LSS4

Installation, Operation, and Maintenance Manual

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CREDITS	This manual was designed and written by the Edwards Systems Technology Technical Services - Documentation Department.
REVISION INFORMATION	The last revisions to this manual were made 19NOVEMBER96.

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Important Information

Limitation of Liability

This product has been designed to meet the requirements of NFPA Standard 72, 1996 Edition; Underwriters Laboratories, Inc., Standard 864, 7th Edition; and Underwriters Laboratories of Canada, Inc., Standard ULC S527. Installation in accordance with this manual, applicable codes, and the instructions of the Authority Having Jurisdiction is mandatory. Edwards Systems Technology shall not under any circumstances be liable for any incidental or consequential damages arising from loss of property or other damages or losses owing to the failure of Edwards Systems Technology products beyond the cost of repair or replacement of any defective products. Edwards Systems Technology reserves the right to make product improvements and change product specifications at any time.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, Edwards Systems Technology assumes no responsibility for errors or omissions.

FCC Warning

This equipment can generate and radiate radio frequency energy. If this equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply within the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user at his own expense, will be required to take whatever measures may be required to correct the interference.

Document History

LSS4 Master Installation, Operation, and Maintenance Manual
P/N 387012
Revision Status

Revision	Date	Reason For Change
0.1	June, 1993	Added 12 to 36 zone information
1.0	May, 1994	Added 52 zone information, removed programming example.
1.1	June, 1994	Revised IAC and battery calculation information
1.2	July, 1994	Incorporated European changes
1.3	January, 1995	Add notes to Figure 14
1.4	February, 1995	Update RMOD current: 1A both circuits continuous mode, 2A both circuits 1 second pulse mode.
1.5	May, 1995	Remove references to "power-limited".
2.0	January, 1996	Added primary and secondary dB error counter information and revised upload procedures.
2.5	November, 1996	Revised: format; compatibility information; external RS-485 wiring; module current draws.

Related Documentation

National Fire Protection Association (NFPA)
1 Batterymarch Park
PO Box 9101
Quincy, MA 02269-9101

NFPA 70	National Electric Code
NFPA 72	National Fire Alarm Code

Underwriters Laboratories Inc. (ULI)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 38	Manually Actuated Signaling Boxes
UL217	Smoke Detectors, Single & Multiple Station
UL 228	Door Closers/Holders for Fire Protective Signaling Systems
UL 268	Smoke Detectors for Fire Protective Signaling Systems
UL 268A	Smoke Detectors for Duct Applications
UL 346	Waterflow Indicators for Fire Protective Signaling Systems
UL 464	Audible Signaling Appliances
UL 521	Heat Detectors for Fire Protective Signaling Systems
UL 864	Standard for Control Units for Fire Protective Signaling Systems
UL 1481	Power Supplies for Fire Protective Signaling Systems
UL 1638	Visual Signaling Appliances
UL 1971	Visual Signaling Appliances

Chapter 1

System Introduction

About This Manual

This manual is intended for use by qualified technical personnel who configure, install, and maintain LSS4/12, /36, and /52 zone panels. The manual is divided into sections which detail system capabilities and programming requirements. Additional information about site-specific applications may be obtained through authorized Edwards Systems Technology distributors or the Edwards Systems Technology Technical Services Department.

System Overview

System Features

- Style B (class B) or optional Style D (class A) Initiating Device Circuits (IDC)
- Configurable Style Y or Z (class B or class A) Notification Appliance Circuits (NAC)
- Silenceable/non-silenceable Notification Appliance Circuits with automatic short circuit disconnect
- Alarm verification
- Seven segment status LED
- One man test
- City box and remote station options
- March time, temporal, or Morse "U" Notification Appliance Circuit coding
- Subsequent alarm & trouble resound
- Silence/reset inhibit timer
- Alarm signal cutoff timer
- Integral battery charger
- Extinguishing Agent Release Module w/optional style C Initiating Device Circuits
- Central station notification delay upon AC brownout option
- Auxiliary Power Supplies for 36 & 52 Zone enclosures
- European Option: Included in 120 VAC and 230 VAC Models
- Assignable Zone Relays
- Multiple Zone remote annunciation over two wires (plus power)
- Optional PC based panel configuration program

Description

Overview

The LSS4 series panels are expandable, installer configurable, fire alarm panels, which meet the requirements of NFPA Standard 72. The LSS4 supports configuration software, a variety of expansion modules and remote annunciators for site-specific configuration.

LSS4: Four Zone Master Panel

The LSS4 Master Panel features four Style B (class B) Initiating Device Circuits (IDC), each capable of supporting up to 50 two wire smoke detectors, and two configurable Style Y/Z (Class B/A) Notification Appliance Circuits. Additional IDC cards may be added to increase the number of IDCs to 52. Style B IDC circuits may be converted to Style D by using a 4CLA Converter Module. Each IDC has a multi-color ZONE ACTIVE LED, a yellow trouble LED, and a Zone Disconnect switch.

The Zone Active LED displays alarms red, and active supervisory conditions yellow. Zones in verification display alternating red/green. Circuit troubles turn on the yellow zone trouble LED. Common Control LED's display system status. The status conditions are NORMAL (green), ALARM (red), SUPERVISORY (yellow), and TROUBLE (yellow). The system common control switches include RESET, ALARM SILENCE, TROUBLE SILENCE, AND DRILL/AUTOMATIC EVACUATION CANCEL.

The LSS4 master panel features both a configurable alarm signal cutoff timer and an alarm silence/reset inhibit timer. Configurable march time, temporal and Morse "U" codes are available to modulate the Notification Appliance Circuits. The temporal rate meets the requirements of the national emergency evacuation signal (ISO-8201-1987 & ANSI S3-41-1990).

Full supervision of critical system parameters is provided by the LSS4 master panel, including: brown out and ground fault detection, fuse and battery supervision, and a watchdog circuit to verify proper microprocessor operation. Hardware circuit protection is provided using MOVs, transorbs, and spark gaps. The enclosures are constructed of 16 gauge steel, have a key lock, and space for up to 30 AH batteries.

Initiating Device Circuit Expansion Modules: 4ZEXP and 8ZEXP

The IDC Module comes in four and eight circuit versions which may be defined for alarm or supervisory operation. Alarm circuits may be configured for verified, non-verified, or waterflow operation. Style B circuits may be converted to Style D by using a 4CLA Converter Module. Switched open collector circuits are provided for system alarm, trouble, and supervisory conditions, as well as alarm conditions on each individual Initiating Device Circuit. To reduce power consumption, where feasible, 8ZEXP, Rev. B Zone Expansion modules should be used in systems requiring 12 zones or more.

Notification Appliance Circuit Module: 4IAC

Notification Appliance Circuit Modules have four circuits which may be loaded up to a maximum of 3.5 Amps from a shared power source. The amount of power available to a circuit depends on the power source. The circuits may be wired Style Y or Z (Class B or A). The 4IAC module requires one module space.

Auxiliary Relay Module : 4REXP

The 4REXP is a supplementary board with four programmable auxiliary relays. The 4REXP may be installed on the LSS4 master panel, and on each 4ZEXP or 8ZEXP zone expansion card. The 4REXP installed on the LSS4 master panel may have two relays re-configured: one as the common system trouble relay, and a second as the common system

supervisory alarm relay. Operation of the system trouble relay by an AC power failure or brownout condition may be optionally delayed 6 hours for central station operation.

Style D Converter Module: 4CLA

Optional 4CLA modules are available to convert the Initiating Device Circuits from style B (class B), to style D (class A) on the LSS4 master panel and 4ZEXP and 8ZEXP Zone Expansion Modules.

City Tie Module: MBPR

The MBPR provides for local energy auxiliary and remote station operation. The MBPR board takes the place of a 4REXP relay card. A form C alarm contact is provided for external system interface. Switched open collector circuits are provided for system alarm, trouble, and supervisory conditions, as well as alarm conditions on each individual Initiating Device Circuit.

Auxiliary Power Supply Module: LSSPS and LSSPS/230VAC

The LSSPS auxiliary power supply provides additional battery backed up 24 VDC @ 3.5 Amps for Notification Appliance or auxiliary circuits. Each LSSPS power supply requires one of two dedicated enclosure locations. The LSSPS/230VAC is designed for 230 VAC applications.

Releasing Module: RMOD

The RMOD extinguishing agent releasing module requires one module space and provides three Initiating Device Circuits and a Notification Appliance Circuit which may be configured as follows:

- Style B (class B) Initiating Device Circuits capable of supporting 2 or 4 wire smoke detectors.
- Style C Initiating Device Circuits capable of supporting 2-wire smoke detectors.
- Style C manual agent release and abort circuits.
- Style Y (class B) pre-discharge Notification Appliance Circuit.

The RMOD features independent manual and automatic delay timers, and the choice of Industrial Risk Insurers (IRI) or deadman abort sequences utilizing style C abort initiating circuit wiring. The two agent release solenoid circuits are supervised for open and short circuits. An RMOD requires one module space.

Power Management

The LSS4 system provides power from the LSS4 master panel and from LSSPS Auxiliary Power Supplies. If the panel and the auxiliary power supply share a common battery, the available power is shown in Figure 1-1.

Power Distribution, Common Batteries

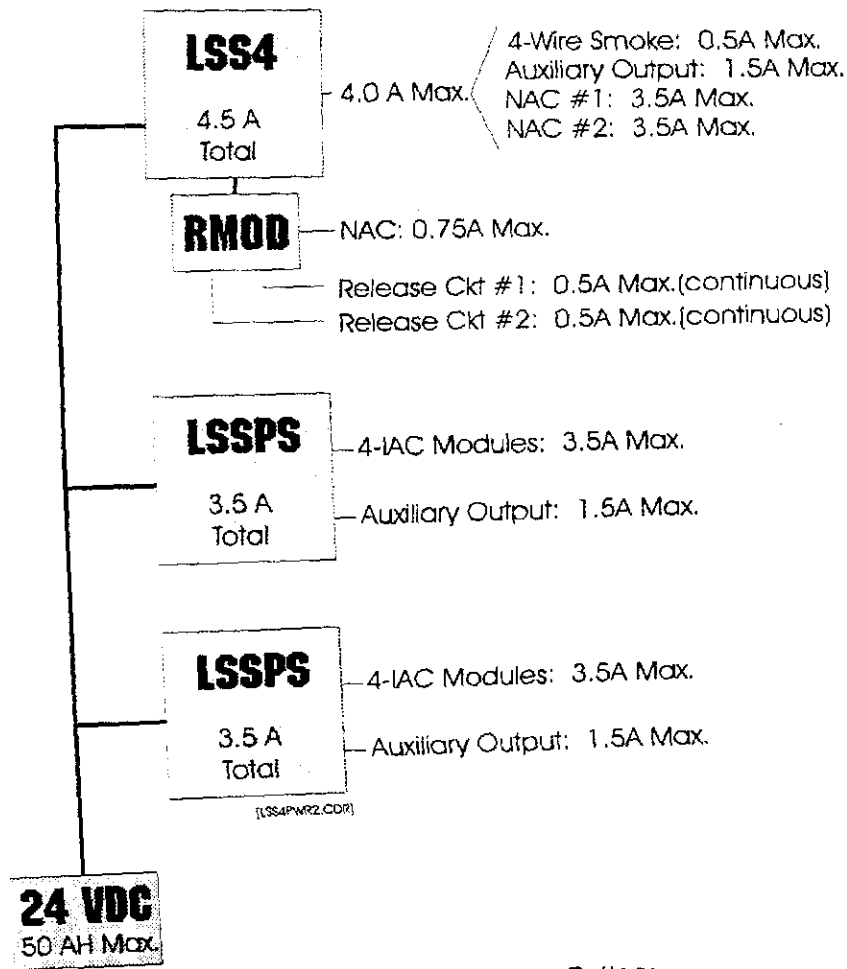


Figure 1-1: LSS4 Power Distribution, Common Battery

If multiple individual sets of batteries are used to power the LSS4 panel and their LSSPSs, the available power is shown in Figure 1-2. DO NOT exceed the total current rating of the panel or power supplies and of the individual circuits.

Notice that when separate battery sets are used the standby battery capacity increases from 50 AH to 90 AH.

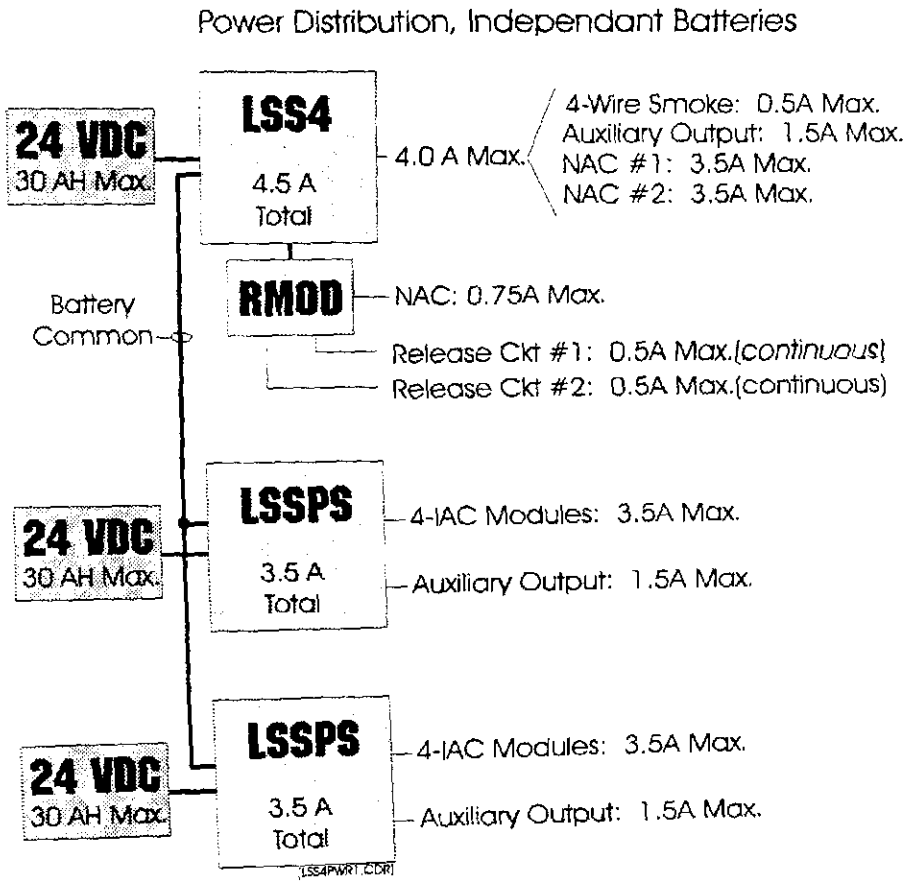


Figure 1-2: LSS4 Power Distribution, Separate Batteries

Application

General

LSS4 series panels are self contained fire alarm control systems designed for small to medium size local, auxiliary (local energy), remote station, and proprietary protective signaling system applications. When equipped with an RMOD module, the LSS4 is suitable for releasing device service. The LSS4 is a 4 zone master panel which has capacity for additional expansion cards and power supplies.

Initiating Device Circuits support 2 and 4 wire smoke detectors and dry contact alarm initiating devices. The alarm verification feature should not be used on a circuit which supports 4-wire smoke detectors or dry contact alarm initiating devices.

When used in accordance with NFPA Standard 72 for Central Station Signaling Service, a 4REXP relay module must be installed in the LSS4 Master Panel, and a Silent Knight Model 5104 Fire Communicator must be installed and wired in accordance with the LSS4 and NFPA 72 wiring instructions.

When used in accordance with NFPA Standard 72, Chapter 9 for Proprietary Station Signaling Service, the proprietary monitoring system must be wired in accordance with the LSS4 and NFPA 72, Chapter 9 wiring instructions.

RMOD Application

The RMOD is suitable for Halon, pre-action sprinkler and deluge sprinkler system release. Release may be initiated by a single IDC zone or BOTH IDCs going into alarm (cross zone) or by activating the manual agent release circuit. Notification Appliance Circuit and output relays may be operated by the RMOD smoke detector and manual release circuits. Two independent adjustable time delays are provided, one for automatic agent release, and the second for manual agent release. Either deadman or the IRI abort sequence may be configured to inhibit agent release. Solenoids may be configured for a one second pulse or continuous activation.

Two RMOD modules may be connected together to protect multi-area hazards. The master RMOD module provides the primary abort, manual release, and timing functions. The slave RMOD module provides detection and release circuits, slave ONLY abort and manual release functions.

Automatic Agent Release

Automatic agent release may be accomplished by setting the module to start the discharge sequence when a single Initiating Device Circuit is in alarm, or by requiring BOTH IDCs to be in alarm, i.e. cross zoning. Once the initial conditions for automatic discharge have been met, the automatic discharge delay timer starts, the pre-discharge Notification Appliance Circuit activates, and the pre-discharge relay energizes. Time-out of the automatic delay timer causes both agent release solenoids to activate. Agent release solenoids may be configured for a 1 second pulse or continuous operation. The RMOD Initiating Device Circuits cause a system alarm on the LSS4 panel, operating the MBPR (if installed) module and system Notification Appliance Circuits.

Manual Agent Release

The manual agent release sequence begins when the manual agent release circuit is activated. Once activated, the manual discharge timer starts, the discharge warning Notification Appliance Circuit activates, and the alarm and pre-discharge relays energize. Time-out of the manual delay timer causes both agent release circuits to activate. The RMOD manual release Initiating Device Circuit causes a system alarm on the LSS4 panel, operating the MBPR module (if installed), and system Notification Appliance Circuits.

Deadman Abort Sequence

The deadman abort sequence may be activated at any time during an automatic agent release sequence. Operating and maintaining the abort switch stops and holds the automatic agent release delay timer at 10 seconds, and holds the discharge warning Notification Appliance Circuit. Release of the abort switch restarts the automatic agent discharge sequence and continues the discharge warning NAC countdown. The deadman abort sequence does NOT function during the manual agent release sequence.

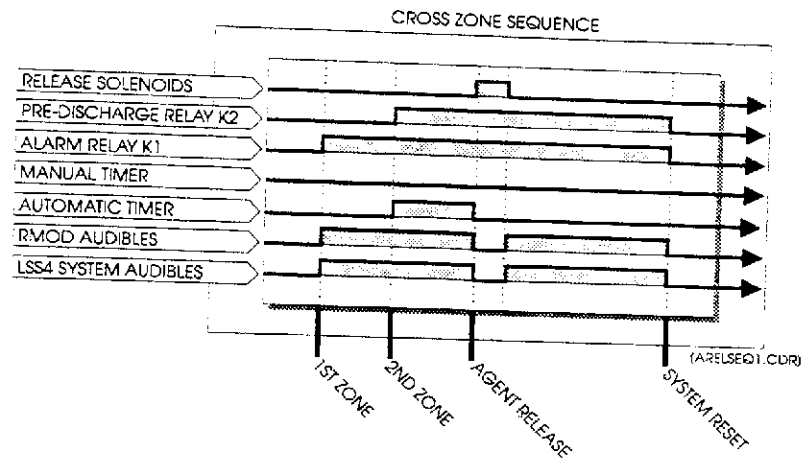


Figure 1-3: Cross Zoned Release Sequence

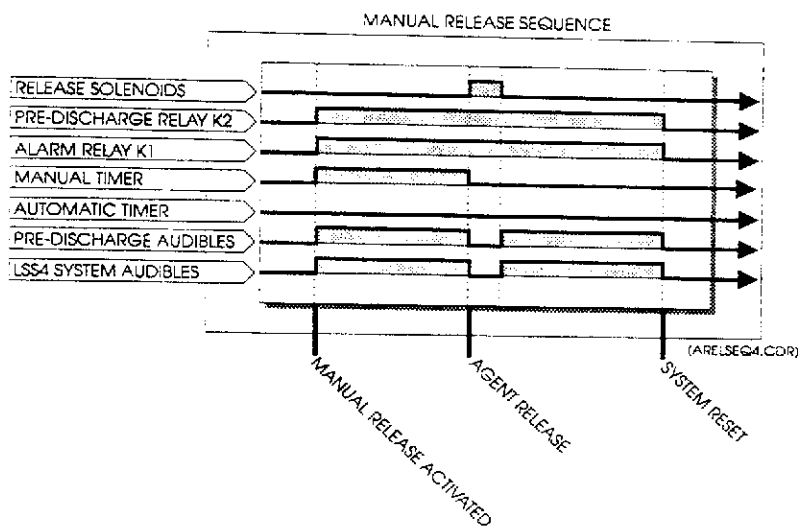


Figure 1-4: Manual Release Sequence

IRI Abort Sequence

The IRI abort sequence may only be activated prior to alarm receipt by the second Initiating Device Circuit in cross zoned operation. Operating and maintaining the abort switch prior to alarming of the second IDC stops and holds the automatic agent release delay timer at 10 seconds, and holds the discharge warning Notification Appliance Circuit. Release of the abort switch restarts the automatic agent discharge sequence and continues the NAC countdown. The IRI abort sequence does not function during the manual agent release sequence, or when only one Initiating Device Circuit is used to start the agent discharge sequence.

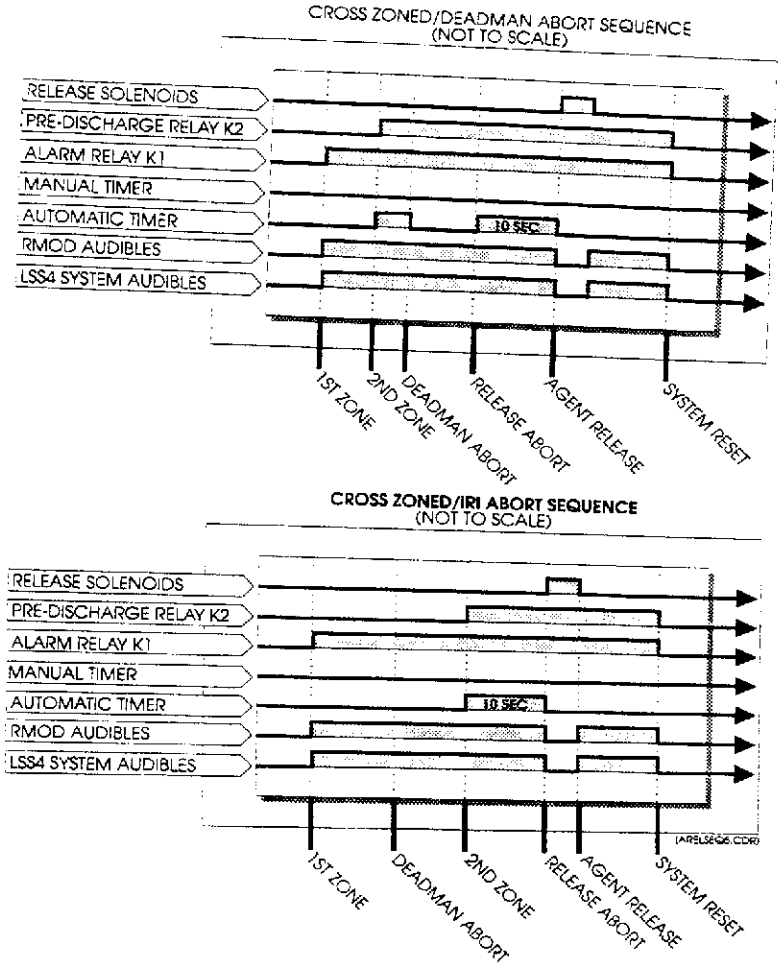


Figure 1-5: Deadman and IRI Abort Sequences

Alarm Relay (K1)

The alarm relay operates whenever any manual or automatic Initiating Device Circuit is activated. When used in the master/slave configuration, any alarm (K1) relay circuits which must operate when either the master/slave combination or slave only operates, must be connected to the slave RMOD module.

Pre-Discharge Relay (K2)

The pre-discharge relay energizes whenever the conditions for discharge have been met, i.e. manual release, cross zone, etc. When used in the master/slave configuration, any pre-discharge relay (K2) circuits which must operate when either the master/slave combination or slave only operates, must be connected to the slave RMOD module.

Discharge Warning Notification Appliance Circuit (TB3-5&6)

The discharge warning Notification Appliance Circuit provides a variable pulse width modulated signal whose pulse duration depends on the time remaining on the manual or automatic discharge delay timers. As the timer progresses, the on pulses of the discharge warning Notification Appliance Circuit become longer and longer until the warning horn is sounding continuously at the time of discharge. This adds an additional awareness factor to the impending system discharge. The discharge warning Notification Appliance circuit is *not suitable* for strobe lights. When used in the master/slave configuration, the discharge warning Notification appliance circuit must be wired to the slave RMOD module.

Supervisory Zone (TB2-1&2)

The PSI supervisory zone is provided to monitor system pressure sensors, and generates a LSS4 system supervisory condition when activated.

Worksheets

This manual contains numerous worksheets which assist in designing and configuring the panel

Chapter 2

System Installation

General Installation Information

Precautions

The components used in this system are sensitive to Electrostatic Discharge. when handling electronic assemblies, you must take precautions to avoid the buildup of static charges on your body and on the equipment.

- Do not open the anti-static packaging until you are ready to install the electronics.
- Wear a grounded wrist strap to bleed off any static charge which may have built up on your body.

General

The following installation instructions provide information required to properly install LSS4 series panels. The same step by step instructions for assembly of the LSS4/12 panel (Figure 2-2), may be used for assembly of the LSS4/36 panel (Figure 2-3), and the LSS4/52 (Figure 2-4). Careful attention should be paid to all written warnings and cautions.

WARNING: LETHAL VOLTAGE
Disconnect power before removing or installing modules

Caution: POWER DOWN SEQUENCE
1. Disconnect Batteries
2. Disconnect AC Power

Caution: POWER UP SEQUENCE
1. Apply AC Power
2. Connect Batteries

General Installation Requirements

1. Enclosures are suitable for surface and semi-flush mounting, and are provided with keyhole mounting holes and conduit knockouts. INSTALL CONDUIT ONLY ON THE TOP AND SIDES OF THE ENCLOSURE. The bottom of the enclosure must remain clear for battery installation.
   Panels should be located to provide adequate access for maintenance. A dedicated 120 V 60 Hz. branch circuit is required to power the panel, and must be labeled "FIRE ALARM". 120 VAC wiring must be routed separately.
2. Install MBPR or 4REXP, and/or 4CLA option modules on the base LSS4 panel first, followed by installation of the expansion modules and their options.
3. Remove the zone identification labels, fill in zone descriptions, and re-install.
4. Install batteries in the enclosure. DO NOT CONNECT BATTERIES AT THIS TIME.

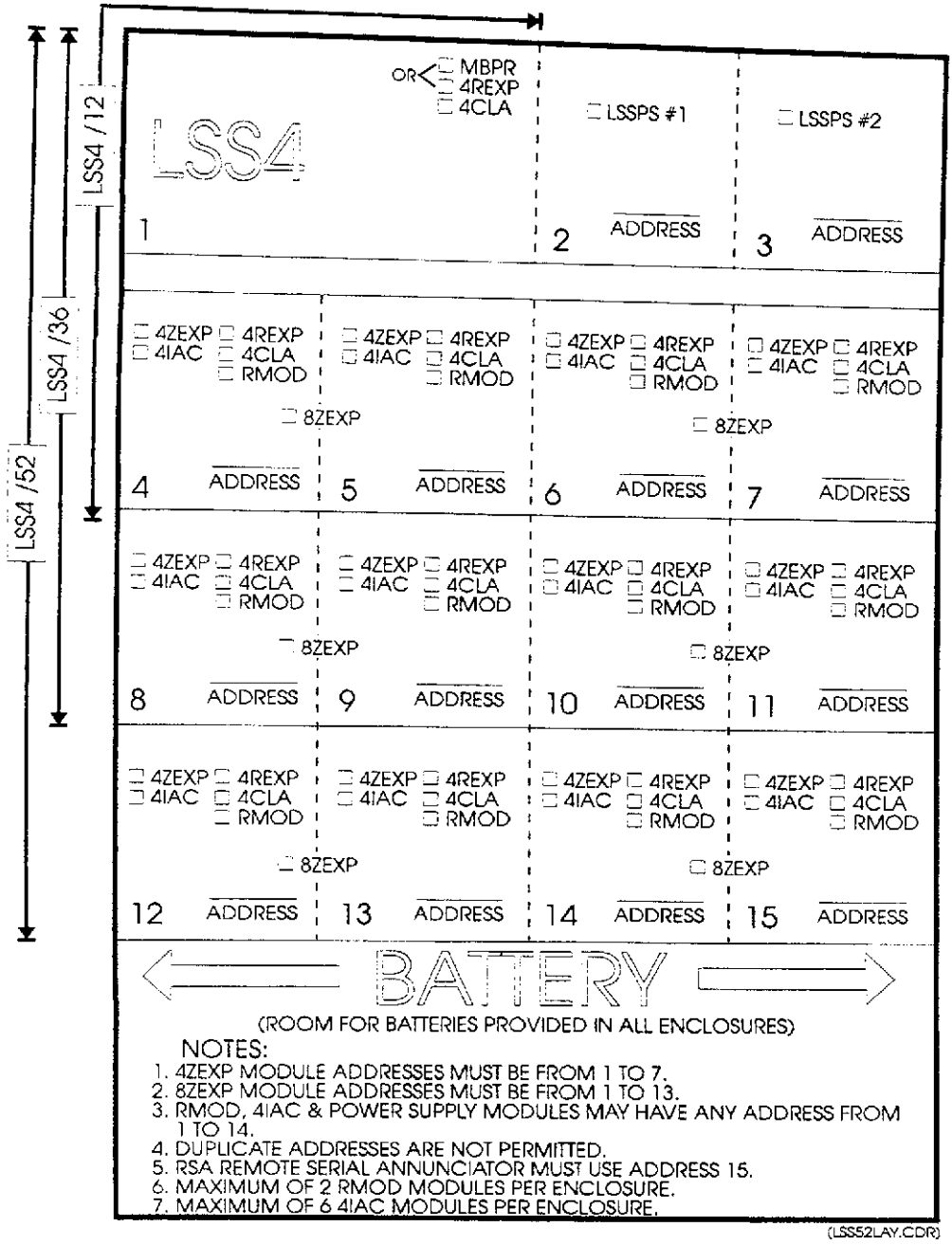


Figure 2-1: LSS4 Component Layout

Enclosures

Table 2-1: LSS4 Installation Parts List
Refer to Figure 2-2, Figure 2-3, or Figure 2-4

	LSS4/12 LSS4/12/220*	LSS4/36 LSS4/36/220*	LSS4/52 LSS4/52/220*	
Item	**P/N**	**P/N**	**P/N**	**Description**
1	LSS4/12 & LSS4/12R LSS4/12/220	LSS4/36 & LSS4/36R LSS4/36/220	LSS4/52 & LSS4/52R LSS4/52/220	Enclosure, cover plates, windows
2	235017	235017	235017	LSS4 Master Panel Assembly (120 VAC)
2	235136	235136	235136	LSS4 Master Panel Assembly (230 VAC)
3	250134	250134	250134	Machine Screw (kit)
4	362253	362253	362253	Threaded Spacer
5	210302	200026	200026	Front Cover Plate
6	362221	362221	362221	Machine Screw
7	4CLA	4CLA	4CLA	4CLA Class A Module
8	MBPR	MBPR	MBPR	MBPR Reverse Polarity Module
9	4REXP	4REXP	4REXP	4REXP Relay Module
10	210304	200027	200027	Front Cover Plate
11	4ZEXP	4ZEXP	4ZEXP	4ZEXP Zone Expansion Module
12	8ZEXP	8ZEXP	8ZEXP	8ZEXP Zone Expansion Module
13	RMOD	RMOD (2 Max.)	RMOD (2 Max.)	RMOD Releasing Module
14	210303	210303	210303	Expansion Frame
15A/B	N/A	LSSPS	LSSPS	LSSPS, 120 VAC Auxiliary Power Supply; A = Front Board B = Rear Board
15A/B	N/A	LSSPS/220 VAC	LSSPS/220 VAC	LSSPS/220 VAC, 230 VAC Auxiliary Power Supply; A = Front Board B = Rear Board
16	N/A	4IAC (2 Max.)	4IAC (2 Max.)	4IAC Notification Appliance Circuit Module
17	N/A	210351	210351	Expansion Frame, LSSPS

* - LSS4/XX are 120 VAC models and LSS4/XX/220 are 230 VAC models.

Table 2-2: LSS4 Enclosure Specifications

Construction	16 Gauge welded Steel w/Painted Finish
Back Box Dimensions (HWD)	LSS4/12: 17 3/4" [45.1cm] x 12 1/4" [31.1cm] x 3 9/16" [9.1cm] LSS4/36: 29" [73.7cm] x 24 9/32 " [61.7cm] x 4 3/4 " [12.1 cm] LSS4/52: 35.5" [90.2 cm] x 24 9/32" [61.7cm] x 4 3/4" [12.1 cm]
Overall Dimensions (HWD)	LSS4/12: 19 3/4" [50.2cm] x 14" [35.6cm] x 4 1/2" [11.4cm] LSS4/36: 31" [78.7cm] x 26 5/32" [66.4cm] x 5 5/8" [14.2cm] LSS4/52: 37.5" [95.3 cm] x 26 1/4" [66.7cm] x 5 5/8" [14.2cm]
Capacity	LSS4/12: (2) 4ZEXP Modules, (1) 8ZEXP Module; (3) 4CLA Cards; (3) 4REXP Cards; (1) MBPR Card; (2) RMOD cards. LSS4/36: 8 Single width option modules and 2 LSSPS Auxiliary Power Supplies; Max (2) RMOD; Max (6) 4NAC; Max (4) 8ZEXP; Max (2) 4ZEXP. LSS4/52: 12 Single width option modules and 2 LSSPS Auxiliary Power Supplies; Max (2) RMOD; Max (6) 4NAC; Max (2) 4ZEXP; Max (6) 8ZEXP.

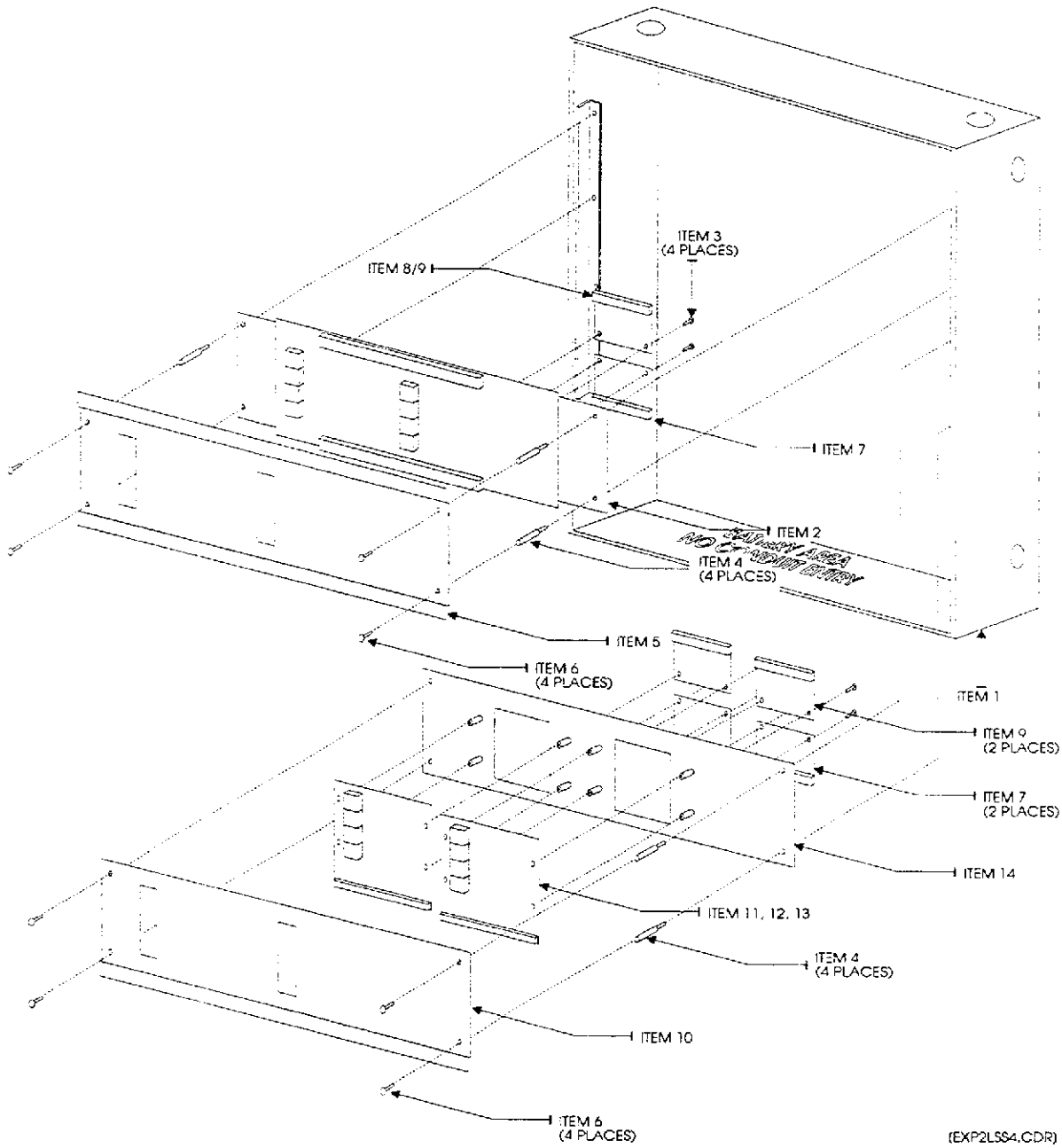


Figure 2-2: LSS4/12 Installation

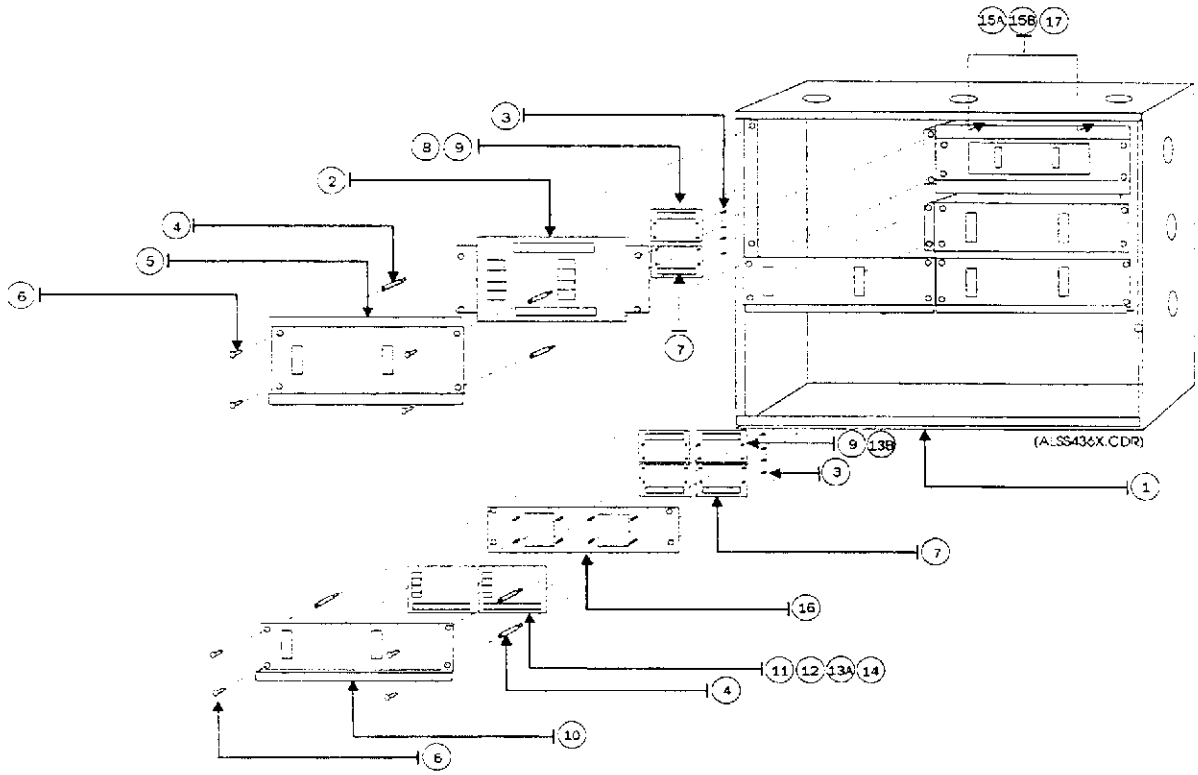


Figure 2-3: LSS4/36 Installation

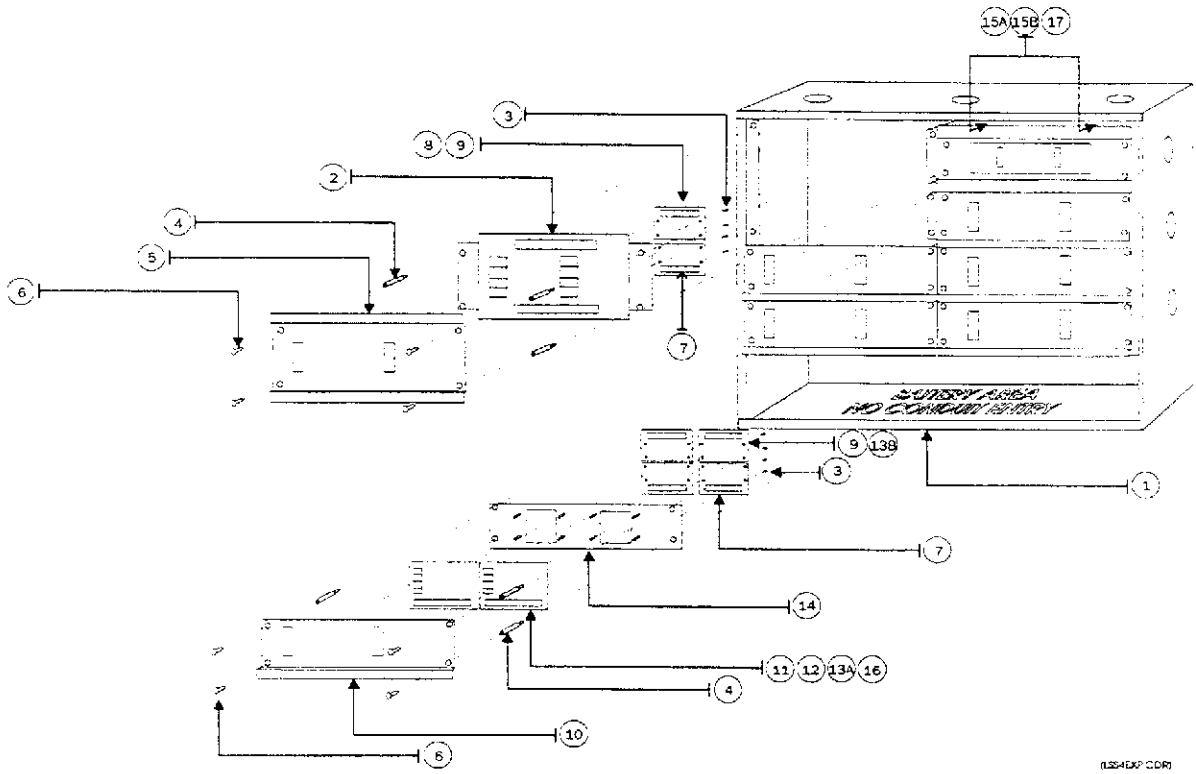


Figure 2-4: LSS4/52 Installation

System Modules

LSS4 Master Panel Assembly (120 VAC/230 VAC)

Table 2-3: LSS4 Master Panel Specifications

Standby Current	
Master panel w/4 zones	100 mA
Class A card	10 mA
4-Wire Smoke Power	20 - 27 VDC See Note #1
Initiating Device Circuits (IDC)	
Voltage	16.1 to 26.48 VDC
Supervisory Current per circuit	6 mA
Maximum Short circuit current	70 mA
EOL Resistor	3.9K Ω
European mode (Style C) Short Circuit Resistance	100 Ω
Notification Appliance Circuit (NOTE 2)	
Voltage	19.7 - 26.7 VDC
Maximum Current per circuit (NOTE 1)	3½ A
EOL Resistor	15 KΩ
Auxiliary Power	
Voltage	20 -27 VDC
Maximum Current (NOTE 1)	1.5 A
General Panel	
Open Collector outputs, per circuit	30 VDC, 100 mA. ,current sink
Input Voltage (120 VAC Model)	120 VAC, 2A, 60 Hz
Input Voltage (220 VAC Model)	230 VAC, 1.5A, 50 Hz
Temperature	0° - 49°C (32° - 120°F)
Humidity	85% Non-Condensing
Battery charger	30 AH Max. @ 24 VDC
Maximum charging current	1.52 A
Alarm Silence/Reset Inhibit Timer	0 to 99 Minutes in 1 Min. Increments
Alarm Signal Cutoff Timer	0 to 99 Minutes in 1 Min. Increments
Maximum supervisory current available	1.0 A
Maximum wire size any terminal	12 AWG
Alarm Contacts	
Type	SPDT
Rating	120 VAC/30 VDC, 2 A max., inductive .35 pF

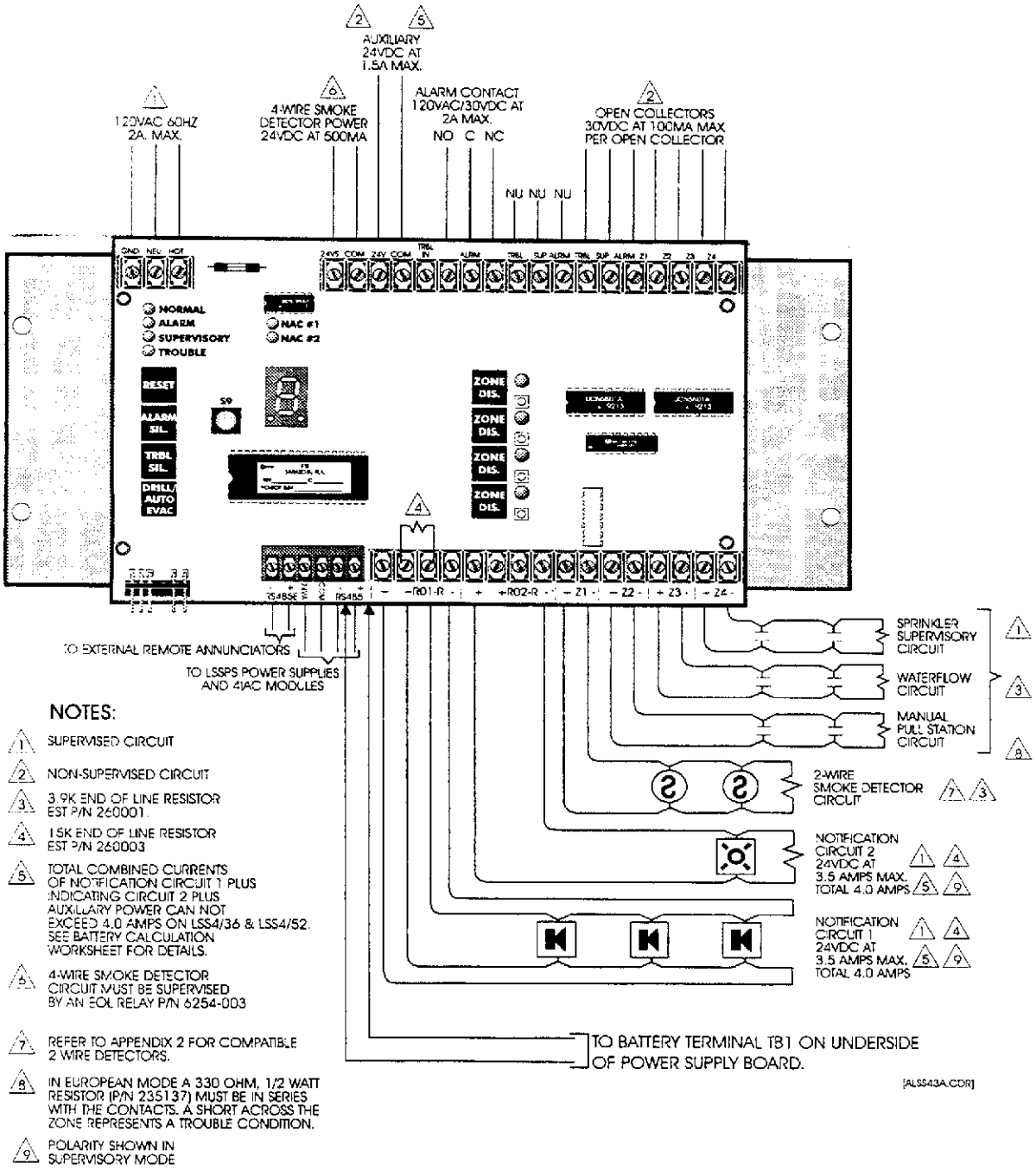
Note 1: Maximum current from all circuits directly powered by the LSS4 Master Panel can not exceed 4.5 amps. Refer to the battery calculation sheet for detailed information.

Note 2: NAC #1 and NAC #2 are temporally silenced during RMOD solenoid release in pulse mode only.

LSS4 Installation

Refer to Figure 2-2, Figure 2-3, or Figure 2-4.

1. Remove the LSS4 front cover plate (5,6).
2. Remove the LSS4 master panel assembly from the enclosure (4,2).
3. Mount the enclosure (1).
4. Install option modules on LSS4 master panel assembly, if required. Detailed Module installation instructions follow this section.
5. Reinstall the LSS4 master panel assembly in the enclosure (2,4).
6. Connect and verify all field wiring.
7. Install additional modules per instructions which follow. Verify and connect field wiring for each module.
8. Apply AC Power.
9. Connect backup battery.



NOTES:

1. SUPERVISED CIRCUIT
2. NON-SUPERVISED CIRCUIT
3. 3.9K END OF LINE RESISTOR EST P/N 260001.
4. 15K END OF LINE RESISTOR EST P/N 260003
5. TOTAL COMBINED CURRENTS OF NOTIFICATION CIRCUIT 1 PLUS INDICATING CIRCUIT 2 PLUS AUXILIARY POWER CAN NOT EXCEED 4.0 AMPS ON LSS4/36 & LSS4/52. SEE BATTERY CALCULATION WORKSHEET FOR DETAILS.
6. 4-WIRE SMOKE DETECTOR CIRCUIT MUST BE SUPERVISED BY AN EOL RELAY P/N 6254-003
7. REFER TO APPENDIX 2 FOR COMPATIBLE 2 WIRE DETECTORS.
8. IN EUROPEAN MODE A 330 OHM, 1/2 WATT RESISTOR (P/N 235137) MUST BE IN SERIES WITH THE CONTACTS. A SHORT ACROSS THE ZONE REPRESENTS A TROUBLE CONDITION.
9. POLARITY SHOWN IN SUPERVISORY MODE

Figure 2-5: LSS4 Master Panel Wiring

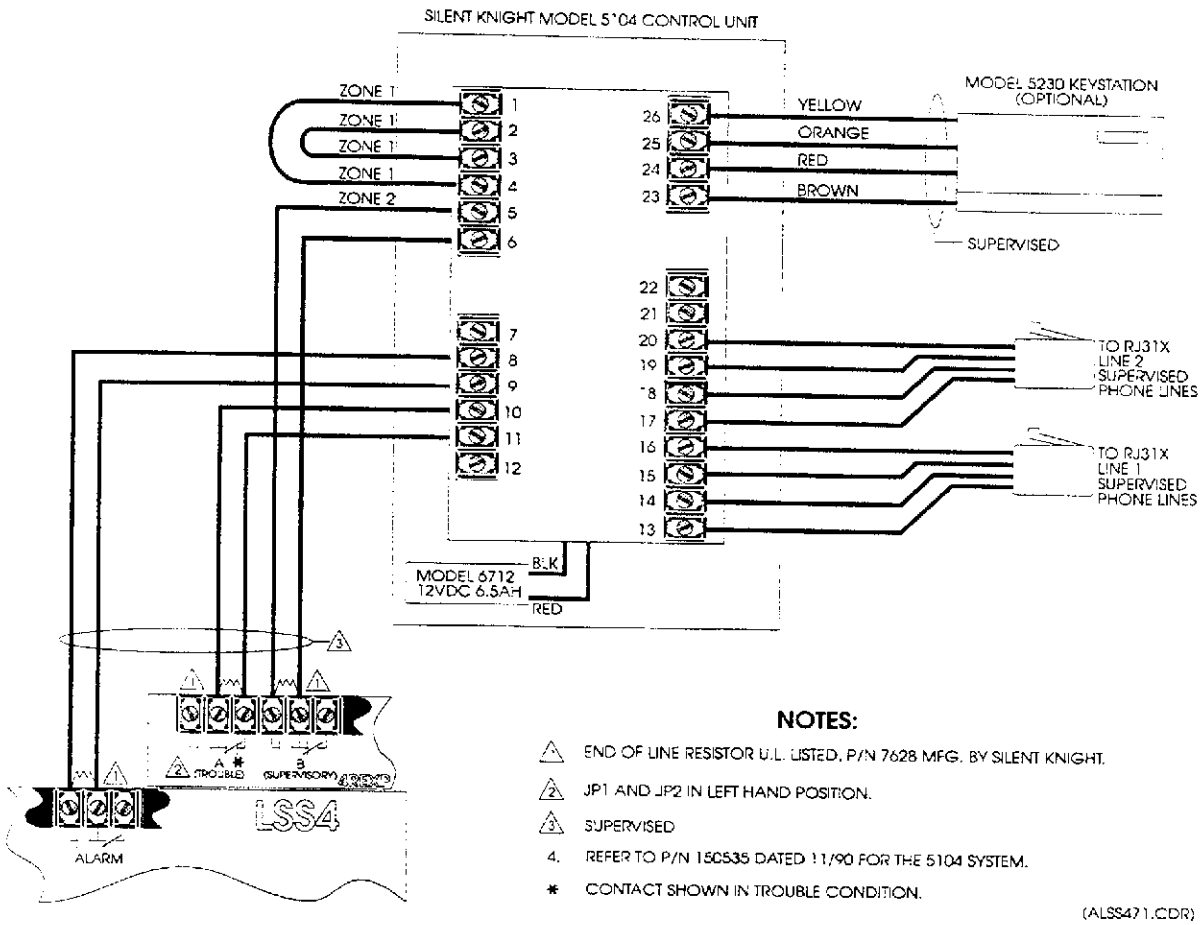
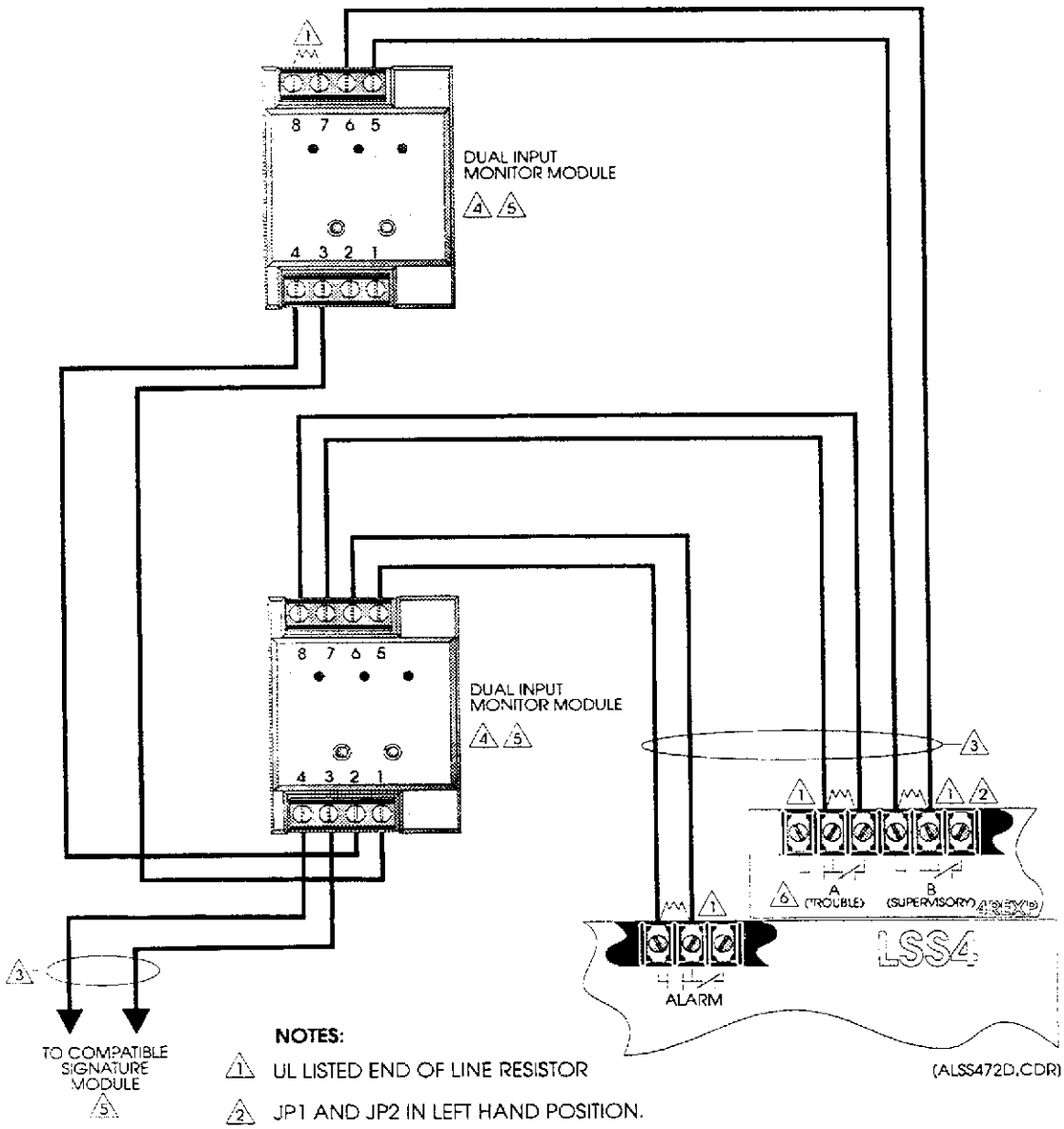


Figure 2-6: LSS4 NFPA 72 Central Station

Note: Trouble notification may be delayed 6 hours for AC brownout conditions



NOTES:

1. UL LISTED END OF LINE RESISTOR
2. JP1 AND JP2 IN LEFT HAND POSITION.
3. SUPERVISED AND POWER LIMITED
4. INSTALL MONITOR MODULES WITHIN 20 FEET OF LSS4 PANEL AND IN SAME ROOM.
5. REFER TO THE SIGNATURE MODULE MANUAL.
6. RELAY NORMALLY ENERGIZED AND CONTACTS ARE OPPOSITE OF THOSE SHOWN.

Figure 2-7: LSS4 NFPA 72 Proprietary Station Wiring

Note: Trouble notification may be delayed 6 hours for AC brownout conditions.

MBPR Master Box Reverse Polarity Module Rev B

Table 2-4: MBPR City Tie Module Specifications

Standby Current	37 mA
Local Energy Master Box Output	
Maximum Voltage	24 VDC
Maximum current	275 mA Momentary Pulse
Maximum Impedance	2 KΩ
Reverse Polarity Output	
Maximum Voltage	24 VDC
Maximum Current	7 mA
Maximum Impedance	50 Ω

Installation

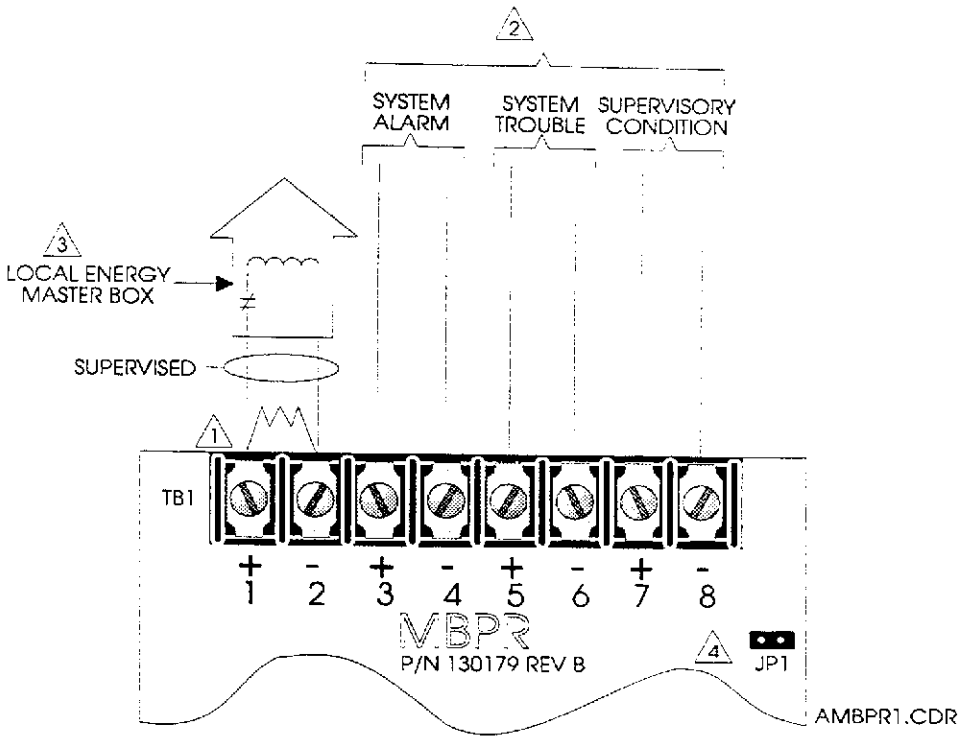
Refer to Figure 2-2, or Figure 2-3, or Figure 2-4, and Figure 2-8: MBPR Wiring

1. Remove the LSS4 front cover plate (5,6).
2. Remove the LSS4 master panel assembly from the enclosure (4,2).
3. Set jumper JP1 for desired operation. (See MBPR Output State List)
4. Plug the MBPR module (8) into the horizontally oriented connector on the back upper edge of the LSS4 master panel assembly, next to the power supply.
5. Secure the MBPR board to the mounting frame with machine screws (3).
6. Reinstall the LSS4 master panel assembly in the enclosure (2,4).
7. Reinstall the LSS4 front cover plate on the LSS4 assembly (5,6).

Table 2-5: MBPR Output State List

Module Configured as⇨	**Master Box**		**3 Circuit Configuration (JP1 IN)**						**1 Circuit configuration (JP1 OUT)**	
TERM	1	2	3	4	5	6	7	8	3	4
System State⇩	**Output Polarity**									
NORMAL	+	-	+	-	+	-	+	-	+	-
ALARM	+	-	-	+	+	-	+	-	-	+ See Note 1
SUPERVISORY	N/A	N/A	+	-	+	-	-	+	0	0
TROUBLE	N/A	N/A	+	-	-	+	+	-	0	0

Note 1: When in alarm -- trouble or supervisory conditions do not effect the circuit.



NOTES:

1. INSTALL 3.9K EOL P/N 260001IF NO MASTER BOX CONNECTION.
2. INTENDED FOR CONNECTION TO A POLARITY REVERSAL CIRCUIT OF A REMOTE STATION RECEIVING UNIT HAVING COMPATIBLE RATINGS.
3. LOCAL ENERGY MASTER BOX OUTPUT: 24VDC, 275 mA. (14.5 OHM COIL) REVERSE POLARITY OUTPUT: 24VDC, 7mA. MAXIMUM IMPEDENCE: 50 OHMS.
4. 5. JP1 OUT FOR 1 CIRCUIT (TERMS 3 AND 4) ALARM, SUPERVISORY, & TROUBLE CONFIGURATION. REVISION A DOES NOT SUPPORT THIS FEATURE.

Figure 2-8: MBPR Wiring

4CLA Style D (Class A) Module

Table 2-7: 4CLA Class A Card Specifications

Standby current	10 mA
Circuit trouble current	18 mA

Installation of a 4CLA on the LSS4 Master Panel Assembly.

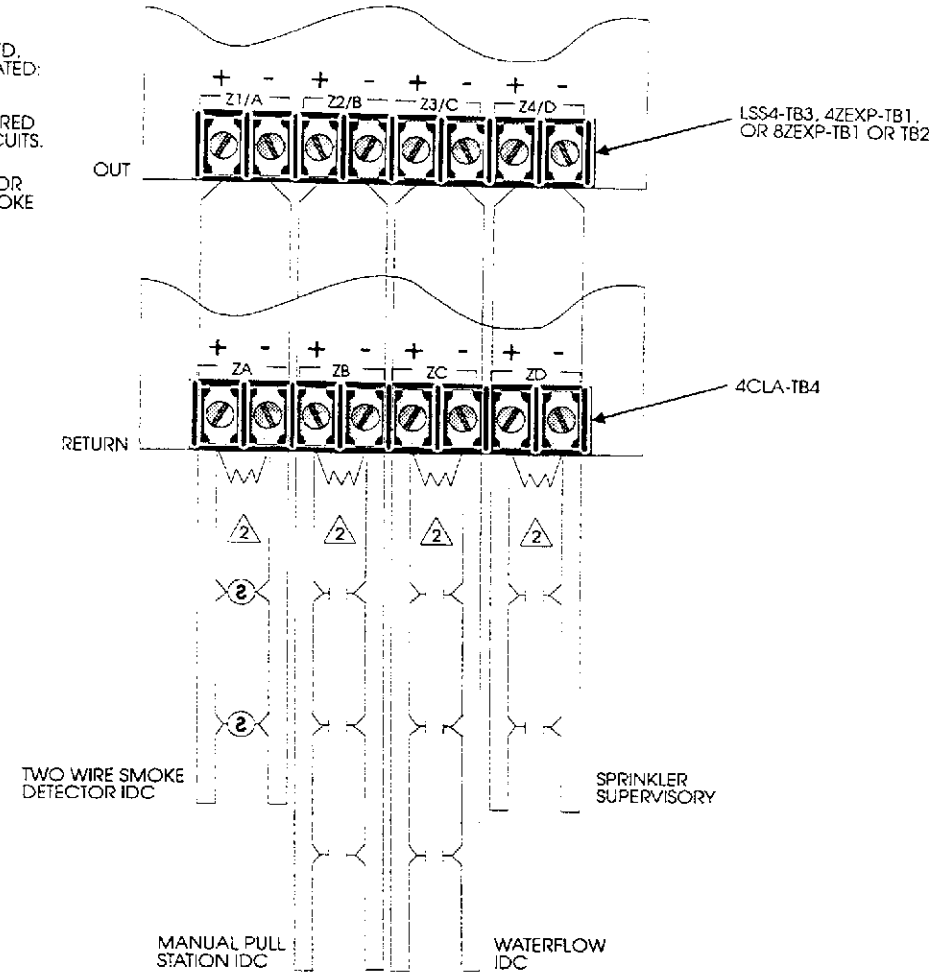
1. Remove the LSS4 front cover plate (6,5).
2. Remove the LSS4 master panel assembly from the enclosure (4,2).
3. Plug the 4CLA (7) module into the vertically oriented connector on the back lower edge of the LSS4 master panel assembly, next to the power supply.
4. Secure the 4CLA board to the mounting frame with machine screws (3).
5. Reinstall the LSS4 master panel assembly in the enclosure (2,4).
6. Reinstall the LSS4 front cover plate on the LSS4 master panel (5,6).

Installation of a 4CLA on a 4ZEXP or 8ZEXP Module

1. Remove the expansion frame (16) from the enclosure.
2. The 4ZEXP or 8ZEXP zone expansion module(s) (11 or 12) should be installed on the frame. (See 4ZEXP or 8ZEXP installation instructions.)
3. Plug the 4CLA module (7) into the vertically oriented connector on the back lower edge of the 4ZEXP or 8ZEXP module (11 or 12).
4. Secure the board to the mounting frame with machine screws (3).
5. Install the expansion frame in the enclosure with threaded spacers (4).
6. Install the front cover plate with machine screws (10,6).

NOTES:

1. ALL CIRCUITS SUPERVISED, POWER LIMITED AND RATED: 24VDC, 5mA.
2. 3.9 EOL RESISTOR REQUIRED ACROSS ALL 4CLA CIRCUITS.
3. REFER TO APPENDIX 2 FOR COMPATIBLE 2 WIRE SMOKE DETECTORS.



(A4CLA1B.CDR)

Figure 2-10: 4CLA Wiring

4CLA Style D (Class A) Module

Table 2-7: 4CLA Class A Card Specifications

Standby current	10 mA
Circuit trouble current	18 mA

Installation of a 4CLA on the LSS4 Master Panel Assembly.

1. Remove the LSS4 front cover plate (6,5).
2. Remove the LSS4 master panel assembly from the enclosure (4,2).
3. Plug the 4CLA (7) module into the vertically oriented connector on the back lower edge of the LSS4 master panel assembly, next to the power supply.
4. Secure the 4CLA board to the mounting frame with machine screws (3).
5. Reinstall the LSS4 master panel assembly in the enclosure (2,4).
6. Reinstall the LSS4 front cover plate on the LSS4 master panel (5,6).

Installation of a 4CLA on a 4ZEXP or 8ZEXP Module

1. Remove the expansion frame (16) from the enclosure.
2. The 4ZEXP or 8ZEXP zone expansion module(s) (11 or 12) should be installed on the frame. (See 4ZEXP or 8ZEXP installation instructions.)
3. Plug the 4CLA module (7) into the vertically oriented connector on the back lower edge of the 4ZEXP or 8ZEXP module (11 or 12).
4. Secure the board to the mounting frame with machine screws (3).
5. Install the expansion frame in the enclosure with threaded spacers (4).
6. Install the front cover plate with machine screws (10,6).

NOTES:

1. ALL CIRCUITS SUPERVISED, POWER LIMITED AND RATED: 24VDC, 5mA.
2. 3.9 EOL RESISTOR REQUIRED ACROSS ALL 4CLA CIRCUITS.
3. REFER TO APPENDIX 2 FOR COMPATIBLE 2 WIRE SMOKE DETECTORS.

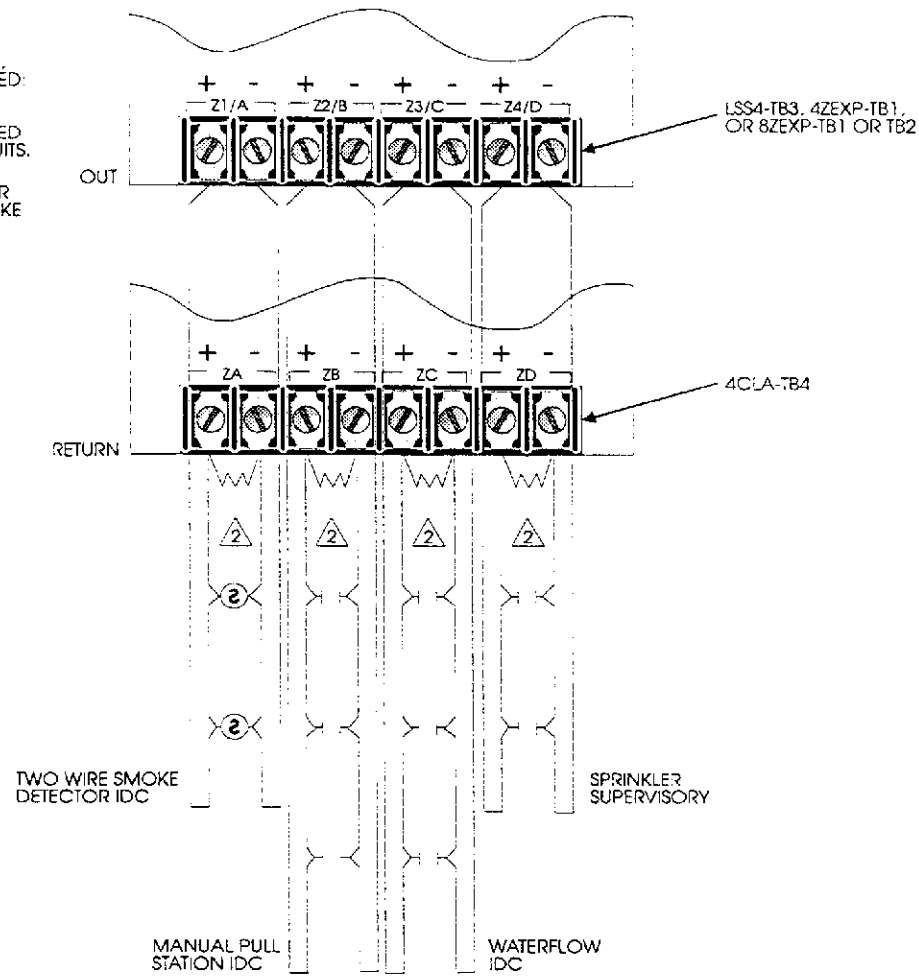


Figure 2-10: 4CLA Wiring

4ZEXP Four Zone Expansion Module

Table 2-8: 4ZEXP Four Zone Expansion Module Specifications

Standby current	86 mA
Alarm Current	86mA + 61 mA/ Alarmed Zone
Initiating Device Circuits	
Voltage	16.1 to 26.48 VDC
Total Supervisory Current per zone	9 mA
Maximum Short circuit current/zone	70 mA
EOL Resistor	3.9 KΩ
Module space required	One
Open Collector outputs per zone	30 VDC, 100 mA., current sink
European Mode (Style C) Short Circuit Resistance	100 Ω

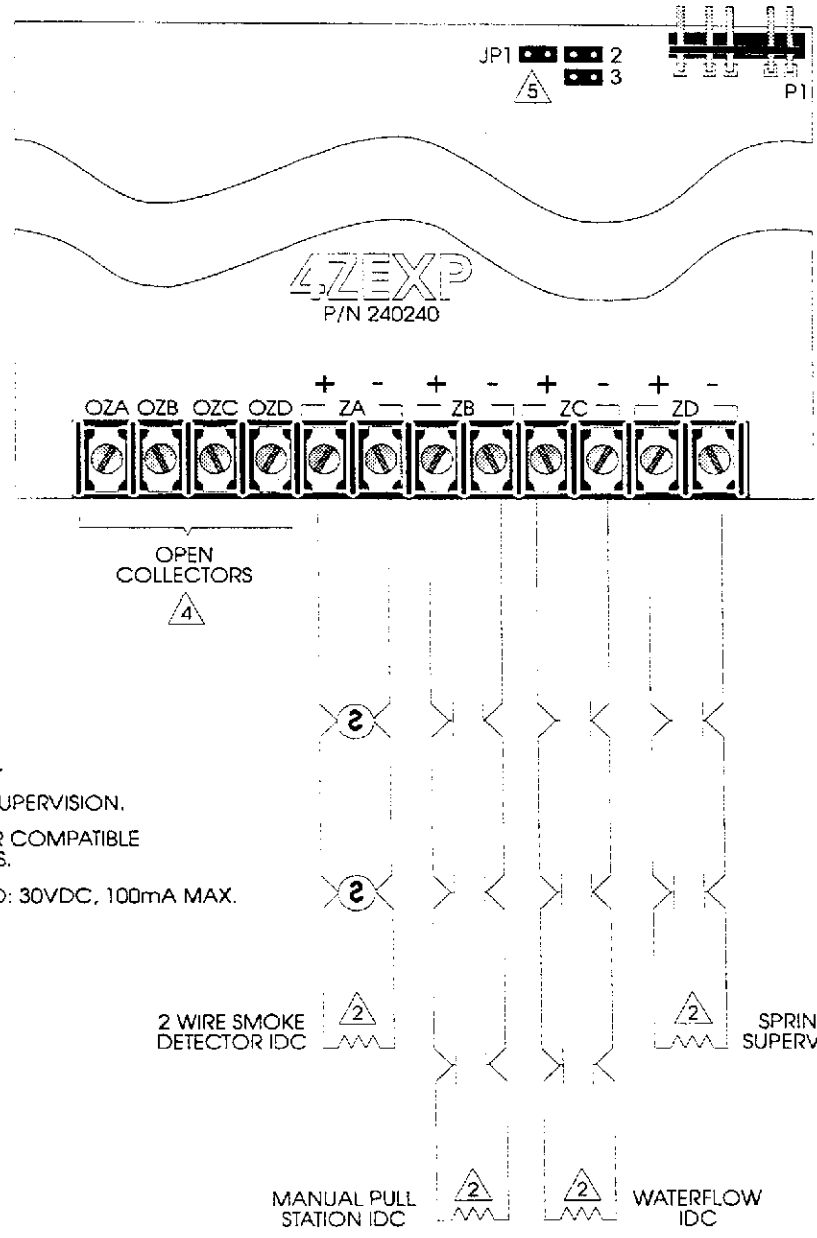
Installation

Refer to Figure 2-2, or Figure 2-3, or Figure 2-4, and Figure 2-11.

1. Remove the expansion module front cover plate and mounting frame from the enclosure (6, 10, 4).
2. Set the address of the 4ZEXP module per Table 2-9. Any module in any panel location may have any address. No duplicate addresses.
3. Install the module on the nylon standoffs on front of the expansion frame (16).
4. Install any 4CLA class A option modules (7) and 4REXP relay option modules (9) required. Refer to module installation instructions.
5. Connect the power/data cable (P/N 250150) from P7 of the LSS4 master panel assembly to P1 of the 4ZEXP module(s).
6. Re-install the expansion frame in the enclosure (16,4).
7. Install the front cover plate on the expansion frame (10,6).
8. Reconfigure panel.

Table 2-9: 4ZEXP Addressing

Address	JP3	JP2	JP1
1	OUT	OUT	IN
2	OUT	IN	OUT
3	OUT	IN	IN
4	IN	OUT	OUT
5	IN	OUT	IN
6	IN	IN	OUT
7	IN	IN	IN



NOTES:

1. ALL CIRCUITS SUPERVISED AND RATED: 24VDC, 3mA.
2. 3.9K EOL REQUIRED FOR SUPERVISION.
3. REFER TO APPENDIX 2 FOR COMPATIBLE 2 WIRE SMOKE DETECTORS.
4. OPEN COLLECTORS RATED: 30VDC, 100mA MAX.
5. VALID ADDRESSES: 1 TO 7.

(A4ZEXP1.CDR)

Figure 2-11: 4ZEXP Wiring

8ZEXP Eight Zone Expansion Module

Table 2-10: 8ZEXP Eight Zone Expansion Card, Rev. B Specifications*

Standby Current	116 mA
Alarm Current	116 mA + 11 mA/ Alarmed Zone
Initiating Device Circuits	
Voltage	16.1 to 26.48 VDC
Supervisory Current / zone	9 mA
Maximum Short circuit current	18 mA
EOL Resistor	3.9 KΩ
Module space required	two
Open Collector outputs per zone	30 VDC, 100 mA., current sink
European Mode (Style C) Short Circuit Resistance	100 Ω

*All Revision "B" 8ZEXP Cards work in European Mode.

Installation

Refer to Figure 2-2, or Figure 2-3, or Figure 2-4.

Note: The 8ZEXP, Revision B must be used for LSS4/52 panel applications.

1. Remove the expansion module front cover plate and mounting frame from the enclosure (6,10,4).
2. Set the addresses of the 8ZEXP module (Table 2-11).The 8ZEXP module requires two (2) addresses. Use the jumpers to set the lowest of the two addresses assigned to the module.
3. Install the module on the nylon standoffs on front of the expansion frame (16).
4. Install any 4CLA Class A or 4REXP option modules (7,9).
5. Connect the power/data cable (P/N 250150) from P7 of the LSS4 master panel assembly to P5 of the 8ZEXP module.
6. Re-install the expansion frame in the enclosure (16,4).
7. Install the front cover plate on the expansion frame (10,6).
8. Reconfigure panel. Refer to Chapter 3.

Table 2-11: 8ZEXP Addressing

Address	JP4	JP3	JP2	JP1
1	OUT	OUT	OUT	IN
2	OUT	OUT	IN	OUT
3	OUT	OUT	IN	IN
4	OUT	IN	OUT	OUT
5	OUT	IN	OUT	IN
6	OUT	IN	IN	OUT
7	OUT	IN	IN	IN
8	IN	OUT	OUT	OUT
9	IN	OUT	OUT	IN
10	IN	OUT	IN	OUT
11	IN	OUT	IN	IN
12	IN	IN	OUT	OUT
13	IN	IN	OUT	IN

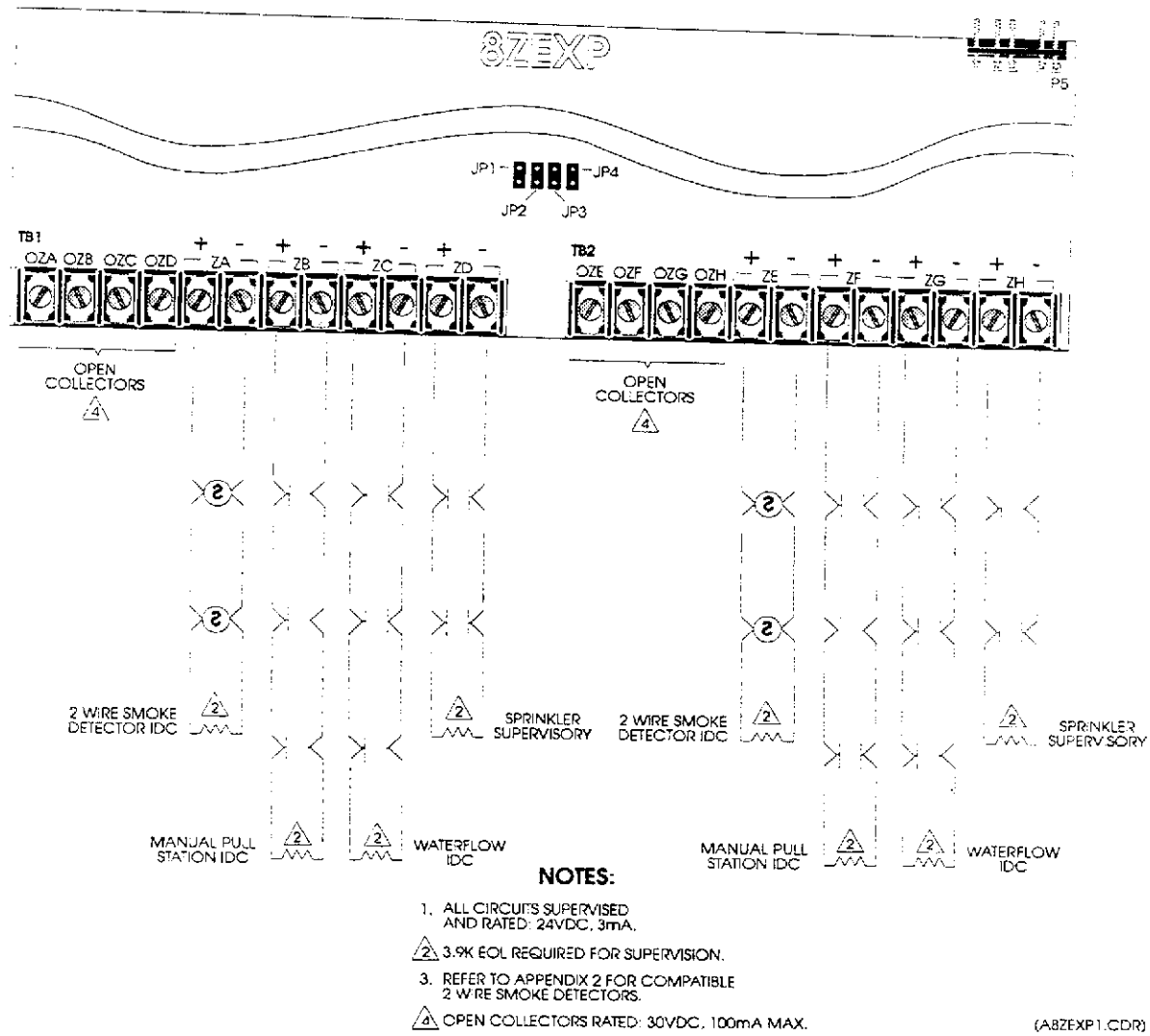


Figure 2-12: 8ZEXP Wiring

4IAC Notification Appliance Circuit Module

Table 2-12: 4IAC Notification Appliance Circuit Module Specifications

Voltage	19.7- 26.7 VDC
Maximum Current per circuit	3 1/2 A
EOL Resistor	15 KΩ
Total Supervisory current	35 mA
Alarm current	35 mA + 23 mA /Active Circuit
Module space required	one

Installation

Refer to Figure 2-2, or Figure 2-3, or Figure 2-4, and Figure 2-13.

Note: A LSSPS Power Supply is required to power 4IAC Modules.

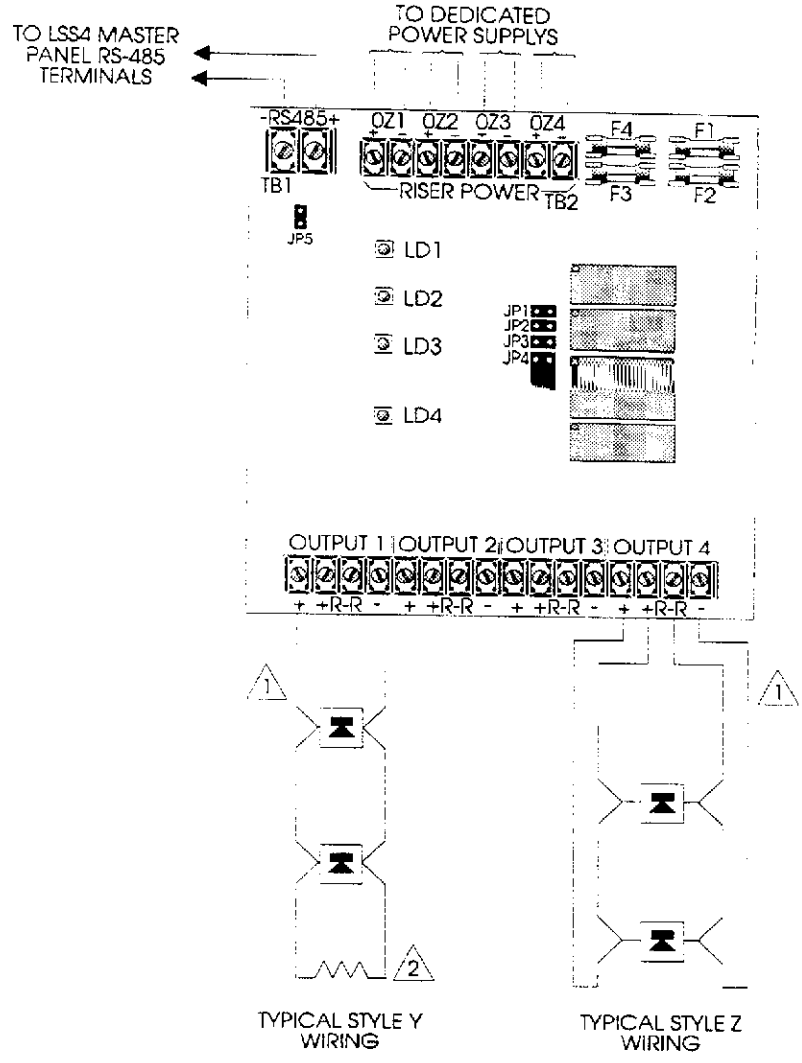
1. Remove the front cover plate and mounting frame from the enclosure (I6,10,4)
2. Install the 4IAC board on the nylon standoffs on front of the expansion frame(16)
3. Re-install the expansion frame in the enclosure (16,4)
4. Set jumpers JP1, JP2, JP3, & JP4 to the address of the 4IAC Module per the worksheet and the 4IAC address table. Duplicate addresses are not permitted.
5. Install jumper JP5 if this is the last module on the RS-485 control circuit.

Table 2-13: 4IAC Module Fuses

4IAC Fuses	PROTECTED CIRCUIT
F1: SFE-4, 4 Amp	IAC #4
F2: SFE-4, 4 Amp	IAC #1
F3: SFE-4, 4 Amp	IAC #3
F4: SFE-4, 4 Amp	IAC #2

Table 2-14: 4IAC Addressing 4IAC Addressing

Address	JP4	JP3	JP2	JP1
1	OUT	OUT	OUT	IN
2	OUT	OUT	IN	OUT
3	OUT	OUT	IN	IN
4	OUT	IN	OUT	OUT
5	OUT	IN	OUT	IN
6	OUT	IN	IN	OUT
7	OUT	IN	IN	IN
8	IN	OUT	OUT	OUT
9	IN	OUT	OUT	IN
10	IN	OUT	IN	OUT
11	IN	OUT	IN	IN
12	IN	IN	OUT	OUT
13	IN	IN	OUT	IN
14	IN	IN	IN	OUT



NOTES:

1. SUPERVISED
2. 15K OHM EOL RESISTOR P/N 260003.
3. NOTIFICATION CIRCUITS MAX. RATED 24VDC AT 3.5 A.
4. POLARITY IS SHOWN IN SUPERVISORY CONDITION.
5. DO NOT EXCEED OUTPUT RATING OF POWER SUPPLY.

(A4IACB.CDR)

Figure 2-13: 4IAC Wiring

Additional 4IAC to LSS4 and LSSPS interconnecting wiring information may be found in the LSSPS section.

LSSPS, 120 VAC Auxiliary Power Supply and LSSPS/220 Auxiliary Power Supply

Table 2-15: LSSPS Auxiliary Power Supply Module LSSPS/220 Auxiliary Power Supply Module Specifications

Input Voltage (120 VAC Model)	120 VAC, 2A, 60 Hz
Input Voltage (230 VAC Model)	230 VAC, 1.5A, 50 Hz
Temperature	0 - 49C (32 - 120F)
Humidity	85% Non-Condensing
Battery Charger (Note 3)	30 AH Max. @ 24 VDC
Maximum Charging Current	1.52A
Maximum Auxiliary current	1.5 A
Maximum Output Current	3.5 A
Maximum Wire Size, any terminal	12 AWG
Dedicated Power Supply space required	one

Note: A single auxiliary power supply, model LSSPS, may be configured to increase battery charging capacity to 50 AH.

Installation

Refer to Figure 2-2, or Figure 2-3, or Figure 2-4, and Figure 2-14.

1. Remove the power supply front cover plate and mounting frame from the enclosure.
2. Install the top power supply board on the nylon standoffs on front of the expansion frame (17).
3. Install the bottom LSSPS board (13)
4. Re-Install the expansion frame in the enclosure (17,4).
5. Set jumpers JP1, JP2, JP3, & JP4 on the top board to the address of the LSSPS module from the worksheet and Addressing Table 5. Duplicate addresses are *not* permitted
6. Install jumper JP5 on the top board if this is the last module on the RS-485 control circuit.
7. Removal of the lower board "suitcase" jumper JP2 disables the battery charger on this power supply, if required. The base LSS4 charger and a single LSSPS charger circuit may be wired in parallel to increase charger capacity to 50 AH.
8. Install the power supply cover plate on the expansion frame.

Table 2-16: LSSPS Addressing

Address	JP4	JP3	JP2	JP1
1	OUT	OUT	OUT	IN
2	OUT	OUT	IN	OUT
3	OUT	OUT	IN	IN
4	OUT	IN	OUT	OUT
5	OUT	IN	OUT	IN
6	OUT	IN	IN	OUT
7	OUT	IN	IN	IN
8	IN	OUT	OUT	OUT
9	IN	OUT	OUT	IN
10	IN	OUT	IN	OUT
11	IN	OUT	IN	IN
12	IN	IN	OUT	OUT
13	IN	IN	OUT	IN
14	IN	IN	IN	OUT

Note: JP5 - Terminating Jumper, install on top board if this is the last module on the RS-485 control circuit.

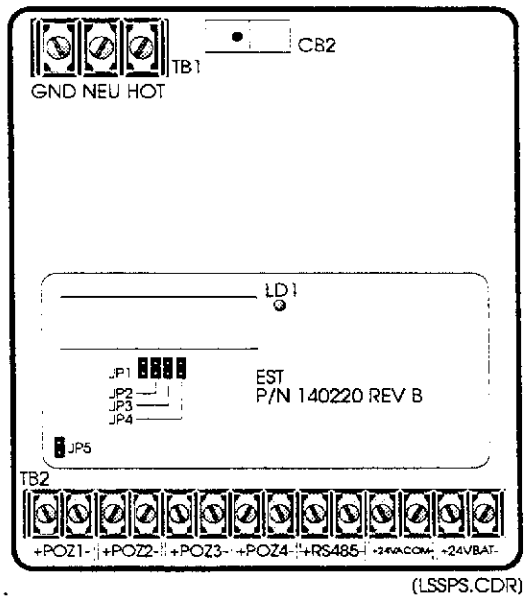


Figure 2-14: LSSPS Front View

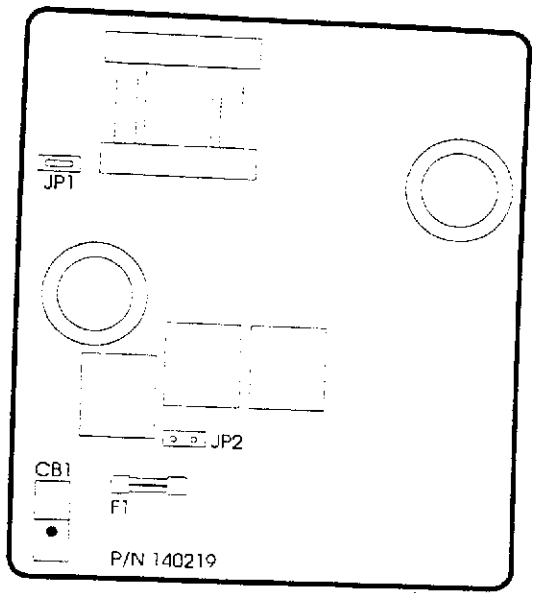


Figure 2-15: LSSPS, Rear View

Note: Do not exceed the 3.5 A output capacity of the power supplies.

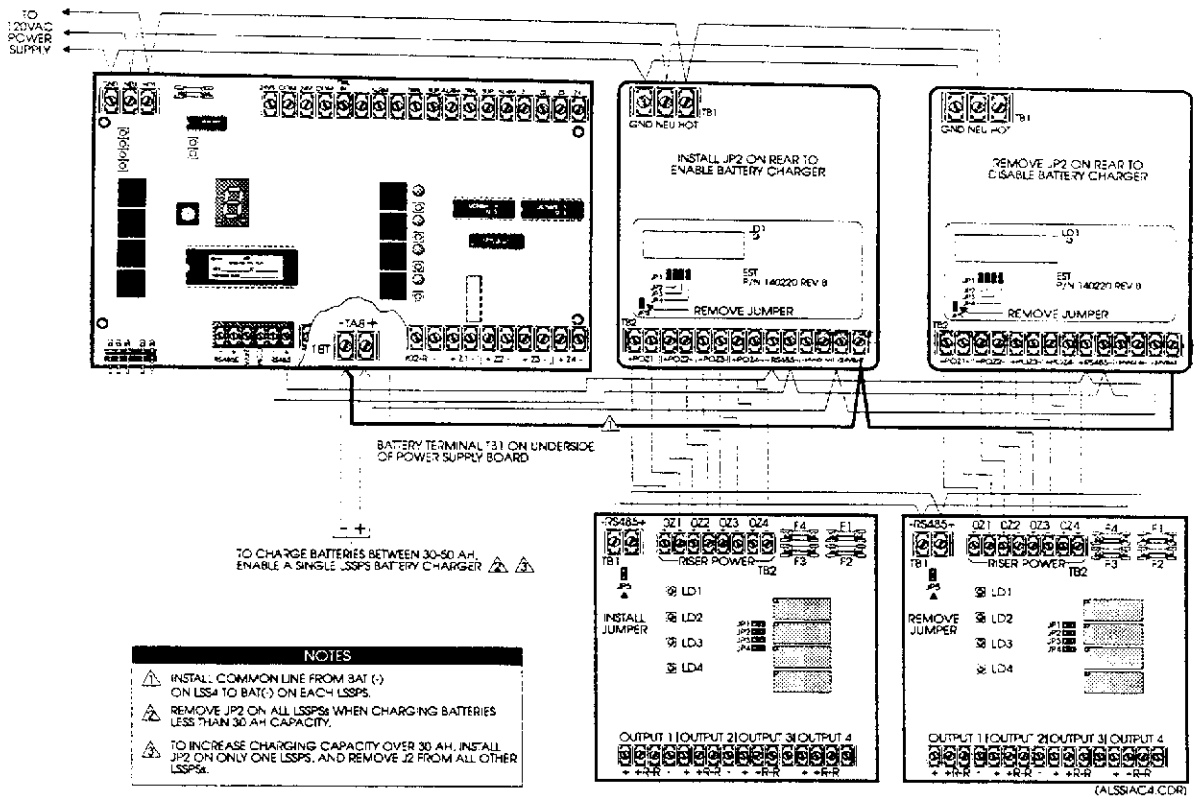


Figure 2-16: Typical LSS4 to LSSPS to 4IAC Wiring

RMOD Releasing Module

Table 2-17: RMOD Releasing Module Specifications

NOTE: A maximum of two RMOD Modules may be used with an LSS4/12, LSS4/36, or LSS4/52.	
Voltage	16.1 - 26.48 VDC
Standby Current	65 mA
Alarm Current	375 mA
Initiating Device Circuits STYLE B & C EOL Style C Series Resistor, smoke detector Style C Series Resistor, dry contact devices	 3.9 KΩ 220 Ω 680 Ω
Manual Release Circuit EOL Series Resistor	 6.8 KΩ 2.0 KΩ
Abort Circuit EOL Series Resistor	 6.8 KΩ 2.0 KΩ
PSI Supervisory Circuit EOL Discharge Warning Notification Appliance Circuit EOL Agent release solenoid	 6.8 KΩ 24 VDC @ 0.75 A 15 KΩ 24 VDC @: 1A total both circuits - continuous mode 2A total both circuits - 1 second pulse mode
Alarm & Pre-discharge relay	120 VAC, 30 VDC @ 2 A, Max., inductive .35 pF
Time Delay - manual release	0 - 30 seconds in 10 second increments
Time Delay - automatic release	15 - 60 seconds in 15 second increments
Module space required	one

RMOD Installation Instructions

Refer to Figure 2-2, or Figure 2-3, or Figure 2-4.

1. Remove the expansion module front cover plate and mounting frame from the enclosure (6,10,4).
2. Install the top module board on the nylon standoffs on front of the expansion frame (16).
3. Install the bottom RMOD board (13B)
4. Connect the power/data cable (P/N 250150) from P7 of the LSS4 assembly to P5 of the RMOD module(s).
5. Re-install the expansion frame in the enclosure (16,4).
6. Set jumpers JP1, JP2, JP3 & JP4 for the address of the RMOD module per Table 2-23. Any module in any panel location may have any address. Duplicate addresses are not permitted.
7. Set Jumpers JP5 & JP6 for the desired RMOD configuration per Table RM6 . Set switches SW4-1 through SW4-8 per Table 2-18 to Table 2-22 for the desired RMOD configuration.
8. Install the front cover plate on the expansion frame (10,6).

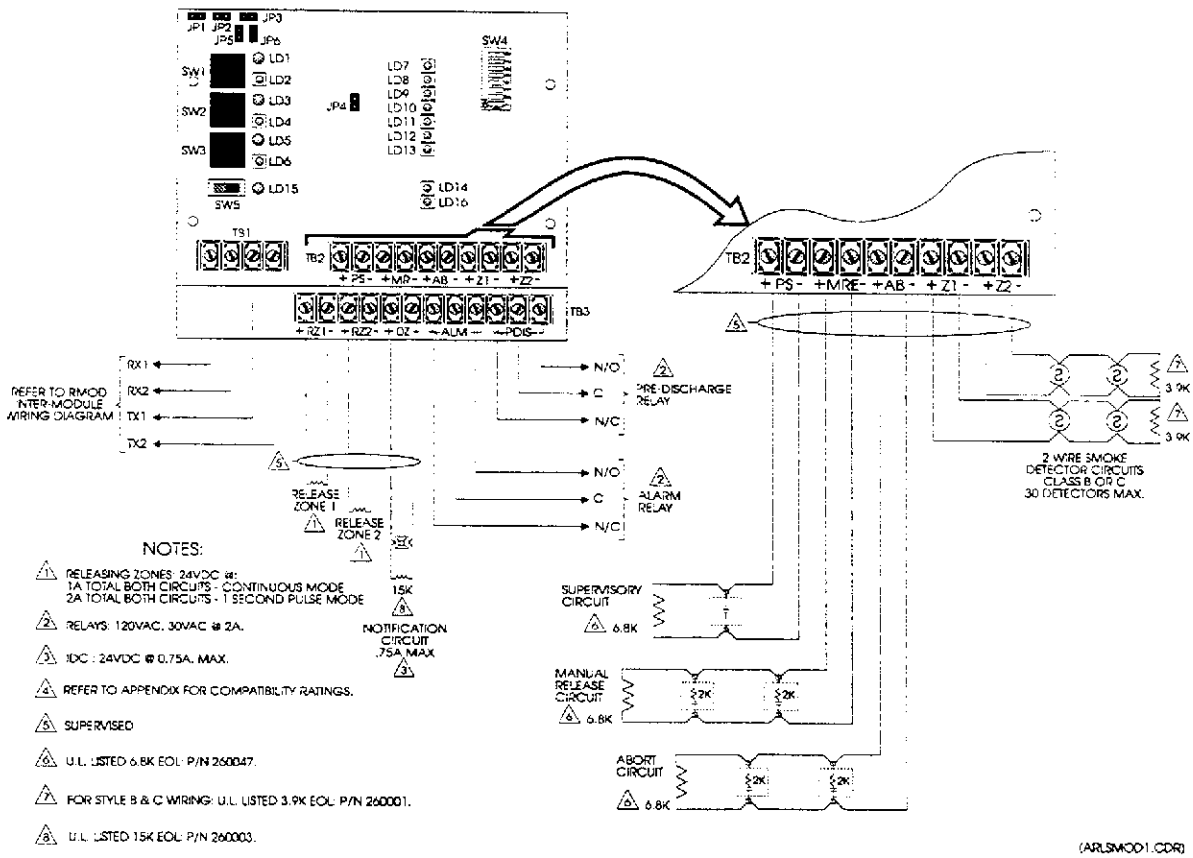


Figure 2-17: RMOD Wiring

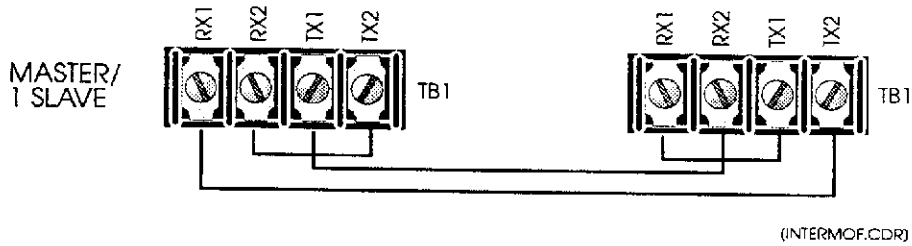


Figure 2-18: RMOD Inter Module Wiring

RMOD WIRING

Refer to Figure 2-17, and Figure 2-18.

1. Wire the inter-RMOD connections within a master/slave RMOD module group serving a related hazard(i.e. room and under floor). The Master/Slave connections are made to TB1 per Figure 2-18.
2. Connect the RMOD Field wiring:

TB2-1 (+), TB2-2 (-)

Pressure Supervisory Circuit. N.O. Dry contact used to monitor extinguishing agent level. 2.0 KΩ series resistor required in series with switch. 6.8 KΩ EOL resistor required.

TB2-3 (+), TB2-4 (-)

Manual Discharge Initiating Device Circuit. 2.0 KΩ resistor required in series with contact. 6.8 KΩ EOL resistor required.

TB2-5 (+), TB2-6 (-)

Abort Initiating Circuit. 2.0 KΩ resistor required in series with contact. 6.8 KΩ EOL resistor required. When used in the master/slave configuration, the abort initiating circuit must be wired to the master RMOD module.

TB2-7 (+), TB2-8 (-)

Initiating Device Circuit #1.

Style B - 3.9 KΩ EOL required.

Style C - 3.9 KΩ EOL required.

TB2-9 (+), TB2-10 (-)

Initiating Device Circuit #2.

Style B - 3.9 KΩ EOL required.

Style C - 3.9 KΩ EOL required.

TB3-1 (+), TB3-2 (-)

Agent Release Solenoid Circuit #1. Maximum solenoid coil resistance

2.0 KΩ.

Note: Maximum current limits: 1 A total both circuits when in continuous mode, 2A total both circuits when in 1 second pulse mode.

TB3-3 (+), **TB3-4** (-)

Agent Release Solenoid Circuit #2. Maximum solenoid coil resistance 2.0 KΩ.

Note: Maximum current limits: 1 A total both circuits when in continuous mode, 2A total both circuits when in 1 second pulse mode.

TB3-5 (+), **TB3-6** (-)

Discharge Warning Indicating Appliance Circuit. 15 KΩ EOL resistor required. When used in the master/slave configuration, the discharge warning indicating appliance circuit must be wired to the slave RMOD module.

TB3-7

(Normally Closed), TB3-8 (Common), TB3-9 (Normally Open) alarm relay. When used in the master/slave configuration, alarm relay wiring must be connected to the slave RMOD module.

TB3-10

(Normally Closed),TB3-11 (Common), TB3-12 (Normally Open)

Pre-Discharge Relay. When used in the master/slave configuration, pre-discharge relay wiring must be connected to the slave RMOD module.

In the master/slave configuration:

- The discharge warning notification appliance circuit wiring must be connected to the slave RMOD.
- The abort switch must be wired to the master RMOD.

RMOD Configuration

Switch Setup

Switches SW4-1 through SW4-8 set determine the RMOD configuration.

Table 2-18: Automatic Release Timer

TIME (SECONDS)	SW4-2	SW4-1
15	OFF	OFF
30	OFF	ON
45	ON	OFF
60	ON	ON

Table 2-19: Manual Release Timer

TIME (SECONDS)	SW4-4	SW4-3
0	OFF	OFF
10	OFF	ON
20	ON	OFF
30	ON	ON

Table 2-20: Release Solenoid Abort Sequence

MODE	SW4-5	MODE	SW4-6
1 Sec. Pulse	On	IRI	On
Continuous	Off	Deadman	Off

Table 2-21: Initiating Device Circuits

CONFIGURATION	SW4-7	SW4-8
Style B	On	Not applicable
Style C	Off	Not applicable
Release on either IDC	Not applicable	On
Cross zoned IDC release	Not applicable	Off

NOTES:

1. Style C circuits generate a trouble condition when shorted or open. A series resistor is required in series with all dry contact initiating devices.
2. Set master and slave time delays to the same value.
3. SW4-7 only affects Zone 1 and Zone 2.

4. **Maximum release current: 1A total both circuits in continuous mode, 2A total both circuits in 1 second pulse mode.**

Table 2-22: RMOD Master / Slave Jumpers

MODE	JP5	JP6
Master	In	In
Slave	Out	In
Disable inter RMOD communication	Don't care	Out

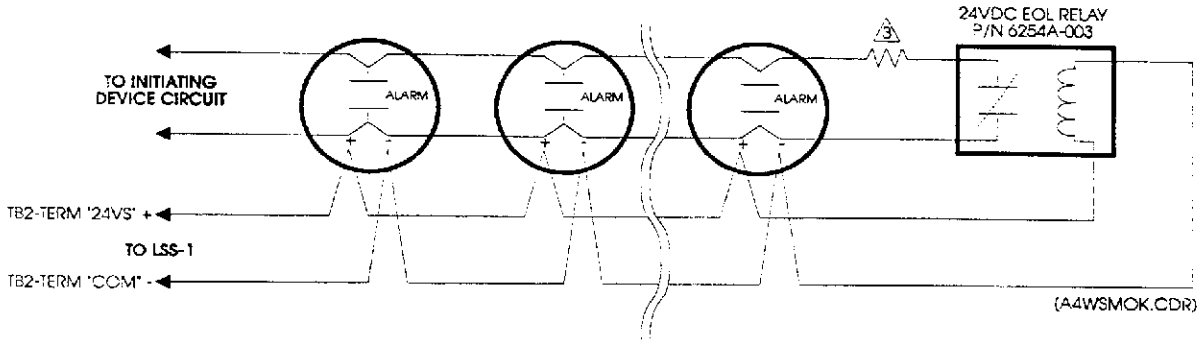
RMOD Address Setup

Jumpers J1, J2, J3, and J4 set the RMOD module address. Set the address of each RMOD module to a unique address, per Table 2-23.

Table 2-23: RMOD Addressing

ADDRESS	JP4	JP3	JP2	JP1
1	OUT	OUT	OUT	IN
2	OUT	OUT	IN	OUT
3	OUT	OUT	IN	IN
4	OUT	IN	OUT	OUT
5	OUT	IN	OUT	IN
6	OUT	IN	IN	OUT
7	OUT	IN	IN	IN
8	IN	OUT	OUT	OUT
9	IN	OUT	OUT	IN
10	IN	OUT	IN	OUT
11	IN	OUT	IN	IN
12	IN	IN	OUT	OUT
13	IN	IN	OUT	IN
14	IN	IN	IN	OUT

Four-Wire Detector Wiring



NOTES:

1. ALL WIRING SUPERVISED AND POWER LIMITED.
2. MAXIMUM SMOKE DETECTOR CURRENT: 500 mA.
3. 3.9K END OF LINE RESISTOR P/N 260001

Figure 2-19: Typical 4-Wire Smoke Detector Wiring

RSA4 Remote Annunciator Installation

OVERVIEW

The RSA4 series remote annunciator is compatible with LSS4 panels using firmware version 1.2 or later. The annunciators utilize multiplex technology to provide annunciation for up to 52 alarm zones and remote control of the master LSS4 panel over two wires. Up to four individual RSA annunciators may be connected to a LSS4 master panel using supervised RS-485 communications. The annunciator components are modular in nature and may be combined as required, to meet job requirements.

DESCRIPTION

The RSA-4 annunciator family consists of the RSA4-CPU Central Processing Unit Module, RSA4-COM Common Control Module, and the SLU-16R LED Module.

RSA4-CPU Central Processor Unit Module

The RSA4-CPU module (Figure 2-20) is the annunciator controller which provides communication between the LSS4 master panel and the annunciator LED modules. Each RSA4-CPU module supports up to four SLU-16R LED modules.

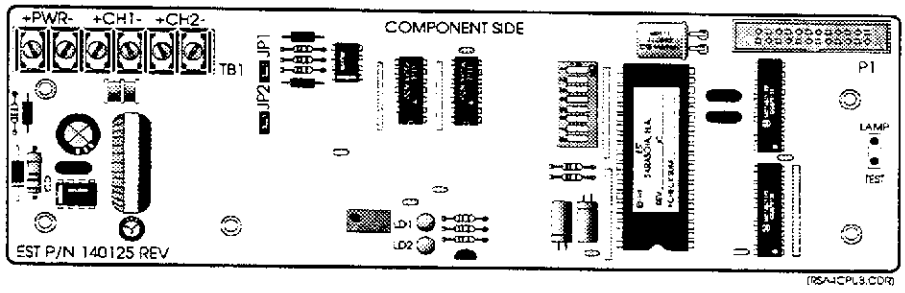


Figure 2-20: RSA4-CPU Central Processing Unit Module

RSA4-COM Common Control Module

The RSA4-COM module (Figure 2-21) provides the common switch and LED functions for the annunciator. LED indicators provided are Alarm, Trouble, Supervisory, and Power. Switches are provided for Alarm Silence, Trouble Silence, Drill/Auto Evacuation Cancel, Reset, and Lamp Test. A key switch is used to Enable or Disable the module switching functions. The RSA4-COM module has an integral buzzer for local audible annunciation.

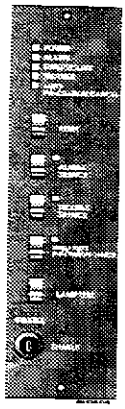


Figure 2-21: RSA4-COM

SLU-16R LED Module

The SLU-16R module (Figure 4) provides 16 Red LEDs for alarm zone annunciation. A removable legend strip is provided for zone identification labels.

Figure 2-22: SLU-16 Module

Annunciator Enclosures

Two semi-flush mount enclosures are available for installing annunciator components. The SAN-4 enclosure (Figure 2-23) accommodates 4 annunciator modules, in addition to the RSA4-CPU module. The SAN-8 enclosure (Figure 2-24) accommodates 8 annunciator modules, in addition to the RSA4-CPU module. Both enclosures are fabricated of 16 gauge steel and finished in textured enamel. The doors are provided with Lexan™ viewing windows and a key lock. Backboxes are provided with conduit knockouts and module mounting studs. The RSAN-6 mounting frame (Figure 2-25) is used to mount up to 6 annunciator modules, and the RSA4-CPU module, in a standard EIA 19" rack enclosure. The RSAN-6 frame is fabricated of .125" aluminum, and has integral module mounting studs.

Application

Up to four RSA-4 annunciators may be connected to a LSS4 master panel. The RS-485 data circuit may have a total length of 4,500' (1,372 m). Each annunciator requires a 24 VDC power source. Power may be derived from the LSS4 panel, LSSPS power supplies, or a 24 VDC power supply local to the annunciator. When using a local power supply, the supply's DC Common must be connected to the DC Common of the LSS4 panel. Annunciator switching functions activated by the RSA4-COM module affect the entire system.

Table 2-24: RSA4 Specifications

RSA4-CPUs per LSS4 Master	4 Maximum
RS-485 Line Length	4,500 (1372 M) Maximum
Addressing	
LSS4 Module Address	15
RSA4 Sub-Addresses	0 to 3
Power	
RSA4-CPU	24 VDC @ 17.6 mA
SLU-16R	Standby = 1.0 mA; Alarm = 6 mA/LED
RSA4-COM	Standby = 7.4 mA; Alarm = 22 mA; Trouble = 20mA
Finished Dimensions (HWD)	
SAN-4	11.5" x 16.0" x 4.0" (29.2cm x 40.6cm x 10.2cm)
SAN-8	11.5" x 27.5" x 4.0" (29.2cm x 69.9cm x 10.2cm)
RSAN-6	10.5" x 19.0" x 2.5" (26.7cm x 48.3cm x 6.4cm)
Rough-in Dimensions (HWD)	
SAN-4	9.5" x 11.25" x 2.5" (24.1cm x 28.6cm x 6.4cm)
SAN-8	9.5" x 23.0" x 2.5" (24.1cm x 58.4cm x 6.4cm)

Installation

Mechanical Installation

The RSA4-CPU module is installed on the back plane of the SAN-4 or SAN-8 enclosures. When using the RSAN-6 frame, the RSA4-CPU is installed on the special bracket perpendicular to the other modules installed in the frame. (Figure 2-23, Figure 2-24, or Figure 2-25).

1. Mount the enclosure at the required location, using the mounting holes provided.
2. Install the annunciator components in the SAN enclosure/frame on the module mounting studs, with the nuts provided.
   Annunciator modules are mounted from left to right, when looking at the front of the panel. The ribbon cables are installed from the RSA4-CPU to the first annunciator module, and then to the other installed modules (Figure 10).
3. Connect per the Electrical Installation section of this document.

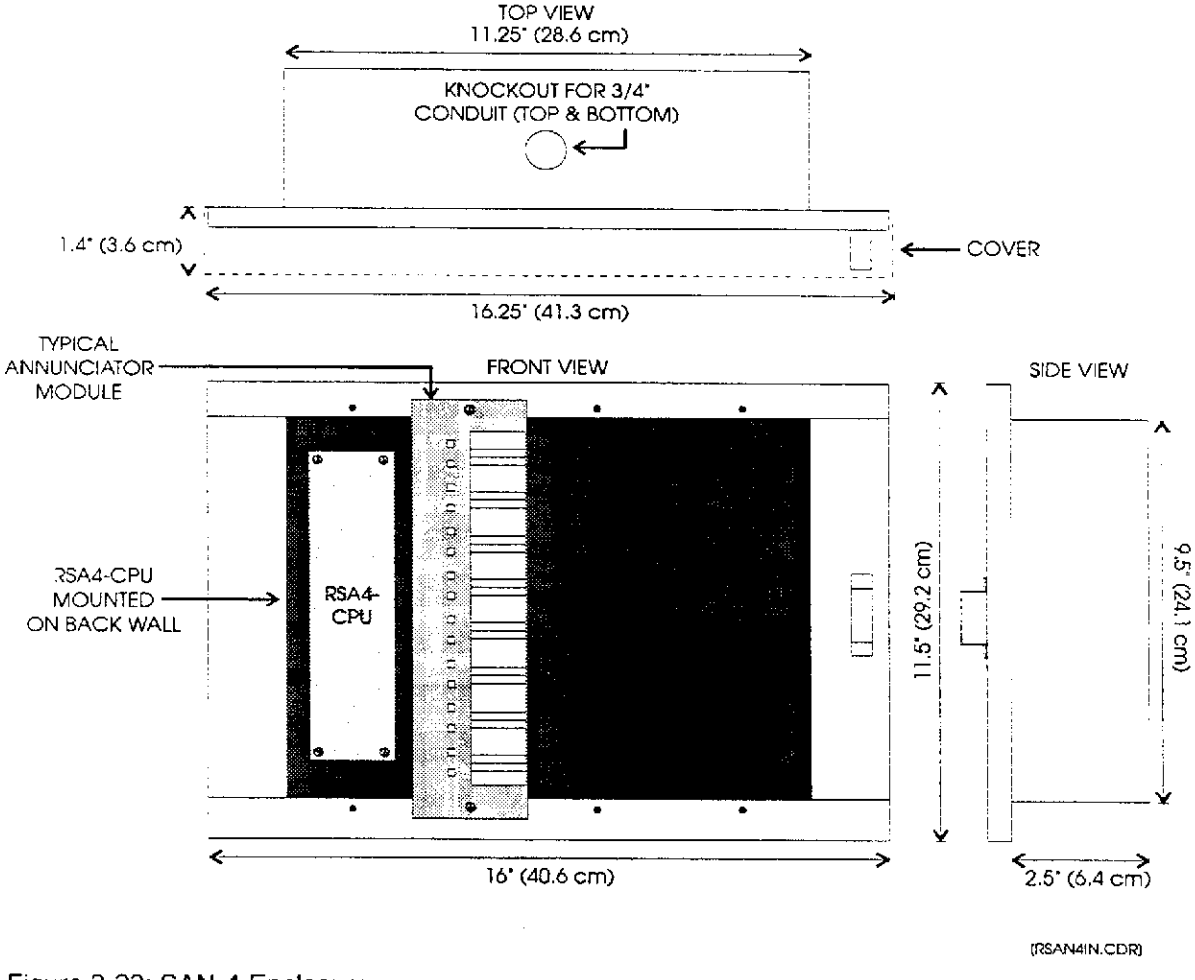


Figure 2-23: SAN-4 Enclosure

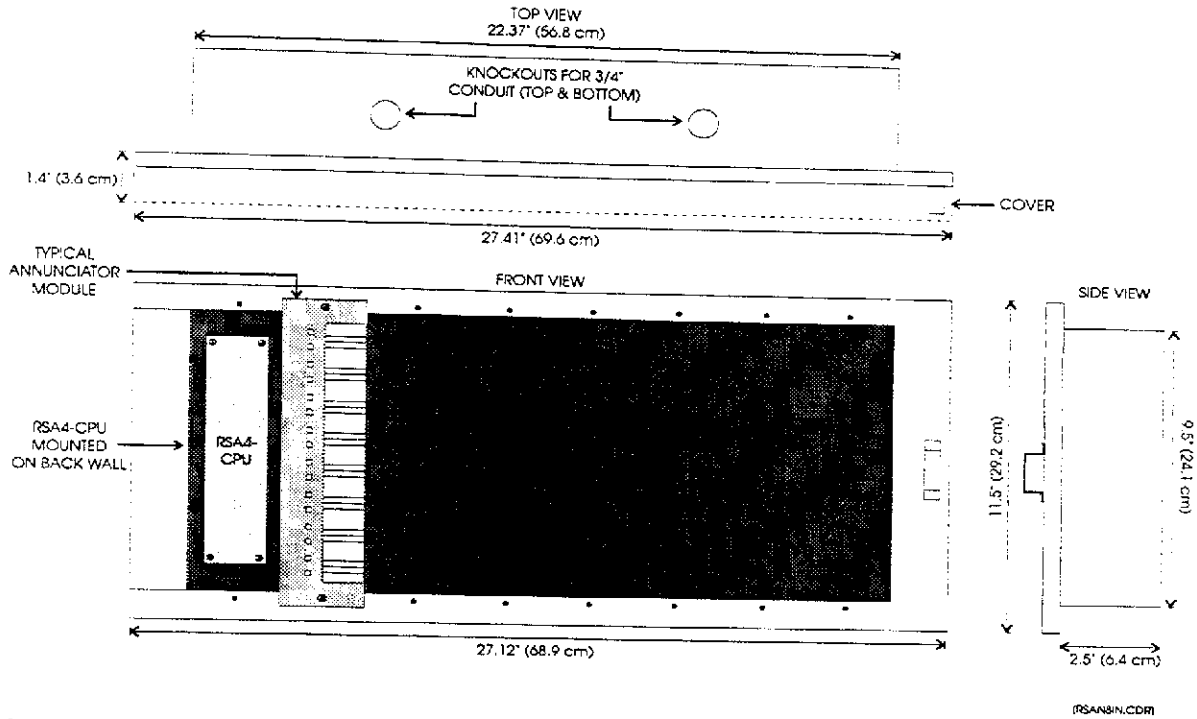


Figure 2-24: SAN-8 Enclosure

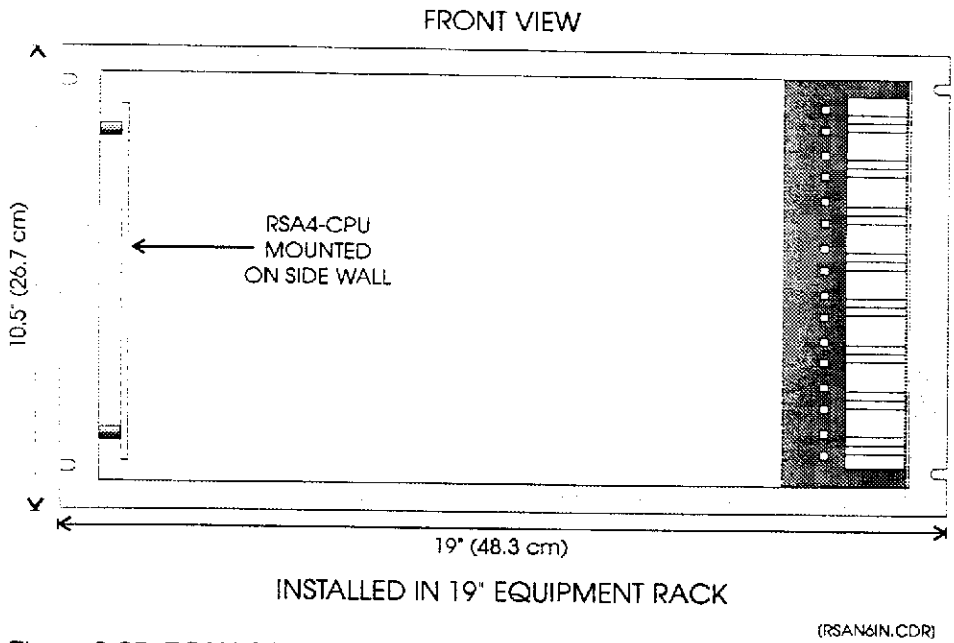


Figure 2-25: RSAN-6 Mounting Frame

Electrical Installation

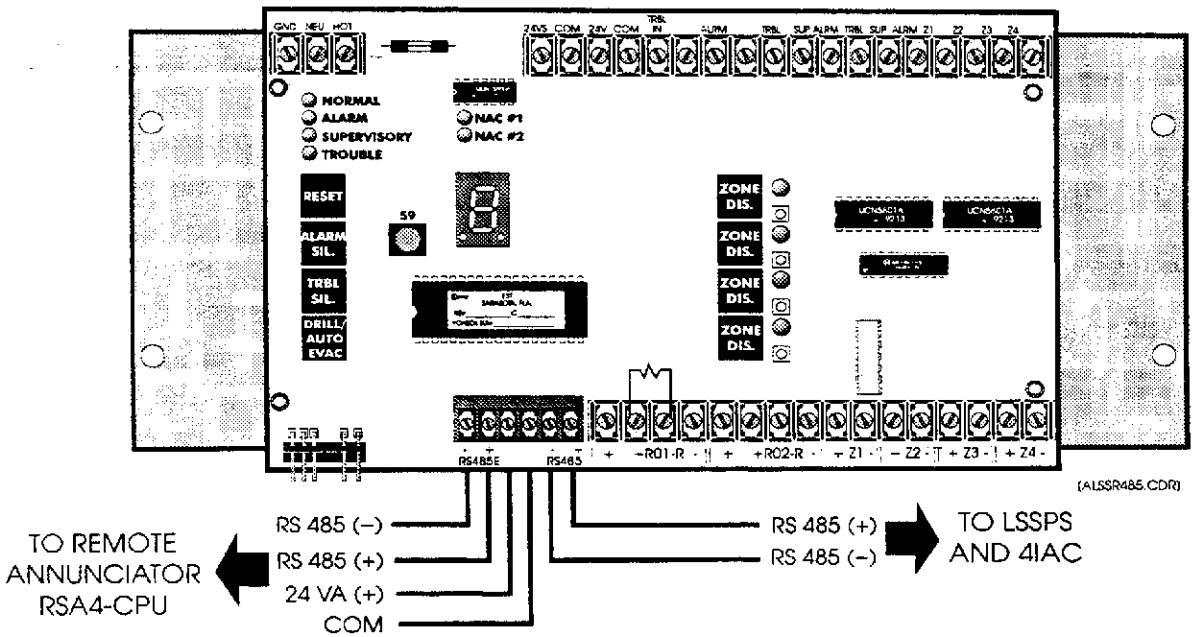


Figure 2-26: LSS4 Master Panel Remote Annunciator Wiring

LSS4 Master Panel

Wiring for remote annunciators is connected to the RS-485E terminals as shown in (Figure 2-26). The RS485"E" terminals provide additional protection for wires leaving the cabinet. Terminate the RS-485 circuit and power wiring as shown in Figure 2-27.

DIP Switch Setup

The RSA4-CPU is automatically set to LSS4 panel address 15-x, where x is the annunciator sub-address. Each annunciator RSA4-CPU Central Processing Unit Module must be assigned a sub-address. Sub-addresses 0-3 may be set on the RSA4-CPU polling address switch per Table 2-25. Do NOT duplicate sub-addresses.

Table 2-25: RSA4-CPU Polling Address Switch Setting

RSA4-CPU Sub-Address	32	16	8	4	2	1
0	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	ON	ON

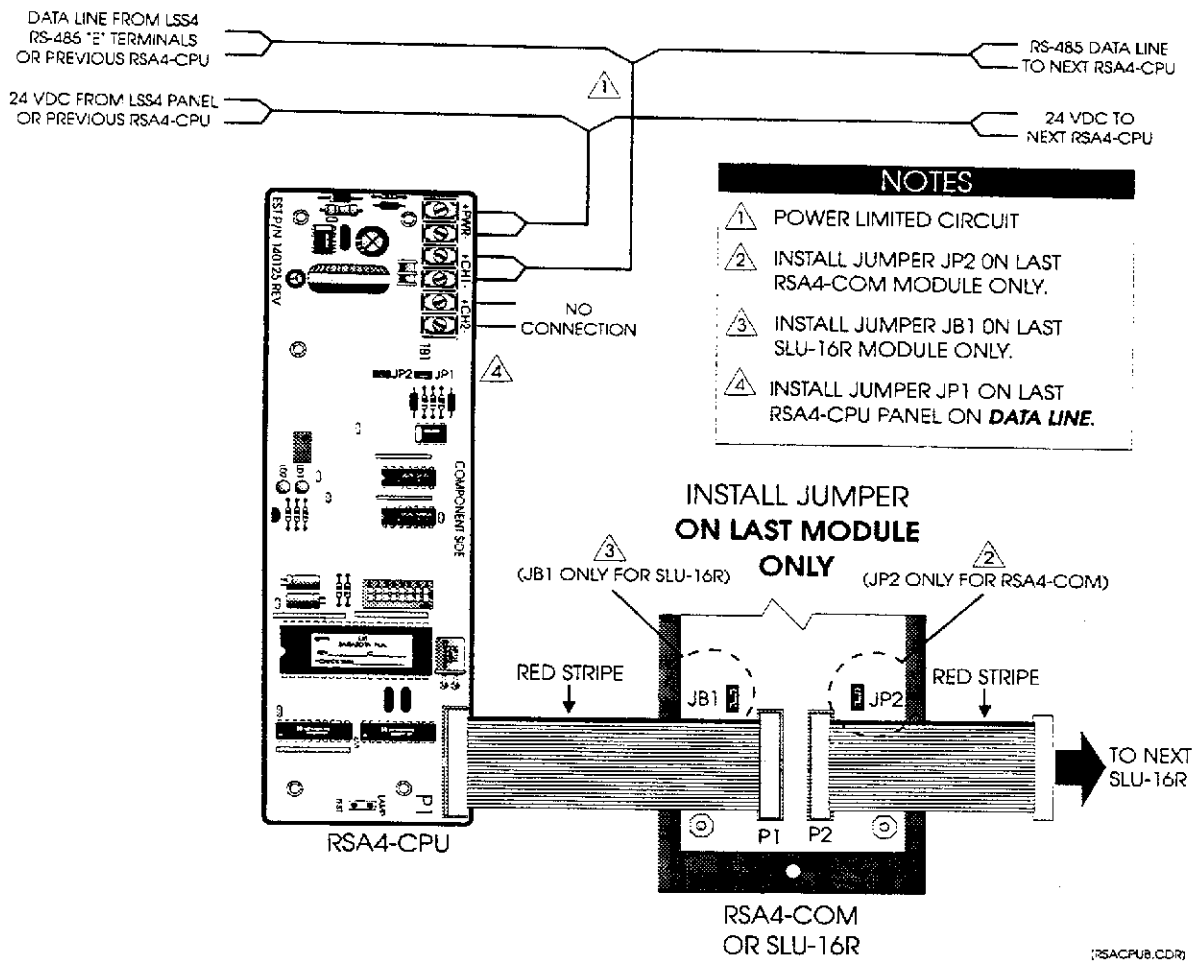


Figure 2-27: RSA4-CPU Connections

RSA4-CPUs may be connected in parallel with CMDN/SMDNs on the LSS4 RS-485 circuit as long as there are no more than four remote annunciators on the circuit, and the annunciator sub-addresses do not conflict. Table 2-26 shows the equivalent sub-address settings for the RSA4-CPU and CMDN/SMDN modules.

Table 2-26: RSA4-CPU / CMDN/SMDN Sub-Address Equivalents

	1ST Sub-Address	2ND Sub-Address	3RD Sub-Address	4TH Sub-Address
RSA4-CPU	0	1	2	3
CMDN/SMDN	1	2	3	4

The "Group Output Address" of each SLU-16R LED module connected to the RSA4-CPU Central Processing Unit Module must be set per Table 2-27.

Table 2-27: Annunciator LED Module "Group Output Address" Switch Settings

	Address Weight			
SLU-16R LED	**1**	**2**	**4**	**8**
Module	**Switch ID**			
	1	**2**	**3**	**4**
A (Zones 1 to 16)	OFF	ON	OFF	OFF
B (Zones 17 to 32)	OFF	OFF	ON	OFF
C (Zones 33 to 48)	OFF	ON	ON	OFF
D (Zones 49 to 54)	OFF	OFF	OFF	ON

Note: The RSA4-COM Common Control Module "Group Output Address" is automatically assigned.

Note: The LED Module ID is independent of its physical location on the ribbon cable.

Jumper Settings

A continuity jumper must be INSTALLED on the SLU-16R (Jumper JB1) or RSA4-COM (Jumper JP2) module that is located electrically farthest on the ribbon cable from the RSA4-CPU module.

When jumper JP1 (on the RSA4-COM) is installed in the ENABLED setting, it annunciates a Trouble which indicates that the key switch on the RSA4-COM module is in the DISABLED position. If jumper JP1 is installed in the DISABLED setting, a DISABLED key switch will NOT be annunciated at the control panel.

RS-485 End-of-Line jumper JP1 (on the RSA4-CPU) must be INSTALLED on the last RSA4-CPU connected in the RS-485 circuit. Jumper JP2 is NOT used.

Wiring

Refer to Figure 2-26 and Figure 2-27.

TB1-1 +24 VDC

TB1-2 24 VDC Common

TB1-3 +RS-485

TB1-4 -RS-485

TB1-5 No Connection

TB1-6 No Connection

Configuration

The annunciator default configuration automatically assigns the first group of four annunciator LEDs to the LSS4 master panel zones 1 through 4, respectively. The remaining annunciator LEDs are assigned sequentially, by 4/8ZEXP and RMOD module address and zone number.

Note: Zones defined as Supervisory zones are assigned an annunciator LED, but the LED will never light, as the individual annunciator SLU-16R LEDs only display Alarm information.

Note: Annunciator Alarm LEDs may be reassigned using the LSS4 configuration program's ASSIGN function.

Note: There are no provisions to reassign remote annunciator LEDs through the LSS4 master panel switches.

Operation

All annunciators operate in parallel. That is, all annunciator modules set to the same group address will display identical information. The Reset, Drill/Auto Evacuation Cancel, Alarm and Trouble Silence, and Lamp Test functions are performed on a system wide basis.

Switches (RSA4-COM):

RESET - Resets the LSS4 system.

DRILL/AUTO EVACUATION CANCEL - Activates all system Notification Appliance Circuits when system is normal. Cancels the Auto Evacuation Sequence when a 2-stage system is in alarm.

TROUBLE SILENCE - Silences the trouble buzzer in the LSS4 master panel and all remote annunciators. When the Master Panel is in the European mode, the Trouble buzzer (when silenced) will sound for .5 seconds (in duration) every 14 seconds.

ALARM SILENCE - Silences all system Notification Appliance Circuits that are configured as silenceable.

LAMP TEST - Activates all LEDs on the LSS4 master panel and all remote annunciators.

ENABLE/DISABLE KEY SWITCH - Enables the RSA4-COM front panel switch functions. When jumper JP1 (on the RSA4-COM) is installed in the ENABLED setting, it annunciates a Trouble which indicates that the key switch on the RSA4-COM module is in the DISABLED position. If jumper JP1 is installed in the DISABLED setting, a DISABLED key switch will NOT be annunciated at the control panel.

Indicators:

POWER - Green LED indicates 24 VDC power is available at the annunciator.

ALARM - Red LED Indicates the LSS4 master panel has detected a fire alarm condition.

SUPERVISORY - Yellow LED indicates the LSS4 master panel has detected a supervisory condition.

TROUBLE - Yellow LED indicates the LSS4 master panel has detected a trouble condition.

ZONE LEDs - Red LEDs indicate the location of the fire alarm.

BUZZER - Internal buzzer indicates the LSS4 master panel has detected a trouble condition.

LD1 (LINE) - Red LED on RSA4-CPU board indicates data channel #1 active when ON, and data channel #2 active when OFF.

LD2 (TXD) - Red LED on RSA4-CPU board indicates data transmission on either channel #1 or channel #2.

Chapter 3

Panel Configuration

Overview

There are two methods available to configure the LSS4 panel. The front panel switches and indicators may be used to configure panel operation, without the need for additional programming tools. For complex panels, the front panel configuration method is time consuming and provides no hard copy record of the panel's configuration. When panel configuration is of a complex nature, a Personal Computer (PC) with the LSS4 Panel Configuration Program installed makes the configuration process fast and easy, and may be used to store copies of the panel configuration for future changes.

The standard (default) configuration of the LSS4 panel has all four Initiating Device Circuits activating both Notification Appliance circuits. NAC1 is defined as audible, silenceable; and NAC2 is defined as visual, non-silenceable. No addressable option modules have been defined and the alarm silence/reset inhibit function is disabled.

WARNING: Panel configuration should be done only by authorized distributors. Changing any system parameter requires a full system test to verify proper operation.

When configuring the panel, the front panel indicators and controls are redefined for configuration purposes, and used to tailor the panel to the end-users specific application. Initiating Device Circuits, Notification Appliance Circuits, and the panel itself are configured with any of the combinations available in Table 3-3 and Table 3-4. The panel configuration may be reviewed at any time during the configuration process. After the panel has been configured, a check is performed to insure the validity of all entries. Properly configured and reviewed panels can then be put in the operational mode.

Addressable option module's (4/8ZEXP, RMOD, & 4IAC) addresses installed in the panel are configured using the first 3 entries in Table 3-4.

Alarm Silence/Reset Inhibit and Alarm Signal Cutoff timers may be configured from 0 to 99 minuets in 1 minute increments.

The Canadian option auto-evac timer may be configured from 0 to 10 minutes in 1 minute increments.

Each Initiating Device Circuit (IDC) may be independently configured as one of the 4 selections in Table 3-3. IDC circuit style selection is a hardware function.

Each Notification Appliance Circuit (NAC) may be independently configured as one of the 9 selections in Table 3-4. NAC style selection is determined by field wiring and EOL resistor placement.

Configuring the Panel

Note: Panel configuration can be done either through the front panel or by using a personal computer (PC). Refer to the LSS4 Configuration Program section in the appendix of the Master Installation, Operation, Programming, and Maintenance Manual, P/N 270116.

Note: Panel configuration worksheets are provided at the end of this chapter.

Enter the Panel Configuration Mode

1. Disconnect Battery.

Caution: Batteries can deliver extremely high currents for short periods. Remove all jewelry to prevent serious burns caused by short circuiting the battery.

2. Apply AC power to the LSS4 and the LSSPS auxiliary power supplies.
3. Depress and hold down the ALARM SILENCE [enter] switch.
4. Press and release the S9 programming mode switch (Figure 2-5) while holding the ALARM SILENCE [enter] switch down, then release the ALARM SILENCE [enter] switch. If the four yellow LSS4 zone trouble LEDs illuminate, you must wait until they are extinguished before releasing the ALARM SILENCE [enter] switch. The NORMAL LED ON and a 0 on the display indicate the panel is in the "select system parameter" configuration mode.
   To start from a known condition and to verify operation of all modules, program the default mode as follows:
5 Press the RESET [increment] switch, stepping through the control panel configuration selections until configure default parameters are indicated: i.e. NORMAL, SUPERVISORY, ALARM & TROUBLE LEDs ON and a 4 in the display.
6 Press the ALARM SILENCE [enter] switch to program the default configuration. Zone LEDs should flash once after several seconds.
7 Press the TROUBLE SILENCE [return to previous menu] switch to return to the main (level 0) menu. The top green LED will be on.
8 Simultaneously press the center two switches (alarm silence & trouble silence). The top green LED should be on and a "C" showing on the display.
9 Press the ALARM SILENCE [enter] switch to enter the operational mode. All zone LEDs should light for a second and then the green NORMAL LED should be ON, Notification the system is operational. (In a few seconds, the system should display battery trouble (code 5), because the battery is not connected.)

10 When in the operational mode, simultaneously pressing the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous menu] switches, initiates a 3 second lamp test. All module LEDs should illuminate. If a module should fail to illuminate ALL LEDs (green LEDs only on 4/8ZEXP), check power, wiring, and the module address jumpers for correct/duplicate settings.

Table 3-1: LSS4 Panel Control Functions - Configuration Mode

Function	Switch
Increment selection	Reset
Enter selection	Alarm Silence
Return to prior menu	Trouble Silence
Review program setup	Drill/Test
Initiating zone X configuration select	Zone X disable
Store programmed selections	Alarm & Trouble Silence simultaneously
Alarm operated zone relay selection	Zone disconnect & Drill/Test simultaneously

The function of the front panel indicators changes when in the panel configuration mode as indicated in Table 3-2.

Table 3-2: Panel Indicators - Configuration Mode

Indication	Function
Normal LED On & status display = 0	System parameter configuration mode selected
Alarm LED On & status display = 1	IDC input zone configuration mode selected
Supervisory LED On & status display = 2	NAC output zone configuration mode selected
Trouble LED On status display = 3	Alarm relay assignment mode selected
Trouble LED flashing	Inter module communications trouble
Initiating zone X Alarm	Initiating zone X selected for configuration
Initiating zone X Trouble	Zone alarm relay X selected
Notification Appliance Circuit X Trouble	Notification Appliance Circuit X selected for configuration
Normal, Alarm, Supervisory, & Trouble LEDs On & status display = 4	Program factory default mode selected
Trouble buzzer	Switch recognition
System Status	Refer to individual configuration sections

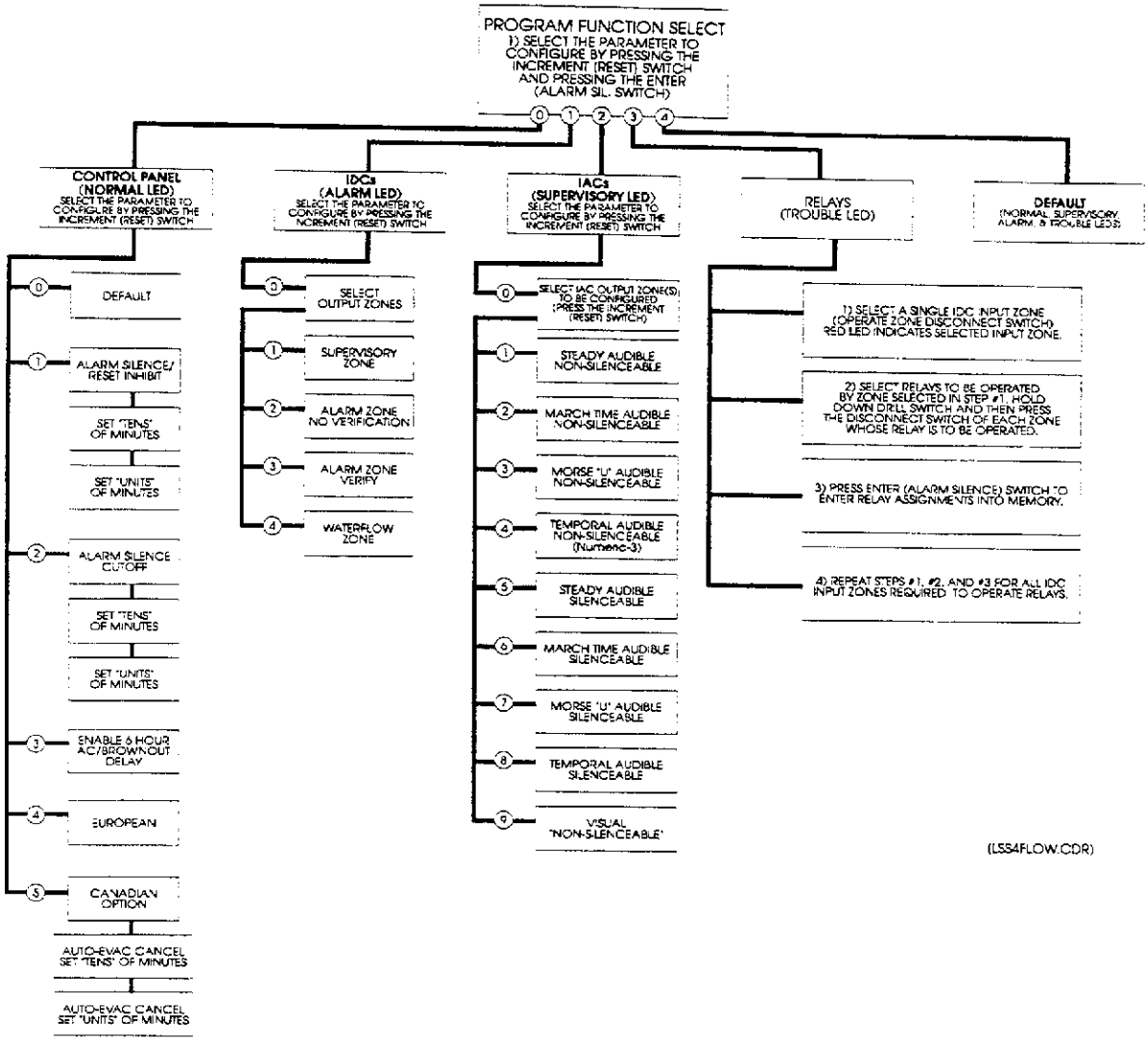


Figure 3-1: LSS4 Configuration Flow Chart

Configuring Control Panel Options

This step configures the alarm silence/reset inhibit timer, the alarm signal cutoff timer, the 6 hour AC/brownout trouble delay timer, and the verification alarm increment timer.

Referring to your LSS4 worksheet, set the panel to configure the system parameters using the following procedure:

1 Verify all batteries are disconnected.
2 Apply AC power to the LSS4 and the LSSPS power supplies (if any). Restore power to the LSSPS power supplies ONLY.
3 Depress and hold down the ALARM SILENCE [enter] switch.
4 Press and release the S9 programming switch while holding the ALARM SILENCE [enter] switch down, the release the ALARM SILENCE [enter] switch. If the four yellow LSS4 zone trouble LEDs illuminate, you must wait until they are extinguished before releasing the ALARM SILENCE [enter] switch.
The NORMAL LED and 0 on the display indicate the panel is in the select system parameter configuration mode.
5 Press the RESET [increment] switch to step through the control panel configuration selections until configure system parameters is indicated: NORMAL LED ON and a 0 in the system display.
6 Press the ALARM SILENCE [enter] switch to enter the system parameter configuration mode.
7 If NO alarm silence/reset inhibit or alarm signal cutoff timers are required, use the RESET [increment] switch to step to selection 0 in the system status display. Enter this selection by pressing the ALARM SILENCE [enter] switch.
8a If the alarm silence/reset inhibit feature is required, use the RESET [increment] switch to step to selection 1 in the system status display. Press the ALARM SILENCE [enter] switch to enter the alarm silence/reset inhibit option.
8b Press the RESET [increment] switch to increment the display from 0 through 9, representing a 10 through 90 minute delay for the alarm silence/reset inhibit option. Press the ALARM SILENCE [enter] switch to enter the "tens digit" delay time indicated in the display.
8c Continue to press the RESET [increment] switch incrementing the display, representing a 0 through 9 minute delay for the alarm silence/reset inhibit option. Press the ALARM SILENCE [enter] switch to enter the "units digit" delay time indicated in the display. The "tens digit" previously entered in step B8b added to the "units digit" make up the total alarm silence/reset inhibit time. Entering the "units" digit automatically returns the system to the system parameters level 1 menu (NORMAL LED ON & "0" in the display.)
9a If the alarm signal cutoff features is required, use the RESET [increment] switch to step to selection 2 in the system status display. Enter the alarm signal cutoff option by pressing the ALARM SILENCE [enter] switch.

9b Press the RESET [increment] switch to increment the display from 0 through 9, representing a 10 through 90 minute delay for the alarm signal cutoff option. Press the ALARM SILENCE [enter] switch to enter the "tens digit" delay time indicated in the display.

9c Continue to press the RESET [increment] switch to increment the display from 0 through 9, representing a 0 through 9 minute delay for the alarm signal cutoff. Press the ALARM SILENCE [enter] switch to enter the "units digit." The "tens digit" previously entered in step B9b added to the "units digit" make up the total alarm signal cutoff time. Entering the "units" digit automatically returns the system to the system parameters level 1 menu (NORMAL LED ON & "0" in the display.)

10 If the 6 hour AC failure/brownout delay feature is required. use the RESET [increment] switch to step to selection 3 in the system status display. Activate this selection by pressing the ALARM SILENCE [enter] switch.

11 If the European option is required use the RESET (increment) switch to step to selection 4 in the system status display. Activate this selection by pressing the ALARM SILENCE (enter) switch.

12 If the Canadian option is required use the RESET (increment) switch to step to selection 5 in the system status display. Activate this selection by pressing the ALARM SILENCE (enter) switch.

13 Press the RESET (increment) switch to increment the display from 0 to 1, representing 0 or 10 minute delay, respectively, for the automatic evacuation timer. Press the ALARM SILENCE (enter) switch to enter the "Tens digit" time indicated in the display.

14 Continue to press the RESET (increment) switch to increment the display from 0 to 9, representing 0 to 9 minute delay, respectively, for the automatic evacuation timer. Press the ALARM SILENCE (enter) switch to enter the "units digit."
The "tens digit" previously entered in step B12 and the "unit digit" make up the total automatic evacuation timer setting. Entering the "unit digit" automatically returns the system to the system parameters level 1 menu (normal LED ON & "0" in the display).

15 Press the TROUBLE SILENCE [increment to previous menu] switch to return to the main (level 0) menu. Proceed to configure the Notification Device Circuits.

16 Simultaneously press the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous menu] to store the control panel configuration in the LSS4 memory. The display should show a C Notification the data was stored Correctly.

17a If the verify confirmation time is required, use the RESET [increment] switch to step to selection 6 in the system status display.

17b Continue to press the RESET [increment] switch to increment the display to 0 or 5 representing a 0 or 5 minute verification time. Entering the "units" digit automatically returns the system to the system parameters level 1 menu (NORMAL LED ON & "0" in the display.

Configuring the Initiating Device Circuits (IDCs)

Each IDC input circuit defined as an alarm or waterflow zone must be configured to operate one or more Notification Appliance Circuits (parameter selection "0"), and as one of the selections listed below:

Table 3-3: IDC Zone Types

IDC Code	IDC Zone Type
1	Supervisory Zone
2	Alarm Zone, Non-verified
	Canadian Option: Pre-Alarm
3	Alarm Zone, verified
	Canadian Option: General Alarm
4	Waterflow Zone

Multiple IDCs may be programmed simultaneously.

Referring to your LSS4 worksheet, set the panel to configure the Initiating Device Circuit parameters as follows:

1 Press the RESET [increment] switch to step through the control panel configuration selections until configure IDC input zones is indicated: ALARM LED ON and a 1 in the system display.
2 Press the ALARM SILENCE [enter] switch to enter the IDC input zone configuration mode.
3 Select one or more IDC input zones on the LSS4 master panel, 4/8ZEXP, or RMOD modules to be configured by operating its respective IDC zone disconnect switch. Selected IDC zones illuminate their red alarm LEDs. Toggling the zone disconnect switch will select/de-select a zone.
4 Press the ALARM SILENCE [enter] switch to enter the "assign Notification Appliance Circuits" mode i.e. ALARM LED ON, a 0 in the display, and yellow NAC #1 circuit LED flashing rapidly on the LSS4. If the selected IDC zones are to operate LSS4 NAC #1 circuit, press ALARM SILENCE [enter] and the NAC#1 LED should flash slowly.

Note: Cursor position is indicated by a flashing LED. A rapid flashing LED indicates the cursor position and the NAC has NOT been selected. A slow flashing LED indicates the cursor position and the NAC has been selected. Selected NACs not at the cursor position illuminate their trouble LEDs continuously.

5 Press the RESET [increment] switch to step the cursor to the next NAC circuit as indicated by the rapidly flashing yellow NAC TROUBLE LED . Note that if the previous NAC was selected for operation it is now ON steady, If the selected IDC zones are to

operate this next NAC circuit, press ALARM SILENCE [enter] and the NAC LED should flash slowly.
Continue to use the RESET [increment] and ALARM SILENCE [enter] switches to increment to, and select all the NACs which are to be operated by the selected group of IDC input zones. Enter the active selection(s) by pressing the ALARM SILENCE switch.

6 Press the TROUBLE SILENCE [increment to previous menu] switch to get back into the main "configure IDC circuit" menu: i.e. red ALARM LED ON, and a 0 in the display; selected NAC trouble LEDs are illuminated, and NO NAC trouble LEDs flashing.
7 Press the RESET [increment] switch to step through IDC configuration selections 1 to 4 listed in Table 3-3. The active selection is indicated by the digit displayed in the system status window.
8 Press the ALARM SILENCE [enter] switch to enter the configuration information for the selected IDC zones.
9 Press the RESET increment] switch until the assign NAC mode i.e. ALARM LED ON, and a 0 in the display is reached.
10 De-select the IDC zones previously programmed by toggling their disconnect switches. Repeat steps 3 to 9 for ALL IDC input zones, including RMOD zones, until all IDC input zones are programmed.
11 Simultaneously press the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous menu] switches until a C appears in the display.

Configuring Notification Appliance Circuits (NACs)

Each NAC output circuit must be configured as one of the selections listed below:

Table 3-4: NAC Circuit Types

NAC Code	NAC Circuit Type
1	Steady Audible, Non-Silenceable
2	March time Audible, Non-Silenceable
3	Morse "U" Audible, Non-Silenceable **Canadian Option:** Pre-Alarm, Non-Silenceable
4	Temporal Audible, Non-Silenceable **Canadian Option:** General Alarm, Non-Silenceable
5	Steady audible, Silenceable
6	March Time Audible, Silenceable
7	Morse "U" Audible, Silenceable **Canadian Option:** Pre-Alarm, Silenceable
8	Temporal Audible, Silenceable **Canadian Option:** General Alarm, Silenceable
9	Visual, Non-Silenceable.

Multiple NACs may be programmed simultaneously.

NAC Canadian Option Configuration Note: Regardless of NAC programming, Pre-Alarm IDCs operate at the 20 SPM Pre-Alarm rate; General Alarm IDCs always operate at the 120 SPM General Alarm rate. Any active general alarm in the panel will automatically force all active pre-alarms to the general alarm state.

1 Use the RESET [increment] switch to step through the control panel configuration selections until "configuring NAC output zones" is indicated, i.e. SUPERVISORY LED ON and a 2 in the system display.

2 Press the ALARM SILENCE [enter] switch to enter the NAC output zone configuration mode. The yellow supervisory LED should be on and the display should indicate 0. If the display does not indicate a 0, use the RESET [increment] switch to step to 0 and press the ALARM SILENCE [enter] switch.

3 Select the NAC output zone(s) for type configuration by pressing the ALARM SILENCE [enter] switch to step to the first NAC on the LSS4 as indicated by the flashing NAC yellow trouble LED

Note: A rapid flashing trouble LED on a NAC output zone indicates the cursor position at an unselected NAC zone. Push the ALARM SILENCE [enter] switch to toggle the state (select or de-select) of the NAC for configuration. NACs selected for configuration are indicated by a steady ON LEDs. A slow flashing LED indicates the cursor is at the NAC and it has been selected for configuration.

4 When all NACs to be configured have been selected, press the TROUBLE SILENCE [increment to previous menu] switch to return to the NAC configuration menu level 1.
Note that the yellow trouble LEDs of the selected NACs remain illuminated.

5 Use the RESET [increment] switch to step through and select a NAC output zone definition (selections 0 through 9 listed at the beginning of this section) for the group of NAC output zones selected in step 3.

6 Press the ALARM SILENCE [enter] switch to enter the configuration information for these NAC output circuits.

7 Simultaneously press the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous selection] switches to store the configuration in the LSS4 memory. The display should show a C Notification the data was stored Correctly.

8 Press the RESET [Increment] switch to return to the NAC output zone configuration mode.

9 Steps 3, 4, 5, 6, & 7 are repeated for the required combinations of NAC output zones, until all NAC output zones are accounted for.

10 Press the TROUBLE SILENCE [return to previous menu] switch to return to the main (level 0) menu.

11 Simultaneously press the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous menu] switches to store the configuration in the LSS4 memory. The display should show a C Notification the data was stored Correctly.

Note: The silence feature of Notification Appliance Circuits defined as silenceable will be overridden if activated by an Initiating Device Circuit defined as waterflow.

Note: Non pre-signal and non general alarm IDC zones operate their assigned NACs per the NAC configuration. Pre-alarm IDCs override all its assigned NACs not actively sounding a general alarm. General alarm IDC zones override its assigned NACs not actively sounding a general alarm output. Any general alarm IDC going into alarm causes all active pre-alarm NACs to the general alarm output condition.

Configuring 4REXP IDC Zone Alarm Relay Responses

Each IDC may operate any combination of 4REXP relays when in an alarm or supervisory condition, depending on zone definition. Each IDC zone is individually assigned relays.

Note: RSA LEDs will automatically be assigned in IDC address sequence, if used. The LSS4 Configuration Program must be used if non-sequential LED assignments are required.

Configure the Initiating Device Circuit parameters as follows:

1 Use the RESET [increment] switch to step through the control panel configuration selections until "assign relays to IDCs is indicated i.e. TROUBLE LED ON, and a 3 in the system display.
2 Push the ALARM SILENCE [enter] switch to enter the IDC zone alarm relay configuration mode. The yellow trouble LED should be on and the display should indicate 0.
3 Select a single IDC input zone for relay configuration by toggling its zone disconnect switch. The selected zone will illuminate its red alarm LED. Toggling the zone disconnect a second time switch will de-select the zone.
4 To add 4REXP relays for activation by the zone selected in step 3, press and hold the DRILL/TEST [review] switch while operating the zone disconnect switch(s) on the zone(s) where the desired 4REXP relay(s) to be activated is located. Toggling the zone disconnect switch de-selects the relay. A red LED indicates the IDC input zone which is to activate the relays being configured. The yellow LED(s) indicate selected relay(s) to be operated by this zone.
5 Push the ALARM SILENCE [enter] switch to enter this relay configuration.
6 Repeat steps 3 , 4, and 5 for each IDC input zone which is to operate one or more relays. NOTE: Operating a zone disconnect switch extinguishes all the yellow LEDs of all zone relays which are programmed to be operated by the previous zone selection.
7 Press the TROUBLE SILENCE [increment to previous menu] switch to return to the main (level 0) menu.
8 Simultaneously press the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous menu] switches to store the configuration in the LSS4 memory. The display should show a C Notification the data was stored Correctly.
9 Press the TROUBLE SILENCE [increment to previous menu] switch to return to the main (level 0) menu.

Note: Operating the ALARM SILENCE [enter] switch immediately after storing configuration information returns the system to the operating mode.

Note: The TROUBLE SILENCE [return] switch may be used to return to the configuration mode section menu at any time.

Reconfiguring Panel to Factory Defaults

To return the panel to factory default settings, use the procedure listed below:

The factory default settings are:

- IDC Input Zones - Unverified alarm zones activating all installed NACs and its own IDC zone relay.
- LSS4 master panel NAC #1 defined as silenceable, steady audible.
- LSS4 master panel NAC #2 defined as non-silenceable, steady visual.
- All 4IAC module #1 & #3 output zones - silenceable, steady audible.
- All 4 NAC module #2 & #4 output zones - non-silenceable, steady visual.
- Alarm silence/reset inhibit timer disabled.
- Alarm signal cutoff timer disabled.
- AC/brownout 6 Hr. trouble delay timer disabled.
- European Option - not selected
- Canadian Option - not selected, auto-evacuation timer disabled.
- RSA LEDs assigned in IDC address sequence.

1 Use the RESET [increment] switch to step through the control panel configuration selections until configure factory defaults is indicated i.e. NORMAL, ALARM, SUPERVISORY & TROUBLE LEDs ON, and a 4 in the system display

2 Press the ALARM SILENCE [enter] switch and wait several seconds until the LSS4 red zone LEDs flash, to enter the factory default configuration.

F3 Simultaneously press the ALARM SILENCE [enter] and TROUBLE SILENCE [increment to previous menu] switches to store the configuration in the LSS4 memory. The display should show a C Notification the data was stored Correctly.

4 Press the ALARM SILENCE [enter] switch to return to normal operation The green NORMAL LED should be on steady, Notification the system is operational. In a few seconds, the system should display battery trouble (code 5).

5 Connect the batteries and verify that battery trouble clears within 90 seconds.

Reviewing the Panel's Configuration

1 Press the TROUBLE SILENCE [increment to previous menu] switch until the main (level 0) menu is reached. The NORMAL LED ON and a 0 in the display indicate the panel is in the "select system parameter" configuration mode.

2 Press the DRILL/TEST [review] switch. The display will flash the configured system parameter numbers as listed below. Parameters 2 and 3 are followed by the "tens" and "units" digits of the timer settings. Use the RESET [increment] switch to step through the system variables. Parameters that are not displayed are not active.

- 0 = Alarm silence/reset inhibit and alarm signal cutoff timers disabled; Canadian and European Pre-Alarm timers disabled.
- 1 = Alarm silence/reset inhibit timer
- 2 = Alarm signal cutoff timer
- 3 = AC/brownout delay timer enabled.
- 4 = European Mode Selected.
- 5 = Canadian mode selected with pre-alarm timer value displayed.

3 Press the TROUBLE SILENCE [increment to previous menu] switch to return to the main (level 0) menu

4 Press the RESET [increment] switch to return to step to the "configure IDC input zone" menu, as indicated by the ALARM LED ON and a 1 in the display.

5 Press the DRILL/TEST [review] switch. The RED ALARM LED of the first IDC input zone on the LSS4 will illuminate, as will the yellow trouble LEDs of each NAC output circuit and the yellow trouble LEDs of each zone whose relay this IDC zone activates.

6 Use the RESET [increment] switch to step to each IDC input zone installed in the system, and review the NACs and relays activated by each IDC zone.

7 Press the TROUBLE SILENCE [increment to previous menu] switch to return to the main (level 0) menu.

8 Press the RESET [increment] switch to step to the "configure NAC output zone" menu i.e. SUPERVISORY LED ON, and a 2 in the display.

9 Use the RESET [increment] switch to step to each NAC output zone installed in the system and verify the display code.

10 Press the TROUBLE SILENCE [increment to previous menu] switch to return to the main (level 0) menu.

11 Press the RESET [increment] switch to return to the "assign relay "menu as indicated by the TROUBLE LED ON and a 3 in the display.

12 Press the DRILL/TEST [review] switch. The RED ALARM LED of the first IDC input zone on the LSS4 will illuminate as will the yellow trouble LEDs of each NAC output circuit and the yellow trouble LEDs of each zone whose relay this IDC zone activates.

Verifying Panel Configuration and Operation

1 Verify each IDC input zone operates the proper NAC(s).

2 Verify each IDC input zone operates the proper 4REXP relay(s).

3 Verify operation of the alarm silence/reset inhibit timer, if enabled

4 Verify operation of the alarm signal cutoff timer, if enabled.

5 Verify operation of options/modules, if installed.

6 Verify operation of the pre-alarm timer if Canadian Option enabled.

Instructions for using the LSS4 Worksheets

The worksheets on the following pages should be used to design the configuration before you attempt to configure the system.

Panel Layout

Arrange the modules within the enclosure. Module locations within the enclosure are identified by number starting with 1 on the top left, and ending with 11 on the lower right, as shown in the illustration to the right. Circuits on each module are identified as -1, -2, etc. Example: the third IDC on a 4ZEXP module located in space 4 is identified as IDC zone 4-3.

Note: LSSPS power supply modules can only occupy spaces 2 & 3, which are NOT suitable for other modules. 8ZEXP modules require two module spaces, starting with an even space number, except spaces 2 & 3.

Assign an address to each module. Valid addresses are 1 to 15. 4ZEXP modules must use addresses 1 to 7. Each 8ZEXP module requires two consecutive addresses. Do not duplicate addresses.

System Configuration

Enter the alarm silence/reset inhibit delay time, if any. Valid entries are 0 to 99 minutes.

Enter the alarm signal cutoff delay time, if any. Valid entries are 00 99 minutes.

Enable the AC/brownout 6 Hr. trouble delay timer, if required.

If using Canadian option, enter auto-evacuation timer values.

Notification Appliance Circuits (NACs)

List all LSS4 and 4IAC Notification Appliance Circuits in the worksheet, and assign an IDC zone type number to each from the list of available choices.

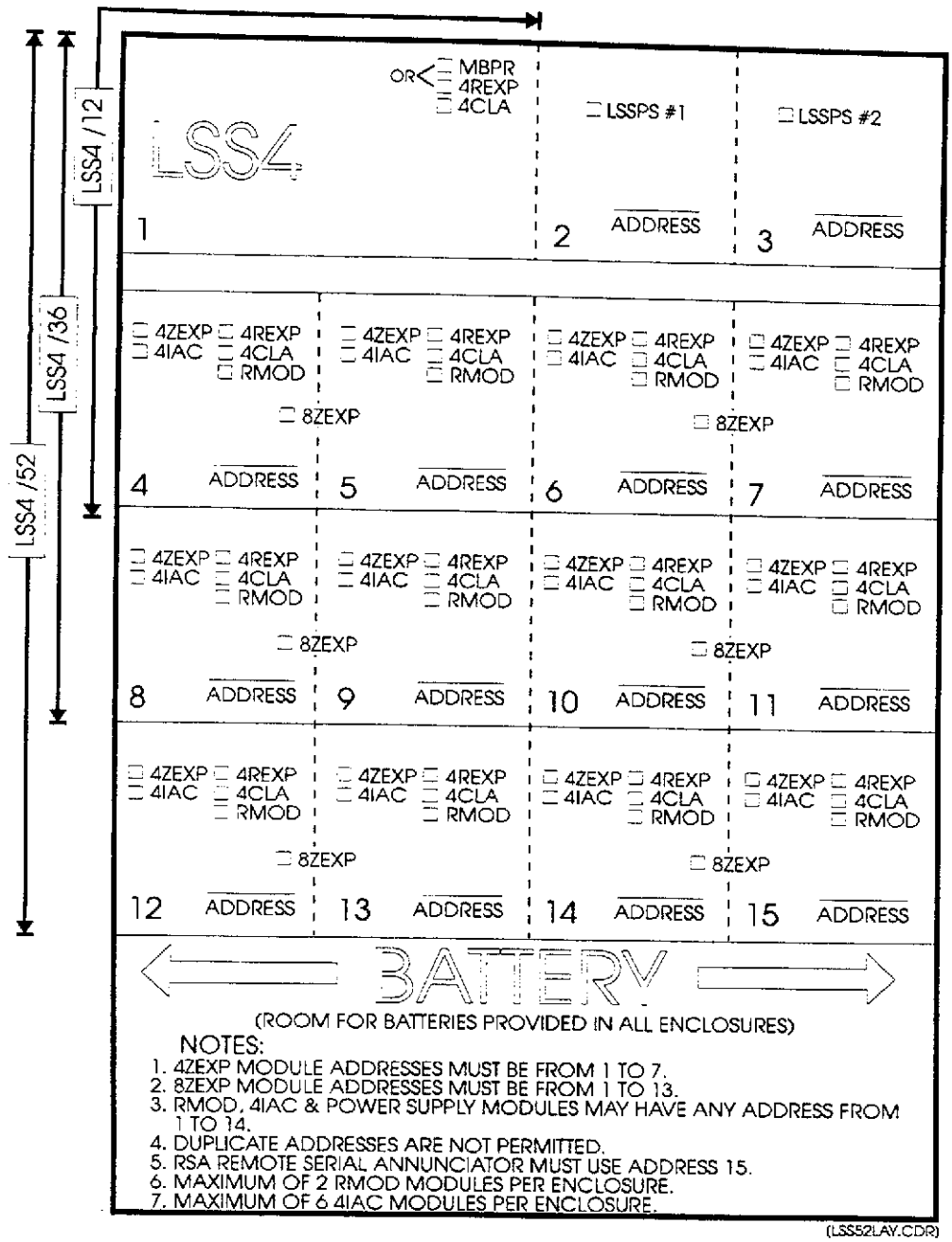
Initiating Device Circuits (IDCs)

List all LSS4 and 4/8ZEXP & RMOD Initiating Device Circuits in the worksheet, and assign an IDC zone type number to each from the list of available choices.

For each IDC zone, list the NAC(s) to be activated when the zone is in alarm.

For each IDC zone, list the relay(s) to be activated when the zone is in alarm.

Note: 4REXP zone relays are not automatically activated by the zone to which they are physically connected. Any combination of multiple zone relays may be operated for each IDC.



Worksheet 3-1: LSS4 Panel Layout Worksheet

Worksheet 3-1: LSS4 Panel Layout Worksheet, Continued

Panel Layout Notes:

1 LSSPS Power Supplies fit in spaces 2 & 3 ONLY.

2 4ZEXP, 4IAC, & RMOD module require one (1) panel space each.

3 The 8ZEXP module requires two (2) panel spaces.

4 The MBPR, 4REXP, & 4CLA modules do not require any panel space.

5 Only two RMOD Modules may be installed with a LSS4 Master Panel.

System Configuration

[ ] Alarm silence/Reset inhibit _____ Minutes.

[ ] Alarm Signal Cutoff _____ Minutes.

[ ] AC/Brownout 6 Hr. trouble delay enable.

[ ] Canadian Option

[ ] European Option

[ ] Auto-Evacuation timer _____ Minutes.

Worksheet 3-2: Notification Appliance Circuit (NAC) Configuration

NAC #	Circuit Description	Circuit Type:
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

NAC Circuit Types

1 Steady, Non-Silenceable

2. March Time, Non-Silenceable

3. Morse "U", Non-Silenceable / Canada - Pre-Alarm, Non-silenceable

4. Temporal, Non-Silenceable / Canada -General Alarm, Non-silenceable

5. Steady, Silenceable

6. March Time, Silenceable

7 Morse "U", Silenceable / Canada - Pre-alarm, Silenceable

8 Temporal, Silenceable / Canada -General Alarm, silenceable

9 Visual, Non-Silenceable

Worksheet 3-4: RMOD Configuration			
RMOD Address _____			
Module Type	Master ____	Slave 1 ____	
Automatic Release	Cross Zone ____		Either Zone ____
Automatic Initiating Device Circuit		Verified _____	Non-Verified ____
Abort Sequence Deadman ____		IRI ____	
Automatic Release Time Delay _____			
Manual Release Time Delay ____			

Chapter 4

System Operation

Operation

Operation of the LSS4 varies with each site-specific configuration. Typical operation / function of all system controls and indicators is included in Table 4-1 to Table 4-5. Additional operator's information is included at the end of this section.

Table 4-1: LSS4 Panel Indicators

Label	Type	Function
Normal	Green LED	On - System operating normally
Alarm	Red LED	System in alarm condition
Trouble	Yellow LED Piezoelectric Buzzer	System in trouble condition
Supervisory	Yellow LED	System in supervisory condition
Zone Alarm	Red LED if zone configured as an alarm zone	Zone in alarm condition. Pulsing LED indicates not silenced. Steady LED indicates silenced.
	Yellow LED if zone configured as a supervisory alarm zone	Alternating Red/Green LEDs indicates zone verification in progress Zone in supervisory condition
Zone Trouble *	Yellow LED	Zone circuit open/disabled or walk test in progress
Notification Circuit Trbl	Pulsing Yellow LED Solid Yellow LED	Notification appliance circuit open or shorted. NAC output on.
System Status	Seven Segment LED Display	See system display code Table 4-2.

Note: *European mode causes a trouble condition on a shorted IDC.

Table 4-2: System Display Codes

Code	System Status
1	Alarm Silenced
2	Trouble Silenced
3	Drill/Test Active
4	AC Power Fail
5	Battery Trouble
6	Power Out Trouble
7	Ground Fault
8	External Trouble
9	Communications Trouble
A	Auto Evacuation Cancel
B	Extra or Missing Module
F	Test Mode

Table 4-3: RMOD Module Indicators

Indicator	Indication	Condition
Alarm Zone 1/2	Alarm - Pulsing Red LED Trouble - Yellow LED Pulsing Green - RMOD Stand Alone Mode	Alarm Initiating Device Circuits 1/2 alarm. Open or shorted circuit. RMOD/LSS4 communications failure.
PSI Zone	Low Pressure - Upper Yellow LED Trouble - Lower Yellow LED	Pressure supervision switch activated. Pressure supervision circuit open.
RZ (Releasing Zone) 1/2	Trouble - Yellow LED Disabled - Yellow LED	Solenoid operating circuit 1/2 open or shorted. Releasing Zone disconnect switch off-normal.
Output Zone 1 Trouble	Pulsing Yellow LED Solid Yellow LED	Discharge Notification Appliance Circuit open or shorted. Output ON.
Manual Release Switch Trouble	Upper Yellow LED Lower Yellow LED	Inter-RMOD communications failure. Manual release Initiating Device Circuit open, shorted, or disconnect switch off-normal.
Manual Engaged	Red LED Pulsing Green - RMOD Stand Alone Mode	Manual release circuit activated. RMOD/LSS4 communications failure.
Abort Zone	Trouble - Yellow LED Active - Green LED	Abort switch circuit open or shorted. Abort switch activated.
Pre-Discharge Countdown In Progress	Yellow LED	Discharge imminent.
Discharge Active	Red LED	System has discharged.

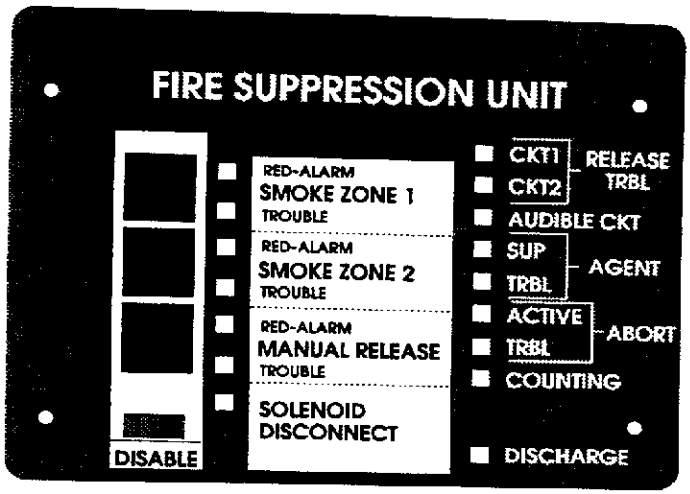
Table 4-4: LSS4 Panel Control Functions

Control/ Function	Function Description
Reset	Resets system and associated smoke detectors. "Increment" switch in program mode.
Alarm Silence	Silences Notification Appliance Circuits defined as silenceable audible circuits and used as an Alarm Acknowledge. CODE "1" appears in display window. Initiating circuit LEDs on steady. Alarms are silenced and resounded by pressing Alarm Silence, but previously acknowledged alarm LEDs will remain in the steady state (acknowledged) rather then return to the NAC resound state (LEDs pulsing). This is valuable when tracking alarms as they come in. If Alarm Silence is disabled, acknowledgments will NOT be allowed until Alarm Silence is enabled. If Alarm Cutoff is active, an acknowledge for each non-acknowledged alarm will be performed automatically as part of the Cutoff Option. Used to turn off drill function. Puts panel in programming mode when held down during power up.
Trouble Silence	Silences the system trouble buzzer. CODE "2" appears in display window. Toggling switch alternately silences & resounds trouble buzzer. When in European mode, a silenced trouble buzzer will resound for .5 seconds (in duration) every 14 seconds.
Test/Auto Evacuation Cancel	Activates Notification Appliance Circuits. System display indicates CODE 3. Normal LED extinguishes. One man Test activated by pushing DRILL/TEST and appropriate zone disconnect switches simultaneously. Canadian (2-Stage) Operation: Stops & Resets automatic evacuation timer.
Zone Disconnect	Disables associated zone. System & zone trouble LED pulse. Normal LED extinguishes. System buzzer activates.
Lamp Test	Lamp test function illuminates all system LEDs for 3 seconds after pushing alarm & trouble silence switches simultaneously.

Table 4-5: RMOD Module Controls/Functions

Control	Function
Disable Alarm Zone 1/2	Disconnects Initiating Alarm Circuit RZ1/2. Zone trouble and LSS4 system trouble LEDs flash, system trouble buzzer sounds.
Disable Manual Zone	Disconnects the manual release circuit. Manual zone trouble and LSS4 system trouble LEDs flash, system trouble buzzer sounds.
Releasing Circuits Normal/Disabled	Disables solenoid circuits 1 & 2. Releasing circuit trouble and LSS4 system trouble LEDs flash, system trouble buzzer sounds.

RMOD Operation



(RMODOVL.CDR)

Figure 4-1: RMOD Front Panel

In the normal state, all LEDs are extinguished, indicating the module and all associated circuits and devices are functioning normally. Automatic or manual initiation of an alarm causes the respective IDC alarm LED(s) to flash red. The automatic release timer starts as configured by SW4. Refer to the appropriate release sequence timing diagram.

Individual circuit disable switches are provided for the Initiating Device Circuits and the solenoid release circuit. Activation of a disable switch illuminates the respective trouble LED and puts the LSS4 control panel into trouble.

Individual trouble LEDs are provided for each Initiating Device Circuit, both solenoid release circuits, the abort circuit, and the audible discharge warning (IAC) circuit.

Status LEDs are provided for abort circuit active, timer count down, agent supervisory switch, and agent discharged.

Note: All Indicating Appliance Circuits are momentarily interrupted during agent release when the momentary release option is selected.

Chapter 1 details the operating sequences available on the RMOD Releasing Module.

Table 4-6: LSS4 Operation

Condition	Active Indicators	System Activity	Notes
Quiescent State	Green "Normal" LED on	Monitoring Initiating, Notification, Panel and Off-Premise circuitry & controls.	
Fire Alarm, Non-Verified IDC	Red System Alarm LED on Red IDC zone LED pulses	System Alarm Relay, City Tie/Remote Station Module transmit fire alarm. Alarm open collector switched to common. IDC zone open collector switched to common. Relays & NACs operate per program.	Alarm Silence quiets all NACs programmed as silenceable and sets zone LED steady on. If alarm Silence/Reset inhibit timer option configured, timer must expire before Alarm Silence or reset switches are enabled. If alarm signal cutoff option configured, NACs will automatically silence after the programmed cutoff time. Zones entering alarm for the first time resound all NACs assigned to previous alarms.
Fire Alarm, Verified IDC	IDC zone LED alternates red/green during verification/confirmation period, until alarm is detected. Verified alarms operate same as non-verified alarms (see above)	System Alarm relay, City Tie/Remote station module transmit fire alarm. Alarm open collector switched to common. IDC zone open collector switched to common. Relays & NACs operate per program.	A second zone in alarm cancels first zone verification and puts both zones in alarm. Zones entering alarm for the first time resound all NACs assigned to previous alarms.
Fire Alarm, Waterflow	Red System Alarm LED on Red IDC zone LED pulses	System Alarm relay, City Tie/Remote station module transmit fire alarm. Alarm open collector switched to common. IDC zone open collector switched to common. Relays & NACs operate per program.	Waterflow NACs are not silenceable even if configured as silenceable. Zones entering alarm for the first time resound all NACs assigned to previous alarms.

Table 4-6: LSS4 Operation

Condition	Active Indicators	System Activity	Notes
Canada Fire Alarm, Non-Verified, Pre-Alarm IDC	Red System Alarm LED on Red IDC zone LED pulses	Notification appliances operate at the slow pulse pre-alarm rate (20 SPM) until Auto-Evac timer expires, then operate at the fast pulse general alarm rate (120 SPM)	Press Drill/Test/Auto-Evac cutoff switch to stop and reset auto-evacuation timer. An "A" will appear in the system display. Subsequent pre-alarm zones restart the auto-evac timer. An "I" will appear in the display if IDCs are silenceable. Alarm Silence switch may be used if NACs configured as silenceable. Zones entering alarm for the first time resound all NACs assigned to previous alarms.
Canada Fire Alarm, Non-Verified, General Alarm IDC	Red System Alarm LED on Red IDC zone LED pulses	Notification appliances override all pre-alarm, and operate at the fast pulse general alarm rate (120 SPM).	Alarm Silence switch may be used if NACs configured as silenceable. Zones entering Alarm for the first time resound all NACs assigned to previous alarms.
Canada Fire Alarm, Verified, General Alarm IDC	Red System Alarm LED on Red IDC zone LED pulses	Notification appliances override all pre-alarm, and operate at the fast pulse general alarm rate (120 SPM).	Alarm Silence switch may be used if NACs configured as silenceable. Zones entering alarm for the first time resound all NACs assigned to previous alarms.

Table 4-6: LSS4 Operation

Condition	Active Indicators	System Activity	Notes
Canada Waterflow IDC	Red System Alarm LED on Red IDC zone LED pulses	Notification appliances operate at the slow pulse pre-alarm rate (20 SPM) until auto-evac timer expires, then operate at the fast pulse general alarm rate (120 SPM)	Press Drill/Test/Auto-Evac cutoff switch to stop and reset auto-evacuation timer. An "A" will appear in the system display. Subsequent pre-alarm zones restart the auto-evac timer. NACs assigned to waterflow IDCs are not silenceable. Zones entering alarm for the first time resound all NACs assigned to previous alarms.
Canada Supervisory Condition	Yellow system supervisory LED on Yellow IDC zone LED flashes. Trouble buzzer sounds	City Tie/Remote station module transmit supervisory condition. Supervisory open collector switched to common. IDC zone open collector switched to common. Relays operate per program	Zone latches into supervisory state regardless of subsequent (i.e. Open or normal) state changes.
Supervisory Condition	Yellow system supervisory LED on yellow IDC zone LED flashes. Trouble buzzer sounds	City Tie/Remote station module transmit supervisory condition. Supervisory open collector switched to common. IDC zone open collector switched to common. Relays operate per program	
NAC Zone Trouble	Yellow system trouble LED on yellow IDC/NAC zone trouble LED pulses trouble buzzer sounds	City Tie/Remote station module transmit trouble. Trouble open collector switched to common.	Indicates open/shorted NAC circuit steady on LED indicates circuit activated
IDC Zone Trouble	Yellow system trouble LED on yellow IDC zone trouble LED pulses trouble buzzer sounds	City Tie/Remote station module transmit trouble . Trouble open collector switched to common.	Indicates open IDC circuit

Table 4-6: LSS4 Operation

Condition	Active Indicators	System Activity	Notes
System Trouble	Yellow System Trouble LED on system displays trouble code trouble buzzer sounds	City Tie/Remote station module transmit trouble . Trouble buzzer sounds. Trouble open collector switched to common.	Display code indicates nature of problem. See table A4.5
Fire Drill	Drill/Test switch activated system display indicates code 3 Yellow System Trouble LED on	All NACs operate. Trouble buzzer sounds. Trouble open collector switched to common.	Disconnect City Tie before starting fire drill & notify fire department. Temporal, march time or Morse "U" codes activate if option configured.
Fastest	Drill/Test switch and IDC zone disconnect switch for zone to be tested are activated simultaneously. Code "F" appears in system display. Rapid flash of zone under test trouble LED. System Trouble LED on.	Programmed NAC operates for 1 second for short (alarm); 2 seconds for open (trouble) then resets the IDC & detector. If IDC defined as supervisory, no IDC smoke power reset is performed.	Alarm in zone not under test restores panel to full operation. Reset ends Fastest. Panel automatically restores to full operation one hour after last test performed.
Lamp Test	Activate Alarm and Trouble Silence switches simultaneously All system LED and display illuminate for 3 seconds.		
Zone Disconnect	Zone disconnect switch activated zone Trouble LED pulses. Yellow System Trouble LED on trouble buzzer sounds.	City Tie/Remote station module transmit trouble . Trouble open collector switched to common.	Restore by toggling zone disconnect switch.

Table 4-6: LSS4 Operation

Condition	Active Indicators	System Activity	Notes
Communication Trouble	Yellow System Trouble LED on System displays code 9. Trouble buzzer sounds.	City Tie/Remote station module transmit trouble . Trouble open collector switched to common. Remote Annunciator trouble Extra or missing option module	
Reset	Green System LED on		

Chapter 5

Maintenance & Troubleshooting

WARNING: Lethal voltages from other systems may be present even with fire alarm power disconnected!

Table 5-1: System Troubleshooting

Condition	Possible Cause	
Code 4 - AC Power Fail	1.	Fuse F1 open on power supply.
	2.	Branch circuit power off or brown-out condition.
Code 5 - Battery Fail	1.	Low battery voltage.
	2.	Battery disconnected.
	3.	Battery fuse F3 open on power supply.
Code 6 - Power Out Fail	1.	Signal Auxiliary power shorted.
	2.	CB1, F1, F2, or F4 open.
	3.	Low Power Supply Output
Code 7 - Ground Fault	1.	Ground fault on field wiring.
Code 8 - External Trouble	1.	Off premise transmitter trouble.
Code 9 - Communications Trouble	1.	Expansion/Option modules inoperative/mis-addressed, or not configured.
Code b - Extra or Missing module	1.	Configuration does not match installed modules
Code E During Programming	1.	At least one NAC must be assigned to each IDC alarm input zone.
Initiating Device Circuit Trouble	1.	Circuit open, missing or wrong EOL resistor.
	2.	Zone disconnect switch operated.
	3.	Smoke power fuse F1 open on power supply.
Notification Appliance Circuit Trouble	1.	Circuit open, missing or wrong EOL resistor.
	2.	Circuit shorted, incorrectly installed device.
	3.	NAC fuse F2 or F4 open.
Trouble buzzer pulses every 8 seconds & Normal LED extinguished.	1.	PU failure.

Table 5-1: System Troubleshooting

Condition	Possible Cause	
4/8ZEXP LEDs do not momentarily illuminate during lamp test.	1.	Module address not entered in memory.
	2.	Power/Data cable loose.
	3.	No address jumpers installed.
	3.	Faulty microprocessor card.
4NAC LEDs do not momentarily illuminate during lamp test.	1	Module address not entered in memory.
	2.	Power/Data cable loose.
	3.	No address jumpers installed.
	4.	Faulty microprocessor card.
RMOD LEDs do not momentarily illuminate during lamp test.	1.	Module in stand alone mode, i.e. not communicating with LSS4 master panel.
LSSPS Amber trouble LED	1.	Ground Fault
	2.	Aux. power circuit breaker CB1 (bottom board)
	3.	AC failure or Brownout.
	4.	Battery/battery fuse failure.

To insure that the LSS4 can power the panel when primary power is lost, the batteries should be periodically inspected, tested, and replaced (as a minimum) every three years.

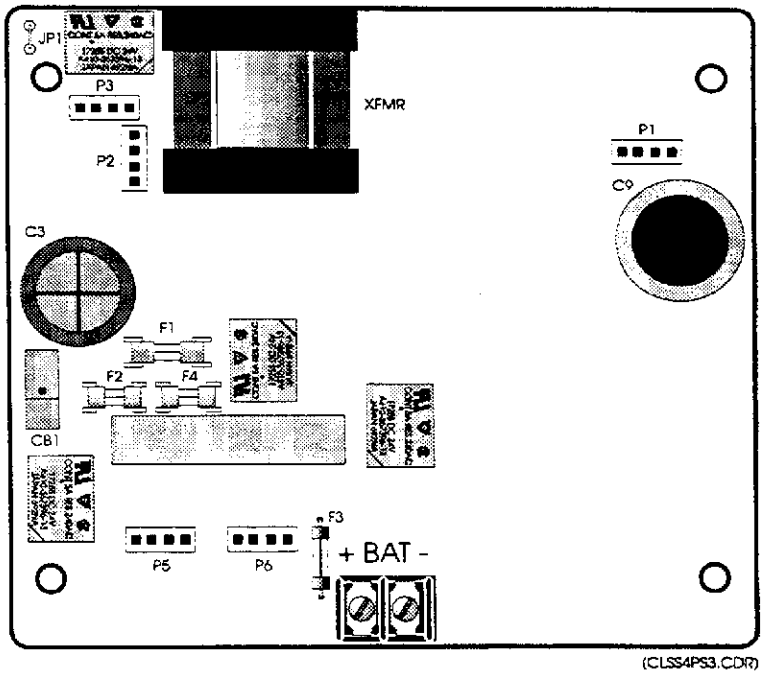


Figure 5-1: LSS4 Master Power Supply (rear board)

Table 5-2: System Fuses

LSS4 Fuse/Circuit Breaker	Protected Circuit
F1: 8AG, 1 Amp	Initiating Device Circuit & Smoke Detector Power
F2, F4 SFE-4, 4 Amps	Notification Appliance Circuit Power
F3 - Not replaceable	Battery
CB1 (Rear board)	Auxiliary Power
CB1 (Front board)	AC Line Input Power

Table 5-3: LSSPS Module Fuses

LSSPS Fuse/Circuit Breaker	Protected Circuit
F1: Pigtail, 6 Amp	Battery
CB1 (Rear board)	24 VDC auxiliary power
CB1 (Front board)	120 VAC

Table 5-4: 4IAC Module Fuses

4NAC Fuses	Protected Circuit
F1: SFE-4, 4 Amp	NAC #4
F2: SFE-4, 4 Amp	NAC #1
F3: SFE-4, 4 Amp	NAC #3
F4: SFE-4, 4 Amp	NAC #2

Table 5-5: RMOD Module Fuses

RMOD Fuse	Protected Circuit
F1: 1 Amp	Notification Appliance Circuit

Table 5-6: RMOD Troubleshooting

Condition	Possible Cause
Alarm zone 1/2 trouble	1. Circuit open (or shorted on style C). 2. Zone disconnect switch operated. 3. Smoke power fuse F1 open on LSS4. 4. Wrong EOL installed.
PSI zone trouble	1. Circuit open. 2. Wrong EOL installed.
Output circuit trouble	1. Signal/Auxiliary power shorted, device improperly installed or open. 2. F1 on RMOD Module open.
Manual circuit trouble	1. Circuit open or shorted. 2. Zone disconnect switch operated. 3. Wrong EOL installed.
Abort circuit trouble	1. Circuit open or shorted. 2. Wrong EOL installed.
Release circuit trouble	1. Disconnect switch operated. 2. Circuit open or shorted.
Green zone LEDs and manual release LED do not momentarily pulse after configuring panel and then entering the operational mode.	1. Power/Data cable loose. 2. No address jumpers installed. 3. Faulty microprocessor card.
Green zone LEDs and manual release LED pulse continuously	1. RMOD in stand alone mode. Communications failure with LSS4 master panel.

Table 5-7: Remote Annunciator Troubleshooting

Problem	Possible Cause
No RSA4 annunciators operate	1) 24 VDC power missing. 2) Multiple annunciators set at same sub-address. 3) RS-485 circuit open, shorted, or mis-wired. 4) RSA4-CPU jumper JP1 improperly installed. 5) Incorrect LSS4 master panel firmware.
Some annunciators operational, others not operational	1) 24 VDC power missing. 2) RS-485 circuit open or mis-wired. 3) Defective RS-485 Interface. 4) RSA4-CPU addressed incorrectly. 5) RSA4-CPU jumper JP1 improperly installed. 6) Ribbon cable loose or defective. 7) RSA4-CPU Module defective.
Some RSA modules operate incorrectly	1) RSA4-COM or SLU-16R group address set incorrectly. 2) Ribbon cable loose.

Spare Parts

Table 5-8: Spare LSS4 Parts

Description	P/N
3.9KΩ EOL Resistor	260001
6.8 KΩ EOL Resistor	260047
15 KΩ EOL Resistor	260003
LSS4 Power/Data Cable	250150
LSS4 to Battery Cable (LSS4/12 & LSS4/36)	250148
LSS4 to Battery Cable (LSS4/52)	250151
1A Fuse, Smoke Power	340054
4A Fuse, NAC Power	340008
LSS-PGM Configuration Download Assy	240365

Table 5-9: Remote Annunciator Spare Parts

Description	P/N
BP-A Blank Panel	240170
Ribbon Cable Assembly	250080

Table 5-10: Battery Specifications

MODEL	# Required	VOLTAGE	CAPACITY	LENGTH	WIDTH	HEIGHT
12V4A5	2	12 V	4.5 AH	5.96 " [15.1 cm]	2.6 " [6.5 cm]	3.7 " [9.4 cm]
12V6A5	2	12 V	6.5 AH	5.95 " [15.1 cm]	2.56 " [6.5 cm]	3.70 " [9.4 cm]
6V10A	4	6 V	10.0 AH	5.95 " [15.1 cm]	2.00 " [5.1 cm]	3.70 " [9.4 cm]
12V17A	2	12 V	17.0 AH	7.2 " [18.1 cm]	3.0 " [7.6 cm]	6.6 " [16.7 cm]
12V24A	2	12 V	24.0 AH	6.5 " [16.6 cm]	4.9 " [12.5 cm]	6.9 " [17.5 cm]
12V40	2	12 V	40.0 AH	7.7 " [19.6 cm]	6.4 " [16.3 cm]	6.9 " [17.4 cm]

European Systems

Hardware

Table 5-11: European Hardware Changes

PRODUCT	REVISION	DESCRIPTION
8ZEXP	A	With 10 KΩ resistors installed in RN7, RN8, RN14, RN15, the 8ZEXP board **will not** support European mode, and is not recommended for use in the 52 zone panel unless the number of 8ZEXPs is restricted to 4 or less. These resistors can be identified by the last three digits of the part number stamped on the resistor. (ex. 103 = 10 K Ω)
8ZEXP	A	With 750 Ω resistors installed in RN7, RN8, RN14, RN15, the 8ZEXP board **will** support European mode, however it is not recommended for use in the 52 zone panel unless the number of 8ZEXPs is restricted to 4 or less.
8ZEXP	B	With 750 Ω resistors installed in RN7, RN8, RN14, RN15, the 8ZEXP board **will** support European mode, and may be used in the 52 zone panel without restrictions, due to current shedding circuitry and improved zoning capabilities.
8ZEXP	B	With 4.7 KΩ resistors installed in RN7, RN8, RN14, RN15, the 8ZEXP board **will** support European mode, and may be used in the 52 zone panel without restrictions, due to current shedding circuitry and improved zoning capabilities.
4ZEXP	B	With 10KΩ resistor installed in RN10, the 4ZEXP board **will not** support European mode.
4ZEXP	B	With 1.8KΩ resistor installed in RN10, the 4ZEXP board **will** support European mode.
All other hardware **will** support the European mode regardless of the revision of the board.		

European Software Revisions

Table 5-12: European System Software Revisions

PRODUCT	REVISION	DESCRIPTION
LSS4	1.00	Initial Release
	1.10	Upgraded output zone trouble LED and incorporated uploading/downloading.
	1.12	Expanded to accommodate: 15 device addresses 4 additional expansion cards in a panel 4 sub-addresses outside the panel (serial annunciators) Serial annunciator dip switch for 1 of 4 possible addresses. Synchronized 4NACs Canadian option
	1.21	Ground fault sensitivity improved.
	1.30	Incorporated European option. Revisions 1.20 or higher added 1.8K ohm (resistor pack for RN9) for proper operation.
4IAC	1.00	Initial Release
	1.10	With main panel firmware revision 1.20 or higher, 4NAC supports synchronization with main panel coded output.
AUXPS	1.00	Initial Release
	1.02	Improved broadcast response.
	1.20	Revised battery test to maintain battery trouble between fuse checks.
	1.30	Improved master communications
	1.40	Battery supervision augmented for auxiliary power supplies to recognize lost or restoration of battery when main panel in alarm.
RMOD	1.00	Initial Release
	1.10	Enhanced reset feature.

Appendix A

System Calculations

Battery Calculations

Introduction

NFPA standard 72 specifies the secondary power supply capacities for each type system. Under maximum normal load, the secondary supply shall operate local and proprietary systems for 24 hours, and auxiliary and remote station systems for 60 hours. At the end of the standby period, the secondary supply shall be capable of operating with 10% of the Initiating Device Circuits activated and operating all alarm notification appliances for 5 minutes.

There are two methods of determining the size of battery required. Table A-1, Table A-2, and Table A-3 give the required battery size for given panel loads and standby times. For conditions not covered by the tables, the calculation method must be used. In either case, the Battery Calculation worksheet must be filled out first.

Battery Calculation Worksheet

The LSS4 Battery Calculation worksheet, Worksheet A-1, is used to determine the standby and alarm current requirements of the panel and all its accessories. When using a common battery to supply all standby power, fill out all applicable line item in the worksheet. If the panel uses separate batteries to backup the auxiliary power supplies, copy the worksheet and fill out line items 9a, 9b, and 9c for each auxiliary power supply powered by its own set of batteries. Refer to the Power Management section in Chapter 1 for additional information.

Worksheet A-1: LSS4 Battery Calculation Worksheet

Line	Item	Qty	IStandby	Total IStandby	IAlarm	Total IAlarm	Notes
1a	LSS4 panel	1	0.100	0.100	0.140	0.140	
1b	LSS4 IDC Zones				0.061 /Alarmed Zone		1
1c	LSS4 Auxiliary Power	N/A					2
1d	LSS4 4-Wire Smoke Power						
2	MBPR City Tie Module		0.037				3
3	4ZEXP Zone Expansion Module		0.086		0.086 + 0.061 /Alarmed Zone		1
4	8ZEXP Zone Expansion Module		0.116		0.116 +0.011/ Alarmed Zone		1
5	4CLA Class A Cards		0.010		0.010		4
6	4REXP Relay Module		0.003		0.023 / Active Relay		
7a	4IAC module		0.035		0.035 +0.023 / Active circuit		1
7b	NAC Appliances		N/A	N/A			5
8a	RMOD Releasing Module		0.065		0.375		
8b	RMOD solenoids		N/A	N/A			6, 7
8c	RMOD Notification Appliances		N/A				8
9a	LSSPS Power Supply			N/A	0.035		
9b	Auxiliary Power	N/A	N/A		N/A		2
9c	NAC Outputs	N/A	N/A		N/A		9
10	TOTAL (amps)	N/A	N/A		N/A		10

Worksheet notes on next page.

LSS4 Battery Calculation Worksheet Notes	
1	10% or a minimum of three of all IDCs and 100% of all NACs must be active when calculating battery requirements.
2	Auxiliary current should include remote annunciators under lamp test. Max 1.5A
3	Auxiliary alarm current is 0.275 Amp pulse. Reverse polarity alarm current is 7 mA
4	4CLA current is 0.010 A in standby; 0.018 A in trouble .
5	Refer to device literature for current consumption
6	Solenoid current total for both circuits in continuous operation can not exceed 1.0A Max. Solenoid current total for both circuits in pulse mode can not exceed 2.0 Amps Max.
	A maximum of two (2) RMOD modules can be installed in any panel.
8	Maximum auxiliary power output 0.75 A.
9	Maximum module output 3.5 A.
10	Standby current can not exceed 1 amp. Total 4LSS alarm current can not exceed 4.5 A. Total LSSPS alarm current can not exceed 3.5A

Refer to Power Management information for additional information.

LSS4 Battery Standby Tables

Table A-1: Battery Requirements For 4 Hour Standby & 5 Minutes In Alarm, Table A-2, and Table A-3 show required battery capacity for selected standby and alarm currents.

Table A-1: Battery Requirements For 4 Hour Standby & 5 Minutes In Alarm

ALARM CURRENT [C] (AMPS)	STANDBY CURRENT [A]	
	0.0 - 0.5 A	0.5 - 1.0 A
0.0 - 0.5	2.4 AH	4.8 AH
0.5 - 1.0	2.5 AH	4.9 AH
1.0 -1.5	2.5 AH	4.9 AH
1.5 - 2.0	2.6 AH	5.0 AH
2.0 - 2.5	2.6 AH	5.0 AH
2.5 - 3.0	2.7 AH	5.1 AH
3.0 - 3.5	2.7 AH	5.1 AH
3.5 - 4.0	2.8 AH	5.2 AH
4.0 - 4.5	2.8 AH	5.2 AH
4.5 - 5.0	2.9 AH	5.3 AH

Table A-2: Battery Requirements For 24 Hour Standby & 5 Minutes In Alarm

ALARM CURRENT (AMPS)	STANDBY CURRENT [A]								
	0.1 - 0.2 A	**0.2 - 0.3 A**	**0.3 - 0.4 A**	**00.4 - 0.5 A**	**0.5 - 0.6 A**	**0.6 - 0.7 A**	**0.7 - 0.8 A**	**0.8 - 0.9 A**	**0.9 - 1.0 A**
0.0 - 0.5	5.8 AH	8.7 AH	11.6 AH	14.4 AH	17.3 AH	20.2 AH	23.1 AH	26.0 AH	28.9 AH
0.5 - 1.0	5.9 AH	8.7 AH	11.6 AH	14.5 AH	17.4 AH	20.3 AH	23.1 AH	26.0 AH	28.9 AH
1.0 -1.5	5.9 AH	8.8 AH	11.7 AH	14.5 AH	17.4 AH	20.3 AH	23.2 AH	26.1 AH	29.0 AH
1.5 - 2.0	6.0 AH	8.8 AH	11.7 AH	14.6 AH	17.5 AH	20.4 AH	23.2 AH	26.1 AH	29.0 AH
2.0 - 2.5	6.0 AH	8.9 AH	11.8 AH	14.6 AH	17.5 AH	20.4 AH	23.3 AH	26.2 AH	29.1 AH
2.5 - 3.0	6.1 AH	8.9 AH	11.8 AH	14.7 AH	17.6 AH	20.5 AH	23.3 AH	26.2 AH	29.1 AH
3.0 - 3.5	6.1 AH	9.0 AH	11.9 AH	14.7 AH	17.6 AH	20.5 AH	23.4 AH	26.3 AH	29.2 AH
3.5 - 4.0	6.2 AH	9.0 AH	11.9 AH	14.8 AH	17.7 AH	20.6 AH	23.4 AH	26.3 AH	29.2 AH
4.0 - 4.5	6.2 AH	9.1 AH	12.0 AH	14.8 AH	17.7 AH	20.6 AH	23.5 AH	26.4 AH	29.3 AH
4.5 - 5.0	6.3 AH	9.1 AH	12.0 AH	14.9 AH	17.8 AH	20.7 AH	23.5 AH	26.4 AH	29.3 AH

Table A-3: Battery Requirements For 60 Hour Standby & 5 Minutes In Alarm

Alarm Current (Amps)	Standby Current [A]				
	0.1 - 0.2 A	0.2 - 0.25 A	0.25 - 0.3 A	0.3 - 0.35 A	0.35 - 0.40 A
0.0 - 0.5	14.4 AH	18.05 AH	21.65 AH	25.25 AH	28.85 AH
0.5 - 1.0	14.5 AH	18.10 AH	21.70 AH	25.30 AH	28.90 AH
1.0 -1.5	14.5 AH	18.15 AH	21.75 AH	25.35 AH	28.95 AH
1.5 - 2.0	14.6 AH	18.20 AH	21.80 AH	25.40 AH	29.00 AH
2.0 - 2.5	14.6 AH	18.25 AH	21.85 AH	25.45 AH	29.05 AH
2.5 - 3.0	14.7 AH	18.30 AH	21.90 AH	25.50 AH	29.10 AH
3.0 - 3.5	14.7 AH	18.35 AH	21.95 AH	25.55 AH	29.15 AH
3.5 - 4.0	14.8 AH	18.40 AH	22.00 AH	25.60 AH	29.20 AH
4.0 - 4.5	14.8 AH	18.45 AH	22.05 AH	25.65 AH	29.25 AH
4.5 - 5.0	14.9 AH	18.50 AH	22.10 AH	25.70 AH	29.30 AH

Battery Capacity Formula

The following information is required before the calculations can be performed:

A Standby current drawn by the panel.
B The number of hours (Typically 24 or 60) the panel must remain operational during primary power outage.
C The total alarm current supplied by the panel.
D Time duration expressed as a fraction of an hour (typically .083 hours) the panel must deliver the total alarm current, after the required standby period has elapsed.

The formula below is used to calculate the required battery capacity.

[A x B] + [C x D] x 1.2 = Minimum AMP-HOUR Battery Capacity

Where:

- A = Standby current [amps].
- B = Duration panel must remain operational [hours].
- C = Alarm Current [amps].
- D = Duration panel must remain in alarm after standby period ends [hours].

Note: Brackets [ ] indicate units of measure to be used.

Table A-4: Minute to Decimal Hours Conversion

05 minutes = 1/12 hour or .083 hrs
10 minutes = 1/6 hour or .167 hrs
15 minutes = 1/4 hour or .250 hrs.
20 minutes = 1/3 hour or .333 hrs.
25 minutes = 5/12 hour or .417 hrs.
30 minutes = 1/2 hour or .500 hrs.
45 minutes = 3/4 hour or .750 hrs.

Note: When a LSSPS power supply is charging its own batteries, an additional battery worksheet must be filled out to determine the required battery capacity for the LSSPS battery. When a LSSPS power supply is sharing a battery with the LSS4 no additional calculations are required.

Remote Annunciator Power Calculations

Overview

The RSA4-CPU requires a 24 VDC power source. The following areas must be addressed:

1. A minimum of 18.0 V is required at the RSA4-CPU.
2. Minimum supply voltage available is 20.4 VDC.
3. The Standby and Alarm current requirements of the RSA4-CPU and the option modules to which it is connected must be known.
4. Maximum total available current per power supply is 1.5 amps.

Calculations

A power consumption/wire sizing calculation must be performed to determine the wire size and wire length for a given load. Below is Table A-5, which may be used to determine RSA4-CPU loading.

Table A-5: RSA4-CPU Current Worksheet

Device	Quantity	Standby (Amps)	Total Standby Current (Amps)	Alarm Current (Amps)	Total Alarm Current (Amps)
RSA4-CPU		0.0176		0.0176	
RSA4-COM		0.0074		0.022	
SLU-16R		0.001		0.006/LED	

Figure A-1, below, shows the RSA4-CPU circuit.

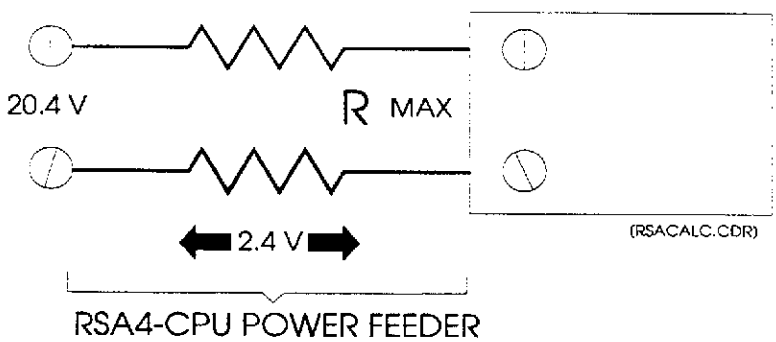


Figure A-1: RSA4-CPU Wiring

The value of RMAX is determined using Ohm's Law for current values from 0.25 to 3.5 amps:

$$R_{MAX} = \frac{2.4}{I_{MAX}}$$

Where:

- RMAX = Maximum allowable wire resistance.
- IMAX = Wire resistance per 1,000' (305 m) pair.

Note: 2.4 = Maximum allowable voltage drop.

Using Table A-6, Wire Resistance, the maximum RSA4-CPU distance from the power supply using any listed wire gauge may be determined as follows:

Table A-6: Wire Pair Resistance

Wire Size (AWG)	Resistance per 1000' Pair R/1000'Pair
#18	13.0 Ω
#16	8.0 Ω
#14	5.2 Ω
#12	3.2 Ω

$$D = \frac{R_{MAX}}{R_{1000'\,PAIR}}$$

Where:

- D = Distance in feet.
- RMAX = Maximum allowable wire resistance.
- R/1000' PAIR = Wire resistance per 1,000' (305 m) pair.

Table A-7, shown below, was derived using this method.

Table A-7: Load Vs Distance in Feet
RTSA4-CPU Power Feed Circuit
(2.4 Volt Drop)

Current (Amps)	#18 AWG	#16 AWG	#14 AWG
.25	738	1200	1846
.50	369	600	923
.75	246	400	615
1.00	184	300	462
1.25	148	240	369
1.50	123	200	308
1.75	105	171	263
2.00	92	150	231
2.25	82	134	206
2.50	74	120	185
2.75	67	109	167
3.00	62	100	154
3.25	57	93	142
3.50	53	86	133

Appendix B

Compatible Devices

Compatible Devices - ULI

Initiating Devices

Table B-1: 2-Wire Detector Compatibility

Manufacturer: GS Building Systems Corp. Control Unit: LSS4 Series						
Zone Module Model #	**UL Smoke Detector Compatibility ID**	**Electrical Data**				
		Standby Voltage @ Detector	**Ripple Voltage**	**Maximum Standby Detector Load**		**EOL**
				Style B	**Style D**	
LSS4	0.0	16.1 - 26.48 VDC	1.2 V Max.	3.0 mA @ 22.3 VDC	N/A	3.9 KΩ P/N 260001
4/8ZEXP	0.0	16.1 - 26.48 VDC	1.2 V Max.	3.0 mA @ 22.3 VDC	N/A	3.9 KΩ P/N 260001
4CLA	0.0	16.1 - 26.48 VDC	1.2 V Max.	N/A	3.0 mA @ 22.3 VDC	3.9 KΩ P/N 260001

Table B-2: ULI Compatible Manual Stations

Catalog No.	Description
270-SPO	Fire Alarm Station - Single Pole
270A-SPO	Fire Alarm Station - Single Pole, Wire Lead
270-DPO	Fire Alarm Station - Double Pole
270A-DPO	Fire Alarm Station - Double Pole, Wire Lead
270P-SPO	Fire Alarm Station - Presignal
270P-DPO	Fire Alarm Station - Presignal, Double Pole
270-SPO-L	Fire Alarm Station - Single Pole, LOCAL ALARM
270A-SPO-L	Fire Alarm Station - Single Pole, Wire Lead, LOCAL ALARM
270-DPO-L	Fire Alarm Station - Double Pole, LOCAL ALARM

Table B-2: ULI Compatible Manual Stations

Catalog No.	Description
270A-DPO-L	Fire Alarm Station - Double Pole, Wire Lead, LOCAL ALARM
270P-SPO-L	Fire Alarm Station - Presignal, LOCAL ALARM
270P-DPO-L	Fire Alarm Station - Presignal, Double Pole, LOCAL ALARM
276B-1110	Fire Alarm Station - Single Pole, Tool Reset
276B-1120	Fire Alarm Station - Single Pole, Key Reset
276B-1310	Fire Alarm Station - Double Pole, Tool Reset
276B-1320	Fire Alarm Station - Double Pole, Key Reset
276B-1420	Fire Alarm Station - Double Pole (NO/NC), Key Reset
276B-2120	Fire Alarm Station - Presignal
276B-2320	Fire Alarm Station - Presignal, Double Pole
277B-1110	Fire Alarm Station - Single Pole, Tool Reset
277B-1120	Fire Alarm Station - Single Pole, Key Reset
277B-1310	Fire Alarm Station - Double Pole, Tool Reset
278B-1110	Fire Alarm Station - Single Pole, Tool Reset
278B-1120	Fire Alarm Station - Single Pole, Key Reset
278B-1210	Fire Alarm Station - Double Pole, Tool Reset
278B-1320	Fire Alarm Station - Double Pole, Key Reset
278B-1420	Fire Alarm Station - Double Pole (NO/NC), Key Reset
278B-2120	Fire Alarm Station - Presignal
278B-2320	Fire Alarm Station - Presignal, Double Pole
279B-1110	Fire Alarm Station - Single Pole, Tool Reset
279B-1120	Fire Alarm Station - Single Pole, Key Reset
279B-1320	Fire Alarm Station - Double Pole, Tool Reset

Table B-3: ULI Compatible Heat Detectors

Catalog No.	Description
281B	Heat Detector - 135F (57C), FT/ROR
282B	Heat Detector - 197F (92C), FT/ROR
283B	Heat Detector - 135F (57C), FT
284B	Heat Detector - 197F(92C), FT
281B-PL	Heat Detector - 135F (57C), FT/ROR
282B-PL	Heat Detector - 197F (92C), FT/ROR
283B-PL	Heat Detector - 135F (57C), FT
284B-PL	Heat Detector - 197F(92C), FT
EPB501	Explosionproof Heat Detector, 138F (58C),ROR/FT
EPB502	Explosionproof Heat Detector, 190F (88C),ROR/FT
EPB503	Explosionproof Heat Detector, 138F (58C)
EPB504	Explosionproof Heat Detector, 190F (88C)
WPBMPB501	Wxproof/Moistureproof Heat Detector - 138F (58C), ROR/FT
WPBMPB502	Wxproof/Moistureproof Heat Detector - 190F (98C), ROR/FT
WPBMPB503	Weatherproof/Moistureproof Heat Detector - 138F (58C), FT
WPBMPB504	Weatherproof/Moistureproof Heat Detector - 190F(88C), FT
WPBMPB504	Weatherproof/Moistureproof Heat Detector - 190F(88C), FT

Table B-4: ULI Compatible Smoke Detectors

MFG	Model	Type	Base [Housing]	UL ID	Max. QTY/Zone
EST	6264B-001	Ion, Duct	6251B-001A [6260A-100]	001/001	50
EST	6249B	Ionization		001	50
EST	6250B	Ionization	6251B-001A	001/001	50
EST	6269B	Photoelectric		001	45
EST	6266B-001	Photo, Duct	6251B-001A [6260A-100]		45
EST	6270B	Photoelectric	6251B-001A	001/001	45
EST	6269B-003	Photo/Heat		001	45

Table B-5: ULI Compatible Sprinkler Accessories

Catalog No.	Description
WFDT	Detector, T-Mount, Waterflow, w/Retard
OSY-2	Detector, Gate Valve - Metal - Red
PIBV-2	Detector, Post Indicator/Butterfly Valve - Red

Notification Appliances

Table B-6: ULI Compatible Notification Appliances

Catalog #	Description
202-3A-T	30cd Synchronized Strobe
202-3A-TW	30cd Synchronized Strobe
202-5A-T	15cd Synchronized Strobe
202-5A-TW	15cd Synchronized Strobe
202-6A-T	60cd Synchronized Strobe
202-6A-TW	60cd Synchronized Strobe
202-7A-T	15/75cd Synchronized Strobe
202-7A-TW	15/75cd Synchronized Strobe
202-8A-T	110cd Synchronized Strobe
202-8A-TW	110cd Synchronized Strobe
403-3A-R	30cd Synchronized Bell/Strobe Plate
403-5A-R	15cd Synchronized Bell/Strobe Plate
403-7A-R	15/75cd Synchronized Bell/Strobe Plate
403-8A-R	110cd Synchronized Bell/Strobe Plate
405-3A-T	30cd Synchronized Strobe
405-3A-TW	30cd Synchronized Strobe
405-5A-T	15cd Synchronized Strobe
405-5A-TW	15cd Synchronized Strobe
405-6A-T	60cd Synchronized Strobe
405-6A-TW	60cd Synchronized Strobe
405-7A-T	15/75cd Synchronized Strobe
405-7A-TW	15/75cd Synchronized Strobe

Table B-6: ULI Compatible Notification Appliances

Catalog #	Description
405-8A-T	110cd Synchronized Strobe
405-8A-TW	110cd Synchronized Strobe
439D-6AW-R	Bell, 6" (152mm), 24 VDC
439D-8AW-R	Bell, 8" (200mm), 24 VDC
439D-10AW-R	Bell, 10" (254mm), 24 VDC
439DEX-6AW	Explosionproof Bell, 6" (152mm), 24 VDC
439DEX-8AW	Explosionproof Bell, 8" (200mm), 24 VDC
439DEX-10AW	Explosionproof Bell, 10" (254mm), 24 VDC
682-1A-HR	Mini Horn
682-1A-HW	Mini Horn
692-3A-HSR	30cd Synchronized Mini Horn/Strobe
692-3A-HSW	30cd Synchronized Mini Horn/Strobe
692-5A-HSR	15cd Synchronized Mini Horn/Strobe
692-5A-HSW	15cd Synchronized Mini Horn/Strobe
692-7A-HSR	15/75cd Synchronized Mini Horn/Strobe
692-7A-HSW	15/75cd Synchronized Mini Horn/Strobe
692-8A-HSR	110cd Synchronized Mini Horn/Strobe
692-8A-HSW	110cd Synchronized Mini Horn/Strobe
757-1A-C	Chime
757-1A-CW	Chime
757-3A-CS	30cd Synchronized Chime/Strobe
757-3A-CSW	30cd Synchronized Chime/Strobe
757-5A-CS	15cd Synchronized Chime/Strobe
757-5A-CSW	15cd Synchronized Chime/Strobe
757-7A-CS	15/75cd Synchronized Chime/Strobe
757-7A-CSW	15/75cd Synchronized Chime/Strobe
757-8A-CS	110cd Synchronized Chime/Strobe
757-8A-CSW	110cd Synchronized Chime/Strobe
757-1A-H	Horn
757-1A-HW	Horn
757-1A-T	Synchronized Temporal Horn
757-1A-TW	Synchronized Temporal Horn

Table B-6: ULI Compatible Notification Appliances

Catalog #	Description
757-3A-HS	30cd Synchronized Horn/Strobe
757-3A-HSW	30cd Synchronized Horn/Strobe
757-5A-HS	15cd Synchronized Horn/Strobe
757-5A-HSW	15cd Synchronized Horn/Strobe
757-5A-T	15cd Synchronized Temporal Horn/Strobe
757-5A-TW	15cd Synchronized Temporal Horn/Strobe
757-7A-HS	15/75cd Synchronized Horn/Strobe
757-7A-HSW	15/75cd Synchronized Horn/Strobe
757-7A-T	15/75cd Synchronized Temporal Horn/Strobe
757-7A-TW	15/75cd Synchronized Temporal Horn/Strobe
757-8A-HS	110cd Synchronized Horn/Strobe
757-8A-HSW	110cd Synchronized Horn/Strobe
757-8A-T	110cd Synchronized Temporal Horn/Strobe
757-8A-TW	110cd Synchronized Temporal Horn/Strobe
757-8A-RS70W	110cd Synchronized Re-entrant Speaker/Strobe
889D-AW	Explosionproof Horn, 24 VDC

System Accessories

Table B-7: ULI Compatible Accessories

Catalog No.	Description
1501-AQ	Single Floor Mtd. Doorholder/Release, Magnetic
1501-N5	Single Floor Mtd. Doorholder/Release, Magnetic
1502-AQ	Double Floor Mtd. Doorholder/Release, Magnetic
1502-N5	Double Floor Mtd. Doorholder/Release, Magnetic
1504-AQ	Flush Wall Mtd. Doorholder/Release, Magnetic
1504-N5	Flush Wall Mtd. Doorholder/Release, Magnetic
1505-AQ	Flush Wall Mtd. Doorholder/Release, Magnetic
1505-N5	Flush Wall Mtd. Doorholder/Release, Magnetic
1508-AQ	Surface Wall Mtd. Doorholder/Release, Magnetic
1508-N5	Surface Wall Mtd. Doorholder/Release, Magnetic

Table B-7: ULI Compatible Accessories

Catalog No.	Description
6254A-001	Alarm/Power Supervision Relay
RTU(C)	Remote Trouble Unit
4ZA(C)	Remote Annunciator, 4 Zone
8ZA(C)	Remote Annunciator, 8 Zone
RTU4ZA(C)	Remote Annunciator, 4 Zone w/Trouble Unit
RTU8ZA(C)	Remote Annunciator, 8 Zone w/Trouble Unit

(C) = English/French bilingual version

Table B-8: ULI Compatible Control Relays

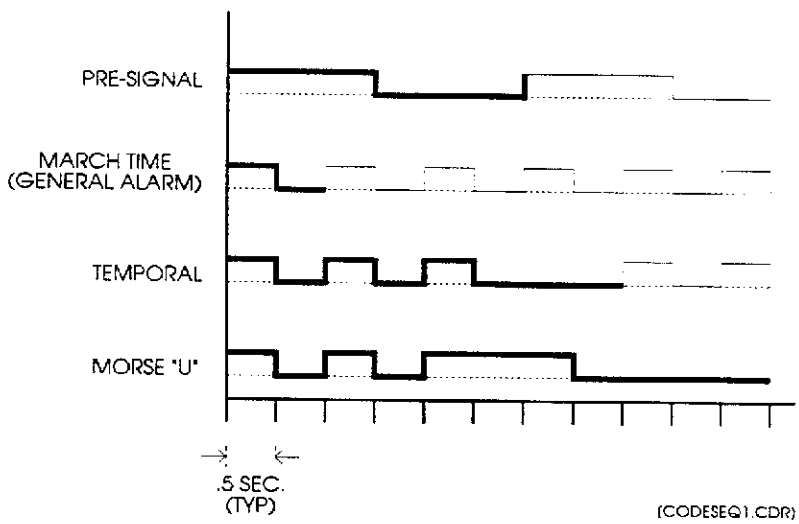
Catalog No.	Description
MR101/T	One SPDT w/LED, Track Mount
MR101/C	One SPDT w/LED, Metal Enclosure
MR104T	4-Position SPDT w/LEDs, Track Mount
MR104C	4-Position SPDT w/LEDs, Metal Enclosure
MR204/T	4-Position DPDT w/LEDs, Track Mount
MR204/C	4-Position DPDT w/LEDs, Metal Enclosure
MR601/S	One SPDT w/LED & Switch, Spacer Mount
MR601/T	One SPDT w/LED & Switch, Track Mount
MR604/S	4-Position SPDT w/LED & Switch, Spacer Mount
MR604/T	4-Position SPDT w/LED & Switch, Track Mount
MR608/S	8-Position SPDT w/LED & Switch, Spacer Mount
MR608/T	8-Position SPDT w/LED & Switch, Track Mount
MR701/S	One SPDT w/LED & Switch, Spacer Mount
MR701/T	One SPDT w/LED & Switch, Track Mount
MR703/S	4-Position SPDT w/LED & Switch, Spacer Mount
MR704/T	4-Position SPDT w/LED & Switch, Track Mount
MR708/S	8-Position SPDT w/LED & Switch, Spacer Mount
MR708/T	8-Position SPDT w/LED & Switch, Track Mount
MR801/S	One SPDT w/LED & Switch, Spacer Mount
MR801/T	One SPDT w/LED & Switch, Track Mount
MR804/S	4-Position SPDT w/LED & Switch, Spacer Mount
MR804/T	4-Position SPDT w/LED & Switch, Track Mount

Table B-8: ULI Compatible Control Relays

Catalog No.	Description
MR808/S	8-Position SPDT w/LED & Switch, Spacer Mount
MR808/T	8-Position SPDT w/LED & Switch, Track Mount
MR199X13	DPDT 24 VDC Relay Only
MR199X13/C	DPDT 24 VDC Relay, Metal Enclosure
MR199X14	DPDT 120VAC Relay Only
MR199X14/C	DPDT 120 VAC Relay, Metal Enclosure
PAM1	One SPDT w/LED, Adhesive Mount

Glossary

Alarm Signal Cutoff	A panel option which automatically silences the silenceable Notification Appliance (NAC) circuits after a programmed time limit. Cutoff timer range 00 to 99 minutes.
Alarm Silence/Reset Inhibit	A panel option which prevents silencing Notification Appliance Circuits and resetting the panel for a programmed period. Inhibit timer range 00 to 99 minutes.
Test	Maintenance mode to test initiating and Notification circuits. Creating an alarm on the initiating device circuit (IDC) under test causes the programmed Notification appliance circuit (NAC) to output a one (1) second pulse. The IDC is then automatically reset. Creating a trouble condition on the IDC under test causes the programmed NAC to output a two (2) second pulse. The IDC automatically resets upon removal of the trouble condition. If the zone is configured as an alarm zone, a 16 second delay occurs due to the resetting of smoke detectors before resetting the panel.
Notification Appliance Circuit (NAC)	A supervised output circuit connected directly to any audible or visual signal device used to indicate a fire.
Initiating Device Circuit (IDC)	A supervised input circuit connected directly to any manual or automatic device whose normal operation results in an alarm or supervisory signal indication at the control panel.



LSS4 Coding Sequences

March Time	A 50% duty cycle, on/off signal pattern.
Morse "U"	A short-short-long (Morse code "U") signal pattern.
Non-Silenceable	An Notification appliance circuit (NAC) which remains active after initiation, independent of the alarm silence switch.

Silenceable	A Notification appliance circuit (NAC) which follows the action of the alarm silence switch.
Temporal Pattern	A 3 pulse signal meeting the requirements of NFPA Standard 72, section A-2-4.10(a). This is the national standard fire alarm evacuation signal.
Verification, Alarm	After receipt of an alarm by a smoke detector, verified zones attempt to automatically reset the detector. Receipt of a second alarm within the 60 second confirmation period after the automatic detector reset period transmits the alarm to the panel.
Water Flow Zone	IDCs defined as water flow zones can activate NACs which are silenceable or non-silenceable. When activating an NAC configured a silenceable, the NAC will override the silenceable NAC configuration, and the NAC will NOT silence