



MS-9200E

Addressable Fire Alarm Control Panel (Export Version)



Programming, Installation, Maintenance and Operating Instruction Manual

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

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

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

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

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

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

Fire Alarm System Limitations

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

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

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

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

FCC Warning

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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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This control panel has been designed to comply with standards set forth by the following regulatory agencies:

- Underwriters Laboratories Standard UL 864
- NFPA 72 National Fire Alarm Code
- CAN/ULC - S527-M87 Standard for Control Units for Fire Alarm Systems

Before proceeding, the installer should be familiar with the following documents.



NFPA Standards

This Fire Alarm Control Panel complies with the following NFPA Fire Alarm Codes:

NFPA 72 National Fire Alarm Code for Central Station Fire Alarm Systems Protected Premises Unit (Automatic, Manual and Waterflow) - requires UDACT-F, Local Fire Alarm Systems (Automatic, Manual Waterflow and Sprinkler Supervisory), Auxiliary Fire Alarm Systems (Automatic, Manual and Waterflow) - requires RTM-8F, Remote Station Fire Alarm Systems (Automatic, Manual and Waterflow) - requires RTM-8F or UDACT-F, Proprietary Fire Alarm Systems (Automatic, Manual and Waterflow) Protected Premises Unit, Automatic Fire Detectors, Installation, Maintenance & Use of Notification Appliances for Fire Alarm Systems and Testing Procedures for Fire Alarm Systems.



Underwriters Laboratories Documents:

UL 38 Manually Actuated Signaling Boxes
UL 217 Smoke Detectors, Single and Multiple Station
UL 228 Door Closers-Holders for Fire Protective Signaling Systems
UL 268 Smoke Detectors for Fire Protective Signaling Systems
UL 268A Smoke Detectors for Duct Applications
UL 346 Waterflow Indicators for Fire Protective Signaling Systems
UL 464 Audible Signaling Appliances
UL 521 Heat Detectors for Fire Protective Signaling Systems
UL 864 Standard for Control Units for Fire Protective Signaling Systems
UL 1076 Proprietary Burglar Alarm Systems
UL 1481 Power Supplies for Fire Protective Signaling Systems
UL 1638 Visual Signaling Appliances
UL 1971 Signaling Devices for Hearing Impaired
CAN/ULC - S524-M91 Standard for Installation of Fire Alarm Systems



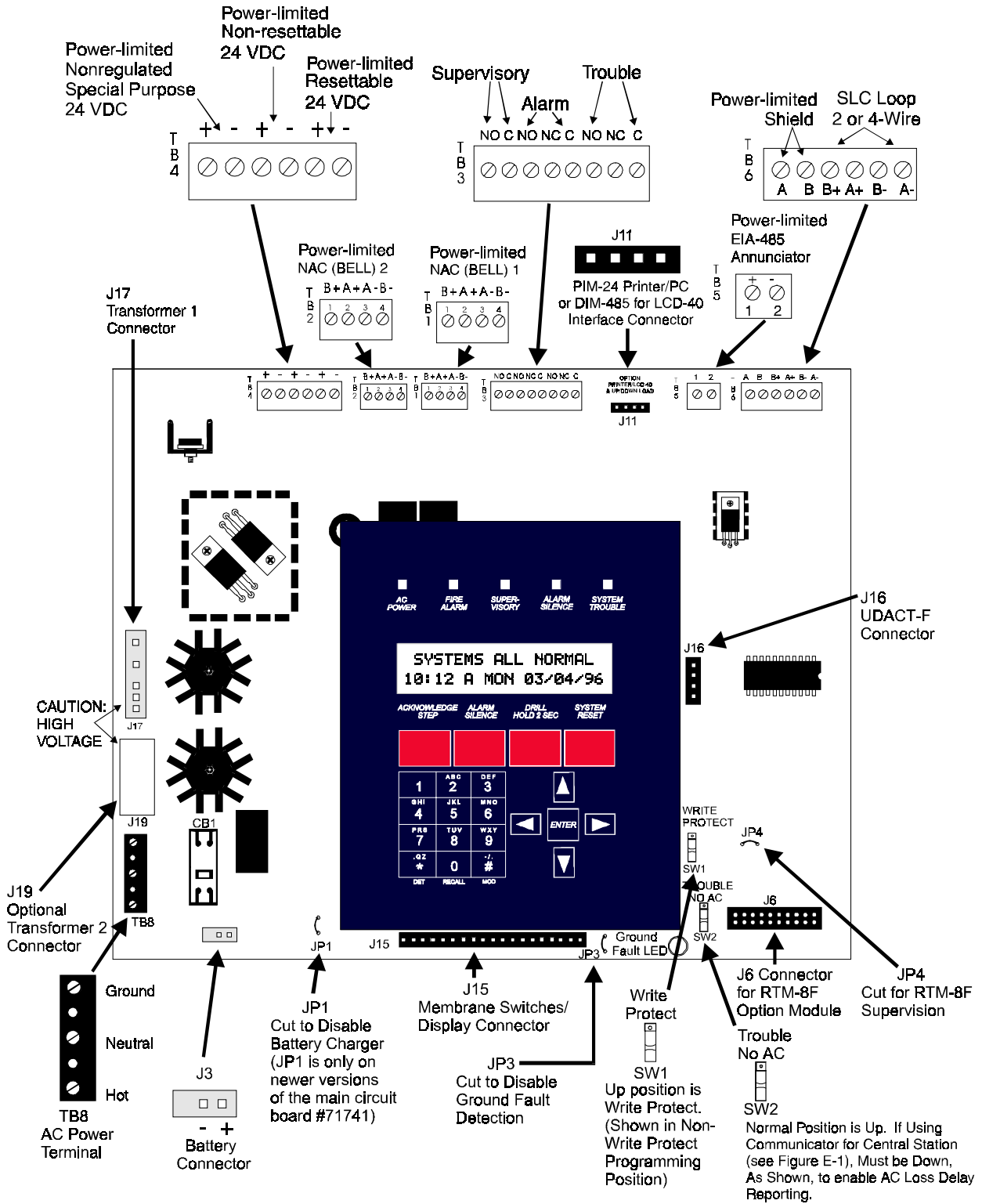
Other:

EIA-485 and EIA-232 Serial Interface Standards
NEC Article 250 Grounding
NEC Article 300 Wiring Methods
NEC Article 760 Fire Protective Signaling Systems
Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction (LAHJ)

Fire•Lite Documents

Fire•Lite Device Compatibility Document	Document #15384
Annunciator Modules	Document #15390
AFM-16ATF and AFM-32AF Annunciators	Document #15970
AFM-16AF Annunciator	Document #15210
MS-5012 Communicator	Document #15465
PK-9200W Off Line Programming Utility	Document #50684
UDACT-F Communicator/Transmitter	Document #50049
FCPS-24F Field Charger/Power Supply	Document #50079
CHG-120F Battery Charger	Document #50888
LDM Series Lamp Driver Modules	Document #50055
LCD-40 Remote Fire Annunciator	Document #50327
ACM-8RF Relay Control Manual	Document #50362

MS-9200E Main Circuit Board



CHAPTER 1 *Product Description*

The Fire•Lite MS-9200E is a compact, cost effective, addressable FACP (Fire Alarm Control Panel) with an extensive list of powerful features. The combination of Fire•Lite's 300 Series Addressable Devices and the MS-9200 FACP offers the latest in fire protection technology. The power supply and all electronics are contained on a single circuit board housed in an attractive metal cabinet, providing a complete fire control system for most applications. Optional modules, which plug into the main circuit board, are available for special functions. Available accessories include LED, graphic and LCD annunciators, digital communicator, local downloading software and remote power expansion.

1.1 Features

- Single standard SLC loop which meets NFPA Style 4, 6 and 7 requirements
- 198 addressable device capacity (99 detectors and 99 monitor/control modules)
- 56 software zones
- Two main circuit board NACs (Notification [bell] Appliance Circuits) expandable via control modules
- Optional RTM-8F eight zone relay module with local energy/reverse polarity transmitter
- Optional ACM-8RF Relay Control Module
- Optional Printer/PC Interface Module
- 3.6 amps system power expandable to 6.6 amps
- 3.0 amps NAC power expandable to 6.0 amps
- 40 character LCD display (backlit)
- Real-time clock/calendar
- History file with 500 event capacity
- Advanced fire technology features:
 - ✓ Automatic device type-code verification
 - ✓ Auto detector test
 - ✓ Maintenance alert
 - ✓ Point trouble identification
- Waterflow (nonsilenceable) selection per module point
- Supervisory (latching or auto-resettable) selection per point with separate system LED. *Note that the auto-resettable feature is only available for panels with software version #M9200EV20 or later*
- System alarm verification selection
- Walktest with report of two devices set to same address
- Presignal per NFPA 72
- Annunciators
 - ✓ AFM LED Zone Annunciator Series
 - ✓ LDM Graphic Annunciator Series
 - ✓ LCD-40 Series Liquid Crystal Point Display Annunciator
- Silence inhibit timer option
- Autosilence timer option
- Continuous/March Time/Temporal or California code for main circuit board NACs
- Remote ACK/Silence/Reset/Drill via M300, M301 modules, AFM annunciators or LCD-40 Remote Fire Annunciator
- Auto-program (learn mode) reduces installation time

- Password and key-protected nonvolatile memory
- User programmable password
- Fully programmable from panel keyboard
- Programmable from an off-line PC
- Rapid poll algorithm for manual stations (U.S. Patent Pending)
- SLC operates up to 10,000 ft. (3,000 m) or 1,000 ft. (300 m) with untwisted, unshielded wire (U.S. Patent #5,210,523)
- Uses Fire•Lite 300 Series Addressable Devices:
 - ✓ CP300 - Ionization Smoke Detector
 - ✓ SD300 - Photoelectric Smoke Detector
 - ✓ SD300T - Photoelectric Smoke Detector with 135° Thermal Detection
 - ✓ C304 - Control Module
 - ✓ M300 - Monitor Module
 - ✓ M301 - Miniature Monitor Module
 - ✓ M302 - 2-wire Detector Module
 - ✓ I300 - Isolator Module
- All 300 Series devices (except I300) feature decade code wheels for addressing
- 300 Series addressable smoke detectors feature a plug-in wiring connector for ease-of-installation and maintenance
- UDACT-F Digital Communicator, reports up to 56 zones or 198 points (all 300 Series devices) to a UL listed Central Station

1.2 Specifications

AC Power - TB8

240 VAC, 50 Hz, 1.2 amps

Wire size: minimum #14 AWG (2.00 mm²) with 600V insulation

Battery (Lead Acid Only) - J3

Maximum Charging Circuit: Normal Flat Charge — 27.6V @ 0.8 amp

Maximum Battery Capacity: 18 Amp Hour (new MS-9200 cabinet holds maximum 12 Amp Hour batteries. Batteries greater than 12 Amp Hour, up to 18 Amp Hour, require Fire•Lite BB-17F or other UL listed battery cabinet). For 25 to 120 Amp Hour batteries, use the CHG-120F Battery Charger *only* if the newer MS-9200 main circuit board #71741, with jumper JP1, is installed. *Note: Jumper JP1, on the FACP main circuit board, must be cut to disable FACP battery charger when using the CHG-120F.*

Communication Loop - TB6

15 VDC nominal, 27.6 VDC maximum

Maximum length is 10,000 ft. (3,000 m) total twisted pair length

Maximum loop current is 250 mA (short circuit) or 100 mA (normal)

Maximum loop resistance is 40 ohms

Supervised and power-limited

Notification Appliance Circuits - TB1 & TB2

Nonregulated special purpose power

Power-limited circuitry

Maximum voltage drop in wiring: 2.0 V

Nominal operating voltage: 24 VDC

Current for all external devices: 3.0 amps expandable to 6.0 amps¹
Current-limit: Fuseless, electronic, power-limited circuitry
Maximum signaling current per circuit: 2.50 amps
End-of-line resistor: 4.7K ohms, ½ watt (P/N 71252 UL listed) for NACs

Alarm, Trouble and Supervisory Relays - TB3

Contact rating: 2.0 amps @ 30 VDC (resistive), 0.5 amps @ 30 VAC (resistive)
Alarm and Trouble relays: Form-C Supervisory relay: Form-A
Refer to Figure 2-6, "Relay Connections," on page 26 for information on power-limited wiring for relay circuits

Four-Wire Smoke Detector Power (24 VDC nominal) - TB4, Terminals 5(+) and 6(-)

Maximum ripple voltage: 10 mV_{RMS} Maximum standby current: 50 mA
Up to 300 mA is available for powering 4-wire smoke detectors^{1 2 3}
Power-limited circuit

Nonresettable Filtered 24 VDC Power (24 VDC nominal) - TB4, Terminals 3(+) & 4(-)

Maximum ripple voltage: 10mV_{RMS} Maximum standby current: 150 mA
Total DC current available from this output is up to 300 mA^{1 2 3}
Power-limited circuit

Nonregulated Special Purpose 24 VDC Power - TB4, Terminals 1(+) & 2(-)

Operating voltage range: 18V to 30V
Total DC current available for powering external devices is 2.5 amps²
This power is not recommended for AFM, LDM or LCD-40 annunciators
Power-limited circuit

1.3 Controls and Indicators

LCD Display

The MS-9200 uses a 40-character (2 lines X 20 characters) high viewing angle LCD display with a character height of 3/16". The display includes a long-life LED backlight that remains illuminated. If AC power is lost and the system is not in alarm, the LED backlight will turn off to conserve batteries.



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

LED Indicators

LED indicators are provided to annunciate the following conditions:

- AC Power (green)
- Fire Alarm ((red)
- Supervisory (yellow)
- Alarm Silence (yellow)
- System Trouble (yellow)
- Ground Fault (yellow) - located on bottom of main circuit board (refer to figure on page 7)

1. Total current for special purpose power, nonresettable power, 4-wire smoke power and two NACs *must not exceed 6.0 amps*. Total external system current in excess of 3.6 amps requires XRM-24E Transformer and 12 AH or 18 AH batteries, not 7.0 AH.
2. For power supply calculations, refer to Appendix A.
3. Total current for resettable 4-wire smoke detector power and nonresettable power must not exceed 600 mA.

Membrane Panel

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

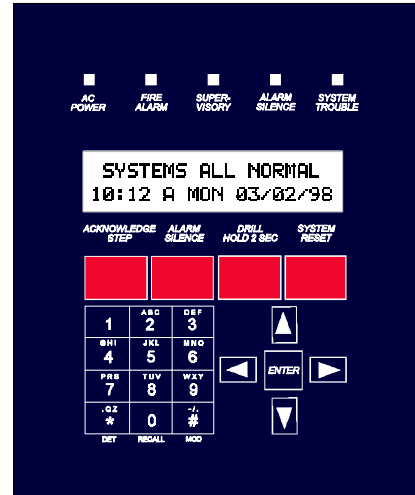
Function switches:

- Acknowledge/Step
- Alarm Silence
- Drill
- System Reset (lamp test)

Service/program switches:

- keys labeled 1 to 9
- * (detector) key
- # (module) key
- 0 (recall) key
- four cursor keys (up, down, right and left)
- Enter key

FIGURE 1-1:MS-9200 Membrane/Display Panel



Local Piezo Sounder

A piezo sounder provides separate and distinct pulse rates for alarm, trouble and supervisory conditions.

1.4 Circuits

SLC Communication Loop

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

Output Circuits

The following output circuits are available on the FACP:

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

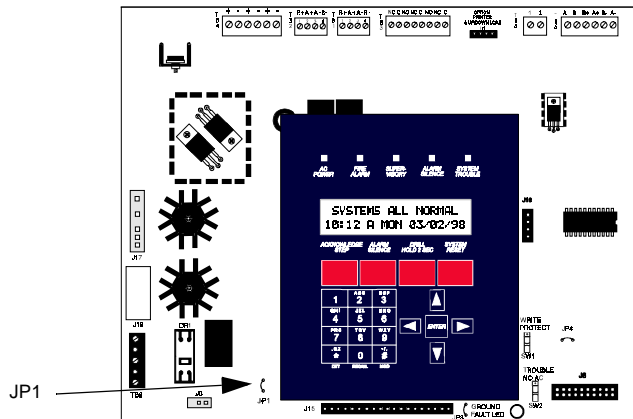
NAC (Notification Appliance Circuits)

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

Relays

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

1.5 Components

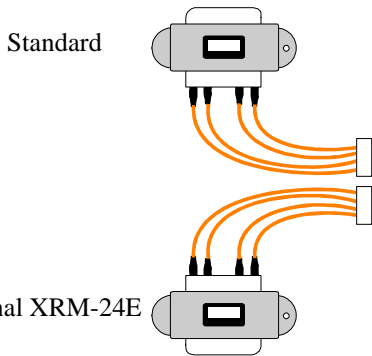


Main Circuit Board

The main circuit board contains the system's CPU, power supply, other primary components and wiring interface connectors. Optional modules plug-in and are mounted to the main circuit board. The circuit board is delivered premounted in the MS-9200 cabinet. *Note that newer versions of the circuit board have jumper JP1 which can be cut to disable the FACP battery charger when using an external battery charger.*

Cabinet

The MS-9200 cabinet is red with an attractive navy blue front overlay. The backbox provides space for two batteries (up to 7 Amp Hour in old version, up to 12 Amp Hour in new version). Refer to Figure 2-1, "MS-9200 Cabinet Dimensions - older version (manufactured through 11/1/98)," on page 21 through Figure 2-4, "MS-9200 Cabinet Mounting - new version," on page 24 [available November 1, 1998], for information on dimensions. Ample knockouts are provided for system wiring. Also available is an optional dress panel (DP-9200 for older backbox or DP-1-R for newer backbox), which mounts to the inside of the cabinet (required and included on the ULC version). The dress panel must be installed to meet FM requirements (refer to "Dress Panel" on page 16).

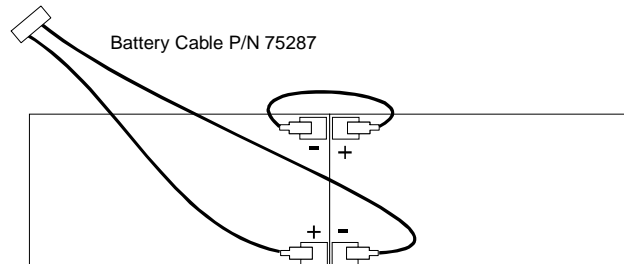


Transformer Assembly

One 100VA transformer is provided standard with the panel (3.6 amps maximum). An optional 100 VA transformer (XRM-24E) is available to provide maximum accessory power (6.6 amp total). Note that transformers are mounted horizontally (as shown) in the newer version of the cabinet which will replace the existing cabinet effective November 1, 1998. Transformers mount vertically in the older cabinet.

Batteries

The MS-9200 cabinet provides space for two batteries (up to 7 Amp Hour in old version, up to 12 Amp Hour in new version). 18 AH batteries require use of the Fire•Lite BB-17F or similar UL listed battery cabinet. The newer version MS-9200 main circuit board, which incorporates jumper JP1 for disabling the FACP charger, can use the CHG-120F for charging 25 to 120 AH batteries. Batteries must be ordered separately and require use of the Fire•Lite BB-55F UL listed battery cabinet.



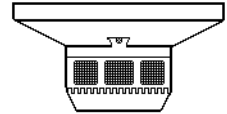
1.5.1 Addressable Devices: 300 Series Detectors

Fire•Lite's 300 Series Addressable Detectors consist of the SD300 Photoelectric smoke detector, SD300T Photoelectric smoke detector with thermal sensor and the CP300 Ionization smoke detector. The detectors communicate with the main circuit board CPU via an SLC loop. The MS-9200 CPU determines the alarm, maintenance or normal status of each device. Each detector responds to an address that is manually set via built-in rotary decimal switches. Each detector head has a removable plug-in connector for ease of wiring and maintenance (or service), as well as a single LED and test connections.

Voltage Range:15-28 Volts DC peak	Diameter: 5.0 inches (12.7 cm)
Standby Current:150 uA @ 24 VDC	Height: 3.0 inches (7.6 cm)
LED Current:7 mA @ 24 VDC (latched 'ON')	Temperature: 0° to 49° C (32° to 120° F)
Loop Resistance:40 ohms maximum	Rel. Humidity: 10% to 85% Non-condensing
Air Velocity:CP300 = 1,500 ft./minute (7.6 m/S) max., SD300 = 3,000 ft./minute (15 m/S) max.	

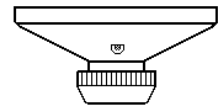
SD300, SD300T

The SD300 is an addressable photoelectric smoke detector which provides smoke sensing utilizing optical sense technology. The detector sends a unique 'type' code to aid the automatic programming feature in the control panel. The SD300T includes a 135° F fixed thermal sensor.



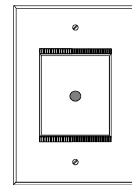
CP300

The CP300 is an addressable ionization smoke detector which measures the level of combustion products in its chamber using the 'ionization principle.' The detector sends a unique 'type' code to aid the automatic programming feature in the control panel.



RA400Z

The RA400Z is a remote single LED annunciator that can be wired directly to an addressable detector for annunciation of that detector's alarm status.

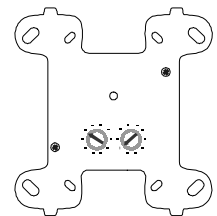


1.5.2 Addressable Devices: 300 Series Modules

The C304 Control Module plus the M300, M301 and M302 Monitor Modules provide an interface between the MS-9200 and conventional initiating devices and notification appliances. All modules respond to an address that is set by the installer via two built-in rotary decimal switches. A flashing LED indicates power is applied to the modules (except for M301). A thermoplastic cover is provided with all modules, except the M301, for mounting to a 4" square mounting box.

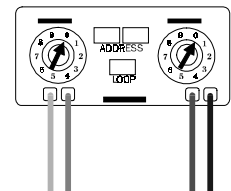
M300

The M300 is an addressable monitor module that can be used to monitor conventional normally open contact alarm initiating devices, such as manual pull stations, 4-wire smoke detectors, heat detectors, waterflow and supervisory devices. The supervised circuit can be wired NFPA Style B (Class B) or Style D (Class A). *The M300 module will not support 2-wire smoke detectors.* The M300 modules can be tested with a test magnet available from Fire•Lite (M02-04-00). The magnet test checks the module electronics and connections to the control panel. The module mounts to a 4" square electrical box with a minimum depth of 2-1/8".



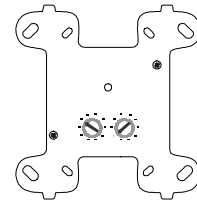
M301

The M301 is an addressable monitor module that is a miniature version of the M300. It connects with wire pigtails (Style B [Class B] only), and may be mounted directly in the electrical box of the device being monitored. Dimensions of 2.75" (6.985 cm) L x 1.30" (3.302 cm) W x 0.50" (1.27 cm) D, allow for mounting in existing single-gang electrical boxes, the device being monitored or similar locations.



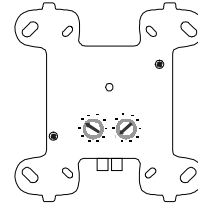
M302

The M302 is an addressable monitor module that can be used to interface and monitor conventional 2-wire smoke detectors. All 2-wire detectors being monitored must be UL compatible with the module (refer to the Fire•Lite Device Compatibility Document). The supervised circuit can be wired NFPA Style B or D. The M302 module can be tested with a test magnet available from Fire•Lite (P/N M02-04-00). Separate filtered switched 24 VDC power is required. The module mounts to a 4" square electrical box with a minimum depth of 2-1/8".



C304

The C304 is an addressable control module that can be used as a Notification Appliance or Speaker Circuit for powering and supervising compatible, UL listed notification appliances. The module's supervised circuit can be wired NFPA Style Y or Z. A 47K ohm ELR is provided. By breaking two built-in tabs, the C304 can be employed as a Form-C control relay. The module mounts to a 4" square electrical box with a minimum depth of 2-1/8".



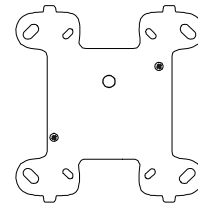
BG-10LX

The BG-10LX is an addressable manual pull station featuring a key-lock reset. The pull station responds to an address set by the installer using the built-in rotary decimal switches on the pull station. The manual pull station includes a Fire•Lite key.



I300

The loop isolator module is an automatic switch which opens the circuit voltage to the SLC Loop branch(es) whenever a wire-to-wire short circuit is detected on that loop. The remainder of the communications loop leading up to the I300 will continue to operate, unaffected by the short. The isolator module is bi-directional, meaning that it can detect a fault condition between the input SLC terminals or output SLC terminals. The I300 is required to meet NFPA Style 7 requirements.



1.5.3 Addressable Device Accessories

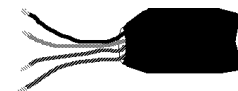
E.O.L. Resistor Assembly Fire•Lite P/N R-47K

The 47K End-of-Line Resistor Assembly is used to supervise the M300 Monitor and C304 Control Module circuits. The resistor is included with each M300 and C304 module.



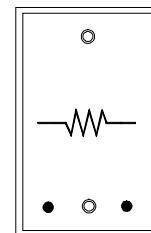
E.O.L. Power Supervision Relay

The UL listed End-of-Line Power Supervision Relay is used to supervise the power to 4-wire smoke detectors and notification appliances.



N-ELR Mounting Plate

The N-ELR is a single End-of-Line resistor plate which is required for use in Canada. An ELR, which is supplied with each module and fire alarm control panel, is mounted to the ELR plate. Resistors mounted to the N-ELR plate can be used for the supervision of an M300 and M301 Monitor Module and C304 Control Module circuit.



1.6 Optional Modules

The MS-9200 main circuit board includes option module connectors which are located on the right side of the board. Available option modules include the following:

ACM-8RF Relay Control Module

The ACM-8RF Relay Control Module contains eight high current (5 amps) Form-C relays. The module interfaces to host fire alarm control panels which employ an EIA-485 communications bus. ACM-8RF modules may be connected to the EIA-485 bus up to 6,000 feet (1,800 m) away from the host control panel. Power-limited, filtered, non-resettable power must be supplied by the host FACP or a UL listed power supply such as the FCPS-24F. Refer to Figure 2-34, "ACM-8RF Relay Control Module Installation," on page 49, for wiring details.

RTM-8F Relay/Transmitter Module

The RTM-8F Relay/Transmitter Module plugs into connector J6 and mounts on the bottom right side of the MS-9200 main circuit board. When the module is installed, jumper JP4 must be cut in order to provide module placement supervision. The RTM-8F provides eight high current (5 amps) Form-C relays. These relays track software zones 1 through 8. The Relay/Transmitter Module also provides Municipal Box or Remote Station transmitters. An MS-9200 equipped with an RTM-8F meets NFPA 72 codes for Auxiliary and Remote Station requirements. In remote station applications, the RTM-8F can be configured to transmit alarm only or alarm and trouble signals. Disable switches and indicators are provided on the module. Refer to Figure 2-35, "RTM-8F Module Installation," on page 50 and Figure 2-36, "RTM-8F Relay Transmitter Module," on page 51, for additional information.

PIM-24 Printer/PC Interface Module

The Printer/PC Interface Module may be used to permanently connect a printer to the MS-9200 for the purpose of printing a history report, walktest file or program listing. Printers require separate primary AC power. The PIM-24 module connects to the serial EIA-232 port on the printer using cable P/N 75267. The module mounts to the J11 connector on the MS-9200 main circuit board. The PIM-24 is also used to connect a computer for upload/download of programming data. Refer to the PK-9200(W) Off Line Programming Utility Manual for programming information. Refer to Figure 2-37, "Remote Serial Printer and Computer Connections," on page 52, for information on connections and "System Edit" on page 61, for information on programming the MS-9200 for use with a printer or PC. *Note that the PIM-24 option cannot be used simultaneously with the DIM-485/LCD-40 option.*

PK-9200W Kit for Local Downloading

The PK-9200W Programming Utility can be used to program an MS-9200 directly from most IBM PC/XT/AT or compatible computers, including laptops and portables, equipped with a serial port. MS-9200 program files can also be created and stored on the PC, then downloaded to the control panel. The PK-9200W Kit includes the MS-9200 Windows based Programming Utility software on four 3½" disks and the Instruction Manual P/N 50684, and requires separate purchase of the PIM-24 Interface module.

UDACT-F Universal Digital Alarm Communicator/Transmitter

The UDACT-F transmits system status to UL listed Central Station receivers via the public switched telephone network. The UDACT-F is compact in size and may be mounted inside the host control panel or may mount externally in a separate cabinet. EIA-485 annunciator communications bus and filtered 24 volt connections are required. The UDACT-F transmits 198 points or 56 zones when connected to the MS-9200. The MS-9200 requires firmware P/N 73580 or greater in order to be compatible with the UDACT-F. Refer to Figure 2-31, "UDACT-F Mounting to MS-9200," on page 47, and Figure 2-32, "External UDACT-F Mounting in ABS-8RF," on page 48, for wiring details and "System Edit" on page 61, for information on programming the MS-9200 for use with the UDACT-F.

DIM-485 Display Interface Module

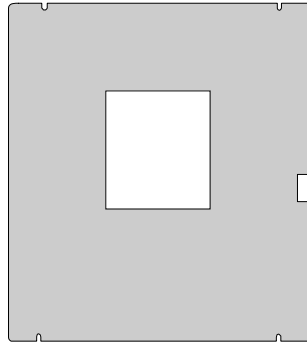
The Display Interface Module is required to connect an LCD-40 Series Remote Fire Annunciator to the MS-9200 FACP. The DIM-485 plugs into connector J11 located on the top right side of the MS-9200 main circuit board. Refer to "LCD-40 Series Annunciator Wiring" on page 88, for wiring details and "System Edit" on page 61, for information on programming the MS-9200 for use with the LCD-40. *Note that the DIM-485/LCD-40 cannot be used simultaneously with the PIM-24 module.*

1.7 Accessories

1.7.1 Dress Panel

A red dress panel (DP-9200 for older backbox or DP-1-R for newer backbox) is available as an option (required for Canadian installation). The dress panel restricts access to the system wiring while allowing access to the membrane switch panel.

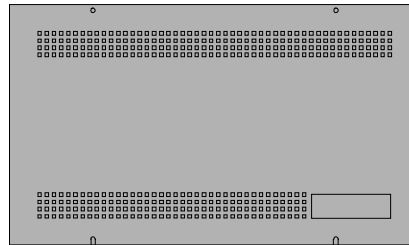
Note that the MS-9200 Addressable Fire Control Panel installed with the dress panel, has received Factory Mutual (FM) approval. It is important to note that FM approval is contingent on the proper installation of the dress panel.



1.7.2 Battery Box

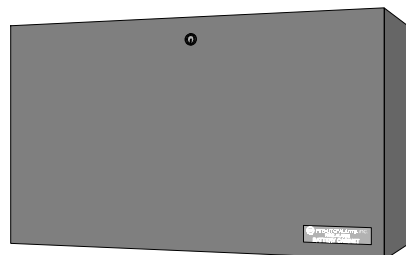
BB-17F

The BB-17F battery box may be used to house two 12 AH (required with older backbox) or 18 AH (required with older or newer backbox) batteries. The battery box mounts directly below the MS-9200 cabinet. The box is red and is provided with knockouts.



BB-55F

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



1.7.3 CHG-120F Battery Charger

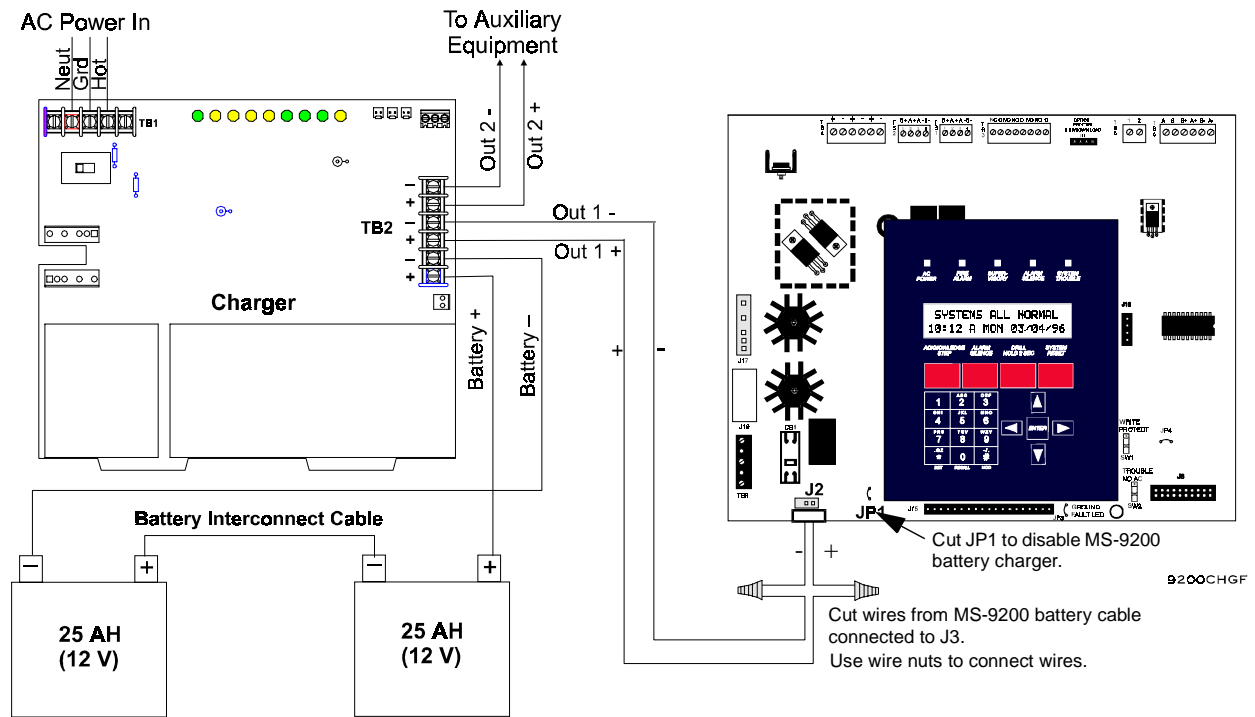
The CHG-120F is capable of charging 25 AH to 120 AH lead-acid batteries with the newer version of the MS-9200 main circuit board which allows disabling of the FACP battery charger. The batteries and charger can be housed in the Fire•Lite BB-55F Battery Box which can be mounted up to 20 feet away from the control panel. Note that when using the BB-55F for housing the charger and batteries, a maximum 25 AH battery can be accommodated. For larger Amp Hour batteries, use multiple BB-55Fs. Refer to the CHG-120F Manual for additional information.



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

Wire the CHG-120F to the MS-9200 as shown. Cut Jumper JP1 on the newer versions of the MS-9200 main circuit board to disable the FACP battery charger when using the CHG-120F. Wire the batteries to the CHG-120F but do not connect the Battery Interconnect cable until the system is ready for testing.

FIGURE 1-2:CHG-120F Battery Charger (Requires BB-55F Battery Box)



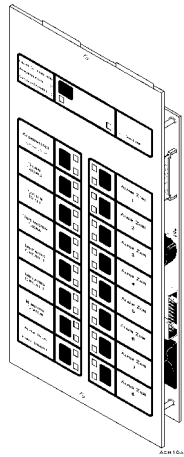
1.7.4 Annunciators

AFM Series LED Zone Type Annunciators

The AFM Series Annunciators remotely display system status. The AFM/AEM-16AT annunciators display zone alarm and trouble status. In addition, they provide remote Acknowledge, Silence, Reset and Drill functions. The AFM/AEM-32 annunciators display zone alarm status only and provide no remote system switch functions. For more detailed information, refer to the appropriate AFM Annunciator manual. Refer to "AFM and LDM Series Wiring" on page 89, for detailed wiring requirements and "System Edit" on page 61, for information on programming the MS-9200 for annunciator use.

AFM-16ATX

The Annunciator Fixed Module-16ATX contains 16 red alarm and 16 yellow trouble LEDs, a System Trouble LED, an On Line/Power LED and a local piezo sounder with switches for MS-9200 Acknowledge, Silence, Reset and Drill. The AFM-16ATX is fixed at address '1' and will accept up to three AEM-16ATF Expanders.

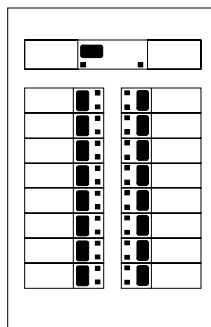


AEM-16ATF

The Annunciator Expander Module-16ATF connects to the AFM-16ATX and adds 16 sets of red alarm LEDs and yellow trouble LEDs. Three AEM-16ATFs may be added to an AFM-16ATX.

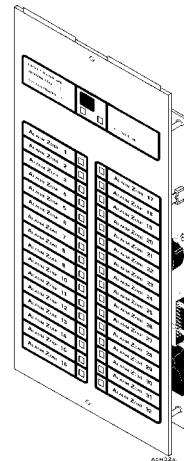
AFM-16ATF

The Annunciator Fixed Module-16ATF contains 16 red alarm and 16 yellow trouble LEDs, a System Trouble LED, an On Line/Power LED and a local piezo sounder with switches for MS-9200 Acknowledge, Silence, Reset and Drill. The AFM-16ATF is fixed at address '1' and communication is via the EIA-485 data line.



AFM-32AX

The Annunciator Fixed Module-32AX contains 32 red alarm LEDs, a System Trouble LED, an On Line/Power LED and a local piezo sounder with a local Silence/Acknowledge switch. The AFM-32AX is fixed at address '1' and will accept one AEM-32AF Expander.

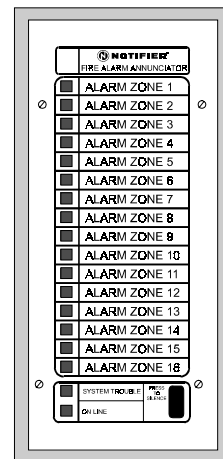


AEM-32AF

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

AFM-16AF

The Annunciator Fixed Module-16AF has 16 red alarm LEDs. Multiple annunciators may be used by setting all annunciators to Receive Only, except the last AFM-16AF in line. Each annunciator's address is internally fixed at '1', and communication is via the EIA-485 data line. The Local Silence/Acknowledge switch functions as local lamp test and silence for annunciator piezo. LEDs include On Line and System Trouble indicators.

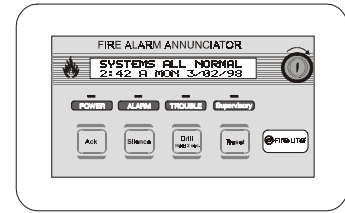


AFM-32AF

The AFM-32AF is similar to the AFM-16AF except it has 32 red alarm LEDs for annunciating up to 32 points.

LCD-40 Series Remote Fire Annunciators

The LCD-40 Series, consisting of the LCD-40 and LCD-40L, are compact, attractive, 40-character backlit LCD fire annunciators that are capable of displaying English-language text. They mimic the display on the MS-9200 main control circuit board and will annunciate device type, point alarm, trouble or supervisory condition, zone assignment plus any custom alpha labels programmed into the control panel. They also provide system status LEDs to display power, alarm, trouble and supervisory conditions. Additionally, the LCD-40 is capable of performing critical system functions such as acknowledge, silence, reset and drill, remotely from the host control panel.



Communication between the control panel and the LCD-40 Series is accomplished over a serial interface employing the EIA-485 communication standard (DIM-485 option module is required). Up to 32 LCD-40 Series Annunciators may be connected to the EIA-485 circuit. The annunciators may be powered from the host FACP or a remote UL listed filtered power supply such as the Fire•Lite FCPS-24F. Refer to “LCD-40 Series Annunciator Wiring” on page 88, for detailed wiring requirements and “System Edit” on page 61, for information on programming the MS-9200 for annunciator use.

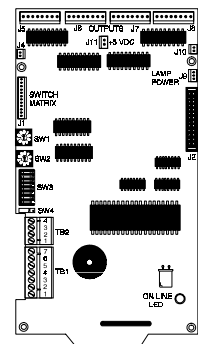
Note: If software with Part Number 73846 is installed in the MS-9200 Export Version, the LCD-40 Series must have software with a Part Number of 73779 or 73879 to operate with the FACP. If software with a Part Number of #M9200EV20 or higher is installed in the MS-9200, the LCD-40 Series must have software with a Part Number of #LCD40V20 or higher to operate with the FACP.

LDM Series Lamp Driver Modules - Graphic Annunciator

The LDM Series Lamp Driver Modules, which consist of the LDM-32F master and LDM-E32F expander modules, are used to provide an interface to a custom graphic LED annunciator. The master module provides power and control for a maximum of three expander modules. The LDM-32F and LDM-E32F have output connectors which are used to drive lamps or LEDs and input connectors which are used for remote switch functions. Refer to the LDM Series Lamp Drive Modules Manual for a complete description. See “AFM and LDM Series Wiring” on page 89, for wiring requirements and “System Edit” on page 61, for information on programming the MS-9200 for annunciator use.

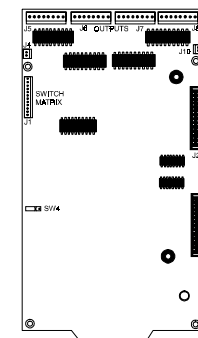
The LDM-32F

The Lamp Drive Module LDM-32F has 32 alarm lamp/LED driver outputs which sink current to system common (-) on activation. A single positive (+) voltage is required to supply total operating power for all lamps or LEDs when all drivers are activated. The LDM-32F provides a separate driver for system trouble and inputs for a local lamp test switch. A maximum of 16 external control switches may be wired to the LDM-32F. DIP switch SW3 is used to enable or disable the onboard piezo sounder, enable remote switch functions, select a flashing LED function for new alarms and troubles and other functions. Switch SW4 is used to configure the module to annunciate 32 alarms or 16 alarms and 16 troubles. A green On Line LED flashes to indicate ongoing communications with the host FACP. One LDM-32F supports up to three LDM-E32F modules. The LDM-32F is supplied with four standoffs and screws for mounting to a CHS-4L chassis or custom backbox.



The LDM-E32F

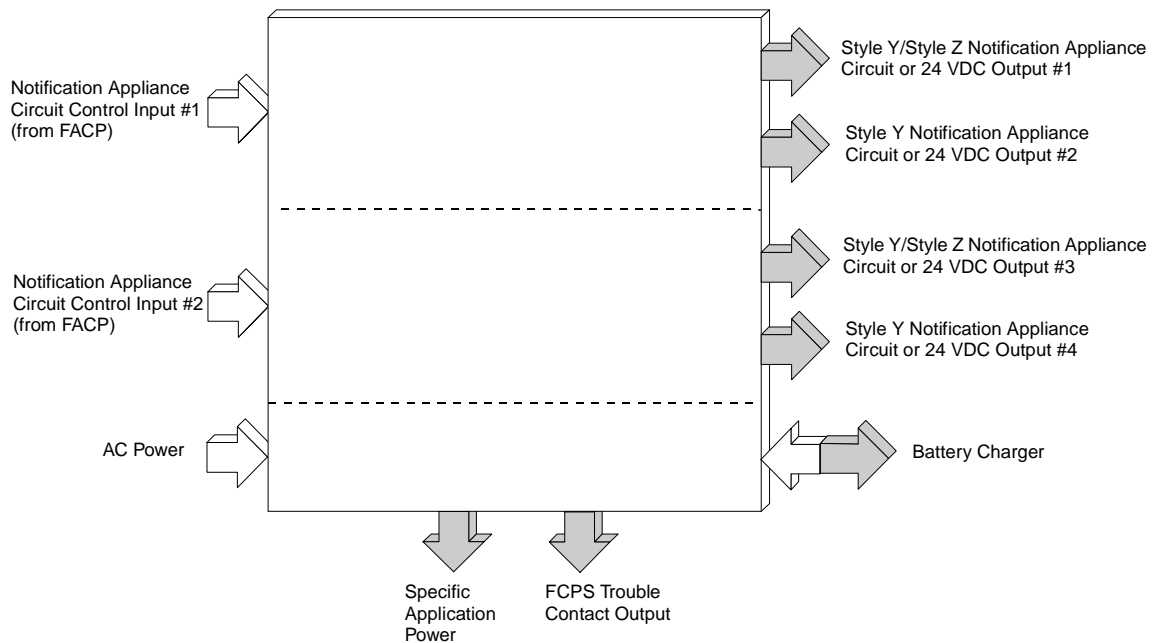
Each LDM-E32F expander module provides 32 additional lamp/LED driver outputs from J5, J6, J7 and J8. The expander module has a slide switch, SW4, for selecting alarm only or alarm and trouble annunciation and an input for a local lamp test switch. In alarm only mode, use only one LDM-32F and one LDM-E32F for a maximum of 56 alarm indicators and 8 system status indicators. In alarm/trouble mode, use one LDM-32F and three LDM-E32Fs for a maximum of 56 alarm indicators, 56 trouble indicators, 16 status indicators and 64 optional control switch inputs. Multiple sets of LDM-32Fs with LDM-E32F expanders increase the system annunciation capabilities beyond 56 zones or points. This is possible by various settings of address switches SW1 and SW2 on the LDM-32F (refer to Appendices). Each LDM-E32F is supplied with a 26-conductor expander ribbon cable, four standoffs and screws.



1.7.5 FCPS-24FE Remote Field Charger Power Supply for System Power Expansion

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

The FCPS-24FE may be used in a number of different applications. It may be used as a remotely-mounted power supply and battery charger powering up to four, coded or noncoded, Notification Appliance Circuits. Alternately, any or all of these circuits may be used as 24 VDC output circuits capable of powering 4-wire smoke detectors or any device that requires filtered power. These circuits may be configured as resettable or nonresettable outputs to expand FACP auxiliary system power.



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

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

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

A C304 Control Module, which can be located up to 10,000 feet (3,000 m) from the FACP, may be used to activate the FCPS power supply. The Control Module can be powered from the FCPS auxiliary 24 VDC power output (TB3 Terminals 8 & 9) and supervised by an EOL relay.

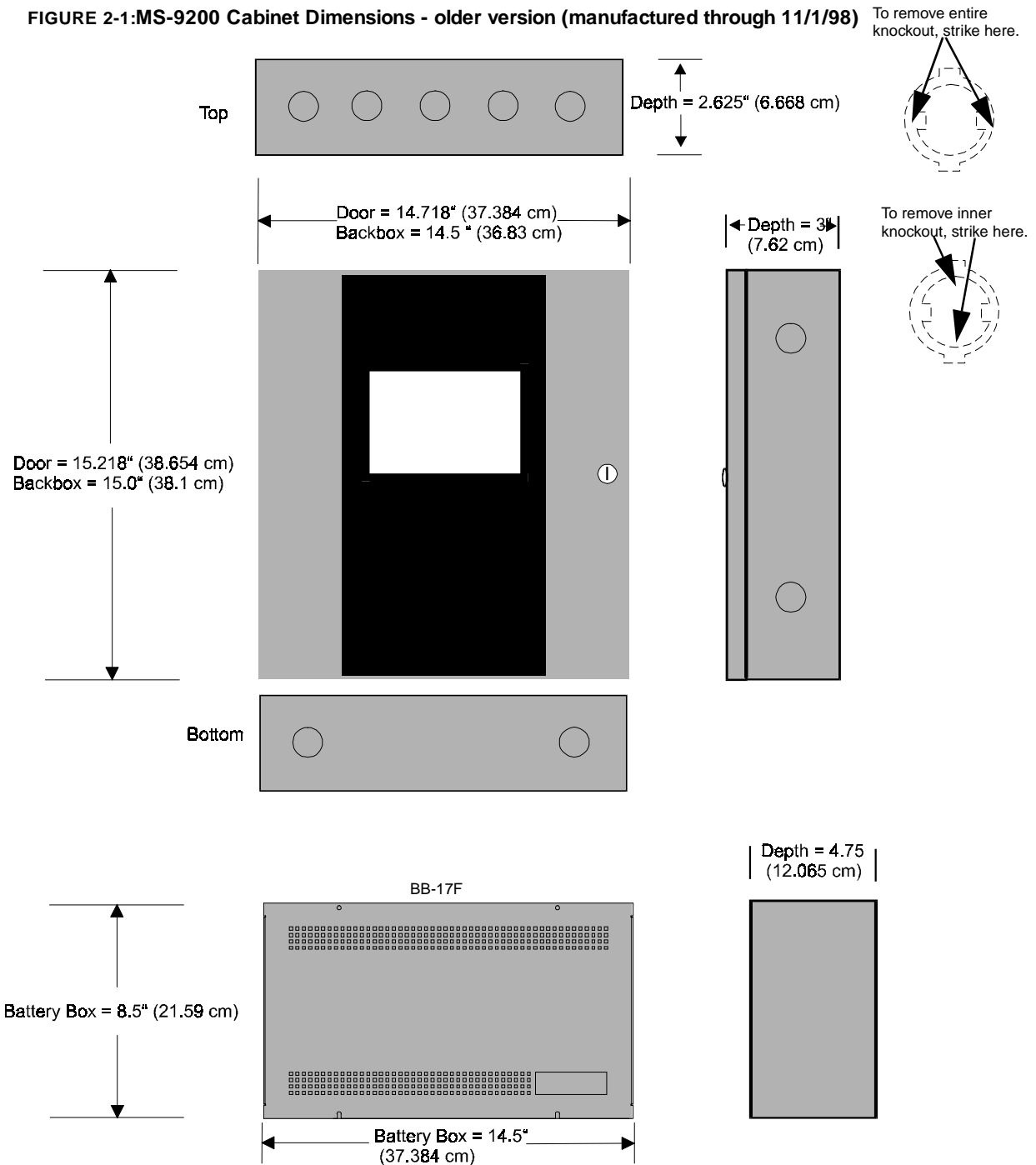
CHAPTER 2

Installation

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

Note: Effective November 1, 1998, the cabinet illustrated in Figure 2-1 and Figure 2-2 will be discontinued. The dimensions for the new cabinet, which will be shipped beginning 11/1/98, are illustrated in Figure 2-3 and Figure 2-4.

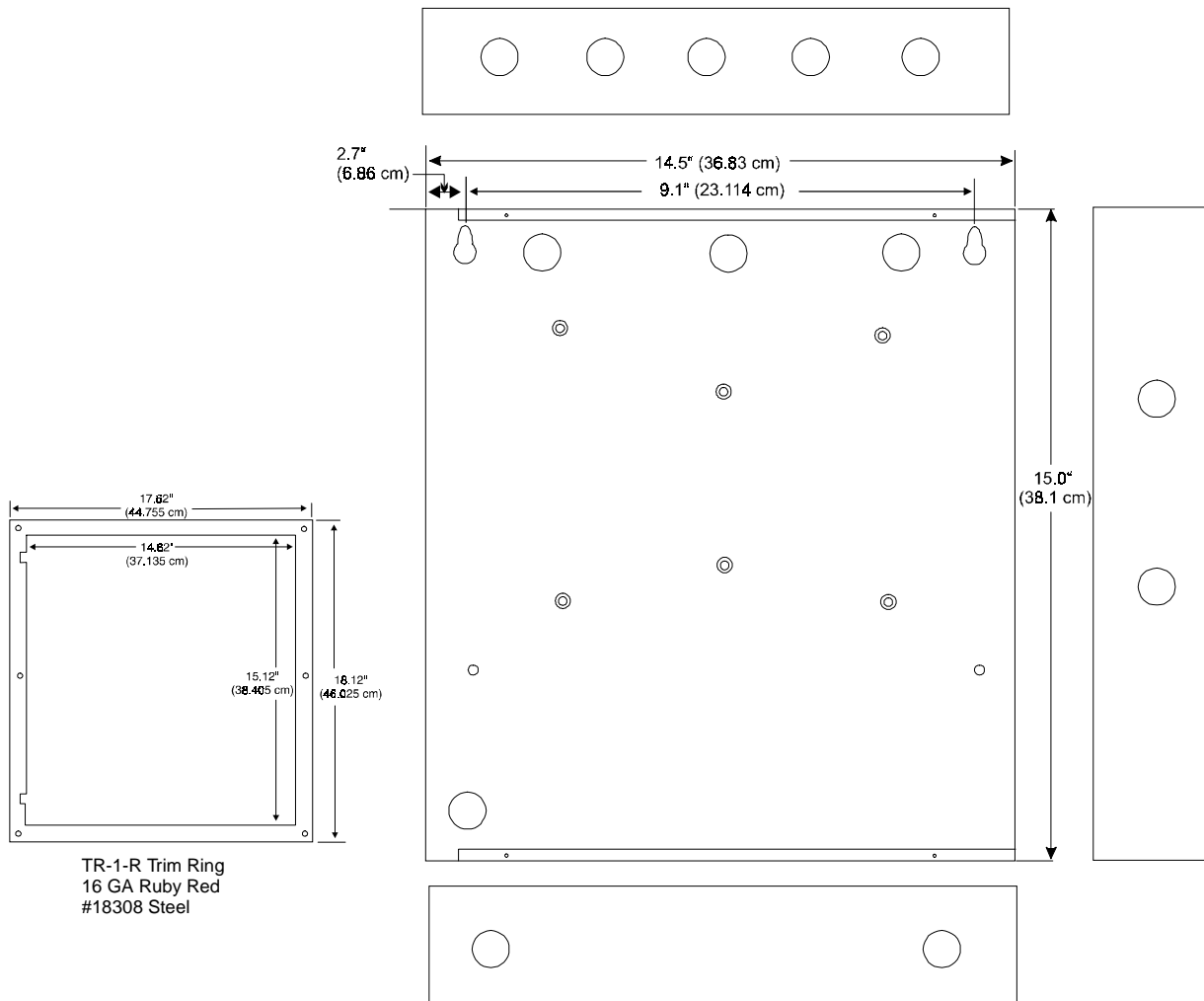
FIGURE 2-1:MS-9200 Cabinet Dimensions - older version (manufactured through 11/1/98)



2.1 Backbox Mounting

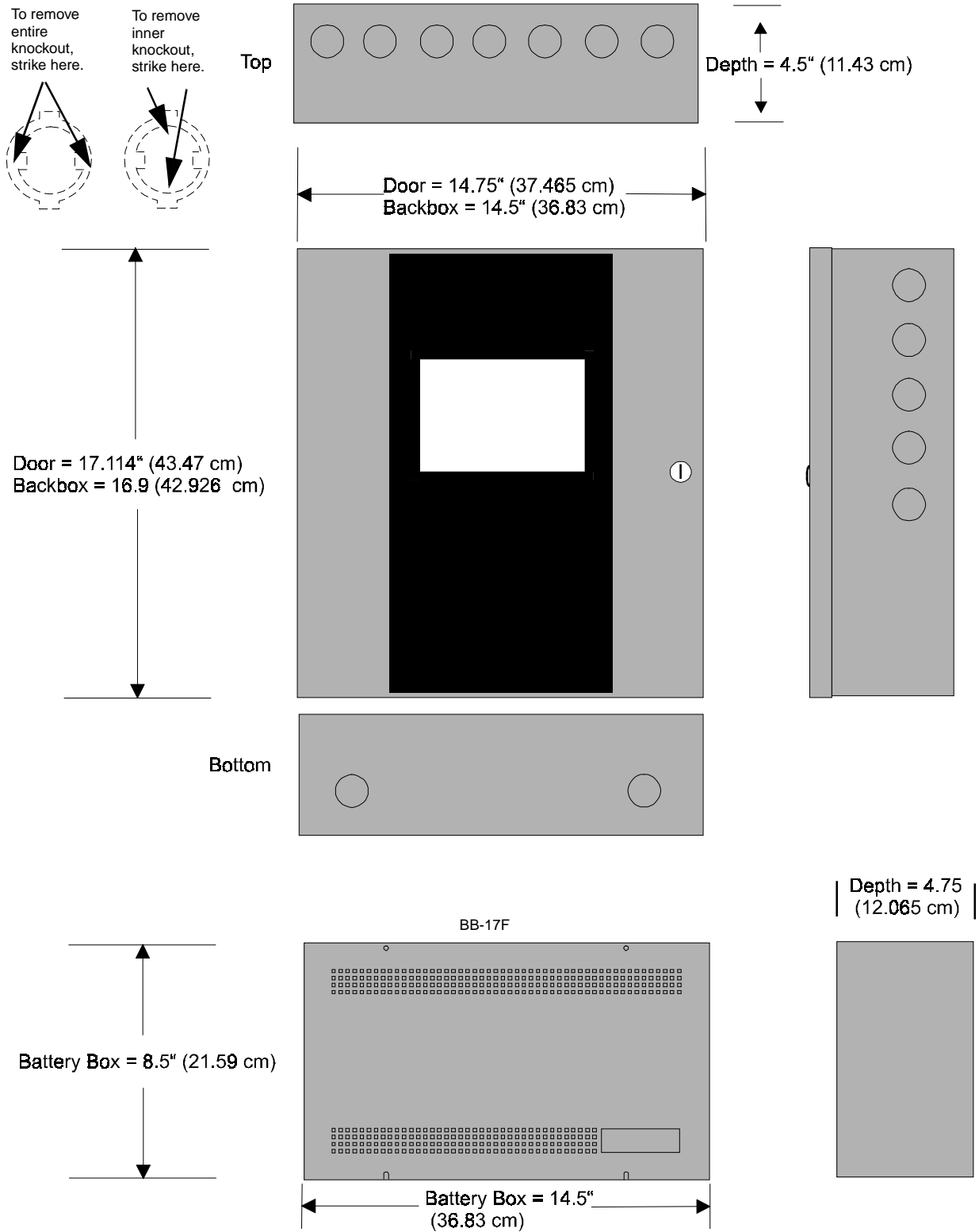
1. Remove the main PC board assembly by unscrewing the four screws in the corners of the board. Two stand-offs support the board in the center. Set the board aside in a safe, clean place. Avoid static discharge which may damage the board.
2. Mark and predrill holes for the top two keyhole mounting bolts using the dimensions shown.
3. Install two upper fasteners in the wall with the screw heads protruding.
4. Using the upper 'keyholes', mount the backbox over the two screws.
5. Mark and drill the lower two holes.
6. Secure backbox by installing the remaining fasteners. Tighten all screws.
7. When the location is dry and free of construction dust, reinstall the main PC board.

FIGURE 2-2:MS-9200 Cabinet Mounting - older version (manufactured through 11/1/98)



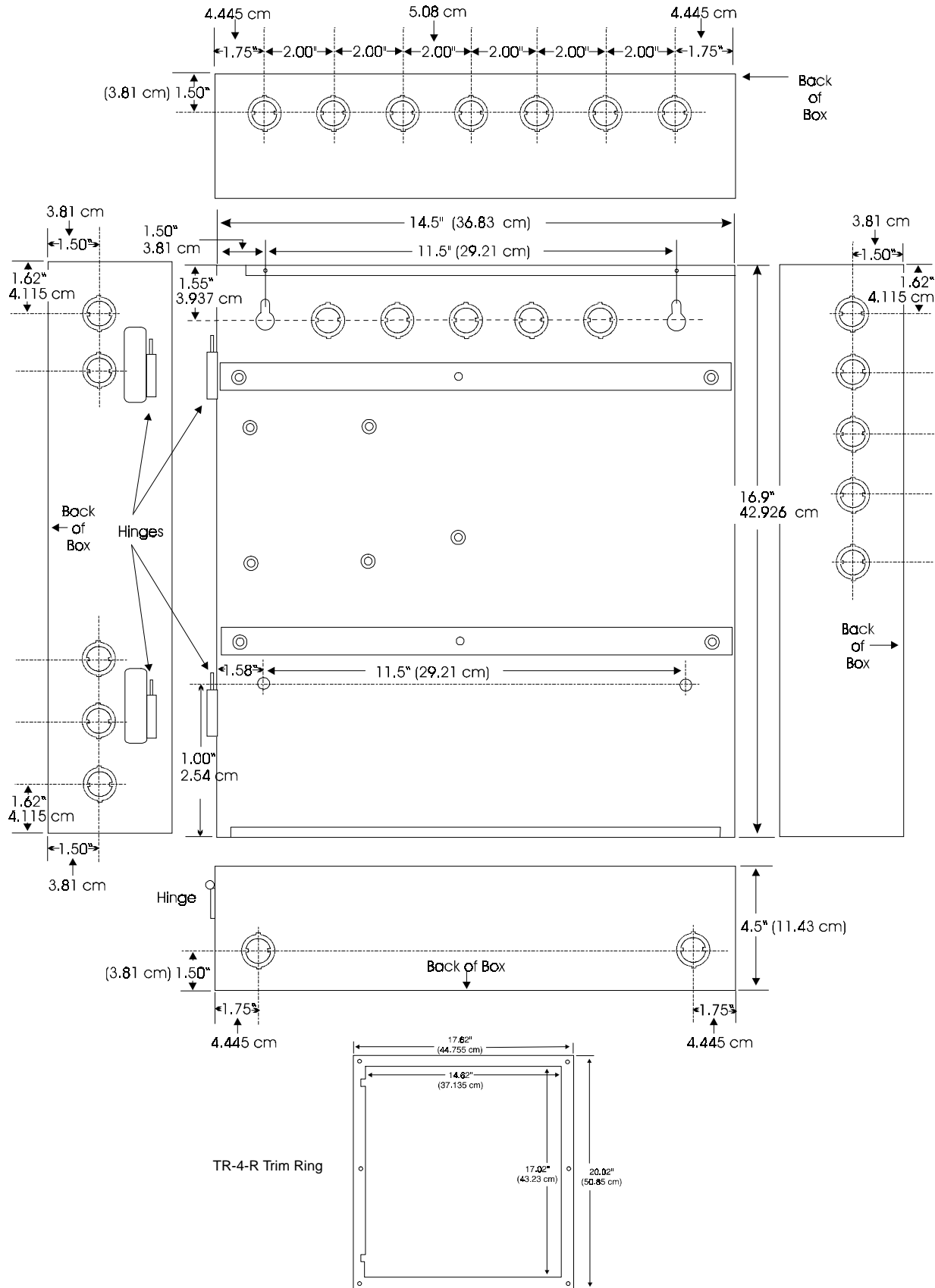
The new cabinet illustrated in this Figure, will begin shipping on November 1, 1998.

FIGURE 2-3:MS-9200 Cabinet Dimensions - new version



The new cabinet illustrated in this figure will begin shipping on November 1, 1998.

FIGURE 2-4:MS-9200 Cabinet Mounting - new version



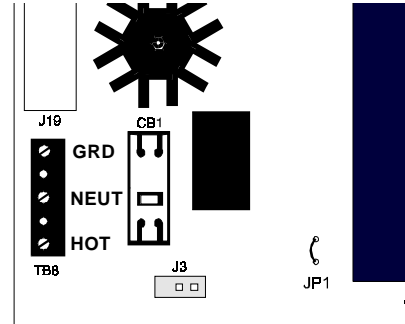
2.2 Power

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

2.2.1 AC Power and Earth Ground Connections

Primary power required for this panel is 240 VAC, 50 Hz, 1.2 amperes. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Code (NEC) and/or local codes. Use #14 AWG (2.00 mm²) or larger wire with 600 volt insulation rating.

In order to comply with Compatibility Directive 89/336/EEC for European Communities (EU Requirements), a ferrite bead P/N 29085, must be installed on the Mains for RF filtering. Refer to Document #50404 for details.



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

2.2.2 Battery Power

Observe polarity when connecting the battery. Connect the battery cable to J3 on the MS-9200 main circuit board using the plug-in connector provided. See "Power Supply Calculations" on page 77, for calculation of the correct battery rating.

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

2.2.3 DC Power Output Connections

All DC power outputs are power-limited.

FIGURE 2-5:DC Power Outputs

Power-limited Nonregulated Special Purpose Power

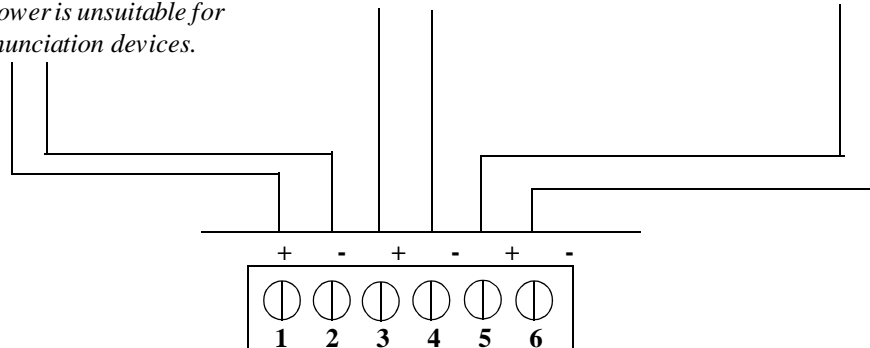
2.5 amps, 24 VDC power for Notification Appliance Circuits. TB4 Terminal 1(+) and 2(-).
Note: This power is unsuitable for EIA -485 annunciation devices.

Power-limited Nonresettable Power

300 mA, 24 VDC nominal filtered, nonresettable power can be drawn from TB4 Terminals 3(+) and 4(-).

Power-limited Resettable Power

300 mA, 24 VDC nominal filtered, resettable power can be drawn from TB4 Terminals 5(+) and 6(-).

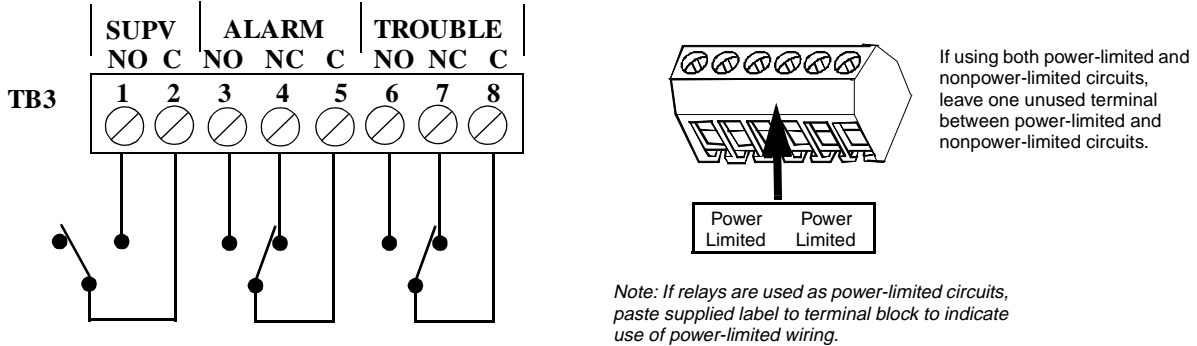


2.3 Standard Relays

The MS-9200 provides a set of Form-C alarm and Form-C trouble contacts rated for 2.0 amps @ 30 VDC (resistive). The panel also provides a Form-A supervisory contact rated for 2.0 amps @ 30 VDC (resistive). Refer to Figure 2-4 for UL power-limited wiring requirements.

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

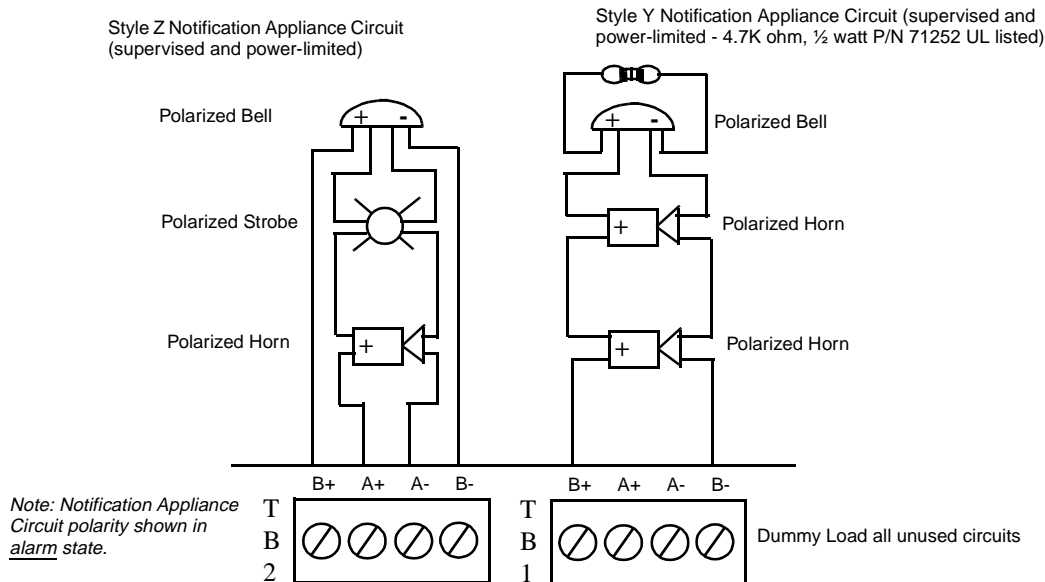
FIGURE 2-6: Relay Connections



2.4 Notification Appliance Circuits

The MS-9200 provides two Notification Appliance (bell) Circuits configurable for Style Y or Style Z. Each circuit is capable of 2.5 amps of current. Total current drawn from these as well as other DC power outputs cannot exceed 6.0 amps. Use UL listed 24 volt notification appliances only. Circuits are supervised and power-limited. Refer to the Fire•Lite Device Compatibility Document for a listing of compatible notification appliances. The two NACs (Notification Appliance Circuits) located on the main circuit board may be expanded via the Fire•Lite FCPS-24FE Field Charger/Power Supply. Surge protection for notification appliances may be provided by using one of the UL listed compatible surge suppressors listed in the Fire•Lite Device Compatibility Document.

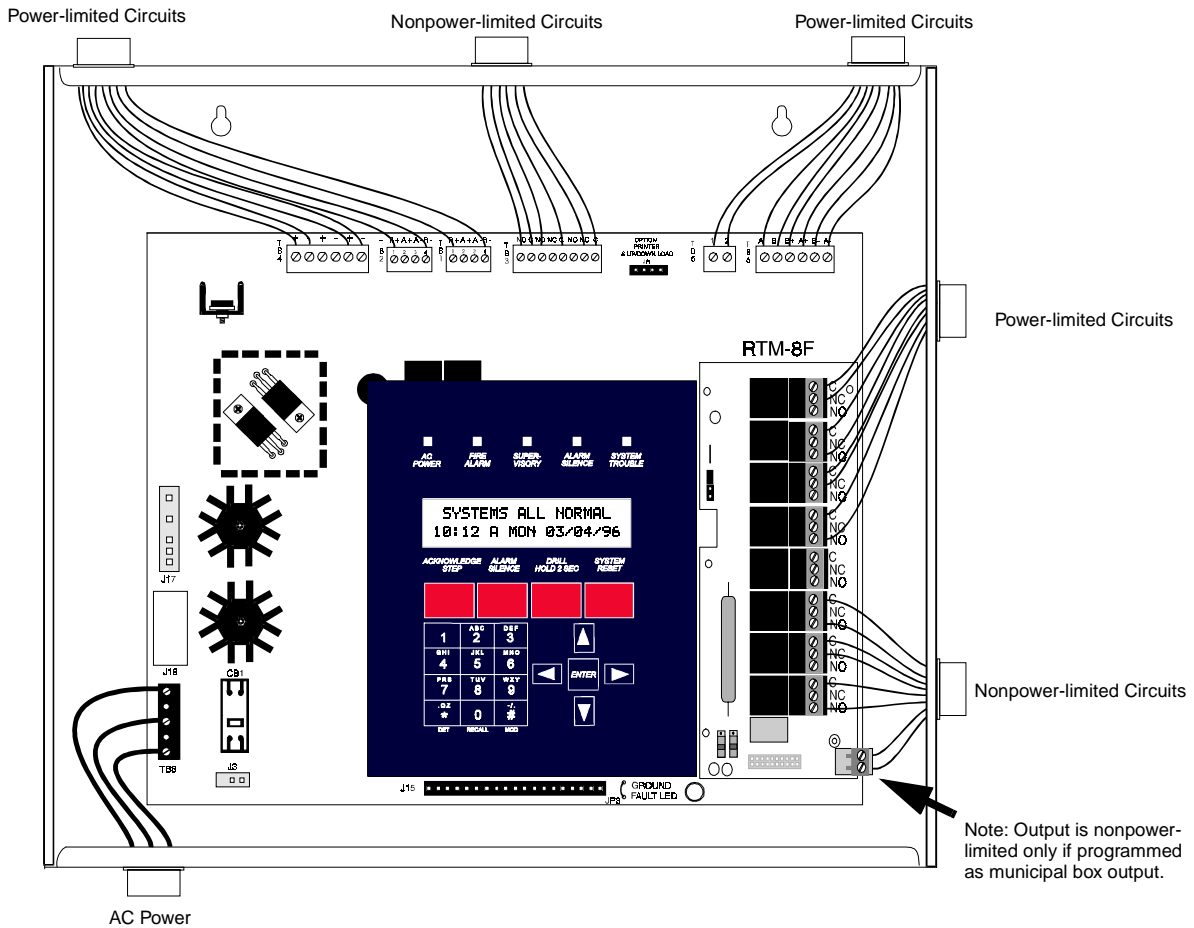
FIGURE 2-7: NAC Connections



2.5 UL Power-limited Wiring Requirements

Power-limited and nonpower-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25" (6.35 mm) away from any nonpower-limited circuit wiring. Furthermore, all power-limited circuit wiring and nonpower-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. A typical wiring diagram for the MS-9200 is shown in Figure 2-8.

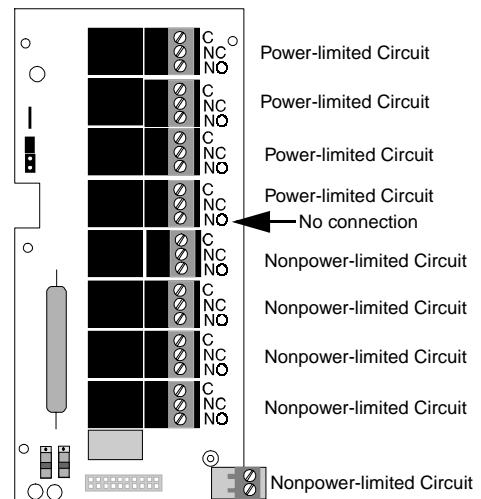
FIGURE 2-8: Typical UL Power-limited Wiring Requirements



RTM-8F UL Power-limited Wiring Requirements

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

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



Refer to Figure 2-36, "RTM-8F Relay Transmitter Module," on page 51, for additional information on the RTM-8F.

2.6 Wiring the Signaling Line Circuit

The MS-9200 communicates with addressable initiating, monitor and control devices through a Signaling Line Circuit (SLC) loop. This SLC loop can be wired to meet the requirements of NFPA Style 4 (see Figure 2-11), Style 6 (Figure 2-12) or Style 7 (Figure 2-13). Surge protection for the SLC loop may be provided by using one of the UL listed compatible surge suppressors listed in the Fire•Lite Device Compatibility Document. *Be certain to change the decade wheels on all detectors and modules from the factory setting of '00'.*

Isolator Modules

Isolator Modules permit a zone of detectors and modules to be electrically 'isolated' from the remainder of the Communications Loop, allowing critical loop components to function in the event of a short circuit on the SLC loop wiring (see Figure 2-11, Figure 2-12 and Figure 2-13). These are required to meet the requirements of NFPA Style 7.

Monitor Modules

Addressable Monitor Modules allow the control panel to monitor entire circuits of conventional normally-open contacts, alarm initiating devices, manual pull stations, 4-wire smoke detectors, heat detectors, waterflow, supervisory devices (see Figure 2-19 and Figure 2-20) and conventional detectors (see Figure 2-21 and Figure 2-22). The BG-10LX is an addressable manual pull station which contains a miniature monitor module providing point annunciation (see Figure 2-11, Figure 2-12 and Figure 2-26).

Control Modules

Through addressable Control Modules, the control panel can selectively activate Notification Appliance Circuits or Form-C output relays (see Figure 2-23 and Figure 2-24).

Addressable Detectors

Through the communications loop, the MS-9200 communicates with addressable ionization, photoelectric and photoelectric/thermal detectors (see Figure 2-27).

Device Capacity

The capacity of each MS-9200 includes up to 99 addressable detectors and an additional combination of up to 99 addressable pull stations, control modules and monitor modules. In addition, the panel supports two NACs.

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

TABLE 2-1: Communications Loop Performance

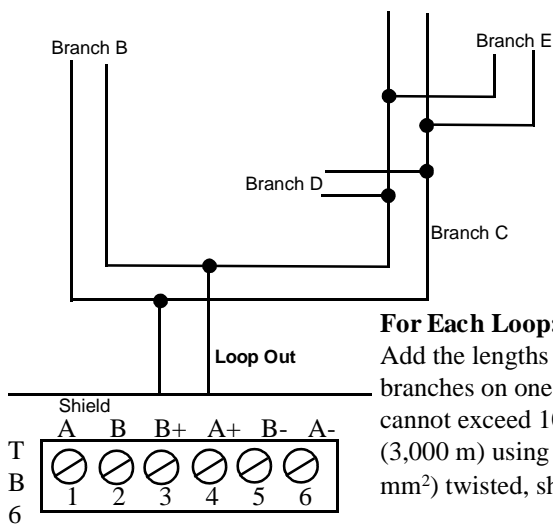
Single Open on Loop	Single Ground on Loop	Shorted Loop	Loop Shorted and Opened	Loop Shorted and Grounded	Loop Opened and Grounded	Communications Loss
Style 4 (2-wire) Loop Operation (meets NFPA 72 Style 4 requirements)						
Trouble ¹	Alarm Capability & Trouble ²	Trouble	Trouble	Trouble	Trouble	Trouble
Style 6 (4-wire) Loop Operation (meets NFPA 72 Style 6 requirements)						
Alarm Capability & Trouble	Alarm Capability & Trouble	Trouble	Trouble	Trouble	Alarm Capability & Trouble	Trouble
Style 7 (4-wire) Loop Operation ³ (meets NFPA Style 7 requirements)						
Alarm Capability & Trouble	Alarm Capability & Trouble	Alarm Capability & Trouble	Trouble	Alarm Capability & Trouble	Alarm Capability & Trouble	Trouble

1. Trouble indicates that a trouble signal will be generated at the control panel during the abnormal condition.
2. Alarm Capability indicates an alarm signal can be transmitted to the control panel during the abnormal condition.
3. Loop operation meeting Style 7 requirements isolates entire physical zone on the communications loop from faults that occur within other areas of the loop.

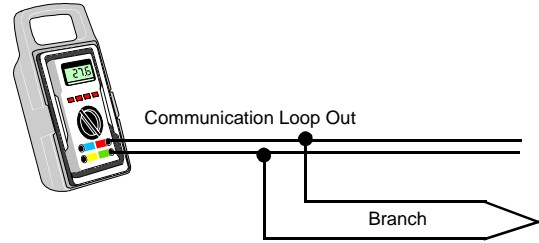
Style 4 Wiring and T-tapping

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

FIGURE 2-9: Style 4 T-tapping and Branch Resistance



For Each Loop:
Add the lengths of all the branches on one loop. This sum cannot exceed 10,000 feet (3,000 m) using 12 AWG (3.25 mm²) twisted, shielded wire.



Branch Resistance

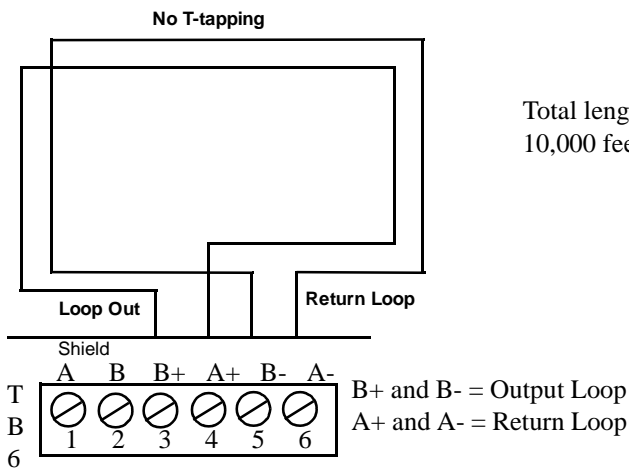
With power removed, short the termination point of one branch at a time and measure the DC resistance from the beginning of the loop to the end of that particular branch. The total resistance from panel to each branch end cannot exceed 40 ohms. Repeat this procedure for all remaining branches.

In this example: Branch A + Branch B + Branch C + Branch D + Branch E = 10,000 feet (3,000 m) or less

Style 6 Wiring

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

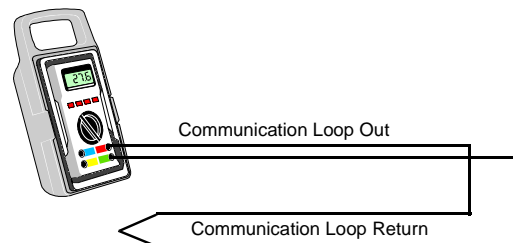
FIGURE 2-10: Style 6 Wiring Requirements



Total length of the Communications Loop pair cannot exceed 10,000 feet (3,000 m) using 12 AWG (3.25 mm²) wire.

DC Resistance of the Communications Loop pair cannot exceed 40 ohms.

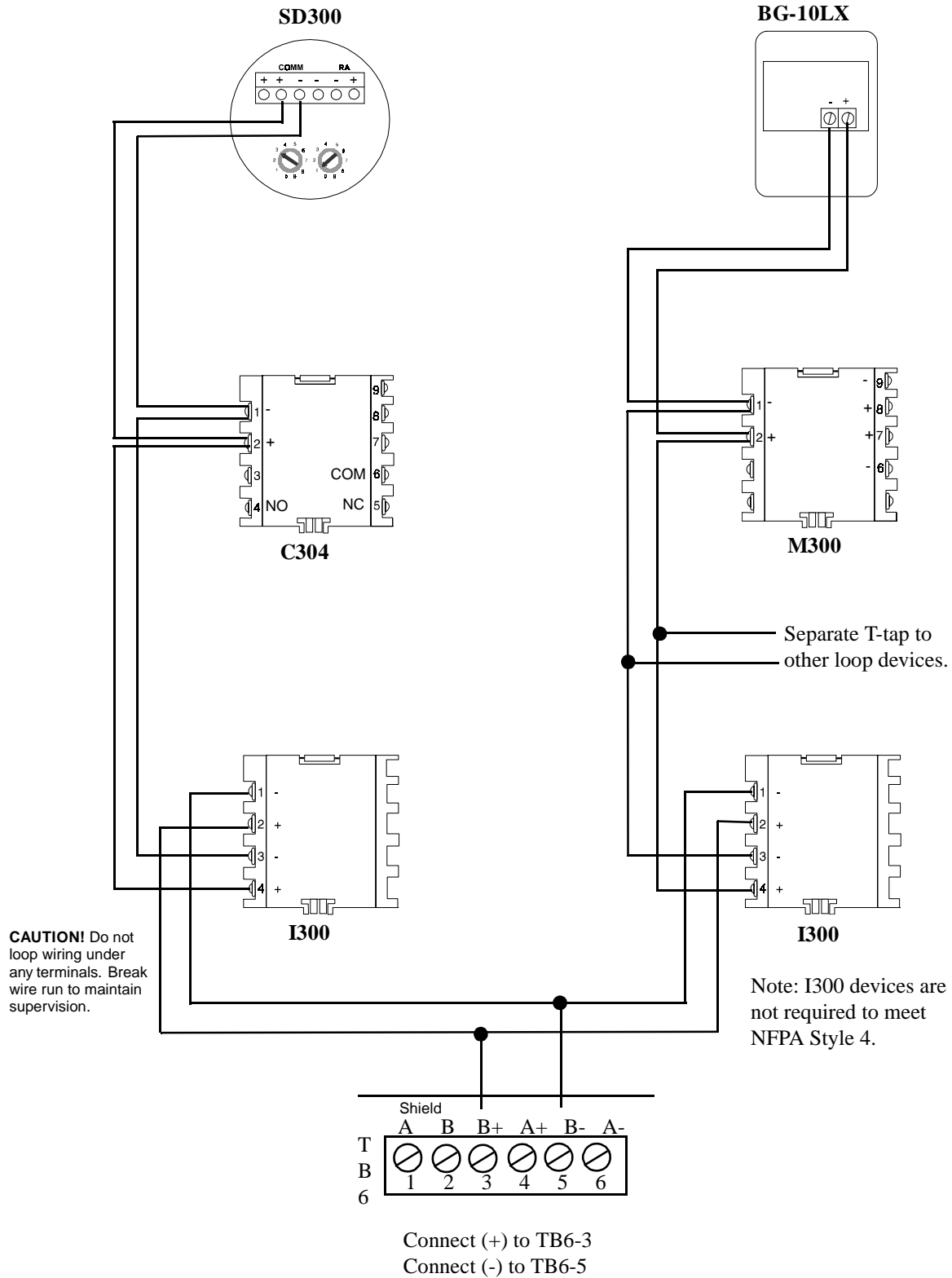
With power removed, disconnect Loop Out and Return at the control panel, short the two leads of Communications Loop Return and meter Loop Out.



Style 4 Two-Wire Communications Loop (supervised and Power-limited)

The 2-wire communication loop meets NFPA 72 Style 4 requirements and may be T-tapped.

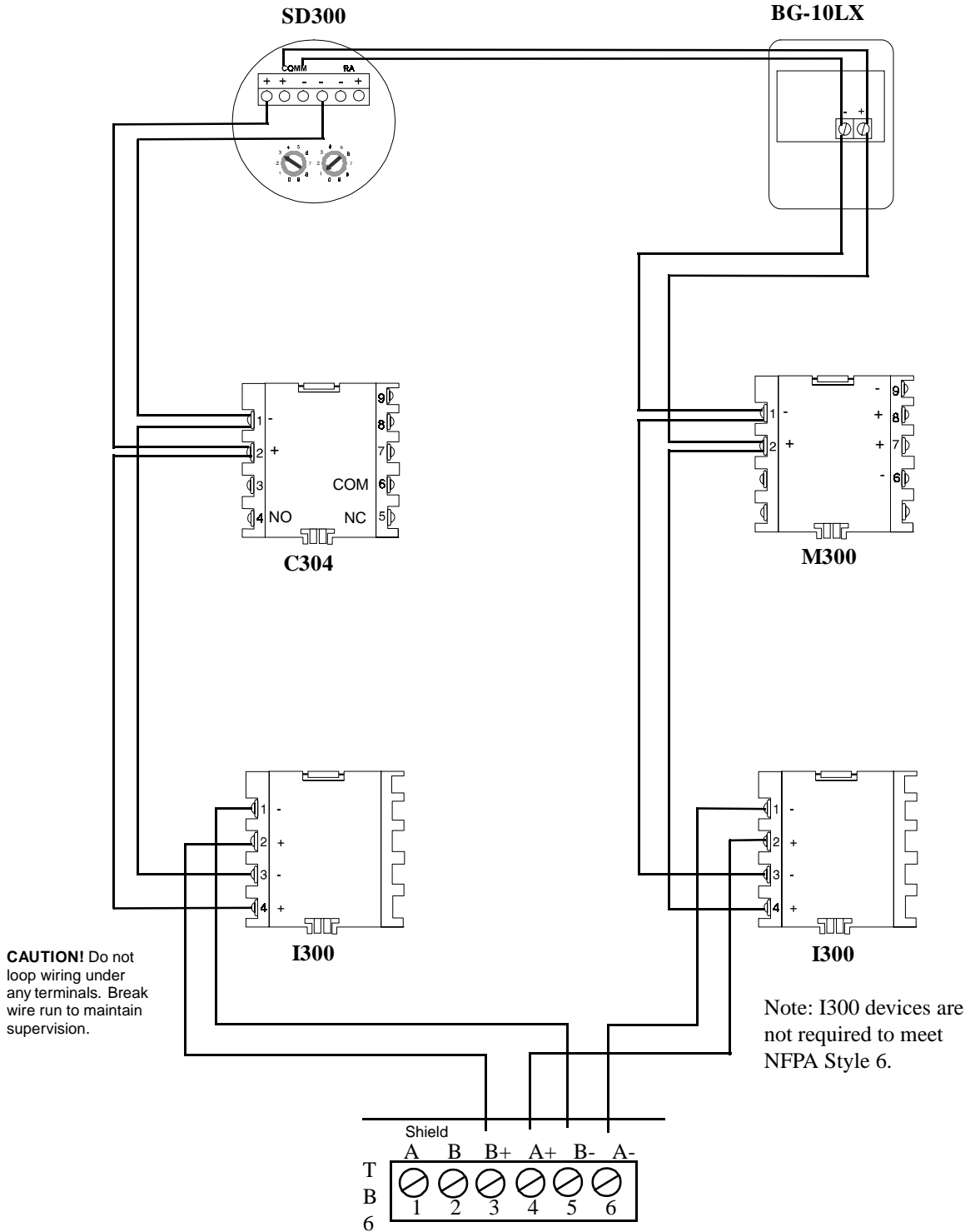
FIGURE 2-11: Two-Wire Communications Loop



Style 6 Four-Wire Communications Loop (Supervised and Power-limited)

The 4-wire communications loop meets NFPA 72 Style 6 requirements. Style 6 cannot be T-tapped.

FIGURE 2-12: Four-Wire Communications Loop

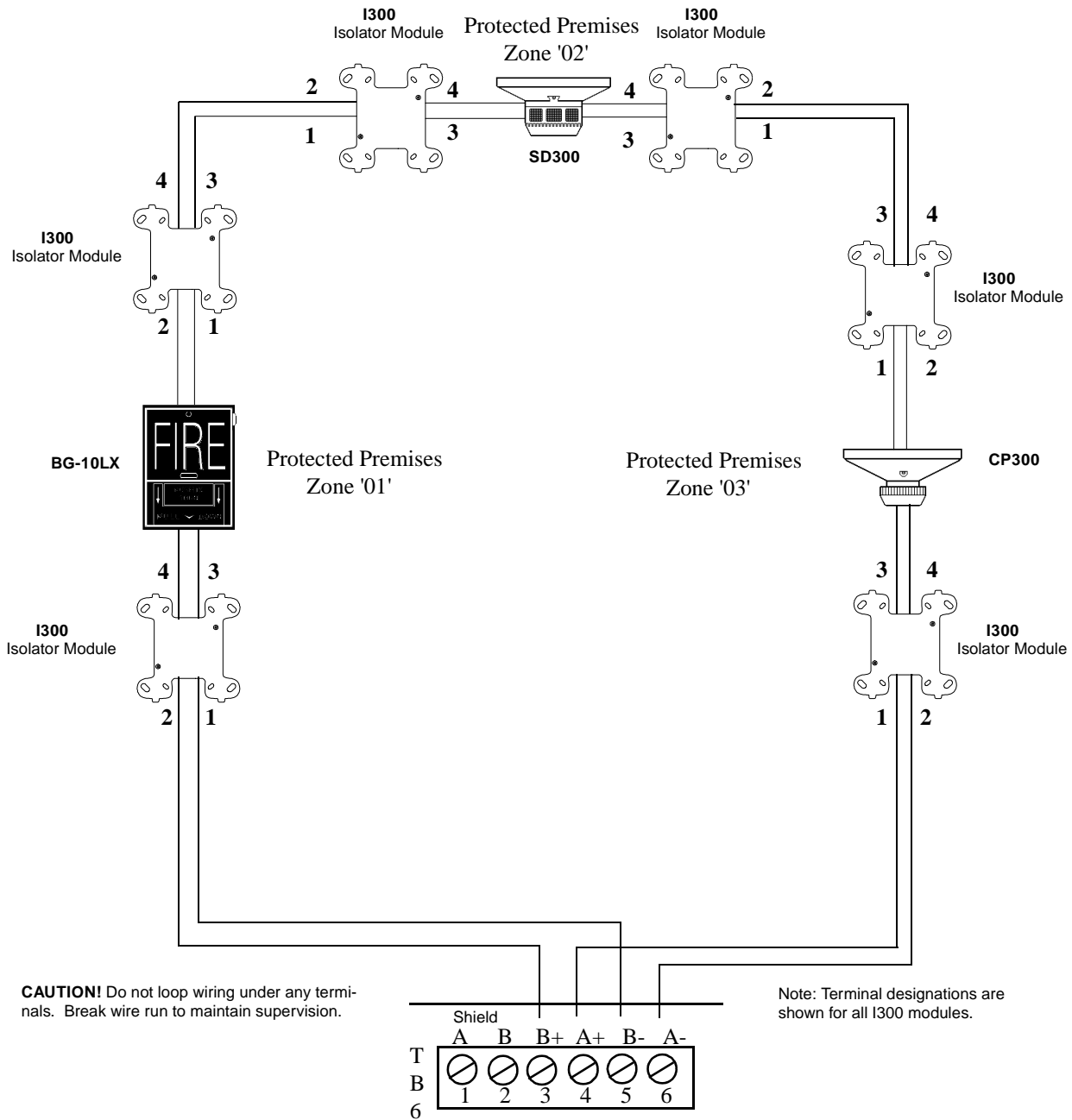


Connect Loop Out to TB6-3(+) and TB6-5 (-)
 Connect Loop Return to TB6-4(+) and TB6-6(-)

Style 7 Four-Wire Communications Loop (Supervised and Power-limited)

The 4-wire communications loop meets NFPA 72 Style 7 requirements. By flanking each communications loop device with a pair of I300 Fault Isolator Modules, each device is protected from short circuit faults that may occur on other devices. For example, a fault on Zone 02 will not affect Zones 01 and 03. The isolator modules on either side of Zone 02 will open the loop. Zone 01 will still operate from power on Loop Out and Zone 03 will operate from Loop Return. Since the MS-9200 will no longer be be able to communicate with Zone 02, a trouble signal(s) will be generated for that device. *No T-tapping or branching is allowed on this circuit. The ratings and characteristics are the same as for a 4-wire circuit meeting NFPA Style 6 requirements.*

FIGURE 2-13:4-Wire Communications Loop

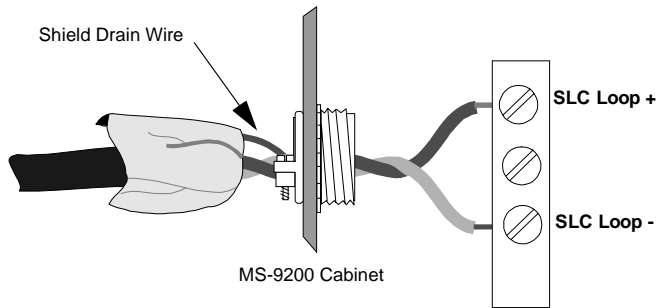


Connect Loop Out to TB6-3(+) and TB6-5 (-)
 Connect Loop Return to TB6-4(+) and TB6-6(-)

Shielded Wire Termination Requirements

Shielded wire is recommended for use on the SLC loop, EIA-485 and EIA-232 circuits (refer to “Wire Requirements” on page 99, for additional wiring information). Proper termination of the shield is shown below for various applications such as no conduit, partial conduit and full conduit. Nonshielded wire may be used on the SLC loop, however, the maximum length should not exceed 1,000 feet (300 m) and full conduit is recommended for optimum EMI and RFI protection.

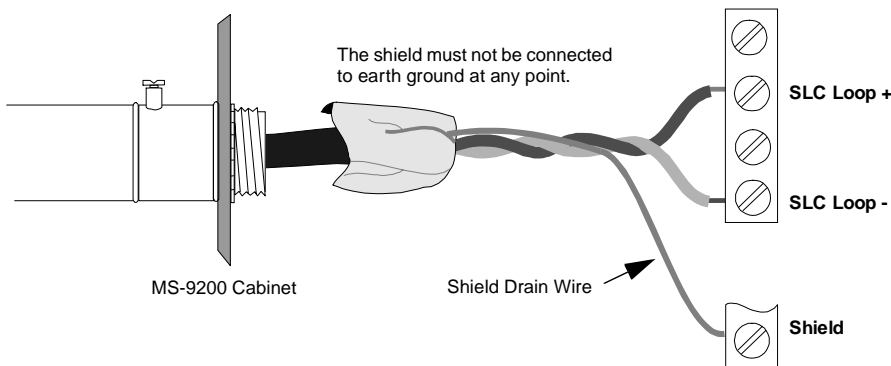
FIGURE 2-14:Shield Termination in No Conduit



All Styles of Wiring

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

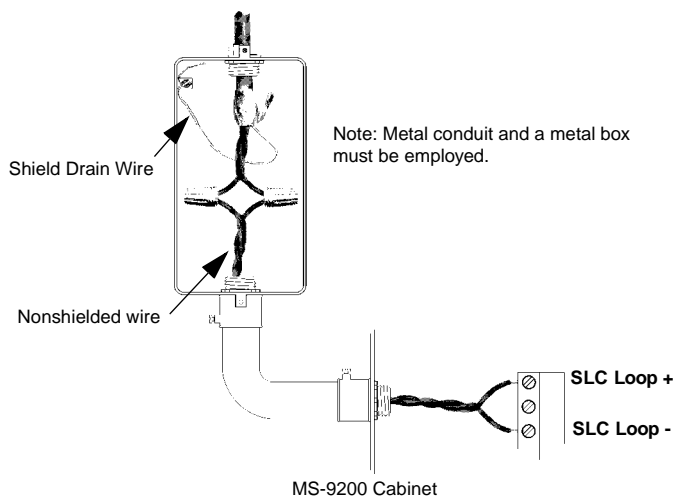
FIGURE 2-15:Shield Termination in Full Conduit



All Styles of Wiring

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

FIGURE 2-16:Shield Termination in Partial Conduit

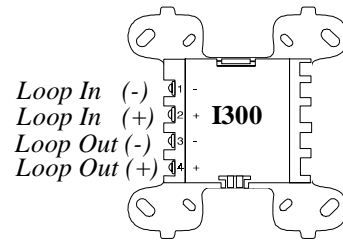


All Styles of Wiring

Do not allow the shield drain wire to enter the system cabinet or the conduit. Connect the drain wire to the termination point of the conduit run (such as a single-gang box as illustrated in Figure 2-16). The conduit cannot be longer than 20 feet (6 m).

2.7 The Isolator Module

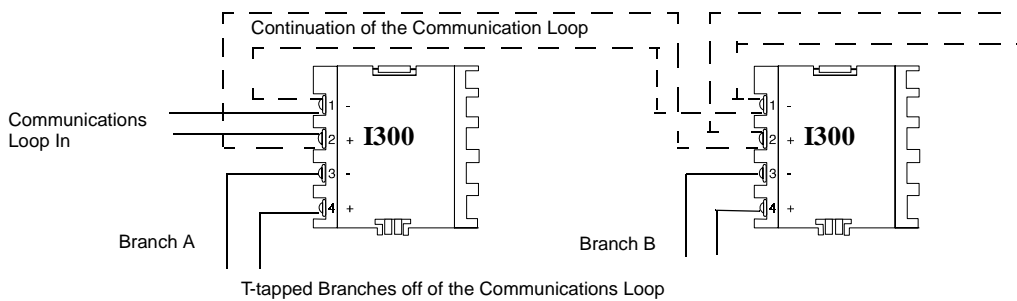
The Loop Isolator Module (I300) is used to protect critical elements of the communications loop from faults on other branches or sections of the loop. The I300 continuously monitors the circuit connected to Terminals 1(-), 3(-), 2(+) and 4(+). Upon power-up, an integral relay is latched on. The I300 periodically pulses the coil of this relay. A short circuit on either side of the loop resets the relay. The I300 senses the short and disconnects the faulty branch by opening the positive side of the loop (Terminal 2 or 4). This effectively isolates the shorted branch from the remainder of the loop. Once the fault is removed, the I300 automatically reapplies power to the communications loop branch. Figure 2-11, “Two-Wire Communications Loop,” on page 30, illustrates the use of an I300 on a 2-wire communications loop meeting NFPA Style 4 requirements. Figure 2-13, “4-Wire Communications Loop,” on page 32, illustrates a 4-wire loop meeting NFPA Style 7 requirements.



Note: During a fault condition, the MS-9200 will register a trouble for each device isolated on the loop branch.

In Figure 2-17, a short on any T-tapped branch off an I300 Isolator Module on the communication loop meeting NFPA Style 4 wiring requirements, will be isolated from all devices installed both upstream of the I300 (Communication Loop In) and on the continuation of the loop (shown as a dotted line). As an example, if a short were to occur on Branch A of the first I300 shown, the Isolator Module would disconnect Branch A and its devices from the rest of the communication loop, allowing all devices connected before and after that I300 to operate normally.

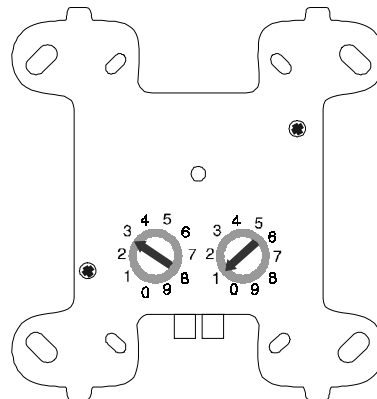
FIGURE 2-17: Isolating Two-Wire Communications Loops



2.8 Module Addressing

Monitor and Control Modules have two rotary decimal switches which are used by the installer to set the module address. Addresses from 01 to 99 may be set by positioning the left rotary switch to the value of the '10s' digit and the right switch to the value of the '1s' digit. For example, address 31 would be set by pointing the left switch to 3 and the right switch to 1 as shown in Figure 2-18.

FIGURE 2-18: Module Addressing Switches



2.9 The M300 Monitor Module

The M300 Monitor Module is an addressable module that monitors normally-open contacts and shorting-type alarm initiating devices. The supervised module circuits can be wired as NFPA Style B or Style D Initiating Device Circuits. There is no limit to the number of contact-type devices installed on a monitor module circuit. Refer to Figure 2-19, “Style B Circuit using M300,” on page 37 and Figure 2-20, “Style D Circuit using M300,” on page 38, for wiring diagrams.

Communications Loop Connections

Connect the MS-9200 Communications SLC loop to M300 Terminals 1(-) and 2(+). The M300 occupies one module address on the loop. Use the rotary switches on the M300 to set the module to the required loop address.

NFPA Style B Initiating Device Circuit

Connect the normally-open contacts of the alarm initiating devices to a single 2-wire circuit as illustrated in Figure 2-19, “Style B Circuit using M300,” on page 37. *Note that this circuit cannot be T-tapped or branched in any fashion and must be terminated across the last device by a listed ELR.* Connect the circuit to M300 Terminals 6(-) and 7(+).

NFPA Style D Initiating Device Circuit

Connect the alarm initiating devices to a single 4-wire circuit as illustrated in Figure 2-20, “Style D Circuit using M300,” on page 38. *Note that this circuit cannot be T-tapped or branched in any fashion.* Connect the 4-wire circuit to M300 Terminals 6(-) and 9(-), then 7(+) and 8(+).

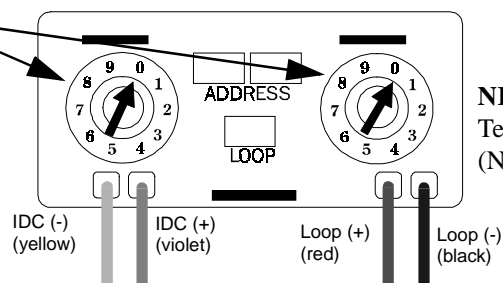
Test Switch

The M300 includes a magnetic test switch located near the center front of the module. Activation of this switch will cause an open circuit indication in the Style B/D loop.

2.10 The M301 Monitor Module

The M301 Monitor Module is an addressable module that is functionally and electrically identical to an M300 Monitor Module (Style B circuits only), but offered in a smaller package for mounting directly in the electrical box of the contact-type device being monitored.

Module address is set with these switches



NFPA Style B Initiating Device Circuit
Terminate with a 47K ohm, ½ watt ELR (N-ELR in Canada).

The M300 and M301 Monitor Modules incorporate the following features:

1. The Initiating Device Circuit is supervised and current-limited to 230 uA @ 24 VDC (nominal).
2. The Initiating Device Circuit wiring may be up to 2,500 feet (760 m) or a maximum of 40 ohms for the M300 and 20 ohms for the M301.
3. The Initiating Device Circuit provides the following services (*DO NOT MIX*):
 - ✓ Fire Alarm Service
 - ✓ Automatic/Manual Waterflow Alarm Service with normally-open contact devices
 - ✓ Sprinkler Supervision with normally-open contact devices
4. The maximum SLC loop resistance, due to wiring, is 40 ohms.

2.11 The M302 Monitor Module

The M302 Monitor Module is an addressable module that interfaces and monitors UL compatible conventional 2-wire smoke detectors. Refer to the Fire•Lite Device Compatibility Document. The supervised circuit may be wired as NFPA Style B or Style D.

Communications SLC Loop Connections

Connect the MS-9200 Communications SLC loop to M302 Terminals 1(-) and 2(+). The M302 occupies one module address on the loop. Use rotary switches on the M302 to set the module to the required loop address.

NFPA Style B Initiating Device Circuit

Connect 2-wire smoke detectors to M302 Terminals 6(B-) and 7(B+) as illustrated in Figure 2-21, “Style B Circuit using M302,” on page 39. IDC installation wiring must not exceed 25 ohms, 12-18 AWG (0.75 - 3.25 mm²) wire. Use a 3.9K ohm ELR across the last initiating device.

NFPA Style D Initiating Device Circuit

Connect 2-wire smoke detectors to M302 Terminals 6(B-) and 9(D-), 7(B+) and 8(D+) as illustrated in Figure 2-22, “Style D Circuit using M302,” on page 40. IDC installation wiring must not exceed 25 ohms, 12-18 AWG (0.75 - 3.25 mm²) wire.

Power Connections

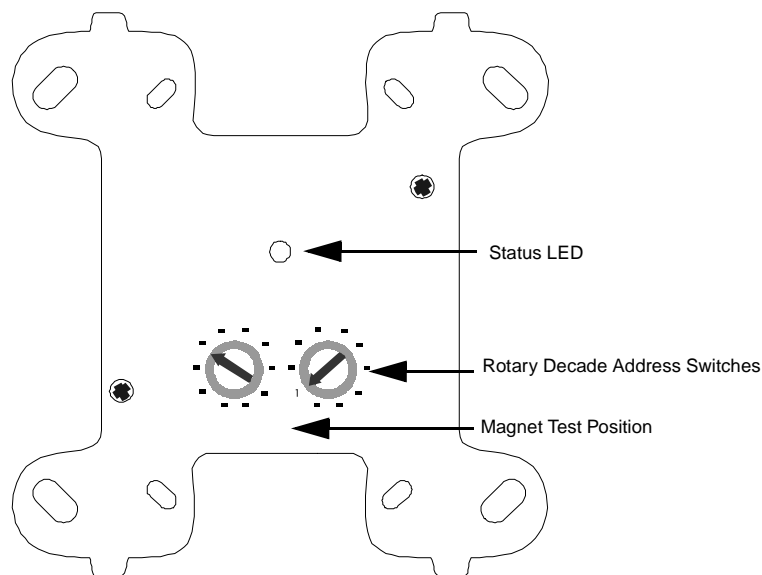
Power must be switched 24 VDC isolated, regulated, filtered and battery backed. Connect to M302 Terminals 3(-) and 4(+) as illustrated in Figure 2-21, “Style B Circuit using M302,” on page 39 and Figure 2-22, “Style D Circuit using M302,” on page 40.

Test Switch

The M302 includes a magnetic test switch sensor located near the center front of the module. Activation of this switch by test magnet P/N M02-04-00 will cause an open circuit indication in the Style B/D loop.

M302 Monitor Module Notes

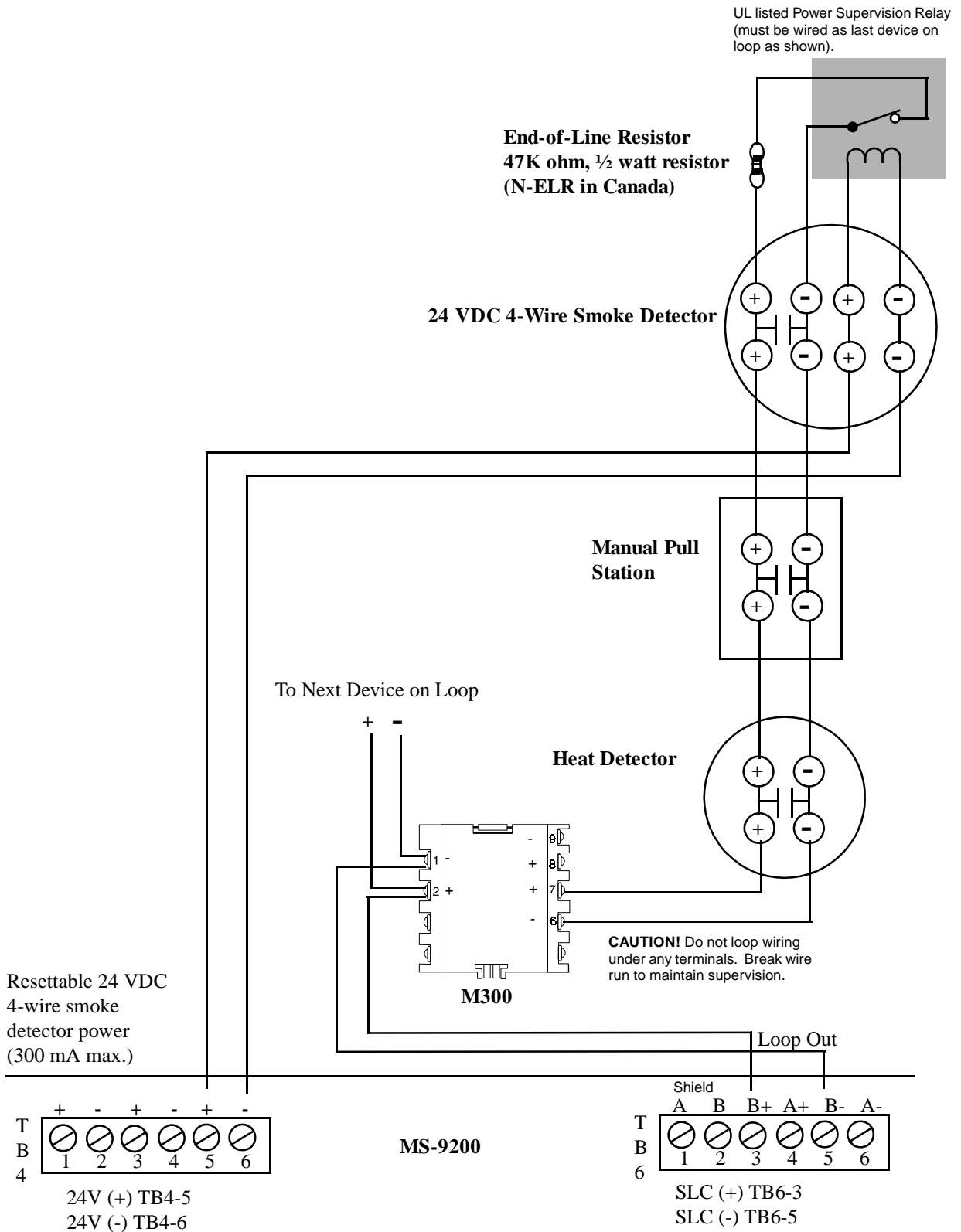
1. IDC and power connections are supervised by the M302 and reported to the MS-9200
2. Maximum current in alarm is 90 mA power-limited
3. See “Power Supply Calculations” on page 77, for power supply calculations



Style B Initiating Device Circuit (Utilizing M300)

The NFPA Style B IDC (Initiating Device Circuit), utilizing an M300 Monitor Module, is supervised and power-limited.

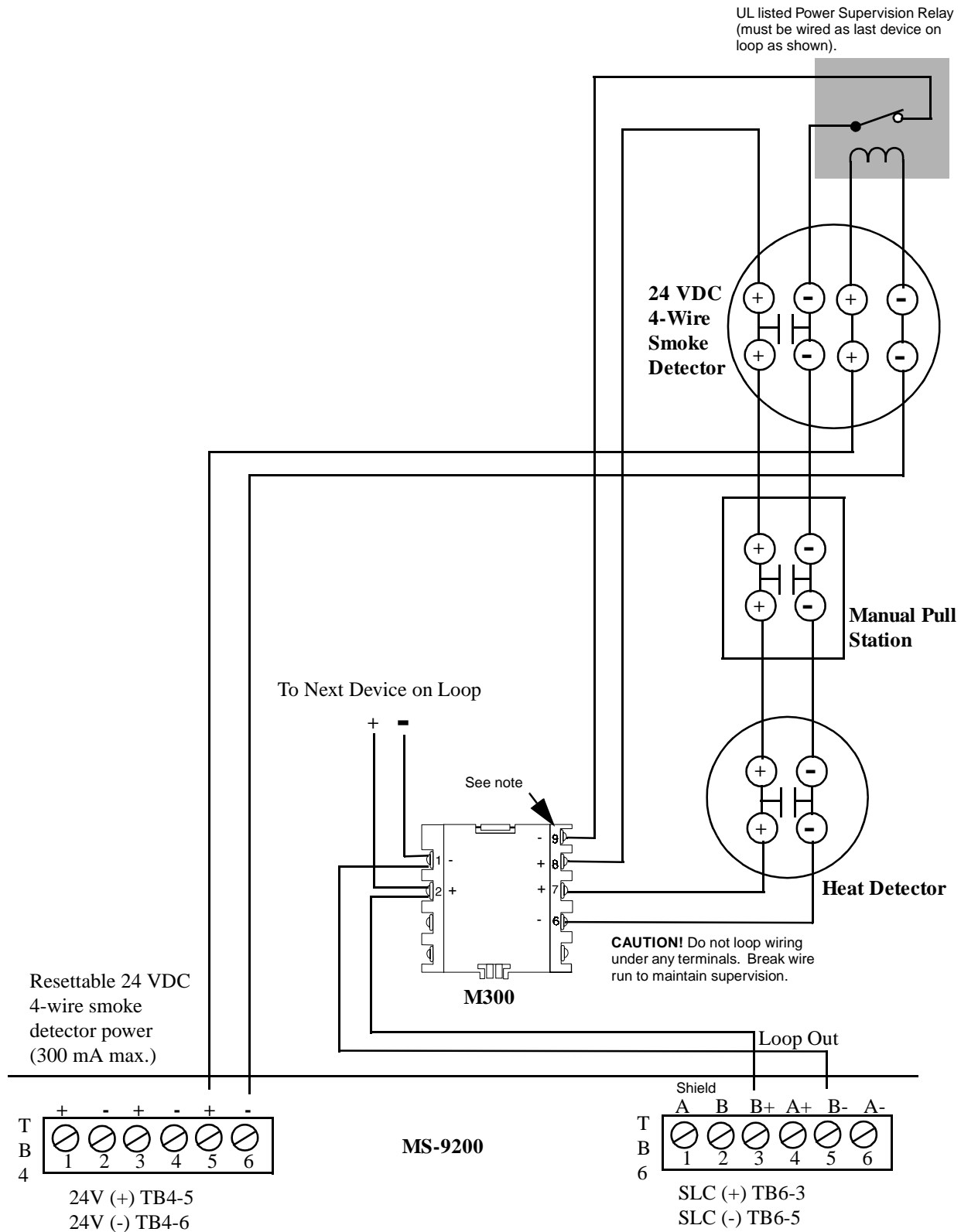
FIGURE 2-19: Style B Circuit using M300



Style D Initiating Device Circuit (Utilizing M300)

The Style D IDC (Initiating Device Circuit), utilizing an M300 Monitor Module, is supervised and power-limited.

FIGURE 2-20: Style D Circuit using M300

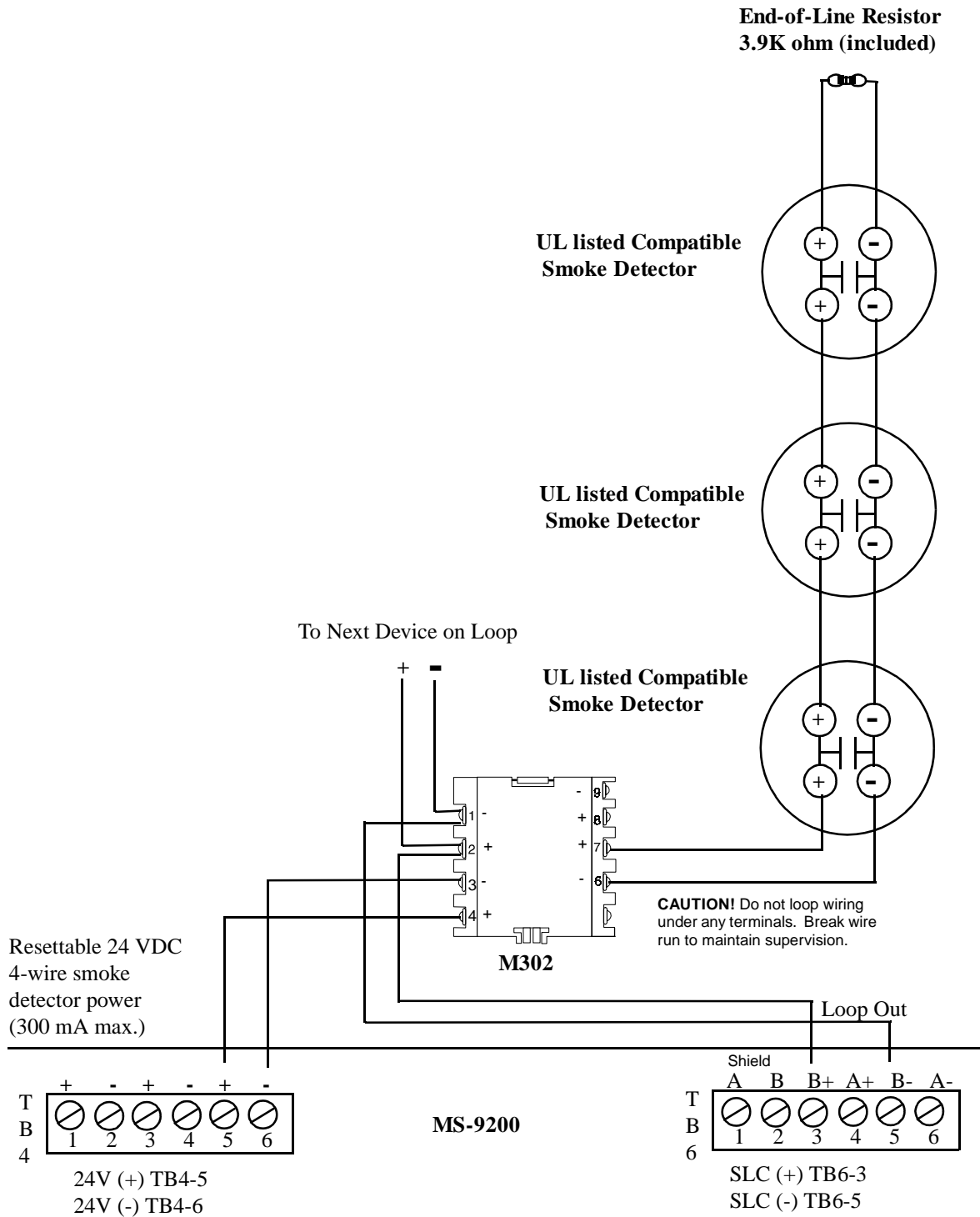


Note: An ELR is not required when wiring Style D (Class A).

Style B Initiating Device Circuit (Utilizing M302 Monitor Module)

The NFPA Style B IDC (Initiating Device Circuit) is supervised and power-limited.

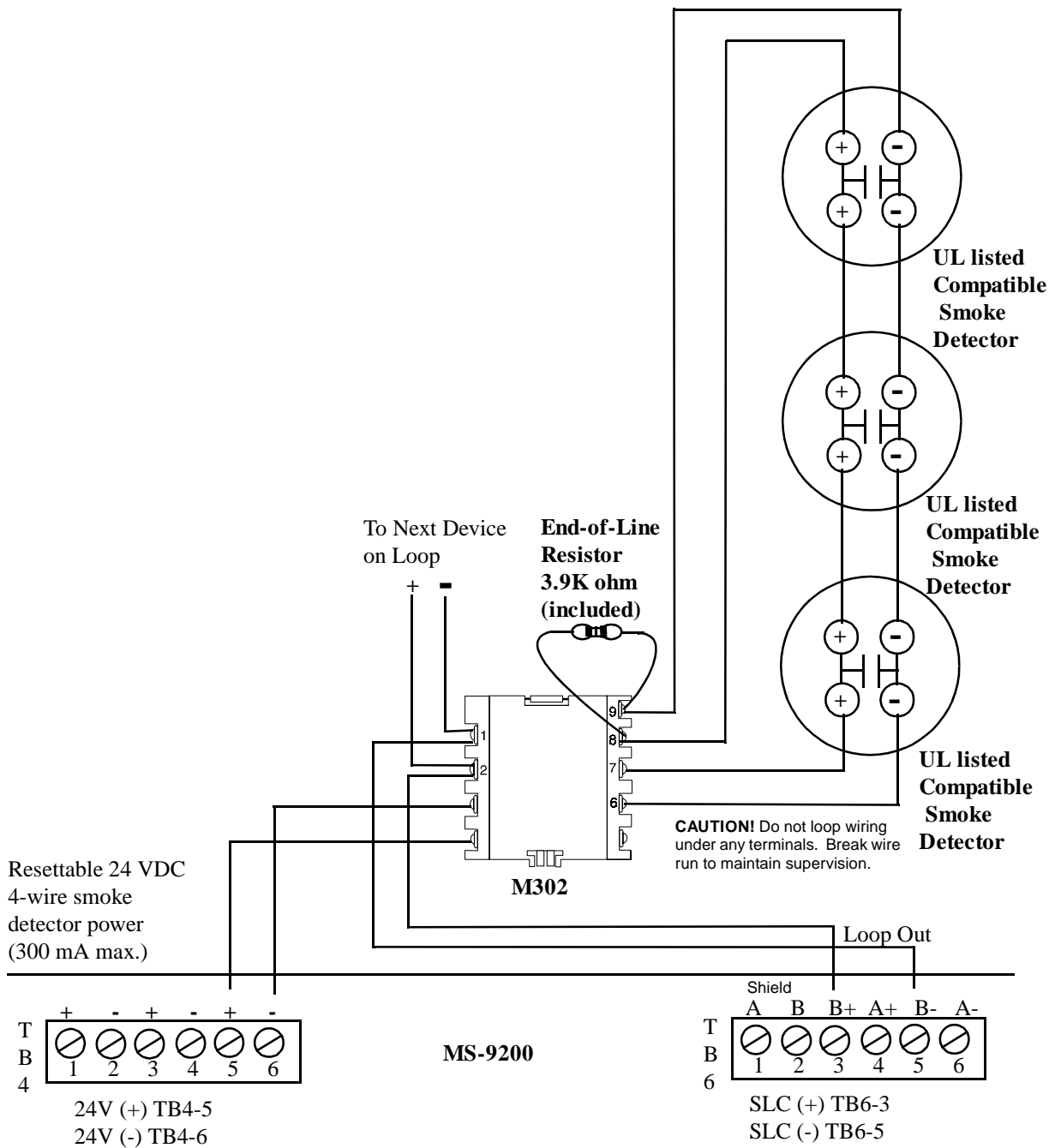
FIGURE 2-21: Style B Circuit using M302



Style D Initiating Device Circuit (Utilizing M302 Monitor Module)

The NFPA Style D IDC (Initiating Device Circuit) is supervised and power-limited.

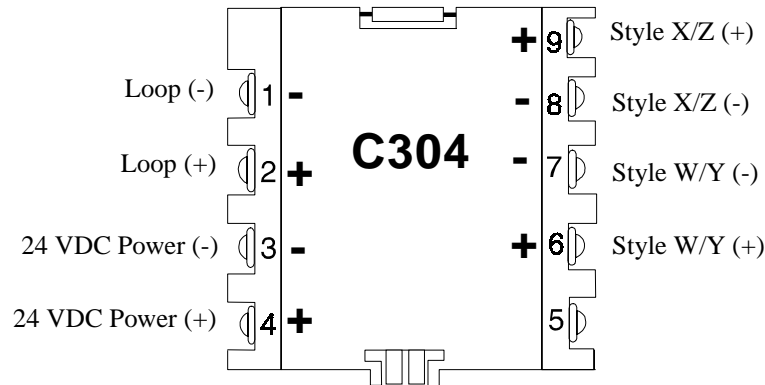
FIGURE 2-22: Style D Circuit using M302



2.12 The Control Module

The C304 Control Module is an addressable module that supervises and switches power to a Notification Appliance Circuit. The C304 can be wired as NFPA Styles W, X, Y or Z Notification Appliance or Speaker Circuits. Alternatively, the C304 module can be employed as a Form-C control relay.

FIGURE 2-23:C304 Control Module - Alarm Polarity



Communications Loop Connections

Connect the MS-9200 Communications SLC loop to C304 Terminals 1(-) and 2(+). The C304 occupies one module address on the loop. Set the rotary switches on the C304 to the particular loop address required.

NFPA Style W or Y Notification Appliance or Speaker Circuit

Connect polarized alarm notification appliances or speakers to a single 2-wire circuit. *Note that this circuit cannot be T-tapped or branched in any fashion and must be terminated across the last device by a 47K ohm, ½ watt ELR (P/N A2143-00).* Connect the circuit to C304 Terminals 6(+) and 7(-). Refer to Figure 2-25 on page 43.

NFPA Style X or Z Notification Appliance or Speaker Circuit

Connect polarized alarm notification appliances or speakers to a single 4-wire circuit. Connect the circuit to C304 Terminals 6(+), 9(+), 7(-) and 8(-).

Note that when wiring Style Z, do not install an ELR since one is built into the C304 Control Module.

Notification Appliance Power

Connect notification appliance power from MS-9200 TB4 Terminal 1 to C304 Terminal 4 (+24 VDC) and MS-9200 TB4 Terminal 2 to C304 Terminal 3 (-24 VDC). This power must be supervised by a UL listed Power Supervision Relay, wired as shown in Figure 2-25.

Coded Operation

Connect notification appliance power from either TB1 (NAC 1 Output) Terminals 1 and 4 or TB2 (NAC 2 Output) Terminals 1 and 4 to C304 Control Module Terminals 3 and 4. Be certain to place one ELR across the last device on the module for Style B wiring. Set NAC 1 or NAC 2, which is now being used to drive the C304, for appropriate coded function. Refer to “System Edit” on page 61, for additional information.

Test Switch

The C304 Control Module includes a magnetic test switch sensor located near the center front of the module. Activation of this switch by test magnet P/N M02-04-00 will cause a short circuit indication for the Style W/X/Y/Z circuit connected to the module.

C304 as a Relay Module

To configure a C304 as a Form-C relay, the two break-off tabs, illustrated in Figure 2-24, must be broken off of the module. Use a pair of needle-nose pliers to break off each tab.



Caution: Failure to break the tabs when configuring the module for Form-C operation can cause damage to the C304 module.

Communications Loop Connections

Connect the MS-9200 Communications SLC loop to C304 Terminals 1(-) and 2(+). The C304 occupies one module address on the loop. Set the rotary switches on the module to the particular loop address required.

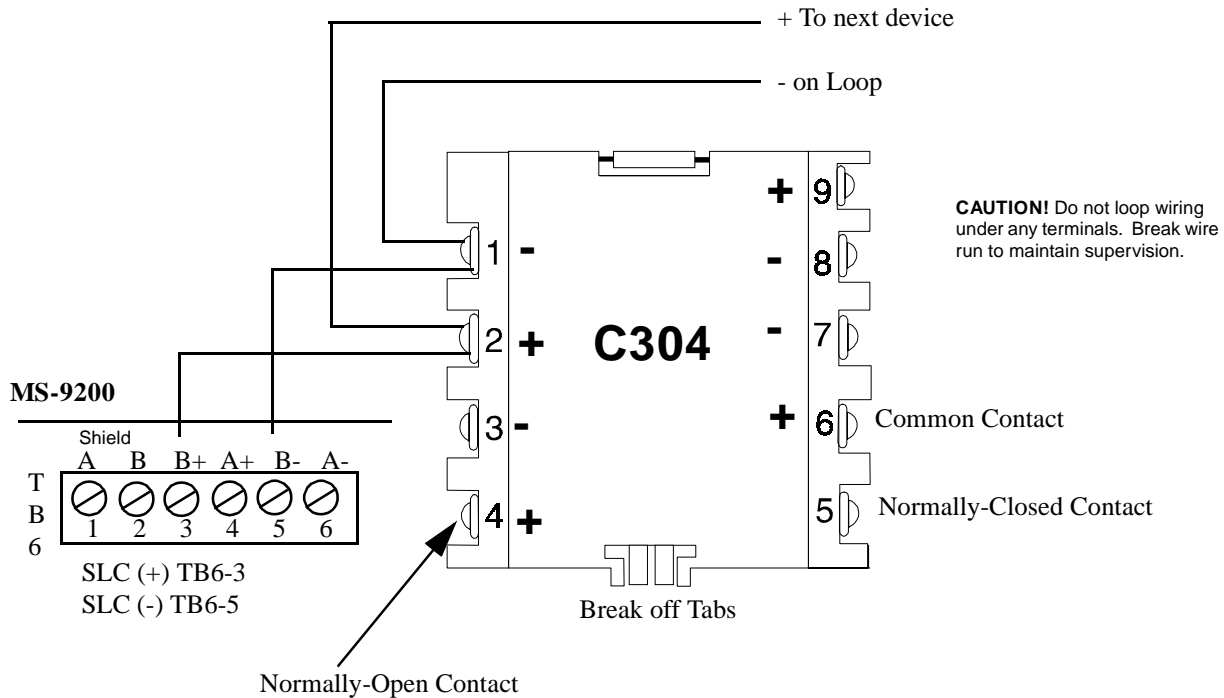
Contact Connections

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

Contact Ratings

- Resistive: 2 amps @ 30 VDC¹
- Inductive: 1 amp @ 30 VDC (0.6 PF)
- Pilot Duty: 0.6 amps @ 30 VDC (0.35 PF)
- 0.3 amps @ 110 VDC (0.35 PF)
- 0.3 amps @ 120 VAC (0.35 PF)

FIGURE 2-24: C304 Control Module - Utilized as Form-C Relay

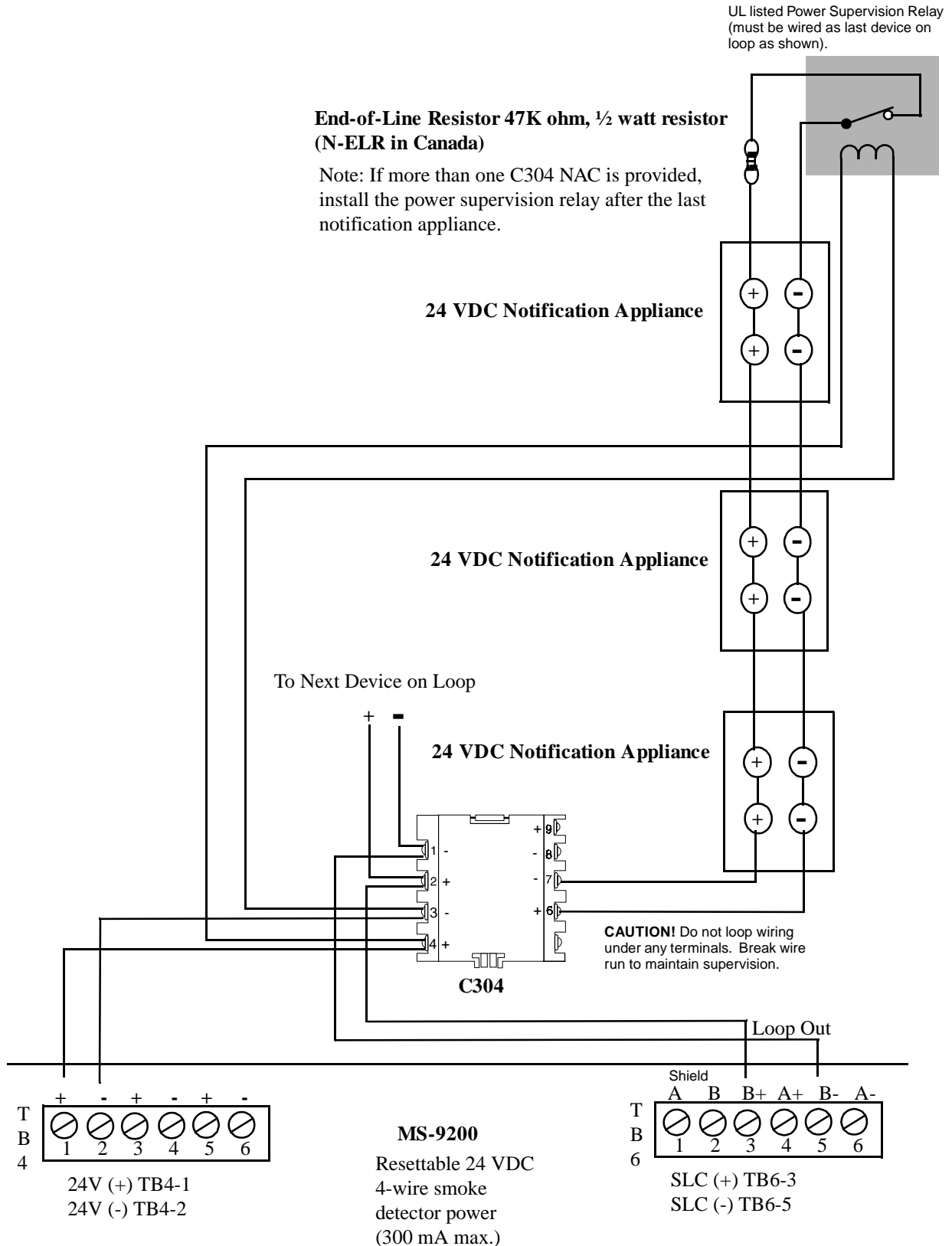


1. Certain electromechanical devices exhibit inductive loading characteristics. For these types of devices, derate the outputs to 1 amp. Refer to the Device Compatibility Document for load characteristics by device.

NFPA Style Y Notification Appliance Circuit (Utilizing C304 Module)

All circuits are supervised and power-limited.

FIGURE 2-25: Style Y NAC using C304



2.13 The Addressable Manual Pull Station

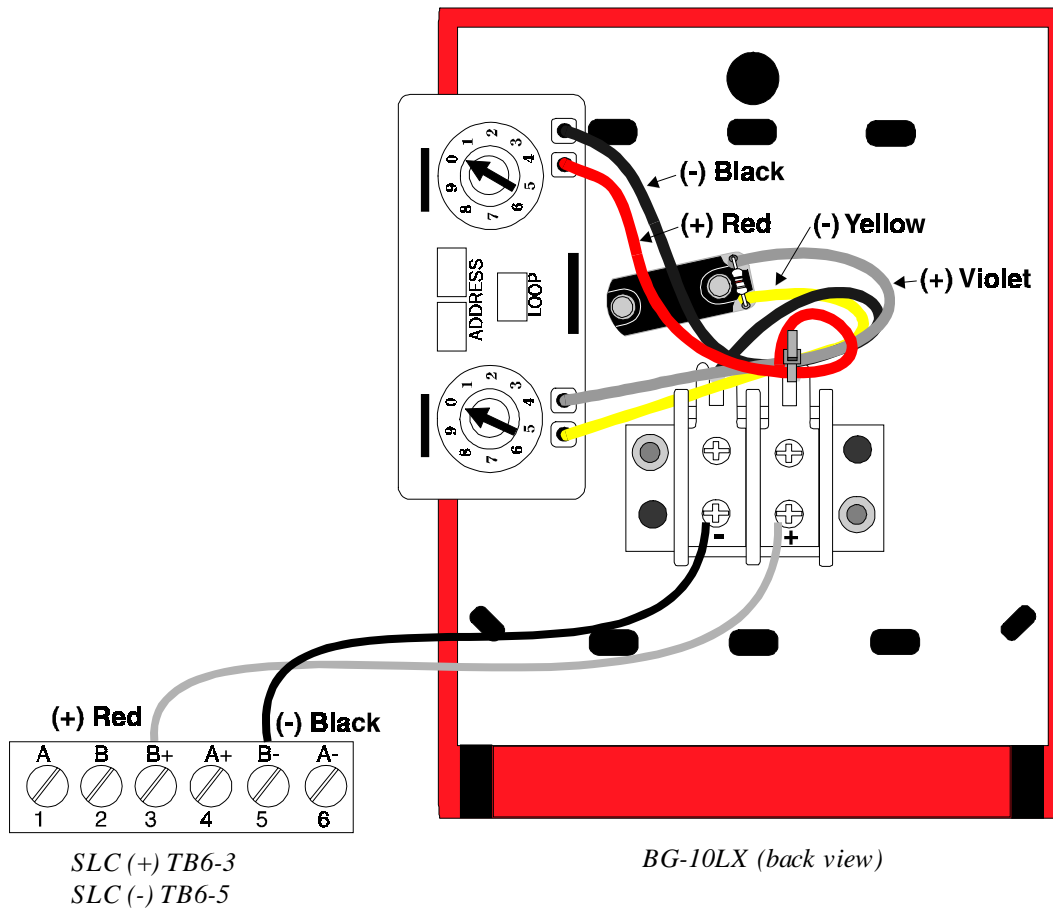
The BG-10LX is an addressable manual pull station with a Fire•Lite key-lock reset feature.

Installation

To install a BG-10LX pull station:

1. Connect the MS-9200 Communications SLC loop to Terminal screws (+) and (-) on the BG-10LX.
2. The BG-10LX is factory preset to address '00'. Set the address by using a screwdriver to turn the rotary address switches on the back of the unit to the appropriate settings.

FIGURE 2-26: Addressable Manual Pull Station Wiring

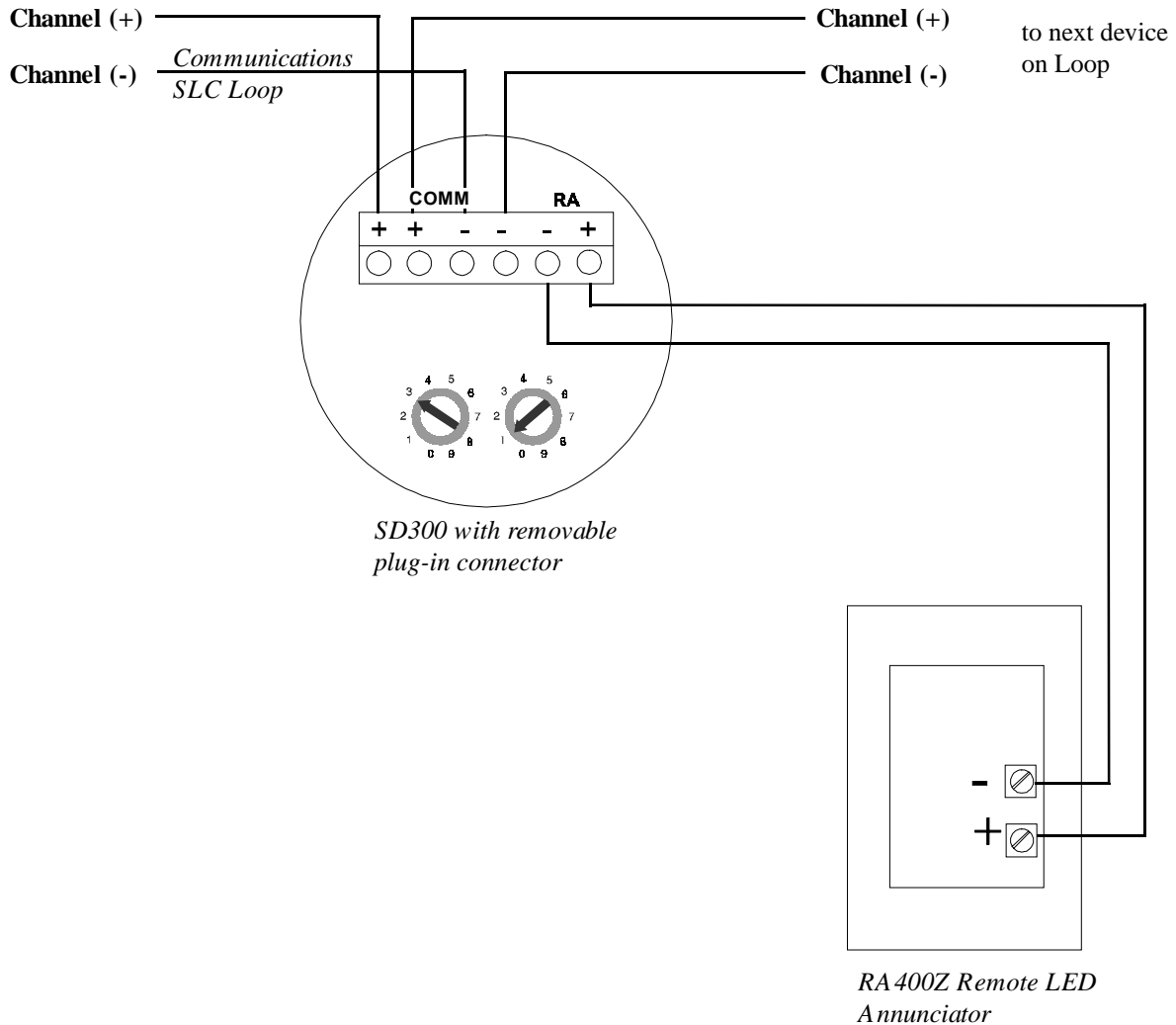


2.14 Wiring Detectors

To install addressable detectors:

1. Connect the MS-9200 Communications SLC loop to Terminal (-) and (+) on the removable terminal block.
2. If an RA400Z Remote LED Annunciator is being employed, connect the RA400Z positive terminal to the RA(+) terminal on the removable terminal block and the negative terminal to the RA(-) terminal on the removable block.
3. Before installing the appropriate addressable detector head, set the detector's address on the head with a small flathead screwdriver. Mark this address on the head.
4. Place the removable terminal block into the connector in the detector head. Be certain to properly align and snap-in securely.

FIGURE 2-27:Wiring Detector with Removable Plug-in Connector



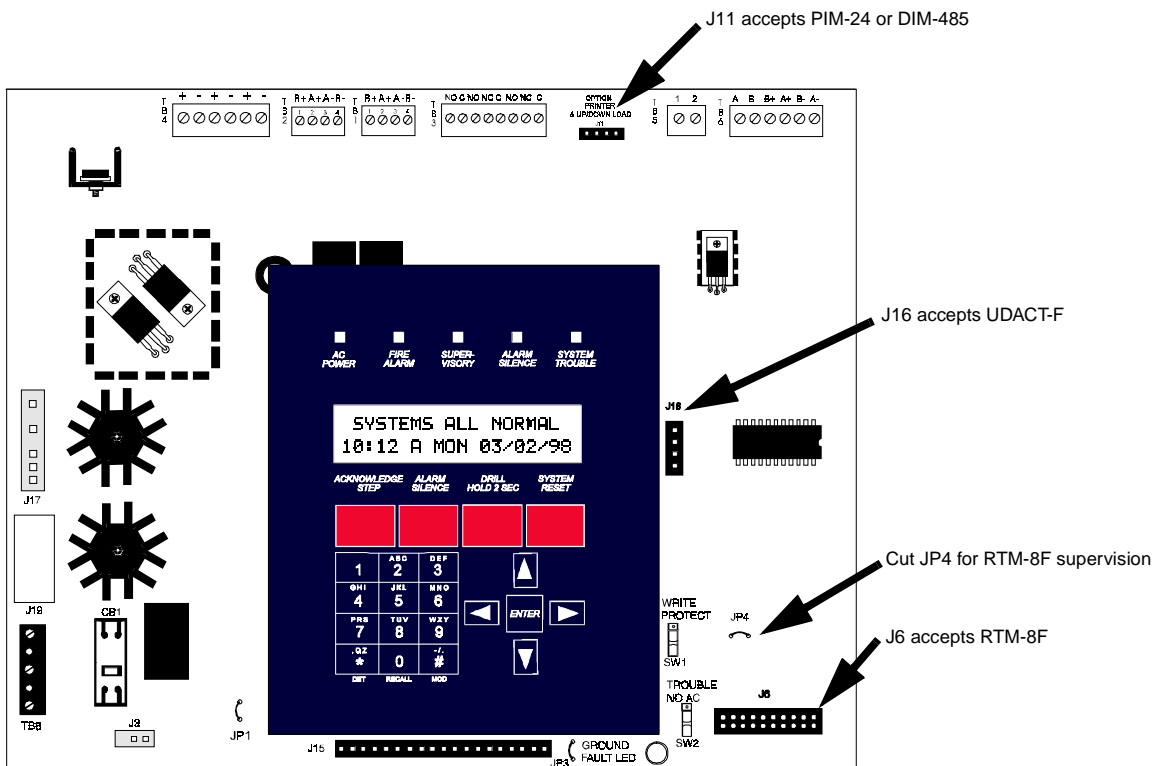
2.15 Optional Modules

The MS-9200 supports option modules using connectors J6, J11 and J16 on the main circuit board. There are four optional modules available for the MS-9200:

- RTM-8F Relay/Transmitter Module
- PIM-24 Printer/PC Interface Module
- UDACT-F Universal Digital Alarm Communicator/Transmitter
- DIM-485 Display Interface Module (for use with LCD-40 Series annunciators)

Jumper JP4 must be cut before installation of the RTM-8F module to enable module placement supervision. Note that devices connected to the standard EIA-485 connector, the optional EIA-232 connector, the optional EIA-485 connector via the PIM-24 or DIM-485 modules or SLC loop may be protected from voltage transients by using one of the UL listed compatible surge suppressors listed in the Fire•Lite Device Compatibility Document.

FIGURE 2-28:Option Module Locations



2.15.1 UDACT-F Universal Digital Alarm Communicator/Transmitter

The UDACT-F transmits system status to UL listed Central Station receivers via the public switched telephone network. It is capable of reporting up to 56 software zones or up to 198 addressable points. The UDACT-F may be mounted directly to the MS-9200 main circuit board or remotely in a UBS-1F or ABS-8RF enclosure. The MS-9200 requires software P/N 73580 or higher to support the UDACT-F. For additional information, refer to the UDACT-F Manual.

FIGURE 2-29:UBS-1F



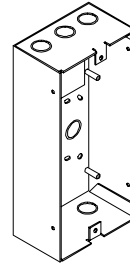


WARNING: *Disconnect all sources of power (AC and DC) before installing or removing any modules or wiring*

UDACT-F Mounting Options

The UDACT-F may be mounted directly to the MS-9200 main circuit board or remotely in an ABS-8RF or UBS-1F enclosure up to 6,000 feet (1,800 m) away from the control panel. All power must be removed from the control panel before making any connections to prevent circuit damage. The EIA-485 serial interface is connected between the control panel and UDACT-F, using twisted shielded pair wire. Power should be wired from the control panel's 24 VDC (nominal) filtered, nonresettable output to TB1 on the UDACT-F (except when mounted in the MS-9200).

FIGURE 2-30:ABS-8RF



Mounting Inside the MS-9200 Enclosure

The MS-9200 must have firmware, with P/N 73580 or higher, installed to allow use of the UDACT-F. Remove all power from the MS-9200 by disconnecting AC and batteries. Install the supplied standoffs (three nylon and one aluminum) in the appropriate holes located on the right side of the MS-9200 main circuit board, as illustrated in Figure 2-31, “UDACT-F Mounting to MS-9200,” on page 47. Using the ribbon cable supplied with the UDACT-F, connect J10 on the UDACT-F to J16 on the MS-9200. Note that the colored edge of the ribbon cable must be oriented toward the top edge of the UDACT-F as illustrated in Figure 2-31. Carefully seat the UDACT-F on the nylon standoffs and secure to the aluminum standoff with the supplied screw.

The EIA-485 circuit and 24 VDC power are provided directly from connector J16 of the MS-9200. Note that a 120 ohm EOL resistor is not required on the UDACT-F EIA-485 terminals when it is installed inside the MS-9200 cabinet. The EOL resistor is required at the last device (if any are installed) on the EIA-485 line external to the MS-9200 panel.

Programming

See “System Edit” on page 61, for information on programming the MS-9200 to function with the UDACT-F.

FIGURE 2-31:UDACT-F Mounting to MS-9200

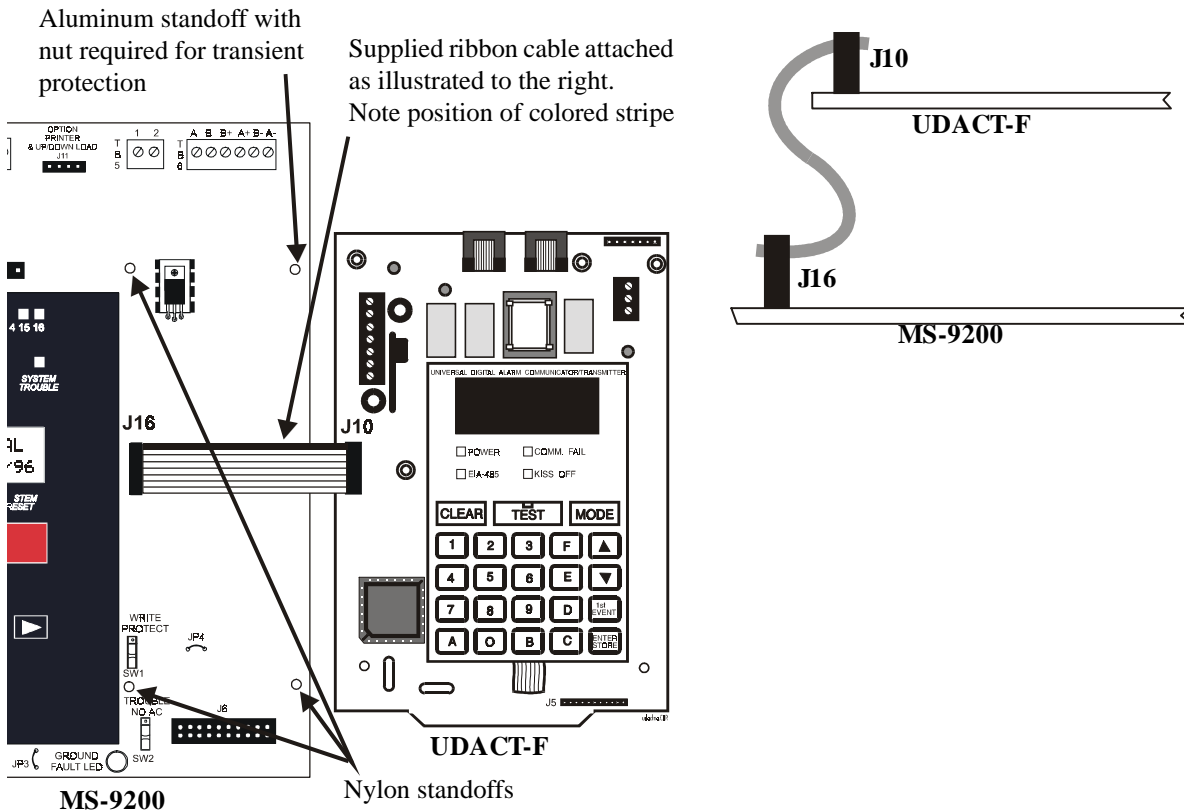
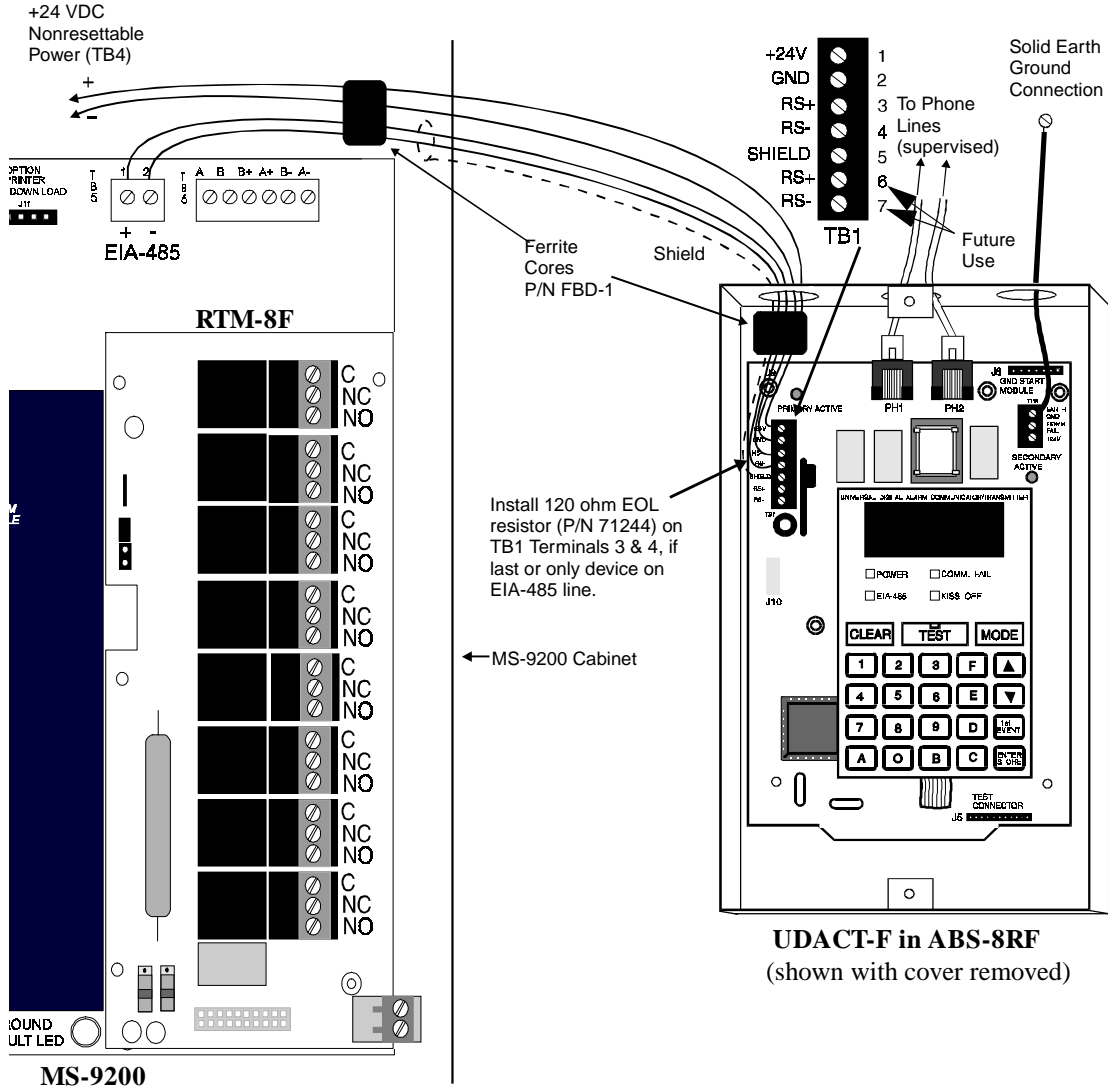


FIGURE 2-32: External UDACT-F Mounting in ABS-8RF

Supervised and Power-limited EIA-485 and power connections.



Notes:

1. This arrangement allows use of the UDACT-F simultaneously with the RTM-8F module.
2. Ferrite cores (P/N FBD-1) are recommended for all applications.
3. Recommended wire is 12 AWG to 18 AWG (0.75 to 3.25 mm²) twisted, shielded pair.
4. If shielded wire is used, connect only one end of the shield:
 - ✓ shield may be connected to cabinet (earth ground) at fire alarm panel, or
 - ✓ shield may be connected to TB1 Terminal 5 (shield) at UDACT-F. *Note that the shield end that is not connected should be insulated to prevent accidental grounding. Do not connect both ends of shield under any circumstances since a ground fault may result.*
5. Conduit is recommended for external wire runs (consult local building codes).
6. Connect ground strap (supplied with ABS-8RF enclosure) from Earth Ground terminal on the UDACT-F to a solid building earth ground. Conduit alone will not provide a reliable earth ground.
7. UDACT-F may be located up to 6,000 feet (1,800 m) away from the host control panel.
8. Refer to "Specifications" on page 9 for power requirements.
9. UDACT-F TB1 Terminals 6 and 7 are for future use. Make no connections to these terminals.

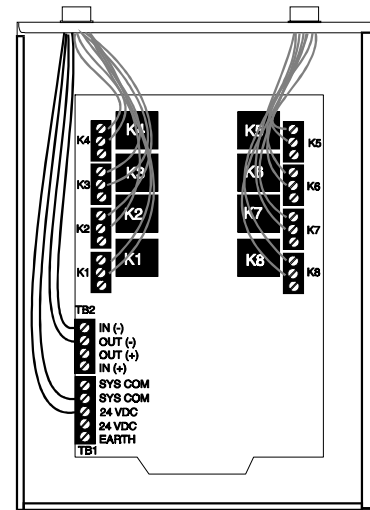
2.15.2 ACM-8RF Relay Control Module

FIGURE 2-33:ABS-8RF Enclosure

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

The ACM-8RF module provides eight Form-C relays with contacts rated for 5 amps. When installed with an MS-9200 FACP, the ACM-8RF modules provide relay activation for each of the 56 possible FACP zones plus special functions. Options exist to allow for alarm only or alarm and trouble activations per zone. Output activation for general alarm, general trouble, general supervisory, NAC fault, AC fail, walktest start and battery trouble are also available. Refer to the ACM-8RF Manual Appendix for information on setting module switches for addressing and relay functions.

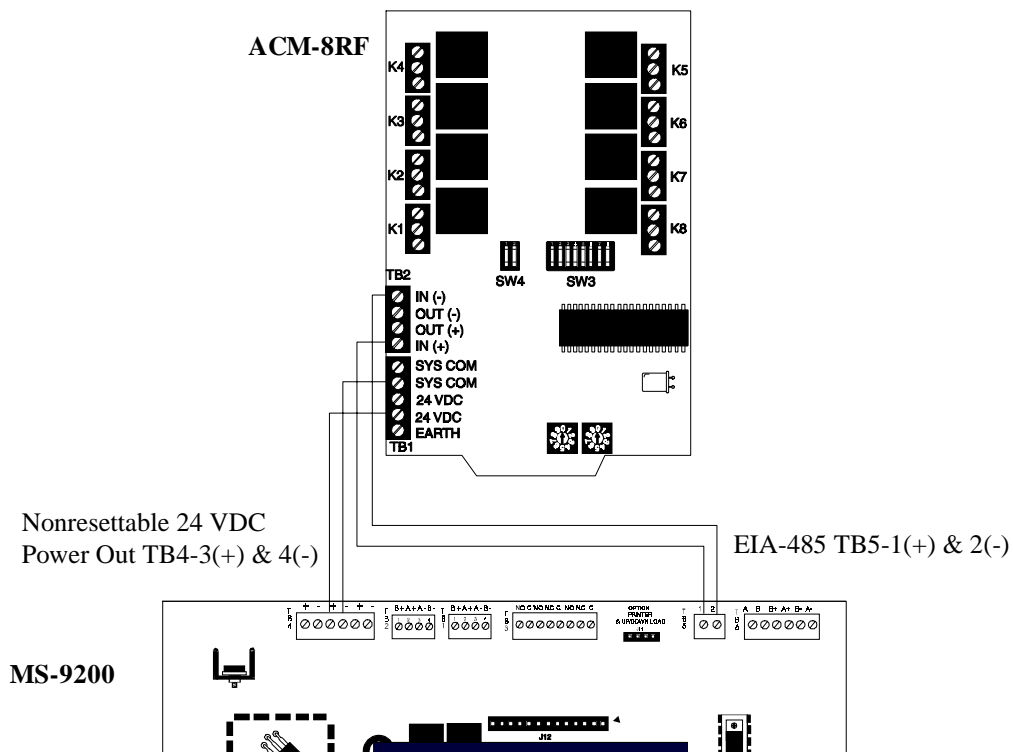
The ACM-8RF is installed on the standard EIA-485 communication bus and wiring is supervised by the FACP. Power for the module must be power-limited and may be provided by the FACP or a UL listed power supply such as the FCPS-24FE. Up to 32 ACM-8RF Relay Control Modules may be placed onto the EIA-485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



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

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

FIGURE 2-34:ACM-8RF Relay Control Module Installation



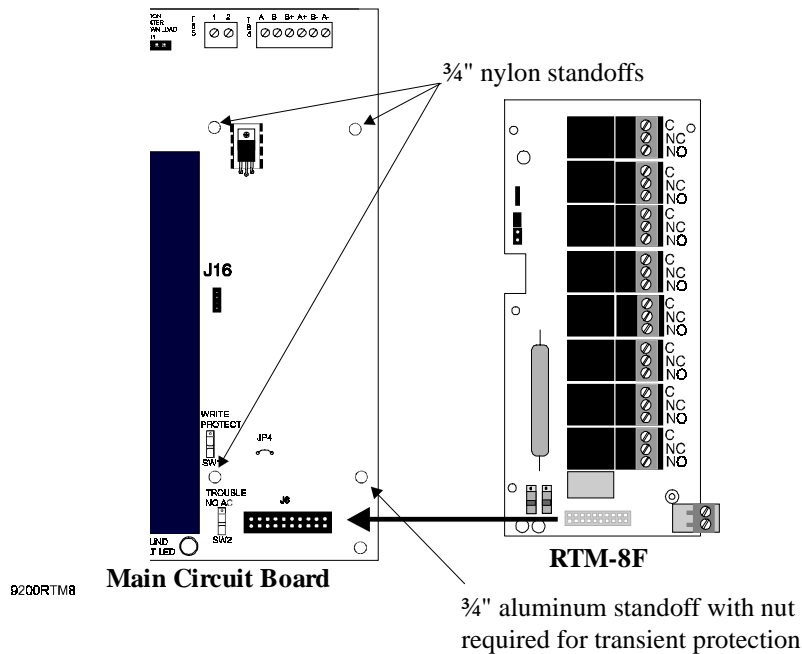
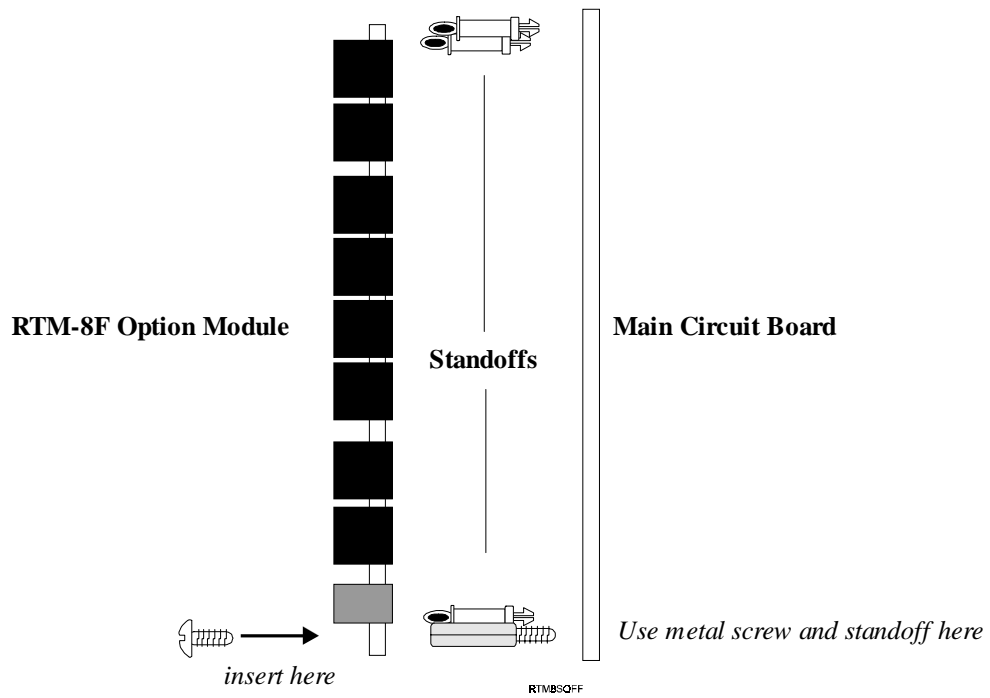
2.15.3 RTM-8F Option Module Installation



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

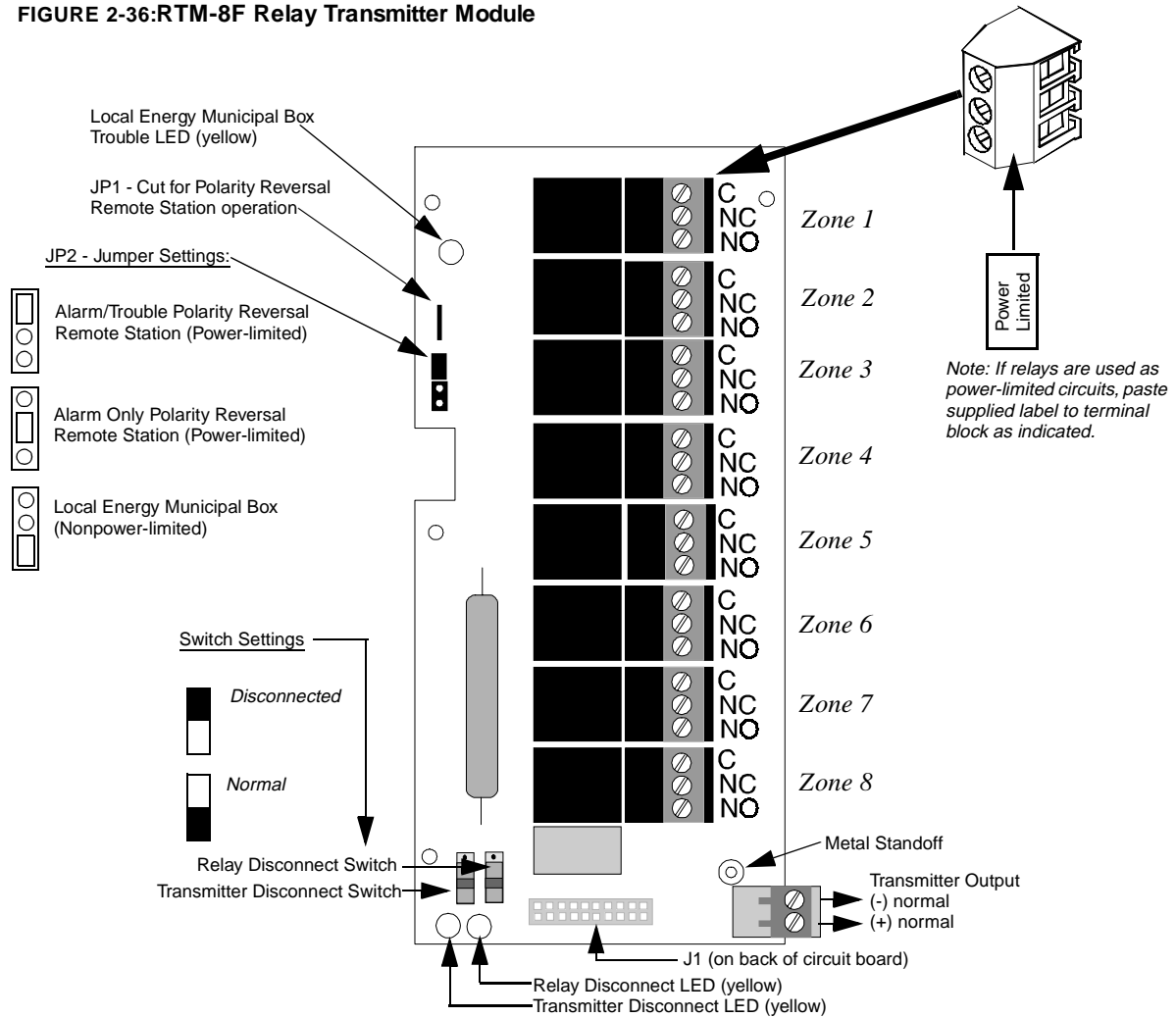
Insert the three supplied nylon standoffs into the holes located on the right-side edge of the MS-9200 main circuit board. Insert the supplied metal standoff on the lower-right corner. Carefully align the pins of J16 on the main circuit board with connector J1 on the RTM-8F option board. Press firmly on the RTM-8F until it locks in place on the standoffs. Be certain to tighten the screw into the metal standoff on the lower-right corner. This is critical to the RTM-8F transient protection. Affix the terminal identification labels provided with the option module.

FIGURE 2-35:RTM-8F Module Installation



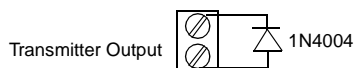
RTM-8F Relay Transmitter Module Components

FIGURE 2-36:RTM-8F Relay Transmitter Module



Notes:

- Zone Relay Contact Ratings:**
 - ✓ Maximum Switched Power is 170W or 1800 VA
 - ✓ Maximum Switched Current is 6 amps
 - ✓ Maximum Switched Voltage is 30 VDC or 300 VAC
 - ✓ UL Rating is 6 amps @ 28 VDC or 120/300 VAC 1/8 HP @ 120/240 VAC (100,000 CYC) 1.5/0.8 A @ 120/240 VAC Pilot Duty is 30,000 CYC
 - ✓ Contact Material is Silver Nickel, Gold Plated
- Polarity Reversal Output:** 24 VDC (nominal), 18.5 mA maximum rated current. Internal Resistance: 1,200 ohms (nominal). Intended for connection to the polarity reversal circuit of a remote station receiving circuit (such as the Fire•Lite RS-82) having compatible ratings. The RTM-8F is not suitable for separate transmission of both alarm and trouble signals simultaneously to a remote station. Output is power-limited and wiring can leave the building.
- Municipal box output:** Supervised for open circuit. Output is nonpower-limited and wiring can leave the building. Yellow Trouble LED, when on, indicates open circuit condition. Check wiring and make certain Municipal Box is reset according to local codes. Maximum current (short circuit) is 0.6 amps. Maximum Voltage (open circuit) is 30.0 V. Maximum Wire Resistance is 3 ohms.
- To prevent the yellow Trouble LED from turning on when the Transmitter Output is not used (no connections), move jumper JP2 to the Local Energy Municipal Box position (bottom two pins) and install a dummy load across the Transmitter Output terminals as shown below. The dummy load is a 1N4004 diode. The cathode must be connected to the terminal labeled '(-) normal' in Figure 2-36, and the anode must be connected to the terminal labeled '(+) normal'. Polarity must be observed or the Trouble LED will remain on. *Caution: Diode must be removed when using the Transmitter Output in order to properly supervise the connections.*



2.16 Printer/PC Interface Module

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

WARNING: DO NOT connect a printer or PC to the MS-9200 FACP if a ground fault exists on the control panel. Circuit damage may result. Remove all power (AC and DC) before installing or removing any modules or wiring.

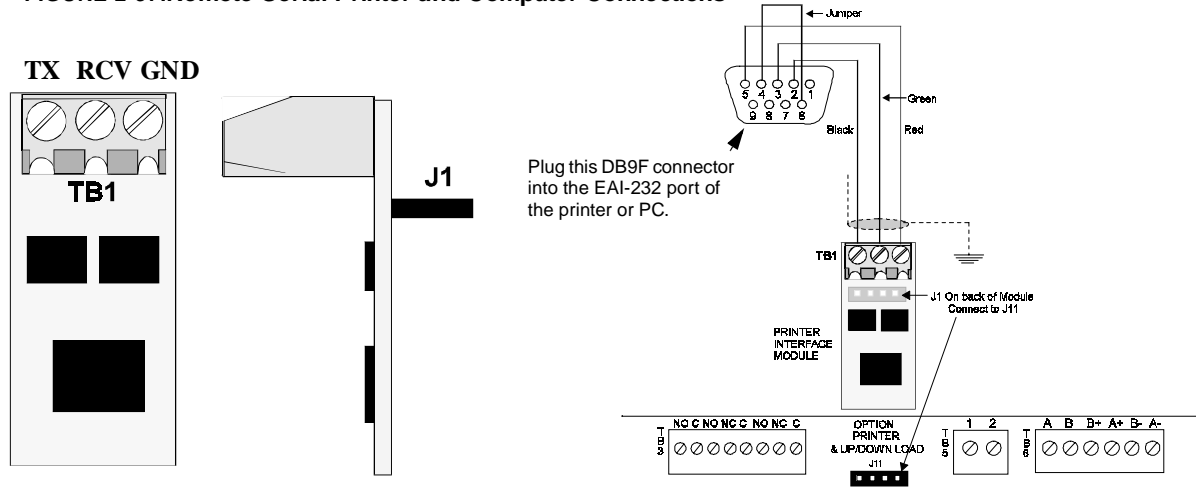
Programming

Refer to "System Edit" on page 61, for printer programming instructions.

Installation

Remote printers and PCs require 240 VAC, 50 Hz primary power. Also required is the PIM-24 which includes the Printer/PC Interface Module, interface cable prewired to a DB9F connector as shown in Figure 2-37 and a DB25 adapter. Connect the Printer/PC Interface board to J11 on the MS-9200 main circuit board and the attached cable to the serial EIA-232 port on the printer or PC. Use the DB25 adapter if a nine pin connector is not available on your printer or PC. Note that a ground fault may occur on the MS-9200 panel, dependent on the printer used, when this connection is made. For this reason, it is important that there be no preexisting ground fault on the panel. Consult the factory for recommended printers.

FIGURE 2-37: Remote Serial Printer and Computer Connections



Printer Configuration

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

TABLE 2-2: Typical Printer Settings

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

PC Configuration

The PK-9200 Kit includes the DOS-based MS-9200 Programming Utility software on 3½" floppy disk P/N 75298, the Instruction Manual P/N 15677 and the PIM-24 (Printer/PC Interface Module with cable and DB9F/25 connectors). The Windows-based PK-9200W Programming Utility Kit contains four 3½" floppy disks and the Instruction Manual P/N 50684.

CHAPTER 3 *Programming/Read Status*

NOTE: *This chapter provides a detailed description of the FACP programming. For your convenience, a Programming Flowchart has been included in "Screen Options Flowchart" on page 100. It may be helpful to follow along with the flowchart as this chapter is reviewed.*

The MS-9200 is completely field programmable and requires no special software skills. Programming may be accomplished in one of three ways:

- The Autoprogram Feature - this method is very convenient for quickly bringing the MS-9200 on-line or for program editing
- Manual Programming or editing, using the MS-9200 keypad
- The Off-Line Programming Feature - this method allows creation of site-specific custom programs using a DOS-based or Windows-based computer. For programs requiring a large amount of data entry, this method may be preferred. A PK-9200(W) programming kit may be ordered for this purpose.

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

```

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

In order to (1) program the system, (2) read system status, (3) print, (4) edit or (5) walktest, the ENTER key must first be pressed. After pressing ENTER, the screen shown below is displayed:

```

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

Pressing 1 will select system Programming, which may only be accomplished by an authorized user. Before attempting to program the system, place the SW1 Write Protect switch in the down position. SW1 is located on the lower-right side of the MS-9200 main circuit board. Refer to the illustration on page 6. If the switch is in the up 'Write Protect' position while attempting to enter the Programming Mode, the LCD will display the following:

```

WRITE PROTECT !!!
PRESS BACKSPACE
  
```

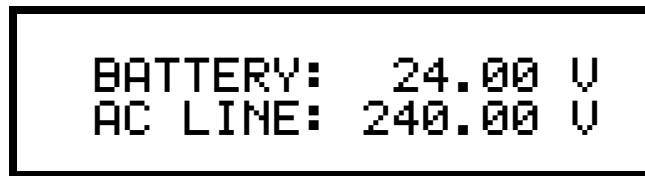
In order to program the system, a valid password must first be entered. Once the correct password is entered, the user may select Autoprogram or Program Edit. After programming is completed, return switch SW1 to the Write Protect position.

1 = Programming: There are two programming levels.

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

2 = Read Status: Entering Read Status allows the user to read the status of any point/zone in the system plus display or print the history file or print the entire user program. The Read Status feature is NOT password protected. Read Status is explained in “Operating Instructions” on page 67.

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



```
BATTERY: 24.00 V
AC LINE: 240.00 V
```

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

3.1 Initial Power-up

After completing the wiring of addressable devices to the SLC loop, power up the fire alarm system. Since the addressable devices have not yet been programmed into the FACP, their LEDs will not flash, the System Trouble LED will be on and the LCD display will alternate between the following two displays:



```
TROUBLE IN SYSTEM
PROGRAM CORRUPTED
```



```
TROUBLE IN SYSTEM
NO DEVICES INSTALL
```

If the system remains unprogrammed, the piezo will sound after a few minutes. It can be silenced by pressing the Acknowledge/Step switch, but it will continue to resound until the system is programmed.

3.2 Programming

Press the ENTER key. The screen below will appear:

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

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

```
KEY PASSWORD, ENTER
```

Entering the Level 1 password (default 00000) will cause the following screen to appear (refer to “Program Change - Level One” on page 56):

```
0=CLR 1=AUTO 2=POINT
3=SYS 4=PWORD 5=LOAD
```

Entering the Level 2 password (default 11111) will cause the following screen to appear (refer to “Program Change - Level 2” on page 63):

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

Passwords

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

3.3 Program Change - Level One

When the correct password is entered, the MS-9200 will enter Level 1 program mode. In this mode, the trouble relay is activated and the System Trouble LED flashes and cannot be changed to steady and the piezo sounder is off. The following display will appear:



```
0=CLR 1=AUTO 2=POINT
3=SYS 4=PASSWORD 5=LOAD
```

3.3.1 Clear

Pressing '0' will clear all general system programming options described in "System Edit" on page 61, and all programmed addressable devices from the nonvolatile memory of the MS-9200. Before executing the Clear command, the display will prompt the user to press ENTER in order to verify the command before the system actually clears programming data. CLEAR is a useful command when the unit is first installed, prior to autoprogramming. *Note that it is necessary to 'Autoprogram' after using the clear function.*

3.3.2 Autoprogram

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

Once Autoprogram is selected, the MS-9200 automatically polls all devices installed/wired to the SLC loop. The panel communicates with each individual addressable device and displays the type of device at each address location starting with detectors and then modules.

While autoprogramming the system, the MS-9200 will display the following:



```
AUTOPROGRAM
PLEASE WAIT
```

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

The first time that autoprogramming is selected, all points installed on the SLC loop are identified. Default device type (monitor, smoke detector, control) and software zone assignments for each device are displayed. On any successive enabling of the autoprogram feature, the LCD will display *only the newly installed, deleted or changed devices on the SLC loop.*

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

New Detector

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



In the preceding example:

- 'P' in 'P01' represents the actual type code (photoelectric) of the detector found at address 01. ('I' would represent an Ionization detector)
- The ADJ (adjective) and NOUN fields are blank, but may be user programmed
- 'Z00' is the default zone selection meaning 'general alarm' (main circuit board NAC outputs 1 & 2). Refer to "Software Zones" on page 81, for software zone assignments.

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

The MS-9200 will lead you through the program editing process. A blinking cursor moves through the fields as you press the right arrow key (triangle to the right of ENTER). After moving into other fields, you may return to a previous field by pressing the left arrow. Change the blinking fields by pressing the up arrow key, the down arrow key or by pressing the appropriate numeric key.

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

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

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

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

Pressing a key on the 12-key pad changes the letter indicated by the blinking cursor. Any alphanumeric character may be entered. Pressing the right or left arrow key moves the blinking cursor one letter right or left. When the right

arrow key is pressed with the blinking cursor on the last letter of the ADJ label, the cursor will move to the first letter of the NOUN field.

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

_____ (default of blanks)	HVAC_ROOM
BASEMENT_	KITCHEN_
BOILER_RM	LOBBY_
CLASSROOM	OFFICE_
CLOSET_	PATIENT_
CORRIDOR_	RESTROOM_
ELECT._RM	ROOM_
ELEVATOR_	STAIRWAY_
ENTRANCE_	STOREROOM
FLOOR_	WING_
GARAGE_	ZONE_
HALLWAY_	

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

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

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

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

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

```
PROGRAM SMOKE DET P01
NO ANSWER   DELETE?
```

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

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

Monitor Module Autoprogram

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

```
PROGRAM MONITOR      M01
<ADJ> <NOUN>        Z00
```

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

<u>TYPE CODE LABEL</u>	<u>SPECIAL FUNCTION</u>
MONITOR	NONE (DEFAULT)
PULL BOX	NONE
HEAT DET	NONE
SMOKE ZON	NONE
WATERFLOW	CAUSES NONSILENCEABLE ALARM
SUPERVISY	BECOMES SUPERVISORY POINT (see Chapter 4, Operation)
AUTO SUPV	BECOMES SUPERVISORY POINT (nonlatching supervisory)
TAMPER_SW	BECOMES SUPERVISORY POINT (see Chapter 4, Operation)
_____	NONE (BLANK LABEL)
ACK_SW__	FUNCTIONS LIKE ACKNOWLEDGE SWITCH
SILENC SW	FUNCTIONS LIKE SILENCE SWITCH
RESET SW	FUNCTIONS LIKE RESET SWITCH
DRILL__	FUNCTIONS LIKE DRILL SWITCH

Follow the same procedure as described in New Detectors section, for editing of the ADJ and NOUN fields. The default zone selection is Z00 (main circuit board NAC outputs 1 & 2) and may be set to Z01 through Z56 if desired. See "Software Zones" on page 81.

Control Module Autoprogramming

A typical control module Autoprogram screen is shown below:

```
PROGRAM CONTROL     CNN
<ADJ>              ZNN ZNN ZNN
```

Control modules default to Zone 00 (general alarm). All type code options are silenceable except Relay and Strobes. The selection of control module type codes may change their function. Select the type code from the library list below. Use the arrow keys as described in the New Detectors section.

<u>TYPE CODE</u>	<u>SPECIAL FUNCTION</u>
1 CONTROL	NONE (DEFAULT) Silenceable
2 BELL CKT	Silenceable
3 HORN CKT	Silenceable
4 SOUNDERS	Silenceable
5 _____	(BLANK LABEL) Silenceable
6 RELAY	IGNORE OPEN CIRCUIT (Nonsilenceable)
7 STROBES	Nonsilenceable

Select an adjective descriptor from the library list shown in the New Detectors section. Use the arrow keys as described in the New Detectors section. Control modules may be assigned to a maximum of three software zones (refer to “Software Zones” on page 81). Zone Z00 represents general alarm. All control modules are assigned to Zone Z00 upon initial power-up.

3.3.3 Point Edit

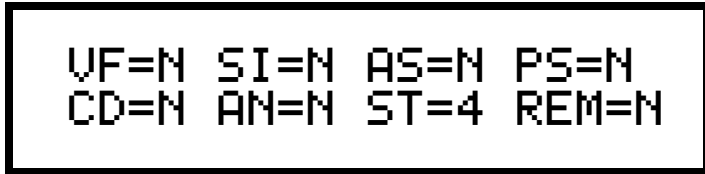
While displaying the Program Level 1 Menu screen (see “Program Change - Level One” on page 56), pressing '2' allows for editing of the point (addressable device) descriptor screens. These screens show the device type, the device address, adjective and noun field descriptors and the software zone locations that the point is assigned to. Point editing is performed *after autoprogramming* and may be done at any time, except during an alarm condition. The following display will appear:



For example, select Detector address 3 program edit by pressing * key (* = detector), followed by numeric key '3', followed by ENTER. Select Module address 3 program edit by pressing the # key (# = module), followed by the numeric key '3', followed by ENTER. If there is no device installed at this address, the panel displays the next higher address where a device is installed. After editing is complete and ENTER is pressed, the display returns to the above menu. *Rather than reentering the next point number, the user may press the up or down arrow key to display the next lower or higher existing point.* Using software P/N 73750 or greater, to edit NAC 1 or NAC 2, press the * key, then the # key, the press '1' for NAC 1 or '2' for NAC 2. Select either 'BELL_CKT' for silenceable functionality or 'STROBE' for nonsilenceable functionality. Use the system edit menu described in “System Edit” on page 61, to select coding. Coding is only possible if the NAC is programmed as 'BELL_CKT'. The point display formats and the method of editing are described in “Autoprogram” on page 56.

3.3.4 System Edit

The System Edit function is selected by pressing '3'. *The system edit screen appears as shown below for software releases prior to P/N 73750.* This software does not support the LCD-40 Annunciator.



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

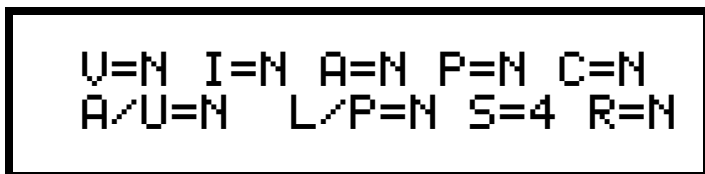
There are eight system function options for software releases prior to P/N 73750. The factory default selections and user option selections are shown below:

<u>FUNCTION</u>	<u>DEFAULT</u>	<u>SELECTION</u>
VF = Alarm Verification	(N)one	(Y) 120 seconds
SI = Silence Inhibit	(N)one	(Y) 60 seconds ¹
AS = Autosilence	(N)one	(Y) 10 minutes ¹
PS = Presignal	(N)one	(Y) 3 minutes with 15 second Acknowledge ¹
CD = Bell Code 1	(M)arch Time	(N)one = No Coding (steady)
Note: Bell 2 is fixed steady		(T) = Temporal
		(C) = California
AN = Annunciators	(N)one	(Z) = 56 Zones
		(ZU) = 56 Zones Annunciator with UDACT-F ²
		(P) = 198 Points
		(PU) = 198 Points Annunciator with UDACT-F ²
ST = SLC loop style	(4) = Style 4	(6) = Style 6
REM = Alarm/Trbl Reminder	(N)o	(Y)es = Sound onboard piezo every 15 seconds during alarm and every two minutes during trouble after acknowledge or silence key has been pressed.

¹Requires prior approval of Local Authority Having Jurisdiction.

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

The system edit screen appears as shown below for software P/N 73750 or greater. This software is required to support the LCD-40 Series Annunciators.



There are nine system function options for software P/N 73750 or greater. The factory default selections and user option selections are shown below:

<u>FUNCTION</u>	<u>DEFAULT</u>	<u>SELECTION</u>
V = Alarm Verification	(N)one	(Y) 120 seconds
I = Silence Inhibit	(N)one	(Y) 60 seconds ¹
A = Autosilence	(N)one	(Y) 10 minutes ¹
P = Presignal	(N)one	(Y) 3 minutes with 15 second Acknowledge ¹
C = Bell Code	(M)arch Time	(N)one = No Coding (steady) (T) = Temporal (C) = California (Z) = 56 Zones (ZU) = 56 Zones Annunciator with UDACT-F ² (P) = 198 Points (PU) = 198 Points Annunciator with UDACT-F ²
A/U = Annunciators with or without UDACT-F	(N)one	L = LCD-40 Series installed (requires DIM-485) P = Printer or local PC installed (requires PIM-24)
L/P = LCD-40 or Printer/PC in use	(N)one	(6) = Style 6
S = SLC loop style	(4) = Style 4	(Y)es = Sound onboard piezo every 15 seconds during alarm and every two minutes during trouble after acknowledge or silence key has been pressed.
R = Alarm/Trbl Reminder	(N)o	

¹Requires prior approval of Local Authority Having Jurisdiction.

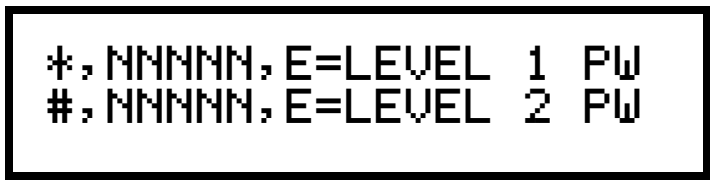
²When the UDACT-F has a fault, this entry allows the FACP to display 'DACT Trouble' on the LCD display and printer hardcopy. The history file will also be updated with this information. For zone annunciation, up to 56 zones, use AFM Series Annunciators or LDM Series Annunciators. For 198 point annunciation,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

3.3.5 Password Change

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

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

Pressing '4' will display the following:



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

the program change screen. If BACKSPACE is entered, the password remains unchanged and the program returns to the program change screen.

3.3.6 Load

While displaying the Program Menu, program selection '5' sets up the MS-9200 for transfer of its application data-base from/to a DOS-based or Window-based computer. This may be used to save the program that exists in an MS-9200 for security and future service reasons; or may be used to transfer a program created off-line to the MS-9200. Refer to the PK-9200(W) Manual for additional information. When the Load option is selected, the following screen will be displayed:

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

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



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

1. *Print out all programmed data or manually view programmed entries and compare to intended program data.*
2. *Test all affected panel operations.*
3. *Immediately correct any problems found.*

3.4 Program Change - Level 2

While the MS-9200 system is normal with no active alarms, troubles or supervisories, the screen shown below will be displayed:

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

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

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

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

```
KEY PASSWORD, ENTER
```

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

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

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

3.4.1 Disable

Pressing '1' displays the following screen:

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

Press the * key to display detectors, the # key to display modules, followed by the device address, then the ENTER key. A typical display is shown below:

```
ENABLE SMOKE DET P01  
NORTH BASEMENT Z01
```

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

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

3.4.2 Clear History

Pressing '2' displays the following screen:

```
ENTER TO CLEAR HIST.  
BACKSPACE TO ESCAPE
```

Press the ENTER key to clear the 500-event History file. Press the left arrow key (backspace) to exit without clearing the History file. *Caution: Pressing Enter will clear all History events associated with this panel. Care should be taken to ensure this is the appropriate action.*

3.4.3 Walktest

If '3' is pressed, followed by ENTER, the following is displayed:

```
WALK TEST 1-SILENT  
2-PULSE SOUNDERS
```

Press '1' to perform a silent walktest with all sounding devices, control modules and the NAC 1 and NAC 2 outputs OFF. Select '2' to perform an audible walktest which sounds all silenceable control modules and NAC 1 and NAC 2 (if programmed as 'BELL_CKT' as explained in "Point Edit" on page 60) output during walktest. Disabled NAC outputs will not activate during walktest. Each alarm and trouble condition (short and open) will be printed in real-time and stored in the 500 event history buffer. After pressing either '1' or '2', the screen shown below will appear:

```
ENTER START WALKTEST  
BACKSPACE TO STOP
```

If ENTER is pressed, the second line goes blank and the unit is in Walktest mode. Walktest may be stopped at any time by pressing the left arrow key (backspace), returning the unit to the main screen. A one hour time-out automatically returns the system to normal operation.

Shorted/Alarm Condition

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

Note that if the system under test includes one or more enabled M302 monitor modules, the following may apply:

If the M302 monitor module is used for a supervised, 2-wire smoke zone, alarming any monitor module in the system will result in the activation of programmed control outputs for an additional eight seconds or less. This is caused by the temporary removal of 24 VDC resettable power from the M302. The M302 reports this loss of power as an open condition in addition to the alarm condition.

Open Condition

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

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



ENTER START WALKTEST

3.4.4 Set Time and Date

If '4' is pressed, the following is displayed:



CHANGE TIME/DATE
10:00A MON 03/02/98

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

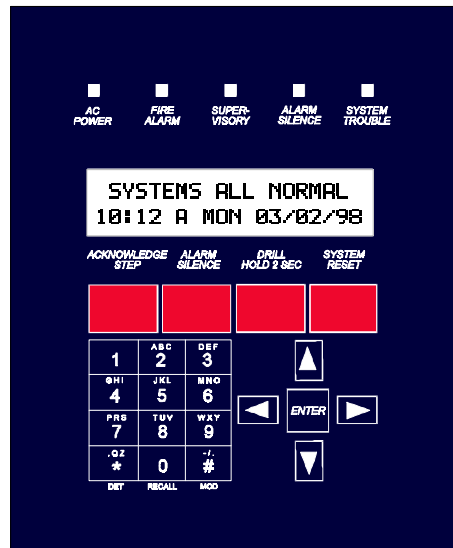
3.4.5 Programming Check

Program selection '5' performs a check on software zone assignments. The MS-9200 looks for output devices assigned to a software zone that does not contain any input devices (detectors, monitor modules). If multiple devices fail the check, the up and down arrow keys are used to step through the list of devices. The user *must* return to point editing to correct any errors.

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

At the completion of system programming, switch SW1 (Write Protect) should be set to the Write Protect position to prevent inadvertent changes to programmed features. Slide the switch to the up position to select the Write Protect feature. Refer to Figure 2-28, "Option Module Locations," on page 46, for the location of SW1.

CHAPTER 4

Operating Instructions

4.1 Control Switches (Keys)

4.1.1 Acknowledge/Step

The Acknowledge/Step key silences the piezo sounder and changes all flashing LEDs to steady. Only one press is necessary regardless of the number of new alarms, troubles or supervisory signals. When the piezo is silenced, an 'Acknowledge' message is sent to the printer and the history file. Multiple active events are scrolled on the display at a three second rate. Acknowledge also automatically sends a 'Silence Piezo' command to the LCD-40, AFM and LDM Series annunciators.

When more than one event exists, the first press of the Acknowledge/Step key silences the piezo and changes all flashing LEDs to steady. The second press of the key stops the scrolling and holds the event on the display for one minute. Subsequent pressing of the key 'steps' through each active event.

4.1.2 Alarm Silence

The Alarm Silence key performs the same functions as Acknowledge/Step. In addition, if an alarm exists, it turns off all silenceable circuits and causes the Alarm Silence LED to turn on. It also sends an 'Alarm Silenced' message to the printer, the history file and the LCD-40. A subsequent new alarm will resound the system.

4.1.3 Drill Hold 2 Sec.

When the Drill key is held for two seconds (time required to prevent accidental activations), the MS-9200 turns on both main panel NAC outputs and all silenceable circuits (all control modules/NACs that are programmed silenceable) and turns off the Alarm Silence LED. The 'Manual Evacuate' message is shown on the LCD display. The same message is sent to the printer and history file. The Silence key operates on *silenceable* NAC outputs only.

4.1.4 System Reset

Pressing the System Reset key turns off all control modules and NACs, temporarily turns off resettable power to 4-wire detectors, causes an 'All Systems Normal' message to be displayed on the LCD and stores 'System Reset' in the

printer and history file. It also turns on all LEDs, piezo sounder and LCD display segments as long as the System Reset Key is held (lamp test). Any alarm or trouble that exists after System Reset will resound the system.

4.2 LED Indicators

The six LED indicators on the front panel operate as follows:

AC Power

This is a green LED which illuminates if 240 VAC power is applied to the system.

Fire Alarm

This is a red LED that flashes when one or more alarms occur. It illuminates steady when the Acknowledge/Step or Alarm Silence key is pressed. The Alarm LED turns off when the System Reset key is pressed.

Supervisory

This is a yellow LED that flashes when one or more supervisory conditions occur, such as a sprinkler valve tamper condition. It illuminates steady when the Acknowledge/Step or Alarm Silence key is pressed. It turns off when System Reset is pressed.

Alarm Silence

This is a yellow LED that turns on after the Alarm Silence key is pressed (preceded by a fire alarm condition). It turns off when the Drill or System Reset key is pressed.

System Trouble

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

4.3 Normal Operation

With no alarms or troubles in the system, the display message is 'Systems All Normal' along with the current time and date as shown below. To set the time and date, see "Set Time and Date" on page 66.



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

The MS-9200 performs the following functions at regular intervals while in normal mode:

- ✓ Polls all devices on SLC loop. Checks for valid reply, alarms, troubles, etc.
- ✓ Monitors AC input voltage and battery capacity
- ✓ Refreshes LCD display and updates time
- ✓ Scans keyboard
- ✓ Performs detector auto test
- ✓ Tests memory
- ✓ Update/Reads EIA-485 communications bus

4.4 Trouble Operation

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

Addressable Smoke Detectors

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



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

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

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

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

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

TABLE 4-1: Specific Device Troubles for a Detector

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

Monitor and Control Modules

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



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

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

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

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

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

TABLE 4-2: Specific Device Troubles for a Module

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

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

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

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

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

If multiple trouble conditions exist in the system, they will be scrolled on the LCD display automatically at a three second rate. *If a combination of alarms, troubles and/or supervisory conditions occur in the system simultaneously, only the alarms are scrolled on the display.* If the Acknowledge/Step key is pressed, the display stops on the present

item for one minute or until the Acknowledge/Step key is pressed again. As the Acknowledge/Step key is pressed, the MS-9200 displays events in the following priority order:


1. Alarms in address order
2. Supervisories in address order
3. Troubles in address order

4.5 Alarm Operation

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

- The piezo sounder produces a steady output, not pulsed
- The System Alarm (not Trouble) LED flashes
- ALARM: device name, type and address are displayed
- Alarms latch and *are not allowed to clear automatically*
- Alarms activate software zones (control-by-event logic) if so programmed
- Timers (Silence Inhibit, Autosilence, Trouble Reminder) are started
- Alarms activate the general alarm relay and zone Z00 (NAC 1 and NAC 2)
- The trouble relay is not activated

A typical alarm display would be:



```
ALARM: PULL STATION M02
<ADJ> <NOUN> ZNN
```

4.6 Supervisory Operation

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

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

A typical Supervisory event would display:



```
ACTIVE TAMPER M02
<ADJ> <NOUN> ZNN
```

Note that, like alarms, supervisory signals latch (except when programmed for supervisory autoresettable) and can be assigned to a software zone. Supervisory alarms do not cause resound as do other alarm conditions. Open circuits in supervisory wiring are processed by the MS-9200 the same way as other trouble conditions.

4.7 NAC (Notification Appliance Circuit) Operation

There are two NACs on the MS-9200. For software releases prior to P/N 73750, NAC 1 is programmable and factory defaulted to general alarm, silenceable and March Time coding operation. NAC 2 is not programmable and is fixed as general alarm, nonsilenceable and may not perform coded functions.

For software releases 73750 or greater, both NAC 1 and NAC 2 are programmable. Both NACs may be either silenceable or nonsilenceable and may be programmed as steady or coded operations. Coded operation includes March Time, Temporal or California types. Refer to “Coded Operation - NAC 1 and NAC 2” on page 73, for additional information on coding.

4.8 Control-By-Event Operation

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

When an input device (detector, M300 series modules) alarms and is not disabled, it activates all software zones assigned to it. An output device (control module or NAC) that is not disabled is turned on when any of the software zones, to which it is mapped, become active.

4.9 Detector Functions

Maintenance Alert

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

Automatic Test Operation

An automatic test of each detector is performed every two hours. The detector's sensing chamber and electronics are functionally tested for normal, safe operation. A trouble message is displayed upon failure of this test. System Reset clears this trouble.

Type Code Supervision

The MS-9200 monitors hardware device type codes (CP300, SD300, SD300T, M300, M301, M302 and C304) at slow intervals. Mismatch of any type code compared to the system program will cause a device trouble.

System Alarm Verification

The panel may be programmed to perform alarm verification. Alarm verification applies to detectors only. Refer to “Alarm Verification (None or Two Minutes)” on page 74, for a description of the Alarm Verification Timer.

4.10 Time Functions: Real-Time Clock

The MS-9200 includes a crystal-based clock that provides time of day, date and day of week. Time is displayed as 12 hour time with month/day/year and is stored in RAM. If both AC and battery power are lost, the time must be reset.

4.11 Coded Operation - NAC 1 and NAC 2

Shown below are the pulse rate outputs via NAC 1 or NAC 2 when coded operation is selected. Note that software releases prior to P/N 73750 allow coding of only NAC 1. Releases 73750 or greater allow coded functions on both NAC 1 and NAC 2.

CONTINUOUS: No Pulse

MARCH TIME: Pulses at 120 ppm (pulses per minute)

TEMPORAL CODE: Pulses at ½ second On, ½ second Off, ½ second On, ½ second Off, ½ second On, 1½ seconds Off

CALIFORNIA CODE: 10 seconds On, 5 seconds Off

4.12 Presignal

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

4.13 Special System Timers

4.13.1 Silence Inhibit Timer (None or 60 Seconds)

This option, if selected, prevents the Alarm Silence key from functioning for 60 seconds after an alarm. A new alarm during the initial 60 seconds will cause the timer to restart with a new 60 seconds. *Silence Inhibit operation requires the approval of the local Authority Having Jurisdiction.*

4.13.2 Auto-silence Timer (None or 10 Minutes)

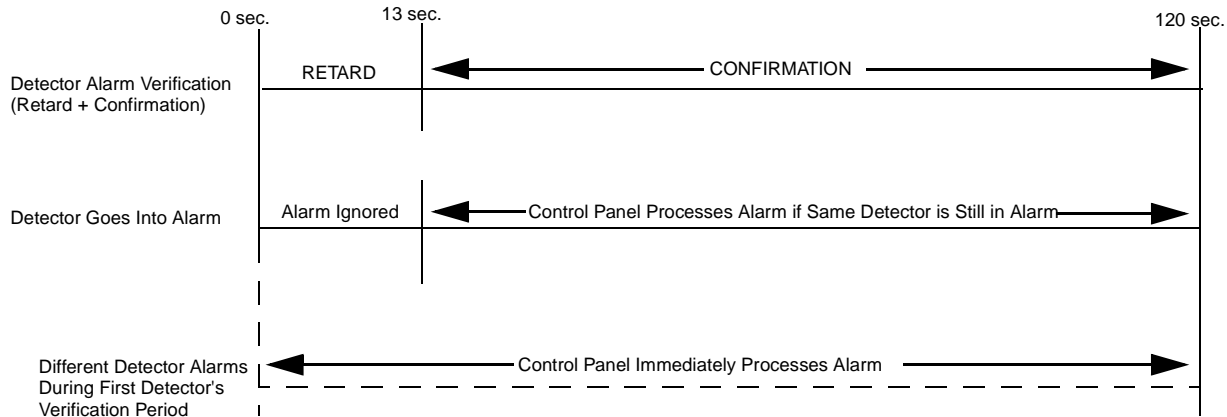
If Auto-silence is selected, the notification appliances will be silenced automatically after ten minutes of activation. Pressing the Drill key will restart the timer with a new 10 minutes. *Auto-silence operation requires the approval of the local Authority Having Jurisdiction.*

4.13.3 Trouble Reminder

If selected, this feature causes a reminding 'beep' every 15 seconds during an alarm (after the Silence key is pressed) and every two minutes during a trouble condition (after the Acknowledge or Silence key is pressed). The 'beeps' from the onboard piezo sounder will occur until the alarm or fault is cleared.

4.13.4 Alarm Verification (None or Two Minutes)

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



4.13.5 Waterflow Circuits Operation

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

4.13.6 Disable/Enable Operation

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

4.14 Style 6 Wiring

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

4.15 Read Status

Read Status functions do not require a password. The MS-9200 will continue to provide fire protection while in Read Status mode. Read Status may be entered while the control panel is in alarm or trouble. If a new alarm or trouble occurs during these functions, the Read Status is exited to prevent confusion.

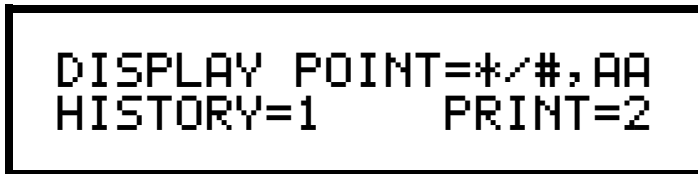
Read Status Entry

The operator presses the Enter key and the LCD display shows:



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

The operator presses '2' and the display shows:



```
DISPLAY POINT=*/#, AA
HISTORY=1 PRINT=2
```

From the display shown above, an operator may select one of the choices as listed below:

- To Display Point Status, the type of device to be read must first be identified by pressing the * key for a detector or the # key for a module. The two-digit device address is keyed in next, followed by the Enter key
- To Display Zone status, press the * key then press the * key a second time. Next, key-in the zone number (1 - 56) and press Enter. The Up and Down arrow keys are used to view the next or previous zone
- To Display System Parameters, press the * key then press the * key again followed by Enter
- To Display Bell Circuit status, press the * key, followed by the # key and then the digit '1' or '2', followed by the Enter key
- To display the 500-event History file on the LCD, press the '1' key followed by the Enter key. The Up and Down arrow keys are used to step through the entries in the file
- To Print Program Contents and Current System Status or History File, press the '2' and then the Enter key. A new menu appears which prompts the user to press '1' to print Program/Status or '2' to print History file

During this and all subsequent operations except print operations, a two minute timer is started that will cause the panel to return to the previous display if no key is pressed within two minutes. Each key press restarts the two minute timer. A press of the left arrow (backspace) key deletes the previous entry. If there is no entry, it will cancel the Read Status operation and return to the previous display. System Reset will also cancel the Read Status operation.

Display Point

Display Point operations display *addressable device status* on the LCD display. After the status of the device is displayed, the Up arrow key may be used to display the status of the next highest addressable device and the Down arrow key may be used to display the status of the previous addressable device. The sequence of point display is Detector points 01 - 99, Module points 01 - 99, NAC bell circuits 01 & 02, System Parameters and Zones 1 - 56.

A typical Read Status display is as follows:



```
NORMAL SMOKE DET P01
WEST HALLWAY 256
```

In the preceding display:

- ✓ **NORMAL** is the present status (could be ALARM, TRBL_#, DISABL, etc.)
- ✓ **SMOKE (DET)** is the device type **P** indicates that this is a photoelectric detector (could be **I** if ionization or PULL BOX, HORN CKT, etc.) and **01** is the device address
- ✓ **WEST HALLWAY** is the custom label programmed for this device
- ✓ **Z56** is the assigned software zone

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

Read History

The MS-9200 has a 500-event history buffer. Stored events include Point Status, System Troubles, and Acknowledge/Step, Alarm Silence, Drill and System Reset key presses. All events are recorded with the time and date. History events are stored in volatile memory, therefore, removal of primary AC power and secondary battery power will clear the history buffer. To clear the History file without removing power, see "Clear History" on page 65. To view events in the history file, use the Up and Down arrow keys to step through the events.

Print Program

All user programmed options, including device types, software zone assignments and system parameters, may be printed. The printout also includes current system status. See "Printer/PC Interface Module" on page 52, for instructions on connecting a printer.

Print History

The entire 500-event history file may be printed using the Print History feature. Refer to "Printer/PC Interface Module" on page 52, for instructions on connecting a printer.

Appendix A *Power Supply Calculations*

A.1 The AC Branch Circuit

The MS-9200 requires connection to a separate dedicated 240 VAC branch circuit, which must be labeled Fire Alarm. The branch circuit must connect to the line side of the main power feed of the protected premises. No other equipment may be powered from the fire alarm branch circuit. The branch circuit wire must run continuously, without any disconnect devices, from the power source to the fire alarm control panel. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Code as well as local codes. Use #14 AWG (2.00 mm²) wire with 600 volt insulation for this branch circuit.

Use Table A-1 to determine the total amount of current, in AC amps, that must be supplied to the fire alarm system.

TABLE A-1: AC Branch Circuit Requirements @ 240VAC

Unit Type	Number of Units		Current Draw (amps)		Total Current per Device
MS-9200E	1	X	1.2	=	1.2
R45-24E Charger*	[]	X	0.5	=	
CHG-120F Charger	[]	X	2.0	=	
Total AC Branch Current Required				=	amps

*Discontinued and replaced with CHG-120F effective November 1, 1998.

A.2 The Main Power Supply

The MS-9200 provides filtered power for operating the fire alarm control panel, operating external devices and operating the standby battery. The power for operating external devices is limited. Use Table A-2 (standby or nonalarm) and Table A-3 (alarm) to determine if external loading is within the capabilities of the MS-9200 power supply.

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

TABLE A-2: Filtered Load in Standby - External Devices Connected to TB4 Only

Device Type	# of Devices		Standby Current (amps)	=	Total Current (amps)
Main Circuit Board	1	X	0.08	=	0.08
RTM-8F	[] one max.	X	0.009	=	
ACM-8RF	[]	X	0.030	=	
AFM-16ATX AFM-32AX	[] one max.	X	0.04	=	
AEM-16ATF AEM-32AF	[]	X	0.002	=	
AFM-16ATF AFM-32AF	[]	X	0.04	=	
AFM-16AF	[]	X	0.025	=	
UDACT-F	[] one max.	X	0.04	=	
LDM-32F	[]	X	0.04	=	
LDM-E32F	[]	X	0.002	=	
LCD-40 Series	[]	X	0.054	=	
4-Wire Smoke Detector	[]	X	[]	=	
Power Supervision Relay	[]	X	0.025	=	
CP300	[]	X	0.00015	=	
SD300	[]	X	0.00015	=	
SD300T	[]	X	0.0002	=	
M300	[]	X	0.0002	=	
M301	[]	X	0.0002	=	
M302	[]	X	0.007	=	
BG-10LX	[]	X	0.0002	=	
C304	[]	X	0.0002	=	
I300	[]	X	0.0004	=	
Auxiliary Devices Powered from TB4	[]	X	[]	=	
Sum Column for Standby Load				=	

Notes:

1. TB4, Terminals 1 & 2; nonregulated 24 VDC, 2.5 amps
2. TB4, Terminals 3 & 4; filtered 24 VDC +/-5% 120Hz ripple @ 10 mV_{RMS}
3. TB4, Terminals 5 & 6; filtered 24 VDC +/-5% 120Hz ripple @ 10 mV_{RMS}
4. TB4, Terminals 3 & 4; nonresettable auxiliary power, 300 mA
5. TB4, Terminals 5 & 6; resettable smoke detector power, 300 mA
6. Refer to Current Limitations on following page

TABLE A-3: Filtered Load in Alarm - External Devices Connected to TB2 & TB4 Only

Device Type	# of Devices		Alarm Current (amps)	=	Total Current ¹ (amps)
Main Circuit Board	1	X	0.168	=	0.168
RTM-8F	[] one max.	X	0.146 ²	=	
ACM-8RF	[]	X	0.158 ³	=	
AFM-16ATX AFM-32AX	[] one max.	X	0.056 ⁴	=	
AEM-16ATF AEM-32AF	[]	X	0.018 ⁴	=	
AFM-16ATF AFM-32AF	[]	X	0.056 ⁴	=	
AFM-16AF	[]	X	0.065 ⁴	=	
UDACT-F	[] one max.	X	0.075 ⁵	=	
LDM-32F	[]	X	0.056 ⁶	=	
LDM-E32F	[]	X	0.018	=	
LCD-40 Series	[]	X	0.054	=	
4-Wire Smoke Detector	[]	X	[]	=	
Power Supervision Relay	[]	X	[]	=	
Addressable Devices	maximum draw for all devices	X	0.2 ⁷	=	0.2
Notification Appliances	[]	X	[]	=	
Auxiliary Devices Powered from TB4	[]	X	[]	=	
Sum Column for Alarm Load				=	amps⁸

1. Current limitations of terminals:
 TB4, Terminals 1 & 2 = 2.5 amps
 TB4, Terminals 3 & 4 = 0.3 amps
 TB4, Terminals 5 & 6 = 0.3 amps
 TB1 and TB2, any one circuit = 2.5 amps
 Total current draw from all terminals cannot exceed 3.6 amps with standard 4000TAE transformer installed; 6.0 amps with both standard 4000TAE transformer and optional XRM-24E transformer installed. Note that total current from TB4, Terminals 3 & 4 and 5 & 6 must not exceed 0.600 amps.
2. All RTM-8F Relays activated
3. All eight ACM-8RF Relays activated on a single module
4. All annunciator LEDs on
5. UDACT-F actively making phone call to Central Station. If the normally open contact is used, current consumption increases to 100 mA
6. LDM-32F with LEDs on
7. M302 Monitor Module current-limited at 90 mA in alarm
8. This column must not exceed total system current draw of 6.6 amps

TABLE A-4: Battery Calculations

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

Notes:

1. Up to 7 AH batteries can be located in the older MS-9200 backbox, up to 12 AH batteries can be located in the newer MS-9200 backbox
2. 12 AH (older backbox) to 18 AH (older and newer backbox) batteries require the Fire•Lite BB-17F battery box
3. When new MS-9200 main circuit board is installed (allows disabling of FACP battery charger), the CHG-120F Battery Charger for 25 AH to 100 AH batteries (requires separate housing)

Appendix B

Software Zones

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

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

Setup of an MS-9200 software zone is straightforward. Any zone may have a minimum of one and a maximum of 99 addressable input devices. Each detector is automatically assigned to a general alarm output. A zone may also have a minimum of one and a maximum of 99 addressable output devices.

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

In the example on the following page:

- Zone 1 has the following addressable devices assigned to it:
 - ✓ SD300 photoelectric detectors with addresses '01' and '02'
 - ✓ M300 monitor module with address '01'
 - ✓ C304 control modules with addresses '03', '04' and '05'
- Zone 2 has the following addressable devices assigned to it:
 - ✓ CP300 ionization detectors with addresses '03' and '04'
 - ✓ M301 monitor module with address '02'
 - ✓ C304 control modules with addresses '03', '06' and '07'
- Zone 3 has the following addressable devices assigned to it:
 - ✓ SD300 photoelectric detectors with addresses '05' and '06'
 - ✓ CP300 ionization detector with address '07'
 - ✓ C304 control modules with addresses '03', '08' and '09'

The example points out some of the key assignment features of the MS-9200. Addresses of detectors are not duplicated. Addresses of monitor and control modules are not duplicated. The control module at address '03' is assigned to the maximum three software zones (providing for floor above and floor below). Detectors and monitor modules are assigned to one software zone.

Be careful to properly plan the installation prior to installing any devices.

Correlation of Inputs and Outputs to Zones

FIGURE B-1: Zoning Example

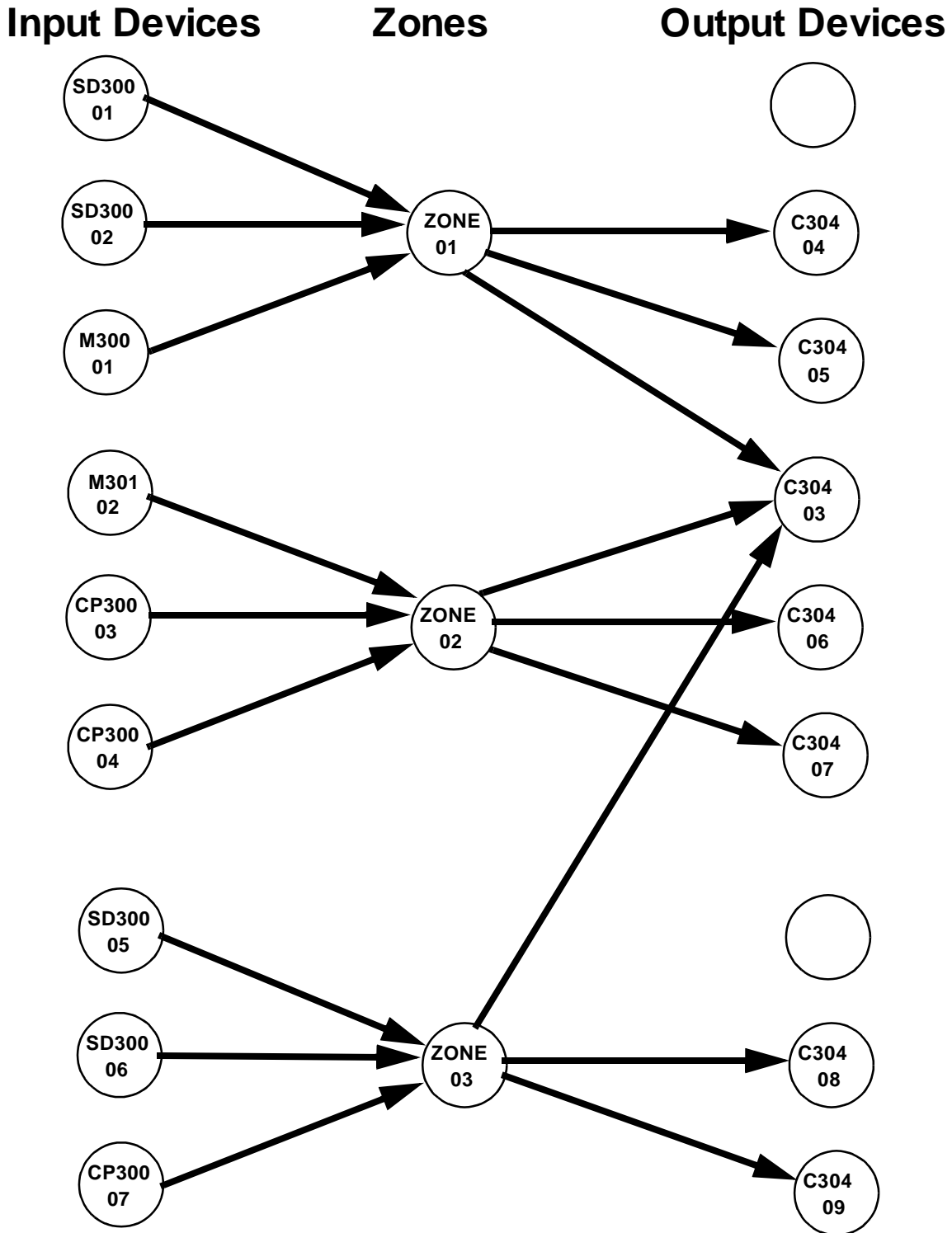


TABLE B-1: Detector Programming Sheet Example

DETECTOR ZONE ASSIGNMENT							
Address	Device Type	Zone Number	ADJ (5 charact. max) NOUN (9 charact. max)	Address	Device Type	Zone Number	ADJ (5 charact. max) NOUN (9 charact. max)
01	SD300	1	FIRST HALL	51			
02	SD300	1	ELEV. LOBBY	52			
03	CP300	2	2ND FLOOR	53			
04	CP300	2	ROOM 210	54			
05	SD300	3	3RD FLOOR	55			
06	SD300	3	MEZZANINE	56			
07	CP300	3	MECH. ROOM	57			
08				58			
09				59			
10				60			
11				61			
12				62			
13				63			
14				64			
15				65			
16				66			
17				67			
18				68			
19				69			
20				70			
21				71			
22				72			
23				73			
24				74			
25				75			
26				76			
27				77			
28				78			
29				79			
30				80			
31				81			
32				82			
33				83			
34				84			
35				85			
36				86			
37				87			
38				88			
39				89			
40				90			
41				91			
42				92			
43				93			
44				94			
45				95			
46				96			
47				97			
48				98			
49				99			
50							

TABLE B-2: Module Programming Sheet Example

MONITOR/CONTROL MODULE ZONE ASSIGNMENT							
Address	Device Type	Zone Number	ADJ (5 charact. max) NOUN (9 charact. max)	Address	Device Type	Zone Number	ADJ (5 charact. max) NOUN (9 charact. max)
01	M300	1	WEST HALL	51			
02	M301	2	EAST STAIRWELL	52			
03	C304	1, 2, 3	2ND FLOOR	53			
04	C304	1	1ST FLOOR	54			
05	C304	1	EAST HALL	55			
06	C304	2	ELEV. LOBBY	56			
07	C304	2	MEZZANINE	57			
08	C304	3	3RD FLOOR	58			
09	C304	3	MECH. ROOM	59			
10				60			
11				61			
12				62			
13				63			
14				64			
15				65			
16				66			
17				67			
18				68			
19				69			
20				70			
21				71			
22				72			
23				73			
24				74			
25				75			
26				76			
27				77			
28				78			
29				79			
30				80			
31				81			
32				82			
33				83			
34				84			
35				85			
36				86			
37				87			
38				88			
39				89			
40				90			
41				91			
42				92			
43				93			
44				94			
45				95			
46				96			
47				97			
48				98			
49				99			
50							

FIGURE B-2: Blank Zoning Sheet

Input Devices

Zones

Output Devices

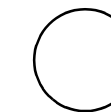
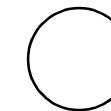
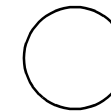
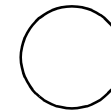
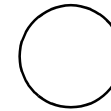
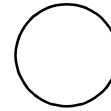
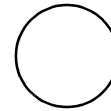
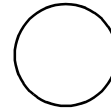
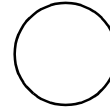
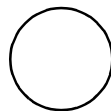
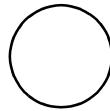
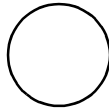
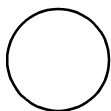
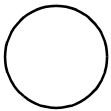
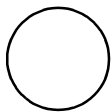
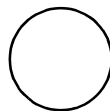
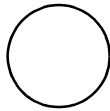
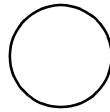
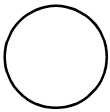
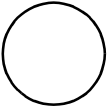
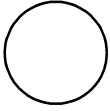


TABLE B-3: Blank Detector Programming Sheet

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

TABLE B-4: Blank Module Programming Sheet

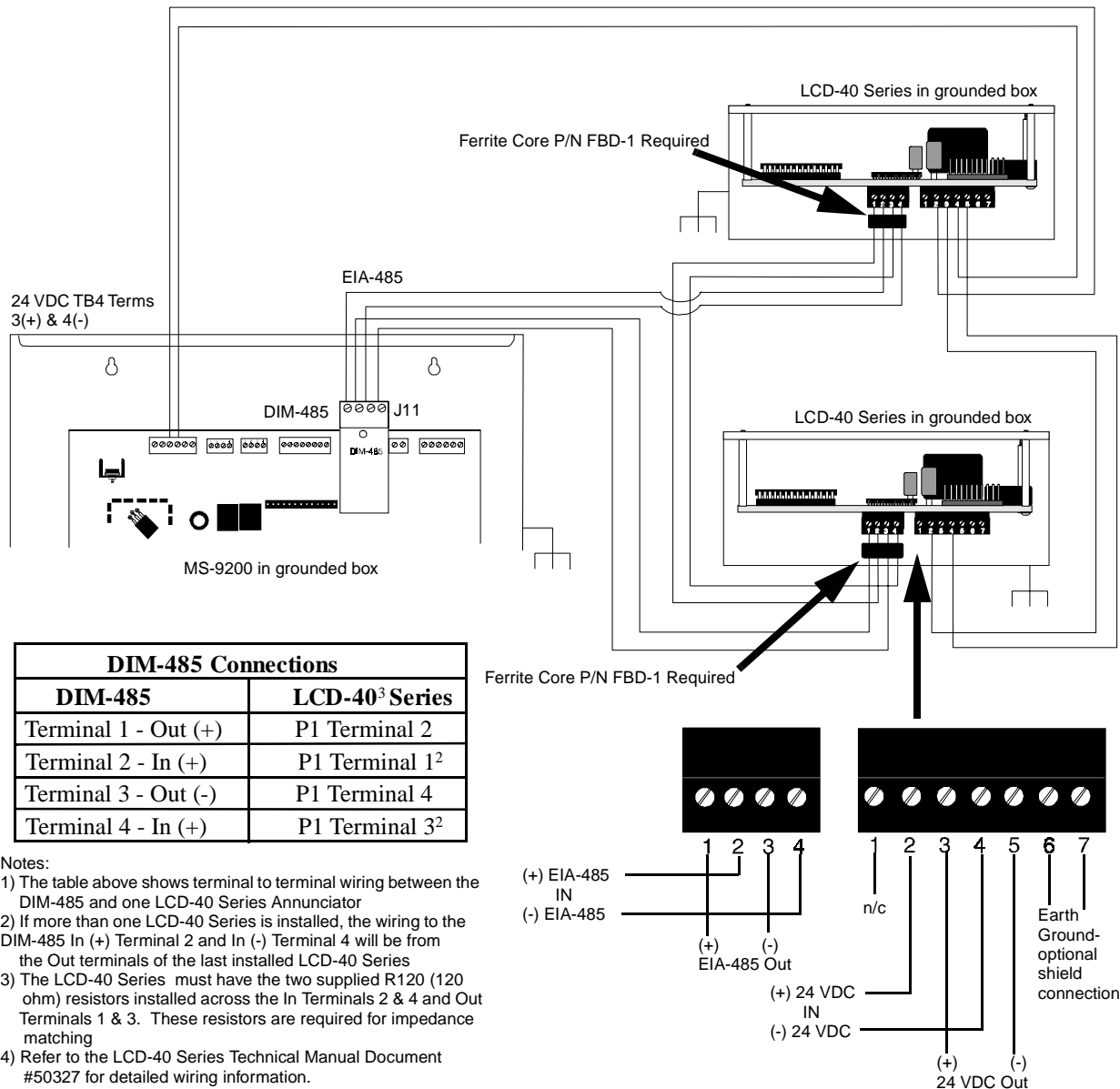
MONITOR/CONTROL MODULE ZONE ASSIGNMENT							
Address	Device Type	Zone Number	ADJ (5 charact. max) NOUN (9 charact. max)	Address	Device Type	Zone Number	ADJ (5 charact. max) NOUN (9 charact. max)
01				51			
02				52			
03				53			
04				54			
05				55			
06				56			
07				57			
08				58			
09				59			
10				60			
11				61			
12				62			
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30				80			
31				81			
32				82			
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41				91			
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43				93			
44				94			
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47				97			
48				98			
49				99			
50							

Appendix C *LCD-40 Series Annunciator Wiring*

The following drawing illustrates the wiring of two LCD-40 Series Remote Annunciators to an MS-9200 FACP. A maximum of 32 LCD-40 Series annunciators may be connected to a single control panel. The EIA-485 wiring must pass through a ferrite core (P/N FBD-1) in each LCD-40 Series. The illustration shows power supplied to the annunciators by the MS-9200. For system applications requiring greater than the 300 mA of nonresettable power the MS-9200 can supply or for remote locations, use the Fire•Lite FCPS-24FE Field Charger Power Supply.

The DIM-485 interface module is required when using the LCD-40 Series. Insert the plastic standoff, supplied with the DIM-485, into the hole located near the J11 connector on the top right side of the MS-9200 main circuit board. Note that older MS-9200 circuit boards do not have a hole near J11, thus preventing the insertion of the standoff. Align the connector on the DIM-485 board with J11 on the MS-9200 main circuit board and align the hole on the DIM-485 with the standoff inserted into the main circuit board. Carefully seat the DIM-485 connector on the main circuit board J11 connector and press to seat the DIM-485 on the standoff.

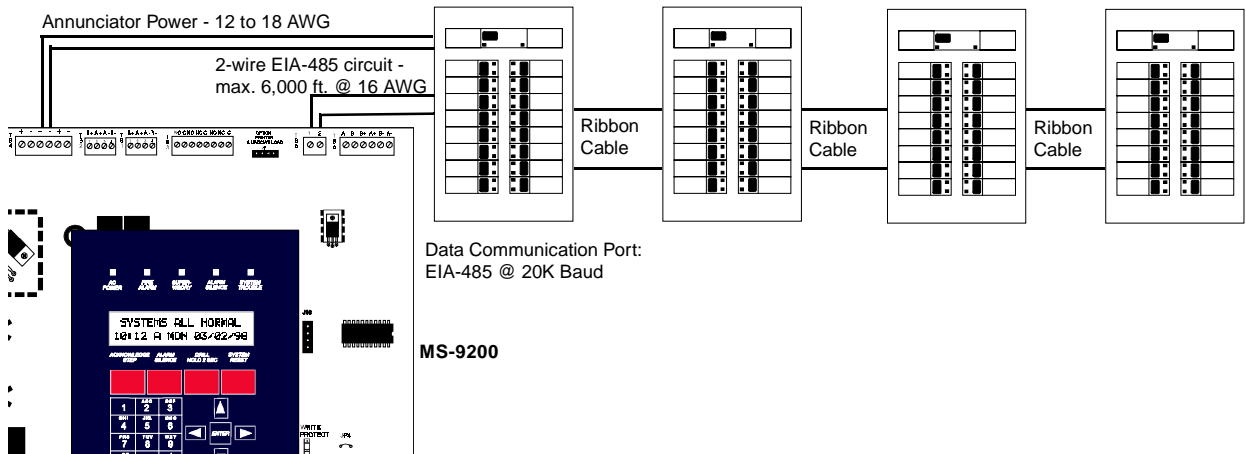
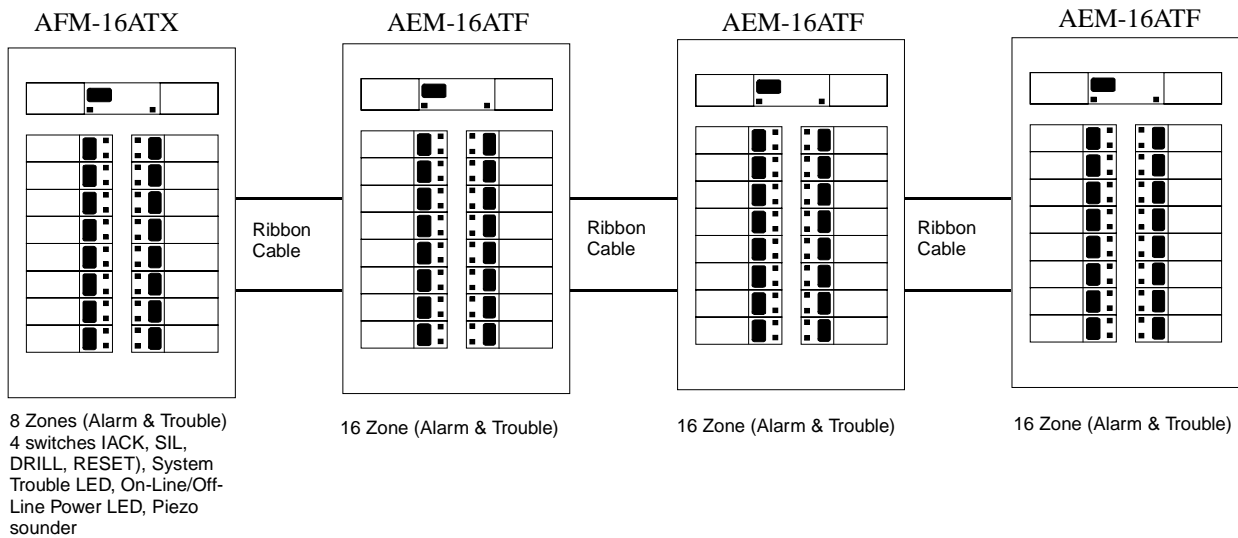
FIGURE C-1: LCD-40 Series Wiring



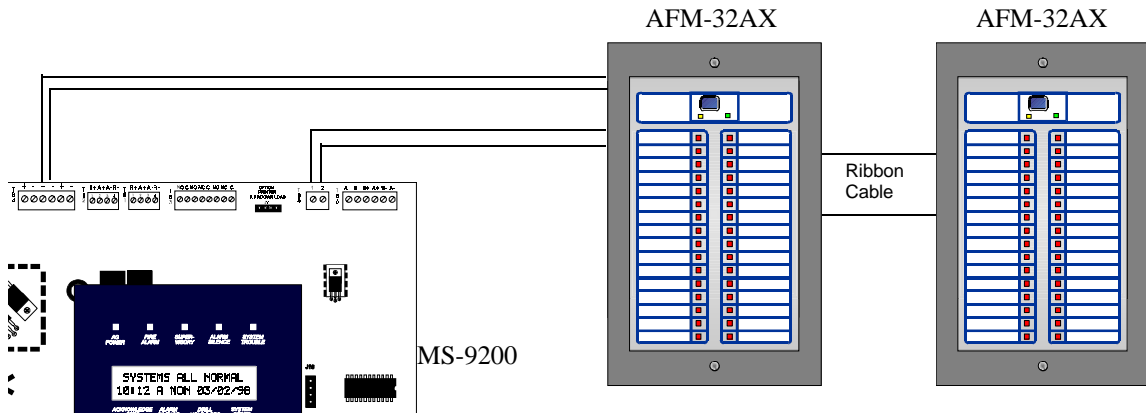
Appendix D *AFM and LDM Series Wiring*

The following illustrations show the various configurations which may be wired utilizing AFM Series Annunciators. LDM Series Annunciators may be used in a similar manner. All illustrations show power supplied to annunciators by the MS-9200. For system applications requiring greater than the 300 mA of nonresettable power the MS-9200 can supply, use the Fire•Lite FCPS-24FE Field Charger Power Supply.

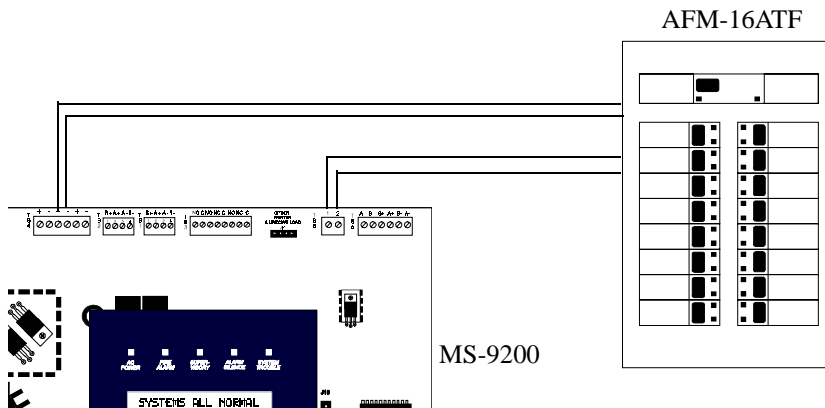
The following figure shows a configuration which provides 56 zones of alarm and trouble indications, remote Acknowledge/Step, Alarm Silence, Drill and System Reset keys, System Supervisory, AC Fail, and Trouble indications. Use AKS-1F keyswitch to prevent unauthorized actuation of control switches. Refer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



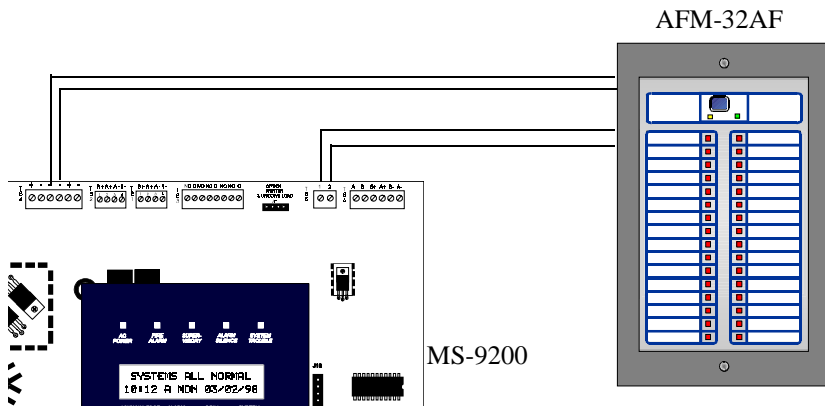
The following configuration provides 56 zones of alarm indication, a System Trouble LED, an On Line/Power LED, local piezo sounder and a local Silence/Acknowledge switch.



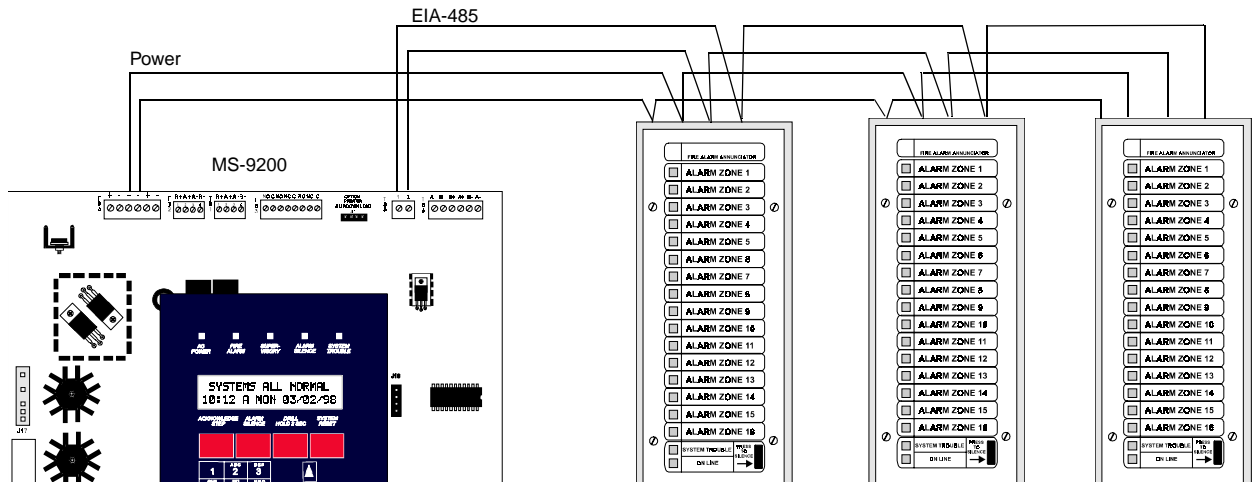
The following configuration provides 16 alarm and trouble LEDs, System Trouble LED, On Line/Power LED, local Silence/Acknowledge, Drill and Reset remote switches and piezo sounder. Only one per system.



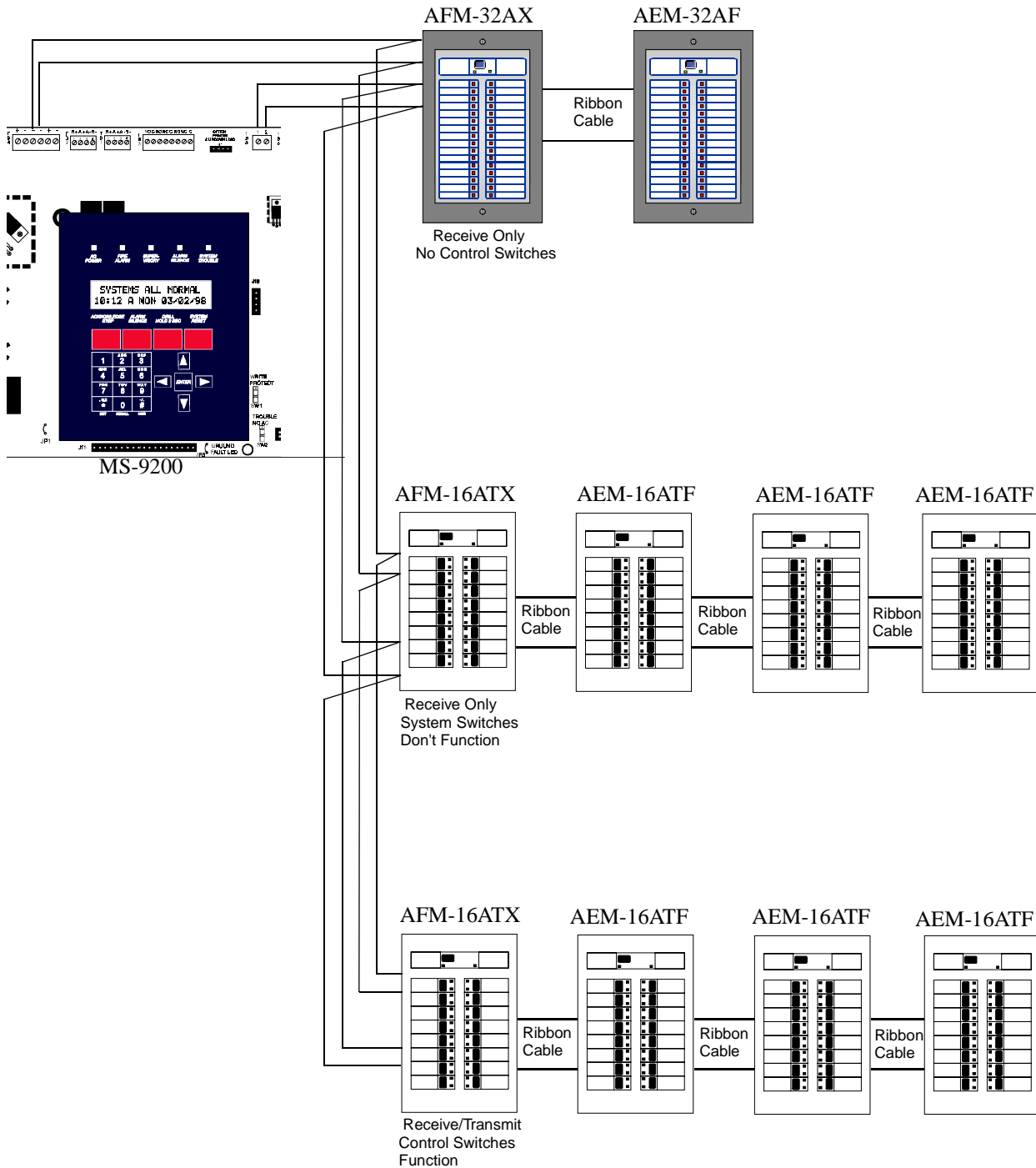
The following configuration provides 32 alarm LEDs, On Line/Power LED, System Trouble LED and local Silence/Acknowledge switch. Only one per system.



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



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



Appendix E *NFPA Standard-Specific Requirements*

The Fire•Lite MS-9200 has been designed for use in commercial, industrial and institutional applications and meets the requirements for service under the National Fire Protection Association (NFPA) Standards outlined in this Appendix. The minimum system components required for compliance with the appropriate NFPA standard are listed below:

MS-9200 Control Panel

Contains the main control board, cabinet (backbox and door), main power supply transformer and power supply.

Batteries

Refer to “Power Supply Calculations” on page 77, for Standby Power Requirements.

Initiating Devices

Connected to one of the control panel's Initiating Device Circuits.

Notification Appliances

Connected to the control panel's Notification Appliance Circuit via a control module.

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

NFPA 72 National Fire Alarm Standards for:

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

MS-5012 for connection to a compatible listed Central Station DACR or Protected Premises Receiving Unit. This unit must be installed as outlined in Figure E-1, “Central Station Service Using MS-5012,” on page 94.

OR

UDACT-F may be installed as illustrated in Figure 2-31, “UDACT-F Mounting to MS-9200,” on page 47 and Figure 2-32, “External UDACT-F Mounting in ABS-8RF,” on page 48.

OR

411-UD may be installed as illustrated in Figure E-2, “Fire•Lite MS-9200E Connection to 411-UD,” on page 95.

NFPA 72 Auxiliary Fire Alarm System

RTM-8F Relay/Transmitter Module for connection to a compatible listed Local Energy Municipal Box. This unit must be installed as outlined in Figure E-3, “Municipal Box Connected to RTM-8F Relay Transmitter Module,” on page 96.

NFPA 72 Remote Station Fire Alarm System

RTM-8F Relay/Transmitter Module for connection to the Fire•Lite RS82 Remote Station Receiver. See Figure E-4, “Remote Station Connection Using RTM-8F Module,” on page 97, for installation instructions for this unit.

NFPA 72 Proprietary Fire Alarm System

MS-9200 Alarm, Trouble and Supervisory contacts connected to Transmitter(s). See Figure E-5, “Proprietary Protective Signaling System,” on page 98, for installation instructions for this unit.

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

The following figure illustrates an example of Central Station/Remote Station Reporting using an MS-5012. The relay contacts from the MS-9200 may be used to trip any dialer UL listed for Central Station/Remote Station Services. The UDACT-F may also be used. Refer to Figure 2-31, “UDACT-F Mounting to MS-9200,” on page 47 and Figure 2-32, “External UDACT-F Mounting in ABS-8RF,” on page 48, for information on installation.

Notes:

1. Reference the MS-5012 Manual for additional information
2. Program the MS-5012 for slave operation
3. SW2 Trouble/No AC switch located on the bottom right of the MS-9200 main circuit board, must be positioned in the down position for this application. This prevents the transmission of a trouble on the loss of AC power

FIGURE E-1: Central Station Service Using MS-5012

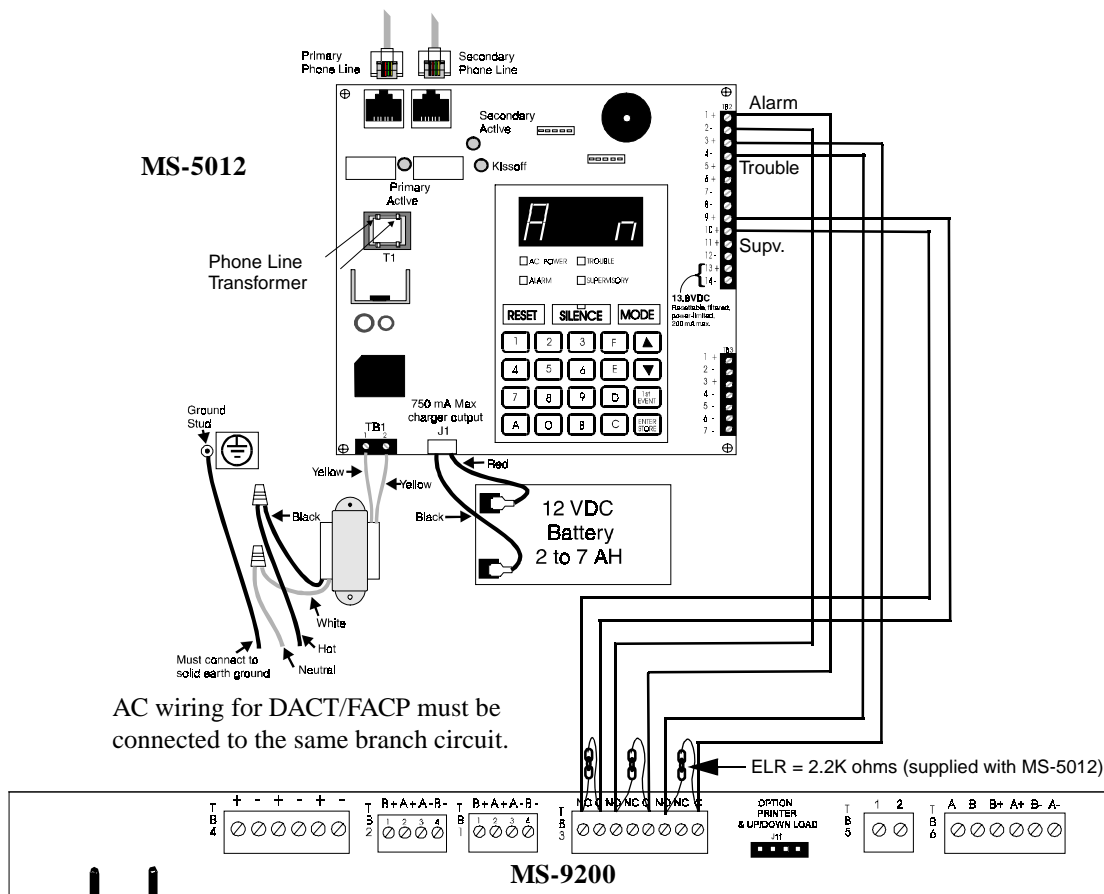


TABLE E-1: MS-5012 Connections to MS-9200

	MS-5012	MS-9200
Alarm	TB2-1	TB3-5
	TB2-2	TB3-3
Trouble	TB2-3	TB3-8
	TB2-4	TB3-6
Supervisory	TB2-9	TB3-2
	TB2-10	TB3-1

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

The following figure illustrates an example of Central Station/Remote Station Reporting using a 411UD. The relay contacts from the MS-9200 may be used to trip any dialer UL listed for Central Station/Remote Station Reporting Services.

FIGURE E-2: Fire•Lite MS-9200E Connection to 411-UD

Note:The M300 monitor module input, which is being used to monitor the 411-UD Relay #2 Output (programmed for DACT Trouble), must be programmed as 'DACT Trouble' at Fire•Lite MS-9200E.

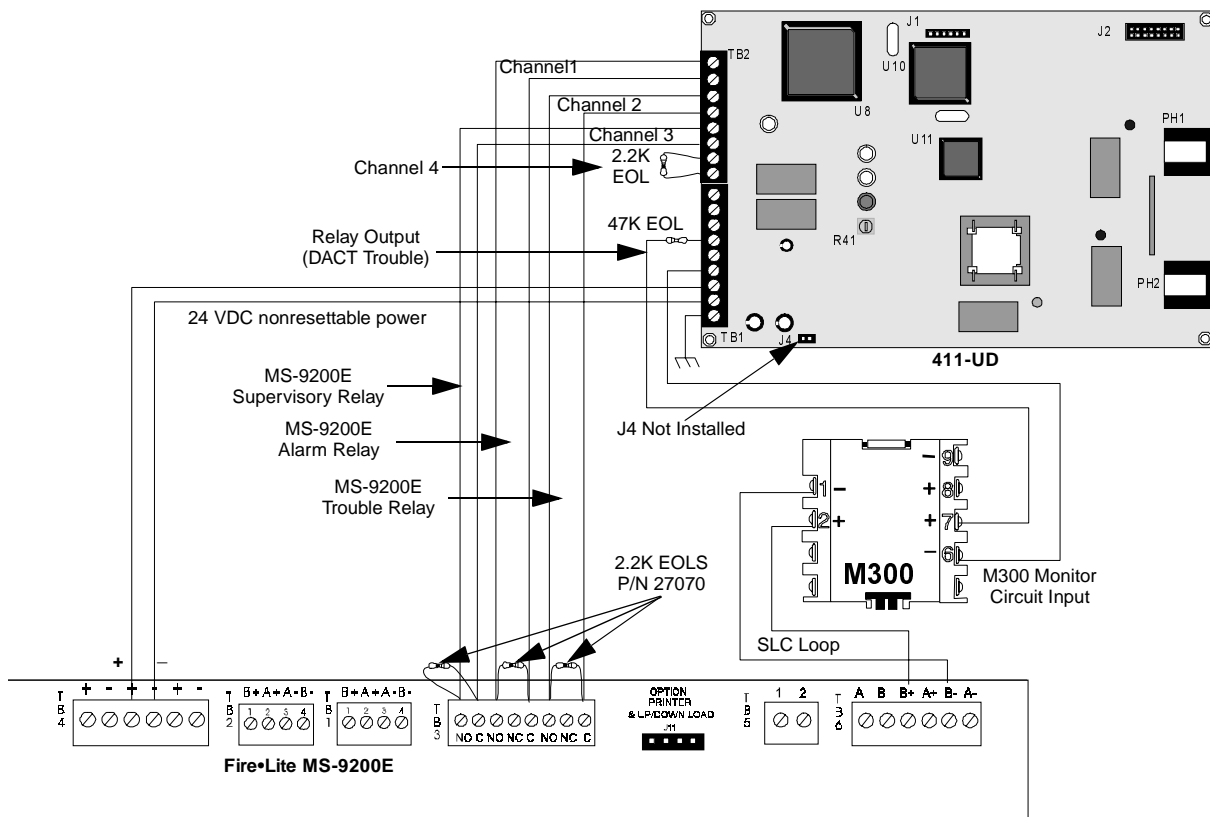


TABLE E-2: MS-5012 Connections to MS-9200E

	411-UD	MS-9200
Alarm	TB2-2	TB3-5
	TB2-1	TB3-3
Trouble	TB2-4	TB3-8
	TB2-3	TB3-6
Supervisory	TB2-6	TB3-2
	TB2-5	TB3-1

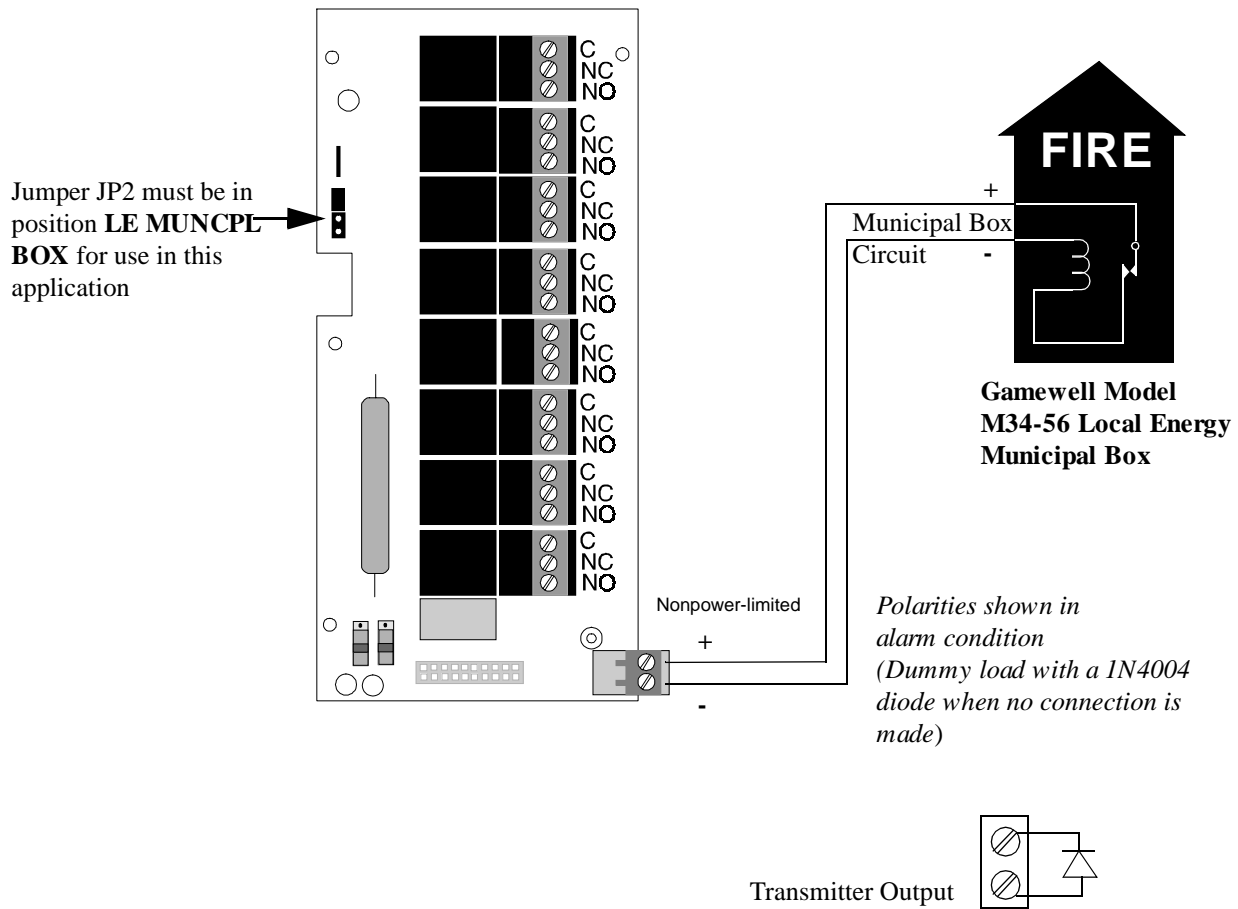
NFPA 72 Auxiliary Fire Alarm System

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

Notes:

1. 3 ohms maximum loop resistance allowed for wiring from control panel to Municipal Box.
2. Cut JP4 on the MS-9200 main circuit board to supervise placement of RTM-8F module and circuit.
3. Refer to Figure 2-8, "Typical UL Power-limited Wiring Requirements," on page 27, and "UL Power-limited Wiring Requirements" on page 27, for information on UL power-limited wiring requirements.

FIGURE E-3: Municipal Box Connected to RTM-8F Relay Transmitter Module

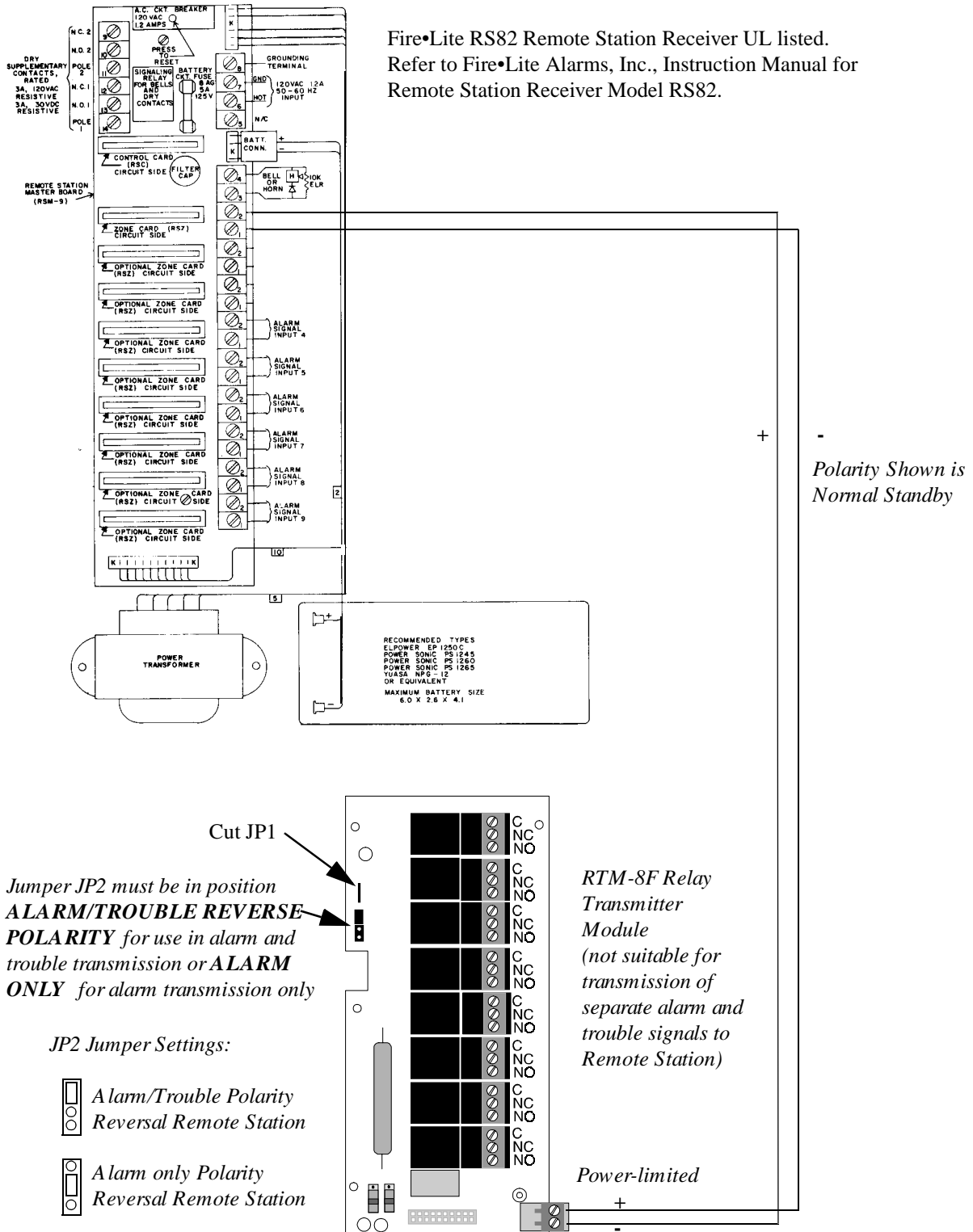


NFPA 72 Remote Station Protective Signaling System

Notes:

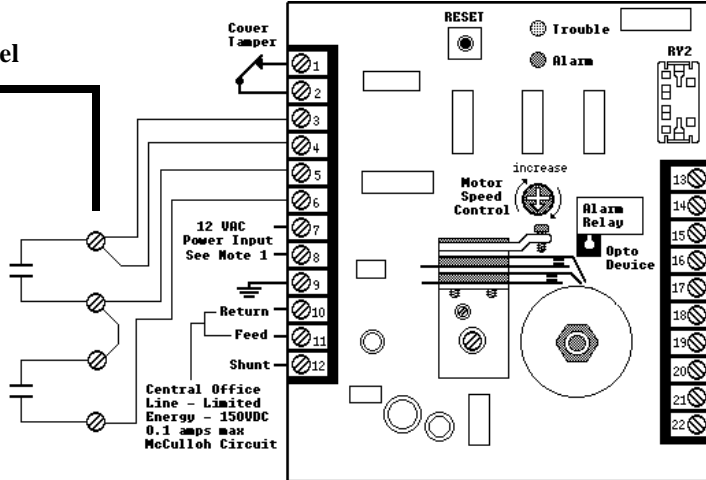
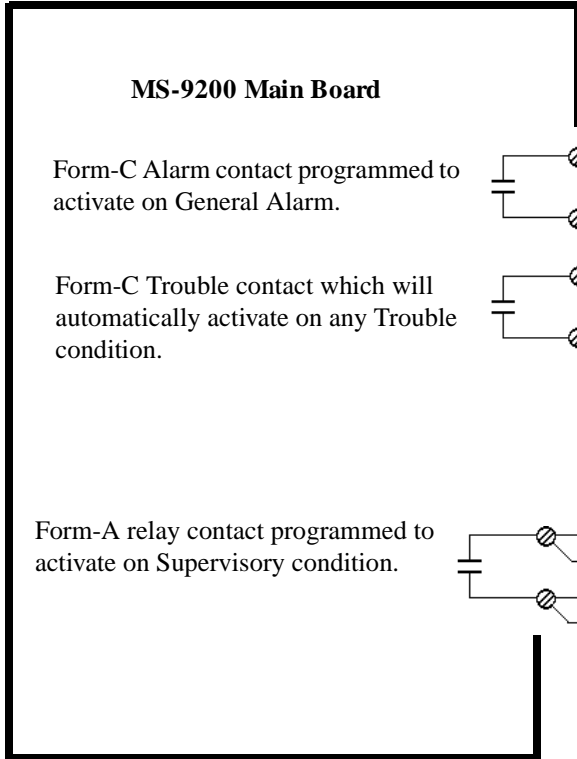
1. Cut Jumper JP4 on the MS-9200 main circuit board to supervise placement of the RTM-8F module.
2. Refer to Figure 2-8, "Typical UL Power-limited Wiring Requirements," on page 27, and "UL Power-limited Wiring Requirements" on page 27, for information on UL Power-limited wiring requirements.

FIGURE E-4: Remote Station Connection Using RTM-8F Module

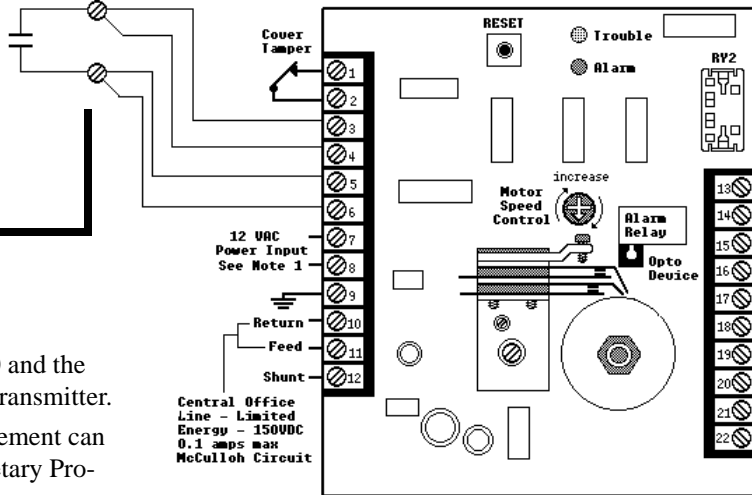


NFPA 72 Proprietary Protective Signaling Systems
 FIGURE E-5: Proprietary Protective Signaling System

MS-9200 Addressable Fire Control Panel



Potter Electric Signal Company Transmitter Model EFI-C used to transmit Alarm and Trouble Signals



Potter Electric Signal Company Transmitter Model EFI-C used to transmit Alarm and Trouble Signals

Notes:

1. Connection between the MS-9200 and the transmitter are supervised by the transmitter.
2. This MS-9200/Transmitter arrangement can be employed for NFPA 72 Proprietary Protective Signaling System.

Appendix F

Wire Requirements

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

Connecting external system accessories to the MS-9200 main circuits must be carefully considered to ensure proper operation. It is important to use the correct type of wire, wire gauge and wire run length for each MS-9200 circuit. Reference the chart below to specify wire requirements and limitations for each MS-9200 circuit.

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

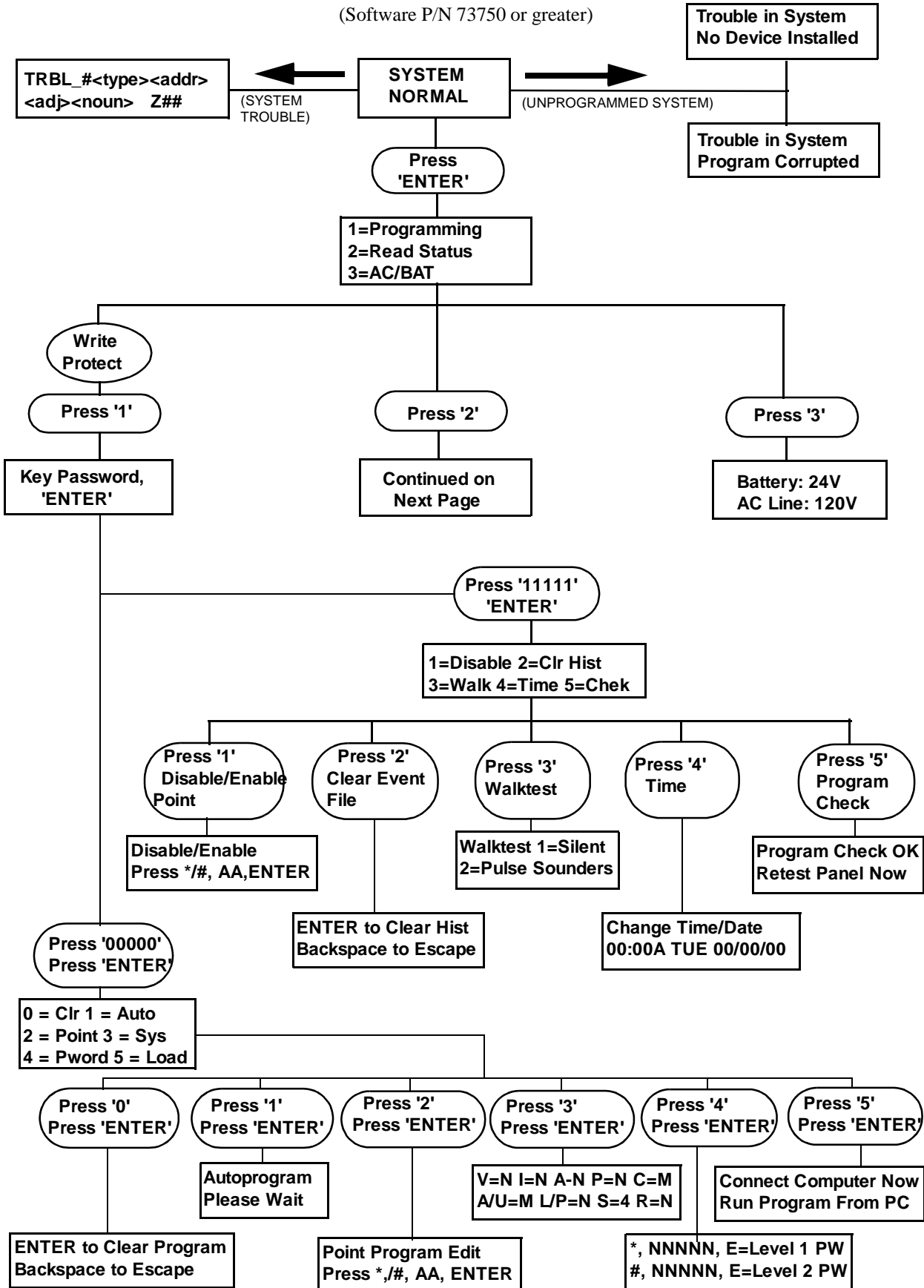
TABLE F-1: MS-9200 Wire Specifications

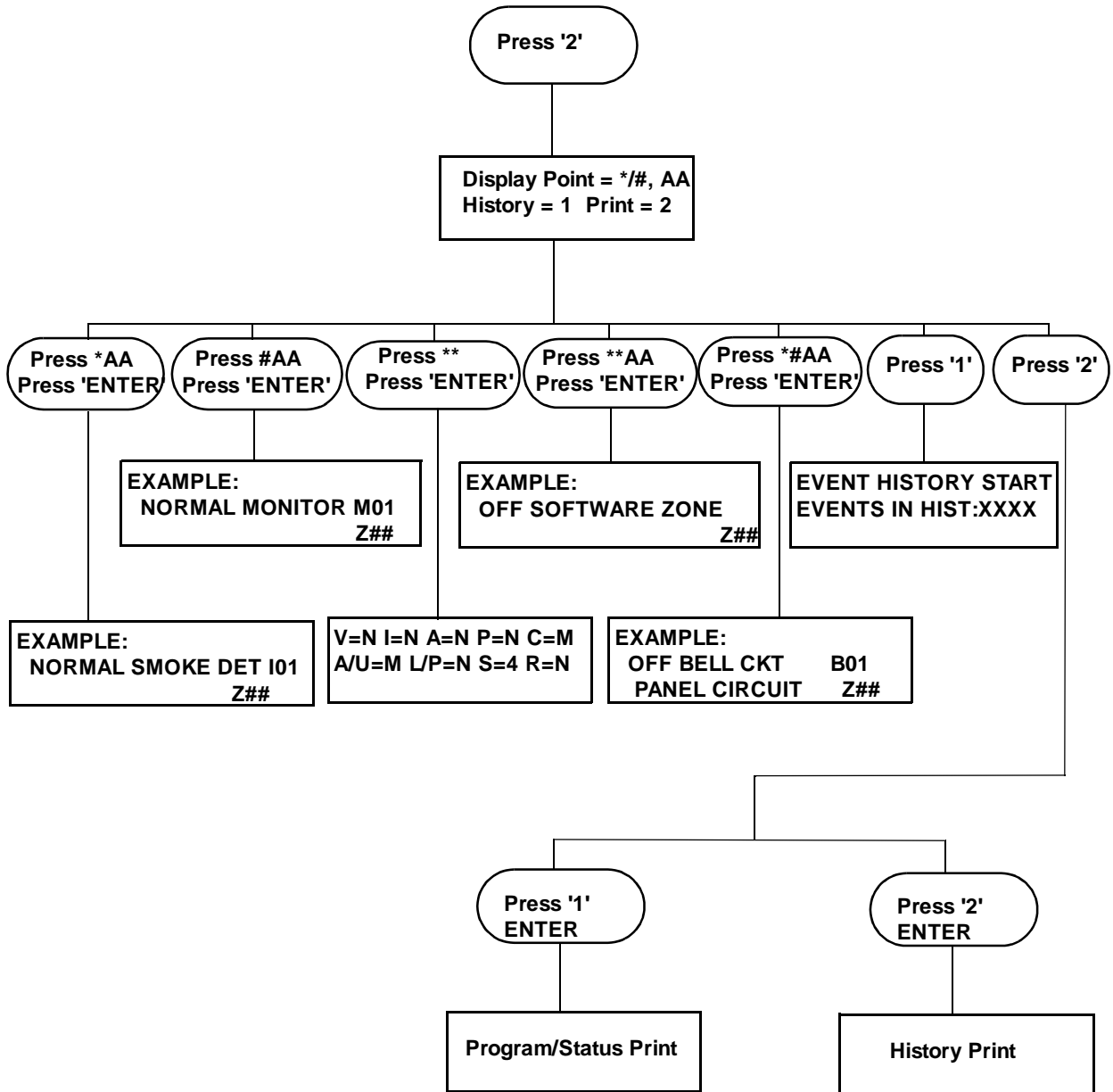
CIRCUIT CONNECTIONS		WIRE REQUIREMENTS		
Circuit Type	Circuit Function	Wire Type and Limitations	Recommended Max. Distance Feet (meters)	Wire Gauge and Compatible Brands
SLC loop (power-limited)	Connects to Addressable Devices	Twisted, shielded pair, 40 ohms maximum per length of Style 6 and 7 loops. 40 ohms per branch maximum for Style 4 loops ¹	10,000 (3,000 m) 8,000 (2,400 m) 4,875 (1,450 m) 3,225 (980 m)	12 AWG (3.25 mm ²): Genesis 4410, Signal 98230, Belden 9583, WPW999 14 AWG (2.00 mm ²): Genesis 4408 & 4608 Signal 98430, Belden 9581, WPW995 16 AWG (1.30 mm ²): Genesis 4406 & 4606 Signal 98630, Belden 9575, WPW991 18 AWG (0.75 mm ²): Genesis 4402 & 4602 Signal 98300, Belden 9574, WPW975
		Untwisted, unshielded pair	1,000 (300 m)	12-18 AWG (3.25 - 0.75 mm ²)
EIA-485 (power-limited)	Connects to annunciator modules	Twisted, shielded pair with a characteristic impedance of 120 ohms	6,000 (1,800 m)	18 AWG (0.75 mm ²)
EIA-232 (power-limited)	PIM-24 output connects to remote printer and PC computer	Twisted, shielded pair	50 (15 m)	18 AWG (0.75 mm ²) minimum
M300 and M301 (power-limited)	Initiating Device Circuit	Maximum loop wire resistance is 40 ohms for the M300 and 20 ohms for the M301	2,500 (760 m)	12-18 AWG (3.25 - 0.75 mm ²)
M302 (power-limited)	Initiating Device Circuit	No more than a 2.4 volt drop allowed at end of circuit. Maximum loop wire resistance is 25 ohms	2,500 (760 m)	12-18 AWG (3.25 - 0.75 mm ²)
C304 (power-limited)	Notification Appliance Circuit	In alarm, no more than a 1.2 volt drop allowed at end of circuit	Distance limitation set by 1.2 volt maximum line drop	12-18 AWG (3.25 - 0.75 mm ²)
24 VDC filtered resettable and nonresettable (power-limited)	Connects to annunciators and other accessories	No more than 1.2 volt drop allowed from supply source to end of any branch	Distance limitation set by 1.2 volt maximum line drop	12-18 AWG (3.25 - 0.75 mm ²)
24 VDC nonregulated (power-limited)	Connects to C304 control modules and accessories	No more than 1.2 volt drop allowed from supply source to end of any branch	Distance limitation set by 1.2 volt maximum line drop	12-18 AWG (3.25 - 0.75 mm ²)
CHG-120F	Remote secondary power source	12 AWG (3.25 mm ²) in conduit	20 (6 m)	12-18 AWG (3.25 - 0.75 mm ²)

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

Appendix G *Screen Options Flowchart*

(Software P/N 73750 or greater)





LEGEND



Text inside box actually appears in LCD display



Text inside oval indicates key press



Write Protect Switch on the MS-9200 motherboard

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