



Intelligent Control Panel  
**SLC**  
Wiring Manual



# 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 photoelectric 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.

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# Installation Precautions

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

**WARNING - Several different sources of power can be connected to the fire alarm control panel.** Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or inter-connecting 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 0-49° C/32-120° 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 15-27° C/60-80° F.

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

**Like all solid state electronic devices,** this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and 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.

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## FCC Warning

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

## Canadian Requirements

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

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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## Software Downloads

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

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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.

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# Section 1: Introduction

## 1.1 Scope

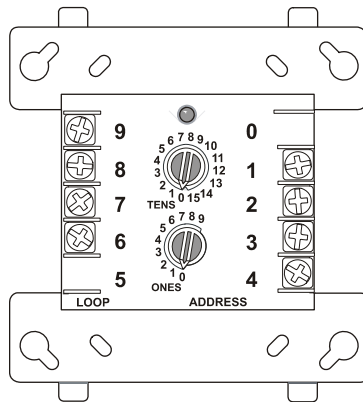
This document describes the operation, installation and wiring of various Signaling Line Circuit (SLC) devices when used with the Fire-Lite MS-9200, MS-9200E, MS-9600, MS-9600E, MS-9600LS, MS-9600LSC, MS-9600LSE, MS-9600UDLS, MS-9600UDLSE, MS-9200UD, MS-9200UDE, MS-9200UDLS, MS-9200UDLSE, MS-9200UDLSC, MS-9050UD, MS-9050UDC, MS-9050UDE, ES-50X, ES-50XC, ES-50XI, ES-200X, ES-200XC, ES-200XI, ES-1000X, ES-1000XC, and ES-1000XI control panels. It also provides basic information that applies to Fire•Lite SLC loops in general, such as the branch resistance measurements.



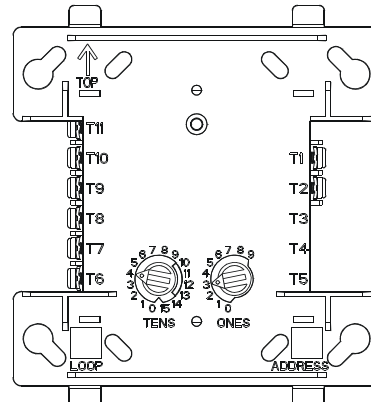
**NOTE:** Any reference in this manual to the MS-9200, MS-9200UD, MS-9200UDLS, MS-9600, MS-9600LS, MS-9600UDLS, MS-9050UD, ES-50X, ES-200X, or ES-1000X includes the MS-9200E, MS-9200UDE, MS-9200UDLSE, MS-9200UDLSC, MS-9600E, MS-9600LSE, MS-9600LSC, MS-9600UDLSE, MS-9050UDC, MS-9050UDE, ES-50XC, ES-50XI, ES-200XC, ES-200XI, ES-1000XC, or ES-1000XI respectively unless otherwise specified.

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

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



**CMF-300**  
Legacy Version Module  
(Vertical Rotary Dial)



**CMF-300**  
Newer Version Module  
(Horizontal Rotary Dial)



**NOTE:** Only the **MMF-300**, **MMF-302**, **CRF-300**, **CMF-300**, and **MDF-300** modules are available as newer type modules. Both the legacy and newer versions share the same part numbers. The newer version modules will be phased in, replacing the legacy version. This manual contains information and wiring diagrams for the newer version of the modules. Refer to “Terminal Conversion Charts for New & Legacy Devices” on page 71 for additional information.

Currently, there are two styles of detector bases available, legacy version and newer version. The obvious difference between the two styles is the orientation of the screw terminals. Refer to Section 9 and Appendix D for an illustration of each.



**NOTE:** Only the B501 Detector Base, B210LP Detector Base (replacement base for B350LP), B224RB Relay Base, and B224BI Isolator Base are available as newer type bases. Both the legacy and newer versions share the same part numbers. The newer version bases will be phased in, replacing the legacy version. This manual contains information and wiring diagrams for the newer version of the bases. Refer to “Intelligent Detector Base Layouts for Legacy Devices” on page 74 for additional information.

### 1.1.1 Reference Documentation

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

| For information on...   | Refer to...                   | Part Number     |
|---|-------------------------------|-----------------|
| MS-9200, MS-9200E   | Instruction Manual            | 51003           |
| MS-9600, MS-9600E   | Instruction Manual            | 51335           |
| MS-9200UD, MS-9200UDE Control Panels                                | Instruction Manual            | 51906           |
| MS-9200UDLS, MS-9200UDLSE, MS-9200UDLSC Control Panels              | Instruction Manual            | 52750           |
| MS-9600LS, MS-9600LS(C/E) & MS-9600UDLS, MS9600UDLSE Control Panels | Instruction Manual            | 52646           |
| MS-9050UD, MS-9050UDC, MS-9050UDE Control Panels                    | Instruction Manual            | 52413           |
| ES-50X, ES-50XC, ES-50XI Control Panels                             | Instruction Manual            | LS10129-000FL-E |
| ES-200X, ES-200XC, ES-200XI Control Panels                          | Instruction Manual            | LS10131-000FL-E |
| ES-1000X, ES-1000XC, ES-1000XI Control Panels                       | Instruction Manual            | LS10133-000FL-E |
| Compatible Devices  | Device Compatibility Document | 15384           |
| Wireless Sensor Network   | Instruction Manual            | LS10036-000FL-E |
| BG-12LX Pull Station  | Installation Instructions     | 156-3655        |



| For information on...   | Refer to...               | Part Number         |
|---|---------------------------|---------------------|
| MMF-300 Monitor Module  | Installation Instructions | 156-1191 / 156-3653 |
| MMF-300-10 Monitor Module                                     | Installation Instructions | 156-1873            |
| MMF-301 Mini Monitor Module                                   | Installation Instructions | 156-1193 / 156-3654 |
| MMF-302 Monitor Module  | Installation Instructions | 156-1192 / 156-3652 |
| MMF-302-6 Interface Module                                    | Installation Instructions | 156-1900            |
| MDF-300 Dual Monitor Module                                   | Installation Instructions | 156-0013 / 156-3665 |
| CMF-300 Control Module  | Installation Instructions | 156-1189 / 156-3650 |
| CMF-300-6 Control Module                                      | Installation Instructions | 156-1874            |
| CRF-300 Relay Module  | Installation Instructions | 156-1190 / 156-3651 |
| CRF-300-6 Relay Module  | Installation Instructions | 156-1875            |
| CDRM-300 Multiple Input/Output Module                         | Installation Instructions | 156-3726            |
| I300 Isolator Module  | Installation Instructions | 156-1381            |
| ISO-6 Isolator Module   | Installation Instructions | 156-4096            |
| AD350 Multi-criteria Detector                                 | Installation Instructions | F300-17-00          |
| AD355 Multi-criteria Detector                                 | Installation Instructions | 156-3660            |
| AD365/-IV Multi-criteria Detector*                            | Installation Instructions | 156-6617            |
| AD365A/-IV Multi-criteria Detector*                           | Installation Instructions | 156-9140            |
| SD350 & SD350T Photo Detector                                 | Installation Instructions | 156-0035            |
| SD355 & SD355T Photo Detector                                 | Installation Instructions | 156-3660            |
| SD355CO CO Detector   | Installation Instructions | 156-4129            |
| SD355R Photo Detector Remote Capable                          | Installation Instructions | 156-3570            |
| SD365CO CO Detector*  | Installation Instructions | 156-6601            |
| SD365/-IV Photo Detector                                      | Installation Instructions | 156-6523            |
| SD365T/-IV Photo Detector                                     | Installation Instructions | 156-6526            |
| SD365R/-IV Photo Detector Remote Capable                      | Installation Instructions | 156-6524            |
| C365 CO Detector*   | Installation Instructions | 156-6613            |
| CSD365 Photo/CO Detector*                                     | Installation Instructions | 156-6609            |
| CP350 Ionization Detector                                     | Installation Instructions | 156-0036            |
| CP355 Ionization Detector                                     | Installation Instructions | 156-3656            |
| H350 Heat Detector  | Installation Instructions | 156-0038            |
| H350R Heat Detector w/ROR                                     | Installation Instructions | 156-0037            |
| H355 Heat Detector (135°)                                     | Installation Instructions | 156-3657            |
| H355R Heat Detector w/ROR                                     | Installation Instructions | 156-3657            |
| H355HT Heat Detector (190°)                                   | Installation Instructions | 156-3657            |
| H365/-IV Heat Detector (135°)                                 | Installation Instructions | 156-6525            |
| H365R/-IV Heat Detector w/ROR                                 | Installation Instructions | 156-6525            |
| H365HT/-IV Heat Detector (190°)                               | Installation Instructions | 156-6525            |
| D350P Duct Detector   | Installation Instructions | F300-10-00          |
| D350PL(A) Duct Detector - low flow                            | Installation Instructions | 156-1975            |
| D350RP Duct Detector w/Relay                                  | Installation Instructions | 156-0047            |
| D350RPL(A) Duct Detector w/Relay - low flow                   | Installation Instructions | 156-1974            |
| D355PL Duct Detector - low flow                               | Installation Instructions | 156-3255            |
| D365PL Duct Detector - low flow                               | Installation Instructions | 156-6626            |
| D365PLA Duct Detector - low flow                              | Installation Instructions | 156-6627            |
| BEAM355(S) Addressable Beam Detector                          | Installation Instructions | 156-2425            |
| OSI-RI-FL Intelligent Beam Detector                           | Installation Instructions | 156-6584            |
| B210LP Plug-in Detector Base                                  | Installation Instructions | 156-3739            |
| B501 Legacy Detector Base                                     | Installation Instructions | 156-0357            |
| B501, B501-WHITE, B501-IV, and B501-BL Detector Bases         | Installation Instructions | 156-3738            |
| B501BH Sounder Detector Base                                  | Installation Instructions | 156-0491            |
| B501BH-2 Sounder Detector Base                                | Installation Instructions | 156-2813            |
| B501BHT Temporal Sounder Detector Base                        | Installation Instructions | 156-1367            |
| B501BHT-2 Temporal Sounder Detector Base                      | Installation Instructions | 156-2819            |
| B200S-WH, B200S-IV Sounder Detector Bases                     | Installation Instructions | 156-3387            |
| B200S-LF-WH, B200S-LF-IV Low Frequency Sounder Detector Bases | Installation Instructions | 156-4151            |
| B200SR-WH, B200SR-IV Sounder Detector Bases                   | Installation Instructions | 156-3392            |

| For information on...   | Refer to...               | Part Number |
|---|---------------------------|-------------|
| B200SR-LF-WH, B200SR-LF-IV Low Frequency Sounder Detector Bases | Installation Instructions | I56-4152    |
| B224RB Legacy Relay Detector Base                               | Installation Instructions | I56-2815    |
| B224RB-WH, B224RB-IV Relay Detector Bases                       | Installation Instructions | I56-3737    |
| B224BI Isolator Detector Base                                   | Installation Instructions | I56-0725    |
| B224BI-WH, B224BI-IV Isolator Detector Bases                    | Installation Instructions | I56-3736    |
| B300-6, B300-6-IV Detector Base                                 | Installation Instructions | I56-6566    |
| SD992 Photo Detector  | Installation Instructions | I56-5827    |
| H995 Photo/Thermal Detector                                     | Installation Instructions | I56-5828    |
| MCP900 Addressable Pull Station                                 | Installation Instructions | I56-5833    |
| CMF-900 Control Module  | Installation Instructions | I56-5829    |
| MMF-900 Monitor Module  | Installation Instructions | I56-5830    |
| MMF-902 Interface Module  | Installation Instructions | I56-5831    |
| I900 Isolator Module  | Installation Instructions | I56-5832    |
| IO900 Input/Output Module                                       | Installation Instructions | I56-5834    |
| B901 Detector Base  | Installation Instructions | I56-1900    |

\* Listed for use in Open Area Protection Applications per UL 268 7th Edition requirements.

## 1.2 Overview

Communication between the control panel and intelligent addressable monitor and control devices takes place through a Signaling Line Circuit (SLC), which can be wired to meet the requirements of NFPA Class A, Class B, 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 “Surge Suppression” on page 67.

## 1.3 Polling Protocols

The MS-9200UDLS, MS-9600LS, MS-9600UDLS, ES-50X, ES-200X, and ES-1000X support LiteSpeed protocol or Classic Loop Interface Protocol (CLIP). The MS-9200/E, MS-9600/E, MS-9200UD/E, and MS-9050UD support Classic Loop Interface Protocol (CLIP) only.

### 1.3.1 Available Protocols

**LiteSpeed** is a communication protocol that greatly enhances the speed of communication between analog intelligent devices. Only the MS-9200UDLS, MS-9600LS, MS-9600UDLS, ES-50X, and ES-200X, and ES-1000X are capable of operating in LiteSpeed mode. This is the default mode of operation for these FACP's.

**CLIP** (Classic Loop Interface Protocol) polls devices in sequential order. All Fire-LiteFireWarden addressable fire alarm control panels can operate in CLIP mode. This is the default mode of operation for all other FACP's.

### 1.3.2 Protocol Use

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

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



**NOTE:** FACP's with more than one SLC loop must be programmed for only LiteSpeed or CLIP mode of operation. Communication protocols cannot be split between SLC loops.

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

## 1.4 Devices

### 1.4.1 Isolator Modules

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

**I300** - Single fault isolator module

**ISO-6** - Six fault isolator module

### 1.4.2 Monitor Modules

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

**MMF-300** - Monitors a Class B or Class A circuit of dry-contact input devices.

**MMF-300-10** - Monitors ten (10) Class B or five (5) Class A normally open contact device circuits.

**MMF-301** - Same as the **MMF-300** except offered in a smaller package for mounting with Class B wired devices. This module does not have an LED.

**MMF-302** - Monitors a single IDC of two-wire smoke detectors.

**MMF-302-6** - Addressable module that provides an interface between the control panel and six (6) Class B or three (3) Class A IDCs of two-wire smoke detectors.

**MDF-300** - Similar to **MMF-300**, but provides for two independent Class B IDCs.

### 1.4.3 Control Modules

Through the **CMF-300** addressable control module, the control panel can selectively activate a Notification Appliance Circuit (NAC).

**CMF-300-6** - Similar in operation to the **CMF-300**, except it can activate six (6) Class B or three (3) Class A NACs.

### 1.4.4 Relay Modules

The **CRF-300** addressable relay module provides the control panel with a dry-contact output for activating a variety of auxiliary devices.

**CRF-300-6** - Similar in operation to the **CRF-300**, except it provides six (6) Form-C relays.

### 1.4.5 Multiple Input/Output Modules

The **CDRM-300** addressable multiple input/output module monitors two (2) Class B input devices and provides two (2) independent Form-C relay contacts.

### 1.4.6 Intelligent Detectors

**AD350**<sup>1</sup> - A multi-criteria smoke sensor that combines a photoelectric sensing chamber and 135°F (57.2°C) fixed temperature heat detection. The sensor uses addressable communication to transmit smoke density and other information to the control panel. It adjusts its detection parameters and alarm threshold depending on the ambient conditions it samples in its environment.

**AD355** - Multi-criteria smoke sensor that combines a photoelectric sensing chamber and 135°F (57.2°C) fixed temperature heat detection. The sensor uses addressable communication to transmit smoke density and other information to the control panel. It adjusts its detection parameters and alarm threshold depending on the ambient conditions it samples in its environment.

**AD365** - Multi-criteria smoke sensor that combines a photoelectric sensing chamber and 135°F (57.2°C) fixed temperature heat detection. The sensor uses addressable communication to transmit smoke density and other information to the control panel. It adjusts its detection parameters and alarm threshold depending on the ambient conditions it samples in its environment. This model is available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in LiteSpeed only.

**CP350**<sup>1</sup> - An addressable ionization smoke detector which measures the level of combustion products in its chamber using the 'ionization principle'. This device cannot be used with the ES-1000X Series panels.

**CP355** - Addressable ionization smoke detector which measures the level of combustion products in its chamber using the 'ionization principle'. This device cannot be used with the ES-1000X Series panels.

**D350P**<sup>1</sup> - An addressable photoelectric duct detector. The **D350RP**<sup>1</sup> includes an alarm relay. Air velocity rating is 500 to 4,000 feet per minute.

**D350PL**<sup>1</sup> - Addressable low flow photoelectric duct detector (**D350PLA** for Canada). The **D350RPL**<sup>1</sup> includes an alarm relay (**D350RPLA** for Canada). Low Flow refers to the air velocity rating of 100 to 4,000 feet per minute (0.5 to 20.32 m/sec).

**D355PL** - An addressable non-relay photoelectric low flow smoke detector. Low Flow refers to the air velocity rating of 100 to 4,000 feet per minute (0.5 to 20.32 m/sec).

**D365PL** - An addressable non-relay photoelectric low flow smoke detector. Low Flow refers to the air velocity rating of 100 to 4,000 feet per minute (0.5 to 20.32 m/sec).

**H350**<sup>1 2</sup> - An addressable detector using a thermistor sensing circuit for fast response. **H350R**<sup>1</sup> incorporates a thermal rate of rise of 15°F (9.4°C)/minute.

**H355**<sup>2</sup> - Addressable 135° fixed temperature heat detector using a thermistor sensing circuit for fast response. **H355R** incorporates a thermal rate of rise of 15° F (9.4° C)/minute.

**H355HT**<sup>2</sup> - Addressable 190° fixed temperature heat detector using a thermistor sensing circuit for fast response.

**H365**<sup>2</sup> - Addressable 135° fixed temperature heat detector using a thermistor sensing circuit for fast response. **H365R** incorporates a thermal rate of rise of 15° F (9.4° C)/minute. This model is available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in LiteSpeed only.

**H365HT**<sup>2</sup> - Addressable 190° fixed temperature heat detector using a thermistor sensing circuit for fast response. This model is available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in LiteSpeed only.

**SD350**<sup>1</sup> - An addressable photoelectric smoke detector which provides smoke sensing utilizing optical sense technology. The **SD350T** includes a 135° F fixed thermal sensor.

**SD355** - Addressable photoelectric smoke detector which provides smoke sensing utilizing optical sense technology. The **SD355T** includes a 135° F fixed thermal sensor. The **SD355R** is a low profile, intelligent, photoelectric sensor that is remote test capable.

- 
1. This detector is not compatible with the ES-1000X(I)(C).
  2. Addressable Heat Detectors are not compatible with the MS-9200(E).

**SD365** - Addressable photoelectric smoke detector which provides smoke sensing utilizing optical sense technology. The **SD365T** includes a 135° F fixed thermal sensor. The **SD365R** is a low profile, intelligent, photoelectric sensor that is remote test capable. For use with DNR(W). This model is available in ivory with -IV added to the model name. The ivory color model has the ability to work in CLIP mode. The standard white color functions in LiteSpeed only.

**SD355CO** - Addressable device that provides both fire and carbon monoxide (CO) detection. It combines four separate sensing elements in one unit (smoke, CO, light/flame, and heat) to sense multiple components of a fire. The detector's electrochemical sensing cell creates a separate signal for life safety CO detection.

**SD365CO** - Addressable devices that provides both fire and carbon monoxide (CO) detection. It combines four separate sensing elements in one unit (smoke, CO, light/flame, and heat) to sense multiple components of a fire. The detector's electrochemical sensing cell creates a separate signal for life safety CO detection. This model functions in LiteSpeed only.

**BEAM355** - Addressable long range projected beam smoke detector designed to provide open area protection. The **BEAM355S** has an integral sensitivity test feature that consists of a test filter attached to a servomotor inside the detector optics.

**DNR(W)** - Innovair Flex, intelligent, non-relay, low flow, photoelectric duct detector housing. This requires the SD355R or SD365R photoelectric smoke detector. Accommodates the installation of the CRF-300 relay module. The **DNRW** is a watertight housing.

**OSI-RI-FL** - Addressable long range projected beam smoke detector designed to provide open area protection. Operates in LiteSpeed or CLIP mode.

**C365** - Intelligent, plug-in type Intelligent CO sensor. The sensor transmits an analog representation of carbon monoxide density over a communication line to a control panel.

**CSD365** - A plug-in type multi-criteria smoke sensor that offers a photoelectric sensing chamber combined with a carbon monoxide (CO) sensor.

## 1.4.7 Manual Pull Station

The **BG-12LX** is a dual-action pull station that, when activated, provide an addressable identification and its location to the control panel. An addressable monitor module is mounted inside the pull station to facilitate servicing and replacement.

## 1.4.8 Wireless Gateway

**W-GATE** - The wireless gateway acts as a bridge between a group of wireless fire devices and a LiteSpeed SLC loop on the ES-50X, ES-200X, ES-1000X, or MS-9200UDLS. It is powered by the SLC loop or by a regulated, external 24VDC UL listed power supply. Available wireless devices include a photo detector, a photo/heat detector, a fixed-temperature heat detector, a rate-of-rise heat detector, and a monitor module. For details about wireless devices, system setup, and operation, see the *SWIFT™ Smart Wireless Integrated Fire Technology Instruction Manual*.



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

## 1.4.9 300 Series Addressable Devices

Fire•Lite's 300 Series of addressable devices are fully compatible with the MS-9200, MS-9200UD, MS-9200UDLS, MS-9600, MS-9600LS(C/E), MS-9600UDLS/E, MS-9050UD, ES-50X, and ES-200X, and ES-1000X FACPs. The devices must be configured for CLIP (Classic Loop Interface Protocol) Mode operation. The address of 300 series devices cannot be set above 99. Compatible devices include:

- SD300 Photo
- SD300T Photo w/Thermal
- CP300 Ionization
- BG-10LX Pull Station
- M300 Monitor Module
- M301 Mini Monitor Module
- M302 2-wire Monitor Module
- C304 Control/Relay Module

## 1.4.10 900 Series Addressable Devices

Fire•Lite's 900 Series of addressable devices are fully compatible with the MS-9200UDLS/E and MS-9050UD/E FACPs, however they are *not for use in the United States or Canada*. The devices must be configured for CLIP (Classic Loop Interface Protocol) Mode operation. The address of 900 series devices cannot be set above 99. Compatible devices include:

- SD992 Photo
- H995 Photo w/Thermal
- MCP900 Call Point/Pull Station
- CMF-900 Control Module
- B901 Base
- MMF-900 Monitor Module
- MMF-902 Interface Module
- I900 Isolator Module
- IO900 Input/Output Module
- CP900 Programming Tool

Refer to the manufacturer's installation instructions for information on wiring and programming.

## 1.5 SLC Capacity

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

## 1.6 SLC Performance

SLC performance depends on the type of circuit (Class A, Class B, or Class X) and the components on the circuit.



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

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 72-1999) lists the trouble conditions that result when a fault exists on an SLC.

| 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                 |
| <ul style="list-style-type: none"> <li>• Trouble - The control panel will indicate a trouble condition for this type of fault.</li> <li>• Alarm - The control panel must be able to process an alarm input signal in the presence of this type of fault.</li> </ul> |                         |                         |                         |

**Table 1.1 SLC Performance**

## 1.7 Surge Suppression

One primary surge protector must be used with each SLC wiring pair whenever SLC wiring runs outside the building. For detailed information refer to “Surge Suppression” on page 67.

## 1.8 LED Operation

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

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

**Table 1.2 LED Operation**

## Section 2: Wiring Requirements

### 2.1 Wire Sizing

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

#### 2.1.1 CLIP (Classic Loop Interface Protocol) Mode

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

| Wire Requirements  | Distance in Feet (meters)                                | Wire Size                      | Wire Type   |
|--|--|--------------------------------|---|
| Twisted-pair, shielded                                       | 10,000 feet (3,048 m)                                    | 12 AWG (3.1 mm <sup>2</sup> )  | Belden 9583, Genesis 4410, Signal 98230, WPW D999         |
|  | 8,000 feet (2,438 m)                                     | 14 AWG (2.0 mm <sup>2</sup> )  | Belden 9581, Genesis 4408, Signal 98430, WPW D995         |
|  | 4,875 feet (1,486 m)                                     | 16 AWG (1.3 mm <sup>2</sup> )  | Belden 9575, Genesis 4406, & 4606, Signal 98630, WPW D991 |
|  | 3,225 feet (983 m)                                       | 18 AWG (0.75 mm <sup>2</sup> ) | Belden 9574, Genesis 4402 & 4602, Signal 98300, WPW D975  |
| Untwisted, unshielded wire, inside conduit or not in conduit | MS-9200 = 1,000 feet (305 m)                             | 12 to 18 AWG                   |   |
|  | MS-9600, MS-9600LS(C) & MS-9600UDLS = 3,000 feet (914 m) |                                |   |
|  | MS-9200UD & MS-9200UDLS = 3,000 feet (914 m)             |                                |   |
|  | MS-9050UD = 3,000 feet (914 m)                           |                                |   |
|  | ES-50X, ES-200X, & ES-1000X = 3,000 feet (914 m)         |                                |   |

Table 2.1 SLC Wiring Requirements in CLIP Mode

#### 2.1.2 LiteSpeed Mode

The ES-50X, ES-200X, ES-1000X, MS-9200UDLS, MS-9600LS, and MS-9600UDLS SLC can be programmed to operate in LiteSpeed mode for a quicker device response time. While shielded wire is not required, it is recommended that all SLC wiring be twisted-pair to minimize the effects of electrical interference. Use the following table to determine the specific wiring requirements for the SLC.

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

Table 2.2 SLC Wiring Requirements in LiteSpeed Mode

## 2.2 Measuring Resistance & Length

### 2.2.1 Two-Wire SLC - Class B

#### Loop Resistance

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

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

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

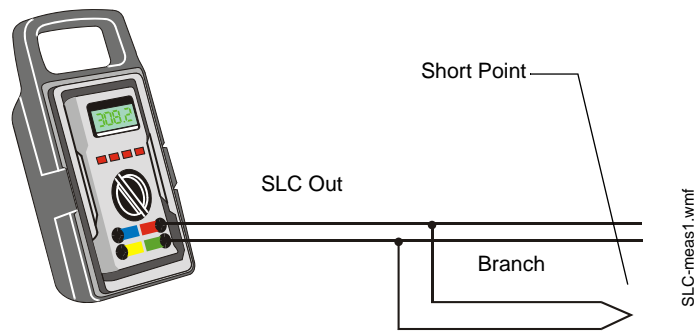


Figure 2.1 Measuring DC Resistance of a Two-Wire SLC

### Total Wire Length

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

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

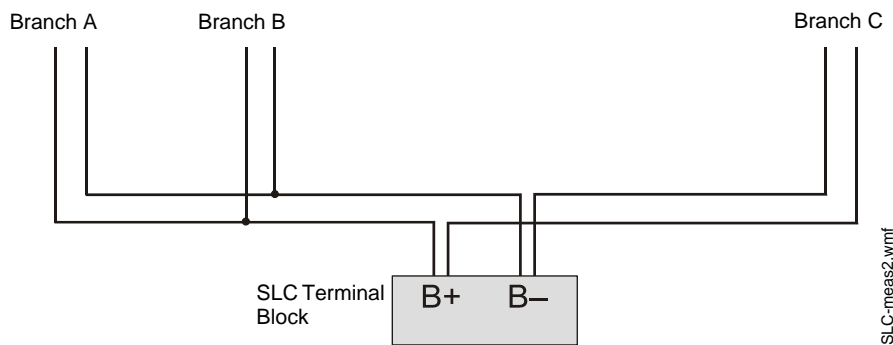


Figure 2.2 Measuring the Total Wire Length - Two-Wire SLC

## 2.2.2 Four-Wire SLC Class A and Class X

### Loop Resistance

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

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

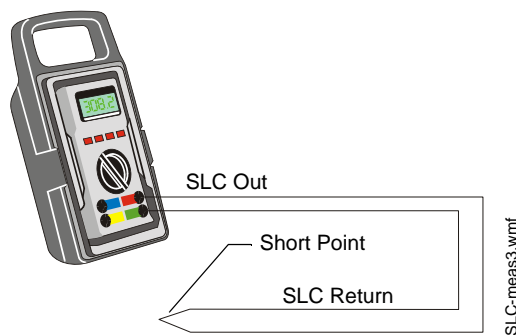


Figure 2.3 Measuring DC Resistance of a Four-Wire SLC

### Total Wire Length

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

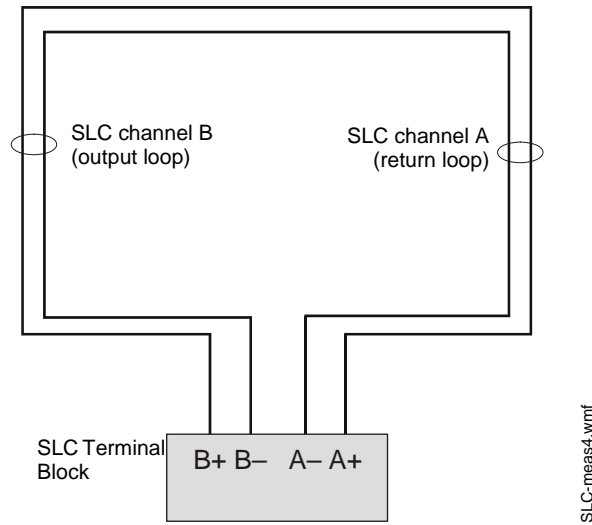


Figure 2.4 Measuring the Wire Length – Four-Wire SLC

### 2.3 Shield Wire Termination

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

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



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



**CAUTION: EARTH GROUND**

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

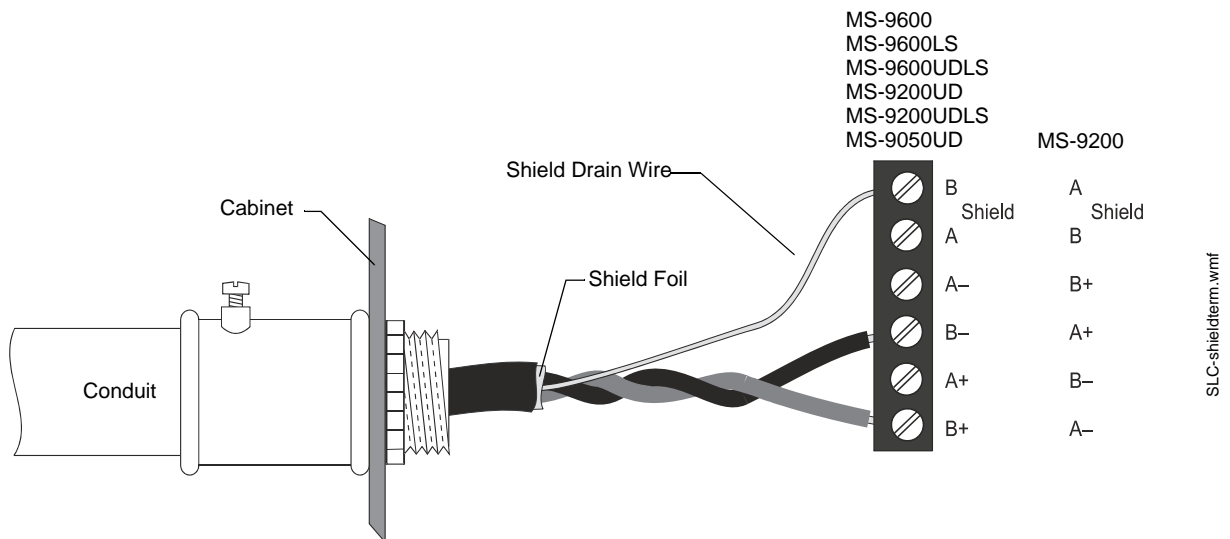


Figure 2.5 Shield Termination



## 2.4 Control Panel Terminal Blocks

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

### 2.4.1 MS-9200

TB4 provides three types of 24 VDC power; Unregulated, Nonresettable and Resettable.

TB6 provides connections for the SLC wiring.

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

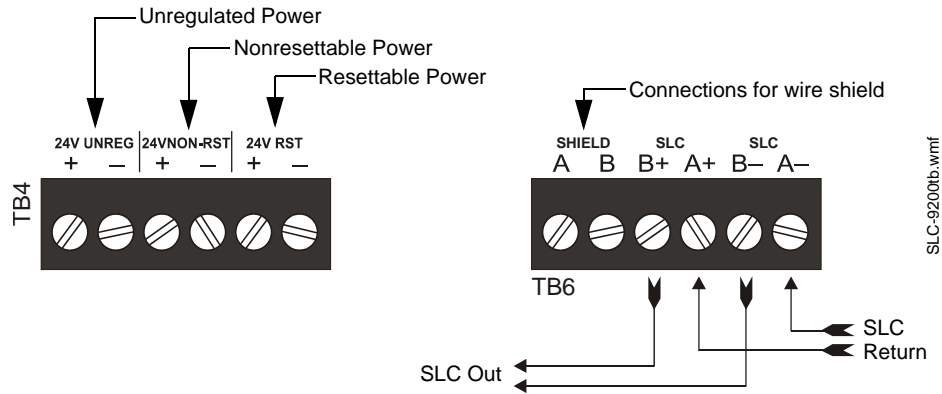


Figure 2.6 MS-9200 Terminal Blocks

### 2.4.2 MS-9600, MS-9600LS, & MS-9600UDLS

TB3 provides two types of 24 VDC power; Nonresettable and Resettable.

TB8 provides connections for the SLC wiring.

198 addresses are available per loop (99 detectors and 99 modules) while operating in CLIP mode. 318 addresses are available per loop (159 detectors and 159 modules) while operating in LiteSpeed mode.

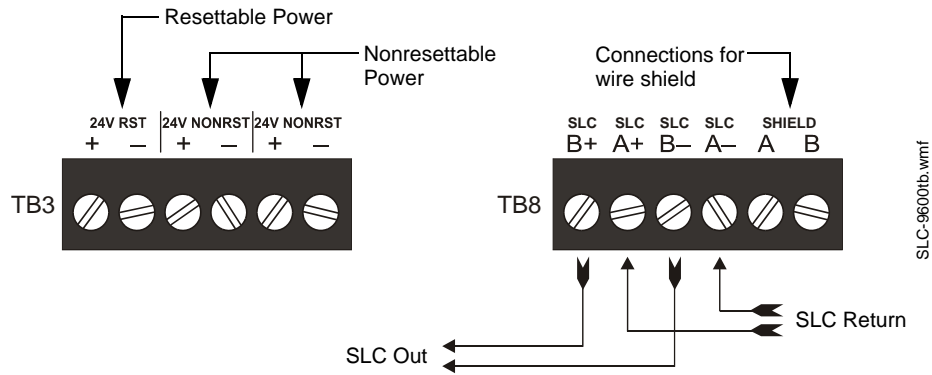


Figure 2.7 MS-9600 Series Terminal Blocks

### 2.4.3 MS-9200UDLS(Software Version 3.0)

TB1 provides two types of 24 VDC power; Nonresettable and Resettable, jumper selectable by JP4 and JP6.  
 TB10 provides connections for the SLC wiring.  
 198 addresses are available per loop (99 detectors and 99 modules).

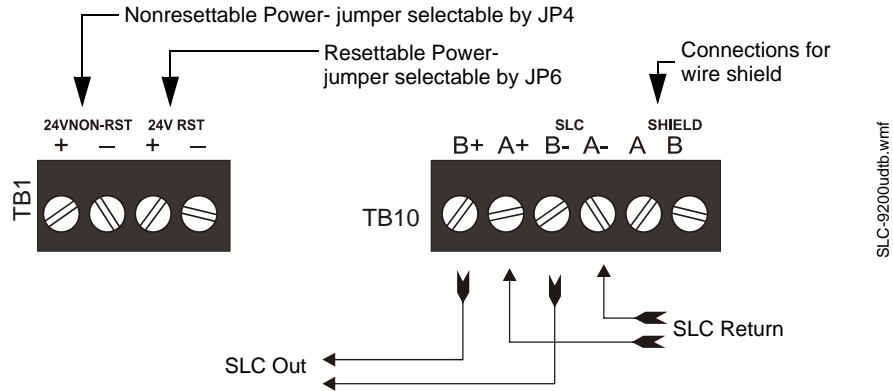


Figure 2.8 MS-9200UDLS (Rev 3) Terminal Blocks

### 2.4.4 MS-9200UD & MS-9200UDLS (Versions 1 and 2)

TB1 provides two types of 24 VDC power; Nonresettable and Resettable.  
 TB10 provides connections for the SLC wiring.  
 198 addresses are available per loop (99 detectors and 99 modules).

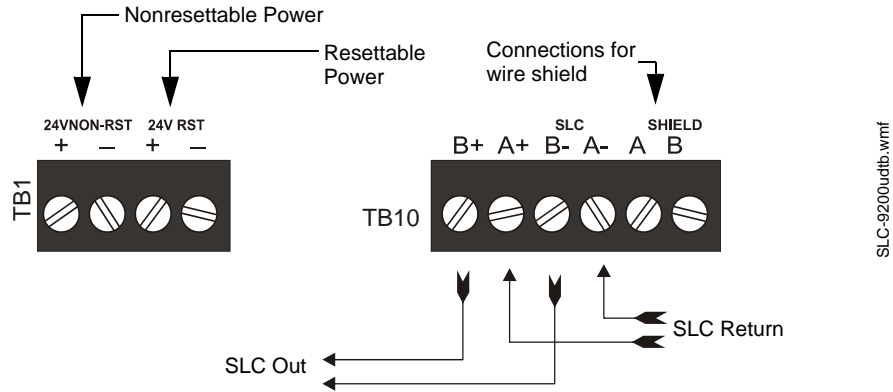


Figure 2.9 MS-9200UD & MS-9200UDLS (Rev 1 & 2) Terminal Blocks

### 2.4.5 MS-9050UD

24 VDC power may be supplied by a remote power supply such as the Fire-Lite FCPS-24FS6/8.  
 TB2 provides connections for the SLC wiring.  
 50 addresses are available (any combination of detectors and modules).

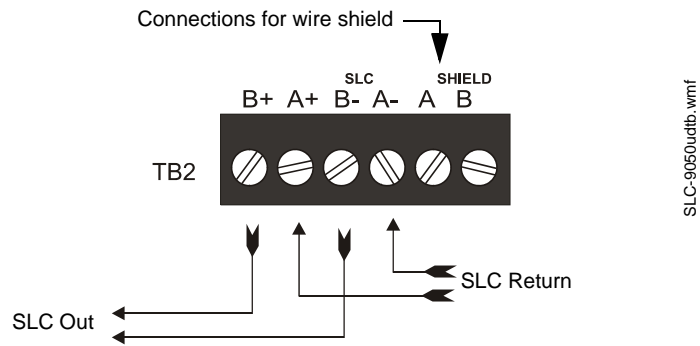


Figure 2.10 MS-9050UD Terminal Block

### 2.4.6 ES-50X

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

TB12 provides connections for the SLC wiring.

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

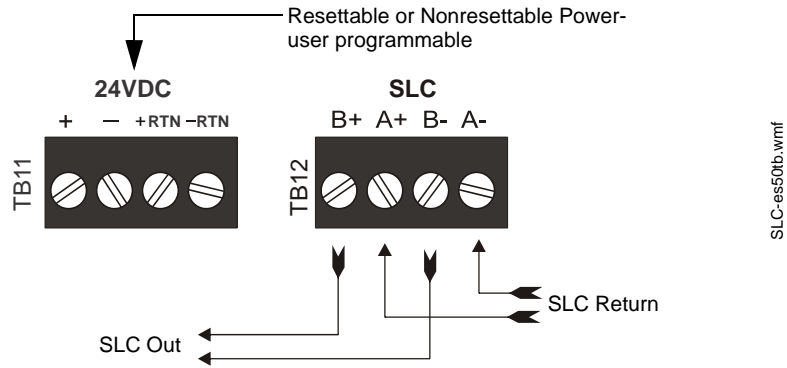


Figure 2.11 Terminal Block

### 2.4.7 ES-200X

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

TB12 provides connections for the SLC wiring.

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

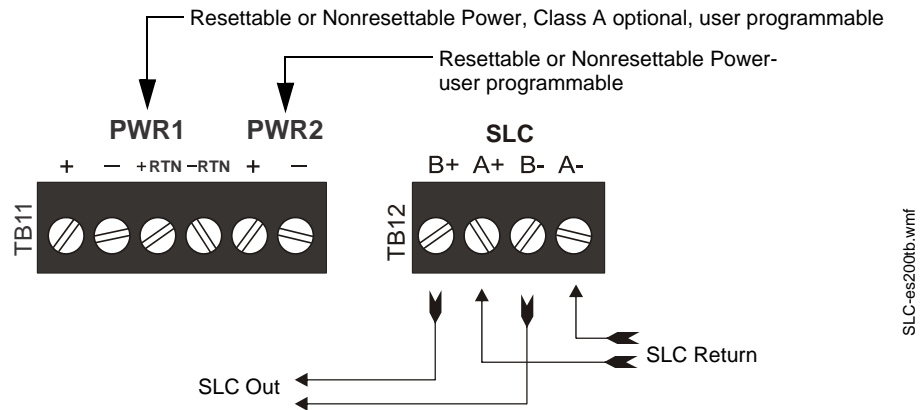


Figure 2.12 Terminal Blocks

### 2.4.8 ES-1000X

TB11, TB18, and TB13 provide two types of 24 VDC power, Non-resettable and Resettable, user resettable. Aux PWR1 on TB11 has a user programmable Class A wiring option.

TB1 on the SLC-3LS loop card provides connections for the SLC wiring.

198 addresses are available per loop (99 detectors and 99 modules) while operating in CLIP mode. 318 addresses are available per loop (159 detectors and 159 modules) while operating in LiteSpeed mode. An extra two SLC loops are available when using additional SLC-3LS loop expander modules.

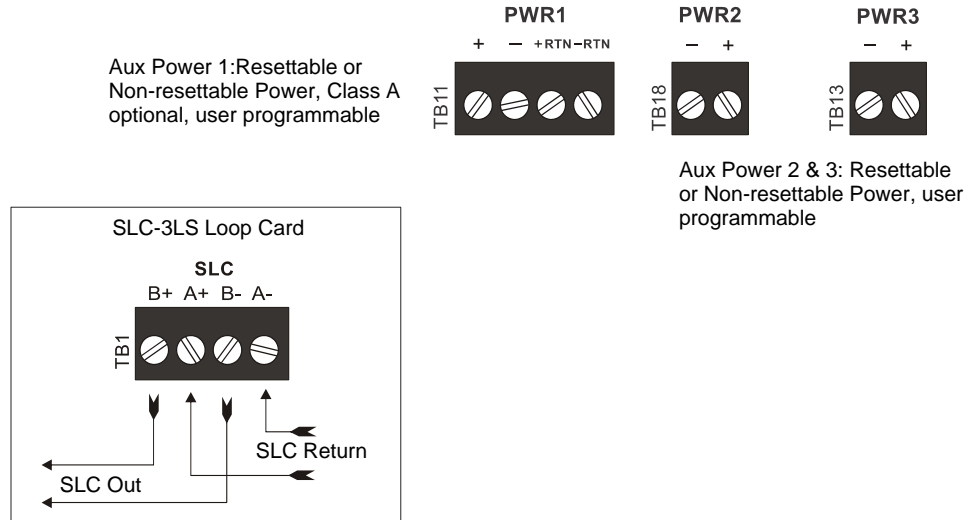


Figure 2.13 Terminal Blocks

SLC-es1000tb.wmf

## Section 3: SLC Circuits without Isolators

### 3.1 Overview

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

- NFPA Class B
- NFPA Class A

### 3.2 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.

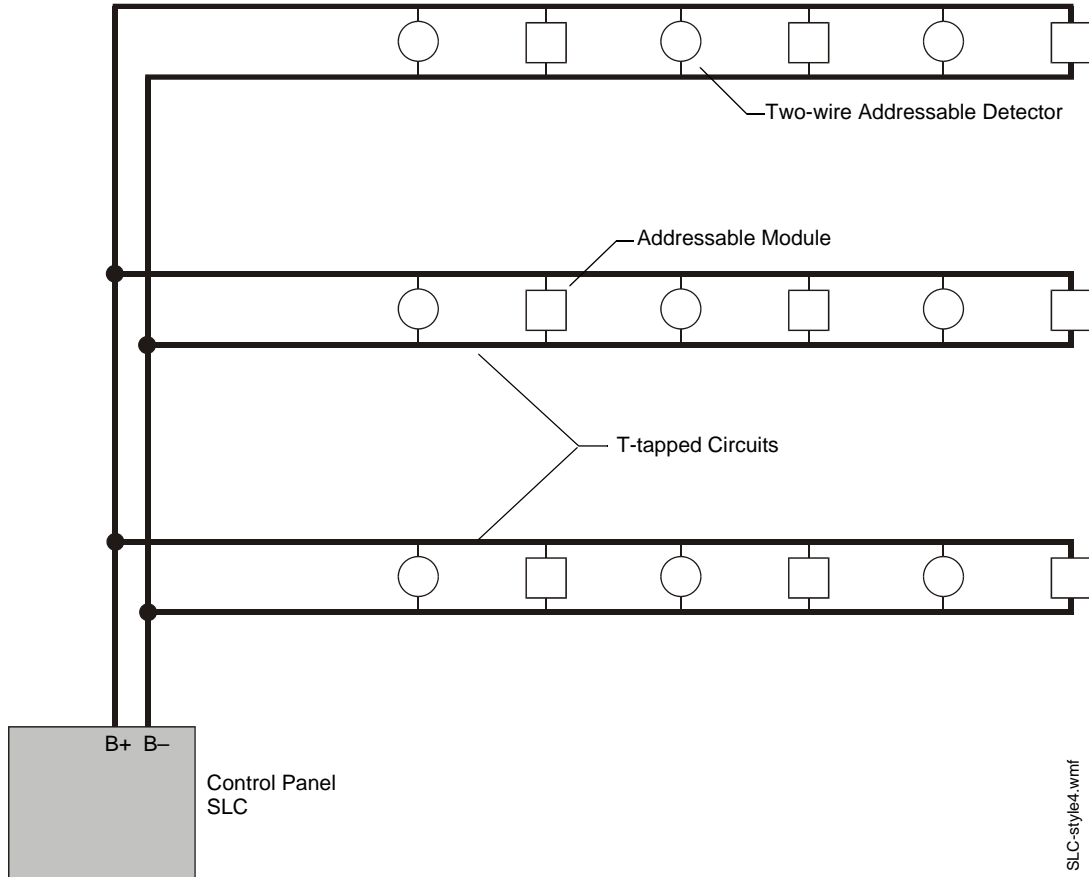


Figure 3.1 Basic NFPA Class B SLC

### 3.3 NFPA Class A SLC

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

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

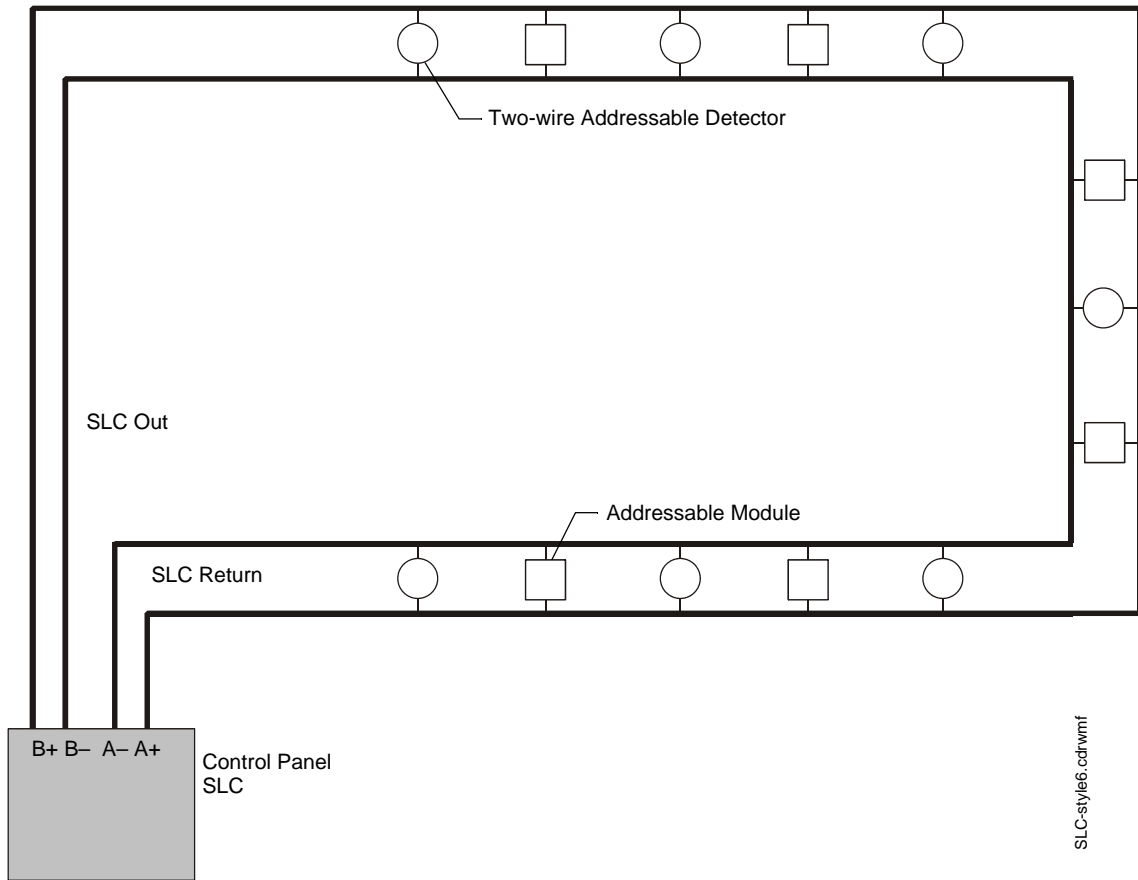


Figure 3.2 Basic NFPA Class A SLC

## Section 4: SLC Circuits with Isolators

### 4.1 Fault Isolator Devices

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

- Fault Isolator Module: **I300**
- Six Fault Isolator Module: **ISO-6**
- Isolator Detector Base: **B224BI/-WH/-IV**

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



#### CAUTION: MAXIMUM ADDRESSABLE DEVICES

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

#### 4.1.1 Isolating an SLC Branch

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

#### 4.1.2 Wiring an Isolator Module

##### I300 Module

The figure below shows typical wiring of an I300 Isolator Module.

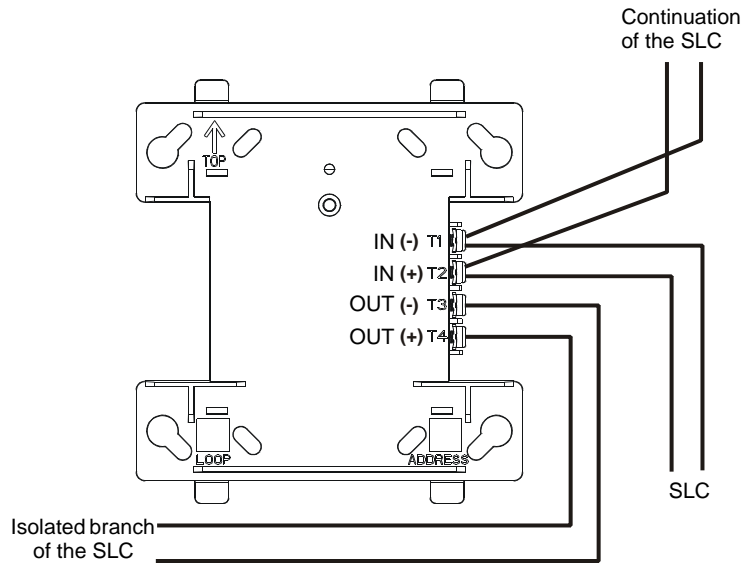


Figure 4.1 Wiring an I300 Module

SLC-isowire2.wmf

### ISO-6 Module

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

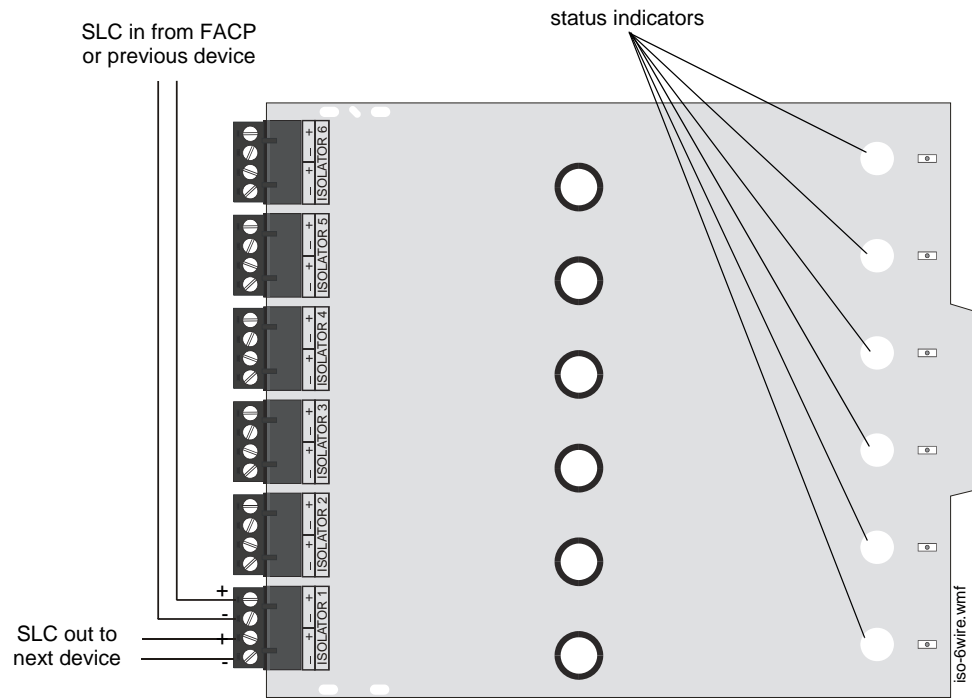
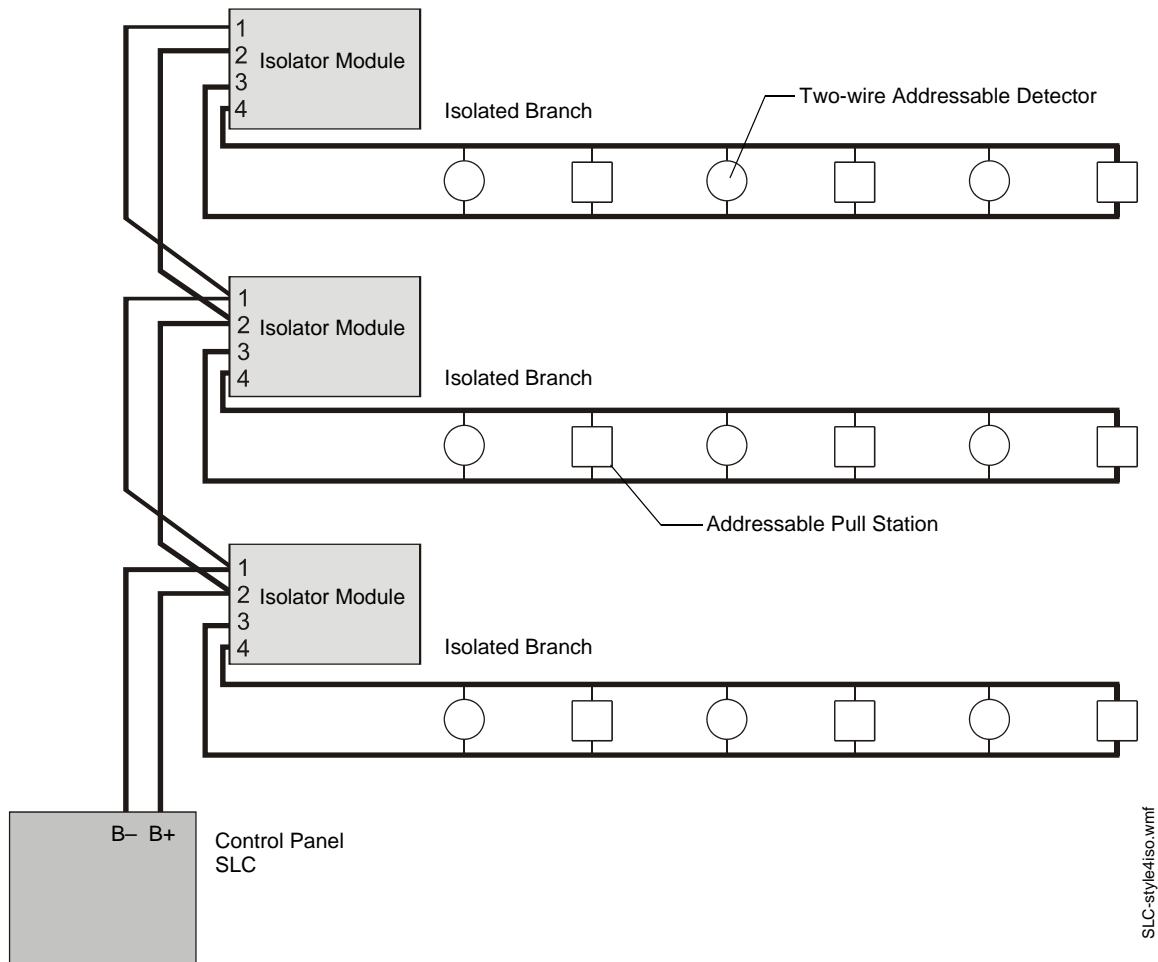


Figure 4.2 Wiring an ISO-6 Module



### 4.2 NFPA Class B SLC Using Isolator Modules

A variation of a Class B operation using an I300 isolator module to protect each branch of the SLC is shown below. Refer to Figure 4.1 for I300 wiring and to Section 4.1 for limitations.



SLC-style4iso.wmf

Figure 4.3 NFPA Class B SLC Using an I300 Isolator Module

A variation of a Class B operation using an ISO-6 isolator module to protect each branch of the SLC is shown below. Each terminal on the ISO-6 acts as a single I300 module. Refer to Figure 4.2 for ISO-6 wiring and to Section 4.1 for limitations. Note that the ISO-6 cannot accept two wires at one pin. Wire Class B SLC loops as shown in the figure below.

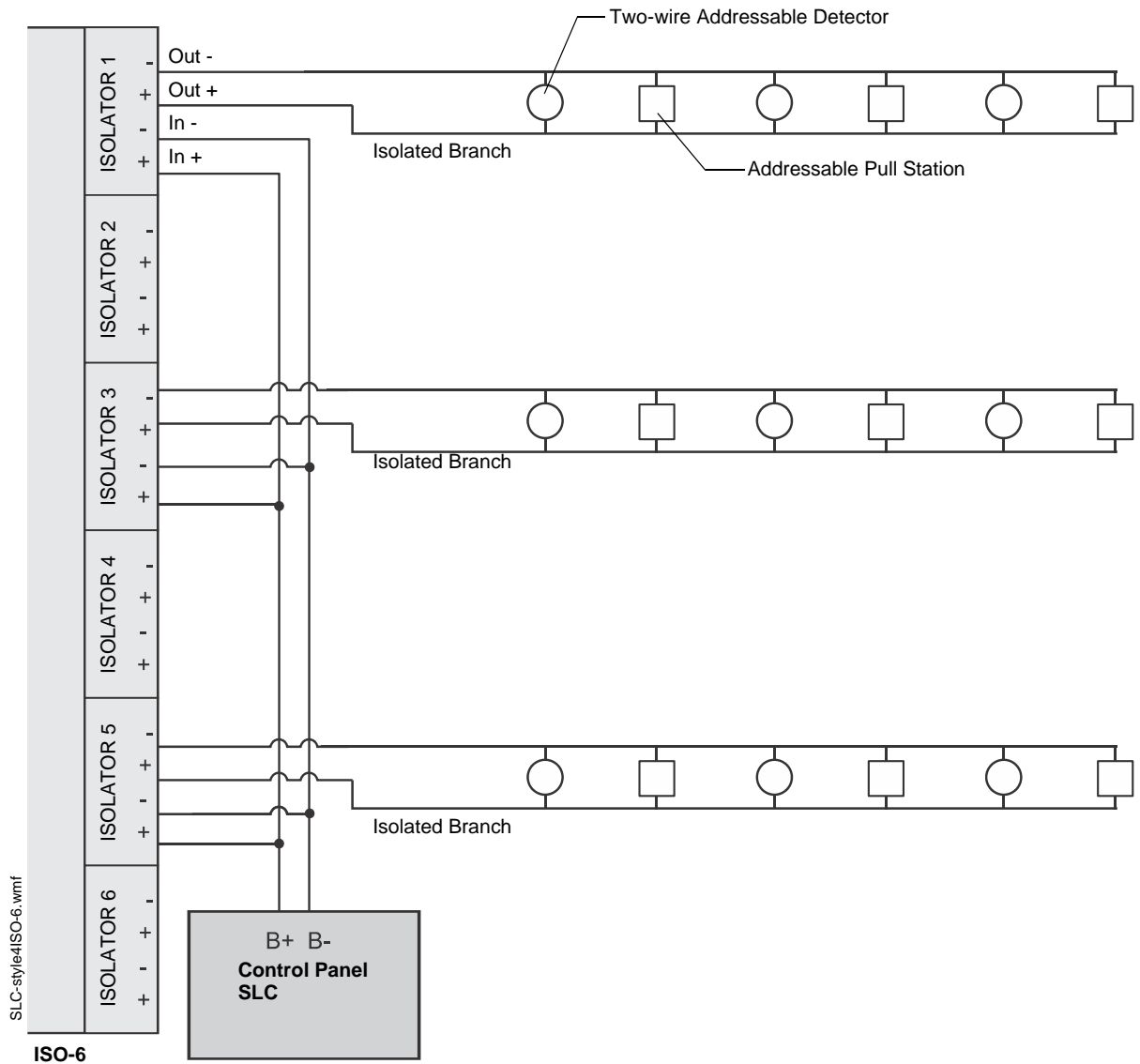


Figure 4.4 NFPA Class B SLC Using an ISO-6 Isolator Module

### 4.3 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 an I300 fault isolator module, each group is protected from faults that may occur in the other groups. For example, a fault in Section B will not effect Sections A & C. The isolator modules on either side of Section B will open the loop. Section A will still operate from power on the SLC Out side and Section C will operate from the SLC Return side.

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

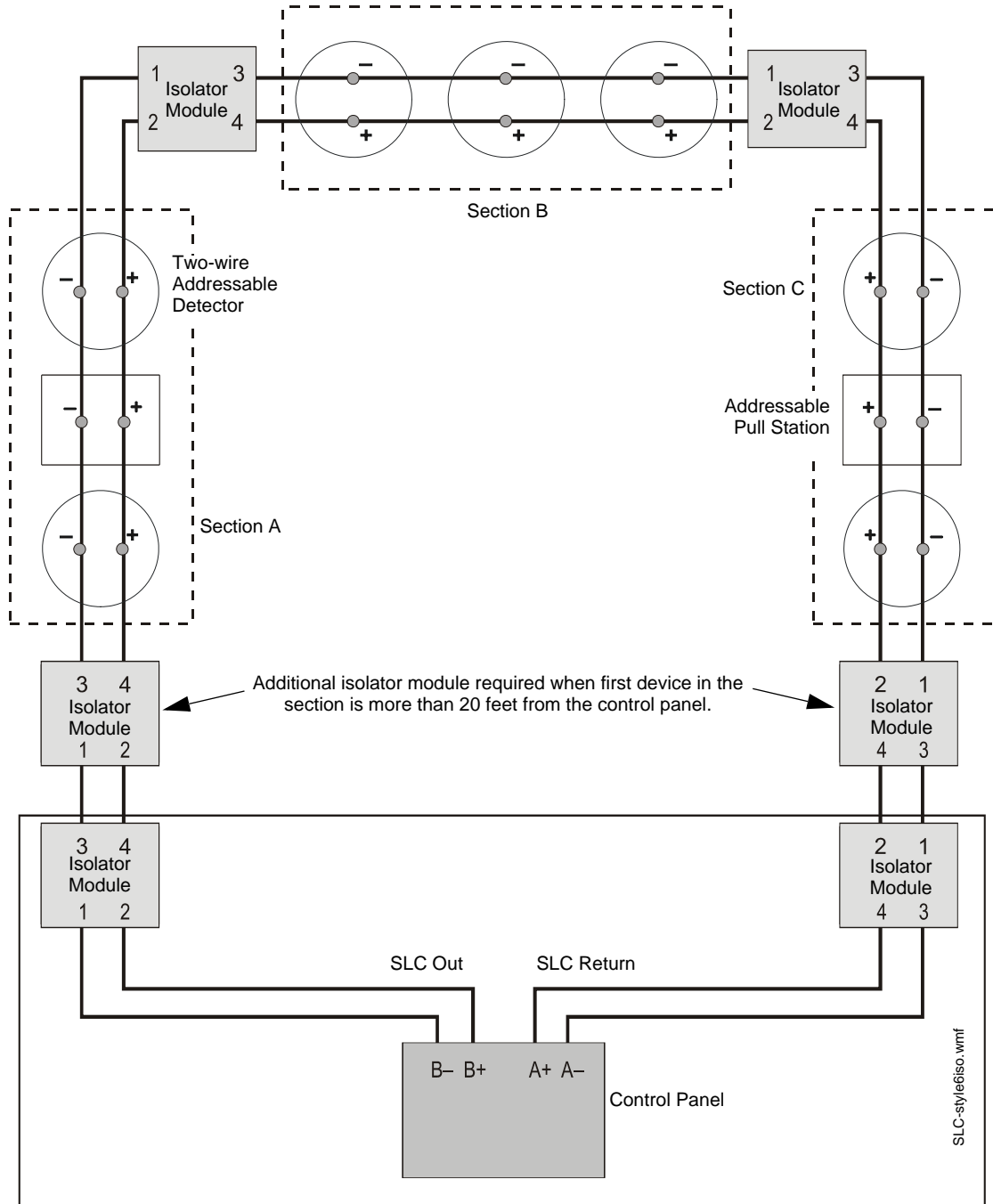


Figure 4.5 NFPA Class A SLC Using Isolator Modules

### 4.4 NFPA Class X SLC Using Isolator Modules

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

- T-tapping is NOT allowed within the Class X wiring configuration.
- When a detector base or pull station is used, install isolator modules on both sides of the device.
- Connections between isolator modules and the device they isolate must be “close-nippled” conduit, within 3 feet (91.44 cm).
- For ES-1000XC(-FR) DCLC applications, an addressable detector with the Isolator Detector Base, B224BI(-WH/-IV), must be used in place of isolator modules as shown below.

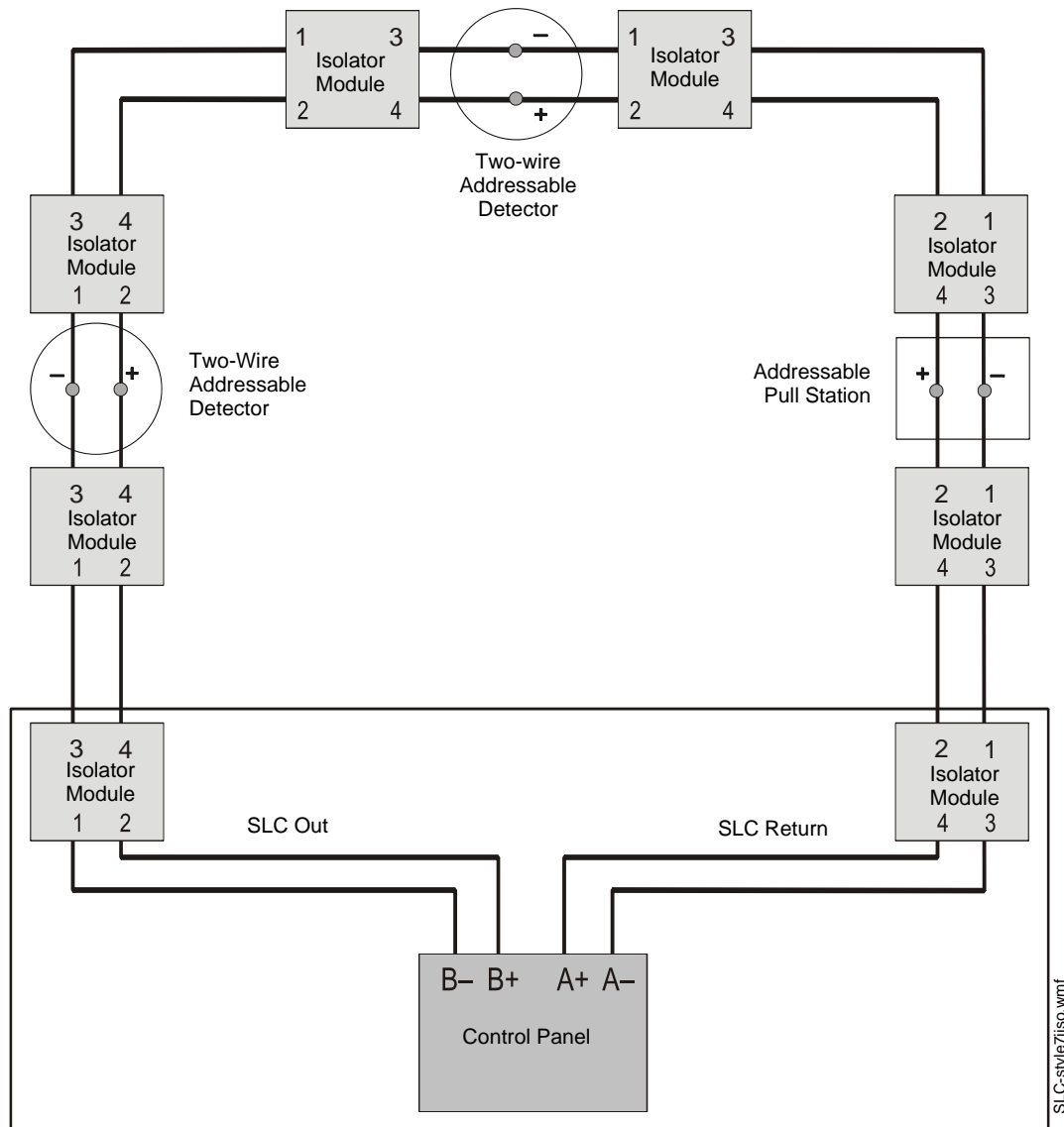


Figure 4.6 NFPA Class X SLC Using Isolator Modules

# Section 5: Monitor Modules

## 5.1 Descriptions

These addressable modules monitor conventional contact-type alarm initiating devices. You can configure module circuits as an NFPA 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 circuit.



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

### 5.1.1 Addressable Monitor Modules

#### MMF-300 Monitor Module

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

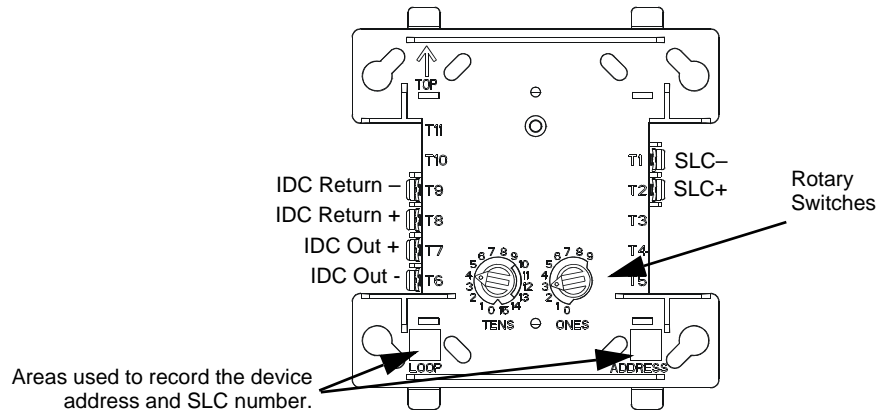


Figure 5.1 MMF-300 Monitor Module

FMM1pH.wmf

### MMF-300-10 Monitor Module

This is an addressable monitor module intended to interface between the FACP and up to ten (10) Class B or five (5) Class A IDCs containing normally open contact devices.

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

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

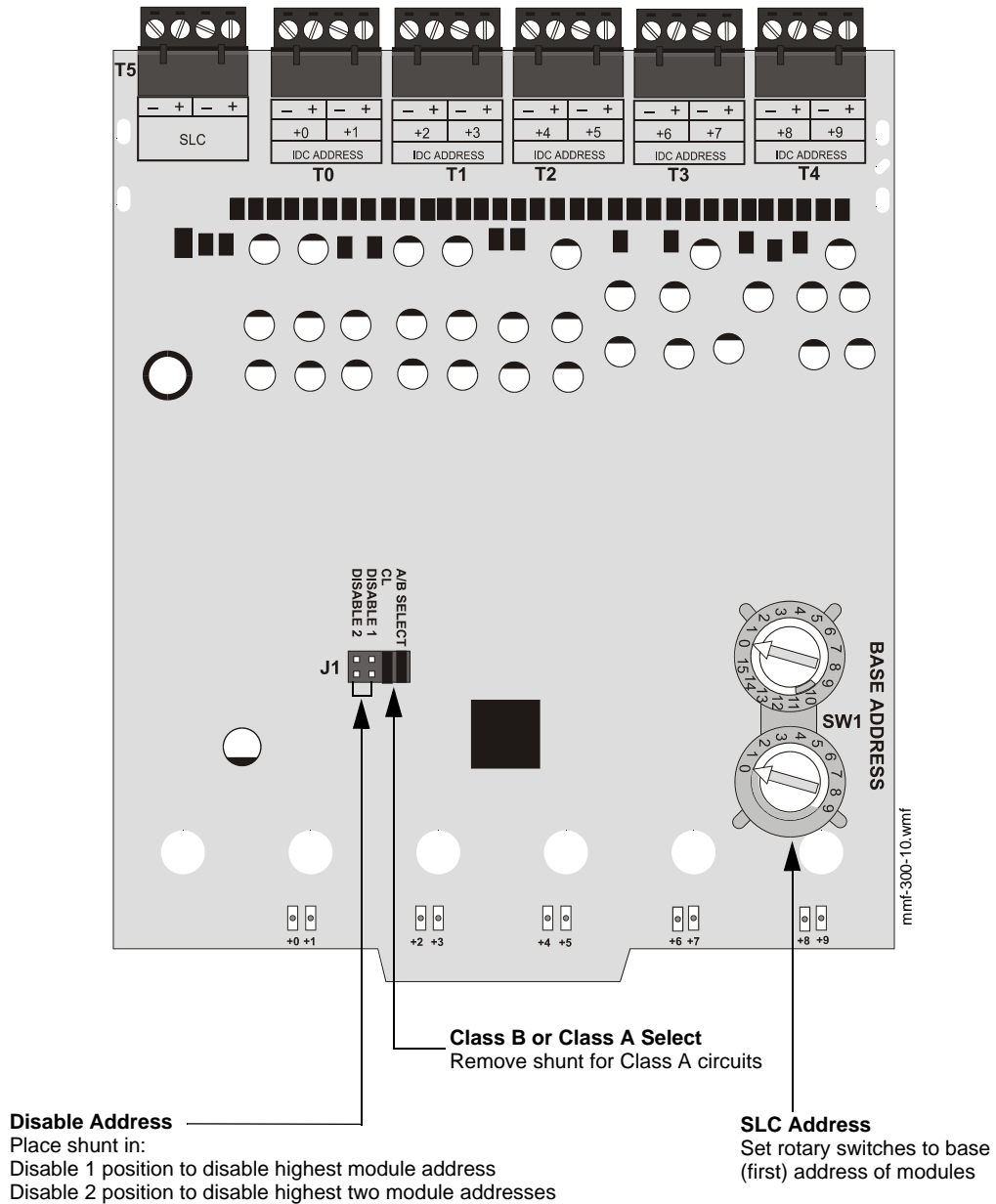


Figure 5.2 MMF-300-10 Monitor Module

### 5.1.2 Zone Interface Modules

#### MMF-302 Module

Similar to the MMF-300, this module is used to monitor a single IDC of UL listed compatible two-wire 24 volt conventional smoke detectors. Refer to the *Device Compatibility Document* for a list of compatible detectors.

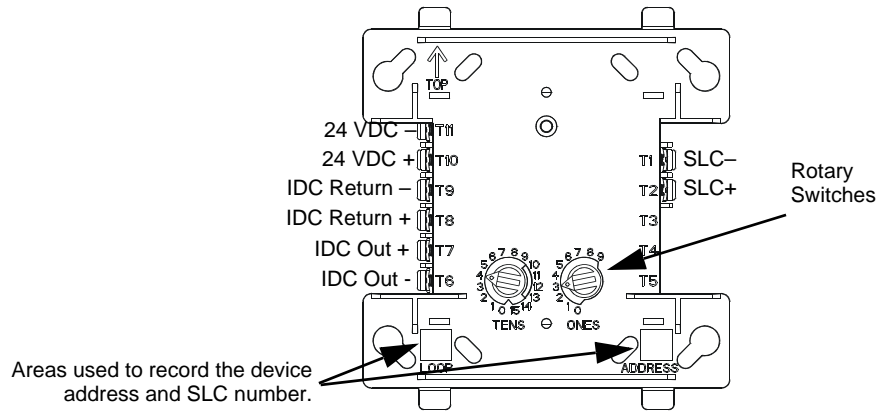


Figure 5.3 MMF-302 Interface Module

### MMF-302-6 Interface Module

This monitor module is intended to interface between the FACP and a conventional alarm system with up to six (6) Class B or three (3) Class A IDCs containing normally open contact devices.

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

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

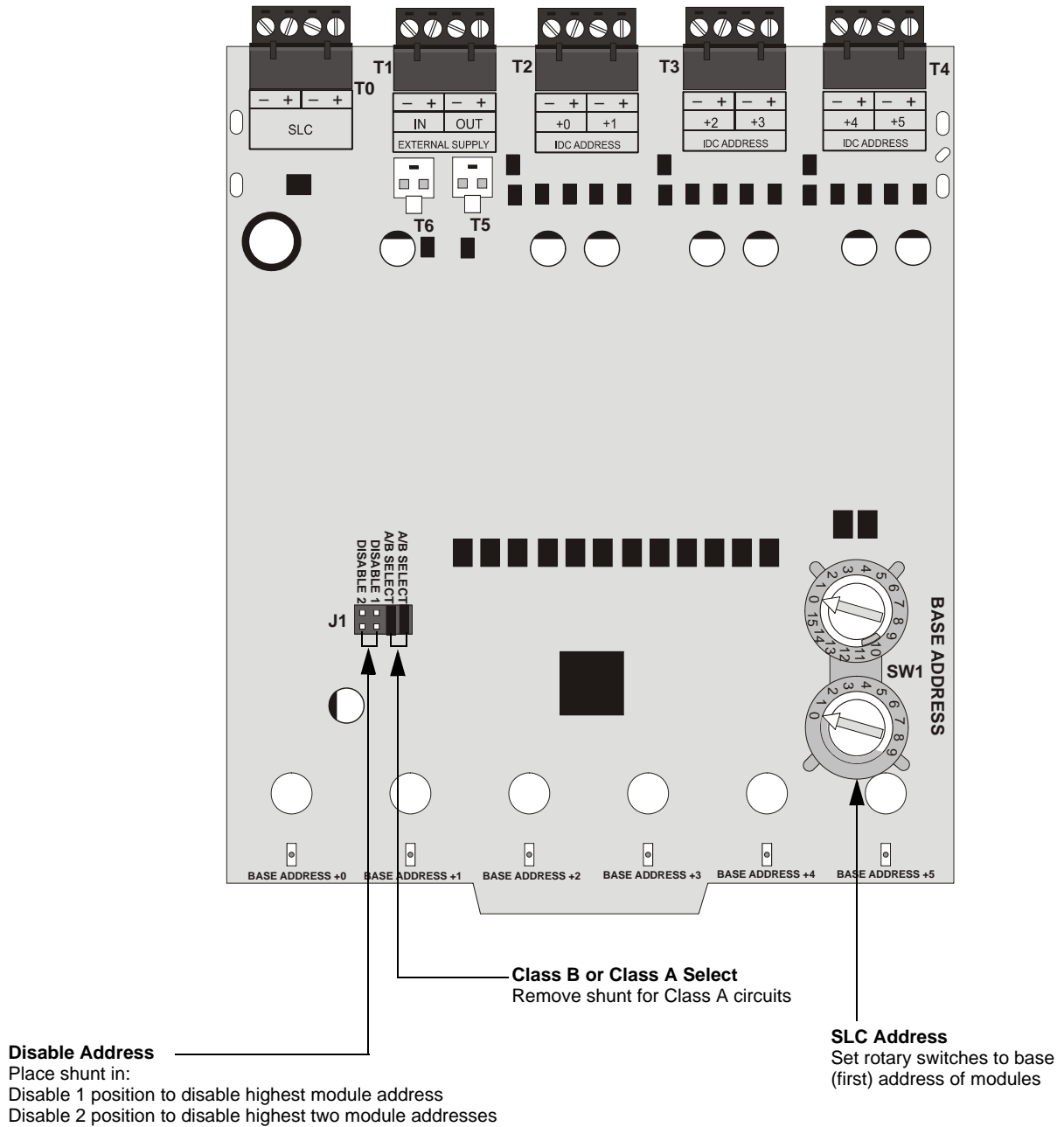


Figure 5.4 MMF-302-6 Interface Module



### 5.1.3 Dual Monitor Module

#### MDF-300 Module

The MDF-300 is similar to the MMF-300 but provides for two independent 2-wire IDCs at two separate, consecutive addresses.

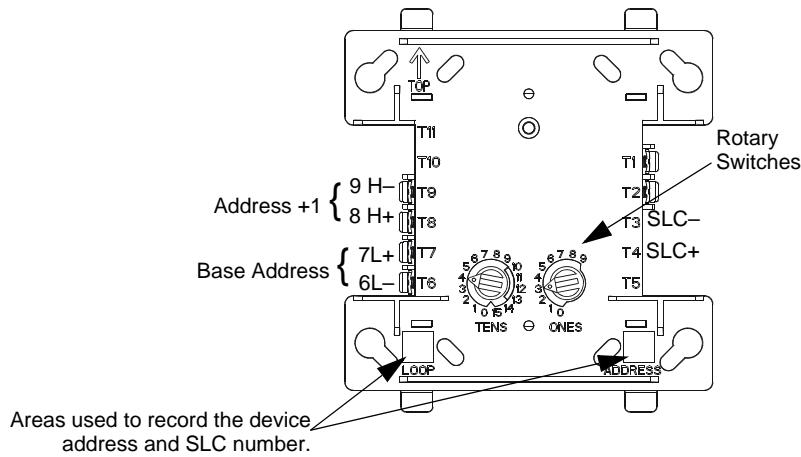


Figure 5.5 MDF-300 Dual Monitor Module

### 5.1.4 Mini Monitor Module

#### MMF-301 Monitor Module

The MMF-301 is functionally and electrically identical to an MMF-300, but is offered in a smaller package for mounting directly in the electrical box of the Class B device being monitored.

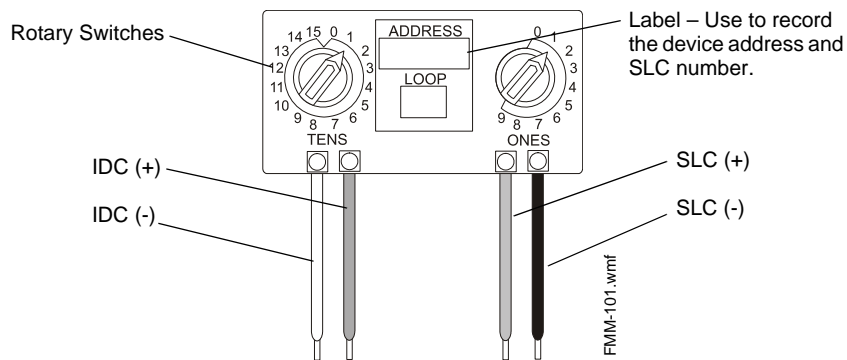


Figure 5.6 MMF-301 Mini Monitor Module

## 5.2 Installation

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

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

### 5.2.1 Setting the SLC Address for a Single Point Module

Each module can be set to one of 159 addresses (01-159) and is factory preset with an address of “00”.



**NOTE:** The MS-9050UD and ES-50X can support addresses 01 - 50. The MS-9200, MS-9200UD, MS-9200UDLS, and ES-200X, can support module addresses of 01 - 99. The MS-9600, MS-9600LS, MS-9600UDLS, and ES-1000X can support module addresses 01 - 159. The plastic stop located on the Tens switch must be removed to set addresses above 99.

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

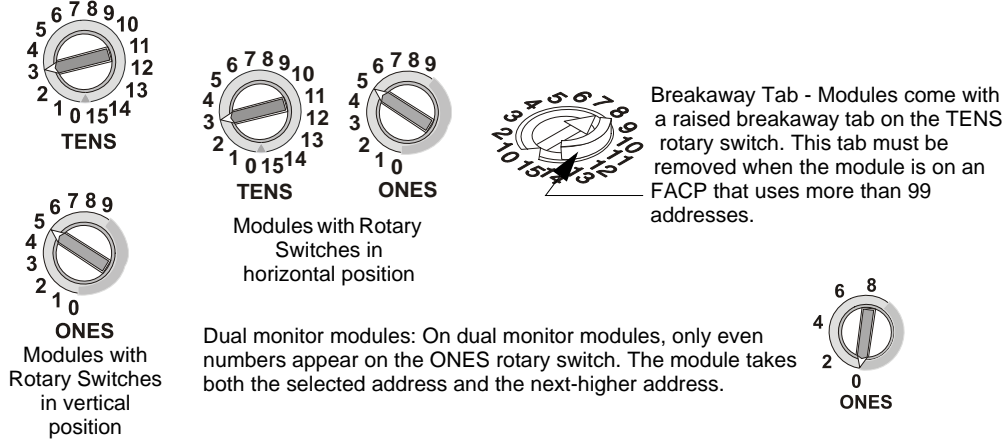


Figure 5.7 Setting an SLC Address on a Single Point Module

### 5.2.2 Setting the SLC Address for a Multi-Point Module

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

In Class B operation, each MMF-300-10, MMF-302-6, CMF-300-6, and CRF-300-6 module is set to a base address. The remaining module points are automatically assigned to the next higher SLC addresses. For example, if the base address of an MMF-300-10 is set to 28, the next module points will be addressed to 29, 30, 31, 32, 33, 34, 35, 36 and 37.

In Class A operation, alternate module points are paired together, resulting in a total of five module points. For example, if the base address of an MMF-300-10 is set to 28, then 30, 32, 34 and 36 will be automatically assigned to the remaining module points and 29, 31, 33, 35 and 37 are available for use by other modules.



**NOTE:** The MS-9050UD and ES-50X can support addresses 01 - 50. The MS-9200, MS-9200UD, MS-9200UDLS, and ES-200X, can support module addresses of 01 - 99. The MS-9600, MS-9600LS, MS-9600UDLS, and ES-1000X can support module addresses 01 - 159. The plastic stop located on the Tens switch must be removed to set addresses above 99.

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

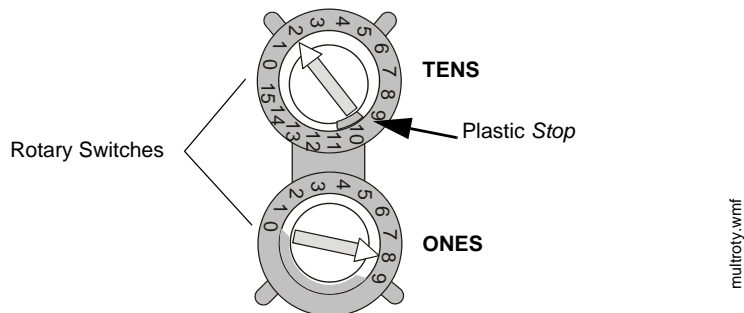


Figure 5.8 Setting an SLC Address on a Multi-Point Module

## 5.3 MMF-300 Wiring Diagrams

Following are wiring diagrams that depict NFPA Class B and Class A Initiating Device Circuits (IDCs) using MMF-300 monitor modules. The Initiating Device Circuit (IDC) is supervised and current-limited to 210 microamperes @ 24 VDC (nominal).

### 5.3.1 Wiring an NFPA Class B IDC with an MMF-300

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

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting the SLC Address for a Single Point Module” on page 34.

The figure below shows typical wiring for a supervised and power-limited NFPA Class B IDC using an MMF-300 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See “Power Considerations” on page 65 for information on supervising 24 VDC power.
- The wiring class of the external power source must match the wiring class of the device being powered.

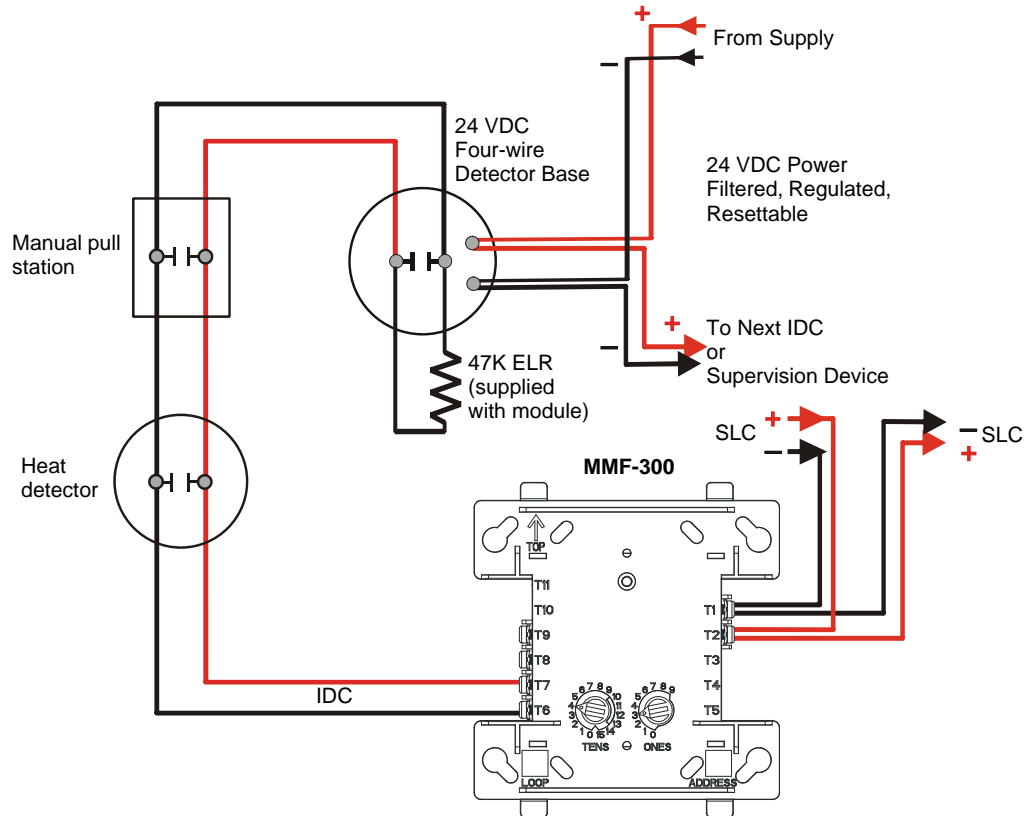


Figure 5.9 Typical Class B IDC Wiring with an MMF-300

SLC-icb1ipH.wmf

### 5.3.2 Wiring an NFPA Class A IDC with an MMF-300

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

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting the SLC Address for a Single Point Module” on page 34.

The figure below shows typical wiring for a supervised and power-limited NFPA Class A IDC using an MMF-300 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See “Power Considerations” on page 65 for information on supervising 24 VDC power.
- The wiring class of the external power source must match the wiring class of the device being powered.

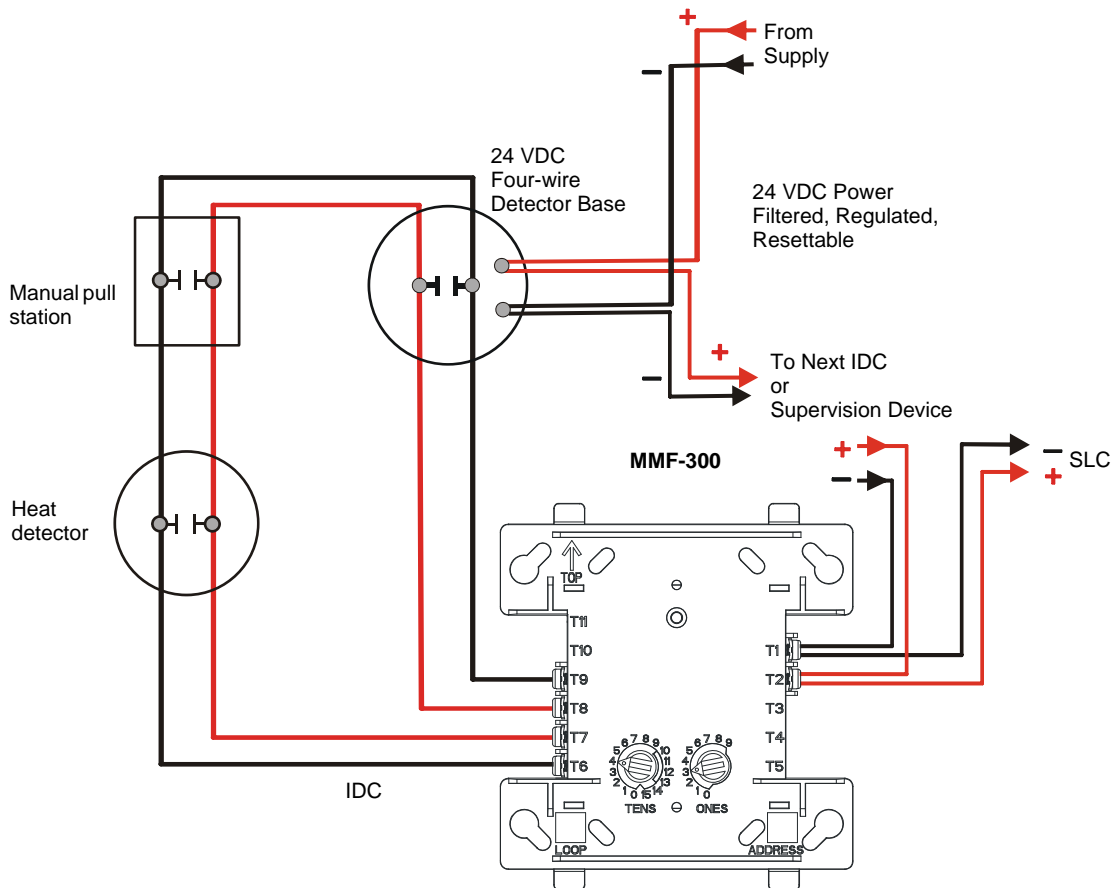


Figure 5.10 Typical Class A IDC Wiring with an MMF-300

SLC-idxD1 tpH.wmf

### 5.3.3 MMF-300 Wiring for Emergency Alarm System Applications

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

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting the SLC Address for a Single Point Module” on page 34.

The figure below shows typical wiring for a supervised and power-limited Emergency Signaling circuit using an MMF-300 module.

- See “Power Considerations” on page 65 for information on supervising 24 VDC power.
- See Section 6, “Control Modules” for instructions on using control modules as NACs on an SLC.
- Refer to the *Device Compatibility Document* #15384 for compatible smoke detectors.

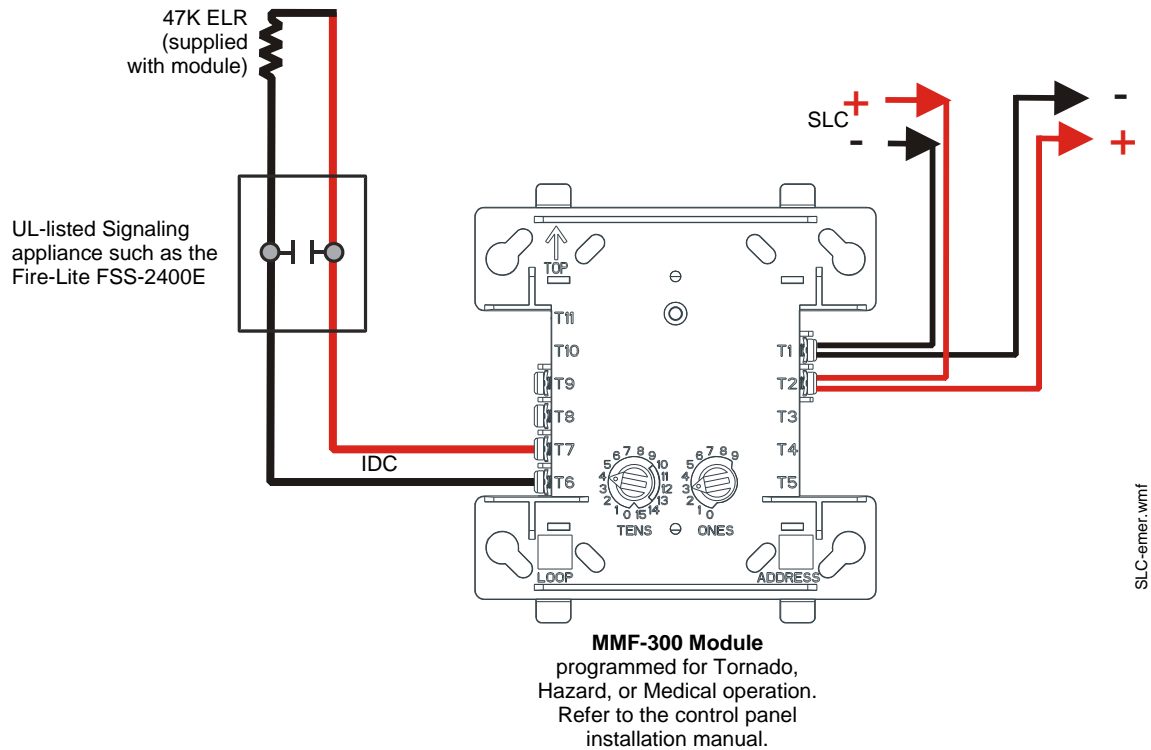


Figure 5.11 Emergency Signaling Wiring with an MMF-300

## 5.4 MMF-300-10 Wiring Diagrams

Following are wiring diagrams that depict NFPA Class B and Class A Initiating Device Circuits (IDCs) using MMF-300-10 monitor modules.

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

### 5.4.1 Wiring an NFPA Class B IDC with an MMF-300-10

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

Use the rotary switches on the module to set the base SLC address. Each module takes ten addresses on the SLC. The remaining module points are automatically assigned to the next nine higher addresses. Refer to “Setting the SLC Address for a Multi-Point Module” on page 34.

*DO NOT* set the lowest address above 150 (41 for the MS-9050UD or ES-50X, 90 for the MS-9200, MS-9200UD, MS-9200UDLS, or ES-200X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Class B IDC using an MMF-300-10 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See “Power Considerations” on page 65 for information on supervising 24 VDC power.
- The wiring class of the external power source must match the wiring class of the device being powered.

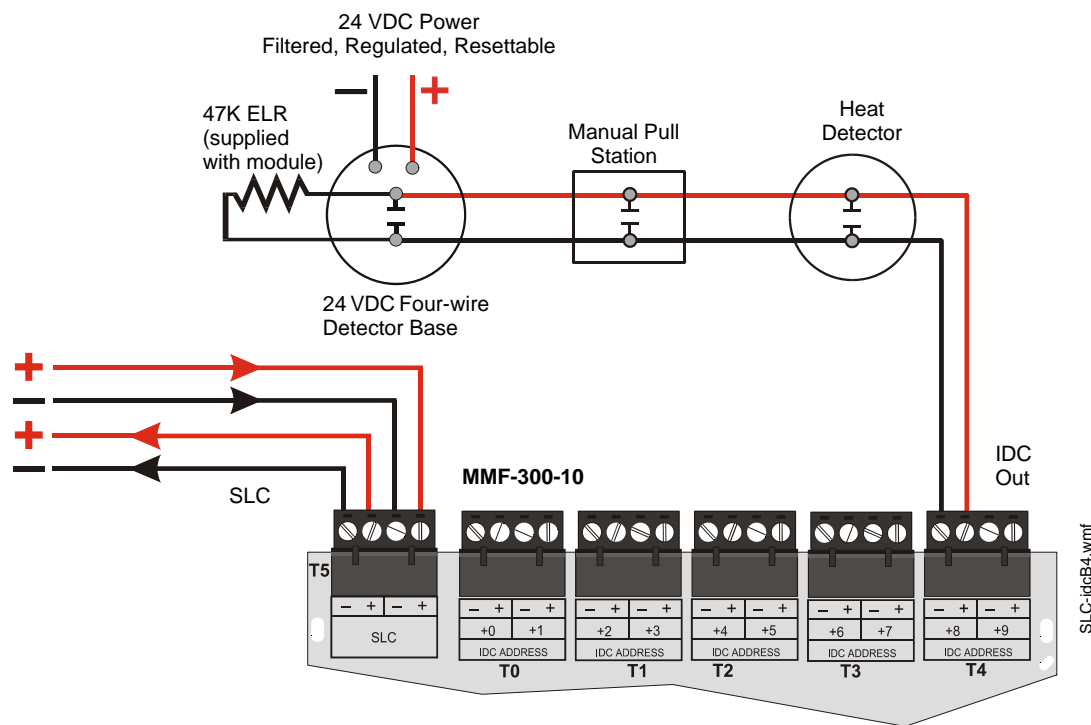


Figure 5.12 Typical Class B IDC Wiring with an MMF-300-10

## 5.4.2 Wiring an NFPA Class A IDC with an MMF-300-10

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

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

*DO NOT* set the lowest address above 150 (41 for the MS-9050UD or ES-50X, 90 for the MS-9200, MS-9200UD, MS-9200UDLS, or ES-200X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Class A IDC using an MMF-300-10 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See “Power Considerations” on page 65 for information on supervising 24 VDC power.
- The wiring class of the external power source must match the wiring class of the device being powered.

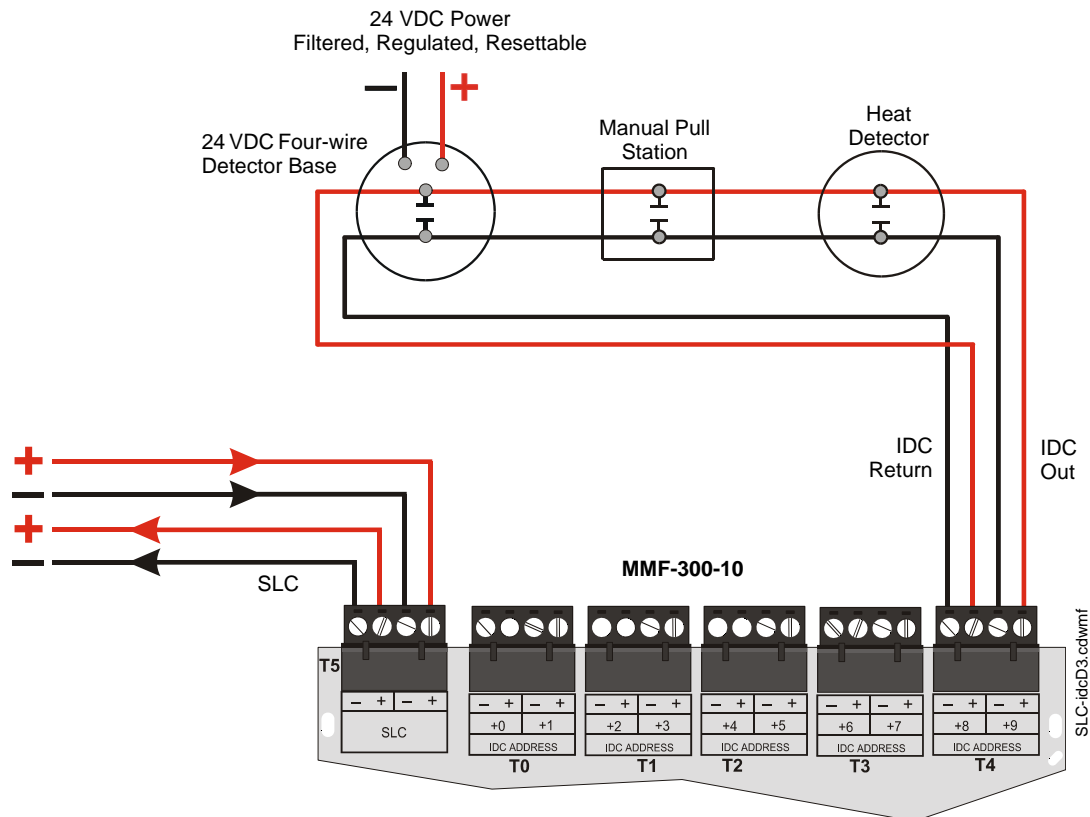


Figure 5.13 Typical Class A IDC Wiring with an MMF-300-10

## 5.5 MDF-300 Wiring Diagrams

Following is a wiring diagrams that depict NFPA Class B Initiating Device Circuits (IDCs) using MDF-300 Dual Monitor Modules.

### 5.5.1 Wiring an NFPA Class B IDC with an MDF-300

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

Use the rotary switches on the module to set it to the SLC address. Each dual module takes two addresses on the SLC. Circuit 'L' corresponds to the address set on the rotary switches, which will be an even number. Circuit 'H' will automatically respond to the next higher address, which will be an odd number. Use caution to avoid duplicate addressing of modules on the system. Refer to "Setting the SLC Address for a Single Point Module" on page 34.

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

The figure below shows typical wiring for a supervised and power-limited NFPA Class B IDC using an MDF-300-10 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- See "Power Considerations" on page 65 for information on supervising 24 VDC power.

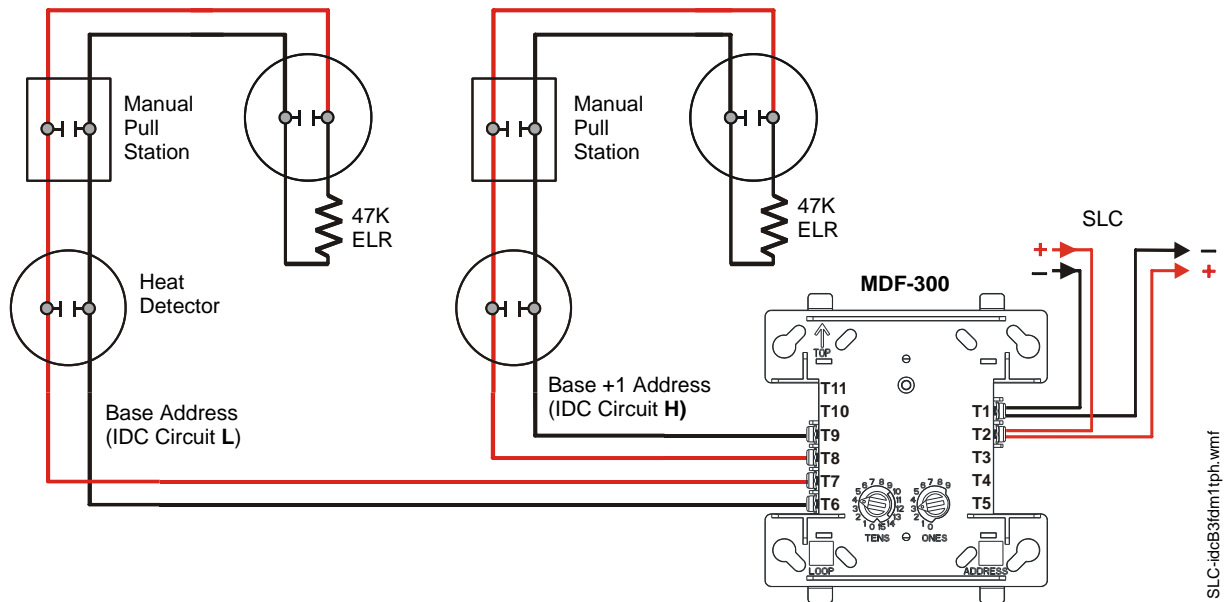


Figure 5.14 Typical Class B IDC Wiring with an MDF-300



## 5.6 MMF-302 Wiring Diagrams

Following are wiring diagrams that concern NFPA Class B and Class A Initiating Device Circuits (IDCs) using MMF-302 Zone Interface Modules.

### 5.6.1 Wiring an NFPA Class B IDC with an MMF-302

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

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting the SLC Address for a Single Point Module” on page 34.

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

The figure below shows typical wiring for a supervised and power-limited NFPA Class B IDC using an MMF-302 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See “Power Considerations” on page 65 for information on 24 VDC power.

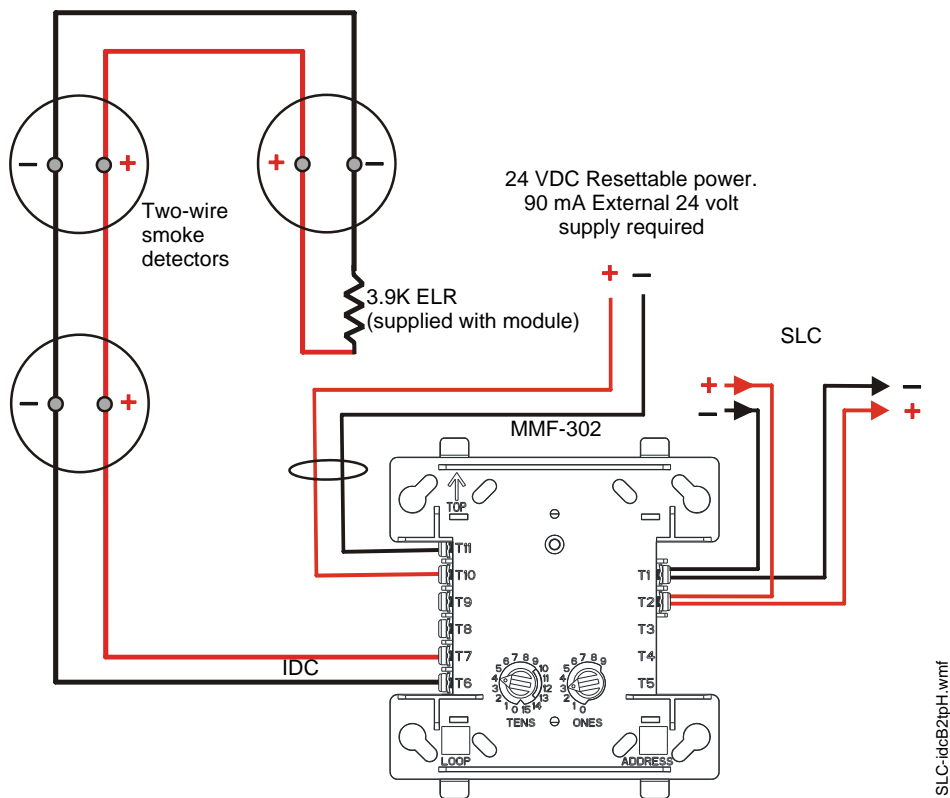


Figure 5.15 Typical Class B IDC Wiring with an MMF-302

### 5.6.2 Wiring a NFPA Class A IDC with an MMF-302

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

Each module takes one address on the SLC. Use the rotary switches on the module to set it to the required SLC address. Refer to “Setting the SLC Address for a Single Point Module” on page 34.

The figure below shows typical wiring for a supervised and power-limited NFPA Class A IDC using an MMF-302 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See “Power Considerations” on page 65 for information on 24 VDC power.

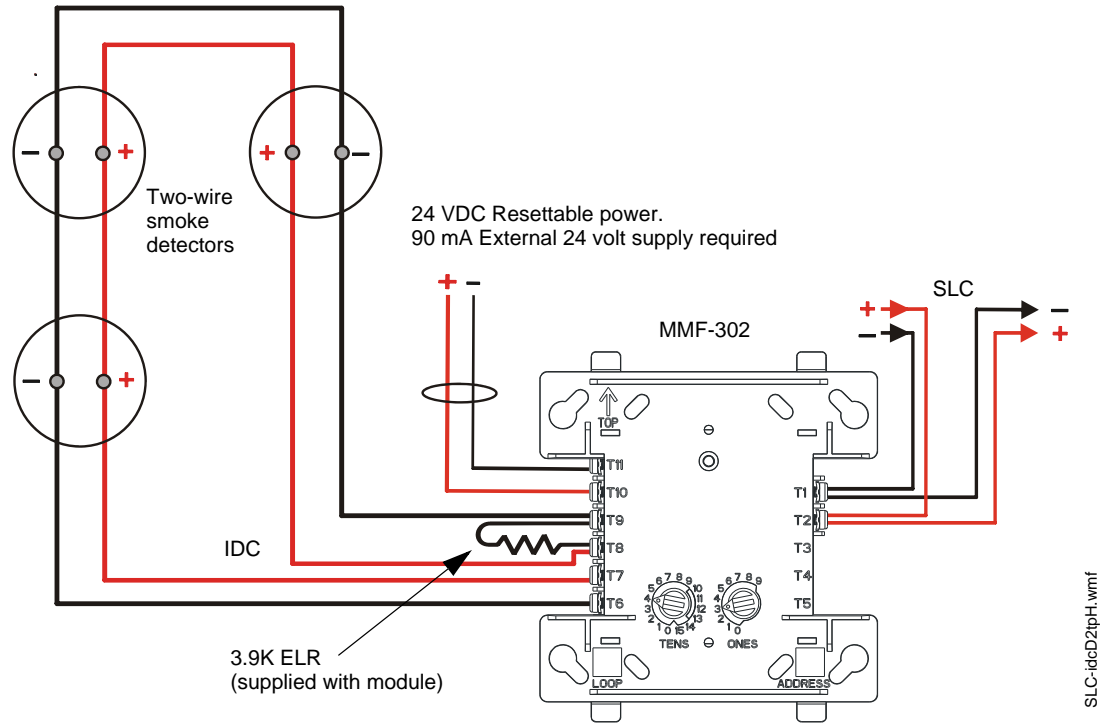


Figure 5.16 Typical Class A IDC Wiring with an MMF-302

SLC-idcD2tpH.wmf

## 5.7 MMF-302-6 Wiring Diagrams

Following are wiring diagrams that concern NFPA Class B and Class A Initiating Device Circuits (IDCs) using MMF-302-6 monitor modules.

### 5.7.1 Wiring an NFPA Class B IDC with an MMF-302-6

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

Use the rotary switches on the module to set the base SLC address. Each module takes six addresses on the SLC. The remaining module points are automatically assigned to the next five higher addresses. Refer to “Setting the SLC Address for a Multi-Point Module” on page 34.

*DO NOT* set the lowest address above 150 (41 for the MS-9050UD or ES-50X, 90 for the MS-9200, MS-9200UD, MS-9200UDLS, or ES-200X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Class B IDC using an MMF-302-6 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See “Power Considerations” on page 65 for information on 24 VDC power.

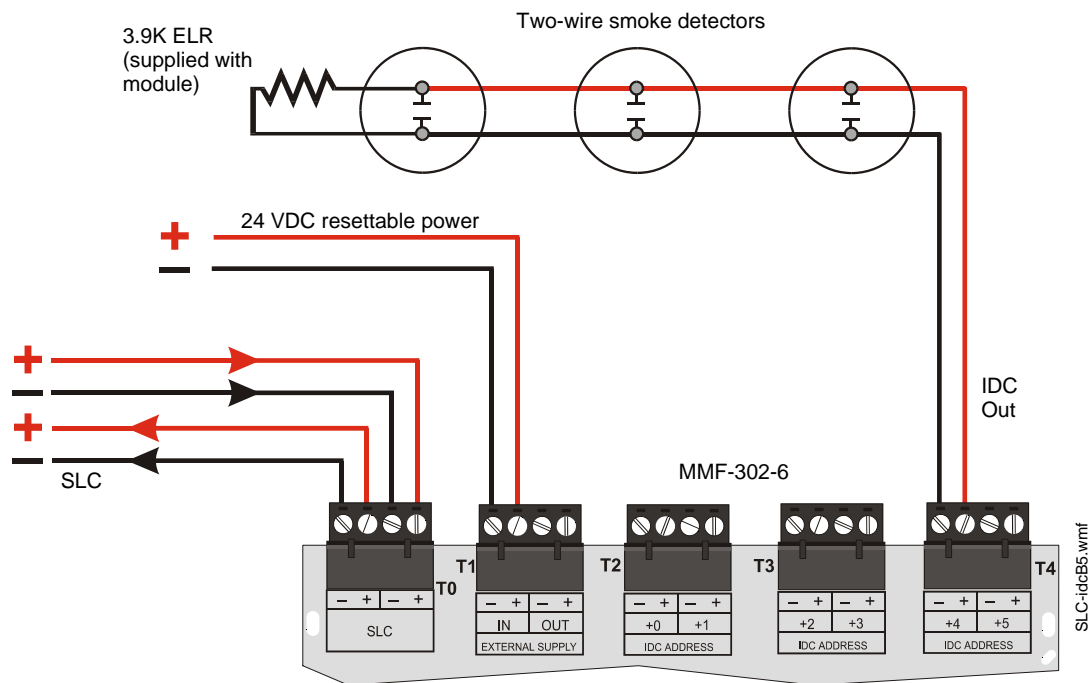


Figure 5.17 Typical Class B IDC Wiring with an MMF-302-6

### 5.7.2 Wiring an NFPA Class A IDC with an MMF-302-6

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

Use the rotary switches on the module to set it to the SLC addresses. Each module takes three alternating addresses on the SLC. The remaining module points are automatically assigned to the next two higher addresses. (Example: 28, 30 and 32). Refer to “Setting the SLC Address for a Multi-Point Module” on page 34.

*DO NOT* set the lowest address above 150 (41 for the MS-9050UD or ES-50X, 90 for the MS-9200, MS-9200UD, MS-9200UDLS, or ES-200X), as the other module points will be assigned to nonexistent addresses.

The figure below shows typical wiring for a supervised and power-limited NFPA Class A IDC using an MMF-302-6 module.

- Refer to the *Device Compatibility Document* for compatible smoke detectors.
- 24 VDC power must be provided from a UL listed power supply for fire protection use. This power is inherently supervised by the module.
- See “Power Considerations” on page 65 for information on 24 VDC power.

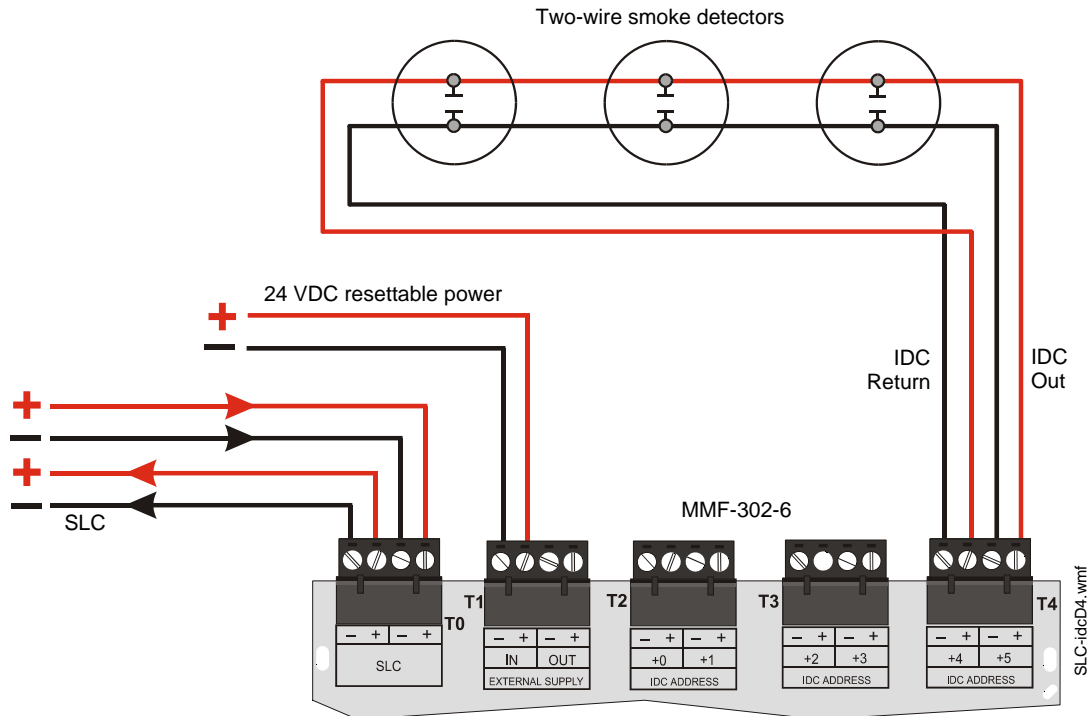


Figure 5.18 Typical Class A IDC Wiring with an MMF-302-6

## Section 6: Control Modules

When using a Control Module as a Notification Appliance Circuit (NAC), the isolation described in the section titled Section 4, “SLC Circuits with Isolators” which begins on page 23, is required or Riser Conductors must be installed in accordance with the survivability from attack by fire requirements in National Fire Alarm Code, NFPA 72.

### 6.1 Description

The CMF-300 and CMF-300-6 are addressable modules that can be used for monitoring and switching 24 VDC Notification Appliance Circuit (NAC) power for NFPA Class B and NFPA Class A circuits.

Ratings for the relay contacts on the modules are:

| Current Rating | Maximum Voltage | Load Description       | Application |
|----------------|-----------------|------------------------|-------------|
| 2 A            | 25 VAC          | Inductive (PF = 0.35)  | Non-Coded   |
| 3 A            | 30 VDC          | Resistive              | Non-Coded   |
| 2 A            | 30 VDC          | Resistive              | Coded       |
| 0.46 A         | 30 VDC          | Inductive (L/R = 20ms) | Non-Coded   |
| 0.7 A          | 70.7 VAC        | Inductive (PF = 0.35)  | Non-Coded   |
| 0.9 A          | 125 VDC         | Resistive              | Non-Coded   |
| 0.5 A          | 125 VAC         | Inductive (PF = 0.75)  | Non-Coded   |
| 0.3 A          | 125 VAC         | Inductive (PF = 0.35)  | Non-Coded   |



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

### 6.2 CMF-300 Installation

#### 6.2.1 Setting an SLC address for a CMF-300 Module

Each module is factory preset with an address of “00”. To set an SLC address refer to “Setting the SLC Address for a Single Point Module” on page 34.

#### 6.2.2 Wiring a Notification Appliance Circuit (NAC) with a CMF-300

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

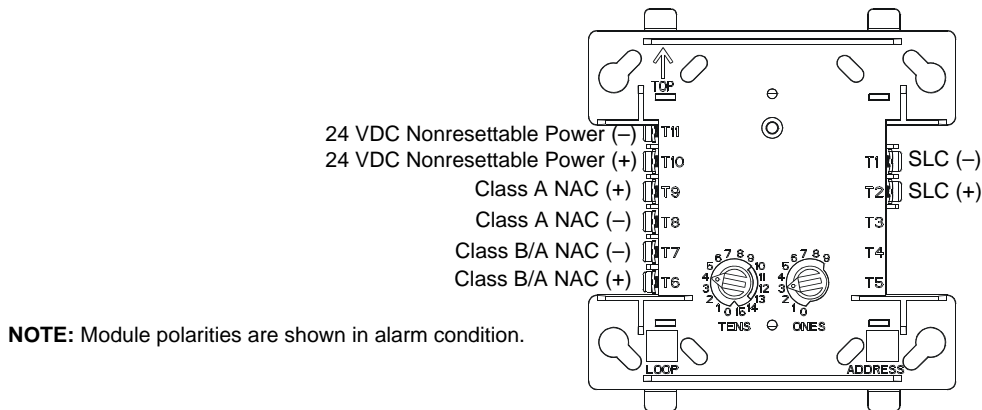


Figure 6.1 CMF-300 Wiring Connections

### 6.3 Wiring a CMF-300 Module

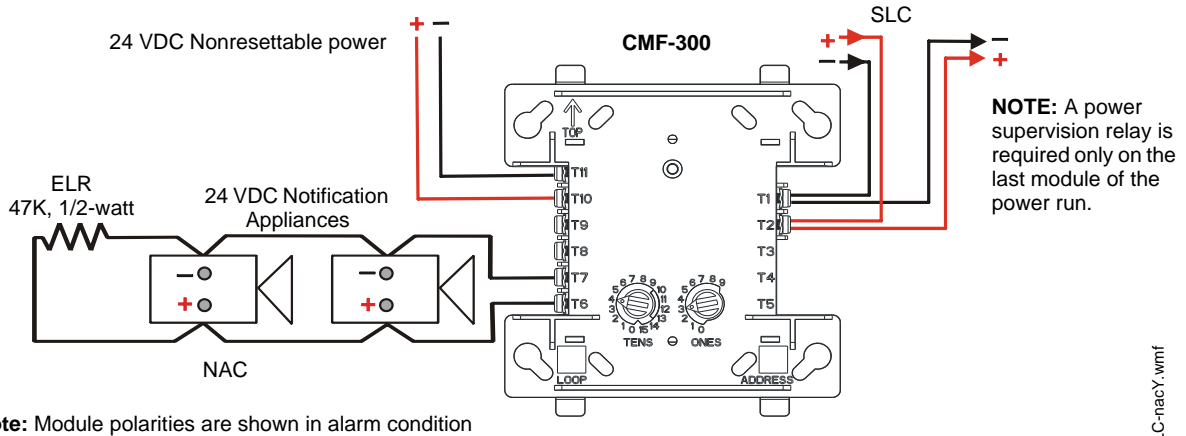
This section contains instructions and diagrams for wiring a Signaling Line Circuit with a CMF-300 as a Notification Appliance Circuit (NAC).

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

A supervised and power-limited NFPA Class B NAC using a CMF-300 module. Polarized alarm notification appliances are shown connected to the module in a two-wire configuration. Refer to the *Device Compatibility Document* for compatible notification appliances and relays.

- See “Power Considerations” on page 65 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Class B circuit.

- Terminate the circuit across the last device using an End-of-Line Resistor 47K, 1/2-watt, P/N SSD A2143-00 (ELR-47K in Canada).
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.



Note: Module polarities are shown in alarm condition

Figure 6.2 NFPA Class B Notification Appliance Circuit

SLC-nacY.wmf

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

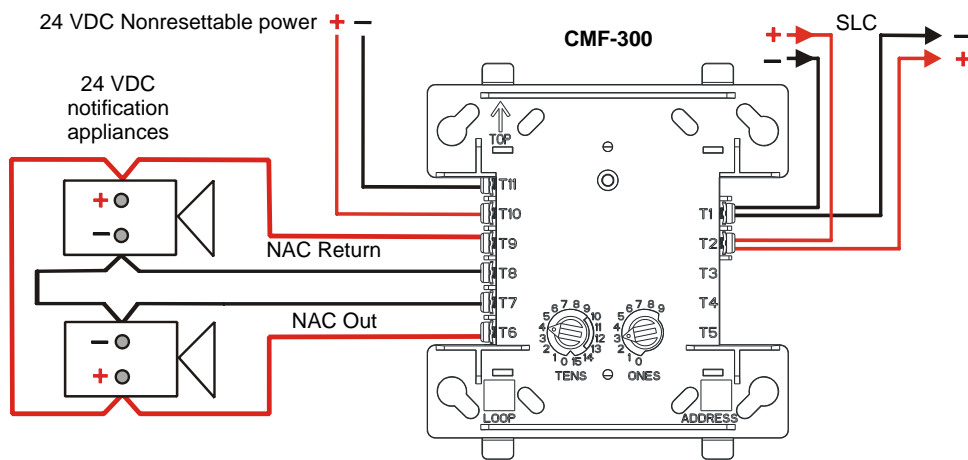
A supervised and power-limited NFPA Class A NAC using a CMF-300 module. Polarized alarm notification appliances are shown connected to the module in a four-wire configuration.



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

- See “Power Considerations” on page 65 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Class A circuit.
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.

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



Note: Module polarities are shown in alarm condition.

Figure 6.3 NFPA Class A Notification Appliance Circuit

SLC-nacZpH.wmf

## 6.4 CMF-300-6 Installation

### 6.4.1 Cabinet Installation

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

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

### 6.4.2 Setting an SLC address for an CMF-300-6 Module

In “Class A” operation each CMF-300-6 module can be set to one of 154 base addresses (01-154). The remaining module points are automatically assigned to the next five higher SLC addresses. For example, if the base address is set to 28, the next five module points will be addressed to 29, 30, 31, 32 and 33.

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

*DO NOT* set the lowest address above 154 (45 for the MS-9050UD or ES-50X, 94 for the MS-9200, MS-9200UD, MS-9200UDLS, or ES-200X), as the other module points will be assigned to nonexistent addresses.



**NOTE:** The MS-9050UD and ES-50X can support addresses 01 - 50. The MS-9200, MS-9200UD, MS-9200UDLS, and ES-200X can support module addresses of 01 - 99. The MS-9600, MS-9600LS, MS-9600LSC, MS-9600UDLS, and ES-1000X can support module addresses 01 - 159.

To set an SLC address, use a common screwdriver to adjust the rotary switches on the module to the desired address. See Figure 6.4 on page 48.



**NOTE:** For use with the MS-9600, MS-9600LS, MS-9600LSC, MS-9600UDLS, and ES-1000X, remove the stop on the upper rotary switch.

### 6.4.3 Setting NACs as Class B or Class A

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

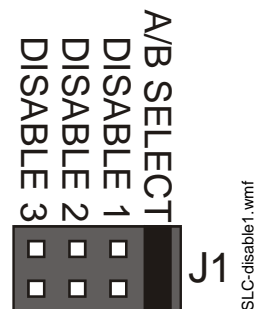
To use this module for Class A operation remove the small shunt from the “A/B SELECT” set of pins. See drawing below and Figure 6.4 on page 48.

### 6.4.4 Disabling Unused Module Addresses

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

In Class A operation, placing a small shunt on ‘DISABLE 3’ will disable all three addresses. Placing it on ‘DISABLE 2’ will disable two out of three addresses.

To disable addresses, securely place one of the supplied small shunts onto the desired set of pins. See drawing and Figure 6.4 on page 48.



### 6.4.5 Short Circuit Protection

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

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

To enable “Short Circuit Protection” for an address, remove the large shunt from the corresponding pins of the pin block. See Figure 6.4 on page 48. Place unused shunts on single pin to store on board for future use.

### 6.4.6 Features Not Supported

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

### 6.4.7 Circuit Board Information

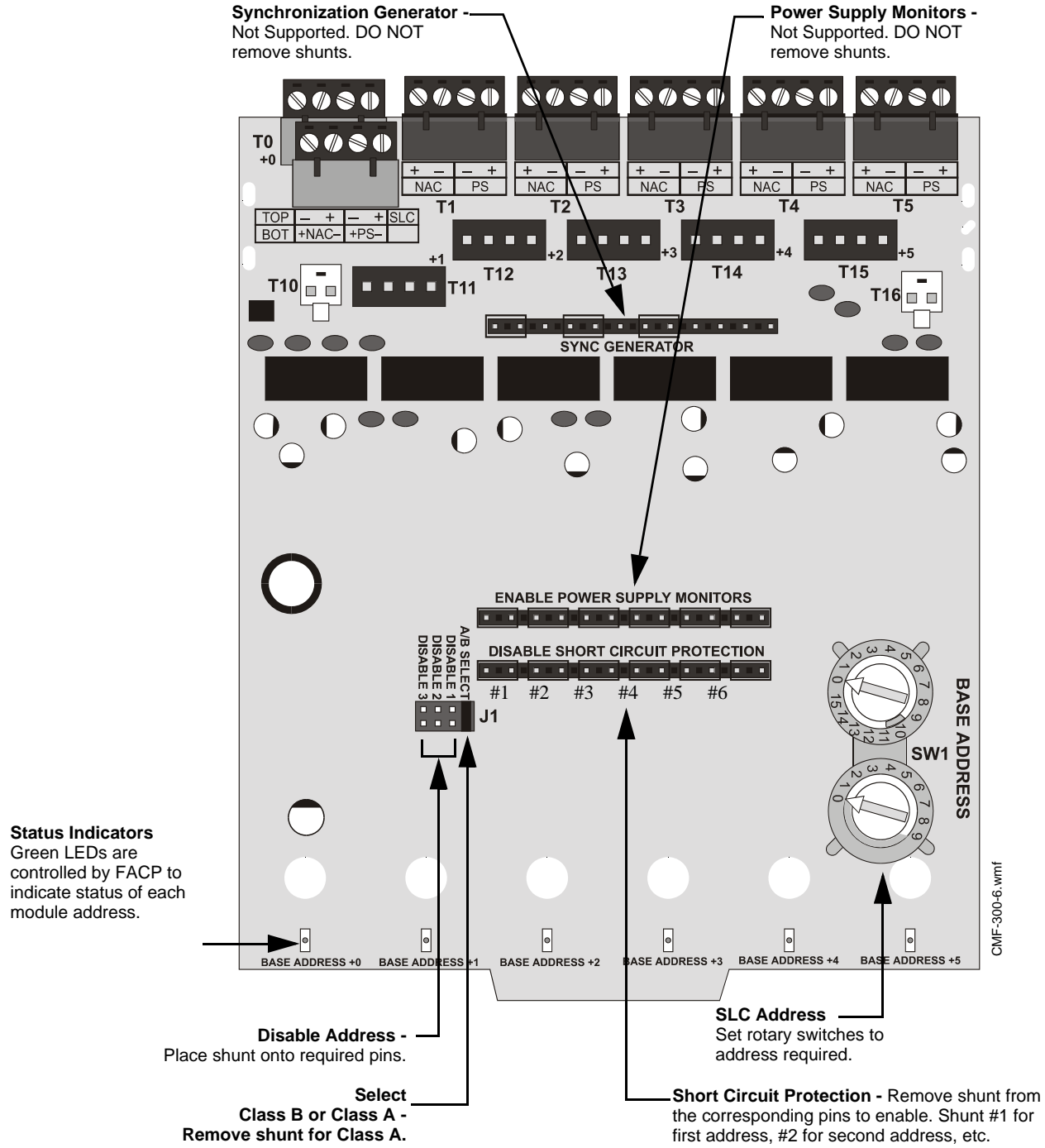


Figure 6.4 CMF-300-6 Control Module Settings



## 6.5 Wiring a CMF-300-6 Module

This section contains basic instructions and diagrams for wiring a Signaling Line Circuit with a CMF-300-6 as a Notification Appliance Circuit (NAC).

For more detailed information on wiring a CMF-300-6 Control Module, refer to the Installation Instructions provided with the module. Included in these instructions are wiring diagrams concerning a single power supply being shared by multiple NACs and audio NAC configurations.

### 6.5.1 Wiring a Class B NAC (Two-Wire)

A supervised and power-limited NFPA Class B NAC with a single power supply dedicated to a single NAC using a CMF-300-6 module. Polarized alarm notification appliances are shown connected to the module in a two-wire configuration.



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

- See “Power Considerations” on page 65 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Class B circuit.
- Terminate the circuit across the last device using an End-of-Line Resistor 47K, 1/2-watt, P/N SSD A2143-00 (ELR-47K in Canada).
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.

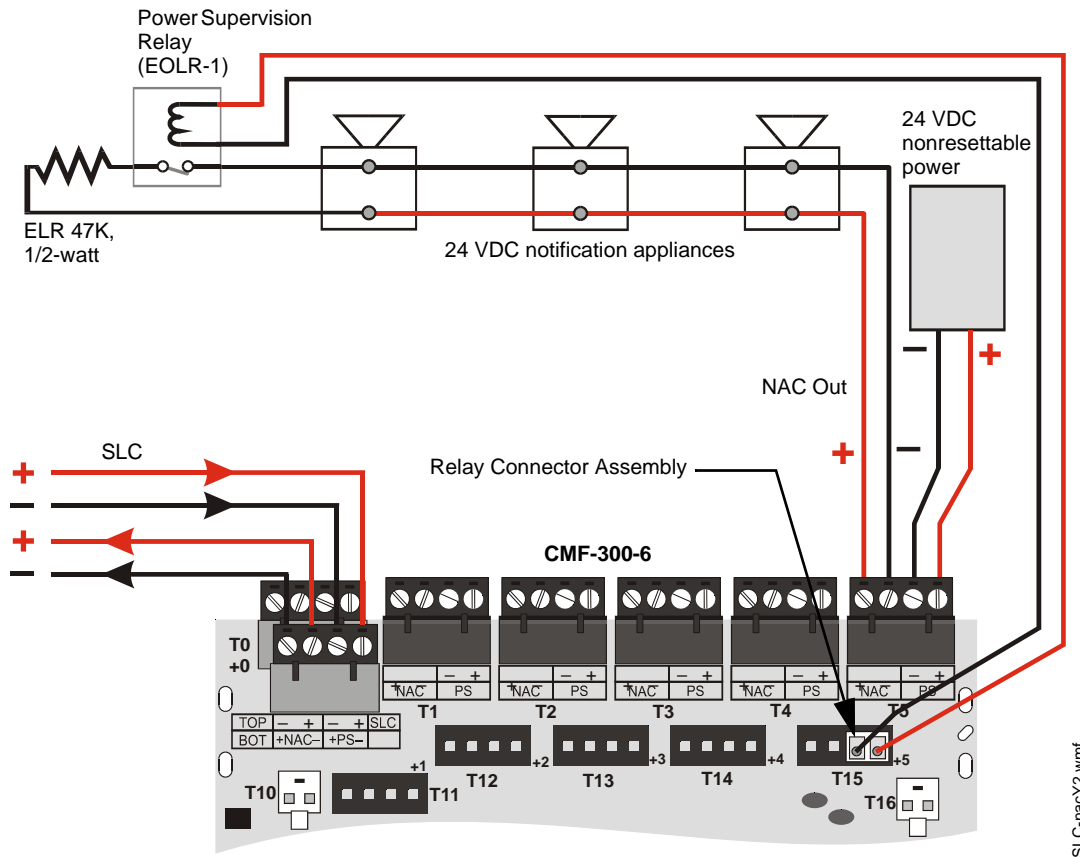


Figure 6.5 NFPA Class B Notification Appliance Circuit

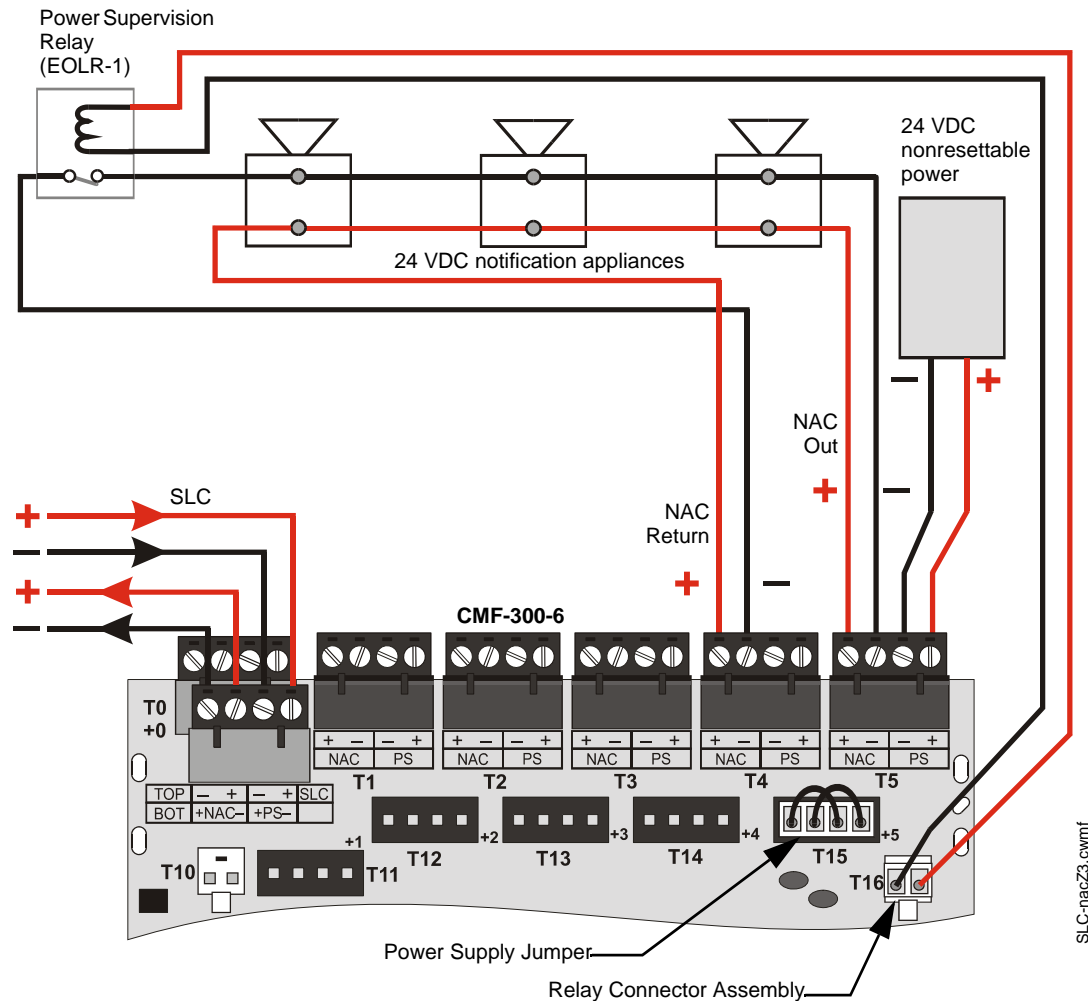
## 6.5.2 Wiring a Class A NAC (Four-Wire)

A supervised and power-limited NFPA Class A NAC with a single power supply dedicated to a single NAC using a CMF-300-6 module. Polarized alarm notification appliances are shown connected to the module in a four-wire configuration.



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

- See “Power Considerations” on page 65 for information on monitoring 24 VDC power.
- Each module can control 2 amps of resistive load (on electronic devices) or 1 amp of inductive load (on mechanical bells and horns).
- 24 VDC power must be provided from a UL listed power supply for fire protection use.
- A power supervision relay is required only on the last module of the power run.
- Do not T-tap or branch a Class A circuit.
- Do not loop wiring under the screw terminals of any notification appliance. To maintain supervision, break the wire run at each device.



**Figure 6.6 NFPA Class A Notification Appliance Circuit**

# Section 7: Relay Modules

## 7.1 Description

The CRF-300 and the CRF-300-6 modules are addressable modules that provides Form-C relay contacts.

Ratings for the relay contacts on the modules are:

| Current Rating | Maximum Voltage | Load Description       | Application |
|----------------|-----------------|------------------------|-------------|
| 2 A            | 25 VAC          | Inductive (PF = 0.35)  | Non-Coded   |
| 3 A            | 30 VDC          | Resistive              | Non-Coded   |
| 2 A            | 30 VDC          | Resistive              | Coded       |
| 0.46 A         | 30 VDC          | Inductive (L/R = 20ms) | Non-Coded   |
| 0.7 A          | 70.7 VAC        | Inductive (PF = 0.35)  | Non-Coded   |
| 0.9 A          | 125 VDC         | Resistive              | Non-Coded   |
| 0.5 A          | 125 VAC         | Inductive (PF = 0.75)  | Non-Coded   |
| 0.3 A          | 125 VAC         | Inductive (PF = 0.35)  | Non-Coded   |



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

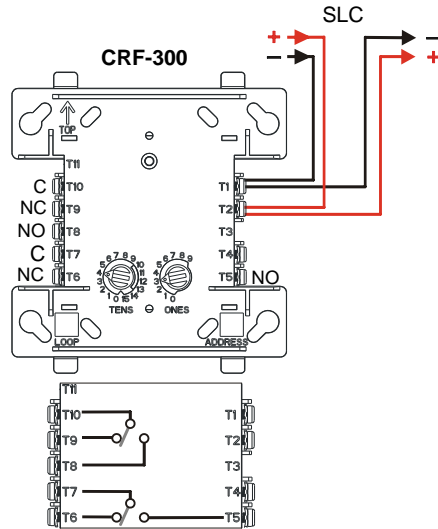
## 7.2 CRF-300 Installation & Wiring

### 7.2.1 Setting an SLC address for a CRF-300 Module

Each module is factory preset with an address of “00”. To set an SLC address, refer to “Setting the SLC Address for a Single Point Module” on page 34.

### 7.2.2 Wiring a CRF-300 Module (Form-C Relay)

The figure below shows CRF-300 module wired to the Control Panel:



SLC-fmCipH.wmf

Figure 7.1 CRF-300 Wiring Connections

### 7.3 CRF-300-6 Circuit Board Information

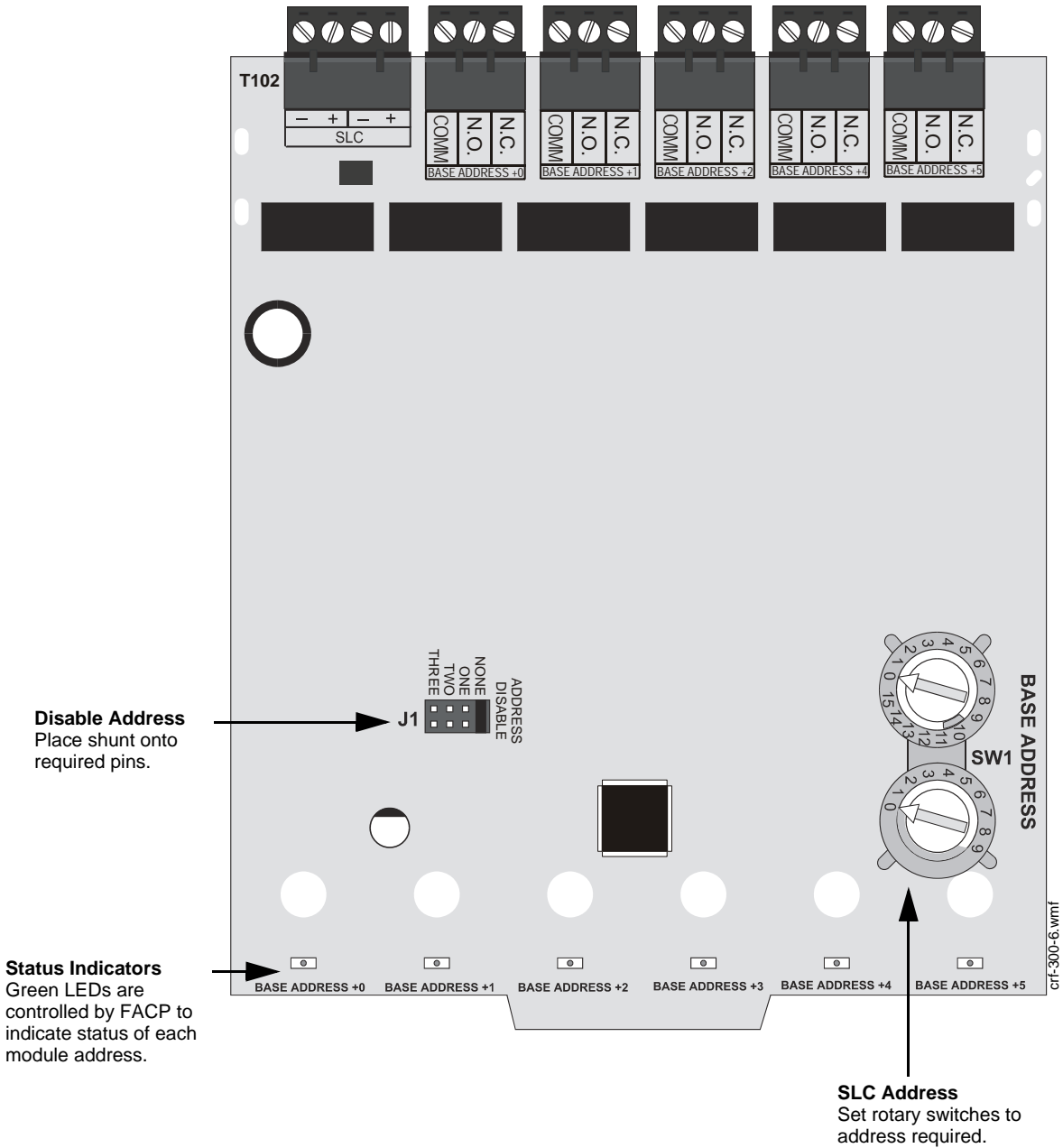


Figure 7.2 CRF-300-6 Control Relay Module

## 7.4 CRF-300-6 Installation & Wiring

### 7.4.1 Cabinet Installation

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

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

### 7.4.2 Setting an SLC address for a CRF-300-6 Module

Each CRF-300-6 module can be set to one of 154 base addresses (01-154). The remaining module points are automatically assigned to the next five higher SLC addresses. For example, if the base address is set to 28, the next five module points will be addressed to 29, 30, 31, 32 and 33.

*DO NOT* set the lowest address above 154 (45 for the MS-9050UD and ES-50X, 94 for the MS-9200, MS-9200UD, MS-9200UDLS, and ES-200X), as the other module points will be assigned to nonexistent addresses.

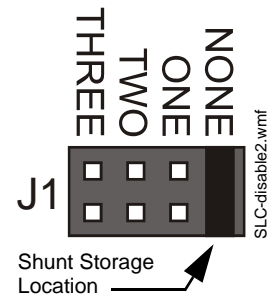


**NOTE:** The MS-9050UD and ES-50X can support addresses 01 - 50. The MS-9200, MS-9200UD, MS-9200UDLS, and ES-200X can support module addresses of 01 - 99. The MS-9600, MS-9600LS, MS-9600UDLS, and ES-1000X can support module addresses 01 - 159. To set an SLC address, use a common screwdriver to adjust the rotary switches on the module to the desired address. See Figure 6.4 on page 48. For use with an MS-9600, MS-9600LS, MS-9600LSC, MS-9600UDLS, and ES-1000X, remove the stop on the upper rotary switch.

### 7.4.3 Disabling Unused Module Addresses

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

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



### 7.4.4 Wiring a CRF-300-6 Module (Form-C Relay)

The figure below shows a CRF-300-6 module wired to the Control Panel.

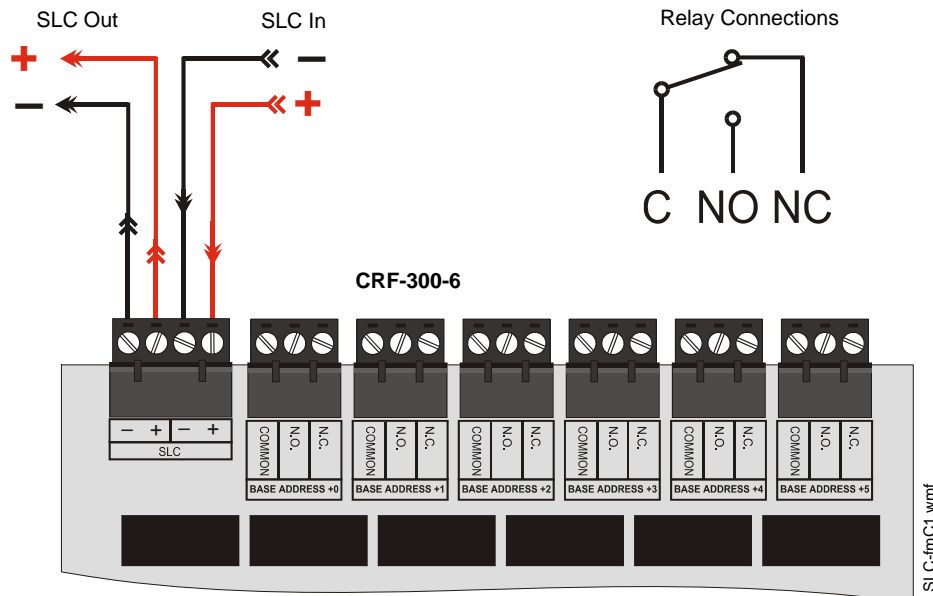


Figure 7.3 CRF-300-6 Wiring Connections

# Section 8: Multiple Input/Output Modules

## 8.1 Description

The CDRM-300 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 relay contacts on the 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          |



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

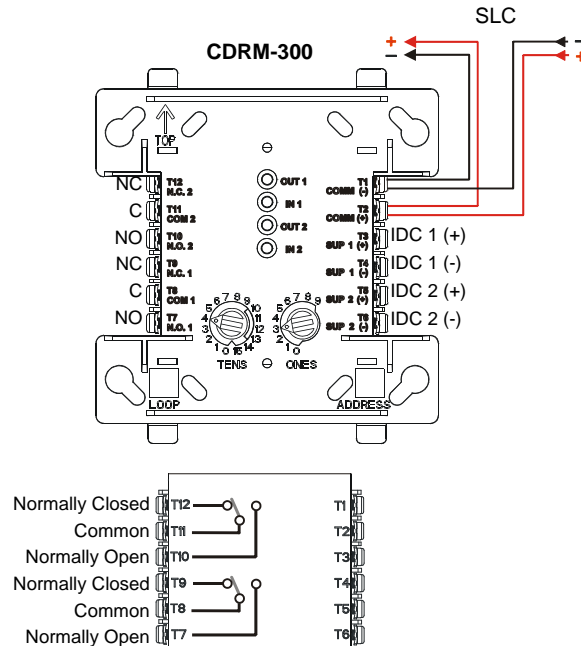
## 8.2 CDRM-300 Installation & Wiring

### 8.2.1 Setting an SLC address for a CDRM-300 Module

Each 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. Each 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.

### 8.2.2 Wiring a CDRM-300 Module (Form-C Relay)

The figure below shows a CDRM-300 module wired to the control panel.



**Figure 8.1 CDRM-300 Wiring Connections**

## Section 9: Intelligent Detector Bases and Wireless Gateway

### 9.1 Description

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

- AD350 and AD355 Multi-criteria Photoelectric Smoke Detectors
- CP350 and CP355 Ionization Smoke Detectors
- H350, H350R, H355, H355R, H355HT, H365(-IV), H365R(-IV), H365HT(-IV) Thermal Detectors
- SD350, SD350T, SD355, SD355T, SD365(-IV) SD365R(-IV), and SD365T(-IV) Photoelectric Smoke Detectors

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

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

On the MS-9200 Control Panel, the sounder will activate when the sensor's visible LEDs are latched on for approximately 10 seconds (Alarm Verification does not delay sounder).

If the MS-9600, MS-9600LS, MS-9600UDLS, MS-9200UD, MS-9200UDLS, MS-9050UD, ES-50X, ES-200X, or ES-1000X, control panel is set with Alarm Verification ON (enabled), the sounder will activate at the end of the verification cycle, providing an alarm is verified, approximately 10 seconds after the sensor's LEDs are latched on. If Alarm Verification is OFF (disabled), the sounder will activate when the sensor's visible LEDs are latched on for approximately 10 seconds.

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

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

The **W-GATE** Wireless Gateway acts as a bridge between a group of wireless fire devices and a LiteSpeed SLC loop on the ES-50X, ES-200X, ES-1000X, or MS-9200UDLS. The gateway can be powered by the SLC loop or by a regulated, external UL-listed, 24VDC power supply. See Section 9.7.



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

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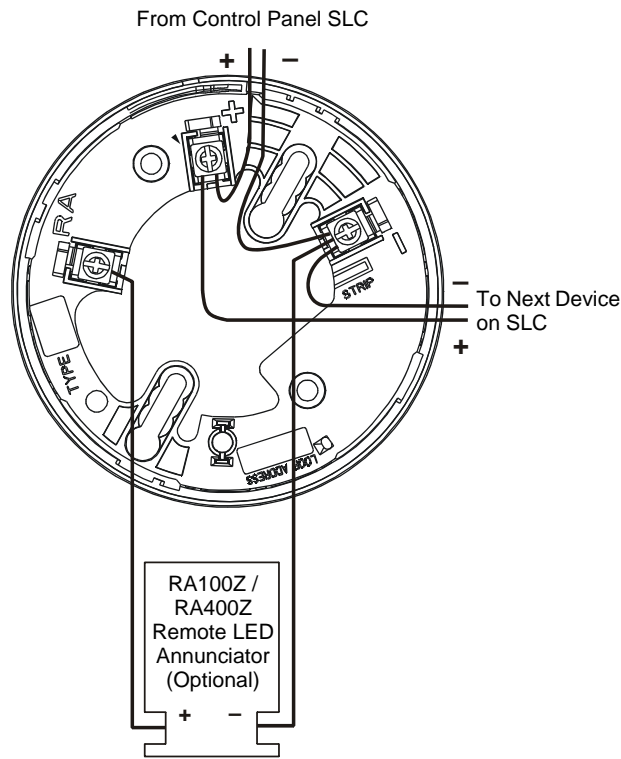
For details about the wireless network and its devices, see the *SWIFT® Smart Wireless Integrated Fire Technology Instruction Manual #LS10036-000FL-E*.

## 9.2 Setting the Detector Address

Each intelligent detector is factory preset with an address of “00.” To set an SLC address, use a common screwdriver to adjust the rotary switches on the detector to the desired address (see “Setting the SLC Address for a Single Point Module” on page 34). When finished, mark the address in the place provided on the base and the detector.

## 9.3 Wiring an Detector Base

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



SLC-B5012wire.wmf

Figure 9.1 Wiring a B300-6, B210LP, or B501 Series Detector Base



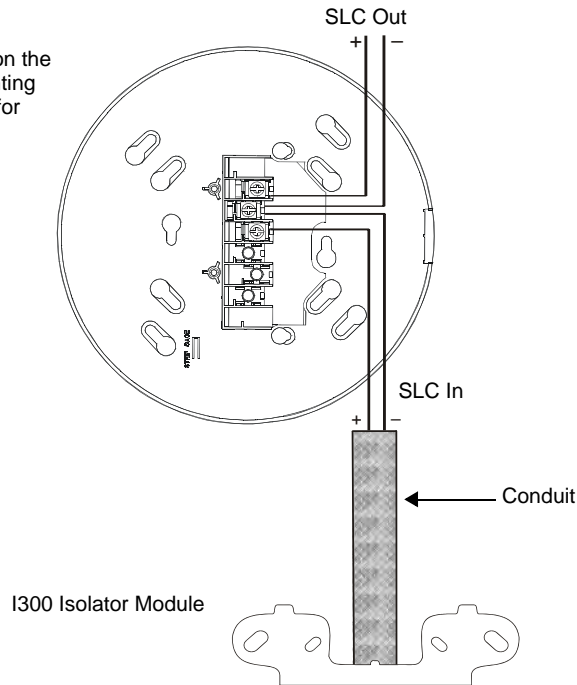
**NOTE:** The B300-6 and B210LP base wiring is identical to the B501 Series. B501 Series are flangeless models.



### 9.4 Wiring an Isolator Base

The **B224BI** Isolator Base will isolate its detector from short circuits that occur on the SLC connected at terminals 2 and 3. It will not isolate its installed detector from short circuits that occur on the SLC connected at terminals 1 and 2. In 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.

**Note:** The “grid” pattern on the redesigned B224BI mounting plate has been removed for illustration purposes only.

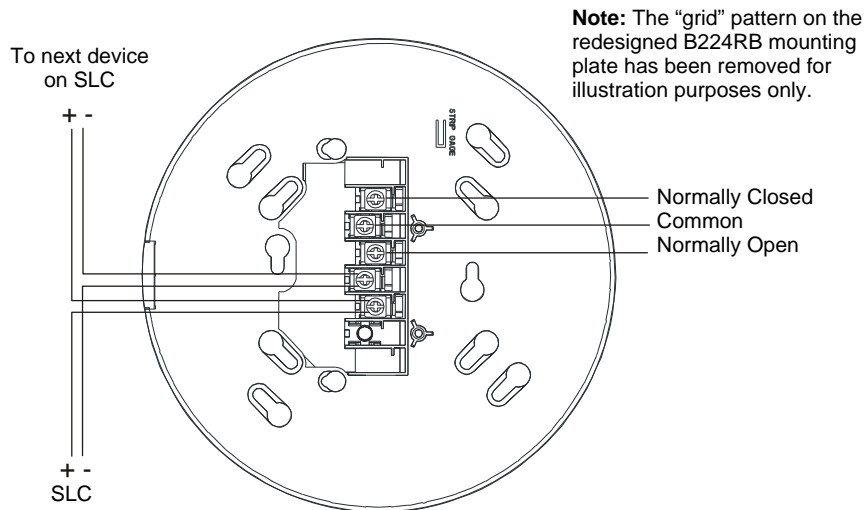


slc-b224bi2wire.wmf

Figure 9.2 Wiring a B224BI Isolator Base Mounting Plate

### 9.5 Wiring a Relay Base

Figure 9.3 shows typical wiring of a B224RB plug-in relay detector base connected to an SLC.

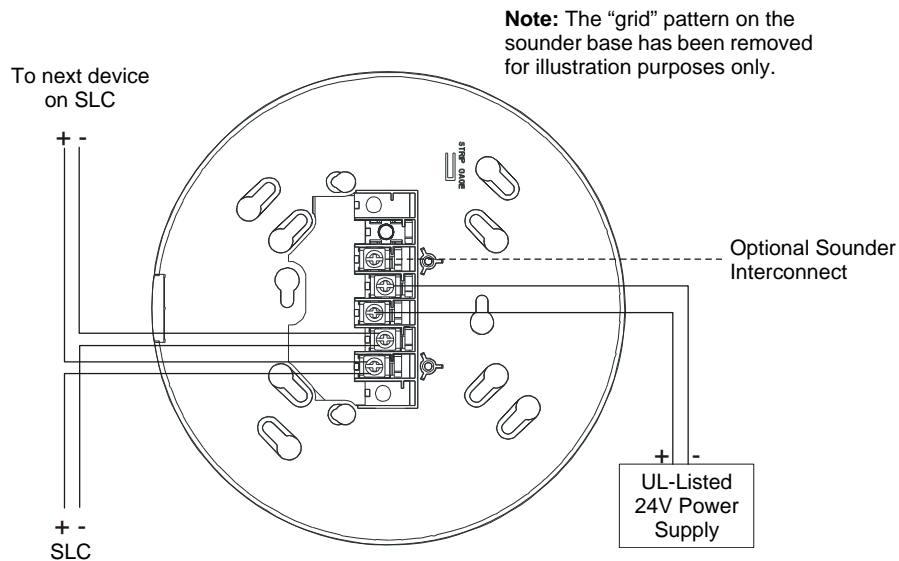


slc-b224rb2wire.wmf

Figure 9.3 Wiring of a B224RB Relay Base Mounting Plate

## 9.6 Wiring a Sounder Base

Figure 9.4 shows typical wiring of the **B200S, B200S-LF, B200SR, or B200SR-LF** Sounder Base.



**Figure 9.4** Wiring of a B200S, B200S-LF, B200SR, or B200SR-LF Sounder Base



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

## 9.7 Wiring the W-GATE



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



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

### 9.7.1 SLC Connections

The W-GATE Wireless Gateway acts as a bridge between a group of wireless fire devices and a LiteSpeed SLC loop on the ES-50X/C, ES-200X/C, ES-1000X, or MS-9200UDLS/C. It is powered by the SLC loop or by a regulated, external 24VDC UL-listed power supply. Available wireless devices include a photo detector, a photo/heat detector, a fixed-temperature heat detector, a rate-of-rise heat detector, and a monitor module. For details about wireless devices, system setup, and operation, see the *SWIFT® Smart Wireless Integrated Fire Technology Instruction Manual*.

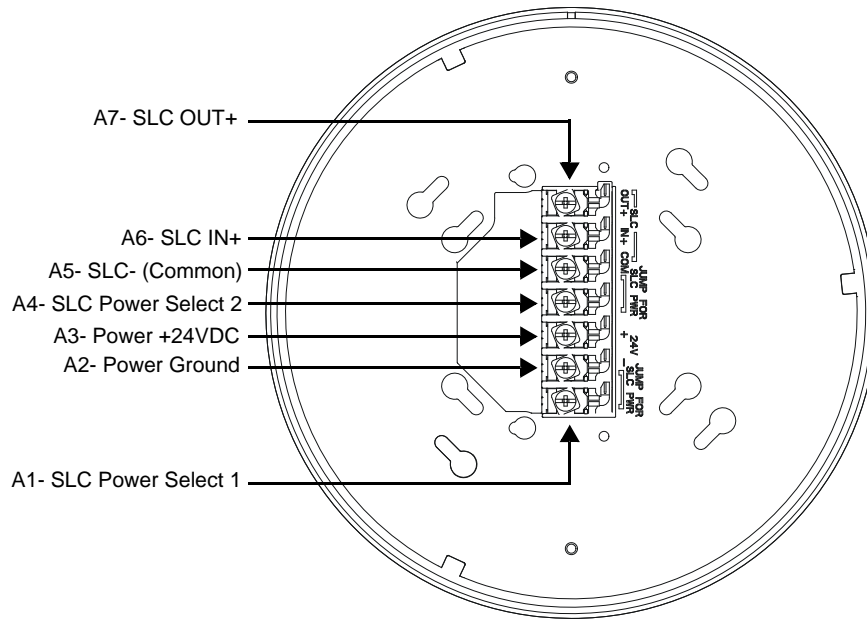


Figure 9.5 W-GATE Mounting Plate - Terminal Layout

2.4.wmf

### 9.7.2 W-GATE Powered by the SLC

The W-GATE 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 W-GATE for more than 100ms may result in a trouble condition and loss of fire protection provided by the wireless devices for approximately 15 minutes. Use of a regulated, external +24VDC power source (not SLC power) is recommended for installations that require fire protection in the presence of short circuits, including Class A applications and applications that use isolator modules. Figure 9.6 shows typical wiring of a Wireless Network Gateway connected to an SLC when power is supplied by the SLC loop

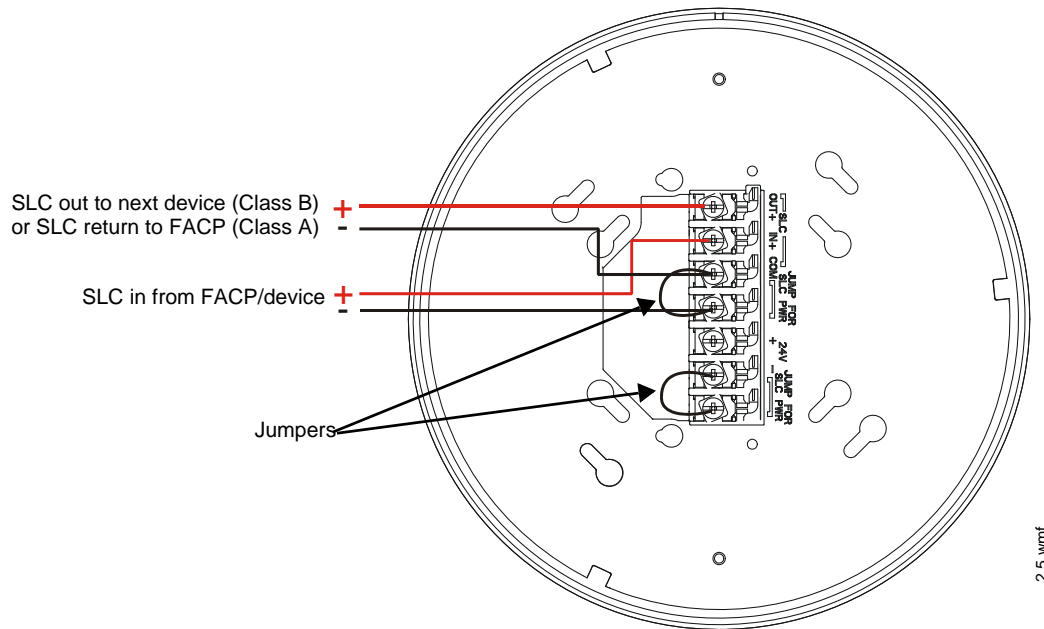


Figure 9.6 W-GATE Powered by the SLC

### 9.7.3 W-GATE Powered by a Regulated, External +24VDC Power Source

The W-GATE 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.

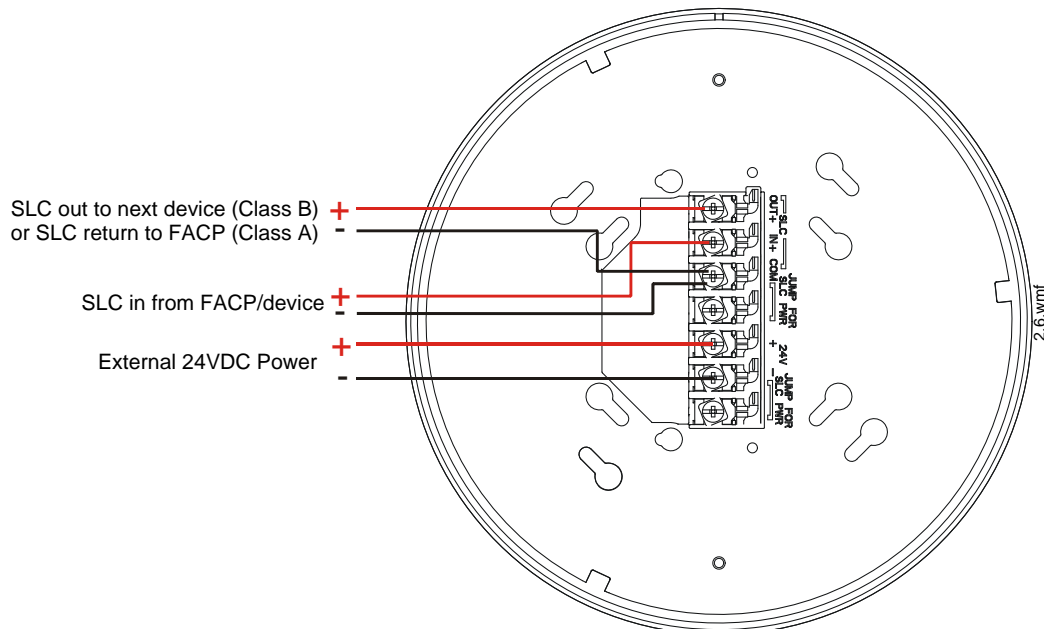


Figure 9.7 W-GATE Powered by a Regulated, External Source

## Notes

# Section 10: Addressable Beam Detectors

## 10.1 Description

The **BEAM355**, **BEAM355S**, and **OSI-RI-FL** are intelligent, addressable projected beam smoke detectors, designed for protecting open areas with high and sloping ceilings and wide-open areas, where spot type smoke detectors are difficult to install and maintain. The **BEAM355S** has an integral sensitivity test feature that consists of a test filter attached to a servomotor inside the detector optics.



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

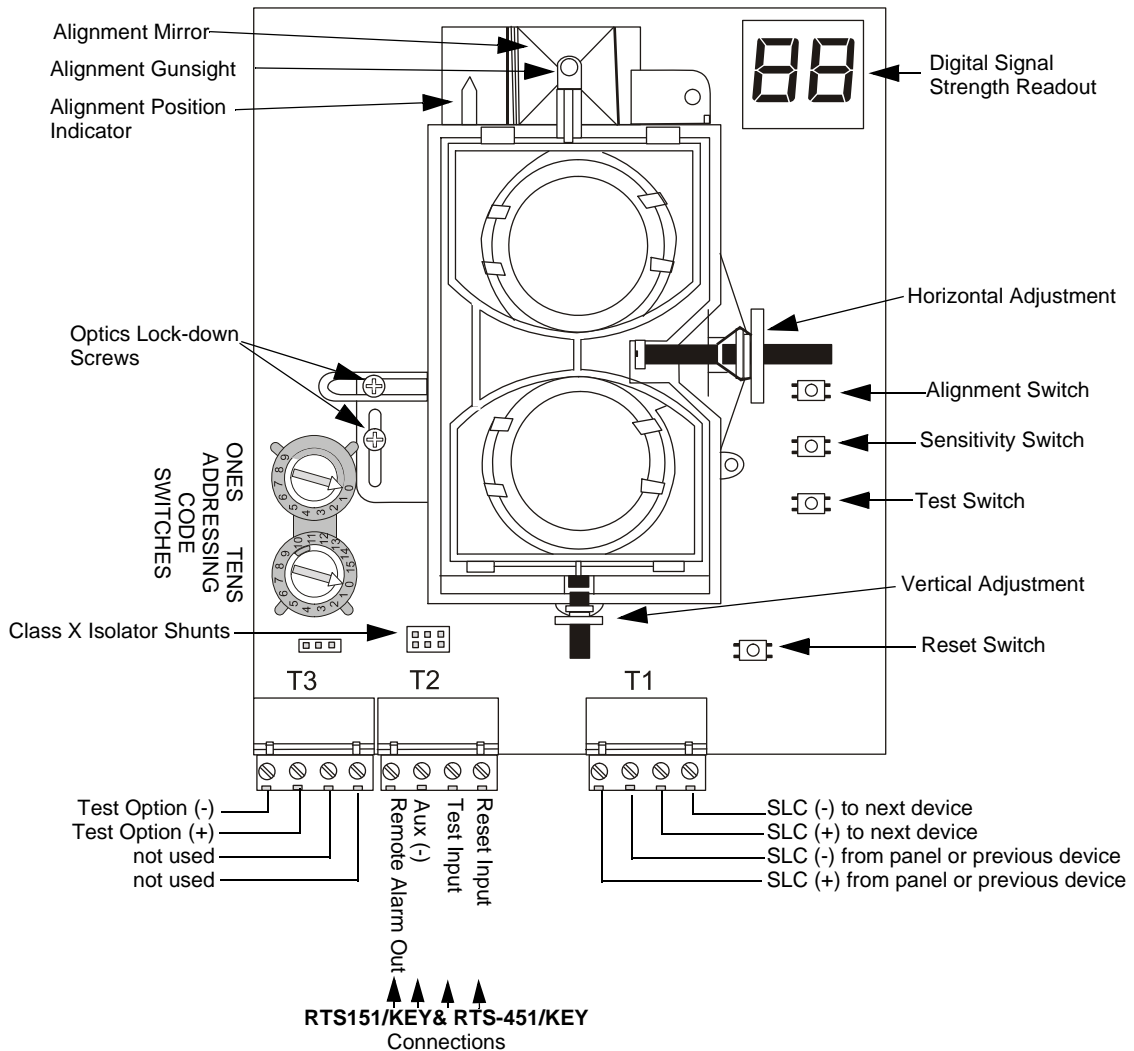
## 10.2 Installation and Wiring

### 10.2.1 Setting an SLC Address for a Beam Detector

Each beam detector is factory preset with an address of “00.” To set an SLC address, use a common screwdriver to adjust the address rotary code switches on the detector to the desired address (refer to “Setting the SLC Address for a Single Point Module” on page 34).

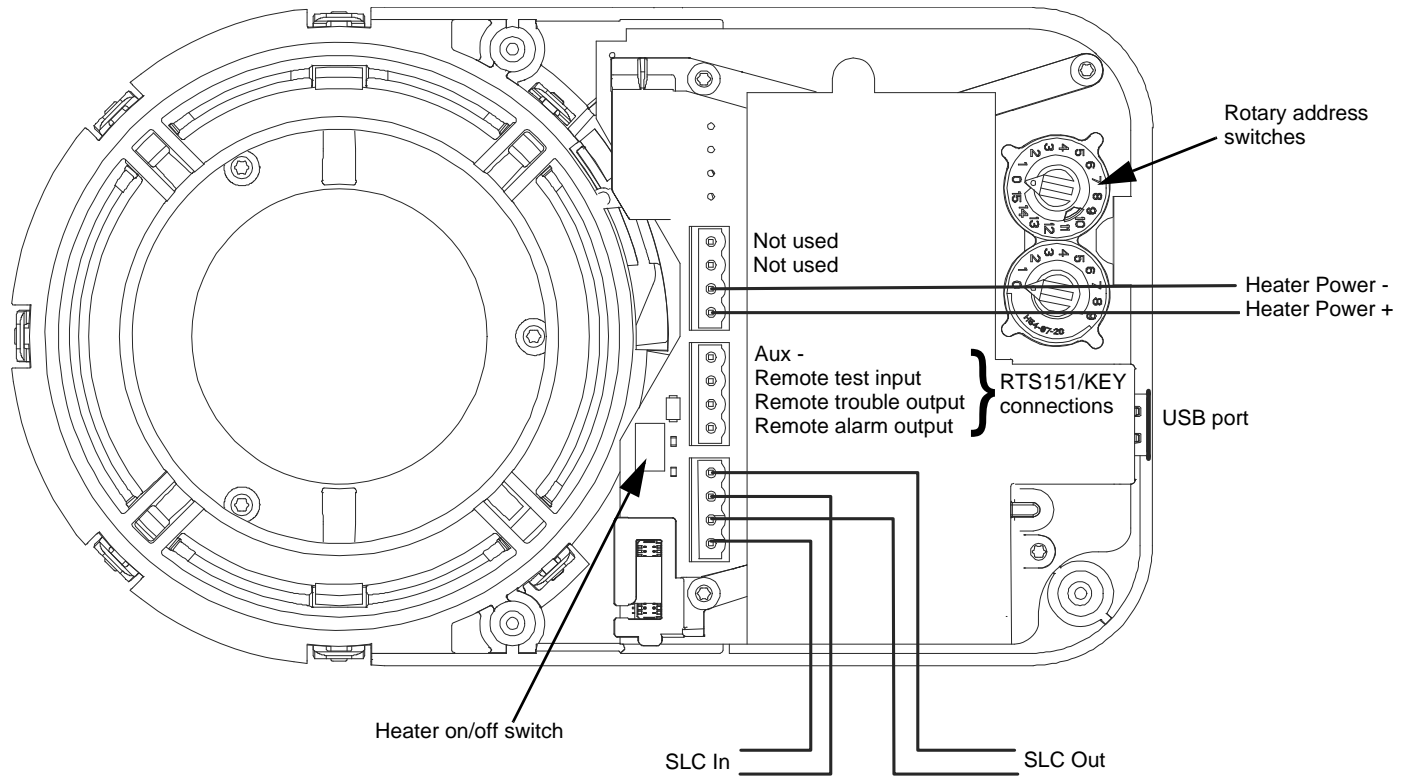
### 10.2.2 Wiring a Beam Detector

Typical wiring of a **BEAM355** beam detector connected to an SLC is illustrated in the figure below.



**Figure 10.1 BEAM355 Beam Detector Terminal Block Wiring**

Typical wiring of an **OSI-RI-FL** beam detector connected to an SLC is illustrated in the figure below.



**Figure 10.2 OSI-RI-FL Beam Detector Terminal Block Wiring**

# Section 11: Addressable Manual Pull Station

## 11.1 Description

The **BG-12LX** is an addressable manual pull station with a key-lock reset feature.



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

## 11.2 Installation

### 11.2.1 Setting an SLC address

Each unit is factory preset with an address of “00.” To set an SLC address refer to “Setting the SLC Address for a Single Point Module” on page 34 for.

### 11.2.2 Wiring a Manual Pull Station

Figure 11.1 shows typical wiring for a **BG-12LX** Manual Pull Station to an SLC:

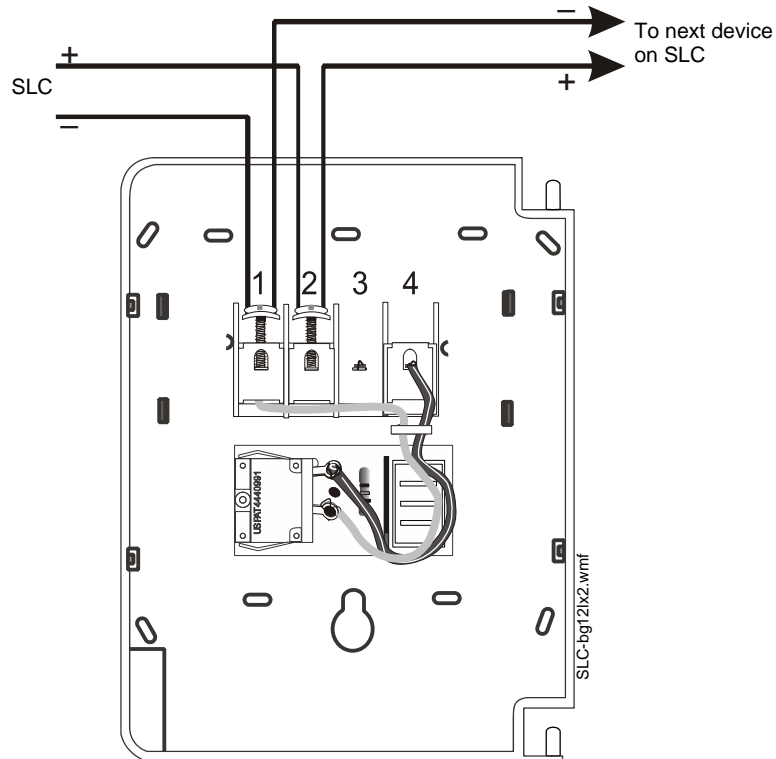


Figure 11.1 Wiring of a BG-12LX Pull Station to an SLC



# Appendix A: Power Considerations

## A.1 Supplying Power to 24 VDC Detectors and NACs

### A.1.1 Resistance and Size

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

**For Four-Wire Detectors:**

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

**For NACs:**

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

Where:

**R<sub>max</sub>** = maximum resistance of the 24 VDC wires

**V<sub>ms</sub>** = minimum supply voltage

**V<sub>om</sub>** = 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<sub>s</sub>** = detector current in standby

**N<sub>a</sub>** = number of detectors on the 24 VDC power circuit which must function at the same time in alarm

**I<sub>a</sub>** = detector current in alarm

**I<sub>r</sub>** = end-of-line relay current

**N<sub>b</sub>** = number of Notification Appliance Devices

**I<sub>b</sub>** = 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 Fire•Lite power supplies are listed below:

| FACP                  | V <sub>ms</sub> | Power Supply          | V <sub>ms</sub> |
|-----------------------|-----------------|-----------------------|-----------------|
| MS-9200               | 16.0            | FCPS-24F              | 19.1            |
| MS-9600               | 16.0            | FCPS-24FS6/FCPS-24FS8 | 19.1            |
| MS-9200UD/MS-9200UDLS | 19.05           | FL-PS6                | 20.3            |
| MS-9050UD             | 18.75           | FL-PS10               | 20.29           |
| ES-50X                | 19.2            |                       |                 |
| ES-200X               | 19.2            |                       |                 |
| ES-1000X              |                 |                       |                 |

**Table A.1 Minimum Supply Voltage**

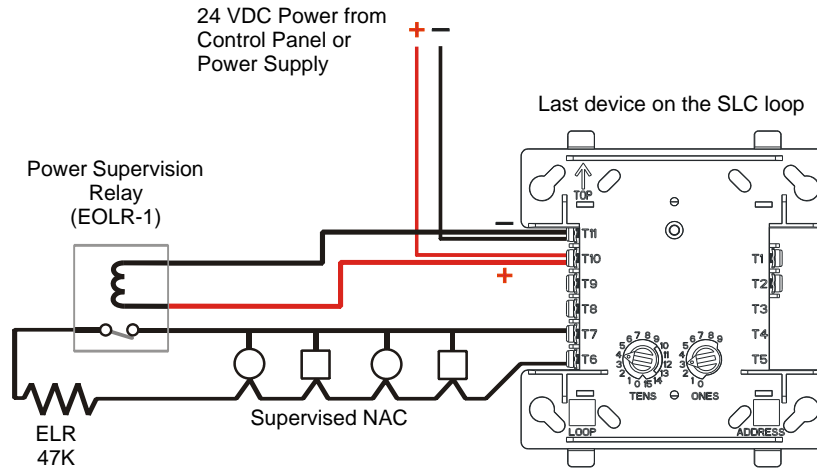
### A.2 Supervising 24 VDC Power

Power used to supply 24 VDC detectors, notification appliances (using the CMF-300), and two wire detectors (using the MMF-302) can be supervised with a power supervision relay. This relay, energized by the 24 VDC power itself, is installed at the end of each respective power run and wired in-line with the supervised circuit of any intelligent module.

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

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

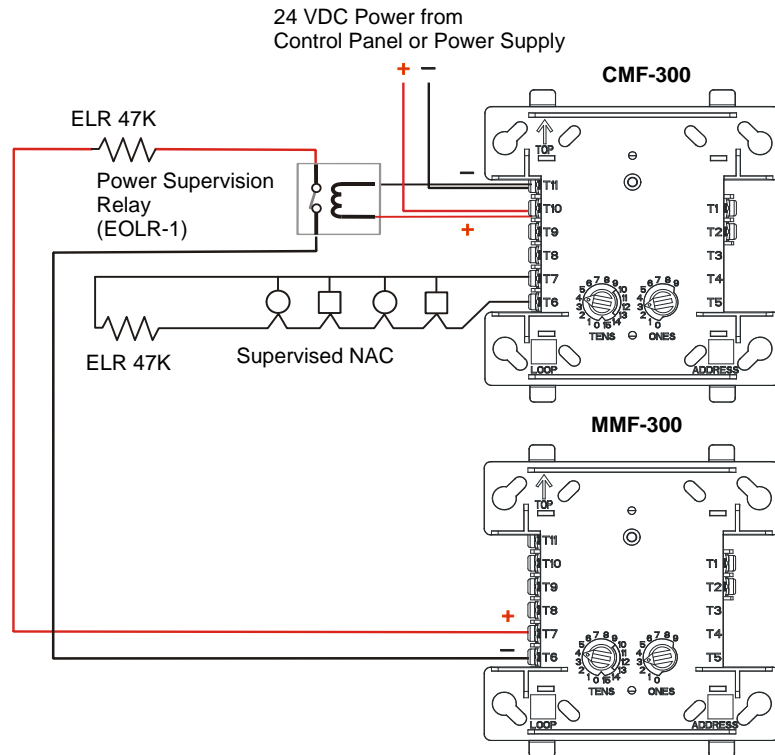
The drawing below illustrates this concept.



SLC-psrtpH.cdr

Figure A.1 Supervised 24 VDC Circuit

An alternate method is shown below.



SLC-psr-2addresspH.wmf

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

# Appendix B: Surge Suppression

## B.1 Introduction



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

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 UL497, the standard for surge protective devices with a marked rating of 330V or less
- Secondary Surge Protectors: must be listed against UL497B, the Standard for Protectors for Data Communications and Fire Alarm Circuits with a marked rating of 50V or less



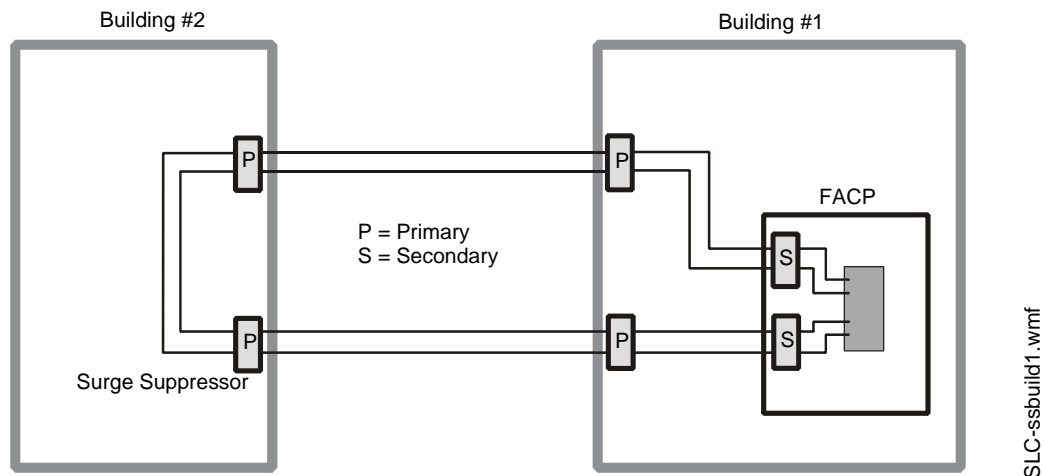
**NOTE:** For detailed information, refer to the *Installation Instructions* supplied with the unit.

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

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

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

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



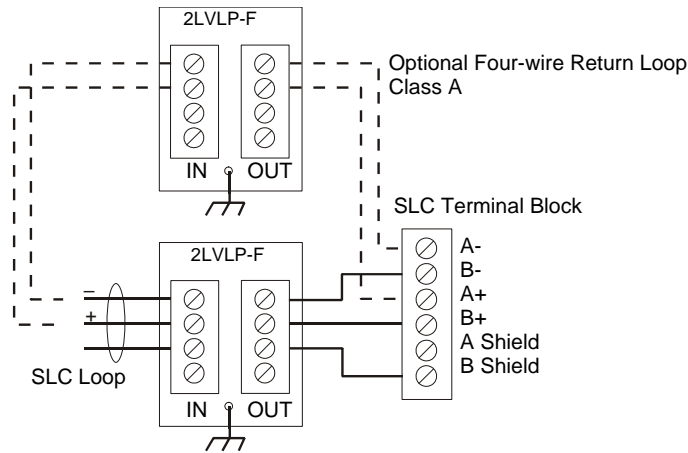
## B.2 Installation

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

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

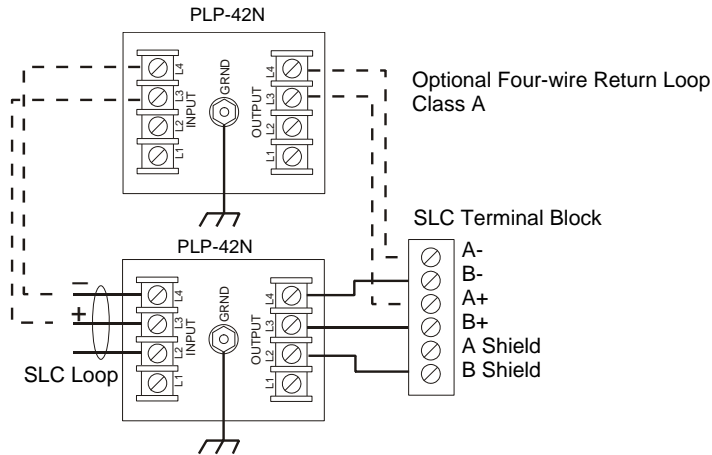
## B.2.1 Wiring Diagram for MS-9200

### DTK-2LVLP-F Connections



SLC-lvlp1.wmf

### PLP-42N Connections

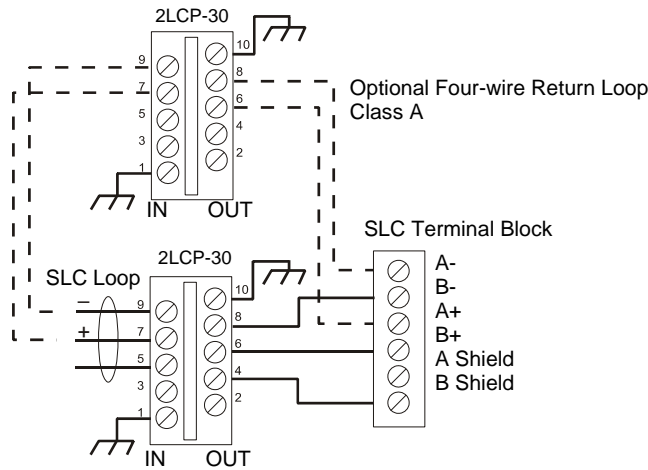


SLC-plpn1.wmf



**NOTE:** Use 12AWG (3.25mm<sup>2</sup>) to 18AWG (0.75mm<sup>2</sup>) wire with crimp-on connectors to connect the unit's ground terminal to equipment ground. Wire length must be minimized to provide best protection.

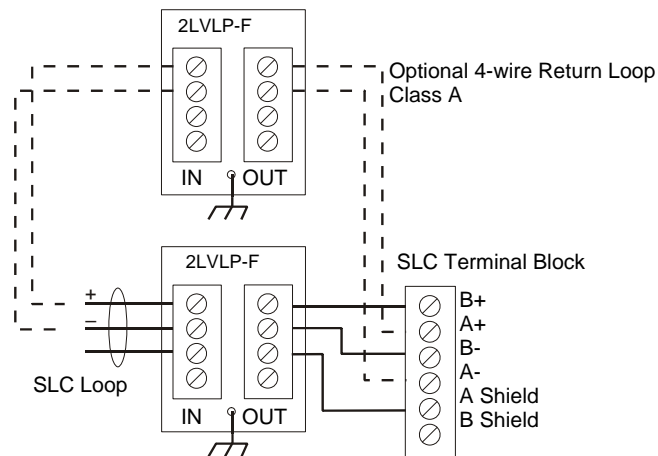
### SLCP-30 Connections



SLC-slcp1.wmf

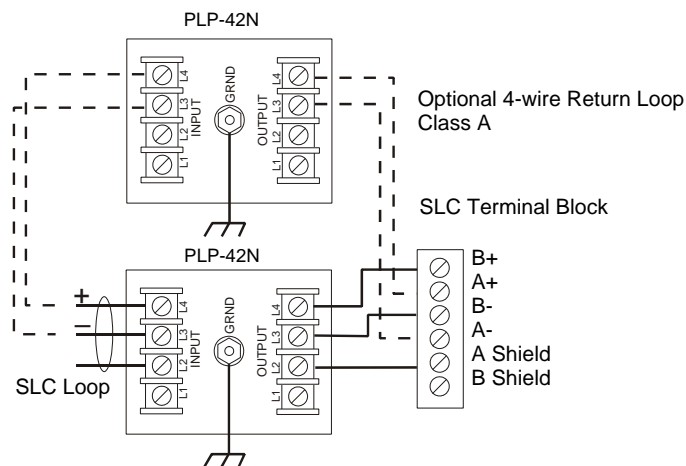
## B.2.2 Wiring Diagram for MS-9600, MS-9600LS, MS-9600UDLS, MS-9200UD, MS-9200UDLS, and MS-9050UD

### DTK-2LVLP-F Connections



SLC-lvp4.wmf

### PLP-42N Connections

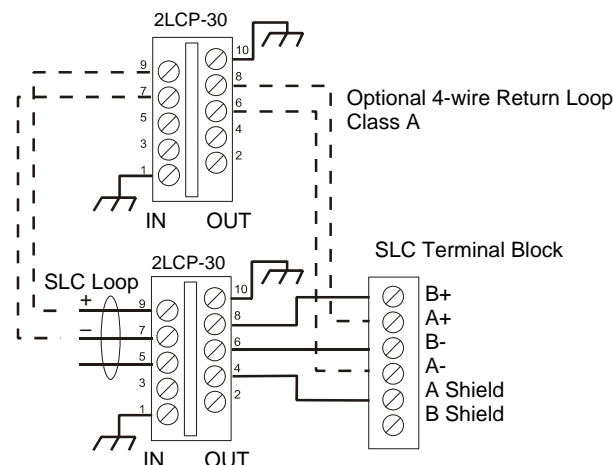


SLC-plpn4.wmf



**NOTE:** Use 12AWG (3.25mm<sup>2</sup>) to 18AWG (0.75mm<sup>2</sup>) wire with crimp-on connectors to connect the unit's ground terminal to equipment ground. Wire length must be minimized to provide best protection.

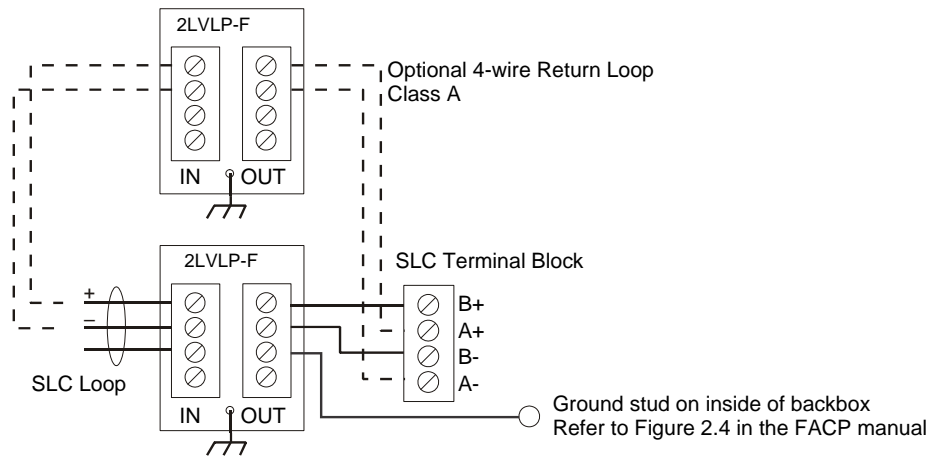
### SLCP-30 Connections



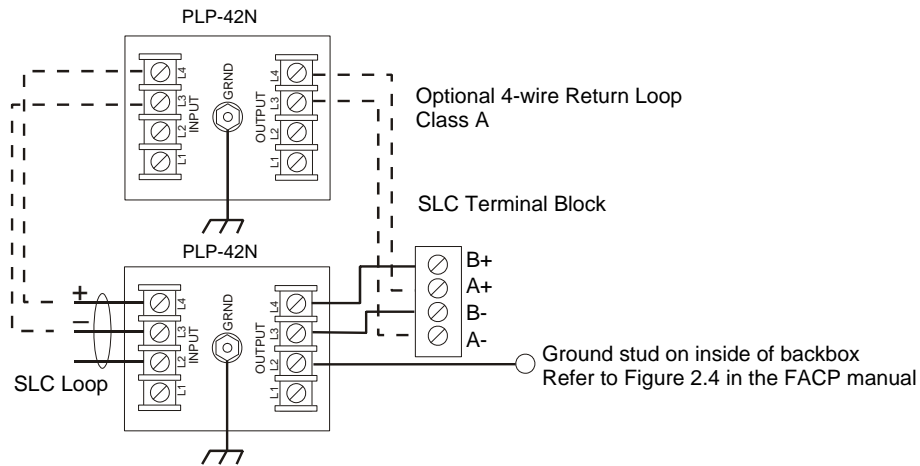
SLC-slcp4.wmf

## B.2.3 Wiring Diagram for ES-50X, ES-200X, and ES-1000X

### DTK-2LVLP-F Connections

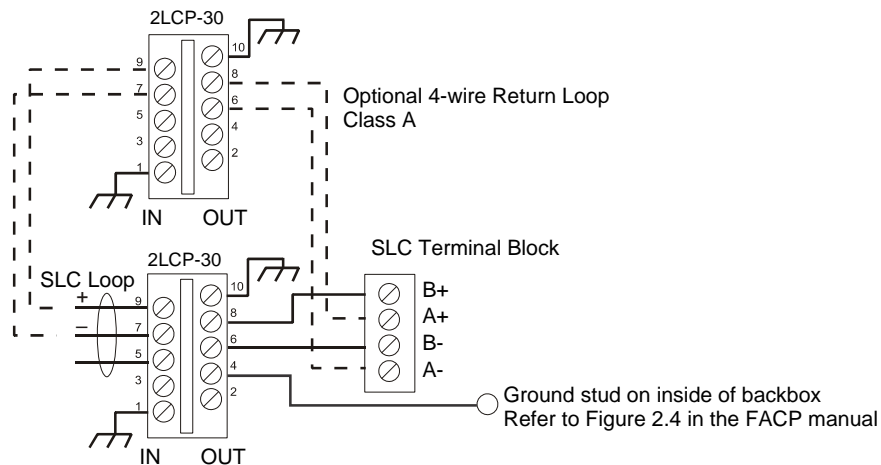


### PLP-42N Connections



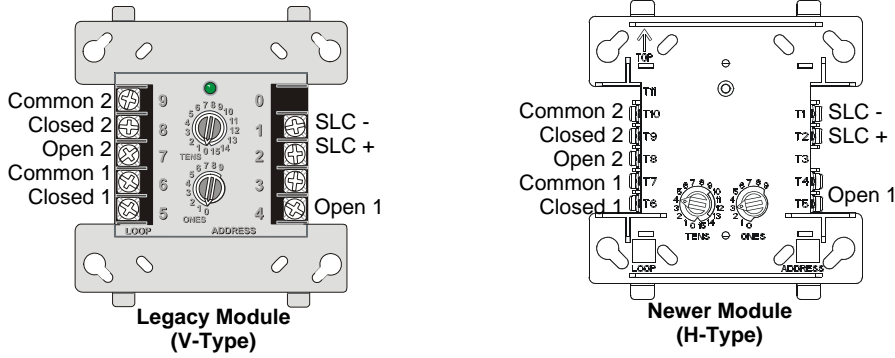
**NOTE:** Use 12AWG (3.25mm<sup>2</sup>) to 18AWG (0.75mm<sup>2</sup>) wire with crimp-on connectors to connect the unit's ground terminal to equipment ground. Wire length must be minimized to provide best protection.

### SLCP-30 Connections



# Appendix C: Terminal Conversion Charts for New & Legacy Devices

## C.1 CRF-300

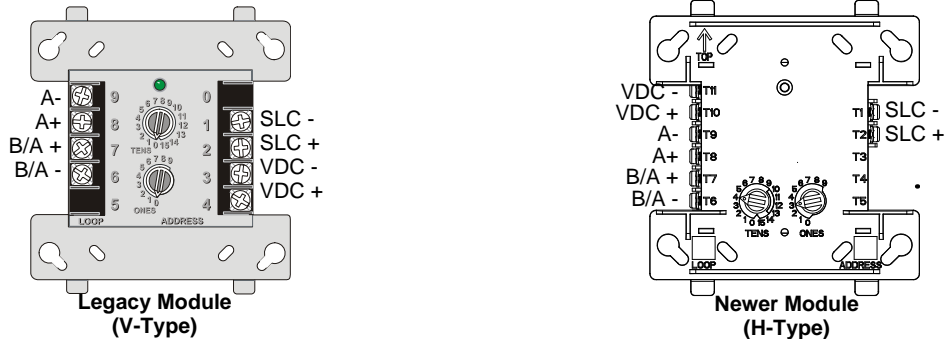


| Legacy Module Terminal Number (V-Type) | Terminal Function   | Newer Module Terminal Number (H-Type) |
|--|---------------------|---------------------------------------|
| 1                                      | SLC -               | 1                                     |
| 2                    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

Table C.1 CRF-300 Terminal Conversions

## C.2 CMF-300 and MMF-302

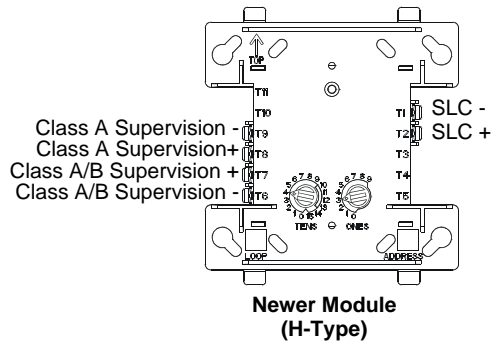
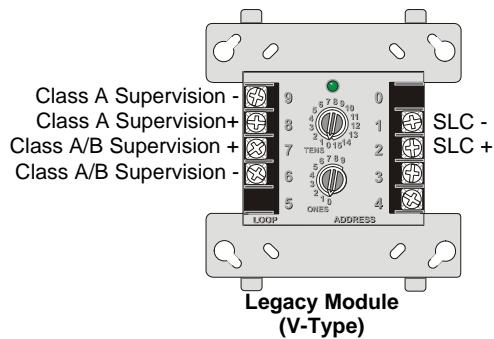
All module polarities are shown in **standby** condition, which reflects the labels on the new modules.



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

Table C.2 CMF-300 and MMF-302 Terminal Conversions

### C.3 MMF-300

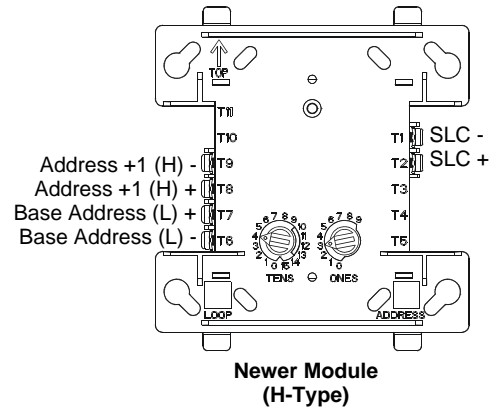
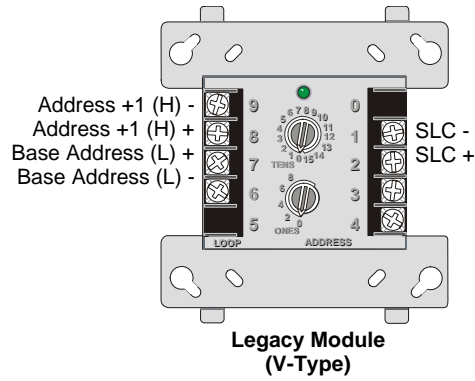


| Legacy Module Terminal Number (V-Type) | Terminal Function       | Newer Module Terminal Number (H-Type) |
|--|-------------------------|---------------------------------------|
| 1                                      | SLC -                   | 1                                     |
| 2        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

Table C.3 MMF-300 Terminal Conversions



### C.4 MDF-300



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

Table C.4 MDF-300 Terminal Conversions

# Appendix D: Intelligent Detector Base Layouts for Legacy Devices

## D.1 B350LP or B501 Detector Base

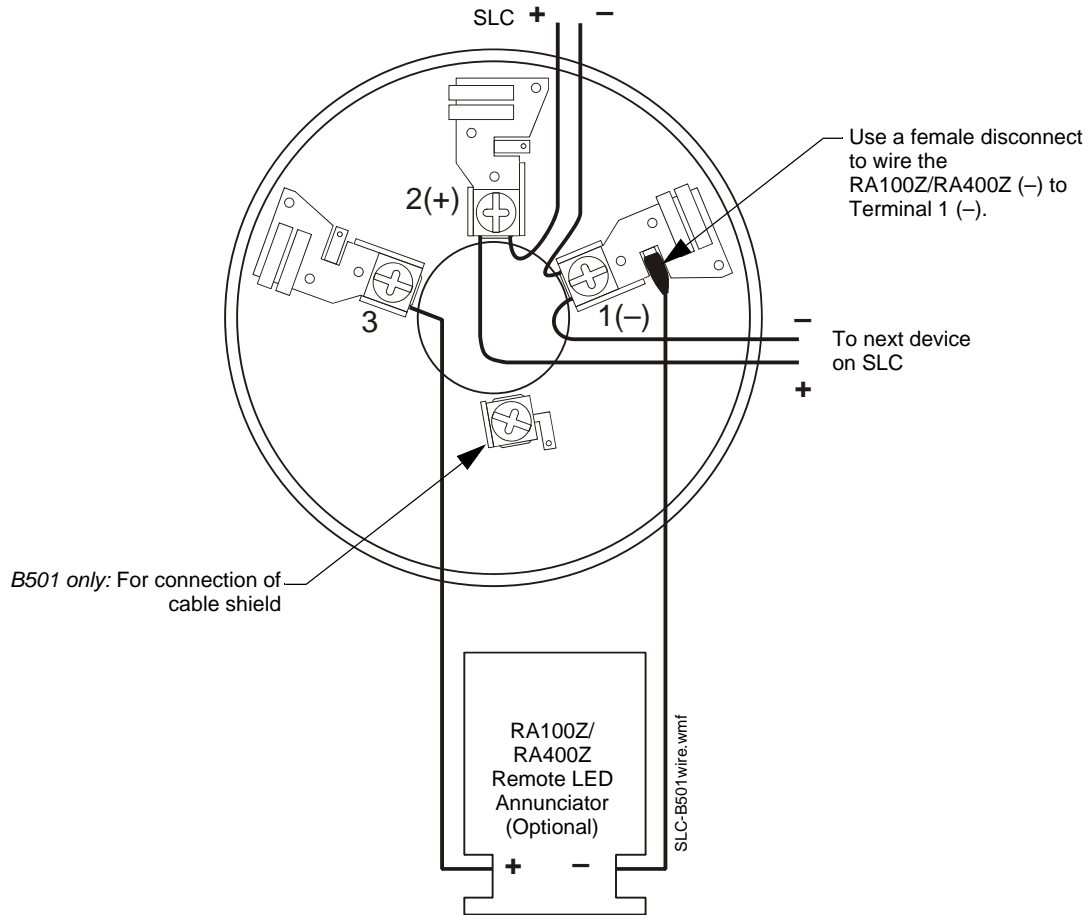


Figure D.1 Wiring the Legacy B350LP or B501 Detector Base



**NOTE:** The B350LP base wiring is identical to the B501, except there is no shield terminal.

## D.2 B224BI Isolator Base

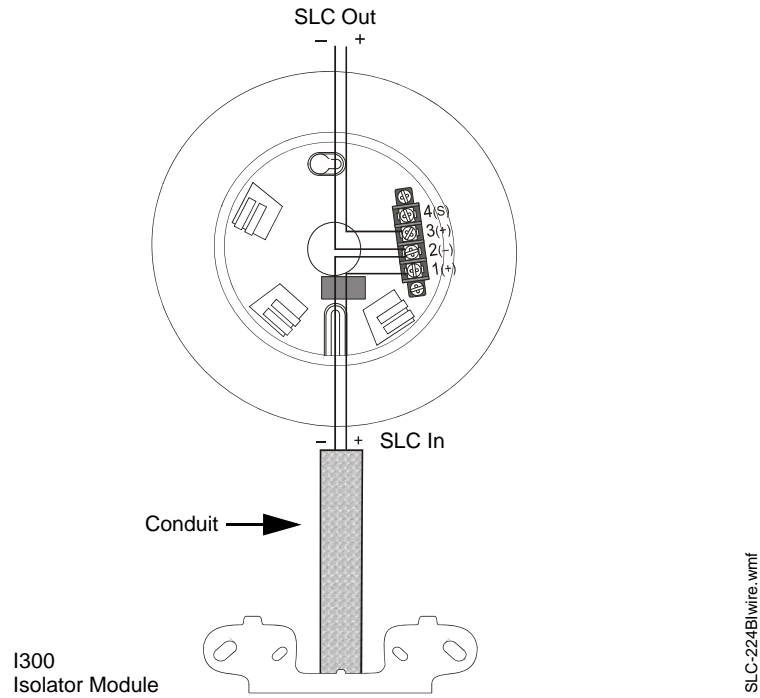


Figure D.2 Wiring the Legacy B224BI Isolator Base

## D.3 B224RB Relay Base

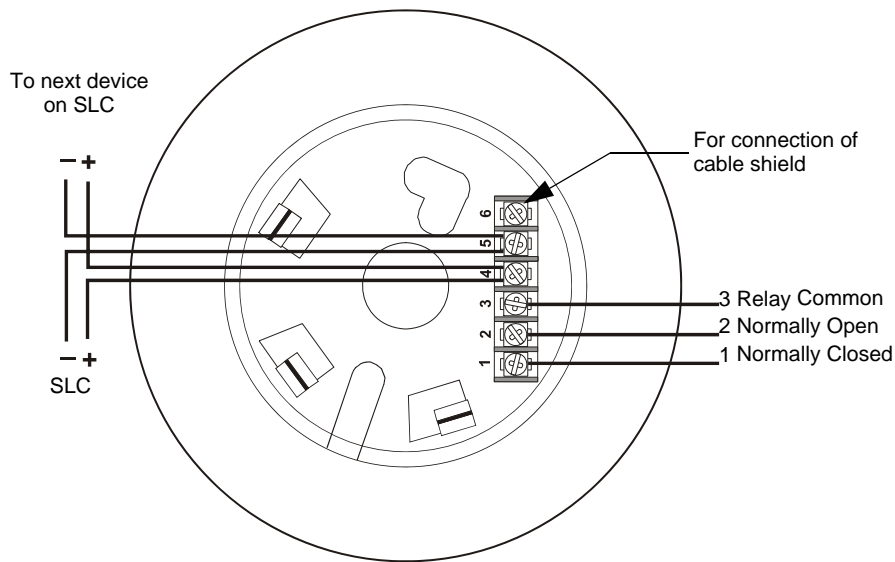


Figure D.3 Wiring the Legacy B224RB Relay Base

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

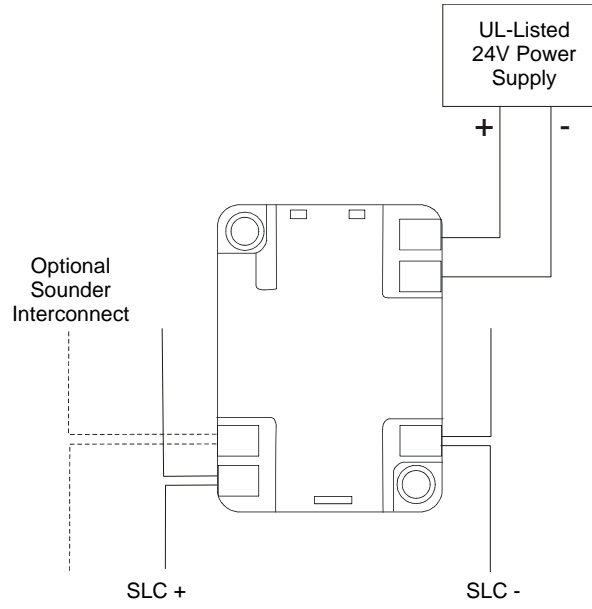


Figure D.4 Wiring the Legacy B501BH(-2) and B501BHT(-2) Sounder Bases

## Appendix E: Canadian Versions of SLC Devices

| UL-listed SLC Device                          | ULC-listed SLC Device                              | Description   |
|---|--|---|
| <b>Detectors</b>                              |  |   |
| AD350, AD355, AD365, AD365-IV                 | AD350A, AD355A, AD365A, AD365A-IV                  | Intelligent detector that combines a photoelectric sensing chamber and fixed temperature heat detection (135°F/57.2°C).   |
| CP350, CP355                                  | CP350A, CP-355A                                    | Addressable, intelligent smoke detector that incorporates an ionization sensing chamber. Designed to provide open area protection.  |
| SD350, SD355, SD355R, SD365(-IV), SD365R(-IV) | SD350A, SD355A, SD355RA, SD365A(-IV), SD365RA(-IV) | Addressable intelligent smoke detector that uses a photoelectric sensing chamber. Listed for use in ducts. Designed to provide open area protection. (-IV in model number indicates ivory color.)   |
| SD350T, SD355T, SD365T(-IV)                   | SD350TA, SD355TA, SD365TA(-IV)                     | Adds thermal sensors that will alarm at a fixed temperature of 135°F (57°C). (-IV in model number indicates ivory color.)   |
| SD355CO, SD365CO                              | NA   | Addressable detector that provides both fire and carbon monoxide (CO) detection.  |
| CSD365  | CSD365A  | Addressable detector that provides both photo and carbon monoxide (CO) detection.   |
| C365  | C365A  | Addressable detector that provides carbon monoxide (CO) detection.  |
| H350, H355, H365(-IV)                         | H350A, H355A, H365A(-IV)                           | Intelligent thermistor sensing circuit for fast response. Designed to provide open area protection with 50 foot spacing capability. A fixed temperature sensor with 135°F fixed temperature alarm. (-IV in model number indicates ivory color.)   |
| H350R, H355R, H365R(-IV)                      | H350RA, H355RA, H365RA(-IV)                        | Incorporates a thermal rate of rise of 15°F (9.4°C). (-IV in model number indicates ivory color.)   |
| H355HT, H365HT(-IV)                           | H355HTA, H365HTA(-IV)                              | High temperature sensor with 190°F (87.8°C) fixed temperature alarm. (-IV in model number indicates ivory color.)   |
| OSI-RI-FL                                     | N/A  | Addressable long range projected beam smoke detector designed to provide open area protection.  |
| D355PL, D365PL                                | D355PLA, D365PLA                                   | An addressable non-relay photoelectric low flow smoke detector.   |
| DNR   | DNRA   | Photoelectric Duct Detector, Low-flow. Requires SD350(A), SD355(A), or SD365(A) detector.   |
| <b>Bases</b>                                  |  |   |
| B210LP  | B210LPA  | Standard U.S. Low-Profile base (6", 15.24 cm).  |
| B501(-WHITE, -BL, -IV)                        | B501(-WHITE, -BL, -IV)                             | Standard European flangeless base (4", 10.16 cm) (-IV in model number indicates ivory color. -BL in model number indicates black color).  |
| B501BH, B501BHT                               | B501BHA, B501BHTA                                  | Sounder base, includes Sounder base with temporal sounder (UL 8th Edition).   |
| B501BH-2, B501BHT-2                           | N/A  | Sounder base, includes Sounder base with temporal sounder (UL 9th Edition).   |
| B224RB, B224RB-WH, B224RB-IV                  | B224RBA, B224RBA-WH, B224RBA-IV                    | Low Profile Intelligent relay base.   |
| B224BI, B224BI-WH, B224BI-IV                  | B224BIA, B224BIA-WH, B224BIA-IV                    | Low Profile Intelligent isolator base.  |
| B200S-WH, B200S-IV                            | B200SA-WH, B200SA-IV                               | Intelligent sounder base, programmable, temporal or steady.   |
| B200S-LF-WH, B200S-LF-IV                      | N/A  | Intelligent sounder base, programmable, for low frequency applications  |
| B200SR-WH, B200SR-IV                          | B200SRA-WH, B200SRA-IV                             | Intelligent sounder base, temporal or steady.   |
| B200SR-LF-WH, B200SR-LF-IV                    | N/A  | Intelligent sounder base for low frequency applications   |
| B300-6(-IV)                                   | B300A-6(-IV)                                       | Standard U.S. Low-Profile base (6", 15.24 cm). (-IV in model number indicates ivory color.)   |
| <b>Monitor and Zone Interface Modules</b>     |  |   |
| MMF-300                                       | MMF-300A   | Used for normally open contact alarm initiating devices, such as manual pull stations, four-wire smoke detectors, heat detectors, waterflow, and supervisory devices.   |
| MMF-302                                       | MMF-302A   | Used to interface with two-wire smoke detectors in addition to normally open contacts.  |
| MDF-300                                       | MDF-300A   | 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.   |
| MMF-301                                       | MMF-301A   | Functionally similar to the MMF-300(A) Monitor Module, but offered in a smaller package for mounting directly in the electrical box of the device being monitored. (Class B input circuit only.)  |
| BG-12LX                                       | BG-12LX  | An addressable manual pull station with key-lock reset feature. The addressable module is housed within the pull station.   |
| <b>Control Modules</b>                        |  |   |
| CMF-300                                       | CMF-300A   | 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. |
| CRF-300                                       | CRF-300A   | Relay Control Module is similar to the CMF-300(A) except used as a Form-C control relay module.   |

| <b>UL-listed SLC Device</b>       | <b>ULC-listed SLC Device</b> | <b>Description</b>  |
|-----------------------------------|------------------------------|---|
| <b>Fault Isolator Module</b>      |                              |   |
| I300                              | I300A                        | 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 I300(A) modules.   |
| <b>Multi-input/output modules</b> |                              |   |
| MMF-300-10                        | MMF-300-10A                  | Supervises ten Class-B addressable Initiating Device Circuits (IDC) which monitor normally open contact initiating devices.   |
| MMF-302-6                         | MMF-302-6A                   | Monitors six zones of conventional two-wire detectors.  |
| CDRM-300                          | CDRM-300A                    | Dual Class B monitor / Form-C relay module.   |
| CMF-300-6                         | CMF-300-6A                   | Similar in operation to the CMF-300, except it can activate six (6) Class B or three (3) Class A NACs.  |
| CRF-300-6                         | CRF-300-6                    | Similar in operation to the CRF-300, except it provides six (6) Form-C relays.  |
| <b>Wireless gateway</b>           |                              |   |
| W-GATE                            | W-GATEA                      | The wireless gateway acts as a bridge between a group of wireless fire devices and a LiteSpeed SLC loop on the FACP.  |

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