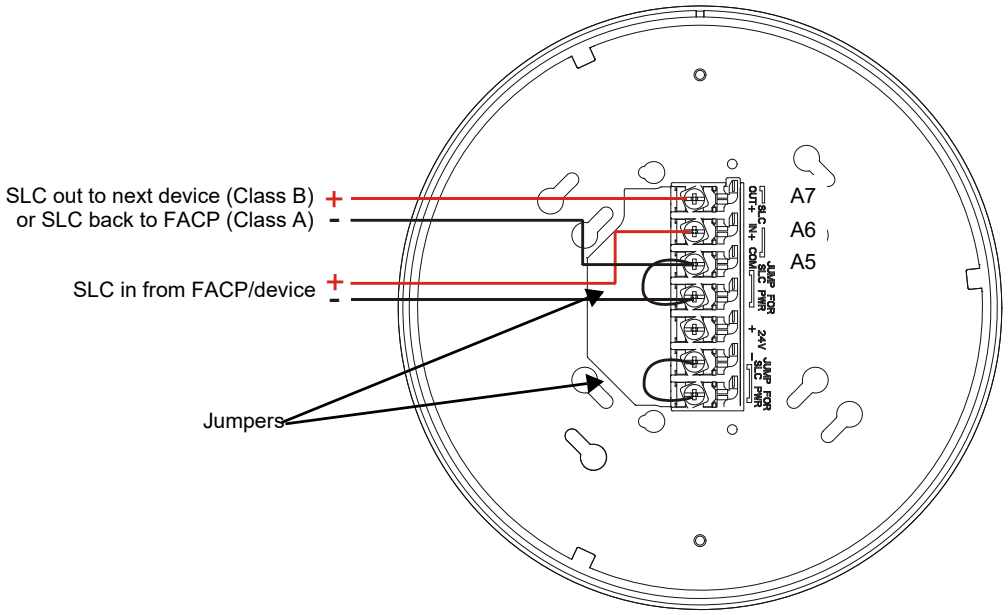


Figure 10.14 FWSG Wiring Diagram, Powered by SLC Loop

10.8.1 Power Connections: External, Regulated +24 VDC Power Source

The FWSG(A) provides isolation of short circuits of the SLC in Class A installations. SLC connections are power-limited by the panel. +24VDC must be power-limited by the source. Figure 10.15 shows typical wiring of a Wireless Network Gateway connected to an SLC when power is supplied by an external, regulated 24 VDC power supply, UL-listed for fire protective service.

For specifics of UL 10th Edition power-supervision requirements, refer to the *SWIFT Gateway Manual*.

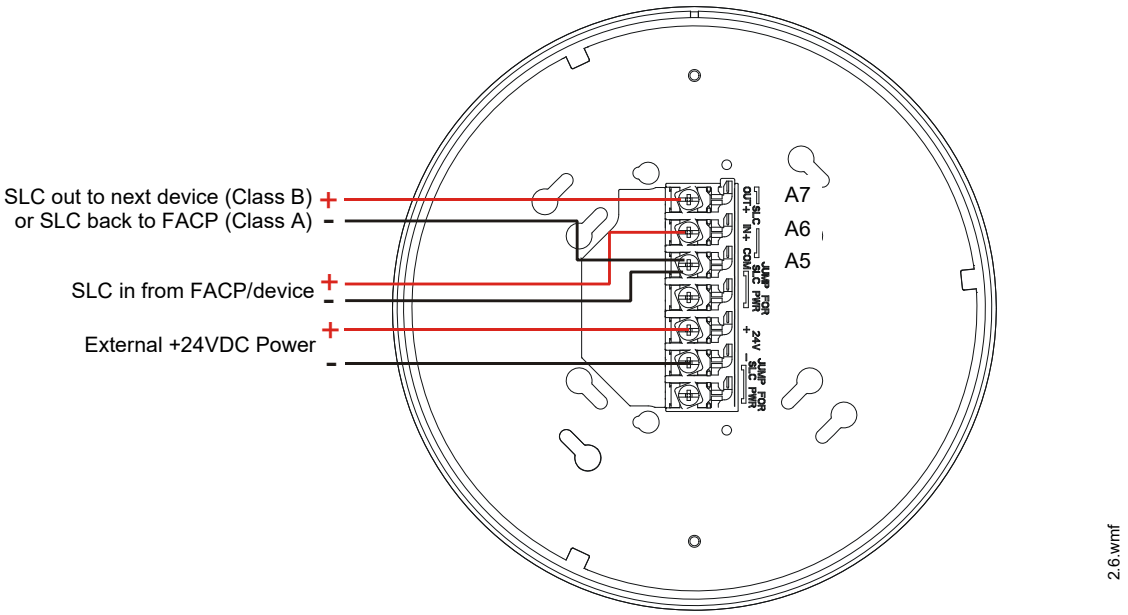


Figure 10.15 FWSG(A) Wiring Diagram, Powered by External 24 VDC Power Source

NOTE: Terminal A5 is referenced more than once in the above connections. It is recommended to use wire of the same gauge for all connections to A5 and use the same wire gauge if there are multiple connections to the same terminal.

Section 11: Addressable Manual Pull Stations

11.1 Description

The NBG-12LX is an addressable manual pull station with a key-lock reset feature. The NBG-12LXSP is a Spanish/English labeled version; NBG-12LXP is a Portuguese-labeled version. Both support FlashScan or CLIP mode. Wiring is the same as for the NBG-12LX Manual Pull Station.

For more information refer to the Installation Instructions document provided with the devices.

11.1.1 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 Module" on page 38.

11.2 Wiring a Manual Pull Station

Typical wiring for the NBG-12LX Manual Pull Station to an SLC is shown below.

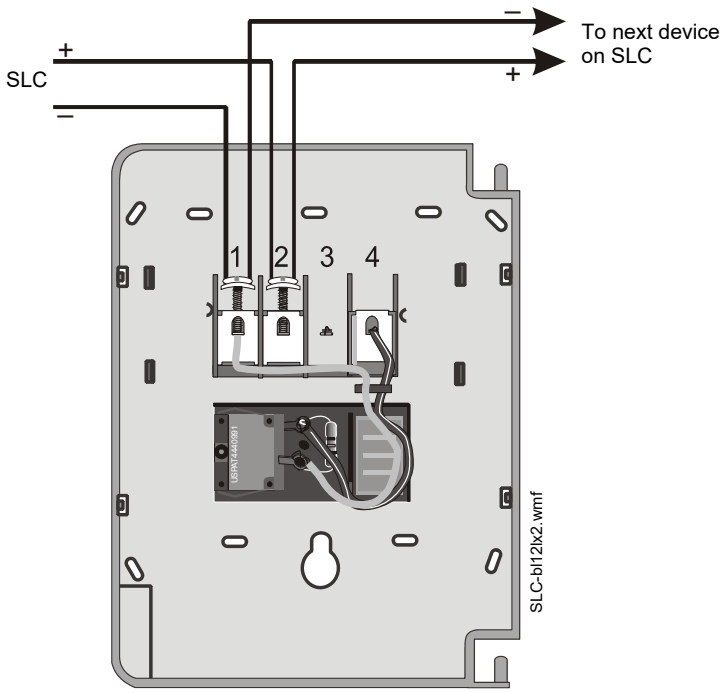


Figure 11.1 Wiring the NBG-12LX Pull Station to an SLC

Appendix A: Power Considerations

A.1 Supplying Power to 24 VDC Detectors and NACs

Resistance and Size

To determine the maximum allowable resistance that can be tolerated in supplying power to 24 VDC four-wire devices and NACs, use the calculations below. These simplified equations assume that the devices are at the end of a long wire run. With the computed resistance and using the manufacturers specifications for the desired wire, select the proper gauge wire for the power run.

For Four-Wire Detectors:

$$R_{max} = \frac{(V_{ms} - V_{om})}{(N)(I_s) + (N_a)(I_a) + (I_r)}$$

For NACs:

$$R_{max} = \frac{(V_{ms} - V_{om})}{(N_b)(I_b)}$$

Where:

R_{max} = maximum resistance of the 24 VDC wires
V_{ms} = minimum supply voltage (see Table A.1 below)
V_{om} = 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
I_s = detector current in standby
N_a = number of detectors on the 24 VDC power circuit which must function at the same time in alarm
I_a = detector current in alarm
I_r = end-of-line relay current
N_b = number of Notification Appliance Devices
I_b = 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
AFP-100	18.1	MPS-24B	20.1
AFP-200	19.4	FCPS-24	19.1
NFS-640	19.15	MPS-24A	19.6
CPS-24 on NFS2-640, NFS-320, or NFS-320SYS	19.48	FCPS-24S6/FCPS-24S8	19.1
		MPS-400	19.23
		ACPS-2406	19.8
		AMPS-24	20.14
		ACPS-610	19.57
		APS2-6R	20.0
		PMB-AUX	20.03

Table A.1 Minimum Supply Voltage

A.2 Supervising 24 VDC Power

There are options for supervising 24 VDC power, as discussed below, according to Class A or Class B of NFPA 72-2013.

- Using FlashScan Type Codes with Built-In Power Supervision (Appendix A.2.1)
- Power Supervision Relay (Appendix A.2.2) (two-wire, Class B only)
- Using the FCM-1 module without relay (Appendix A.2.3)

A.2.1 Using Type Codes with Built-In Power Supervision on N16, NFS2-3030, NFS-3030, NFS2-640, NFS-320 and NFS-320SYS

Certain FlashScan type codes have external power supervision built into the software. For details, refer to “Devices Requiring External Power Supervision” in the appropriate installation manual.

A.2.2 Power Supervision Relay

Power used to supply 24 VDC detectors, notification appliances (using the FCM-1) and two wire detectors (using the 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. This satisfies Class B supervision requirements under UL 864 10th edition.

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 does 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 or IDC circuit, either a two- or a four-wire style.

Figure A.1 shows Class B supervision of a 24VDC circuit using the FCM-1 or FZM-1. Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

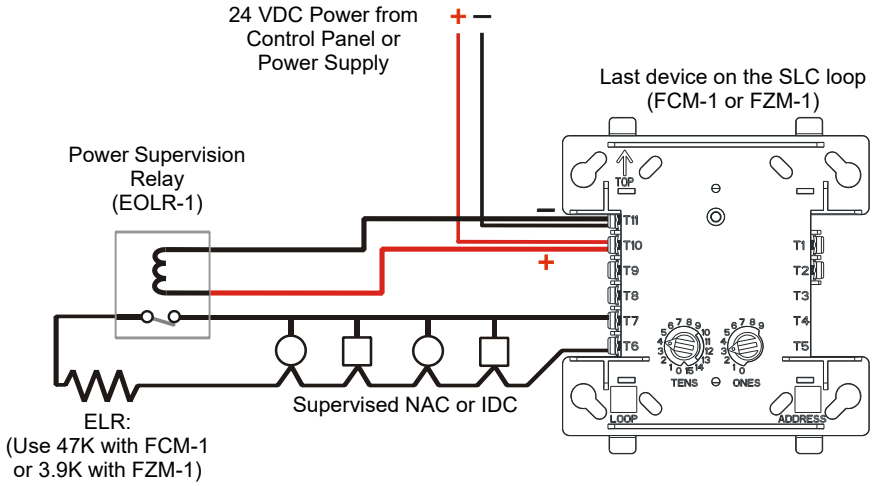


Figure A.1 Supervised 24 VDC Circuit - Class B

Figure A.2 shows an alternate Class B method of supervising a 24VDC circuit using a control module that is fully powered from the SLC loop.

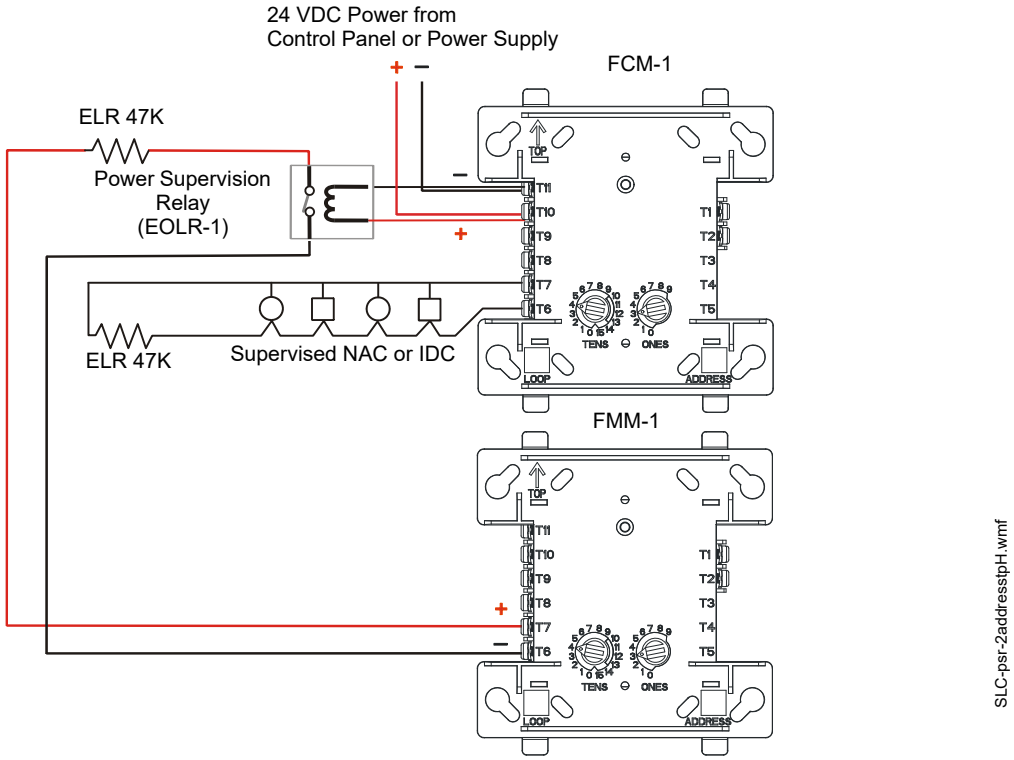


Figure A.2 Alternate: 2-Address Method of Supervising a 24 VDC Circuit - Class B

A.2.3 Using the Addressable Control Module Without Relay

Another option for supervising 24 VDC power fed to the Notification Appliance Circuit of the FCM-1 module eliminates the need for a power supervision relay. This method uses a Notification Appliance Circuit from the control panel or power supply to supply power to the FCM-1 modules. The control panel supervises this circuit, which can be either a Class B or Class A *(see separate wiring diagrams)*.

Class B NAC Power Wiring

Program the NAC from the control panel for general alarm. (Refer to the programming manual or programming section of the FACP documentation for instructions.) Note that if the NAC is a coded output, the FCM-1 output will be coded as well.

Refer to the *Device Compatibility Document* for compatible notification appliances.

- The circuit is supervised and power-limited.
- In this circuit, an external ELR **is** required at end of the NAC circuit.
- Refer to the respective control panel installation manual for NAC terminal block connection information and ELR value.
- Remove internal resistor on each FCM-1 (see instructions in Figure 7.2 on page 44).

Connect the NAC power as follows:

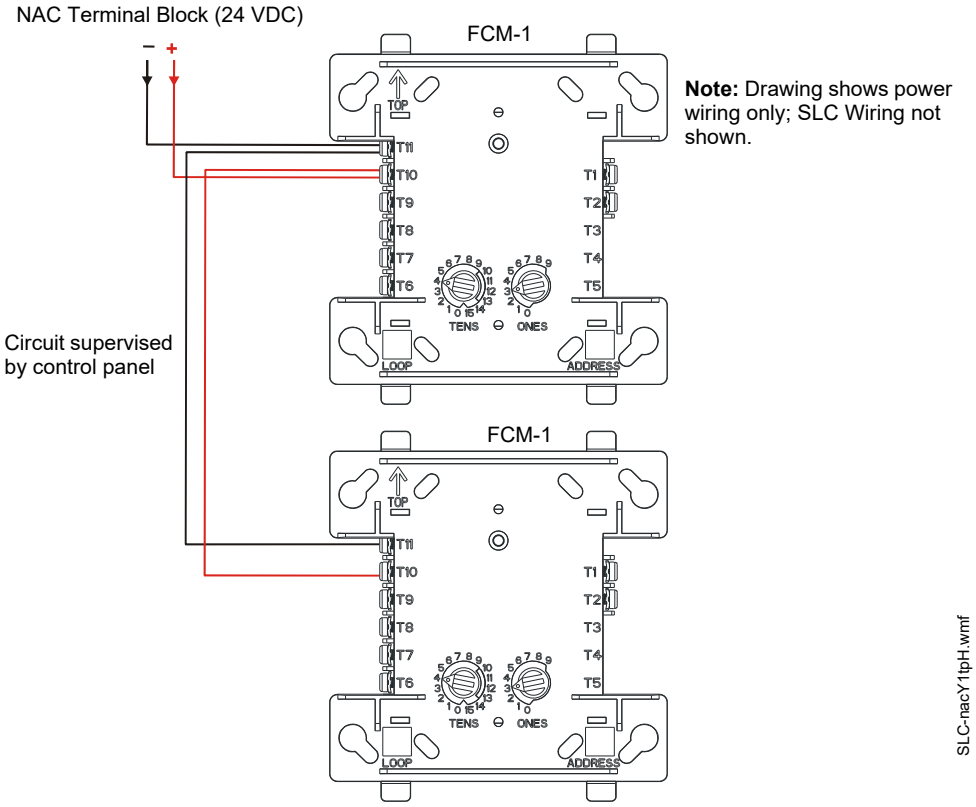


Figure A.3 NFPA Class B NAC Power (Alternate)

Class A NAC Power Wiring

Program the NAC from the control panel for general alarm. (Refer to the programming manual or programming section of the FACP documentation for instructions.) Note that if the NAC is a coded output, the FCM-1 output will be coded as well.

Refer to the *Device Compatibility Document* for compatible notification appliances.

- The circuit is supervised and power-limited.
- In this circuit, an external ELR is **not** required at end of the NAC circuit.
- Refer to the respective control panel installation manual for NAC terminal block connection information.
- Remove internal jumper on each FCM-1 (see instructions in Figure 7.2 on page 44).

Connect the NAC power as follows:

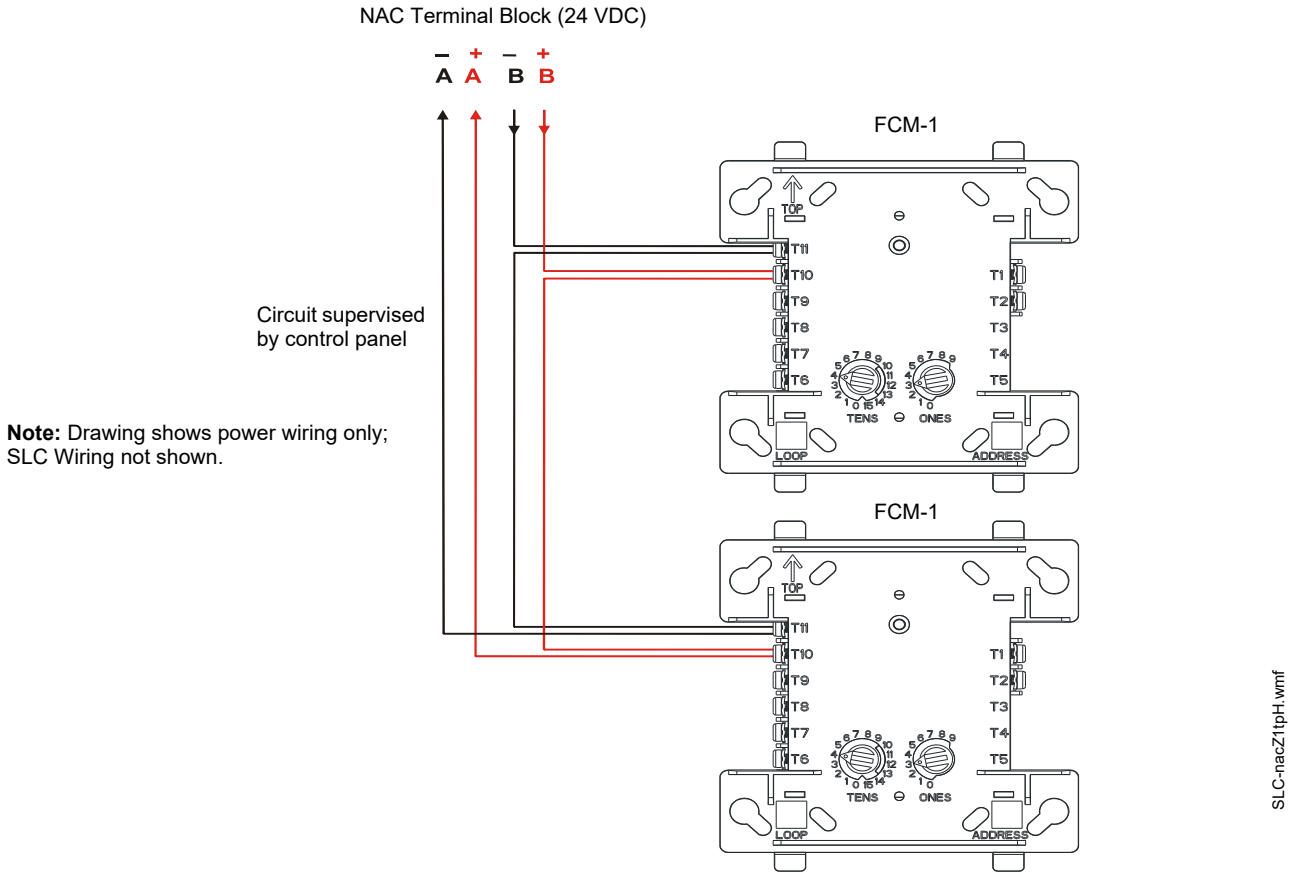


Figure A.4 NFPA Class A NAC Power

A.3 Basics of Class A Power Supervision

See Figure A.5 for Class A power supervision:

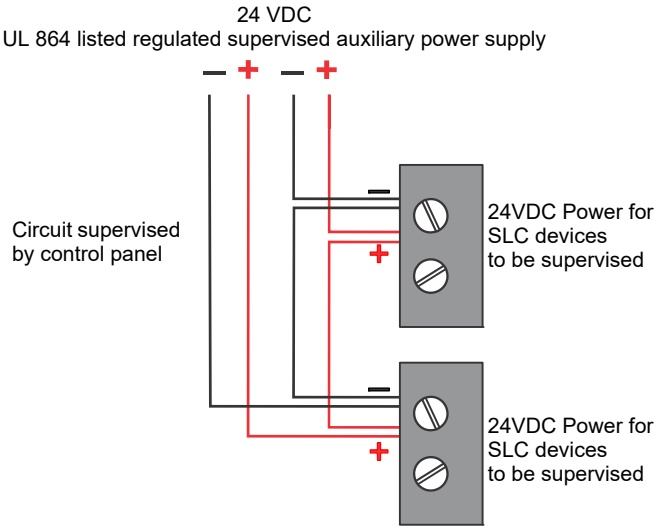


Figure A.5 Class A Wiring to Supervise 24 VDC Power to SLC Devices

Appendix B: SLC Surge Suppression

B.1 Introduction

Primary and secondary UL-listed surge protectors used with fire alarm control panels must have the following characteristics:

- Primary Surge Protector: Must be listed against UL 497, standard for surge protective devices with a marked rating of 330V or less
- Secondary Surge Protectors: Must be listed against UL 497B the Standard for Protectors for Data Communications and Fire Alarm Circuits with a marked rating of 50V or less

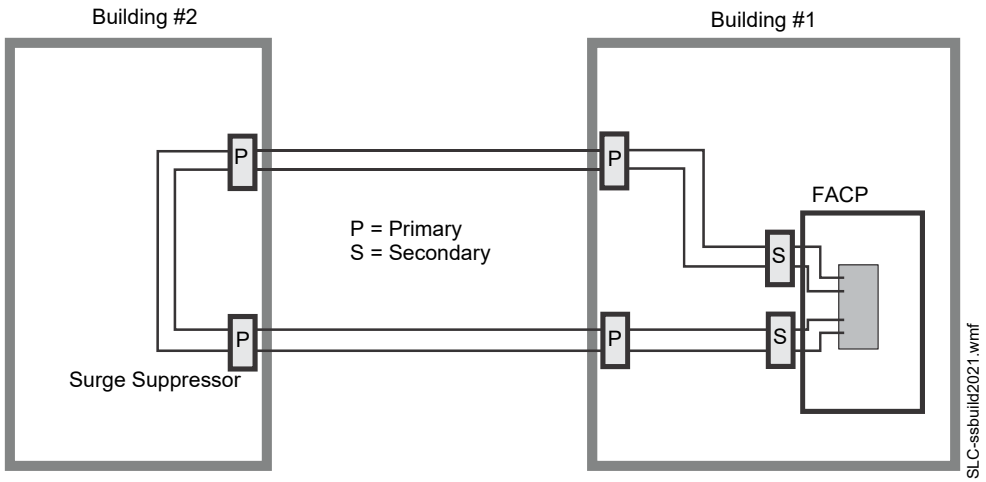
NOTE: For detailed information refer to the installation documentation supplied with the unit.

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.



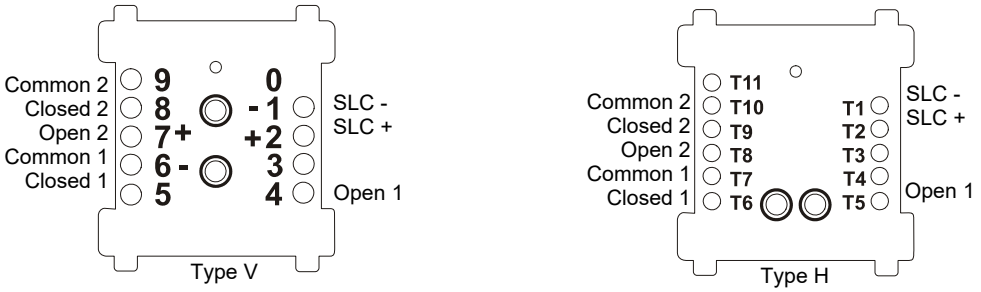
B.2 Installation

Mounting of the secondary surge suppressor must be inside a separate UL-listed enclosure.

- 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.

Appendix C: Terminal Conversion Charts for V-type and H-type Devices

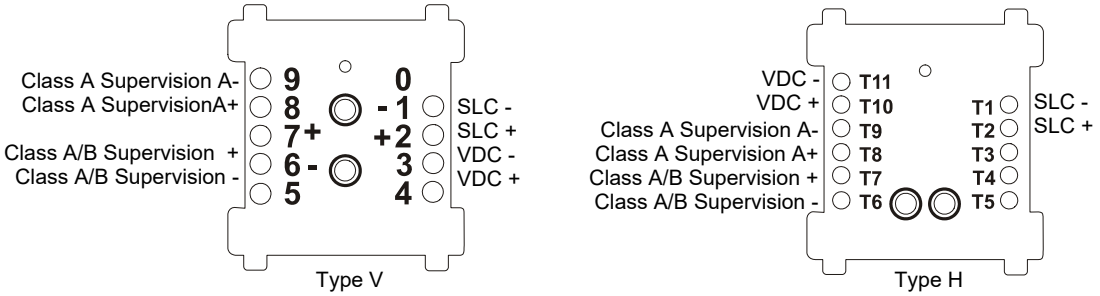
C.1 FRM-1



V-type Terminal Number	Terminal Function	H-type Terminal Number
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 FRM-1 Terminal Conversions

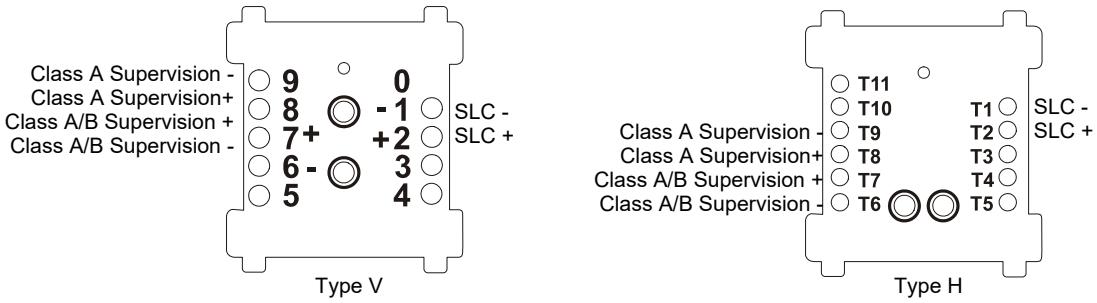
C.2 FCM-1 and FZM-1



V-type Terminal Number	Terminal Function	H-type Terminal Number
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 FCM-1 and FZM-1 Terminal Conversions

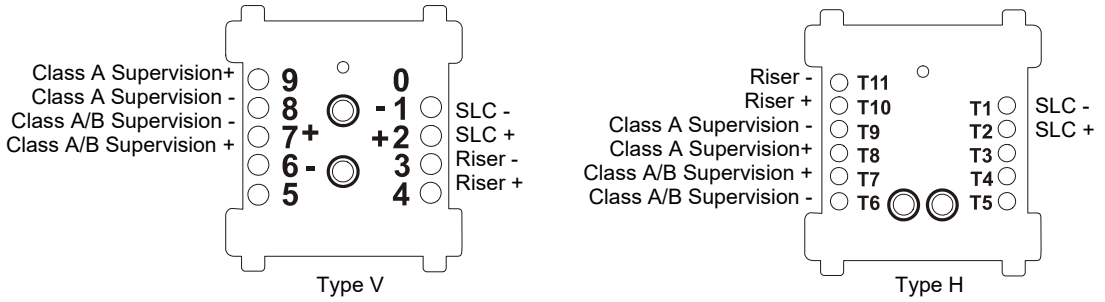
C.3 FMM-1



V-type Terminal Number	Terminal Function	H-type Terminal Number
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 FMM-1 Terminal Conversions

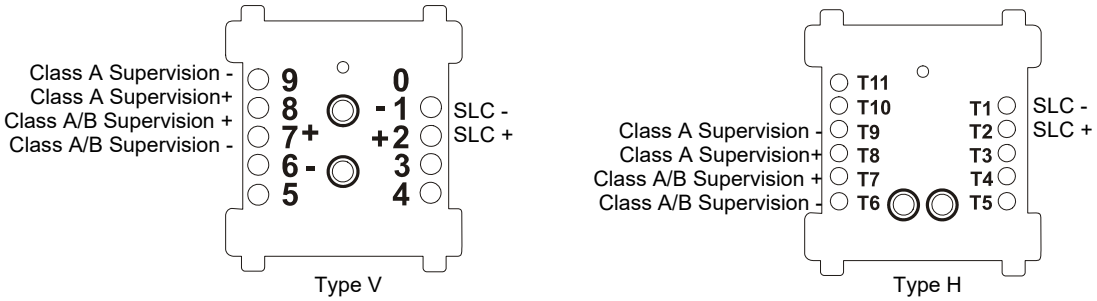
C.4 FTM-1



V-type Terminal Number	Terminal Function	H-type Terminal Number
1	SLC -	1
2	SLC +	2
3	Riser -	11
4	Riser +	10
5	Unused	5
7	Class A/B Supervision -	6
6	Class A/B Supervision +	7
9	Class A Supervision +	8
8	Class A Supervision -	9
N/A	Unused	3
N/A	Unused	4

Table C.4 FTM-1 Terminal Conversions

C.5 FDM-1



V-type Terminal Number	Terminal Function	H-type Terminal Number
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.5 FDM-1 Terminal Conversions

Appendix D: Intelligent Detector Base Layouts for Legacy Devices

For Class A power-supervision requirements, refer to Appendix A.2, “Supervising 24 VDC Power”, on page 66.

D.1 Wiring a Detector Base

Figure D.1 shows typical wiring of the B710LP or B501 detector base connected to an SLC. An optional RA100Z Remote LED Annunciator is shown connected to the base.

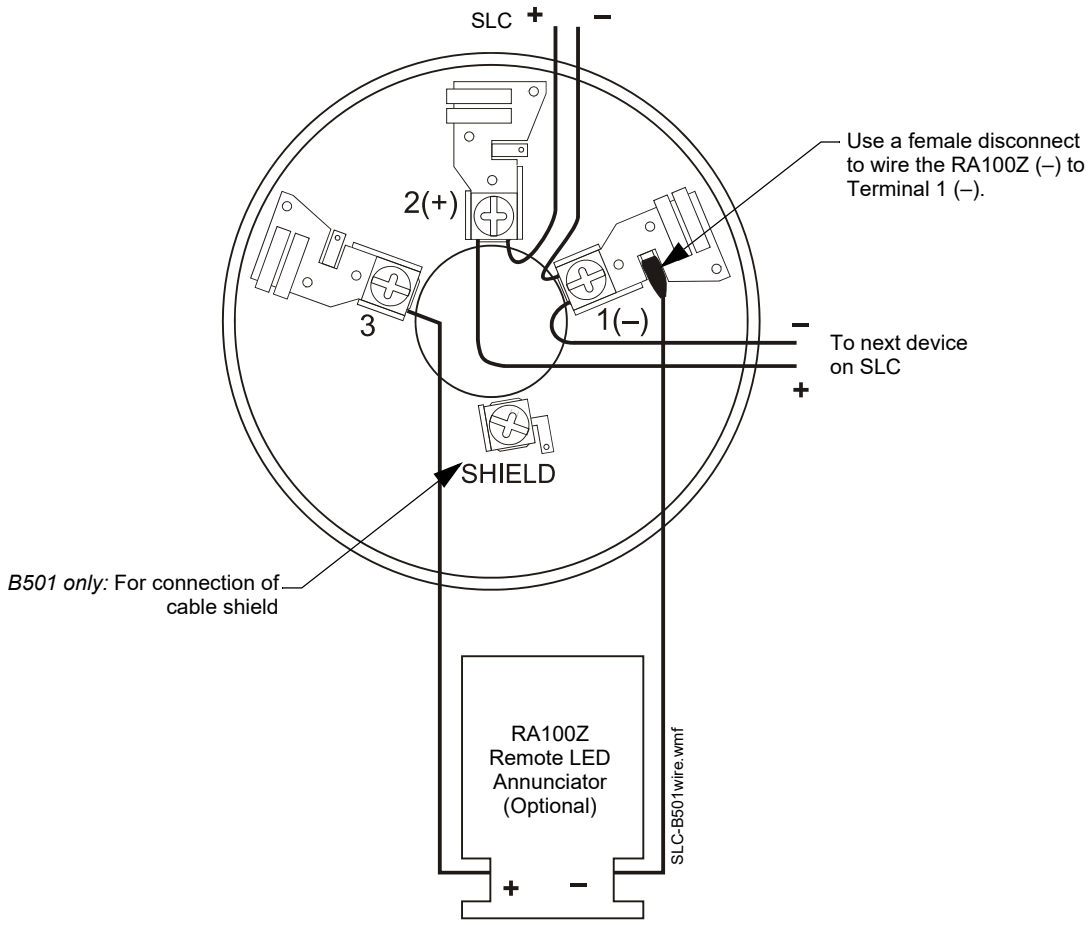


Figure D.1 Wiring of the B710LP or B501 Detector Base

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

D.2 Wiring an Isolator Base

Figure D.2 shows typical wiring of a B224BI/B224BI-WH/B224BI-IV Isolator Base.

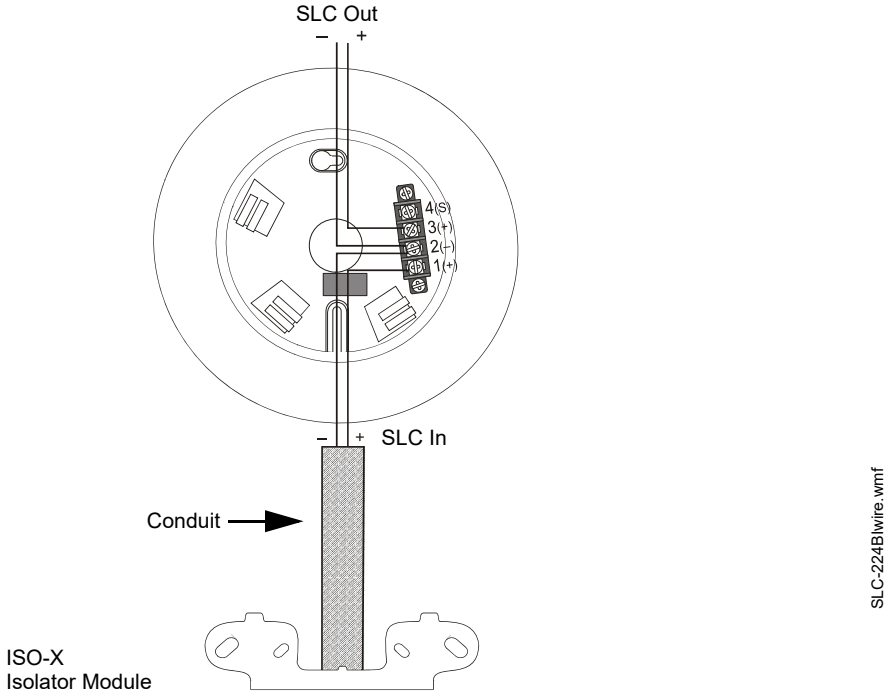


Figure D.2 Wiring an Isolator Base

D.3 Wiring a Relay Base

Figure D.3 shows typical wiring of the B224RB plug-in relay detector base connected to an SLC.

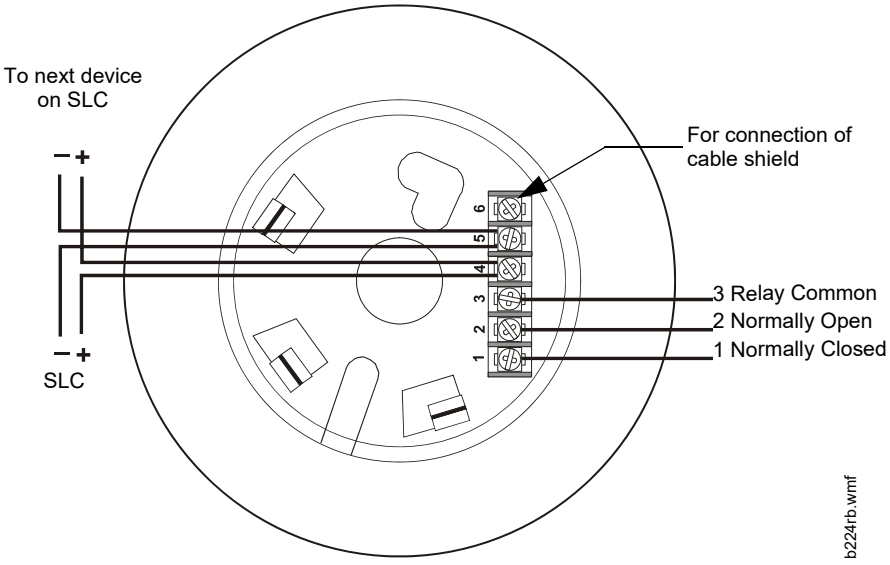


Figure D.3 Wiring of the B224RB Plug-in Relay Detector Base

D.4 Wiring a Sounder Base

Figure D.4 shows typical wiring of the B501BH(-2) and B501BHT(-2) Sounder Bases.

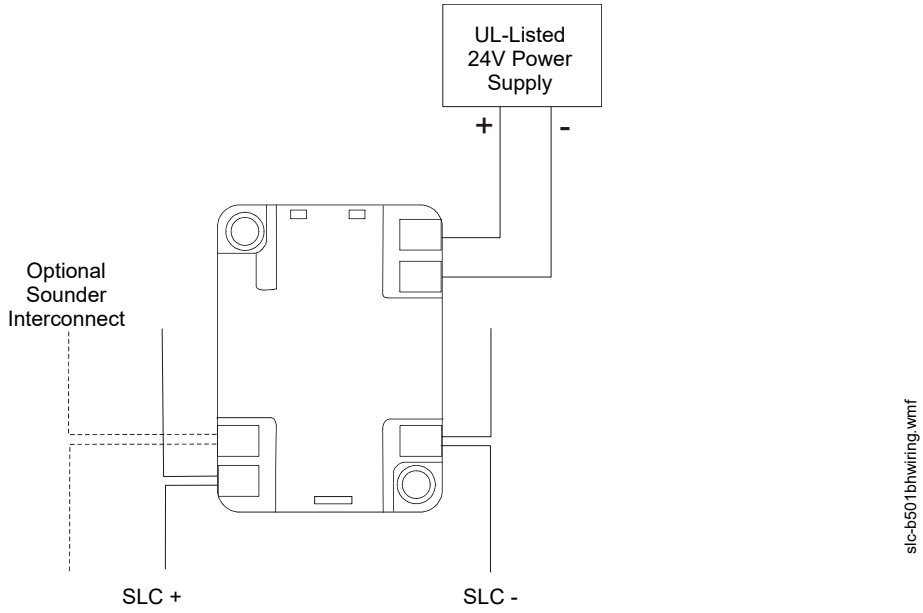


Figure D.4 Wiring the B501BH(-2) and B501BHT(-2) Sounder Bases

Appendix E: Canadian Versions of SLC Devices

Note: Only N16 supports self-test devices. Current release of N16 is for UL applications. If Self Test Smoke Detectors are installed on a SLM-318 loop card (CLP-2PCB), the maximum permissible long line resistance drops to 35 ohms; initial release of SLM-318 drops to 23 ohms (CLP-PCB).

UL-listed SLC Device	ULC-listed SLC Device	Description
Detectors		
FSP-951-SELFT	—	Self-test photo detector; FlashScan; N16 only; UL applications only.
FSP-951T-SELFT	—	Self-test photo/heat detector; FlashScan; N16 only; UL applications only.
FST-951-SELFT	—	Self-test heat detector; FlashScan; N16 only; UL applications only.
FSP-951	FSP-951A	Analog, addressable intelligent smoke detector that uses a photoelectric sensing chamber. Listed for use in ducts. Designed to provide open area protection. FlashScan mode only. White.
FSP-951-IV	FSP-951A-IV	Analog, addressable intelligent smoke detector that uses a photoelectric sensing chamber. Listed for use in ducts. Designed to provide open area protection. FlashScan and CLIP mode. Ivory.
FSP-951R	FSP-951RA	Analog, addressable intelligent photoelectric sensor with remote test capability. For use with DNR(W) in US; for use with DNRA in Canadian applications. FlashScan mode only. White.
FSP-951R-IV	FSP-951RA-IV	Analog, addressable intelligent photoelectric sensor with remote test capability. For use with DNR(W) in US; for use with DNRA in Canadian applications. FlashScan and CLIP mode. Ivory.
FSP-951T	FSP-951TA	Adds thermal sensors that will alarm at a fixed temperature of 135°F (57°C). FlashScan mode only. White.
FSP-951T-IV	FSP-951TA-IV	Adds thermal sensors that will alarm at a fixed temperature of 135°F (57°C). Intelligent Photo/Temperature Detector. FlashScan and CLIP mode. Ivory.
FST-951	FST-951A	High temperature sensor with 190°F (87.8°C) fixed temperature alarm. FlashScan mode only. White.
FST-951-IV	FST-951A-IV	High temperature sensor with 190°F (87.8°C) fixed temperature alarm. FlashScan and CLIP mode. Ivory.
FST-951R	FST-951RA	Incorporates a thermal rate of rise of 15°F (9.4°C). FlashScan mode only. White.
FST-951R-IV	FST-951RA-IV	Incorporates a thermal rate of rise of 15°F (9.4°C). FlashScan and CLIP mode. Ivory.
FST-951H	FST-951HA	High temperature sensor with 190°F (87.8°C) fixed temperature alarm. FlashScan mode only. White.
FST-951H-IV	FST-951HA-IV	High temperature sensor with 190°F (87.8°C) fixed temperature alarm. FlashScan and CLIP mode. Ivory.
FCO-951	FCO-951A	Addressable intelligent multi-criteria smoke sensors: photo, carbon monoxide (CO), 135°F (57.2°C) fixed-temperature heat detector, and infra-red (IR). Transmits an alarm signal due to heat (135°F/57.2°C) per UL 521. White
FCO-951-IV	FCO-951A-IV	Addressable intelligent multi-criteria smoke sensors: photo, carbon monoxide (CO), 135°F (57.2°C) fixed-temperature heat detector, and infra-red (IR). Transmits an alarm signal due to heat (135°F/57.2°C) per UL 521. Ivory
FPC-951	FPC-951A	Multi-Criteria Photoelectric and CO Sensor
FPTI-951	FPTI-951A	Multi-Criteria Photoelectric, Thermal and Infra-Red Sensor. White
FPTI-951-IV	FPTI-951A-IV	Multi-Criteria Photoelectric, Thermal and Infra-Red Sensor. Ivory
FSCO-951	FSCO-951A	Intelligent Carbon Monoxide Sensor
FSV-951	FSV-951A	Intelligent High-sensitivity Photoelectric Smoke Sensors. FlashScan mode only. White.
FSV-951-IV	FSV-951A-IV	Intelligent High-sensitivity Photoelectric Smoke Sensors. FlashScan and CLIP mode. Ivory.
FSV-951R	FSV-951RA	Intelligent High-sensitivity Photoelectric Smoke Sensors Intelligent High-sensitivity Photoelectric Smoke Sensors, Retrofit (Backwards compatible for use with older panels). FlashScan mode only. White.
FSV-951R-IV	FSV-951RA-IV	Intelligent High-sensitivity Photoelectric Smoke Sensors Intelligent High-sensitivity Photoelectric Smoke Sensors, Retrofit (Backwards compatible for use with older panels) FlashScan and CLIP mode. Ivory.

UL-listed SLC Device	ULC-listed SLC Device	Description
FS-OSI-RI	FS-OSI-RIA	Single-ended Reflected Type Projected Imaging Beam Smoke Detector — Intelligent
FSB-200, FSB-200S	FSB-200A, FSB-200SA	Addressable, intelligent, single-ended beam smoke detector with built-in sensitivity testing. FlashScan and CLIP mode.
FAPT-851 (Acclimate™)	FAPT-851A	Intelligent detector that combines a photoelectric sensing chamber and fixed temperature heat detection (135°F/57.2°C). FlashScan capable.
FSI-851	FSI-851A	Addressable, intelligent smoke detector that incorporates an ionization sensing chamber. Designed to provide open area protection. FlashScan capable.
FSP-851	FSP-851A	Analog, addressable intelligent smoke detector that uses a photoelectric sensing chamber. Listed for use in ducts. Designed to provide open area protection. FlashScan capable.
FSP-851T	FSP-851TA	Adds thermal sensors that will alarm at a fixed temperature of 135°F (57°C).
FSP-851R	FSP-851RA	Analog, addressable intelligent photoelectric sensor that is remote test capable. For use with DNR(W).
FST-851	FST-851A	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. FlashScan capable.
FST-851R	FST-851RA	Incorporates a thermal rate of rise of 15°F (9.4°C). FlashScan capable.
FST-851H	FST-851HA	High temperature sensor with 190°F (87.8°C) fixed temperature alarm.
FSD-751PL	FSD-751PLA	Photoelectric Duct Detector, Low-flow.
FSD-751RPL	FSD-751RPLA	Photoelectric Duct Detector, Low-flow.
FSH-751	FSH-751A	Smoke detector provides early warning smoke detection in hostile environments where traditional smoke detectors are not practical.
FSL-751	FSL-751A	An advanced intelligent photoelectric detector that uses a laser diode, special optics, and signal processing to obtain extremely high sensitivity.
FSC-851	FSC-851A	Intelligent multi-criteria detector that combines photoelectric sensing, heat detection, carbon monoxide and flame.
FCO-851	FCO-851A	Addressable, intelligent detector that combines a photoelectric sensing chamber combined with Carbon Monoxide (CO) sensors. FlashScan mode only.
FSA-5000	FSA-5000A	Intelligent FAAST XS aspiration smoke detector, covers up to 5,000 square feet. FlashScan mode.
FSA-8000	FSA-8000A	Intelligent FAAST XM aspiration smoke detector, covers up to 8000 square feet. Supports FlashScan and CLIP mode. (An earlier model was CLIP mode only).
FSA-20000	FSA-20000A	Intelligent FAAST XT aspiration smoke detector, covers up to 28,800 square feet. FlashScan mode.
FSA-20000P	FSA-20000P	Intelligent FAAST XT PRO aspiration smoke detector, covers up to 28,800 square feet through addressable pipes. FlashScan mode UL-/ULC-listed model.
VESDA-E SLC Devices UL 268 6th edition/ULC		
VEP-A00-P-NTF	VEP-A00-P-NTF	Addressable VESDA-E VEP with LEDs, UL 268 6th edition/ULC
VEP-A10-P-NTF	VEP-A10-P-NTF	Addressable VESDA-E VEP with 3.5" Display, UL 268 6th edition/ULC
VEP-A00-1P-NTF	VEP-A00-1P-NTF	Addressable VESDA-E VEP 1 Pipe with LEDs, UL 268 6th edition/ULC
VEU-A00-NTF	VEU-A00-NTF	Addressable VESDA-E VEU with LEDs, UL 268 6th edition/ULC
VEU-A10-NTF	VEU-A10-NTF	Addressable VESDA-E VEU with 3.5" Display, UL 268 6th edition/ULC
VEA-040-A00-NTF	VEA-040-A00-NTF	Addressable VESDA-E VEA-40 point with LEDs, UL 268 6th edition/ULC
VEA-040-A10-NTF	VEA-040-A10-NTF	Addressable VESDA-E VEA-40 point with 3.5" Display, UL 268 6th edition/ULC
VESDA-E SLC Devices UL 268 7th edition		
VEP-A00-P-NTF-UL	—	Addressable VESDA-E VEP with LEDs, UL 268 7th edition
VEP-A10-P-NTF-UL	—	Addressable VESDA-E VEP with 3.5" Display, UL 268 7th edition
VEP-A00-1P-NTF-UL	—	Addressable VESDA-E VEP 1 Pipe with LEDs, UL 268 7th edition
VEU-A00-NTF-UL	—	Addressable VESDA-E VEU with LEDs, UL 268 7th edition
VEU-A10-NTF-UL	—	Addressable VESDA-E VEU with 3.5" Display, UL 268 7th edition
VEA-040-A00-NTF-UL	—	Addressable VESDA-E VEA-40 point with LEDs, UL 268 7th edition
VEA-040-A10-NTF-UL	—	Addressable VESDA-E VEA-40 point with 3.5" Display, UL 268 7th edition

UL-listed SLC Device	ULC-listed SLC Device	Description
VES-A00-P-NTF-UL	—	Addressable VESDA-E VES scanning detector with LEDs, FlashScan, UL 268 7th edition
VES-A10-P-NTF-UL	—	Addressable VESDA-E VES scanning detector with 3.5" Display, FlashScan, UL 268 7th edition
Bases		
B300-6	B3006A	Standard U.S. Low-Profile base (6", 15.24 cm). White.
B300-6-IV	B3006A-IV	Standard U.S. Low-Profile base (6", 15.24 cm). Ivory.
B210LP	B210LPA	Standard U.S. Low-Profile base (6", 15.24 cm). Legacy ivory; replaced by B300-6/-IV.
B501 (before March 2018)	B501A (before March 2018)s	Legacy ivory; replaced by B501-WHITE/-IV/-BL.
B501-WHITE	B501-WHITE (replaces B501A)	Standard European flangeless base (4", 10.16 cm). White.
B501-IV	B501-IV	Ivory version of B501-WHITE.
B501-BL	B501-BL	Black version of B501-WHITE.
B710LP	B710LPA	Standard U.S. Low-Profile base (6", 15.24 cm). Discontinued.
B501BH, B501BHT	B501BHA, B501BHTA	Sounder base, includes B501/A Sounder base with temporal sounder (UL 8th Edition) Discontinued.
B501BH-2, B501BHT-2	N/A	Sounder base, includes B501/A Sounder base with temporal sounder (UL 9th Edition) Discontinued.
B224RB-WH, B224RB-IV	B224RBA-WH, B224RBA-IV	Low Profile Intelligent relay base. Replaces legacy ivory B224RB(A).
B224BI-WH, B224BI-IV	B224BIA-WH, B224BIA-IV	Low Profile Intelligent isolator base. Replaces legacy ivory B224BI(A).
B710HD	B710HDA	Base for a hostile environment detector.Legacy ivory.
B200S-WH, B200S-IV	B200SA-WH, B200SA-IV, B200SCOA-WH, B200SCOA-IV	Addressable sounder base. Replaces legacy ivory B200S(A), and legacy ivory B200SCOA. B200SCOA-WH/IV provides CO detector markings in English/French, for Canadian applications only.
B200SR-WH, B200SR-IV	B200SRA-WH, B200SRA-IV	Sounder base. Replaces legacy ivory B200SR(A).
Note: Because low-frequency bases are designed for a UL requirement, there is no ULC-listed version of B200S-LF-WH/B200S-LF-IV or for B200SR-LF-WH/B200SR-LF-IV.		
Monitor and Zone Interface Modules		
FMM-1	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.
FZM-1	FZM-1A	Used to interface with two-wire smoke detectors in addition to normally open contacts.
FDM-1	FDM-1A	Provides two independent 2-wire Initiating Device Circuits (IDCs) at two separate, consecutive addresses. Wire supervised IDCs as NFPA Class B or Class A circuits. The modules come with a thermoplastic cover for mounting to a 4-inch (10.16 cm) square mounting box.
FMM-101	FMM-101A	Functionally similar to the FMM-1 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.)
Pull Stations		
NBG-12LX	NBG-12LX	An addressable manual pull station with key-lock reset feature. The addressable module is housed within the pull station.
N/A	N-MPS Series Addressable	Addressable manual pull stations with hex-key reset feature. The addressable module is housed within the pull station.N-MPS-SA/N-MPS-SAC are single-stage; N-MPS-2A/N-MPS-2AC are dual stage. All models include screw terminal connectors and a hex key reset. Two-stage manual stations include a keyswitch and one key. N-MPS-SAC and N-MPS-2AC include N/C ancillary contact.
Control Modules		
FCM-1	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 Class B or Class A. The modules come with a thermoplastic cover for mounting to a 4-inch (10.16 cm) square mounting box.
FCM-1-REL	FCM-1-RELA	Control Module for releasing applications. FlashScan only. (For use with NFS2-3030, NFS2-640, NFS-320(C), and NFS-320SYS.)

UL-listed SLC Device	ULC-listed SLC Device	Description
FRM-1	FRM-1A	Relay Control Module is similar to the FCM-1 except used as a Form-C control relay module.
FTM-1	FTM-1A	Firefighter's Telephone Module; FlashScan-only device for use with Fire Fighters Telephone.
Fault Isolator Module		
ISO-X	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 Class A or Class X 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 ISO-X modules.
Multi-input/output modules		
FDRM-1	FDRM-1A	Dual Class B monitor / Form-C relay module.
XP6-C	XP6-CA	Controls six NAC or speaker/telephone circuits. (Not listed for use in releasing applications.)
XP6-R	XP6-RA	Controls six Form-C relays.
XP10-M	XP10-MA	Supervises ten Class-B addressable Initiating Device Circuits (IDC) which monitor normally open contact initiating devices.
XP6-MA	XP6-MAA	Monitors six zones of conventional two-wire detectors.

Notes

Notes

Notes

Index

Manufacturer Warranties and Limitation of Liability

Manufacturer Warranties. Subject to the limitations set forth herein, Manufacturer warrants that the Products manufactured by it in its Northford, Connecticut facility and sold by it to its authorized Distributors shall be free, under normal use and service, from defects in material and workmanship for a period of thirty six months (36) months from the date of manufacture (effective Jan. 1, 2009). The Products manufactured and sold by Manufacturer are date stamped at the time of production. Manufacturer does not warrant Products that are not manufactured by it in its Northford, Connecticut facility but assigns to its Distributor, to the extent possible, any warranty offered by the manufacturer of such product. This warranty shall be void if a Product is altered, serviced or repaired by anyone other than Manufacturer or its authorized Distributors. This warranty shall also be void if there is a failure to maintain the Products and the systems in which they operate in proper working conditions.

MANUFACTURER MAKES NO FURTHER WARRANTIES, AND DISCLAIMS ANY AND ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS, TRADEMARKS, PROGRAMS AND SERVICES RENDERED BY MANUFACTURER INCLUDING WITHOUT LIMITATION, INFRINGEMENT, TITLE, MERCHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE. MANUFACTURER SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL OR INDUSTRIAL USES OF ITS PRODUCTS.

This document constitutes the only warranty made by Manufacturer with respect to its products and replaces all previous warranties and is the only warranty made by Manufacturer. No increase or alteration, written or verbal, of the obligation of this warranty is authorized. Manufacturer does not represent that its products will prevent any loss by fire or otherwise.

Warranty Claims. Manufacturer shall replace or repair, at Manufacturer's discretion, each part returned by its authorized Distributor and acknowledged by Manufacturer to be defective, provided that such part shall have been returned to Manufacturer with all charges prepaid and the authorized Distributor has completed Manufacturer's Return Material Authorization form. The replacement part shall come from Manufacturer's stock and may be new or refurbished. THE FOREGOING IS DISTRIBUTOR'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A WARRANTY CLAIM.

Warn-HL-08-2009.fm

NOTIFIER
12 Clintonville Road
Northford, CT 06472-1610 USA
203-484-7161
www.notifier.com

NOTIFIER®
by Honeywell