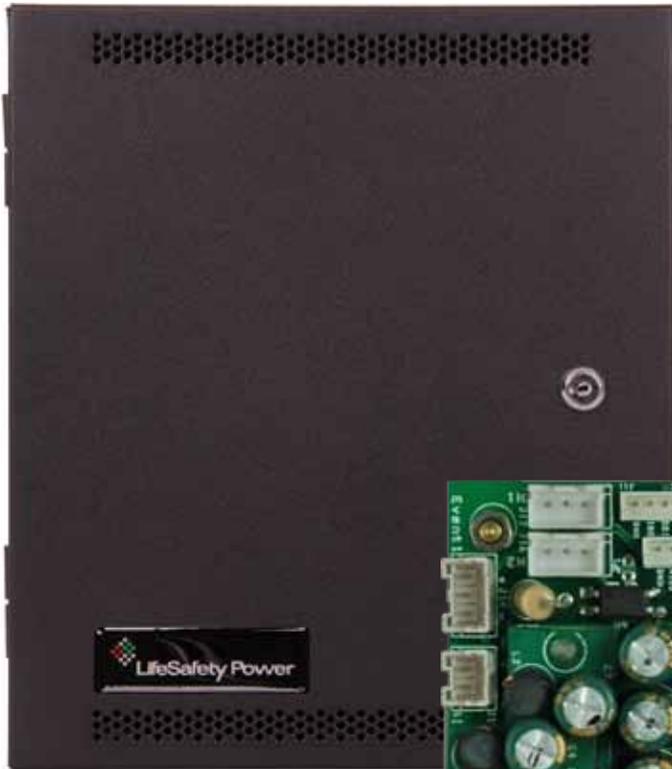




LifeSafety Power®



FLEXPOWER®



NL4

INSTALLATION AND OPERATION MANUAL



**PATENTED
FOUR PORT NETWORK MODULE**

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 **Resetting the NL4**

If the IP address or user name/password is unknown for an NL4 board, press and hold the reset button located next to the backup battery for five seconds. Note that this will reset the IP configuration information, user names, passwords, and SNMP settings to the factory default values and will require reconfiguration of these fields. See section 2.2.1.1 for more information.

 **Upgrading NL4 Firmware**

The browser history / cache should be cleared after performing the firmware upgrade and before accessing the NetLink again to prevent any cached pages from giving outdated information. See page 30 for detailed steps to Firmware upgrades.

Notes and Warnings

Symbol Definitions

The following symbols are used throughout this manual



This symbol is intended to alert the installer of shock hazards within the enclosure. Service should only be performed by qualified service personnel



This symbol is intended to alert the installer to important information or information intended to help the installer avoid personal injury or property damage

Warnings



Installation and service should be performed only by qualified service personnel and should conform to all local codes



To reduce the risk of electric shock or fire, do not expose this equipment to rain or moisture



This equipment shall be installed in a manner which prevents unintentional operation by employees, cleaning personnel, or others working in the premises, by falling objects, customers, building vibration, or similar causes



This equipment is not intended for use within the patient care areas of a Health Care Facility



Replace fuses only with the same type and rating as indicated in the specifications section of this manual.



To prevent impaired operation, ensure that all wiring is routed and secured to prevent accidental open or short circuit conditions



The system and any batteries (if used) should be tested at least once per year to ensure proper operation

Regulatory Information

The following equipment discussed within this manual has been tested to the following standards:

- UL 294, UL 603, UL 1076
- ULC S318, ULC S319

The equipment in this manual is also an ETL Recognized Component that Conforms to ANSI/UL Std. 294, ANSI/UL Std. 2044 and is Certified to CAN/CSA Standard C22.2 No. 60950-1.

Conventions Used Within this Manual

Positional information (e.g. top, bottom, up, down, left, right, etc.) is referenced with the board or enclosure in the orientation shown in the illustrations in this manual

Introduction

Product Description

The NL4 module is a networking appliance which may be used with the FlexPower product line. The NL4 is used to monitor power supply system status over a local or wide area network. When used with a FlexPower FPO DC system, the NL4 will allow limited control of the power system and provide values on demand for power supply output voltage, operational fault status, battery charging voltage, battery charging current, and fire alarm input status. The NL4 is required in systems using an M8 lock control module. In addition, the NL4 may be used with any 8-30VDC power supply in a limited fashion.

Automated reports may be generated on any detected fault condition, battery aging, fire alarm interface activation, and event activation, or on a time base for scheduled confirmation of proper operation. When used with an M8, the NL4 allows programming and control of the M8 board and its zones as well as monitoring of voltage and current on each zone. A time and date stamped log of the past 1000 events is kept as history in a buffer and may be accessed on demand, as a scheduled report, or immediately on an alert or occurrence. The buffer is updated once per hour with all parameters in normal range.

In addition to providing four data ports for connection to FlexPower FPO power supplies and M8 boards, the NL4 provides additional inputs for standalone or FlexPower use to monitor an additional DC voltage value, an Event input (voltage), and two DC currents via current sensor devices. The surrounding air temperature is measured and reported, and an optional remote temperature sensor allows monitoring of a temperature up to six feet away. The Event Input logic can be programmed to respond to the application or removal of voltage to compensate for NO or NC activity.

The NL4 provides two outputs for use in controlling external equipment which may be connected to LifeSafety Power's RB2, RB5, or RB8 DPDT relay modules or to the NS2 accessory module for use in controlling external equipment from the network or internet. The NS2 output controller module is typically used in FPA or RA FlexPower AC Systems.

Class 2 power limited wiring must be separated from non-power limited wiring by a minimum of 1/4 inch and must use separate knockouts

- The installation and all wiring methods shall be in accordance with ANSI/NFPA70 and all local codes.

For ULC compliance, installation and all wiring methods shall be in accordance with the Canadian Electrical Code, C22.1, Part I, Section 32.

All input/output wiring to the module shall be located within the same room (90 ft. max.).

Specifications

Power Input	Voltage	8-30VDC
	Current	60mA Nominal
ADC Input	Voltage	0-30VDC
	Resolution	10 Bits
	Accuracy	± 3%
Event1 Input	Voltage	9-30VDC
	Current	15mA Max.
Control Outputs	Current	50mA Max.
Current Sensors	Current	0-20A ±0.1A +5% of reading

Section 1 – Installation

The following pages cover the installation of the NL4 Network Communication Accessory.

1.1.1 Mounting the NL4 Network Communication Accessory

Use the following procedure when mounting an NL4 Network Communication Accessory to a LifeSafety Power enclosure.

1. Locate the appropriate mounting holes in the enclosure and snap the four standoffs provided into the holes.
2. Align the board mounting holes (mounting hole locations are indicated in the drawing below) with the standoffs and snap the board onto the standoffs. Be sure the board is properly oriented before snapping the board onto the standoffs.

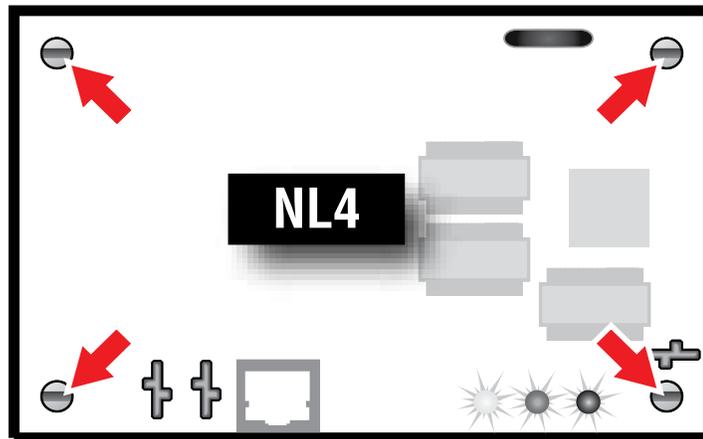


Figure 1.1

1.1.2 Mounting the NS2 Output Controller Accessory

Use the following procedure when mounting an NS2 Output Controller Accessory to a LifeSafety Power enclosure.

1. Locate the appropriate mounting holes in the enclosure and snap the four standoffs provided into the holes.
2. Align the board mounting holes (mounting hole locations are indicated in the drawing below) with the standoffs and snap the board onto the standoffs. Be sure the board is properly oriented before snapping the board onto the standoffs.

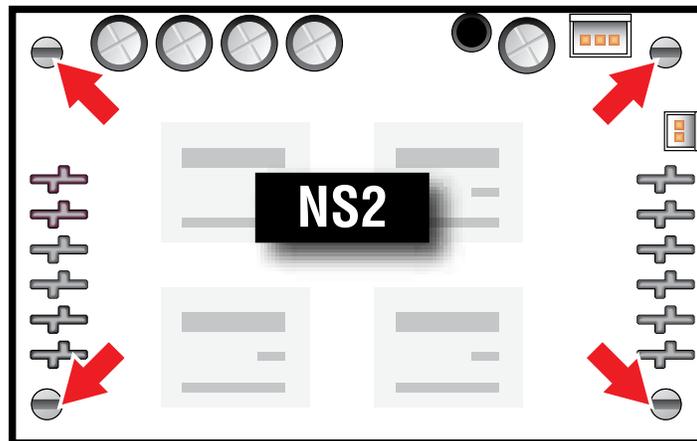
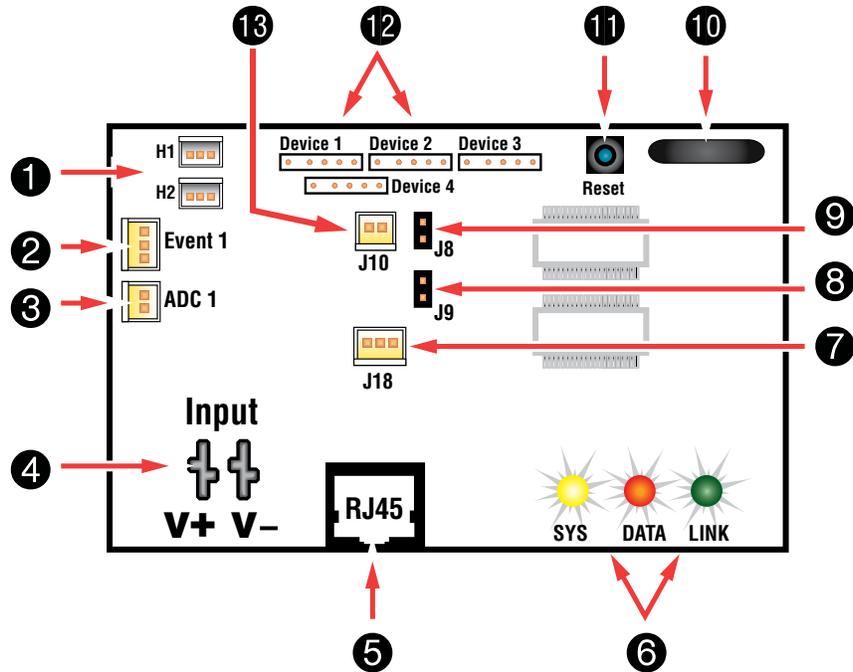


Figure 1.2

1.2 NL4 Network Communication Accessory Overview



The following are basic descriptions. Refer to the appropriate section for more detailed information.

1 NL4 - H1 and H2 Inputs (J12 & J16)

These are the connectors for the current sensors. Only an NL2 or NL4 current sensor should be plugged into this connector. The sensors have a range of +/-20A and may be used to measure any current or may be used to monitor approximate system battery health for FPO power supplies connected to the NL4. See section 1.3.4

2 NL4 - Event 1 Input (J14)

This is the connector for the Event1 input. This input will accept 9-30VDC to initiate an event alert. This input will only indicate an active or inactive condition and will not measure the voltage level. See section 1.3.5

3 NL4 - ADC1 Input (J15)

This is the Analog to Digital Converter (ADC) input, which acts as a voltmeter. It accepts 0-30V and is used to measure positive or negative system voltages which are common grounded with the NL4. The ADC cable wiring must be routed away from high voltages. See section 1.3.7

4 NL4 - Input V+ & V- (J1 & J3)

This is the main power input for the NL4 board. This input accepts 8 to 30VDC ONLY (Observe the polarity carefully) from any power supply. Note that if the NL4 is used with a power supply other than an FPO, only the basic NL4 functions such as the current sensor, Event1 Input, and Control Outputs, will be available. If the NL4 is being used in an AC-only system, such as an FPA series system, an NS2 board is *required* to convert the AC power to DC power. See section 1.3.1

Note - The voltage input of the NL4 must be connected directly to the DC1 output or to the V+/V- fastons (if present) of the FPO power supply.

5 NL4 - Ethernet Connection (SK1)

This is the RJ45 jack for the network connection. The ethernet cable is plugged into this jack. See section 1.3.2

6 NL4 - Status LED Indicators (D2, D3, D4)

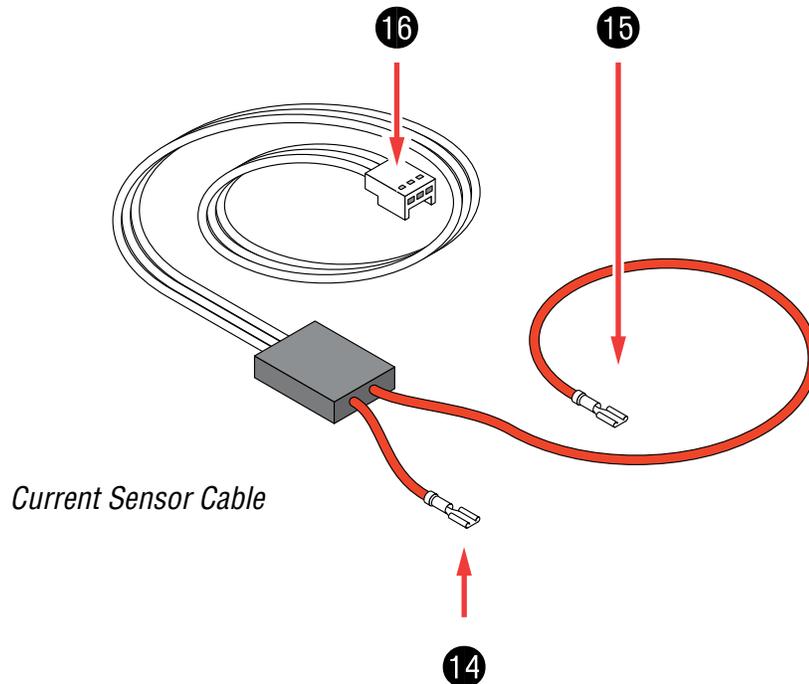
These LEDs indicate the status of the Ethernet link to the NL4 board.

LED Indicator:

Green (LINK) Lights when the NL4 is connected to a network

Red (DATA) Flashes during data transfer

Yellow (SYS) Lights when the NL4 is fully booted up and running. During the bootup process, this LED may flash on and off several times. The NL4 will not be able to be accessed until this LED lights steady.



7 NL4 - External Temperature Sensor

This connector is for the external temperature sensor. See section 1.3.6

8 NL4 - Dual ADC Jumper (J9)

This jumper enables "Dual ADC Mode" when using the NL4 with an NS2 board. If an NS2 board is not being used, leave this jumper OFF.

9 NL4 - Event1 Input Invert Jumper (J8)

This jumper inverts the action of the Event 1 Input. See section 1.3.5

Jumper Position:

- ON Event 1 active when voltage is applied
- OFF Event 1 active when voltage is removed

10 NL4 - Backup Battery (BT1)

This is the coin cell battery for maintaining the clock when all power is removed from the NL4. The battery type is CR2032.

11 NL4 - Factory Reset Button (SW1)

This button resets the User Name, Password, IP Address, and SNMP Settings back to factory default. Typically used when IP and/or login information has been lost. See section 2.2.1.1 for more information.

12 NL4 - Device 1 - Device 4 (J4, J5, J11, J17)

These are the four serial links to the devices to be monitored, such as FPO power supplies, M8, or N24 boards. Data is passed between the NL4 and the connected de-

vices through these links. Each NL4 board is limited to any combination of a maximum of two FPO boards, three M8 boards, and two N24 boards. See section 1.3.3

13 NL4 - Control Outputs (J10)

This connector is for the two control outputs. These outputs are open collector (transistor) low-current outputs for use with the NS2 board, RB Relay Boards, or other low-current inputs. The Control Output cable wiring must be routed away from high voltages. See Section 1.3.8

14 Current Sensor - Current Lead 1 (Short)

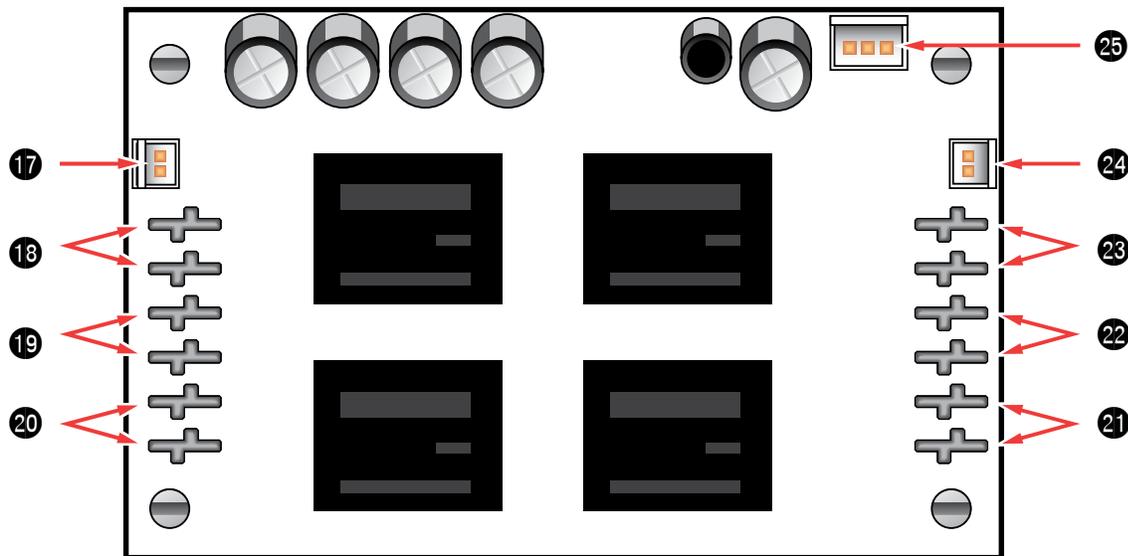
The short red lead connects in-line with the current to be measured toward the more negative side of the current flow. Positive current is measured when current flows from Current Lead 2 (Long Lead) to Current Lead 1 (Short Lead). See section 1.3.4

15 Current Sensor - Current Lead 2 (Long)

The long red lead connects in-line with the current to be measured toward the more positive side of the current flow. Positive current is measured when current flows from Current Lead 2 (Long Lead) to Current Lead 1 (Short Lead). See section 1.3.4

16 Current Sensor - Data Connector

This connector connects to the NL4 board's H1 or H2 input (J12 or J16) to provide the current reading to the NL4. See section 1.3.4



17 NS2 - ADC Output (ADC1 & ADC2)

This connector provides voltage outputs for measurement by the NL4 board, indicating presence of voltage on SB1-1 and SB1-2. Using the supplied cable, this connects to the ADC Input of the NL4 board (J15). The voltages indicated are not accurate and are only for indication of presence of voltage. Place jumper J9 on the NL4 board ON when using this output.

18 NS2 - Buss Inputs - Power Source 1 (B1-1 & B2-1)

These faston connectors are the B1 and B2 power inputs to the NS2 for power source #1. Typically, in a LifeSafety Power FPA system, this would be the blue and orange wires from Transformer #1. The power return (brown wire in an FPA System) connects to the BR1 faston - See #20.

19 NS2 - Buss Inputs - Power Source 2 (B1-2 & B2-2)

These faston connectors are the B1 and B2 power inputs to the NS2 for power source #2. Typically, in a LifeSafety Power FPA system, this would be the blue and orange wires from Transformer #2. The power return (brown wire in an FPA System) connects to the BR2 faston - See #20.

20 NS2 - Buss Inputs - Power Returns (BR1 & BR 2)

These are the power returns for the Buss Inputs. See #18 and #19. Typically, in a LifeSafety Power FPA system, these would connect to the brown secondary wires of the transformers.

21 NS2 - Buss Outputs - Power Returns (SBR1 & SBR2)

These are the switched power returns out to the BR terminals of the A8 distribution boards in a LifeSafety Power FPA system.

22 NS2 - Buss Outputs - Power Source 2 (SB1-2 & SB2-2)

These are the switched B1 and B2 outputs from power source 2. When the control output #2 of the NL4 board is activated, power will be removed from these outputs. Typically, these are connected to the B1 and B2 inputs of the A8 distribution boards in a LifeSafety power FPA system. The BR of the A8 connects to the SBR2 faston - See #21.

23 NS2 - Buss Outputs - Power Source 1 (SB1-1 & SB2-1)

These are the switched B1 and B2 outputs from power source 1. When the control output #1 of the NL4 board is activated, power will be removed from these outputs. Typically, these are connected to the B1 and B2 inputs of the A8 distribution boards in a LifeSafety power FPA system. The BR of the A8 connects to the SBR1 faston - See #21.

24 NS2 - Control Inputs (J9)

This is the control input from the NL4 board, allowing control of the power to the outputs via the NL4's web interface. Using the cable with two 2-pin plugs, connect between this connector and J10 on the NL4 board - See #13.

25 NS2 - NL4 Power Output (+12V-)

This is the power output for powering the NL4 board in an AC-only system. The NS2 converts AC power from the buss inputs to regulated DC power for the NL4 board. Using the supplied cable, connect this connector to the V+/V- input of the NL4.

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1.3 Connecting the NL4 Network Communication Accessory

1.3.1 Making the Power Connections to the NL4

DC Systems ONLY

In a DC system, the DC power source for the NL4 is connected to the INPUT (V+ & V-) fastons. The voltage of this source must be between 8 and 30VDC and should be backed up with a battery set or UPS to maintain communication during a loss of primary AC voltage.

The power connections for the NL4 must connect directly to the DC1 output or the V+/V- faston connectors (if present) of the FPO power supply. (Figure 1.4)

⚠ Note: Do not power the NL4 through another accessory board's output. (Figure 1.5)

AC Systems

⚠ WARNING - DO NOT CONNECT AC POWER TO THE NL4 BOARD'S INPUT (V+ & V-) TERMINALS OR DAMAGE TO THE NL4 WILL OCCUR.

In an AC system, power to the NL4 board MUST be supplied by an NS2 board, which is sold separately. The NS2 board converts the AC power from the low voltage transformer to DC voltage for powering the NL4 board. (Figure 1.6)

Use the cable with the three pin connector at one end and two faston connectors at the other end to make the connection. The three-pin connector plugs into the "+12-" connector (J1) on the NS2 board. The female fastons at the other end of the cable plug into the INPUT (V+ & V-) male fastons on the NL4 board. (Figure 1.6)

1.3.2 Making the Ethernet Connection to the NL4

Plug the Ethernet cable into the RJ45 jack on the NL4 until the locking tab clicks. Connect the other end of the Ethernet cable to the network.

⚠ Note: The NL4 board should be configured via a direct connection to a laptop or PC before connecting to the network. See the Initial Configuration Section (Section 2) of this manual for more details.

1.3.3 Connecting Devices to be Monitored to the NL4

Connect one end of the SPI cable to one of the "Device" connectors on the NL4. Connect the other end to the DataLink (DL) connector of the device to be monitored (such as an FPO - see the manual for the device being connected for the location of the DL connector). If monitoring more than one device, repeat this process for devices 2 through 4 as appropriate. Note that both ends of these cables are keyed and will only plug in one direction.

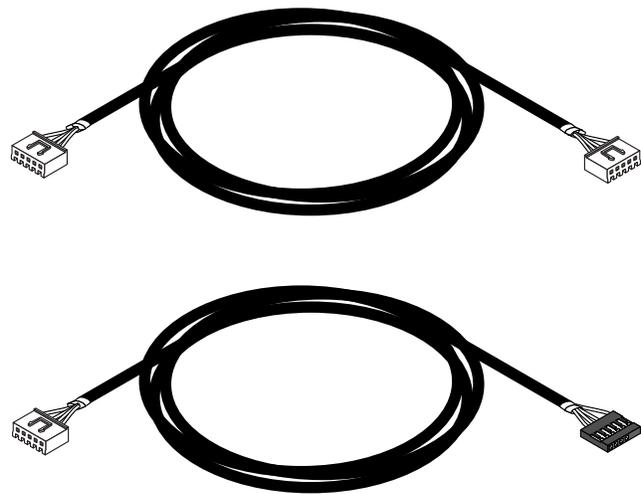


Figure 1.3 - The SPI Cable

There are two types of SPI connector currently in use. (Figure 1.3) The NL4 is supplied with two SPI cables for use with the new-style connector (top drawing in Figure 1.3, above). If the device being connected to the NL4 uses the old-style connector, contact LifeSafety Power for an adaptor cable (bottom drawing in Figure 1.3, above).

If monitoring the battery health of an FPO power supply using the Current Sensor, the NL4 will monitor the battery connected to the FPO power supply connected to Device 1 ONLY.

⚠ Note: The NL4 provides four Device ports which will accommodate a maximum of two FPO boards, a maximum of three M8 boards, and a maximum of two N24 boards.

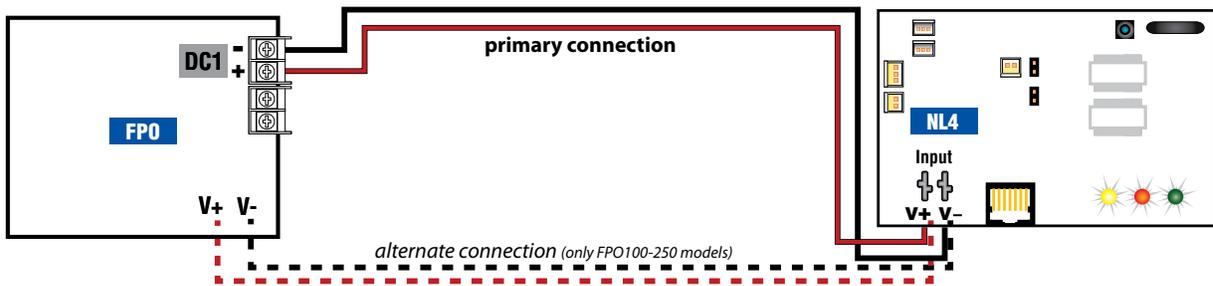


Figure 1.4 - Power the NL4 off the FPO DC1 terminals

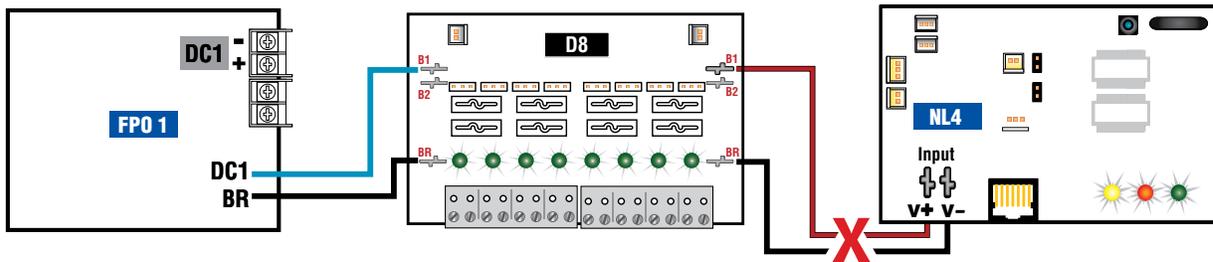


Figure 1.5 - Do not power off another accessory board's output

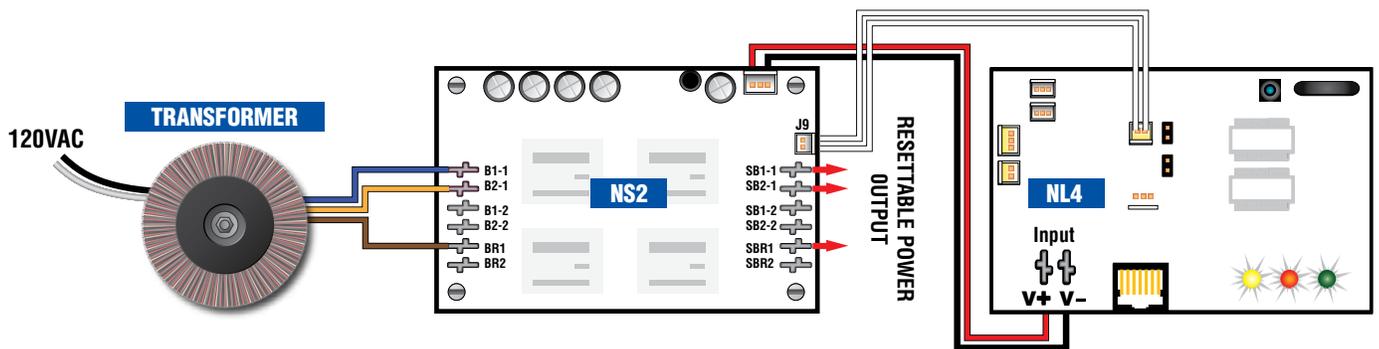


Figure 1.6 - Powering an NL4 in an AC System using an NS2 board

1.3.4 Connecting the Current Sensor(s)

Insert the current sensor in-line with the current to be measured, using the two red leads on the current sensor. (Figure 1.7) To read current in the correct polarity, the positive current should flow from the longer lead to the shorter lead on the current sensor. If current is being displayed in the opposite polarity than expected, swap the short and long red leads.

After connecting the red leads, connect the white cable to the "H1" or "H2" connector on the NL4.

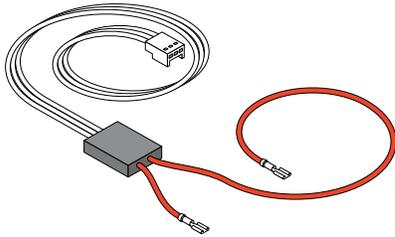


Figure 1.7 - Current Sensor

⚠ Note: To utilize the NL4's Battery Condition bar graph display or battery testing functions, the current sensor must be placed in-line with one of the battery leads. This precludes measuring any other currents with this current sensor. When using the current sensor for the battery measurement, connect the longer lead to the battery positive terminal and the shorter lead to the power supply positive battery connection so that battery DISCHARGE current measures as POSITIVE. The current sensor connected to the "H1" connector is for the battery connected to FPO #1. the "H2" connector is for FPO #2.

1.3.5 Connecting the Event Input

Connect one end of the Event cable to the Event1 connector on the NL4 board and cut off the connector at the other end of the Event cable. Connect the red and black wires to the voltage to be monitored. If monitoring a relay or switch contact (a common example would be the tamper switch of the enclosure), an external voltage must be run through the contact. Set the Event1 Input Invert Jumper as required.

Example:

To monitor the NC tamper switch in an LSP enclosure, connect a positive voltage (from the FPO power supply or distribution board) to one lead of the tamper switch. Connect the other lead of the tamper switch to the red (positive) lead of the Event cable. Connect the black (negative) lead of

the Event cable to the negative (DC Common) of the voltage source. (Figure 1.8) Since we want to cause an alert on the removal of voltage, leave the Event1 Input Invert Jumper OFF.

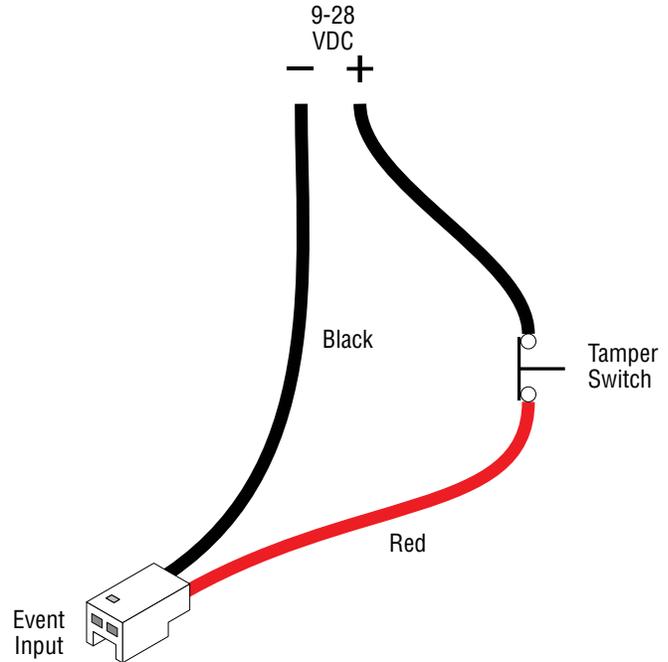


Figure 1.8 - Event1 Tamper Switch Wiring

1.3.6 Remote Temperature Sensor

The remote temperature sensor allows measuring a temperature up to 6 feet away from the NL4 board. Plug the sensor into J18 and run the sensor wire to the area or device to be monitored.

1.3.7 Connecting the ADC (Voltmeter) Input

If using an NS2 board with the NL4, connect one end of the ADC cable to the NL4's ADC input and the other end of the ADC cable to the ADC1/ADC2 connector on the NS2 board.

If not using an NS2 board, connect one end of the ADC cable to the ADC1 input on the NL4 board. Cut off the other end of the ADC cable and connect it to the voltage source to be monitored, observing polarity. The red wire is the positive input and the black wire is the negative (DC Common) input. The ADC cable wiring must be routed away from high voltages and the wire used must be rated for the voltages and temperatures in the area in which it is installed.

⚠ Note: The voltage being measured by the ADC input MUST be common grounded with the voltage source of the NL4 board.

1.3.8 Wiring the Control Outputs

If using an NS2 board with the NL4, connect one end of the Control Output cable to the NL4's control output and the other end of the Control output cable to the NS2's Control Input (J9).

If not using an NS2 board, connect one end of the Control Output cable to the Control Outputs connector on the NL4. Cut off the other end of the control output cable. The wire going to the pin on the connector labeled "FLT" is Control Output # 1. The wire going to the pin labeled "EN_FAI" is Control Output #2.

The Control Outputs are low-current, open collector (transistor) outputs which pull to ground when activated. These outputs can be used to activate sensitive trip relays, supply the ground side to an FAI Input, or other similar uses.

⚠ Note: Do not connect these outputs directly to a voltage source or damage to the NL4 will occur. Also, ensure the wire used is rated for the voltages and temperatures in the area which it is installed.

Section 2 – Initial Configuration

⚠ The NL4 is shipped with DHCP enabled as default. If the NL4 is being connected to a DHCP network, or if the NL4 has been preconfigured for your network, this section may be skipped. If the network is not DHCP, the NL4 must have the IP settings configured. A Network Scan Tool used for finding LSP devices is available at <http://www.lifesafetypower.com/support/software-firmware-downloads>.

2.1 Preparing to configure the NL4

In order to perform the initial configuration of the NL4, you will need the following:

- A computer (PC or Mac) set to a static IP address in the subnet 192.168.1.xxx, where xxx is a subnet address (0 to 255) not being used by any other device on the network. Do not use 192.168.1.9 or the final IP address you will be setting the NL4 to. See Figure 2.1.
- A web browser installed on the computer.
- An Ethernet cable long enough to reach between the computer and the NL4.
- The NL4 to be configured must be wired into the system and powered. After powering the NL4, wait for the NL4 to initialize - when ready, the yellow SYS LED will be lit steady.

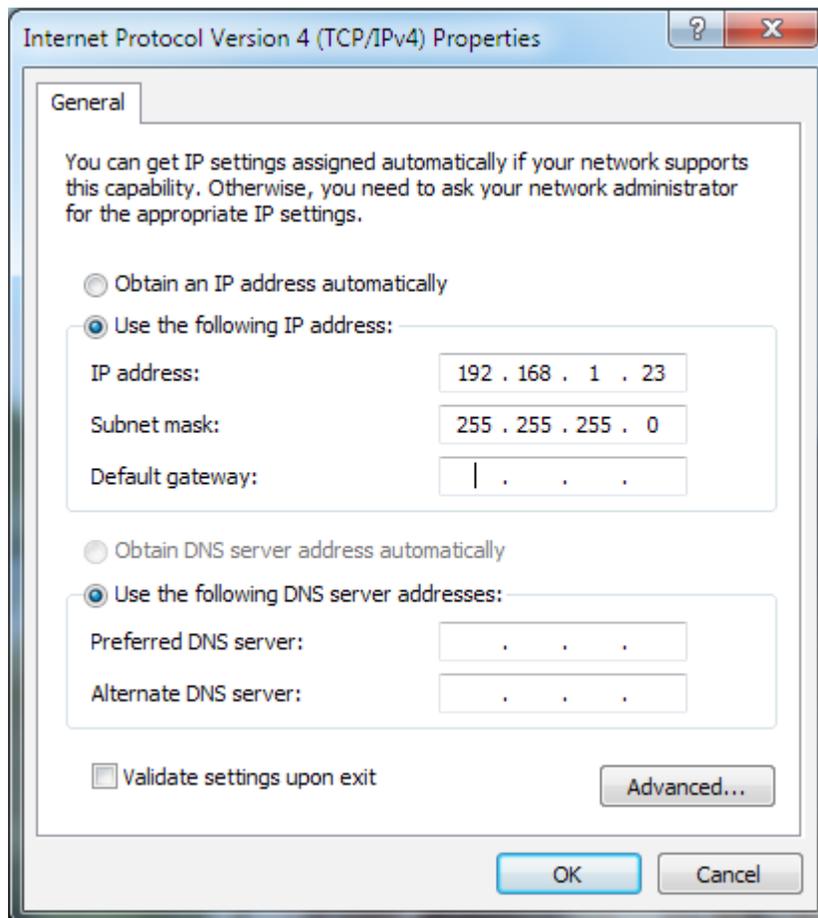


Figure 2.1 - Example of a PC Ethernet Port Settings Window

After the NL4 is powered within the system and initialized, connect the Ethernet cable between the Ethernet ports of the computer and the NL4.

2.2 Configuring the NL4

2.2.1 Logging into the NL4 for the first time

From the factory, the NL4 is preset with the following settings:

- DHCP Active (Ver 7.13 and higher)
- IP Address (If DHCP Server NOT Found): 192.168.1.9
- Username: admin
- Password: admin

⚠ Note that if the NL4 has been connected to a DHCP network, the IP address will be as assigned by the DHCP server. Use the Network Scan Tool at <http://www.lifesafetypower.com/support/software-firmware-downloads>.

Open a browser on the computer and enter "192.168.1.9" into the address bar. A window will appear asking for Authentication (See Figure 2.2). Enter "admin" for both the User Name and Password (note that BOTH are case sensitive). The LifeSafety Power NL4 License Agreement screen will appear. Read this agreement and if you agree, click "Accept" (See Figure 2.3). The home page for the NL4 should appear in the browser window (See Figure 2.4).

⚠ If the wrong password is entered three consecutive times, the user will be locked out of the device for 24 hours. Enter the password carefully to avoid lockout.

2.2.1.1 Resetting the NL4

To reset the NL4 to factory default user name, password, IP address, and SNMP settings, press and hold the reset button for at least 5 seconds. After releasing the button, the NL4 will reset and reboot.

For Firmware revisions 7.13 and above, the NL4 will default to DHCP after reboot. If a DHCP server is found, an IP address will be assigned. The LifeSafety Power scan software, or a third party software must then be used to find the IP address of the NL4.

⚠ If, after approximately 90 seconds a DHCP server is not found, the IP Address will default to 192.168.1.9.

System Login	
User Info	
Username	<input type="text"/>
Password	<input type="password"/>
Remember Password	<input type="checkbox"/>
<input type="button" value="Login"/>	

Figure 2.2 The NL4 Login Window (May appear different, depending on browser)



Figure 2.3 The NL4 License Agreement Window



PowerCom® POWER SYSTEM MANAGER



Ver: 7.12

HOME [Reporting](#) [Configure](#) [Tools](#)

SITE ID FPO75/250-C4D8F8M8NL4E2

Date Tue Jul 28 2015
Time 10:47:57

Network Module Dashboard

Enclosure Temperature 106.5 °F

Office Temperature 83.6 °F

HallSensor1 -0.05 Amp

HallSensor2 -0.10 Amp

ADC1Reading 0.00 VDC

Event1 inactive

Service Due No

Control 1 Off Control 2 Off

NL4 ver:0.9

View/Export past Hour(s) history

Device On/Off Control

1 2

ON OFF | ON OFF

Control 1 Control 2

Control 1 Control 2

Temperature

°F °C

NL4 Connected Devices

<p>Device 1</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <div> <p>Model: FPO75-25</p> <p>Device ID: FP-1</p> <p>Status: ●</p> </div> </div>	<p>Device 2</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <div> <p>Model: M8</p> <p>Device ID: M8-1</p> <p>Status: ●</p> </div> </div>
<p>Device 3</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <div> <p>Model: FPO150-100</p> <p>Device ID: FP-2</p> <p>Status: ●</p> </div> </div>	<p>Device 4</p>

Figure 2.4 - Typical NL4 Home Page

2.2.2 Configuring the TCP/IP Settings

In the orange menu bar at the top of the browser screen (Figure 2.4), click the "Configure" link. In the TCP/IP Setting block of the Configuration screen (See Figure 2.5), set the name to any meaningful name of your choice and set the first three numbers of the IP address to match the subnet of the network the NL4 will be connected to. Set the fourth value of the IP address to a number between 0 and 255 which is not being used by any other device on the subnet. Follow the example below to complete the remainder of the TCP/IP settings. Consult your IT department for information on these settings.

⚠ Note The NL4 has DHCP enabled by default. If the NL4 is connected to a DHCP network, the DHCP server will automatically configure the TCP/IP settings. **Note that you will need the Network Scan tool available at <http://www.lifesafetypower.com/support/software-firmware-downloads> to locate the NL4's IP address before logging into the NL4 board.**

The port number used by the NL4 can also be set in the Port# field. By default the NL4 is set to use port 80. To disable HTTP access and only allow access via HTTPS, check the "Disable HTTP" selection.

After completing the TCP/IP settings, click the "Submit" button in the bottom right corner of the TCP/IP Setting box. Note that the new TCP/IP settings will not take effect until the NL4 is rebooted or power to the NL4 is cycled.

To access the NL4 board from outside the installation site's firewall, the firewall must have the ports used by the NL4 for http/https, and SNMP (if used) open. See your IT department for firewall port opening details.

The screenshot displays the configuration interface for the PowerCom POWER SYSTEM MANAGER. At the top, the LifeSafety Power logo and the title "PowerCom® POWER SYSTEM MANAGER" are visible. The navigation bar includes "HOME", "Reporting", "Configure", and "Tools", with "Configure" selected. The version "Ver: 7.12" is shown in the top right. Below the navigation bar, the "SITE ID" is displayed as a blank field, and the current date and time are "Date: Fri Jul 24 2015" and "Time: 08:08:38".

The main configuration area is divided into three sections:

- TCP/IP Setting:** Includes fields for Name (LSP), IP Address (192.168.1.7), Net Mask (255.255.255.0), MAC Address (00:02:AC:55:94:BA), Gateway IP Address (192.168.1.1), DNS0 IP Address (75.75.75.75), DNS1 IP Address (75.75.76.76), and Port # (80). There are checkboxes for "Enable DHCP" (checked) and "Disable HTTP" (unchecked), with a "Submit" button.
- Time Setting:** Includes a "Select timezone:" dropdown menu (set to "(GMT-05:00)Eastern Time(US&Canada)"), "Insert Date:" fields (Year: 2015, Mon: 07, Day: 24), "Insert Time:" fields (Hour: 08, Min: 08, Sec: 40), an "NTP Server:" field (nist1-nj.ustiming.org), and a "Get GMT Time" button. A "Submit" button and a "Sync Date/Time with computer" button are also present.
- SNMP Setting:** Divided into "Basic", "Security Name", and "V3 User" sections. The "Basic" section includes "Read Community:" (public), "Write Community:" (blank), "Location:" (LSP), "Port #:" (161), and "Trap Type:" (Trap). The "Security Name" section has a table with columns "Name", "Source Network", and "User Name". The "V3 User" section has a table with columns "User Name" and "Password".

At the bottom, there are sections for "SNMP Trap Receiver" and "SNMP Inform Log", each with "IP" and "Port" fields and "Submit" and "Delete" buttons. A "Show Inform Log" button is also present.

Figure 2.5 - Typical Configure Page (top portion)

2.2.3 Time Settings

The Time Settings block (See Figure 2.5 previous page) is where the time and date are programmed into the NL4. Select the correct time zone from the drop down list and click Submit. After the time zone is set, enter the correct time. Enter the correct time and date in the following format and click the "Submit" button:

For Date: **YYYY MM DD**

For Time: **HH MM SS**

⚠ ALWAYS enter two digits in time field.. ie., 7AM = 07, not 7

The new date and time will take effect immediately. You can view the date and time on the Home page of the interface.

The "Sync Date/Time with computer" button will set the date and time of the NL4 to match the computer currently being used to access the NL4. The NTP Server field allows you to enter an NTP server for automatic setting of the time and date via the internet. The NL4 must be configured for internet access before this setting will work. Enter up to two NST servers in the fields provided (available from websites such as NIST). Either the IP address of the server or the DNS name of the server may be entered. After entering at least one server, click the "Get GMT Time" button to set the NL4 time. Depending on server traffic, it could take several seconds for the time setting to complete.

2.2.4 Configuring the SNMP settings

Scrolling down in the Configure page reveals the "SNMP Settings" section (Figure 2.6).

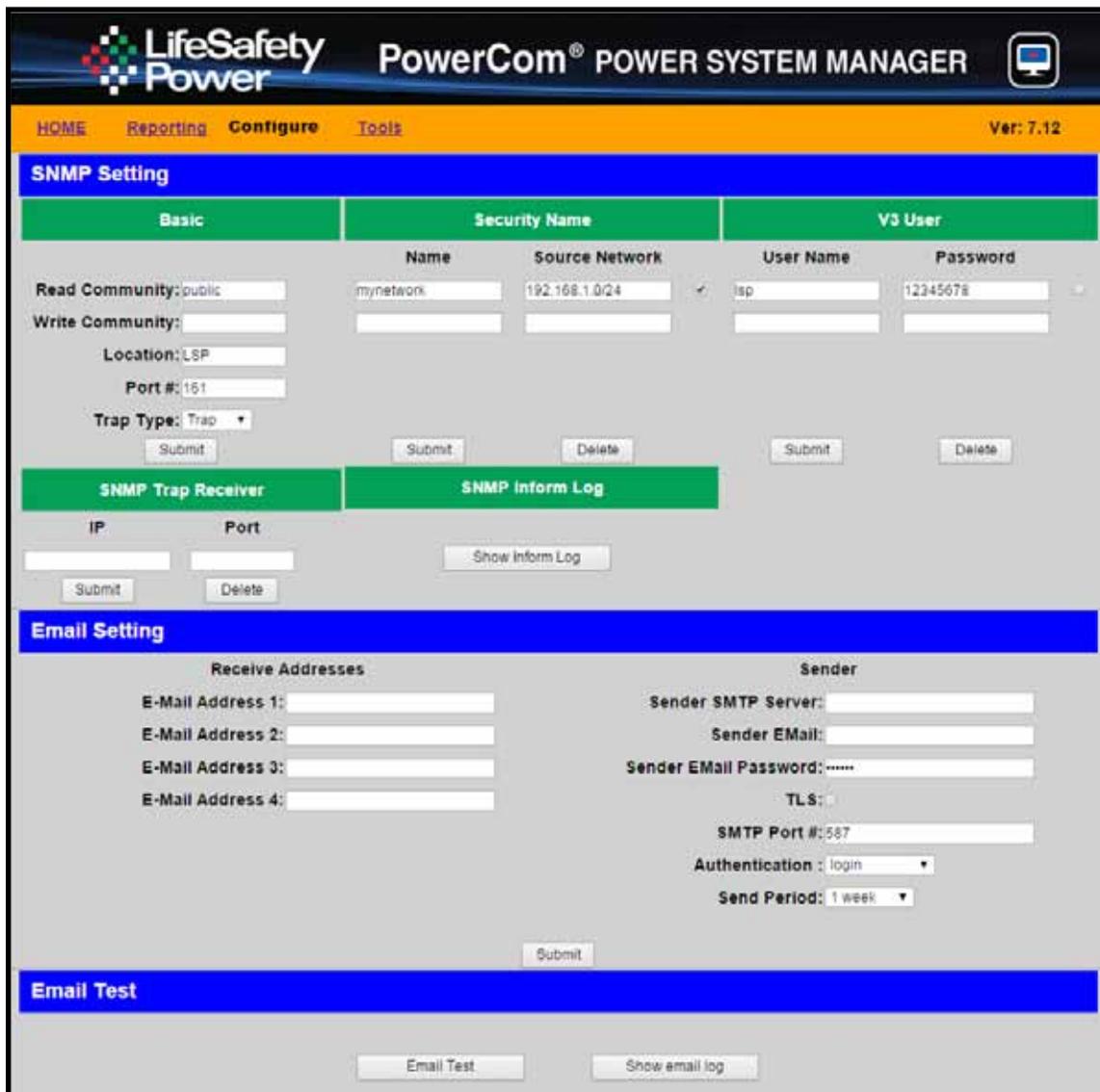


Figure 2.6 - Typical Configure Page (middle portion)

In the SNMP Setting block, under the "Basic" heading, set Read and Write Community to "public" and set Location to a meaningful name of your choice. This entry will help you identify the specific NL4 board when multiple NL4 boards are installed on the same subnet. This entry will be read by an SNMP system as "syslocation", OID .1.3.6.1.2.1.1.6. The port used for SNMP may also be changed in this section. The default port for SNMP is port 161. Be sure to open the SNMP port if accessing SNMP outside your firewall. Click the "Submit" button at the bottom of the "Basic" section to save the settings, otherwise you will lose the settings. These settings will take effect after a reboot of the NL4.

The "Security Name" section of the SNMP Setting block allows you to grant only specified computers (by IP address) SNMP v1 and v2 access. Since v1 and v2 do not have password protection, the Security Name settings add security to v1 and v2 access. The web server is password protected and a user must have the web server password in order to setup a computer in the Security Name settings and gain v1 and v2 access.

Multiple source networks can be added to the Security Name Setting block. Be sure to click the "Submit" button to save the settings. The settings will take effect after a reboot of the NL4.

The "V3 User" section of the SNMP Setting block allows for a user to set up an SNMP v3 user name and password. With a user name and password, the NL4 board may be accessed from anywhere via the internet by using the SNMP v3 protocol. No security name setup is required for v3 users and multiple v3 users may be set up in the same table. Click the "Submit" button to save the settings, which will take effect after rebooting the NL4.

The SNMP Trap Receiver IP and Port settings should be set to the proper address for the SNMP Trap receiver. Click the "Submit" button and reboot the NL4 for the settings to take effect. The SNMP Inform Log may be seen by clicking the "Show Inform Log" button. Click "Hide Inform Log" to hide the log window.

2.2.5 Configuring the Email Settings

The NL4 can be configured to send email alerts on user-specified conditions and periodic status reports. Underneath the SNMP Settings block on the Configure page is the Email Settings block (See Figure 2.6).

Under "Receive Addresses", the email address or addresses to receive the alerts and reports should be entered. Up to four recipient email addresses may be entered.

Under "Sender", the settings of the account to send the emails should be entered. These settings include:

Sender SMTP Server	This is the address of the SMTP server for the email provider. Consult with your email provider for this address.
Sender's Email	This is the email address which the NL4 will use to send emails.
Sender Email Password	This is the password associated with the Sender's Email account
TLS	Check this box if your email provider requires TLS or SSL encryption
SMTP Port #	Enter the port number required by your email provider for sending email. Usually this is "25"
Authentication	Choose the proper authentication method for your email provider from the drop-down list. Usually, this is "login". Select "off" to completely disable authentication.
Send Period	Selects how often the NL4 sends a regular email status report. The period can vary from 1 hour to 6 months or, if you do not want the NL4 to send periodic reports, select "Never". Note that the "Send Period" setting does not affect the sending of email alerts generated on faults or events selected by the user, only the periodic status report.

⚠ Note: *Regarding Microsoft Exchange – By Default, Microsoft Exchange will not accept SMTP connections. To use the NL4's email functions through Microsoft Exchange, the Exchange service must be configured to allow SMTP connections. Consult with the administrator of your Microsoft Exchange Server.*

⚠ Note: **Click the "Submit" button to save the settings, which will take effect after rebooting the NL4.**

TIP: *Most mobile phone providers have an email address available which will convert an email into an SMS text message. This email address is usually in the form of: (the mobile phone number)@xxxxxx. Consult with your mobile provider for more information. The CSV attachment will be removed, since SMS text messages are not compatible with attachments. Because of this, it is recommended that the SMS email be entered as an ADDITIONAL "Receive Address" on the NL4, so that the CSV file will still be available via regular email.*

2.2.6 The Email Test Section

Below the Email Settings section is the Email Test section. (See Figure 2.6 page 14) After configuring the email settings, the Email Test button will send a test email to all Email Receive addresses. Please note that it could take up to several hours to receive an email, depending on the speed of your email server. Clicking the Show Email Log button will show the feedback from the email server. This can be useful for diagnosing email problems.

2.2.7 Remote VPN Settings

Below the Email Test section is the VPN Settings section (See Figure 2.7). When using the NL4 with an MSM-200 which is not within the same local network, the IP address, User Name, and Password for the MSM-200 may be entered here. Click "Submit" for the settings to take effect. See Section 2.3 and the manual for the MSM-200 for more information.

2.2.8 Configuring the NL4 Network Module Settings

Below the Email Setting block is the NL4 Network Module Setting block, where application-specific parameters of the NL4 can be set (See Figure 2.7).

Site ID	Enter any meaningful name to help identify the installation site. The Site ID text will appear at the top of the Home page, as well as in the subject line of email alerts and reports.
Data Buffer Interval	This selects the time period between "snapshots" of the data for the email/csv reports. The default value is 0.083 hours, or about 5 minutes.
External Event	Enter a name related to the usage of the Event1 input. In the example, this setting is labeled "Event1".
Hall Sensor 1	Enter a name indicating the current being measured by the current sensor connected to the H1 connector of the NL4. In the example, the label is "HallSensor1".
Hall Sensor 1 Lower Limit	This is the lower current limit for Hall Sensor 1. If the measured current goes below this value, an alert will be generated. By default, this value is set to -3A to disable the limit.
Hall Sensor 1 Upper Limit	This is the upper current limit for Hall Sensor 1. If the measured current goes above this value an alert will be generated. By default this value is set to 15A.
Hall Sensor 2	Enter a name indicating the current being measured by the current sensor connected to the H1 connector of the NL4. In the example, the label is "HallSensor2".
Hall Sensor 2 Lower Limit	This is the lower current limit for Hall Sensor 2. If the measured current goes below this value, an alert will be generated. By default, this value is set to -3A to disable the limit.
Hall Sensor 2 Upper Limit	This is the upper current limit for Hall Sensor 2. If the measured current goes above this value an alert will be generated. By default this value is set to 15A.
Control 1	Enter a name for the Control 1 output. This label will appear below the Netlink Control Setting 1 radio buttons on the home page.
Control 2	Enter a name for the Control 2 output. This label will appear below the Netlink Control Setting 2 radio buttons on the home page.
ADC1 Reading	Enter a name indicating the voltage being measured by the ADC input of the NL4. This reading is the voltage between the two ADC input pins. In the example, the label is "ADC1Reading". Note that if the Dual ADC jumper is in place (ONLY when using an NS2 board with the NL4), a second setting, labeled ADC2 Reading, will appear under the ADC1 Reading setting.
ADC1 Lower Limit	This is the lower voltage limit for the ADC1 input. If the measured voltage goes below this value, an alert will be generated. By default, this value is set to -30V to disable the limit.
ADC1 Upper Limit	This is the upper voltage limit for the ADC1 input. If the measured voltage goes above this value, an alert will be generated. By default, this value is set to 30V.
External Temperature	Enter a name for the external temperature measurement.
Temperature Lower Limit	Enter a lower temperature limit for the external temperature sensor input. If the temperature measured by the sensor goes BELOW this value, an alert will be triggered.
Temperature Upper Limit	Enter an upper temperature limit for the external temperature sensor input. If the temperature measured by the sensor goes ABOVE this value, an alert will be triggered.
Next Service Due	Enter a date indicating the next service due date. If "Service Due" is selected as an email alert condition, an alert email will be sent out to the specified email recipient(s) when the system time matches the due date time.
Reminder Message	Enter a brief message to indicate the type of service which is due in the email alert. This message will appear in the Subject line of the alert email.

⚠ Note: After entering the above information into the NL4 Network Module Setting block, click the "Submit" button to save the settings. These settings will take effect immediately without rebooting the NL4 board.

2.2.9 User Settings

In the User Settings block of the Configure screen (bottom of Figure 2.7), you can enter the user names, passwords, and access levels for the NL4.

The default user is "admin" and the password for this account is also "admin". It is highly recommended to change this user name and password for security reasons. Click Submit when done. Note that there must ALWAYS be at least one admin-level user.

Adding a New User

To add another user, first select the Authorization level desired for the user. Three authorization levels are available:

- Admin Admin-level users have full control over the NL4. There are no restrictions.
- Manager Manager-level users have access to all areas of the NL4 except for the Configure page.
- Guest Guest-level users may only view information on the NL4 screens. No changes can be made and none of the control features are available.

After selecting the Authorization level, enter the new user name in the User Name column and enter the password into the Password column. Passwords must be at least eight characters long and contain at least one capital letter and one number. Re-enter the password into the Verify Password column. Click Submit when done.

After clicking Submit, the new user will be active and another blank row will appear for entering the next user name.

The screenshot displays the 'Configure' page of the PowerCom POWER SYSTEM MANAGER. The page is divided into three main sections:

- VPN Setting:** Includes a checkbox for 'EnableRemoteVPNServer', input fields for 'IP Address', 'User Name', and 'Password', and a 'submit' button.
- NL4 Network Module Setting:** Contains various configuration parameters:
 - Site ID: FPO75/250-C4D8F8M8NL4E2
 - Data buffer interval: 0.083 Hour(s)
 - External Event: Event1
 - Hall Sensor 1: HallSensor1
 - Hall Sensor 1 Lower Limit: -3.00 Amp
 - Hall Sensor 1 Upper Limit: 15.00 Amp
 - Hall Sensor 2: HallSensor2
 - Hall Sensor 2 Lower Limit: -3.00 Amp
 - Hall Sensor 2 Upper Limit: 15.00 Amp
 - Control 1: Control 1
 - Control 2: Control 2
 - ADC1 Reading: ADC1Reading
 - ADC1 Lower Limit: -30.00 VDC
 - ADC1 Upper Limit: 30.00 VDC
 - External Temperature: Room Temperature
 - Temperature Lower Limit: 55.00 °F
 - Temperature Upper Limit: 100.00 °F
- User Setting:** Features a table for user management with columns for 'Authorization', 'User Name', 'Password', and 'Verify Password'. The first row shows 'admin' for both authorization and user name. There are 'Submit' and 'Delete' buttons at the bottom.

Figure 2.7 - Typical Configure Page (bottom portion)

2.2.9 Setting up the Parameters for the Email Reports

The NL4 can send email alerts based on selectable conditions. If enabled, when the selected conditions are met, the NL4 will send an email with an attached report file (in CSV format). To set up the email alert conditions, click the "Reporting" link in the top menu.

Select the Email Alert Triggers

The "Alert Enable On" block of the Reporting page contains checkboxes for the various conditions that can cause an email alert to be sent (See Figure 2.8).

System Fault	If checked, a System Fault condition on a connected device will generate an email alert.
AC Fault	If checked, an AC fault condition on a connected device will generate an email alert.
Hall Sensor 1	If checked, a current outside the range set for Hall Sensor 1 will generate an email report.
External Temperature	If checked, an external temperature outside of the range set on the Configure page will generate an email alert.
Event1	If checked, a valid input on the Event1 Input will generate an email alert.
FAI Active	If checked, an active FAI Input on a connected device will cause an email alert.
Hall Sensor 2	If checked, a current outside the range set for Hall Sensor 2 will generate an email report.
Battery End of Life	If checked, an email alert will be sent when the Battery Runtime of the connected device reaches the "Rated Battery Life" setting on the Configure page. When a new battery is installed, the "Reset Timer for New Battery Installation" box on the Programming page should be set to reset the Battery Runtime counter.
Battery Condition	An email alert will be sent when the battery charge is less than 20% (one yellow bar on the "Bat. Condition" display on the Home page).
ADC1 Reading	If checked, a voltage outside the range set for ADC1 will generate an email report.
Service Reminder	An email alert will be sent when the "Next Service Due" date and time on the Configure page are reached.
Device Detect	An email alert will be sent when a SPI device (FPO, N24) is connected or disconnected from the NL4 board. This will notify the email recipient if the NL4 loses communication with a connected device.

After setting the email alert triggers, click the "Submit" button at the bottom of the "Alert Enable On" section for the settings to take effect.

Select the Occurrences to Report

The "Select Occurrences to Report" block of the Reporting page allows the setting of the number of history events which will be included in the report file attached to the alert email (See Figure 2.8). The NL4 records a snapshot of device parameters at the time period selected on the Configure page. Up to 1000 history events can be recorded. The user can enter between 1 (the latest event only), up to 1000 (for all events). After entering the number of history events to email, click the "Submit" button to save this setting.

LifeSafety Power **PowerCom® POWER SYSTEM MANAGER**

HOME Reporting Configure Tools Ver: 7.12

SITE ID FPO75/250-C4D8F8M8NL4E2

Date Tue Jul 28 2015 **Time** 10:49:38

[Send Email Report](#)

Alert Enable On

System Fault Event1 Battery End of Life Service Reminder
 AC Fault FAI Active Battery Condition Device Detect
 HallSensor1 HallSensor2 ADC1Reading External Temperature

Select Occurrences to Report

Select: Occurrence

NL4 Report

HallSensor1 ADC1Reading Enclosure Temperature
 HallSensor2 Event1 Office Temperature

FP1 Report

Model Number
 System Fault Status
 AC Fault Status
 FAI Status
 FAI Latch Status
 FPO Output Voltage
 Battery Voltage
 Battery Charge Current
 FPO Runtime
 Battery Runtime
 AC Fault Total
 System Fault Total
 Battery Soc

FP2 Report

Model Number
 System Fault Status
 AC Fault Status
 FAI Status
 FAI Latch Status
 FPO Output Voltage
 Battery Voltage
 Battery Charge Current
 FPO Runtime
 Battery Runtime
 AC Fault Total
 System Fault Total
 Battery Soc

Figure 2.8 - Typical Reporting Page

Select the Devices and Parameters to Report

The bottom section of the Reporting page contains the devices and parameters selection area (See Figure 2.8). Any connected devices will show here, along with a section for the NL4 itself. To include these devices in the email alert report, check the box to the right of the device name in the heading for the device.

The NL4 and each device also have selectable parameters listed below their headings. Checking these parameters will add them to the report attached to the email alert. These are the same parameters as seen on the Home page.

Available NL4 parameters include: enclosure temperature, external temperature, current sensor readings (will appear as the label set for "Hall Sensor 1" and "Hall Sensor 2" on the Configure page), the ADC1 reading (will appear as the label set for "ADC1 Reading" on the Configure page), and the Event Status (will appear as the label set for "External Event" on the Configure page).

Available FPO parameters include: Model Number, System Fault Status, AC Fault Status, FAI Status, FAI Latch Status, FPO Output Voltage, Battery Voltage, Battery Charge Current, FPO Runtime, Battery Runtime, AC Fault Total, System Fault Total, and Battery State Of Charge.

Available N24 parameters include: Model Number, System Fault Status, FAI Status, Alm/Spv Mode

M8 parameters are set on the M8's configure page (See the M8 Manual for more information).

After setting the devices and parameters to be reported, be sure to click the "Submit" button for each device.

2.3 Setting Up the NL4 for use with the MSM-200 multi-site manager

The MSM-200 will auto discover the NL4 when properly configured. The configuration method is determined by the MSM's IP subnet in relation to the NL4.

NL4 in the same subnet as the MSM-200

If the NL4 is within the same local network as the MSM-200 and is set to be within the same subnet, the MSM will auto-detect the NL4. For example, if the MSM is properly configured on a LAN and has the local IP address of 192.168.1.100, the NL4 should also have an IP address of 192.168.1.xxx to be auto-discovered. The MSM may take several minutes to find the NL4. Once discovered, the MSM will auto assign the VPN IP address for the NL4 (for example, 192.168.3.xxx).

NL4 not within the same subnet or LAN as the MSM-200

If the NL4 is not within the same subnet as the MSM-200, additional configuration must be performed in order to connect the device to the MSM-200. NOTE: To configure an NL4 which is NOT on the same LAN as the MSM-200, both the MSM-200 and the NL4 must be on networks with internet access.

Within the NL4's "Configuration" screen is a VPN Settings section (Figure 2.9). To configure the device to be auto detected by the MSM-200, configure this section as follows:

EnableRemoteVPNServer - Check this box to enable the remote VPN Server

IP Address - Enter the IP address of the remote MSM-200.

User Name - Enter one of the VPN user names. These are either the predefined vpn1 through vpn9 default user names or an administrator configured user name. See section 3.5 of the MSM-200 manual for more information.

Password - Enter the correct password for the VPN user name entered. For the default vpn1 through vpn9 user names, this password is "12345".

Click the "Submit" button to apply the settings and reboot the NL4 for the settings to take effect. The MSM may take several minutes to discover the NL4, depending on network speed and traffic.



Figure 2.9 - VPN Setting Configuration Screen

Section 3 – Using the NL4

Before system parameters can be viewed, you must be logged into the NL4 board using the proper IP address, user name, and password for the NL4 to be viewed, as shown in Section 2 of this manual.

3.1 Viewing System Parameters on the NL4 Home Page

The Home page contains all of the real-time parameters monitored by the NL4 as well as status of the connected devices. The Home page is broken into several sections as follows.

3.1.1 Basic Site Information

The top portion of the NL4 Home page lists the Site ID (as programmed on the Configure page) as well as the system time and date (Figure 3.1).

The screenshot displays the NL4 Home Page interface. At the top, the LifeSafety Power logo and PowerCom® POWER SYSTEM MANAGER are visible. The navigation menu includes HOME, Reporting, Configure, and Tools. The current version is Ver: 7.12. The main section shows the SITE ID as FPO75/250-C4D8F8M8NL4E2, the Date as Tue Jul 28 2015, and the Time as 10:47:57. Below this, the Network Module Dashboard is divided into two columns. The left column displays various sensors: Enclosure Temperature (106.5 °F), Office Temperature (83.6 °F), HallSensor1 (-0.05 Amp), HallSensor2 (-0.10 Amp), ADC1Reading (0.00 VDC), Event1 (inactive), and Service Due (No). The right column shows Device On/Off Control for two devices (Control 1 and Control 2) and Temperature settings (°F and °C). The NL4 Connected Devices section lists four devices: Device 1 (Model: FPO75-25, Device ID: FP-1, Status: On), Device 2 (Model: M8, Device ID: M8-1, Status: On), Device 3 (Model: FPO150-100, Device ID: FP-2, Status: On), and Device 4 (Status: Off).

Figure 3.1 - Typical NL4 Home Page

3.1.2 Network Module Data, & History and Control Sections

Below the Basic Site Information are the parameters and settings related to the NL4 board and the Web Interface itself (See Figure 3.1 page 21).

Enclosure Temperature	This is the temperature of the NL4 board. The temperature sensor is installed on the NL4's PC board. The temperature may be set to be displayed in either Fahrenheit or Celsius, based on the setting of the "Temperature" radio buttons on the bottom right of the Home page.
External Temperature	If an external temperature sensor is connected to J18, this temperature display will display the external sensor's temperature.
Current Sensor Measurements	These will appear as the labels you set for the Current Sensors on the Configure page. In the example shown, this is "HallSensor1" and "HallSensor2". These measurements are shown as a positive or negative current in Amps DC. A positive current measurement indicates current flow from the longer red lead of the current sensor to the shorter red lead of the current sensor. If current is being displayed in the opposite polarity than expected, swap the short and long red leads. See section 1.3.4 for more information on the current sensor.
ADC Voltage Measurement	This is the voltage measured by the on-board Analog-to-Digital converter (ADC) and will appear as the label you set for the ADC input on the Configure page. In the example shown, this is "ADC1Reading". This measurement is shown as a positive or negative voltage in Volts DC. If using an NS2 board with the NL4 and J9 is installed, two measurements will appear here.
Event1 Indicator	This field shows the status of the Event1 input. It will appear as the label set for the Event1 input on the configure page. In the example shown, this is "Event1". This field will show "Active" on a yellow background or "Inactive" on a green background to indicate the status of the Event1 input.
Service Due	This field will display "Yes" when the "Next Service Due" date programmed on the Configure page has been reached and will display "No" before the due date. If the "Service Due" checkbox is enabled on the Reporting page, the color of the "Service Due" field on the home page will change colors based on the status. If service is due, the field will be yellow, if service is not due the field will be green.
Control 1 and Control 2 Status	These fields indicate the state of the two control outputs of the NL4. These control outputs will be labeled with the names given on the Configure page and can be manipulated with the Output Control radio buttons in the History and Control section of the home page. The Control 1 and Control 2 fields will display "Off" with a white background or "On" with a green background.
View/Export History	The NL4 saves a snapshot of data every hour, on the hour. These snapshots can be reviewed by entering the number of events to view or export then clicking Go. There are up to 1000 hours available for review. In the page that opens, each row is a parameter and each column is snapshot of the parameters at the time displayed in the date and time column. Click the Return button at the top to return to the home page.
Device On/Off Control	These two pairs of radio buttons select the state of the two Control Outputs of the NL4 board. After changing the radio button, the "Submit" button must be clicked for the setting to take effect. The labels entered for these outputs on the Configure page appear below the radio buttons.
Temperature	This changes the display of the NL4 temperature between Celsius and Fahrenheit on the browser display. The "Submit" button must be clicked for this setting to take effect.

3.1.3 Network Connected Devices Section

The bottom of the home page shows the devices connected to the Device connectors of the NL4 with a SPI cable. Each device will display a photo of the device and the model number. The Device ID is a unique number given by the NL4 to each device. The "Status" indicator shows the current status of the device. Green indicates a normal state and yellow indicates a fault. A red indicator shows that an FAI request has been received by the device. To access the page for a device, click either the photo of the device or the model number. See Section 3.2 of this manual for more information on connected devices.

3.2 Accessing and Programming Connected Devices

When devices are connected to the NL4, detailed information relating to these devices may be viewed and various parameters of these devices can be programmed through the NL4's interface. Note that programming these parameters changes the operation of the device itself. To access the page for a device, click on the photo of the device in the NL4 Connected Devices section of the home page. (See bottom of Figure 3.1 page 21).

3.2.1 FPO Power Supplies

The FPO Power Supply page (Figure 3.2) contains the same Site ID, Time, and Date information as the Home page of the NL4; below that are five main sections.

3.2.1.1 FPO Device Parameters & History

The section at the top left of the screen will show the available parameters of the FPO Power Supply.

The screenshot displays the 'FPO Power Supply' page in the PowerCom POWER SYSTEM MANAGER. The interface includes a navigation bar with 'HOME', 'Reporting', 'Configure', and 'Tools' links, and a user status 'admin Log Out'. The site information is 'SITE ID NL4', 'Date Mon Jul 15 2013', and 'Time 08:17:22'. The device is identified as 'FP 1 FPO250-20 Ver:2.6'. The 'Power Supply Status' section shows: Output Voltage 25.40 VDC, AC Fault Status No, System Fault Status No, Battery Voltage 28.30 VDC, Battery Chg Current 0.48 Amp, FAI Status Inactive, and FAI Latch Inactive. The 'Battery State of Charge' section indicates a 'Replace battery on or before: 2012/10/23' and a 'Status: 2012/10/23'. There is an 'Enable' button with a note: 'Used to enable the State of Charge meter when a current sensor is connected to the battery.' The 'History' section shows: AC Fault Count 245, System Fault Count 13, Battery Installed Time 3660 Hours, Device Installed Time 10873 Hours, and System Installed Date 0/0/0. The 'Battery Test' section has a 'Start Manual Test' button and a 'Schedule Test' section with fields for YYYY, MM, DD, hh, mm, AM, and PM.

Figure 3.2 - Typical FPO Page (top portion)

Available Parameters of an FPO Power Supply

Any FPO power supply connected to a device input will provide the following parameters (Figure 3.2):

Device	This is the identifying label for the FPO device. This label is given by the NL4 and is not user settable. The first FPO connected to a device input is labeled FP1 and the second is labeled FP2. Up to two FPO power supplies may be connected to an NL4 board.
Model	This is the model family of the FPO connected to the NL4 as reported by the FPO. There are currently three FPO model families: FPO25-75, FPO100-150, and FPO200-250.
Output Voltage	This is the measured system output voltage (in Volts DC) of the FPO, as measured directly out of the power supply engine within the FPO power supply board. This voltage is distributed to the DC1 and DC2 output terminals and fastons.
AC Fault Status	Indicates whether the FPO is reporting a low or missing AC voltage. "No" on a green background indicates that no problem is being reported. "Yes" on a yellow background indicates an AC Fault condition. See the FPO manual to troubleshoot.
System Fault Status	Indicates whether the FPO is reporting a System Fault condition. "No" on a green background indicates that no problem is being reported. "Yes" on a yellow background indicates a System Fault condition. See the FPO manual to troubleshoot.
Battery Voltage	Indicates the measured battery voltage in Volts DC. This field only indicates the terminal voltage of the battery set and does not necessarily indicate the condition or state of charge of the battery set.
Battery Chg Current	This field indicates the rate of charge the FPO is applying to the battery set (in Amps DC). This field only represents charge into the battery and does not show battery discharge current. Use the NL4 current sensor to measure both charge and discharge current.
FAI Status	This field indicates the status of the FAI Input of the FPO. "Inactive" on a green background indicates that the FAI input is not activated. "Active" on a red background indicates that the FAI input is receiving a valid activation signal.
FAI Latch	This field indicates the status of the FAI Latch Input of the FPO. If the Latch Input is being used and the FAI Input is active and latched, this field will show "Active" on a red background. If FAI Latch is not being used this field will show "Inactive" on a green background.
AC Fault Count	This field shows the number of AC Fault detections since the last fault counter reset. When new, an FPO may contain a random number in this field and the counter should be reset (in the FPO Service Settings section) before being used.
System Fault Count	This field shows the number of System Fault detections since the last reset of the fault counter. An FPO may contain random data in this field when new and the counter should be reset (in the FPO Service Settings section) before being used.
Battery Installed Time	This field displays the battery runtime in hours since the last reset of the battery runtime counter. The battery runtime field may display random data on a new FPO and should be reset on the FPO Service Settings section before use. This Runtime is independent of the Battery End-of-Life / Bat. Replacement Date calculation.
System Installed Time	This field displays the total power-up time in hours for the FPO. This value cannot be reset. It is normal for several hours to show in this field on a new FPO, due to burn-in testing at the factory.

3.2.1.2 FPO Power Supply Settings

The section at the bottom left of the FPO home screen will show the programmable settings for the FPO power supply.



(Figure 3.3)

The following parameters are available:

Battery Charge Selector	Select the proper battery size range for optimal charging rate.
AC Fault Reporting Delay	Select the desired delay for reporting an AC fault in hours, minutes, and seconds. Note that this delay will affect the AC Fault LED and relay as well as email reporting. Check your local codes regarding fault delays.
System Fault Reporting Delay	Select the desired delay for reporting System fault conditions in hours, minutes, and seconds. Note that this delay will affect the Sys Fault LED and relay as well as email reporting. This setting should be used with caution, as intermittent faults may be masked by a fault delay. System Fault delays should typically be kept to 5 seconds or less to prevent critical faults from being masked. Check your local codes regarding fault delays.
Reset Timer for New Battery Installation	Select this option after installing a new battery set in order to reset the battery replacement alert counter. The NL4 uses this counter along with the user-entered "Battery Rated Life" to calculate the next battery replacement date.
Enter Installation Date	Enter the date the system was initially installed. This value is only for the user's information and is not used by the NL4.
Reset AC and System Fault Counts	Selecting this option will reset the AC and System Fault counters. This is typically done after testing or servicing the system.

After entering the values or selecting the appropriate options, click the "Apply" button at the bottom of the FPO Service Settings area. The settings will take effect immediately without rebooting the NL4.

3.2.1.3 Battery Status

The section at the top right of the screen shows the current battery status. (Figure 3.2) This section will only be enabled if a current sensor is connected in line with the battery for the FPO (See Section 1.3.4 of this manual).

Battery State of Charge

If enabled, this will display a bar graph indicating the estimated battery condition of the battery connected to the FPO. Once the battery is connected and the NL4 detects current flow, an enable/disable button will appear at the bottom of the Battery Status area. If the button is enabled, a four segment bar graph display will appear with one end labeled "Full" and the other end labeled "Empty". Note that it can take several minutes for an accurate indication of battery condition. Current Sensor calibration should be performed upon initial installation for accurate results (See Section 3.2.1.6). The various possible states of the Bat Condition bar graph display are as follows:

4 Green Bars	Battery is at 80% to 100% charge
3 Green Bars	Battery is at 60% to 79% charge
2 Green Bars	Battery is at 40% to 59% charge
1 Green Bar	Battery is at 20% to 39% charge
1 Yellow Bar	Battery is at 6% to 19% charge (email alert will be sent, if enabled)
1 Red Bar	Battery is at 5% or lower charge

When the battery discharges to one yellow bar, an email alert will be sent if the Battery Condition checkbox on the Reporting page is enabled.

Note that if the current sensor is being used for another function other than monitoring battery current, the Battery Condition display will show invalid data and MUST be disabled to prevent confusion in the future. ONLY enable the Battery Condition display if the current sensor is in line with one of the battery leads.

Status

The Status field gives the state of the battery. Possible states are "Charging", "Charged", or "Discharging".

Replace Battery On or Before

This displays the scheduled battery replacement date, which is calculated based on the current date and the "Rated Battery Life" setting entered on the Configure page. If the battery is within its calculated life, the field will be green. Once the due date has passed, this field will change to yellow and an email alert will be sent if enabled on the Reporting page.

Enable/Disable Button

This button will enable or disable the Battery Status section. Disable the section to prevent confusion and erroneous email alerts if the current sensor is not connected in series with the battery (Figure 3.4).

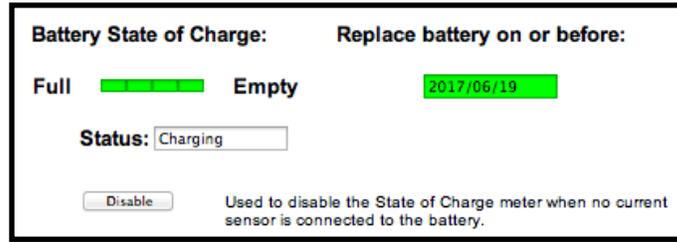


Figure 3.4 - Battery Enable / Disable Button (FPO main screen)

3.2.1.4 Battery Test

The Battery Test section allows the user to test the actual run-time of a system with the installed battery set. (Figure 3.2, page 22). This test may be run manually or may be scheduled for a one-time automated test. If email is configured on the NL4, a report of the results can be emailed. Select "Y" next to the Email Report heading to send an email at the conclusion of the test.

⚠ WARNING: During the Battery Run Time Test, the system battery will be discharged to 85% of the nominal voltage, leaving essentially 0% battery capacity should AC power be interrupted during or immediately after the test. Appropriate measures MUST be taken to ensure the security/safety of the building and its occupants during the Battery Run Time Test.

To run a test manually

- Ensure a battery set is connected to the FPO power supply and that the Current Sensor is properly connected in line with the battery set. See Section 1.3.4 for more information on the Current Sensor. The "Enable/Disable" button in the Battery Status section must be ENABLED.
- Select whether or not you want a report emailed at the end of the test by selecting "Y" or "N" in the "Battery Run Time Test" header. Email parameters must be properly set up on the Configure page of the NL4, or this selection will be unavailable.
- Click the "Start Manual Test" button. A warning message will appear (Figure 3.5). Click OK to begin the test.

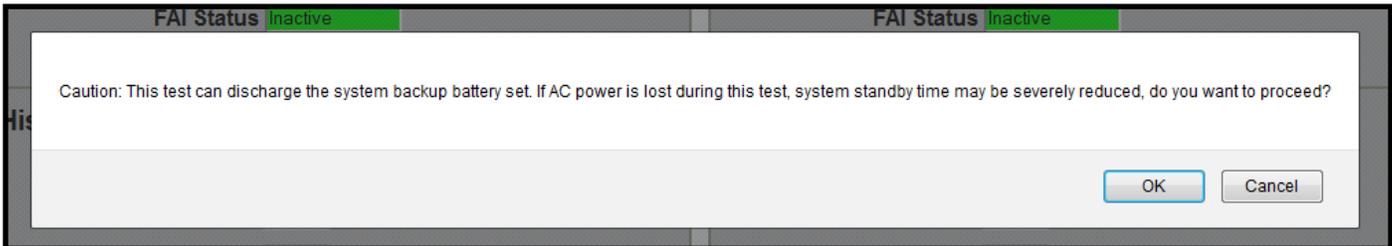


Figure 3.5 - Battery Run Time Test Warning

- While the test is in progress, there will be two messages on the FPO page - one indicating "Battery discharging..." in the Battery Run Time Test section, and one indicating "Caution Battery test in progress. System powered by battery." in the FPO Status section (See Figure 3.6)
- At the conclusion of the test, the measured battery runtime and last test date will be displayed in the Battery Test section (See Figure 3.7, page 27). The results will also be emailed if emailing is enabled.

To Schedule a One-Time Test

- Ensure a battery set is connected to the FPO power supply and that the Current Sensor is properly connected in line with the battery set. See Section 1.3.4 for more information on the Current Sensor. The "Enable/Disable" button in the Battery Status section must be ENABLED.
- Select whether or not you want a report emailed at the end of the test by selecting "Y" or "N" in the "Battery Run Time Test" header. Email parameters must be properly set up on the Configure page of the NL4, or this selection will be unavailable.
- Enter the Year, Month, Day, Hour, Minute, and am/pm for when you want the test to begin.
- Click the "Schedule Test" Button - the Scheduled Start Time will appear.

- At the conclusion of the test, the measured battery runtime and last test date will be displayed in the Battery Test section (See Figure 3.8, page 28). The results will also be emailed if emailing is enabled.

3.2.1.5 Battery Settings

The Battery Settings block is under the Battery Test block on the FPO page (See Figure 3.3, page 24). The available settings are as follows:

Rated Battery Life	Enter the rated battery life or desired replacement period in years. This is used by the NL4 to calculate the Battery End-of-Life alert time. Note: <i>The current time and date MUST be set BEFORE setting the rated battery life for proper Battery End-of-Life date calculation.</i>
Rated Capacity	Enter the battery capacity of the battery connected to the FPO. This rating is used by the NL4 to approximate how much capacity is remaining in the battery (if using the current sensor to monitor battery health).

Note: After setting the battery information, click the "Submit" button for the changes to take effect.

Figure 3.6 - Typical Status Page (top portion)

Figure 3.7 - Battery Run Time Test Results

3.2.1.6 Current Sensor Calibration

The Current Sensor Calibration block is at the bottom right of the FPO page (See Figure 3.8). This section allows the current sensor to be calibrated to allow the most accurate current readings.

To perform the calibration, first ensure both red leads of the current sensor are disconnected and that the white cable on the current sensor is connected to the NL4 board. After the red leads are disconnected, click the "Zeroing" button. A warning message will appear, reminding you to make sure the current through the sensor is zero (by disconnecting both red leads on the current sensor). Click "OK", and the NL4 will self-calibrate to the current sensor. Ensure the current reading on the home page is zero (or very close to zero) before reconnecting the current sensor's red leads. If the reading is not zero, repeat the calibration procedure.

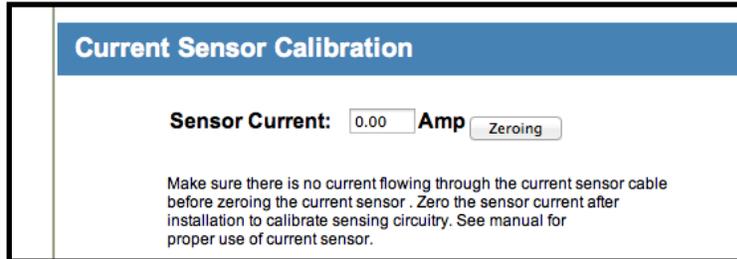


Figure 3.8 - Current Sensor Calibration

3.2.2 Available Parameters of an N24 NAC Expander (Device NAC1 or NAC2)

Up to two N24 NAC Expanders may be connected to an NL4 board. Every N24 NAC Expander connected to a device input will provide the following parameters (See Figure 3.9):

Device	This is the identifying label for the N24 Device. This label is given by the NL4 and is not user settable. The first N24 connected to a device input is labeled NAC1 and the second is labeled NAC2.
Model	This is the model number, which is N24.
System Fault Status	Indicates whether the N24 is detecting a System Fault condition. "No" on a green background indicates that no problem is detected. "Yes" on a yellow background indicates a System Fault condition. See the N24 and FPO manuals to troubleshoot.
FAI Status	"Active" on a red background indicates that a valid alarm input has been received by the N24. "Inactive" on a green background indicates that no alarm input has been received.
Mode Status	"Supervisory" on a green background indicates that the N24 is in Standby mode and is supervising the output wiring. "Alarm" on a red background indicates that the N24 has responded to an alarm input.

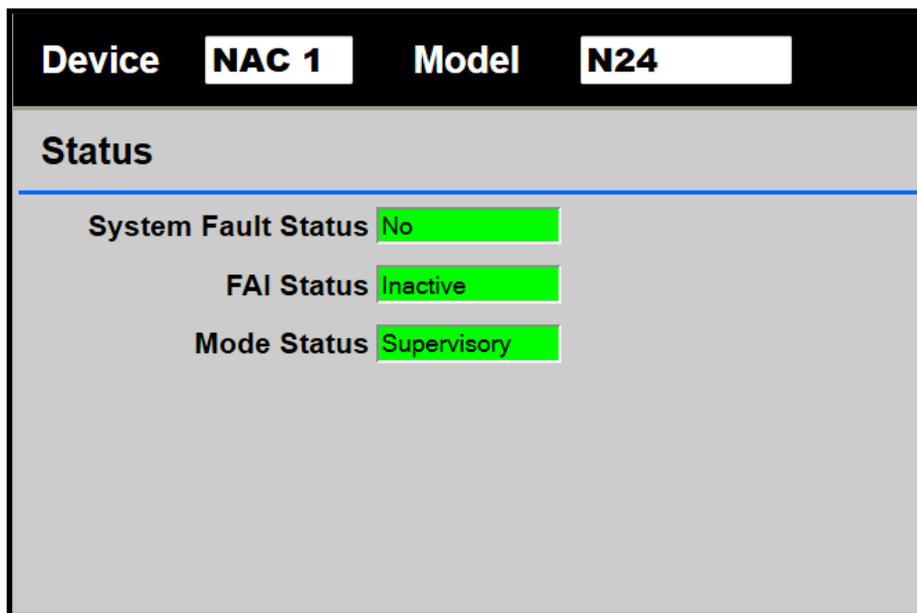


Figure 3.9 - The N24 Parameters Window

3.3 Using the Tools Page

Clicking the Tools link at the top of the display will bring up the Tools page (See Figure 3.10). This page allows upgrading of the firmware and rebooting the NL4 board.

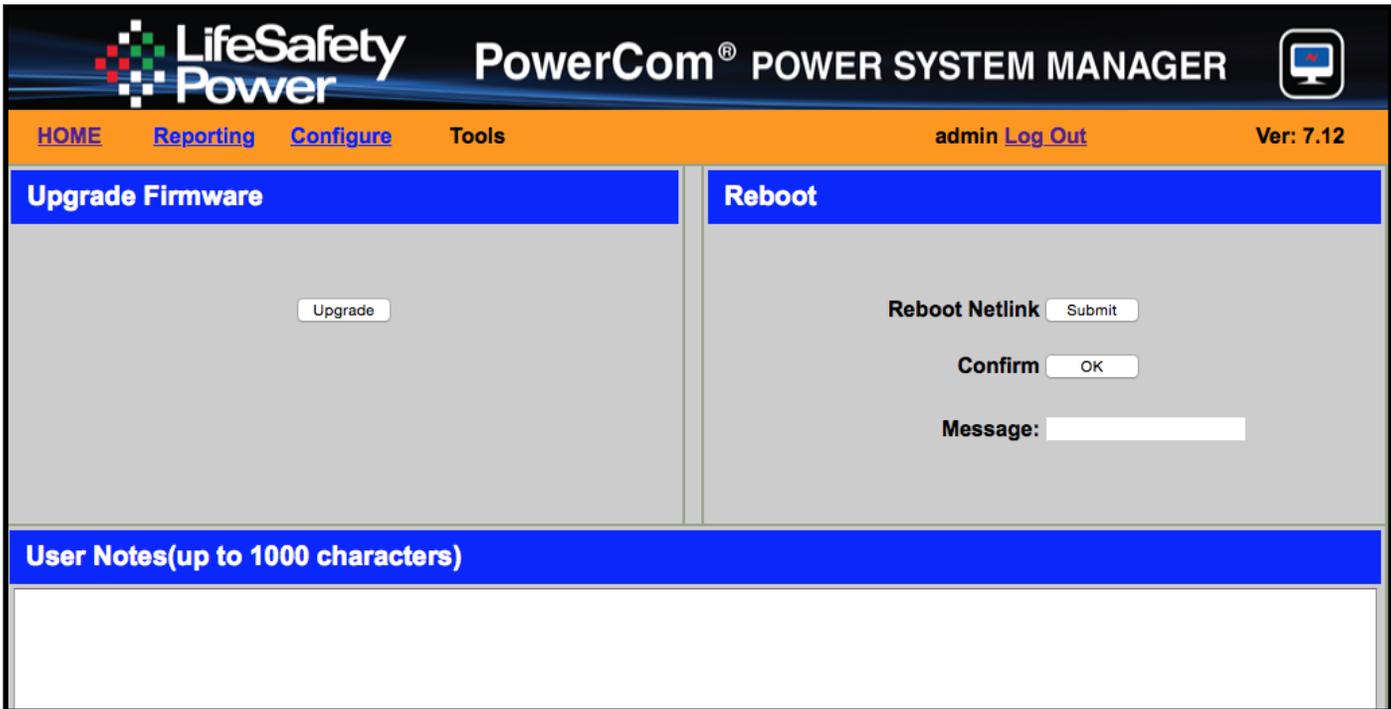


Figure 3.10 - The Tools Page

Upgrading Firmware

The Upgrade Firmware section is at the top left of the Tools page (See Figure 3.10). To upgrade the firmware, first ensure that the new firmware file is available on your computer, then click the "Upgrade" button and the Upgrade window will appear.

Click the "Browse..." button and locate the new firmware file with the file extension ".bin" on your computer. Once the file is selected, click the "Download" button to temporarily download the new firmware into the RAM of the NL4 board. This process will take from 30 seconds to three minutes depending on network speed and traffic, and the message box will display "Download...". Once the firmware is loaded into the NL4's RAM, it can then be burned to the processor in the NL4. Verify the correct file name and click the "Confirm" button to confirm the upgrade. Next click the "Burn" button to begin burning the firmware to the NL4's processor.

⚠ Note: This process may take up to 12 minutes - **DO NOT REMOVE POWER TO THE NL4 DURING THIS PROCESS** or the NL4 will be rendered nonfunctional.

Once the update is complete, a message will appear in the message box indicating "Update Finished". The NL4 must be rebooted in order to start the new firmware.

⚠ Note: The browser history / cache should be cleared after performing the firmware upgrade and before accessing the NetLink again to prevent any cached pages from giving outdated information.

Rebooting the NL4 Board

The "Reboot" section is on the top right of the Tools page (See Figure 3.10). To reboot the NL4, click the "Submit" button. Once the "Confirm Reboot" message appears in the Message window, click the OK button to Confirm the reboot. The rebooting process will take approximately 1 minute, during which you will lose communication with the NL4. Communication will be restored once the yellow LED lights steady.

User Notes

This section allows the user to enter notes such as service history, installation specifics, reminders, etc. Up to 1000 characters may be entered.

3.4 Understanding The Email Report

The report file sent by email by the NL4 is sent as an unformatted .CSV file. Many programs, such as Microsoft Excel, will import a .CSV file to allow viewing of the data (See Figure 3.11).

The example in Figure 3.11 has been reformatted for better readability in Excel. The top three rows of data give the following basic information:

Site ID	BGO Chicago Office - This is set in the "Site ID" setting on the Configure Page of the NL4
Report Trigger	Report Period - this is a periodic status report. The frequency of the status reports is set by the "Send Period" setting in the Email Settings section of the Configure page.
Service Due	No - The "Next Service Due" date set on the Configure page has not been reached.

Below the top three rows is data specific to the NL4 and any devices connected to it.

Device Name	This column shows which device the associated parameter belongs to. In this example, the devices are the NL4 and FP1.
Device Parameter	This column shows the available parameters which are being monitored. These parameters vary depending on the device(s) connected to the NL4.
Date/Time Stamp	To the right of the Parameter column are columns with date/time stamps. These columns are the data, measured hourly at the dates and times listed. The number of columns displayed is set by the "Select Occurrences to Report" setting on the Reporting page.

	A	B	C	D	E	F	G
1	Site ID	BGO Chicago Office					
2							
3	Report trigger: report period						
4							
5	Service due	no					
6							
7	Device name	Device parameter	Wed Jul 10 2013 09:00:00	Wed Jul 10 2013 08:00:00	Wed Jul 10 2013 07:00:03	Wed Jul 10 2013 06:00:02	Wed Jul 10 2013 05:00:01
8							
9	Netlink	Cabinet internal temperature	87.83 Deg.F	87.83 Deg.F	87.83 Deg.F	94.74 Deg.F	96.46 Deg.F
10							
11	FP1	Model number	FPO250-200	FPO250-200	FPO250-200	FPO250-200	FPO250-200
12							
13	FP1	System fault status	No	No	No	No	No
14							
15	FP1	AC fault status	No	No	No	No	No
16							
17	FP1	FAI status	Active	Active	Active	Active	Active
18							
19	FP1	Output latching on FAI	Inactive	Inactive	Inactive	Inactive	Inactive
20							
21	FP1	Output voltage	12.46 Volts				
22							
23	FP1	Battery voltage	13.84 Volts	13.81 Volts	13.81 Volts	13.78 Volts	13.81 Volts
24							
25	FP1	Battery charger current	0.00 Amps	-0.00 Amps	-0.00 Amps	-0.00 Amps	-0.00 Amps
26							
27	FP1	Total power-up time	12469 Hours	12468 Hours	12467 Hours	12466 Hours	12465 Hours
28							
29	FP1	Battery installed time	12263 Hours	12262 Hours	12261 Hours	12260 Hours	12259 Hours
30							
31	FP1	# of AC faults detected		133	133	133	133
32							
33	FP1	# of system faults detected		106	106	106	106
34							

Figure 3.11 - Example Email Report CSV File

Appendix 1 – Software Agreement

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- (a) Limitations. Except as provided below: (i) IN NO EVENT WILL LIFESAFETY POWER INC.'S, OR ANY OF ITS OFFICERS', DIRECTORS', SHAREHOLDERS', PARENTS', SUBSIDIARIES', AGENTS', INSURERS', SUCCESSORS', AND/OR ASSIGNS', LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT EXCEED THE AGGREGATE OF FEES PAYABLE TO LIFESAFETY POWER INC. PURSUANT TO THIS AGREEMENT (INCLUDING FEES BOTH PAID AND DUE) AT THE TIME OF THE EVENT GIVING RISE TO THE LIABILITY; AND (ii) IN NO EVENT WILL LIFESAFETY POWER INC. OR ANY OF ITS OFFICERS, DIRECTORS, SHAREHOLDERS, PARENTS, SUBSIDIARIES, AGENTS, INSURERS, SUCCESSORS, AND/OR ASSIGNS BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, SPECIAL, INCIDENTAL, OR PUNITIVE DAMAGES. THE LIABILITIES LIMITED BY THIS SUBSECTION 5(a) APPLY: (A) TO LIABILITY FOR NEGLIGENCE; (B) REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT, STRICT PRODUCT LIABILITY, OR OTHERWISE; (C) EVEN IF LIFESAFETY POWER INC., AND/OR ANY OF ITS OFFICERS, DIRECTORS, SHAREHOLDERS, PARENTS, SUBSIDIARIES, AGENTS, INSURERS, SUCCESSORS, AND/OR ASSIGNS IS/ARE ADVISED IN ADVANCE OF THE POSSIBILITY OF THE DAMAGES IN QUESTION AND EVEN IF SUCH DAMAGES WERE FORESEEABLE; AND (D) EVEN IF RECIPIENT'S REMEDIES FAIL OF THEIR ESSENTIAL PURPOSE. If applicable law limits the application of the provisions of this Section 5(a), LIFESAFETY POWER INC.'s liability will be limited to the maximum extent permissible.
- (b) Further Limitations. IN NO EVENT WILL LIFESAFETY POWER INC. OR ANY OF ITS OFFICERS, DIRECTORS, SHAREHOLDERS, PARENTS, SUBSIDIARIES, AGENTS, INSURERS, SUCCESSORS, AND/OR ASSIGNS BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, SPECIAL, INCIDENTAL, OR PUNITIVE DAMAGES ARISING OUT OF OR RELATED TO ANY OF THE FOLLOWING:
 - (i) revisions to the Software made without the express, written consent of LIFESAFETY POWER INC.;
 - (ii) Recipient's failure to incorporate Software Upgrades that would have avoided the alleged liability, provided LIFESAFETY POWER INC. offered such Upgrades without fees or charges and with notice to Recipient thereof;
 - (iii) use of the Software in combination with hardware or software or Third Party Information not provided by LIFESAFETY POWER INC.: (A) that is specifically forbidden by the Documentation; or (B) that is not designated in the Documentation as available for interface with the Software.

6. Term and Termination.

- (a) Term. This AGREEMENT shall remain in effect so long as the Recipient continues to use and/or maintain any copies of the Software within Recipient's possession or control in any storage medium without limitation.
- (b) Termination for Cause. Either party may terminate this AGREEMENT for material breach by written notice, effective in 30 days unless the other party first cures such breach.
- (c) Effects of Termination. Upon termination of this AGREEMENT, the licenses granted herein shall terminate and Recipient shall cease all use of the Software and delete all copies in its possession or control. The following provisions will survive termination of this AGREEMENT: (i) any obligation of Recipient to pay for Software and/or Upgrades rendered before termination; (ii) Sections 4, 5 and 7 of this AGREEMENT; and (iii) any other provision of this AGREEMENT that must survive termination to fulfill its essential purpose.

7. Miscellaneous.

- (a) Notice and Contact Information. LIFESAFETY POWER INC. may be contacted at the mailing address below or by the LIFESAFETY POWER INC. website. Notices pursuant to this AGREEMENT should be sent to the address below, or to such others as may be provided in writing. Such notices will be deemed received at such addresses upon the earlier of (i) actual receipt or (ii) delivery in person, by fax with written confirmation of receipt, or by certified mail return receipt requested.
 - (i) Corporate Headquarters, Mailing Address: LIFESAFETY POWER INC., 49 Range Road, Windham, NH, 03087 USA.
 - (ii) Website Address: www.lifesafetypower.com
- (b) Independent Contractors. The parties are independent contractors and will so represent themselves in all regards. Neither party is the agent of the other and neither may bind the other in any way. Nothing in this AGREEMENT is intended or shall be construed to create between the Parties a relationship of principal and agent, partners, joint venturers, or employer and employee. No Party shall hold itself out to others or seek to bind or commit another Party in any manner inconsistent with this AGREEMENT.
- (c) No Waiver. Neither party will be deemed to have waived any of its rights under this AGREEMENT by lapse of time or by any statement or representation other than (i) by an Authorized Representative and (ii) in an explicit written waiver. No waiver of a breach of this AGREEMENT will constitute a waiver of any prior or subsequent breach of this AGREEMENT.
- (d) Force Majeure. To the extent caused by force majeure, no delay, failure, or default will constitute a breach of this AGREEMENT.
- (e) Choice of Law & Jurisdiction. This AGREEMENT shall be governed solely by the internal laws of the State of Illinois, without reference to such State's principles of conflicts of law. The parties consent to the personal and exclusive jurisdiction of the federal and state courts of Illinois, United States of America.
- (f) Severability. All of the provisions of this AGREEMENT are intended to be distinct and severable. To the extent permitted by applicable law, the parties hereby waive any provision of law that would render any clause of this AGREEMENT invalid or otherwise unenforceable in any respect. In the event that a provision of this AGREEMENT is held to be invalid or otherwise unenforceable, such provision will be interpreted to fulfill its intended purpose to the maximum extent permitted by applicable law, and the remaining provisions of this AGREEMENT will continue in full force and effect.
- (g) Conflicts among Attachments. In the event of any conflict between the terms of this main body of this AGREEMENT and those of any attachment including those of any documentation, the terms of this main body will govern.
- (h) Electronic Execution, Binding Agreement. This AGREEMENT may be executed as a "click-wrap" or "browse-wrap" AGREEMENT or by other form of electronic signature and Recipient agrees that this execution shall result in a binding AGREEMENT between the parties. RECIPIENT AGREES THAT THIS AGREEMENT IS ENFORCEABLE LIKE ANY WRITTEN NEGOTIATED AGREEMENT SIGNED BY RECIPIENT OR RECIPIENT'S AUTHORIZED REPRESENTATIVE. THIS AGREEMENT IS ENFORCEABLE AGAINST RECIPIENT AND ANY LEGAL ENTITY THAT OBTAINED THE SOFTWARE AND ON WHOSE BEHALF IT IS USED. IF YOU DO NOT AGREE, DO NOT INSTALL OR USE THIS SOFTWARE.
- (i) Interpretation and Construction. The parties agree that the terms of this AGREEMENT result from negotiations between them. This AGREEMENT will not be construed in favor of or against either party by reason of authorship.
- (j) Entire Agreement. This AGREEMENT sets forth the entire AGREEMENT of the parties and supersedes all prior or contemporaneous writings, negotiations, and discussions with respect to the subject matter hereof. Neither party has relied upon any such prior or contemporaneous communications.
- (k) Modification or Amendment. Notwithstanding any modifications related to Upgrades made in accordance with section 3(b) above, this AGREEMENT may not be modified or amended except (i) by Authorized Representatives of each party and (ii) in a written contract signed by both parties.
- (l) Headings. The headings of sections and subsections have been included for convenience only and shall not be considered in interpreting this AGREEMENT.
- (m) Counterparts. This AGREEMENT may be executed in one or more counterparts, each of which shall be deemed to be an original, and all of which together shall constitute one and the same AGREEMENT.
- (n) Notice to U.S. Government End Users. The development of the Software has been exclusively at the private expense of LIFESAFETY POWER INC. Accordingly, the Software and Documentation are "Commercial Items," as that term is defined at 48 C.F.R. §2.101, and comprises "Commercial Computer Software" and "Commercial Computer Software Documentation," as such terms are used in 48 C.F.R. §12.212 or 48 C.F.R. §227.7202, as applicable. Accordingly, and consistent with 48 C.F.R. §12.212 or 48 C.F.R. §§227.7202-1 through 227.7202-4, as applicable, the Commercial Computer Software and Commercial Computer Software Documentation are being licensed to U.S. Government end users (a) only as Commercial Items and (b) with only those rights as are granted to all other end users pursuant to the terms and conditions herein.

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