



## ИБП Liebert NXL - руководство по эксплуатации блока управления. Юниджет

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# Liebert® NXL™ System Control Cabinet

Operation Manual — 1600A-5000A 60Hz

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## CONTACTING VERTIV FOR SUPPORT

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Contact Vertiv Liebert® Services for information or repair service in the United States at 1-800-LIEBERT (1-800-543-2378).

For repair or maintenance service outside the 48 contiguous United States, contact Liebert Services, if available in your area. For areas not covered by Liebert Services, the authorized distributor is responsible for providing qualified, factory-authorized service.

Have the following information available before calling Liebert Services:

Part Numbers: \_\_\_\_\_

Serial Numbers: \_\_\_\_\_

kVA Rating: \_\_\_\_\_

Date Purchased: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Location: \_\_\_\_\_

Input Voltage/Frequency: \_\_\_\_\_

Output Voltage/Frequency: \_\_\_\_\_

Battery Reserve Time: \_\_\_\_\_

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# IMPORTANT SAFETY INSTRUCTIONS

## SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of your Liebert NXL UPS and batteries.

### **WARNING**

Risk of electric shock. Can cause equipment damage, injury or death.

Exercise extreme care when handling cabinets to avoid equipment damage or injury to personnel. Refer to separate installation manual for equipment handling information and installation procedures.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or others approved for use in electrical fire fighting.

Extreme caution is required when performing maintenance. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.

AC voltage will remain on the system bypass, the UPS output terminals and the static bypass switch, unless associated external circuit breakers are opened.

Check for voltage with both AC and DC voltmeters prior to making contact.

When the system is under power, both the operator and any test equipment must be isolated from direct contact with earth ground and the cabinet chassis frame by using rubber mats.

Some components within the cabinets are not connected to the chassis ground. Any contact between floating circuits and the chassis is a lethal shock hazard. Exercise caution that the test instrument exterior does not make contact, either physically or electrically, with earth ground.

This equipment contains circuitry that is energized with high voltage. Only test equipment designated for troubleshooting should be used. This is particularly true for oscilloscopes. Always check with an AC and DC voltmeter to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high voltage may exist at the capacitor banks.

Observe all battery precautions when near the battery for any reason.

ONLY properly trained and qualified service personnel should perform maintenance on the UPS system. When performing maintenance on any part of the equipment under power, service personnel and test equipment should be standing on rubber mats. The service personnel should wear insulating shoes for isolation from direct contact with the floor (earth ground).

One person should never work alone. A second person should be standing by to assist and summon help in case an accident should occur. This is particularly true when work is performed on the battery.



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# 1.0 INTRODUCTION

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The Liebert NXL Switchgear provides continuous, high-quality AC power to your business-critical equipment, such as telecommunications and data processing equipment. The Liebert NXL UPS will supply power that is free of the disturbances and variations in voltage and frequency common to utility power, which is subject to brownouts, blackouts, surges and sags.

If maintenance or repair of the UPS is necessary, the load can be switched without interruption in service to the maintenance bypass.

## 2.0 OPERATION

The Liebert NXL Control for Switchgear is equipped with a microprocessor-based display touchscreen designed for convenient and reliable operation. The display is driven by an easy-to-follow, menu-prompted software.

### 2.1 FEATURES

The Liebert NXL interface display enables the operator to perform such tasks as:

- Quickly check operational status
- Monitor the power flow through the UPS system and all meter readings
- Execute operational procedures
- Check status reports and history files
- Adjustment of programmable parameters (access limited by security access function)

The touchscreen is a white-background display with multicolor text. The display turns on automatically, but after 15 minutes of inactivity the back light will go out and the display will appear very dim. Touching the screen will reactivate the back light; the back light will again be active for 15 minutes. If any screen other than the mimic screen is accessed, that screen will be displayed for 5 minutes without any interaction. If there is no activity for 5 minutes, the display will revert to the basic mimic screen.

Figure 1 Main display screen, typical

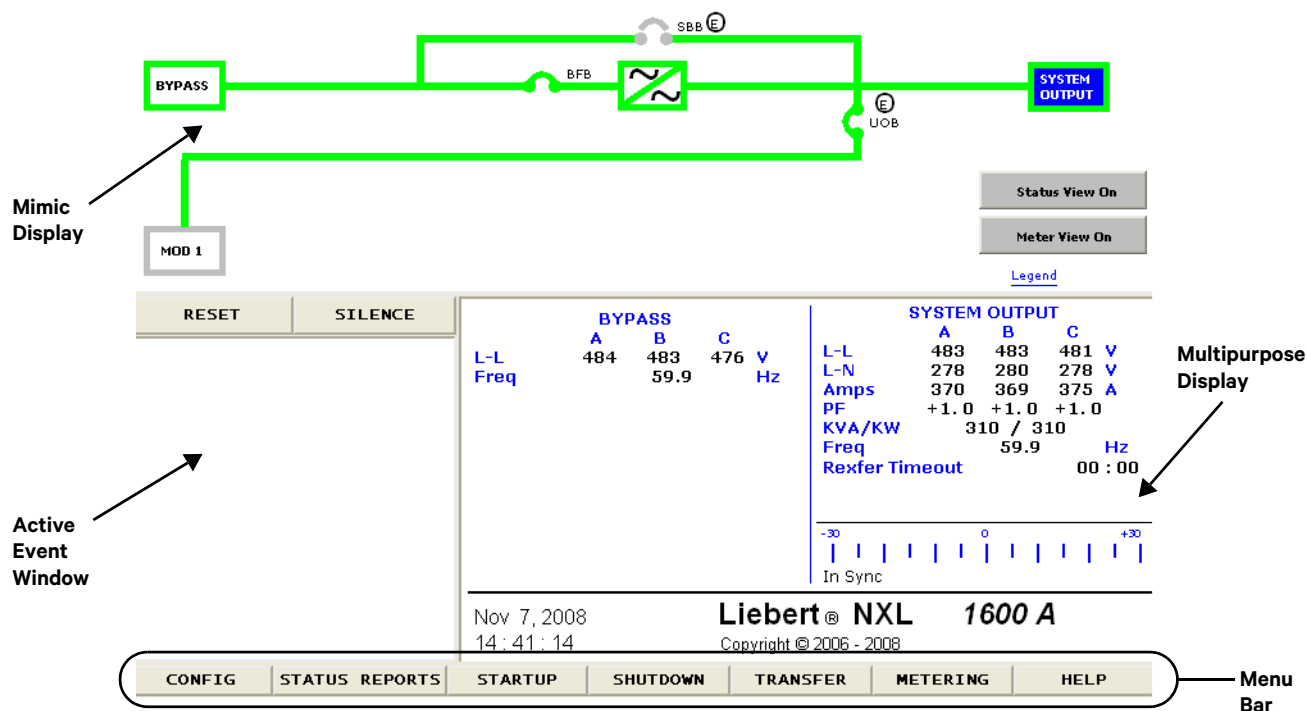
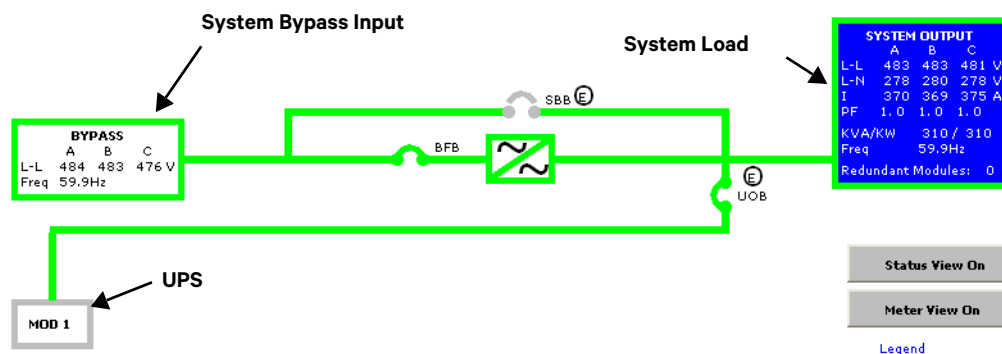


Figure 2 Mimic display



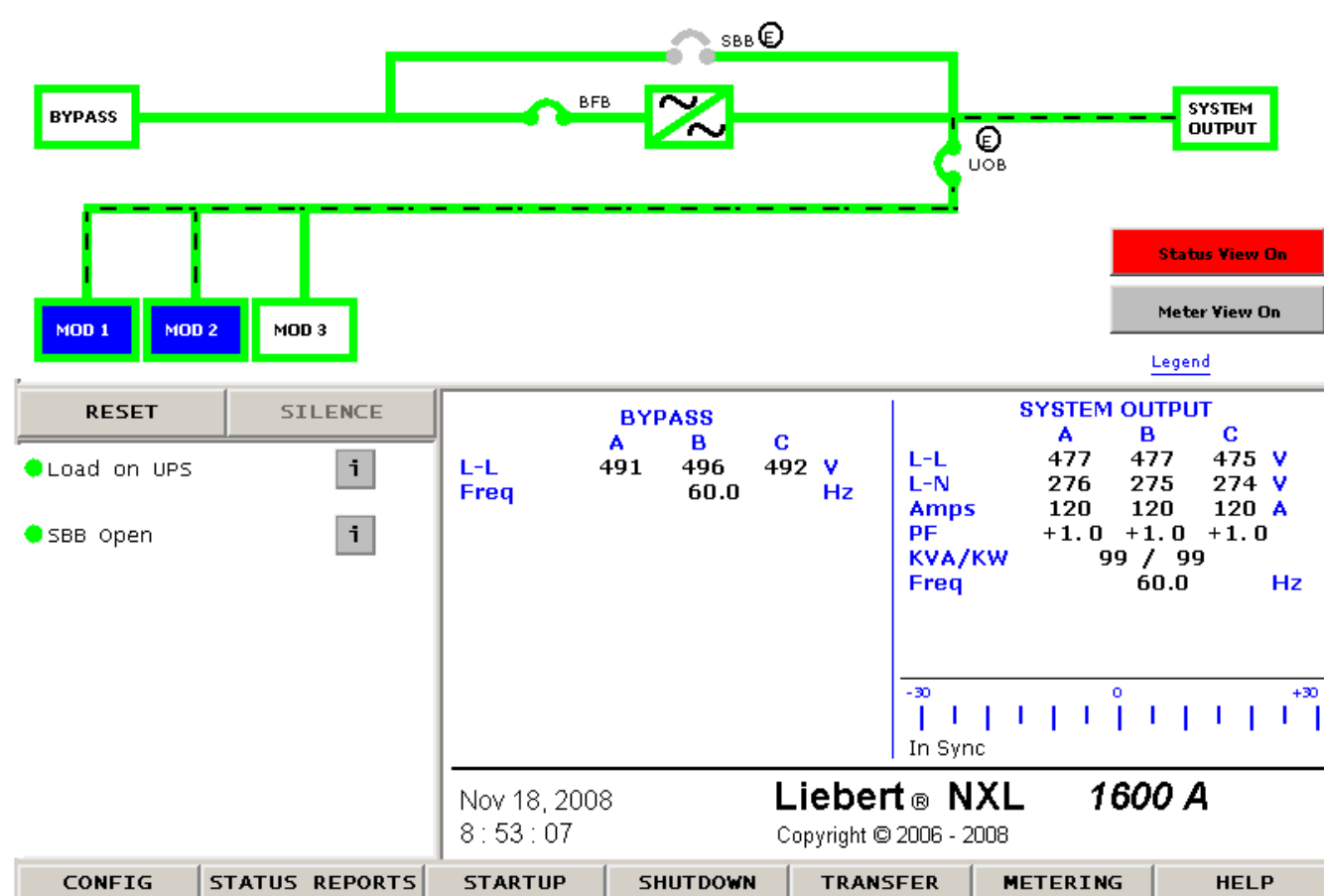
**System Bypass Input**—Displays the bypass input voltage and the bypass input frequency. The bypass circuit breaker (BFB) is to the right of this block. The circuit breaker status is shown as open or closed.

**System Load**—Displays the output line voltage, phase voltage, current, kVA, kW, power factor, frequency and number of redundant UPS's.

**UPS**—Shows whether System Load is support by UPS's

- Green outline—The UPS module inverter is ready
- Blue Fill—The UPS is supporting the load

**Figure 3 Monitor/mimic display example: Normal power flow**

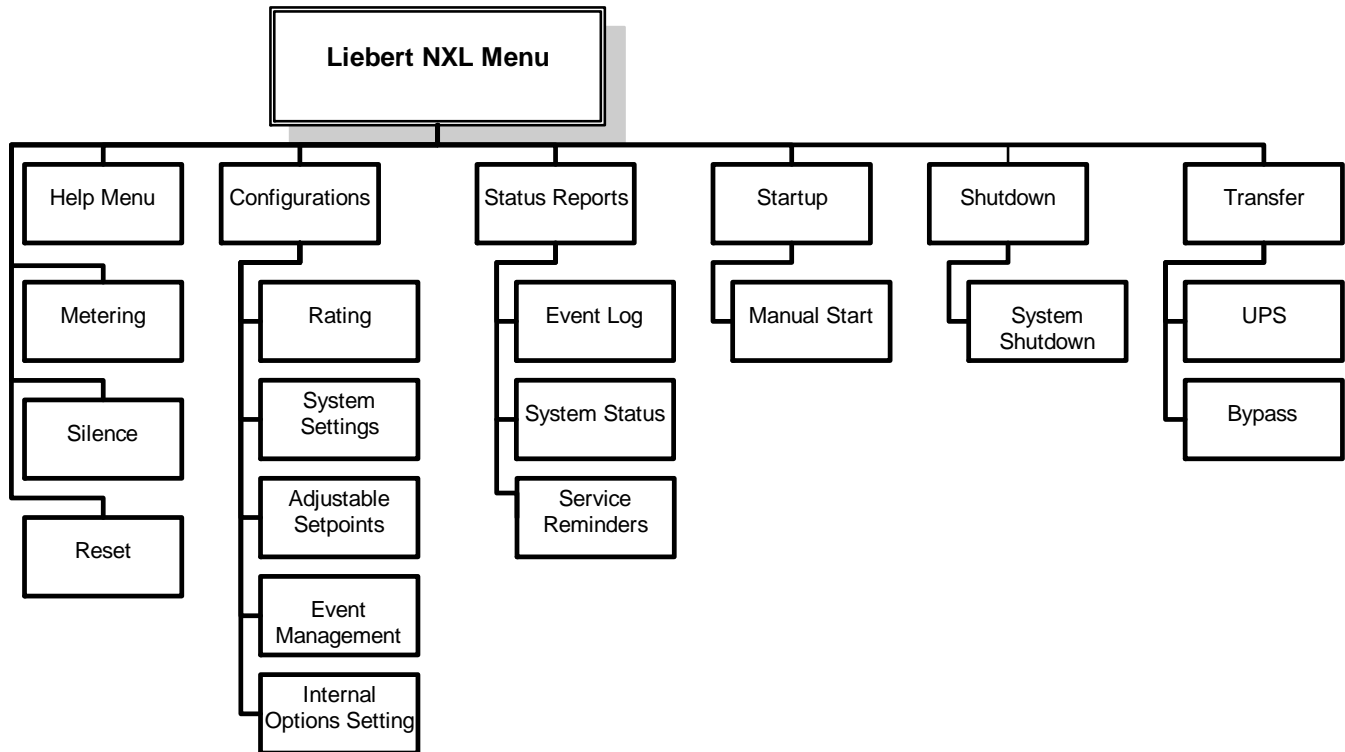


## 2.2 TOUCHSCREEN NAVIGATION

### 2.2.1 Main Display Screen

Several menu items can be accessed from the main display screen (see **Figure 1**). These menu items are detailed in subsequent sections.

**Figure 4** Menu tree



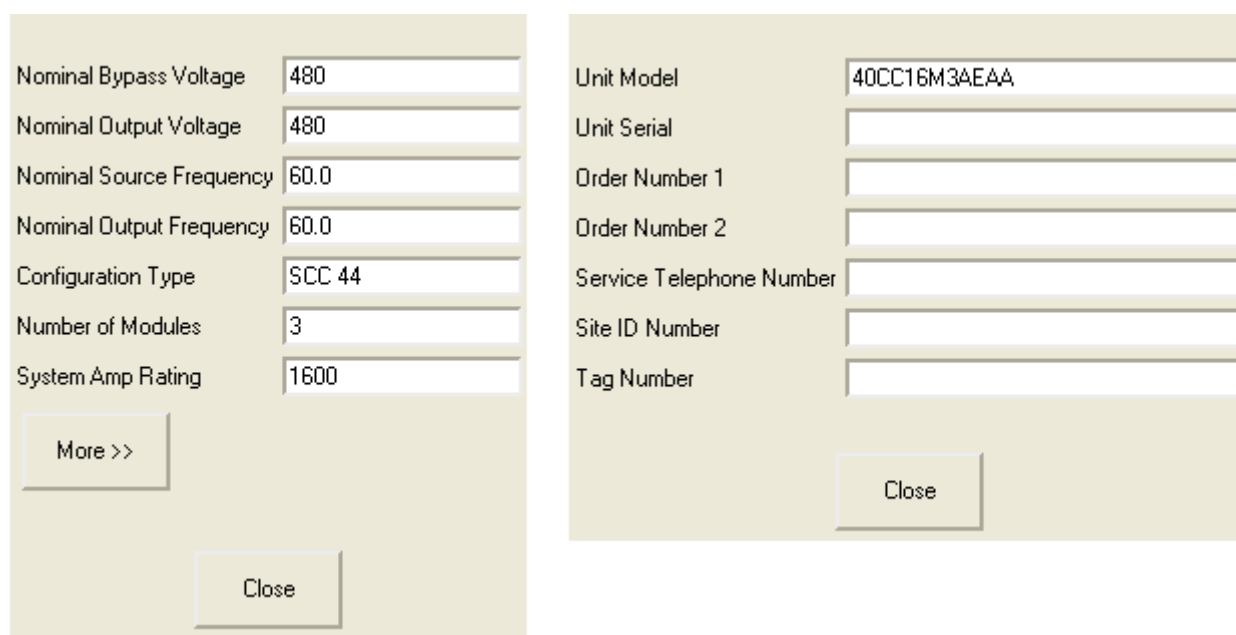
## 2.2.2 Configurations Menu

### Rating

This menu item will display a popup showing the following parameters (see **Figure 5**). These parameters are entered during commissioning when the UPS is installed.

- Nominal Bypass Voltage
- Nominal Output Voltage
- Nominal Source Frequency
- Nominal Output Frequency
- Configuration Type
- Number of Modules
- System Amp Rating
- Unit Model
- Unit Serial
- Order Number 1
- Order Number 2
- Service Telephone Number
- Site ID Number
- Tag Number

**Figure 5 Rating parameters**



### User Settings

#### System Settings

These display settings can be changed from the touchscreen. Press the box to the left of each parameter to bring a popup window that will allow the parameter to be changed.

- Backlight Brightness—High or Low (default: Low)
- Time (24hr format)—Adjust Hour, Minute or Seconds
- Date (MM DD, YYYY format)—Adjust Month, Day or Year
- Password – Reset the password (4 characters, alphanumeric, case-sensitive)
- Language—English, Chinese
- Audio level—Range 1 to 10 (default: 5)
- Phase labeling—Auto, ABC, RST, XYZ, RYB, RWB, UVW, 123, L1L2L3 (default: Automatic)
- Module Locator
  - Location ID—Alphanumeric
  - System Number—Alphanumeric
  - Module Label—Alphanumeric

**Figure 6 System Settings parameters**

### Adjustable Setpoints

These warning and alarm settings can be changed from the touchscreen. Press the box to the left of each parameter to bring a popup window that will allow the parameter to be changed.

#### Max Load Alarm

- Phase A (%)—10% to 105% (default: 95%)
- Phase B (%)—10% to 105% (default: 95%)
- Phase C (%)—10% to 105% (default: 95%)
- Delay (second)—0 to 60 (default: 5 seconds)

#### Manual Xfer Bypass Voltage Limits

- Manual Xfer Bypass Voltage Low Limit (%)—1% to 20% (default: 10%)
- Manual Xfer Bypass Voltage High Limit (%)—1% to 15% (default: 10%)

**Figure 7 Adjustable setpoints parameters**

## 2.3 EVENT MANAGEMENT

This menu item permits changing how the Liebert NXL handles Alarms, Faults and Status information. Each event can be configured for the following:

- Latch (yes/no)—Event stays active in the event window, even if the fault condition has been cleared, until user acknowledges it by pressing the “Reset” button.
- Audible (yes/no)—Will set Audible alarm when event occurs
- Event log (yes/no)—Will display event in Event log when it occurs



### NOTE

*You must press Save for the changes to take effect.*

See **Table 6** for a list of alarms, fault and status messages.

**Figure 8 Typical Event Management Parameters**

Alarms	Latch	Audible	Event Log
Auto Restart Fail	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>
Auto Rexfer Failed	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>
BFB Open	<input type="button" value="No"/>	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>
BPSS Ovid Exceeded	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>
Byp Overload Ph A	<input type="button" value="No"/>	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>
Byp Overload Ph B	<input type="button" value="No"/>	<input type="button" value="Yes"/>	<input type="button" value="Yes"/>

Alarms    Faults    Status       

## 2.4 STATUS REPORTS MENU

This menu accesses the events records.

- Event Log—Up to 1024 time/date stamped events are captured in the log. The oldest record will be overwritten with a new record once the buffer reaches 1024 events.
- System Status
  - Total Operating Hours—Total number hours the Switchgear has been operational
- Service Reminders—Displays when service is recommended for the fans. Also shows when the warranty and/or maintenance agreement will expire.



### NOTE

*The recommended service time is based on the typical life expectancy of those components. These components may need serviced earlier. Talk to your Liebert representative for more details.*

## 2.5 STARTUP MENU

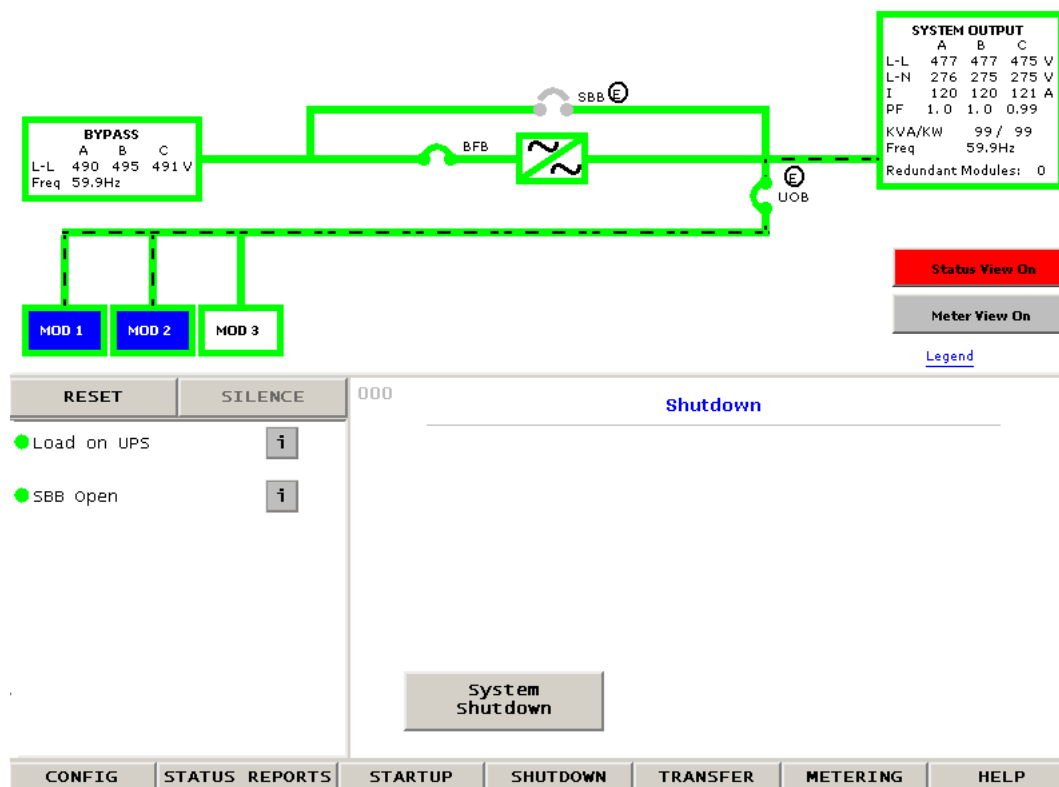
This menu is used to start the system and individual devices.

Manual—This will begin the UPS startup. See **2.15 - Manual Procedures** for details.

## 2.6 SHUTDOWN MENU

This menu permits shutting down the system.

**Figure 9 Shutdown menu**



**System Shutdown**—Open UOB breaker and open all system bypass breakers. This can shutdown the system completely.

### NOTICE

Risk of equipment damage. This command will result in the load being shut down.

Several popup windows are displayed when the system is about to be shut down. To shut down the system, an operator must press OK. See **2.15 - Manual Procedures**.



## 2.7 TRANSFER MENU

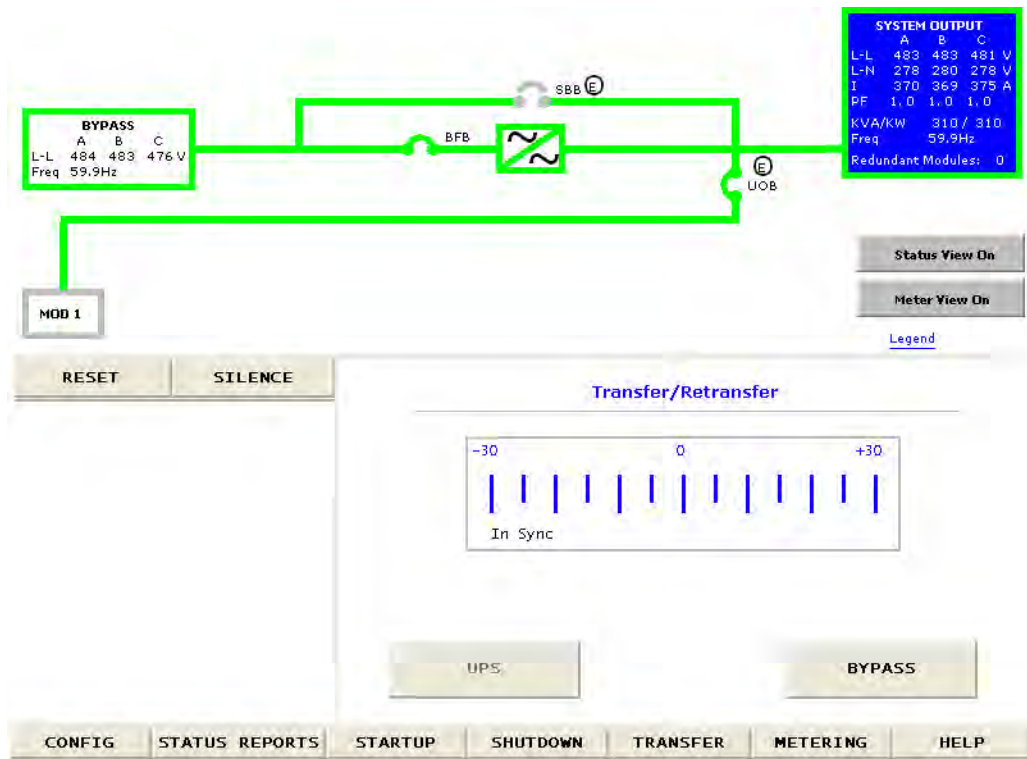
This menu permits switching between UPS and Bypass mode. A graph in the multipurpose window shows if the UPS is in synch with the bypass. If the UPS and bypass are in synch, pressing Bypass will switch the UPS to Bypass mode. Pressing UPS will switch back to Normal (Inverter) Mode (see **Figure 10**).



### NOTE

*The transfer buttons will be inactive and displayed as grayed-out when the bypass and UPS are out of synchronization range.*

**Figure 10** Transfer/retransfer commands



## 2.8 METERING

This button will place the metering tables in the multipurpose window.

## 2.9 HELP

This button will display the Help menu.

## 2.10 RESET

This button will reset any non-active latched events.

## 2.11 SILENCE

This button will silence the audible alarm.

## 2.12 STATUS VIEW

This button will show the following status of each module in the system

### Comms—

Normal (UPS connected to System cabinet),  
Failed (UPS not communicating to System Cabinet)

### Events—

None (UPS has no active events).  
Alarms (UPS has an Alarm),  
Fault (UPS has Fault)

### Inverter Ready—

NO (UPS Inverter is off)  
Yes (UPS Inverter is ready to take load)

### Output Volts—

Normal (UPS Output voltage is OK)  
Marginal (UPS Output Voltage is not OK)  
Fail (UPS Output voltage is outside of range)

### Output State—

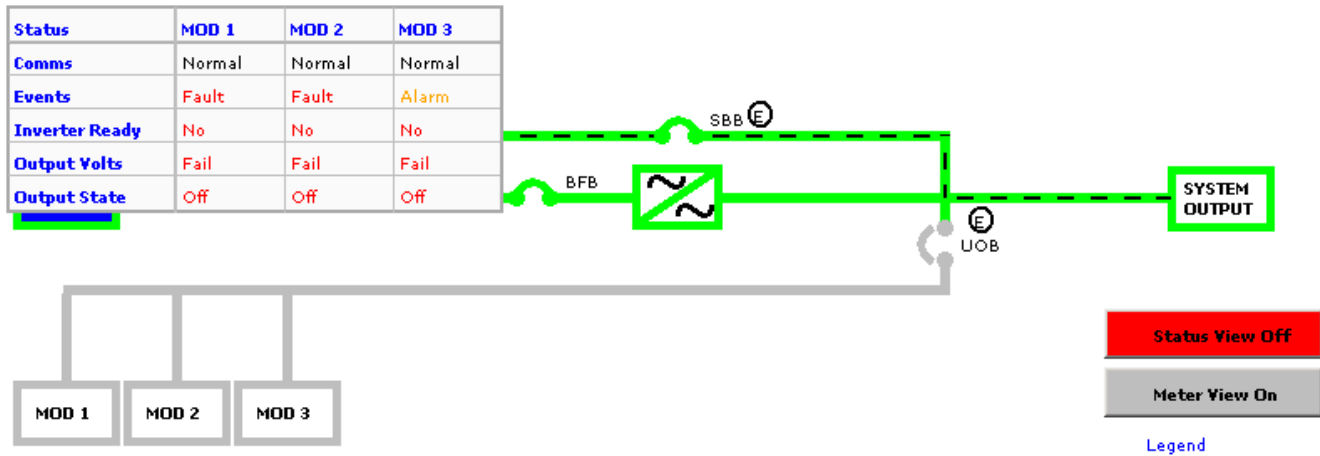
Normal (UPS is in Normal Mode)  
Off (UPS Inverter is off)



### NOTE

The Status View will be red if one of the UPS's has a fault.

Figure 11 Status view

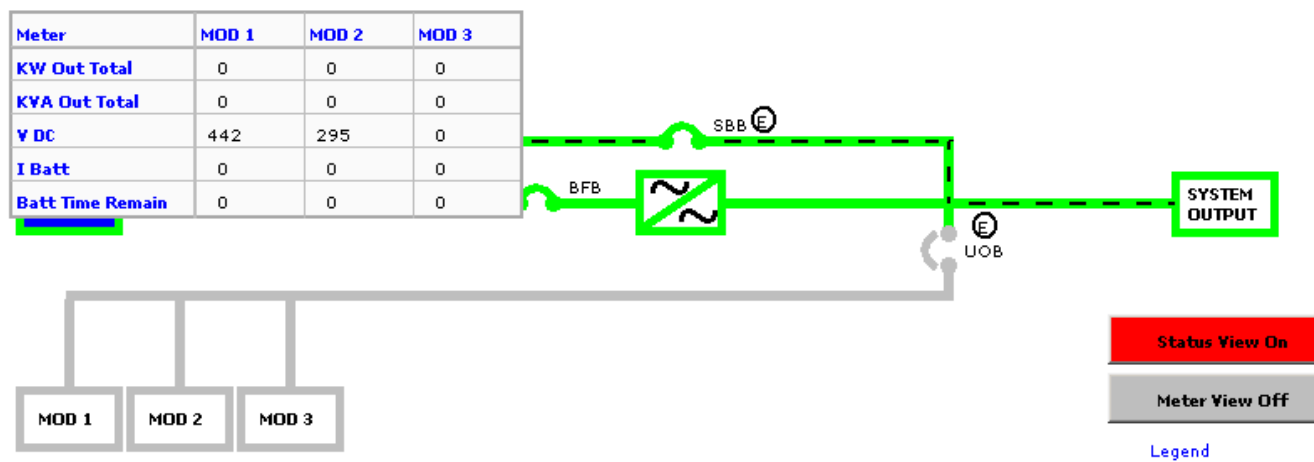


## 2.13 METER VIEW

This button will show the following meter of each module in the system

- KW Out Total
- KVA Out Total
- V DC
- I Batt
- Batt Time Remaining

**Figure 12 Meter View**



## 2.14 MODES OF OPERATION

This section illustrates the flow of power through circuit breakers, switches and UPS's during various modes of operation. The same modes of operation apply to all configurations of the Liebert NXL. Highlighted (thick) lines in the diagrams indicate power flow and power availability.

These illustrations do not show an alternate power source (generator) and automatic transfer switch (external to the UPS) that might be present at your installation.

### 2.14.1 Load on System Bypass

The system could be in this mode of operation during either initial startup or system shutdown and isolation of UPS's for maintenance.

#### NOTICE

Risk of equipment damage. When the critical load is being supplied power from the bypass line, it is exposed to utility failure and fluctuations.

### 2.14.2 OK to Transfer

The OK to Transfer status message will be displayed when the System bypass and UPS's output power are both available, their voltage, frequency and phase synchronization are matched within specifications. An alarm message may be displayed to indicate Load On Bypass. If no alarm is displayed, the operating status is Load On UPS.

When the OK to Transfer message is displayed, the load can be manually transferred from the UPS's to System bypass or the load can be manually retransferred from the System bypass to the UPS's.

To perform a manual transfer, Use the Load Transfer Procedures screen. Refer to **2.15.3 - Load Transfer Procedures**.

The control logic will initiate an automatic transfer to bypass if an overload condition exceeds the system current-versus-time window or if a UPS fault is detected. The control logic may initiate an automatic retransfer to the UPS system when the system is recovering from overloads lasting less than five minutes. Refer to **2.17 - Automatic Operations**.

### 2.14.3 Input Power Failure—Load on Battery

If the utility AC power source fails or is outside the acceptable range, the battery plant becomes the power source for the UPS module inverters. The UPS's continue to supply power to the critical load and also to the UPS's controls.

Use the Battery Time screen at the UPS modules to monitor the present battery voltage compared to the shutdown value. The time the battery can sustain the load depends on the size of the load and the size and condition of the battery plant.

Alarm messages that indicate battery status are Battery Discharge, Low Battery and Battery Shutdown. The voltage limits for these alarms are displayed on the UPS module Alarm Limit Settings screen. These limits were selected for your installation by Vertiv Liebert Services during initial startup. The battery block in the UPS module Monitor/Mimic Display indicates Charge or Discharge and the current in amperes.

### 2.14.4 Emergency Module Off—Optional

The Local Emergency Module Off (LEMO) mode will transfer the critical load to the bypass line and remove power from all UPS module components except the controls, bypass circuit breaker and the static switch.

The Emergency Module Off control is a guarded pad next to the display touchscreen.

Lift the cover and press the pad. The load will be transferred to bypass. Refer to **2.16 - Shutdown Procedures**.

### 2.14.5 Remote Emergency Power Off—Optional

The Remote Emergency Power Off control is a user-provided switch located remotely from the system. It usually is installed in the same room as the critical load equipment. This mode can also be initiated by an automatic contact closure in the same external circuit as the manually operated switch.

When the Remote Emergency Power Off switch is operated, all system circuit breakers are opened, including the bypass circuit breaker. All power is removed from the load. Typically, the REPO circuit also opens the circuit breakers that provide power to the bypass lines and the controls. Refer to **2.16 - Shutdown Procedures**.

## 2.15 MANUAL PROCEDURES

The Liebert NXL Multi-Module System is designed to function while unattended by an operator. Many important functions are handled automatically by the system control logic, as explained in **2.17 - Automatic Operations**. Other procedures must be performed manually.

Manual procedures available to the operator include System Startup, Load Transfers and System Shutdowns. These procedures are performed by using the touchscreen and some manually operated circuit breakers and switches.

The touchscreen lists all steps required for each manual procedure. This section lists step-by-step controls to operate and conditions to observe in the following manual procedures:

- System Startup—including initial startup, recovering from battery shutdown and recovering from shutdowns for emergencies or maintenance.
- Load Transfers—including transfers from UPS's to System bypass and retransfers from System bypass to the UPS's.
- System Shutdowns—including shutdowns for maintenance and emergency shutdowns.



#### NOTE

*The following procedure assumes that the UPS installation inspection and initial startup have been performed by Liebert Services. An Vertiv-authorized representative must perform the initial system startup to ensure proper system operation.*

## 2.15.1 System Startup Procedure

### CAUTION

The following procedure provides power to the critical load distribution system. Verify that the critical load distribution is ready to accept power. Make sure that personnel and equipment are ready for the critical load distribution system to be energized.

During startup, power is supplied to the critical load through the system bypass line while the UPS systems are being energized. Depending on the reason for the system shutdown, power may be present in the bypass line. To determine this, check the Monitor/Mimic Display screen after control power is available.



#### NOTE

*If the system was shut down in response to an "Emergency Off," there may be alarm messages on the touchscreen that describe system conditions before (or at the time of) the shutdown. Some or all of the alarm conditions may have been resolved. To clear these alarm messages, turn off control power. Wait at least 10 minutes for the control power circuitry to de-energize completely. After 10 minutes, turn control power back on and wait two minutes before continuing.*

### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

If the UPS's have been shut down for maintenance, verify that all of the UPS's system doors are closed and latched. All test equipment must be removed from the system. All electrical connections must be secure.

1. Before applying power to the system, verify that these circuit breakers are open:

- Bypass Circuit Breaker (BFB)
- Optional Unit Output Breaker (UOB).
- Optional System Bypass Breaker (SBB).
- Optional Maintenance Bypass Breaker (MBB)
- Optional Maintenance Input Breaker (MIB)
- All UPS breakers (CB1 & CB2).



#### NOTE

*Not all systems will have the breakers listed above. Review the system configuration to see if what breakers are in the system.*

2. Power must be provided to the System controls so the operator can use the display touchscreen and so the system logic can function properly. The display touchscreen may be used to monitor system status, even when the UPS modules are not operating. This will be the usual condition unless you are recovering from a maintenance shutdown.
3. If the bypass line is not supplying the load, energize the bypass line by closing the external breaker feeding the System Bypass. The display touchscreen should start up.
4. On the SCC HMI screen, press the "Start-Up" then "Manual Start" menu buttons.
5. If MBB is installed: The "Close MBB" message appears in the multipurpose window. Close the MBB breaker.
6. If SBB is installed: The "Press OK to issue SBB close command" message will appear. Press "OK"
7. The "Close BFB" message appears in the multipurpose window. Close the BFB breaker.
8. If MIB is installed: The "Close MIB" message appears in the multipurpose window. Close the MIB breaker.
9. If MBB is installed: The "Open MBB" message appears in the multipurpose window. Open the MBB breaker.
10. Start each UPS that will be connected to the system.
11. Under Startup, press Manual Start.

This will initiate the UPS startup and instructions will be displayed in the multipurpose window. See SL-25434 available at Liebert's Web site, [www.liebert.com](http://www.liebert.com), for details.

When enough UPS modules have been started-up that can support the load, the SCC HMI screen will display the "Press OK to system transfer to UPS Inverter Command" message. Press "OK." This will put the load on the UPS inverters.



## NOTE

When the load is transferred to the UPS's, the following happens:

- UOB breaker will close (if installed)
- SBB breaker will open (if installed)
- CB2 breakers in all UPS modules will close
- System Bypass Static Switch will turn off.



## WARNING

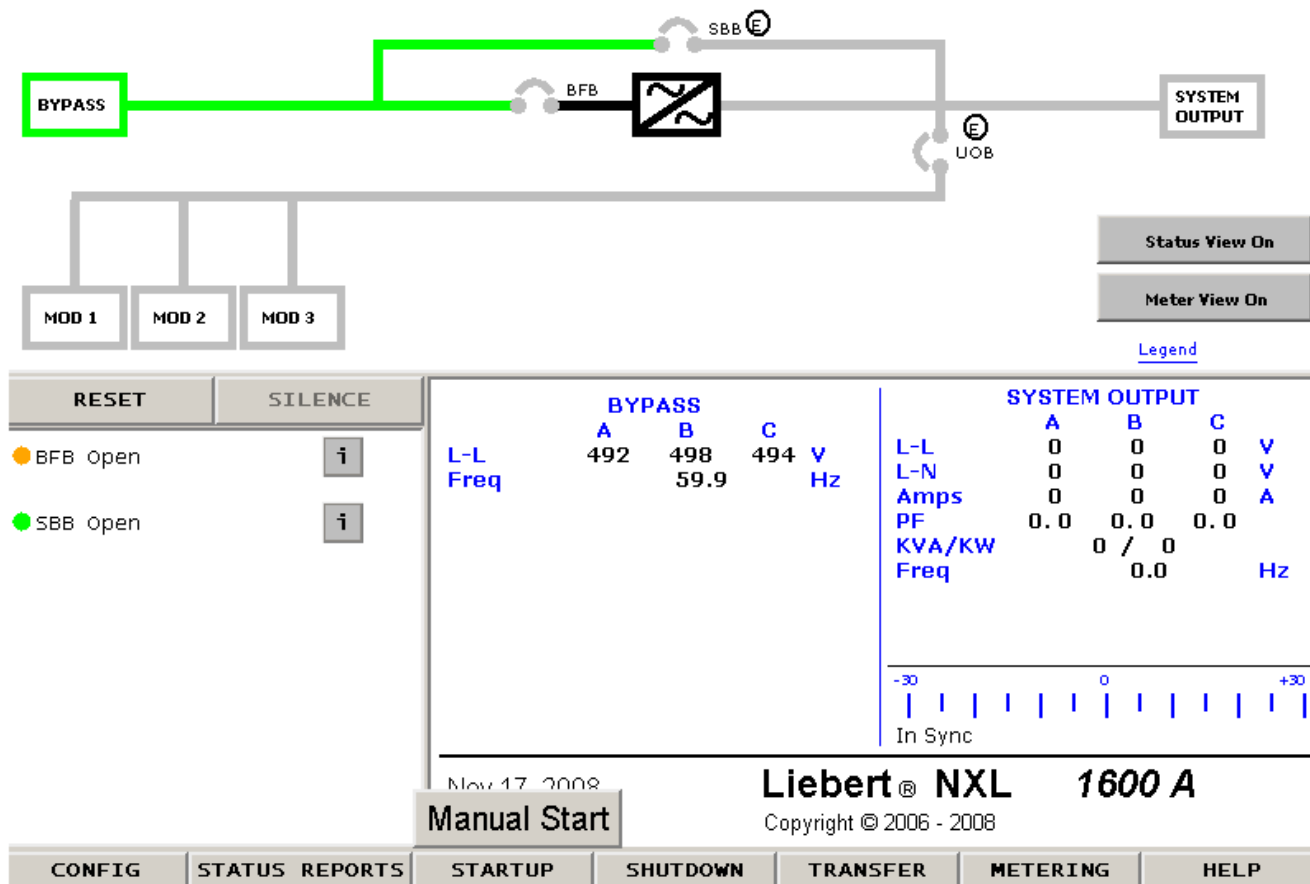
Risk of electric shock, explosive reaction, hazardous chemicals and fire. Can cause equipment damage, personal injury and death.

Do not use equalize charging with valve-regulated, lead-acid batteries. Refer to the battery manufacturer's manual, available on the manufacturer's Web site, for specific information about equalize charging.

## NOTICE

Risk of equipment damage. If any abnormal situation occurs during this startup procedure, open the input circuit breaker and investigate the problem. Call Liebert Services if help is required.

Figure 13 Startup commands



### 2.15.2 Adding a UPS to a System

To add a UPS to the System after the System is already running, startup the UPS as described in **2.15.1 - System Startup Procedure, Step 10**.

### 2.15.3 Load Transfer Procedures

Changing the load from the UPS's to the System bypass is called a transfer. Changing the load from System bypass to the UPS's is called a retransfer. Note that the System control logic can initiate automatic load transfers and retransfers. Refer to **2.17 - Automatic Operations**.

#### Transfer Procedure

1. Press the "Transfer" menu button on the touchscreen.
2. The Transfer/Retransfer screen will appear in the multipurpose window (see **Figure 10**).
3. If the UPS modules' output are in with synchronization with the bypass, press the "Bypass" button. This will transfer the load from UPS's to Bypass.

#### Retransfer Procedure

1. Press the "Transfer" menu button on the touchscreen.
2. The Transfer/Retransfer screen will appear in the multipurpose window (see **Figure 10**).
3. If the UPS's outputs are with synchronization with the bypass, press the "UPS" button. This will transfer the load from System Bypass to the UPS's.

## 2.16 SHUTDOWN PROCEDURES

### 2.16.1 UPS Module Shutdown Procedure

Perform a Module Shutdown Procedure when you want to remove power from a UPS module.

Read all warnings in the *UPS Operation and Maintenance Manual, SL-25425*, before performing any maintenance on your Liebert NXL UPS. These warnings and cautions must be observed during any work on the UPS.



#### NOTE

*Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.*

Use the module Monitor/Mimic Display to determine the operating condition of the UPS module.



#### NOTE

*This shutdown turns Off the inverter and the rectifier and trips all battery breakers.*

1. Press the "Shutdown" menu button on the touchscreen.  
The Shutdown screen will appear in the multipurpose window.
2. Press the "UPS" button. This brings up a warning dialog box.
3. Press OK to shut down the UPS.



#### NOTE

*If removing the UPS would result in overloading the other UPS's, the "Shutdown" will not be available.*

### 2.16.2 System Shutdown Procedure

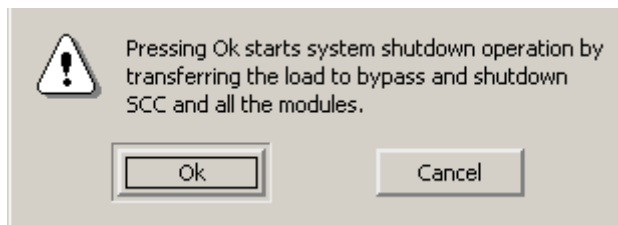
Perform a System Shutdown Procedure when you want to remove power from the entire system.



#### NOTE

*This shutdown will shutdown all the UPS's and opens the System Bypass. This procedure will shut down the load.*

1. Press the "Shutdown" menu button on the display touchscreen.  
The Shutdown screen will appear in the multipurpose window (see **Figure 9**).
2. Press the "System" button. This brings up a warning dialog box (see **Step 14**). This will open UOB breaker (if installed) and transfer the load to System Bypass.

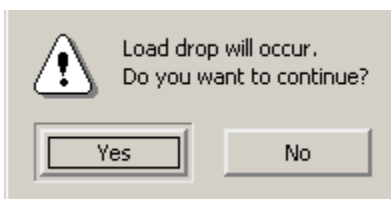
**Figure 14 System shutdown popup**

3. If MBB & MIB are not installed:
  - a. Press OK to transfer the load to System Bypass and the following warning Dialog box will appear (see **Figure 15**).

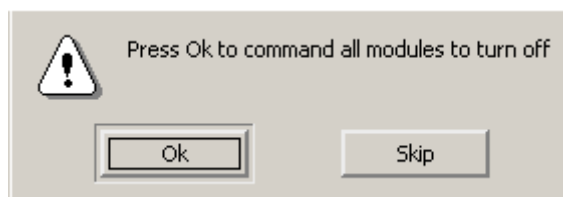
**NOTE**

*Pressing OK will result in the load being dropped.*

- b. Press OK to open the System Bypass. This will turn off the System Bypass Static Switch and open SBB breaker (if installed) or;
- c. Press "No" to leave the load on System Bypass.

**Figure 15 System shutdown popup con't**

4. If MBB & MIB are installed
  - a. The "Verify Maintenance Bypass source, then close MBB" message appears in the multipurpose window. Close the MBB breaker.
  - b. The "Open MIB" message appears in the multipurpose window. Close the MIB breaker.
  - c. System Bypass Static Switch will turn off and SBB breaker (if installed) will open.
5. The "Press Ok to command all modules to turn off" message appears in the multipurpose window (see **Figure 16**).
  - a. Press "OK" to have all the UPS module turned off
  - b. Press "Skip" to leave the UPS modules running.

**Figure 16 System shutdown popup con't**

## 2.17 AUTOMATIC OPERATIONS

The Liebert NXL system is designed to function while unattended by an operator. The system control logic monitors the performance of the system, the availability of power sources and the current required by the critical load.

The system control logic:

- Determines what overload conditions can be sustained without a transfer to bypass.
- Initiates an automatic transfer to bypass to sustain an overload or when selected faults occur.
- Can initiate an automatic retransfer to the UPS after an overload has been cleared.
- Initiates an automatic transfer to bypass and emergency module shutdown when specified UPS faults occur.

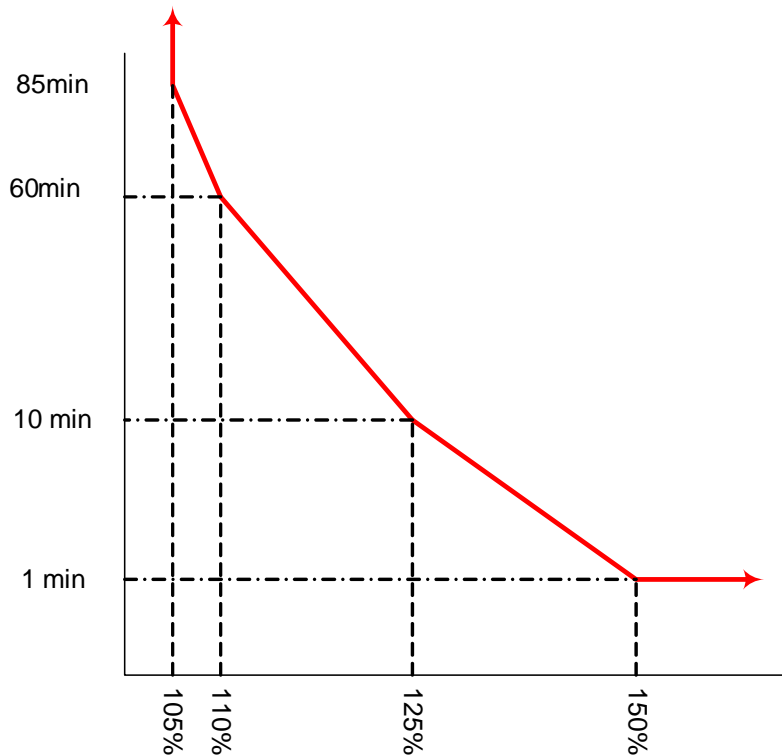


### 2.17.1 Overloads (Without Transfer)

The UPS system is capable of sustaining full output voltage ( $\pm 2\%$  of the nominal voltage) for overload conditions that remain within (under) the current-versus-time curve of overload capacity (**Figure 17**). Note that the time scale is not linear.

Whenever an overload condition occurs, you should determine the cause of the overload. If an overload condition exceeds the overload capacity, the UPS system initiates an automatic load transfer to the System bypass.

**Figure 17** Current-versus-time curves of overload capacity



### 2.17.2 Automatic Transfers to Bypass (Overload Condition)

The UPS system will initiate an automatic load transfer to the System bypass if an overload condition exceeds the current-versus-time curve of overload capacity or if specified UPS system faults occur.

The Overload Transfer and Output Undervoltage alarm messages will initiate an automatic transfer to System bypass and the Load On Bypass message will be displayed. The active event window will display the Automatic Transfer to Bypass message. Other UPS system faults will initiate an automatic transfer to bypass followed immediately by the shutdown and isolation of the UPS system. Refer to **2.17.3 - Automatic Transfers to Bypass, UPS System Faults**.

In an automatic transfer to bypass the output and bypass circuit breakers do not overlap as they do in a manual transfer. The static bypass switch is fired (closed), the output circuit breaker is opened (UOB), and the bypass circuit breaker (SBB) is closed. Bypass power is supplied to the critical load through the static bypass switch during the short time while both circuit breakers are open.



#### NOTE

*A load transfer to the bypass line will be completed whenever an automatic transfer to bypass is initiated. If the OK to Transfer condition is present, the load transfer will be uninterrupted. If the Static Switch Unable alarm message is present for any reason, the automatic transfer will be interrupted for 40 to 120 milliseconds. Because of the reliability of the UPS components, an interrupted load transfer is a very unlikely occurrence.*

### 2.17.3 Automatic Transfers to Bypass, UPS System Faults

For specified UPS system faults, the control logic will initiate an automatic transfer to System bypass followed immediately by a shutdown and isolation of the UPS system. The UPS output, battery (MBD) and input circuit breakers are open.

The following UPS system faults will initiate an automatic transfer to bypass:

- DC Overvoltage Shutdown
- Hardware Shutdown
- Inverter Fault
- Low-Battery Shutdown
- Output Overvoltage
- Overload Shutdown
- Overtemperature Timeout
- Rectifier Fuse Blown
- Reverse Power

Refer to **Table 6** for more information about these alarm messages.



#### NOTE

*A load transfer to the bypass line will be completed whenever an automatic transfer to bypass is initiated and the bypass line is available. If the OK to Transfer condition is present, the load transfer will be uninterrupted. If the Static Switch Unable alarm message is present for any reason, the automatic transfer will be interrupted for 40 to 120 milliseconds. Because of the reliability of the UPS components, an interrupted load transfer is a very unlikely occurrence.*

Some installations may include a Remote Emergency Power Off mode that can be initiated automatically by a contact closure in the critical load equipment. Refer to **2.14.5 - Remote Emergency Power Off—Optional**.

### 2.17.4 Automatic Retransfers to UPS

The following critical bus conditions must be present to initiate an automatic retransfer of the critical load from the bypass source to the UPS inverter:

1. Critical load was initially transferred to the bypass source due to a system overload only. A manual retransfer from bypass is required if the transfer to bypass was caused by any condition other than output overload.
2. Overload has since dropped below 100% of the rated load.
3. Both the UPS's Input and the Battery (MBD) circuit breakers have remained closed since the overload transfer.
4. OK to Transfer signal received from the control logic for at least 10 seconds, within 5 minutes of the system overload transfer. A manual retransfer from bypass is required for overloads lasting 5 minutes or more.
5. Cyclic-type overloads, which occur up to five (select range is 0 to 5) times in 60 minutes, are automatically returned to the inverter for each event including the Nth overload.



#### NOTE

*If you do not want the UPS system to initiate any automatic retransfers, this can be set during the initial commissioning or by calling your local Liebert Services representative.*

## 3.0 OPTIONS



### NOTE

*These items must be enabled by service before they become functional. If a feature is disabled, the feature will not be available and the menu item will not be displayed.*

### 3.1 INPUT CONTACT ISOLATOR BOARD

The Input Contact Isolator Board (ICI) provides a Liebert NXL module interface for up to eight external user alarm or message inputs to be routed through the Liebert NXL's alarm network. The eight contacts are normally open dry contacts. When a contact closes, an event is triggered.



### NOTE

*Up to two (2) ICI's can be installed in a Liebert NXL.*

The Input Contact Isolator options are configured through the Input Contact Isolator dialog box, which is accessed from the Internal Option Settings under Config dialog box on the HMI touchscreen display. The Input Contact Isolator dialog box contains eight choices to match the eight channel input board. You can label each button to identify the event associated with the contact. When the dialog box is accessed, each button flashes to display the Input Contact Isolator number and the user entered label. This label also appears in the Display Panel when an event related to an Input Isolator Connector is triggered.

The Input Contact Isolator dialog box allows you to:

- Label the input contact assignments for your setup.
- Set the delay for an external event triggering an alarm.
- Review the isolator contact assignments, once the labels are entered.

The delay allows setting the number of seconds that a condition must exist before it will trigger an alarm. To configure the Input Contact Isolator relays:

1. Press Internal Option Settings from the Config menu.
2. Press which Input Contact Isolator to be configured. The Input Contact Isolator dialog box is displayed.

**Figure 18 Input contact isolator dialog box**

Channel	Custom	Pre-assigned	Contact Name	Delay
Ch #1	Custom	Pre-assigned	Input Contact 11	0.0
Ch #2	Custom	Pre-assigned	Input Contact 12	0.0
Ch #3	Custom	Pre-assigned	Input Contact 13	0.0
Ch #4	Custom	Pre-assigned	Input Contact 14	0.0
Ch #5	Custom	Pre-assigned	Input Contact 15	0.0
Ch #6	Custom	Pre-assigned	Input Contact 16	0.0
Ch #7	Custom	Pre-assigned	Input Contact 17	0.0
Ch #8	Custom	Pre-assigned	Input Contact 18	0.0

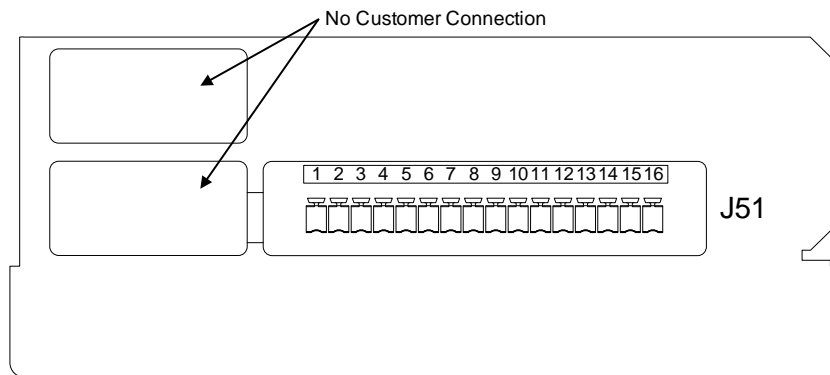
Buttons: Save, Cancel

- Assignment—Custom, Pre-assigned (default: “Input Contact” XY)
  - Delay, sec—0 to 99.9 (default: 0)
  - Message—Custom: 0-19 characters
3. To assign labels for each channel:
    - a. Press Pre-assigned for default labels on Channels 1-6 (See **Table 1**)
    - b. For Custom labels
      1. Press Custom to unique labels.
      2. Click on Input Contact XX button. A keyboard is displayed to allow naming alarms.
      3. Enter the name of the alarm set for that input. For example, a fan problem could be indicated by naming the button FAN.
      4. Press OK on the keyboard to keep your label.
  4. Press DELAY.
    - a. A keypad is displayed prompting you for a delay time, in seconds, for a condition to exist before the alarm is triggered.
    - b. Enter the delay value. The range for the values are from 0 (zero) to 99.9 seconds.
    - c. Press OK on the keypad to keep your setting. The value you entered is displayed in the field adjacent to the corresponding input contact.
  5. Repeat **Steps 3** and **4** for each input contact.
  6. Press SAVE after you have configured all input contacts.  
Be sure to press Save even if you have accessed this dialog only to change a setting.
  7. This information is not saved if control power is removed.

**Table 1 Input Contact Isolator Board pre-assigned values**

Channel Number	ICI #1 Pre-Assigned Label	ICI #2 Pre-Assigned Label
1	Reduced Rect ILimit	Stop Battery Charge
2	Reduced Batt ILimit	Stop Battery Charge
3	Stop Battery Charge	Stop Battery Charge
4	Inhibit Rect Restr	Stop Battery Charge
5	Inhibit Byp Restr	Stop Battery Charge
6	Inhibit Inv Restr	Stop Battery Charge
7	Input Trap Filter Disconnect	Inhibit IP Standby
8	Suspend ECO Mode	

**Figure 19 Optional Input Contact Isolator Board**



1. Customer control wiring connection points are terminals 1 through 16 (see **Table 2**).
2. Customer provided normally open dry contacts for user alarm messages.
3. All control wiring (by others) must be run separate from power wiring. Control wiring runs should not be combined in the same conduit.
4. Signal voltage: 100mA @ 12VDC.
5. Maximum cable length 500 ft. (152m) with #16AWG and flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

**Table 2 Input Contact Isolator Board control wiring connections**

Input Contact	Pin No.
1	1
	2
2	3
	4
3	5
	6
4	7
	8
5	9
	10
6	11
	12
7	13
	14
8	15
	16

## 3.2 PROGRAMMABLE RELAY BOARD

The Programmable Relay Board (PRB) provides a means to trigger an external device when an event occurs in the Liebert NXL. Each PRB has eight channels. Each channel has two sets of Form-C dry contacts, rated at either 1A @ 30VDC or 450mA @ 125VAC.

Any alarm/event can be programmed to any channel or channels. Up to four (4) events can be programmed to a relay. If multiple events are grouped to one relay, group the events logically to simplify troubleshooting when an event is triggered. The same alarm/event can be programmed to more than one channel. Up to two Programmable Relay Boards can be installed in the Liebert NXL for a total of 16 channels. Programming is performed through the HMI touchscreen display.



### NOTE

Up to two (2) PRB's can be installed in the Liebert NXL.

**Figure 20 Control wiring, Programmable Relay Board**



1. Customer control wiring connection points are Terminals 1 through 15. (Pin 16 not used on J71, J72, and J73.)
2. Programmable Relay Board option includes eight signal channels with two Form-C dry contacts per channel (see **Table 3**).
3. All control wiring (by others) must be run separate from power wiring. Control wiring runs should not be combined in the same conduit.
4. Contact ratings: 1A @ 30VDC, 450mA @ 125VAC.
5. Maximum cable length 500 ft. (152m) with #16AWG and flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

**Table 3 Programmable Relay Board pinout**

Terminal Block	Channel	Pin No.	Common	Normally Closed	Normally Open
J71	CH1	A 1-3	1	2	3
		B 4-6	4	5	6
	CH2	A 7-9	7	8	9
		B 10-12	10	11	12
J72	CH3	A 13-15	13	14	15
		B 1-3	1	2	3
	CH4	A 4-6	4	5	6
		B 7-9	7	8	9
	CH5	A 10-12	10	11	12
		B 13-15	13	14	15
TB3	CH6	A 1-3	1	2	3
		B 4-6	4	5	6
	CH7	A 7-9	7	8	9
		B 10-12	10	11	12
J74	CH8	A 13-15	13	14	15
		B 1-3	1	2	3

Note: Pin 16 not used on J71, J72, and J73.

### 3.2.1 Configuring the Programmable Relay Board Settings

1. Press Internal Option Settings from the Config menu.
2. Press which Programmable Relay Board will be configured. The Programmable Relay Board dialog box is displayed.
3. Press the Relay channel
4. Press up to four events. Selected events will show up under Relay 1 Assignment.

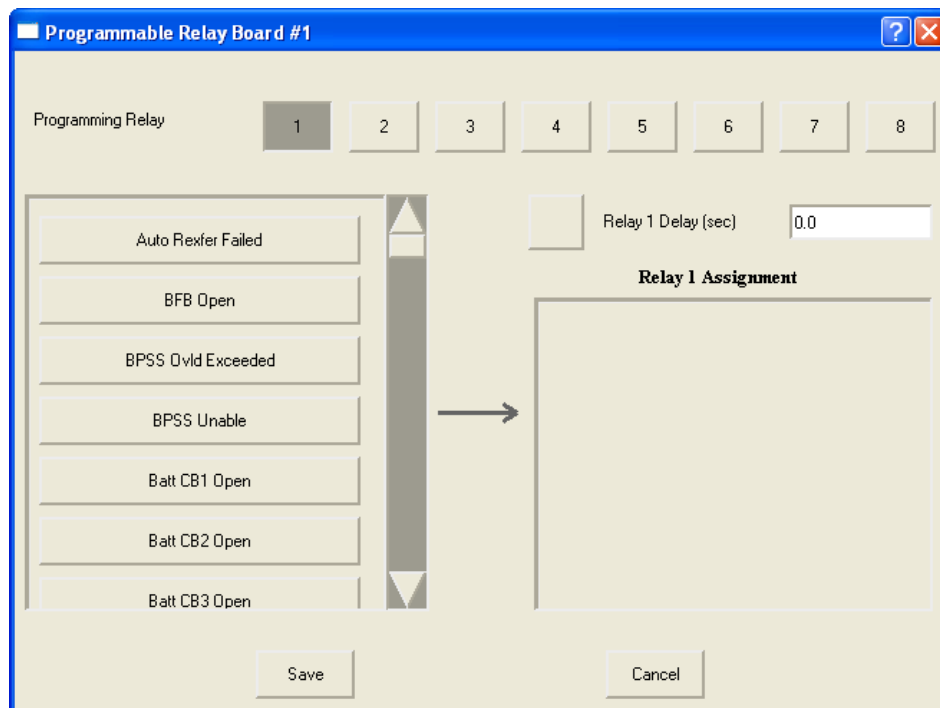


#### NOTE

To deselect an event, click on the event.

5. Repeat **Steps 3** and **4** for each relay.
6. Press SAVE to keep the settings.

**Figure 21 Programmable relay board dialog box**



- Assignment—0 to 4 event (default: 0)
- Delay, sec—0 to 99.9 (default: 0)

### 3.3 REMOTE ALARM STATUS PANEL RAS

The Remote Alarm Status Panel (RAS) uses LED status indicators that allow the operator to monitor the UPS. The main purpose of the Remote Alarm Status Panel option is to report the status of the load and the UPS. To interpret the LED indicators, see **Table 4**.

**Table 4 RAS indicators**

LED Name	LED Color	Meaning
Load on UPS	Green	The load is fully protected and no alarm conditions are present. The UPS is supplying uninterrupted power to the load.
Load on Bypass Alarm	Red	Power to the load is bypassing the UPS. The UPS is no longer supplying power to the load.
Battery Discharge Alarm	Red	The DC source is providing power to the UPS.
Low Battery Reserve Alarm	Red	DC source capacity is low and has reached the low-battery alarm setting.
Overload	Red	System load has exceeded the system rating.
Ambient Overtemp	Red	UPS inlet cooling air temperature has exceeded the specified limits.
System Summary Alarm	Red	An alarm has occurred at the UPS.
New Alarm Condition	Red	A second alarm has occurred at the UPS. The New Alarm Condition LED lights when the UPS Alarm Condition LED has been triggered and has not been reset.

The RAS also includes:

1. An audible alarm
2. Lamp Test/Reset push button to test the LED indicators
3. Audio Reset push button to silence an audible alarm

#### 3.3.1 Lamp Test/Reset Push Button

The Lamp Test/Reset push button is used to verify that each LED indicator is in working condition and to reset an LED indicator that has been triggered by a condition at the load or UPS.

To test the LEDs, press the Lamp Test/Reset push button. This lights all of the LED indicators for visual inspection.

If an LED indicator does not respond to the lamp test, contact your local Vertiv representative for assistance.

To reset an activated LED, press the Lamp Test/Reset push button.

#### 3.3.2 Audio Reset Push Button

The Audio Reset push button is used to silence an audible alarm that has been triggered and reset the alarm to activate on the next alarm condition.

After correcting the alarm condition, press the push button to reset the audible alarm.

### 3.4 DIGITAL LOAD BUS SYNC

#### 3.4.1 System Description

Liebert's Load Bus Sync™ (LBS) option keeps the output of two or more independent Uninterruptible Power Systems in synchronization, even when the systems are operating from different power sources. The Liebert Load Bus Sync option works by synchronizing the Designates Slave System (DSS) to the output of the Designated Master System (DMS). There are no other connections between the logic or controls of either UPS. This ensures maximum system independence and reliability.

#### 3.4.2 LBS Configurations

- Load Bus Sync – Enable or Disabled (default: Disable)
- LBS Master Select - Master or Slave (default: Slave)



#### NOTE

*The LBS settings permit proper operation with only one UPS set as the Master unit.*

- LBS Slave Priority – 0 to 7 (default: 0)

**NOTE**

Setting of '0' will disable LBS Slave Priority

**3.4.3 Normal Operations**

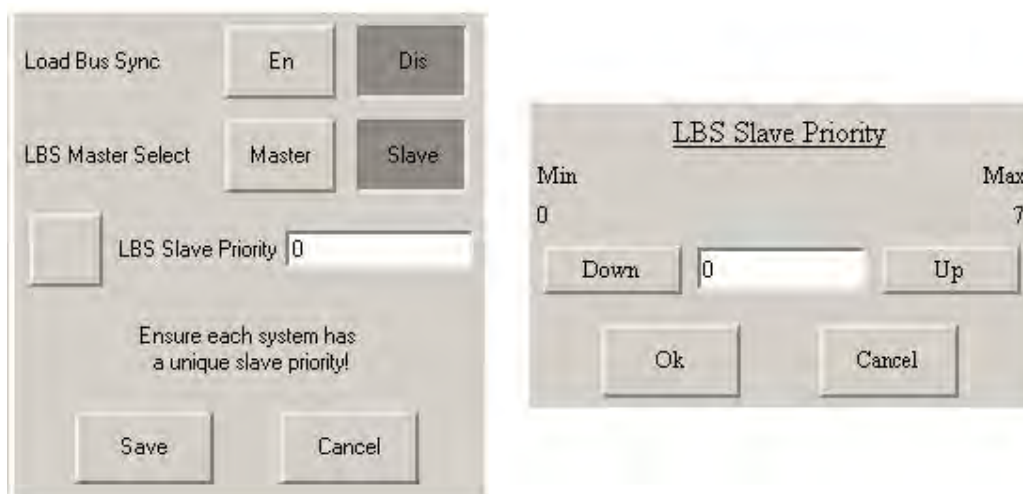
The LBS will synchronize the Designated Slave Systems (DSS) to the Designated Master System (DMS). The DSS will synchronize to the DMS output if the DMS is in Normal, Battery, Bypass or Maintenance Bypass Mode. If the DSS transfers to Bypass Mode or Maintenance Bypass mode, the DMS will then synchronize to the output bus of the DSS. This re-selection of master will be accomplished automatically.

**3.4.4 Slave Priority**

When Slave Priority is enabled, the LBS system will work the same as Normal operations (See **3.4.2 - LBS Configurations**) except when the DMS disqualifies its bypass source. If the DMS's bypass is disqualified, the LBS system will synchronize to the output of the DSS with the lowest Slave Priority number that has a qualified bypass. The LBS system will synchronize back to the DMS when the DMS's bypass is qualified or all DSS's bypass are disqualified.

If a DSS LBS Slave Priority is set to "0", it will not assume the synchronization of the system if the DMS disqualifies its bypass.

**Figure 22 LBS configuration**

**3.4.5 Master System**

The unit designated at power-up/reset to be the Master will monitor the LBS Sync Pulse line.

If two units are designated as Master, the second designated Master Unit to come on-line will inhibit the LBS and synch to its own bypass.

The LBS Master will monitor the LBS Sync Pulse continuously; if the LBS Master detects that another unit has transferred to bypass, the LBS Master will follow the unit on bypass.

- Slave can no longer follow the Master; the Master must follow the Slave.

When the Master unit is following a Slave LBS Sync Signal, it will generate the LBS Active event.

If the Slave LBS Sync Pulse stops, the Master will resume generating the LBS Sync Pulse.

**3.4.6 Slave System**

Any unit designated as the Slave upon power-up / reset will monitor and lock to the Master LBS Sync Pulse.

When the Slave unit is on bypass, the Slave will generate the LBS Sync Pulse.

- The Slave will slew to be locked to its own bypass source. The inverter in the LBS Slave system will follow the local bypass.
- When the Slave unit is on UPS, the Slave will stop generating the LBS Sync Pulse.

When more than one Slave unit goes to bypass:

- All systems on UPS will follow the first Slave's LBS Sync Pulse
- All other Slave systems on Bypass will follow their own local Bypass Source.



## 3.5 ECO MODE

ECO Mode improves the overall efficiency by powering the critical bus from the bypass static switch instead from the inverters.

### 3.5.1 ECO Mode Setup

ECO Mode Operation—To enable or disable ECO mode via the front touchscreen.

- Enable, Disable
- Default: Disabled

**Maximum Auto Suspensions**—Used to specify how many times the system is allowed to automatically reactivate ECO Mode before the current ECO Mode session is terminated and Excessive ECO Mode Suspension event is set.

- Min., 1; Max., 5; Iteration, 1
- Default, 3

**Restart Delay**—Used to specify how long the conditions to activate must be satisfied before reactivating ECO Mode. Once Automatic Reactivation has been satisfied, the conditions must remain satisfied for the full Restart Delay before ECO Mode is active.

- Min., 10 minutes; Max., 60 minutes; Iteration, 10 minutes
- Default, 30 minutes

**Continuous Operation**—Permits running ECO Mode continuously through the Start command and Stop command.

- Enable, Disable
- Default: Disabled

**Figure 23 ECO Mode settings**

ECO Mode Operation

En Dis

Continuous Operation

En Dis

Auto ECO Mode Restart Delay (mins) 30

Max ECO Mode Suspensions per Period 4

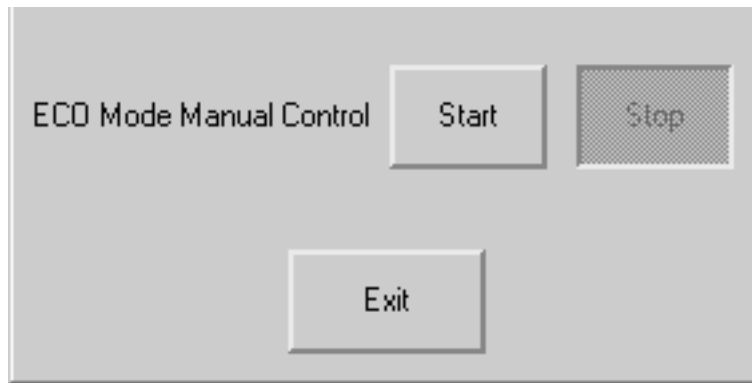
Save Cancel

### 3.5.2 Operation

ECO Mode can be started either manually or automatically.

**Manually**—If “Continuous Operation” is enabled under ECO Mode - Operations, pressing Start will activate ECO Mode.

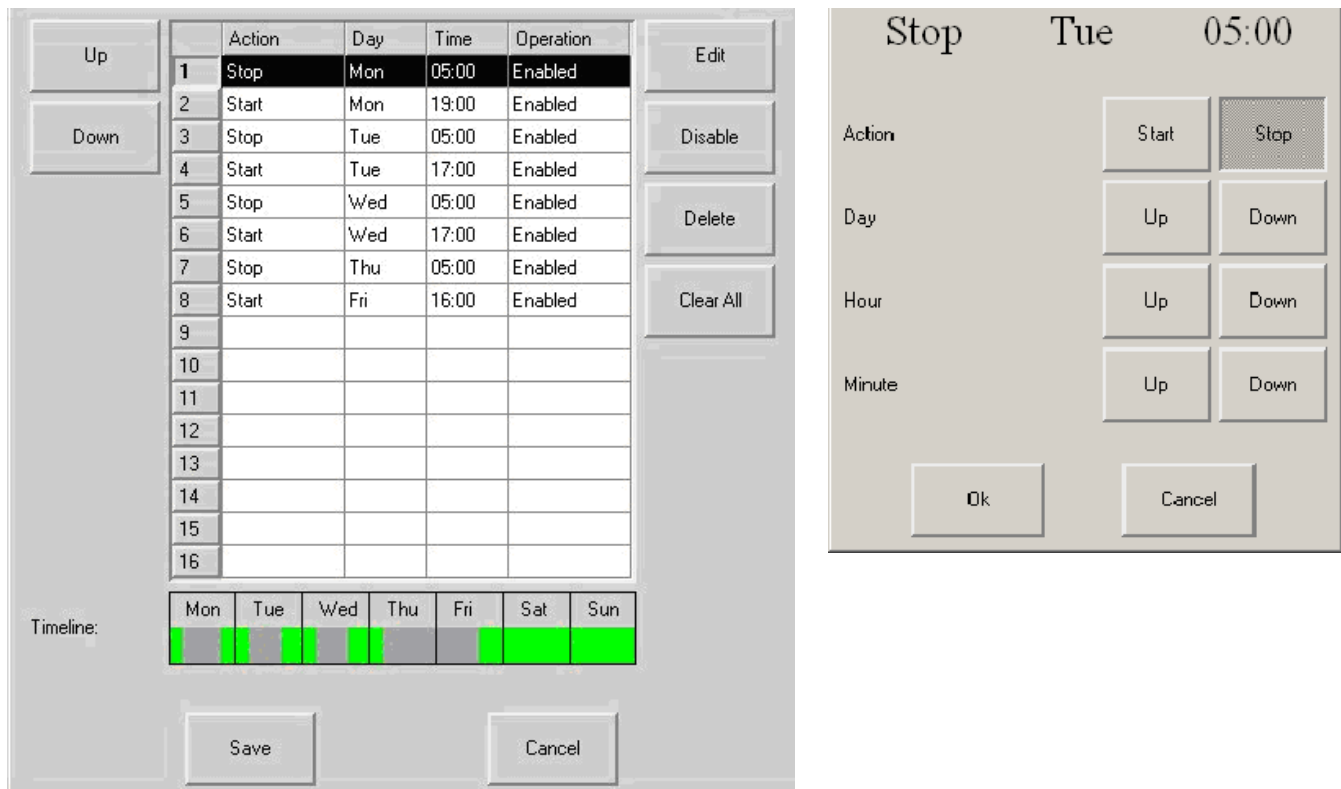
Figure 24 ECO Mode manual operation



**Automatically**—If ECO Mode schedule has been programmed (see **Figure 25**), the system will start ECO Mode at the next scheduled start time.

- Schedule Entry Enable: Permits enabling or disabling an Schedule Entry Action Start entry in the operation schedule
  - Enable, Disable
  - Default: Enable
- Schedule Entry Day of the Week: Permits choosing the day of the week for an associated schedule entry action to take effect
  - Sun, Mon, Tues, Wed, Thurs, Fri, Sat
  - Default: Sun
- Schedule Entry Time: Permits choosing the time of day for an associated schedule entry action to take effect.
  - hh:mm (24-hour clock)
  - Default: 00:00
- Schedule Entry Action: Permits choosing the action an associated schedule entry will take.
  - Start, Stop
  - Default: Start (1st entry), Opposite of previous entry afterwards

Figure 25 ECO Mode scheduling—overall and example



### 3.5.3 Bypass Qualification limits

All of the following conditions must be true to qualify ECO Mode operations based on the bypass source:

- Bypass voltage is within Manual Transfer Bypass Voltage High Limit setting and Manual Transfer Bypass Voltage Low Limit setting or Max Bypass range of  $\pm 10\%$
- Bypass Frequency is within the Bypass Tracking Window setting
- Bypass is within the slew limits per Bypass Tracking Slew Rate setting
- Bypass Sync Error event is not active
- Back-feed Breaker is closed
- Bypass Static Switch Unable event is not active

### 3.5.4 Conditions to Activate ECO Mode

All the following conditions must be satisfied to start ECO Mode

- ECO Mode Session is active
- Bypass Source Qualification is satisfied
- The Load On UPS event must be active for a short, specified amount of time
- Input Contact Interface 1 (Channel 8) event is not active
- Load is greater than 10%

### 3.5.5 Conditions to Suspend ECO Mode

The system will suspend ECO Mode when at least one of the following conditions is true:

- Bypass Source Qualification is not satisfied.
- Input Contact Interface 1 (Channel 8) event active.
- On Generator Active event is active.
- Load kW is less than 10%.

When any Conditions to Suspend have been satisfied, the inverter(s) will power the load and the bypass will be turned Off. When the Conditions to Activate ECO Mode (Section **3.5.4**) have been met, the system will automatically return to ECO Mode.

### 3.5.6 Conditions to Terminate ECO Mode

The system will terminate ECO Mode when at least one of the following conditions is true:

- ECO Mode - Stop command is received.
- Scheduling stop time is reached.
- Excessive ECO Mode Suspension event is set.
- ECO Mode Operation setting is disabled.
- System transfers to bypass, either automatically or manually.
- Back-feed Breaker Open event is active.
- Bypass Static Switch Unable event is active (SCR Short, SCR Open).
- Inverter Output Breaker (CB2/IOB) Open event is active.
- Module Output Breaker (MOB) Open event is active.
- Critical Bus Voltage Disqualification is satisfied.
- Bypass Line Fault or Critical Bus Load Fault detected.

When any Conditions to Terminate have been satisfied, the inverter(s) will power the load and the bypass will be turned off. ECO Mode will not turn on until the next Start command - either manually or automatically if scheduled.

## 3.6 INTELLIGENT PARALLELING

Intelligent Paralleling is intended to increase system efficiency and reduce operating hours on the modules. Intelligent Paralleling will put one or more paralleled modules into standby operation when the number of redundant modules is above the user specified threshold.

### 3.6.1 Intelligent Paralleling Setup

#### Operation

- Enable, Disable
- Default: Disabled

Minimum System Redundancy—Permits setting the redundancy threshold at which Intelligent Paralleling will operate. This is the minimum Number of Redundant Modules that the system will allow before bringing one or more modules back to normal operation and terminating Intelligent Paralleling.

- Min: 0; Max: Number of Modules - 1; Iteration: 1
- Default: 1

Maximum Time Module In Standby—Permits cycling a module that has had Intelligent Paralleling active the longest with another module currently in normal operation after the selected amount of time. After the cycle is successful, the new module that has had Intelligent Paralleling active the longest will go into standby mode. Disable this feature by selecting 0 days.

- Min: 0 Days; Max: 30 Days; Iteration: 1 Day
- Default: 30 Days

Shutdown Delay—Permits choosing how long a module should wait before Intelligent Paralleling is active and module is in standby.

- Min: 5 minutes; Max: 60 minutes; Iteration 1 minute
- Default: 5 minutes



#### NOTE

*These are global settings. The settings only have to be configured from one module.*

**Figure 26** Intelligent Paralleling settings

Intelligent Paralleling Operation

En Dis

Mode of Operation

Disconnect Idle

☐ Minimum System Redundancy 0

☐ Shutdown Delay (minutes) 8

☐ Maximum Time Module In Standby (days) 12

Save Cancel

### 3.6.2 Intelligent Paralleling Target Area

The Intelligent Paralleling Target Area is the Number of Redundant Modules that fall between the Minimum System Redundancy setting and the internal Maximum System Redundancy (Minimum System Redundancy + 1.25).

- The Maximum Number of Redundant modules is designed to provide hysteresis so that modules are not started and stopped when the load oscillates a few percentage points.
- When the Number of Redundant Modules goes above the Target Area, the system puts one or more modules into standby operation until the Number of Redundant Modules is inside the Target Area.
- When the Number of Redundant Modules goes below the Target Area, the system puts one or more modules back into normal operation until the Number of Redundant Modules is inside the Target Area or all available modules are supporting the load.

### 3.6.3 Conditions to Activate Intelligent Paralleling

All of the following conditions must be true for the system to activate Intelligent Paralleling

- Intelligent Paralleling is enabled.
- The Number of Redundant Modules is above the Intelligent Paralleling Target Area for longer than the Shutdown Delay setting.
- The Critical Load is on UPS.
- The module is part of the collective.
- No modules are on DC source.
- The module is selected as the next module to activate Intelligent Paralleling.
- Input Contact Interface 2 (Channel 7) event is not active

### 3.6.4 Conditions to Suspend Intelligent Paralleling

#### Suspend Intelligent Paralleling for a Module

At least one of the conditions below must be true for the module to terminate Intelligent Paralleling at a module and return the module to normal operation:

- Intelligent Paralleling is disabled.
- The Number of Redundant Modules is below the Intelligent Paralleling Target Area.
- One or more modules is on DC source.
- Module is removed or user has issued a UPS/System shutdown.
- All Module Termination is initiated.
- Maximum Time Module In Standby has expired.
- Inhibit IP Standby (Input Contact Interface 2, Channel 7) event active.

#### Suspend Intelligent Paralleling for the system

Any of the following conditions will terminate Intelligent Paralleling and place all modules in normal operation:

- All modules transfer to bypass
- System overload
- One or more modules go on DC source

### 3.6.5 Intelligent Paralleling Module Selection

#### Intelligent Paralleling Module Activation

The next module chosen to activate Intelligent Paralleling and put into standby operation will be done by cycling through the Module Numbers, starting with Module 1.

- The module chosen to be next must be a part of the collective (load on UPS). Otherwise, this module will be skipped.
- When the last Module Number is chosen, the next module will be Module 1 (start cycle over).

#### Intelligent Paralleling Module Termination

The next module chosen to terminate Intelligent Paralleling normally and put back into normal operation will be done by selecting the module that has had Intelligent Paralleling active the longest.

### 3.6.6 Module Standby Rotation

Module Standby Rotation will limit the time a module is in standby operation when the Number of Redundant Modules doesn't change for a long period.

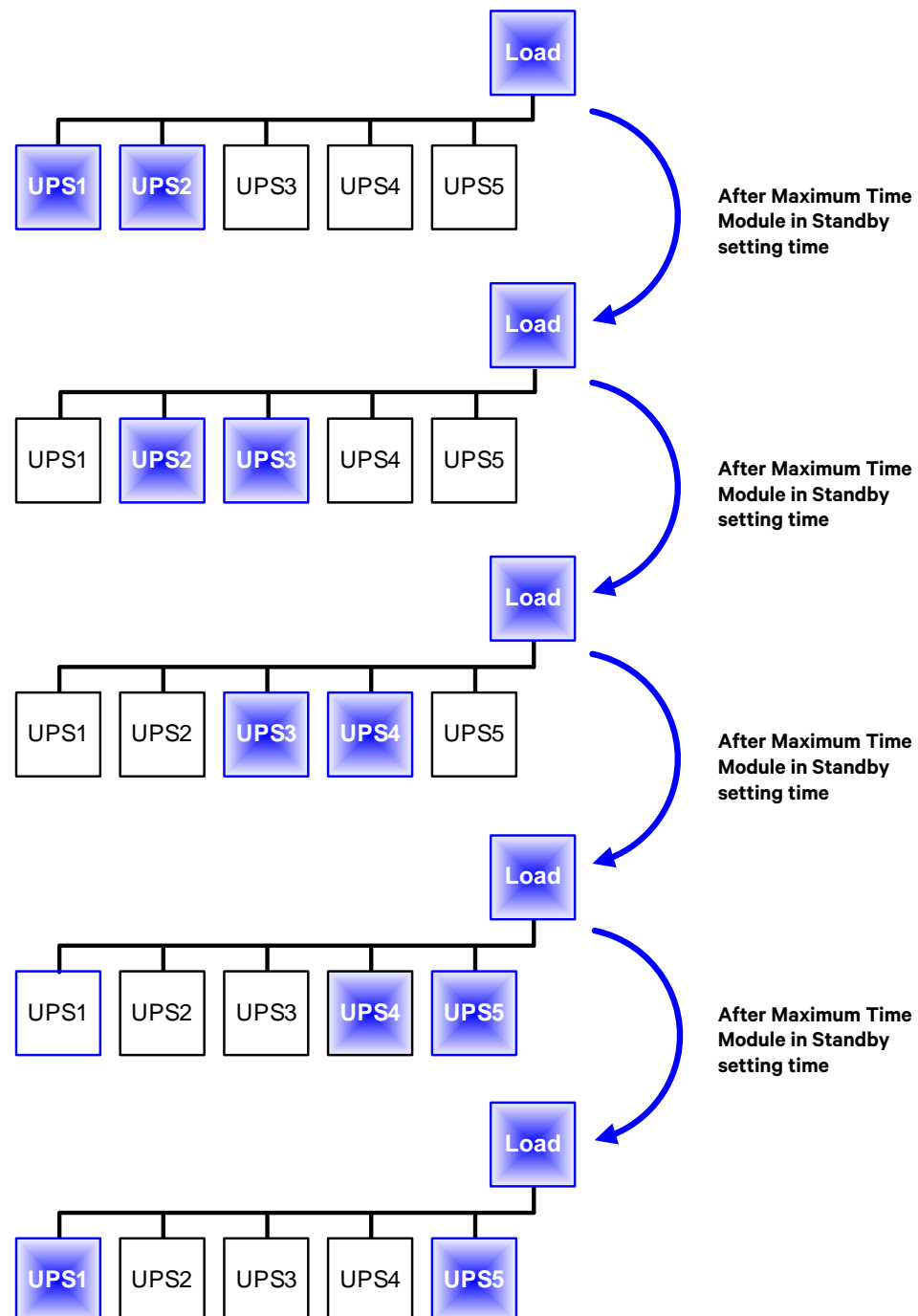
- The module selected as the next to terminate Intelligent Paralleling per Module Selection - Termination, (see **Intelligent Paralleling Module Termination on page 30**), will not be in standby operation for longer than Maximum Time Module In Standby (see **3.6.1 - Intelligent Paralleling Setup**).
- When this time expires, the module will terminate Intelligent Paralleling and come back online.
- The next module selected to activate Intelligent Paralleling will be put into standby operation.



#### NOTE

*When Maximum Time Module In Standby setting is 0, Module Standby Rotation is disabled.*

Figure 27 Module standby rotation



## 4.0 MAINTENANCE

### 4.1 SAFETY PRECAUTIONS

Observe all safety precautions in this manual.



#### NOTE

*Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.*

Observe ALL of the WARNINGS below before performing ANY maintenance on the UPS System and associated equipment. Also observe the manufacturer's safety precautions pertaining to the DC source, along with the DC source safety precautions in this section.



### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

Extreme caution is required when performing maintenance.

Be constantly aware that the UPS system contains high DC as well as AC voltages. With input power off and the DC source disconnected, high voltage at filter capacitors and power circuits should be discharged within 5 minutes. However, if a power circuit failure has occurred, you should assume that high voltage may still exist after shutdown. Check with a voltmeter before making contact.

AC voltage will remain on the bypass and output circuit breakers and the static bypass switch, unless associated external circuit breakers are opened.

Check for voltage with both AC and DC voltmeters prior to making contact.

When the UPS system is under power, both the operator and any test equipment must be isolated from direct contact with earth ground and the UPS chassis frame by using rubber mats.

Some components within the cabinets are not connected to chassis ground.

Any contact between floating circuits and the chassis is a lethal shock hazard. Use differential oscilloscopes when measuring a floating circuit.

Exercise caution that the test instrument exterior does not make contact, either physically or electrically, with earth ground.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or others approved for use in fighting electrical fires.



### WARNING

Risk of electrical shock and high short circuit current. Can cause equipment damage, personal injury and death.

Always identify connecting wiring prior to disconnecting any wiring.

Do not substitute parts except as authorized by Vertiv.

Maintain the UPS cabinets free of foreign materials such as solder, wire cuttings, etc.

Contact Liebert Services if you are not sure of the procedures to follow or if you are not familiar with the circuitry.

## 4.2 LIEBERT SERVICES

Startup, UPS maintenance, DC source maintenance and training programs are available for the Liebert NXL UPS through your Vertiv sales representative.

### 4.2.1 Professional Startup

**UPS Startup**—Liebert's Customer Engineers perform a thorough non-powered inspection of the units and will then conduct a complete electrical checkout. The DC source installation is also inspected and placed on an initialization charge to ensure cell equalization. Customer Operation training will be conducted during DC source charge time.

Load bank testing and full site acceptance testing are additional services that can be performed during a UPS startup. One preventive maintenance service call can be added to the initial UPS startup agreement.

**Battery Installation/Startup**—When purchased with a UPS Startup, this Agreement provides consistent, professional service for your entire UPS system. This one-source approach avoids conflicts that may occur during a multisource installation. Note that Vertiv requires a mandatory installation inspection for all batteries not installed by Liebert Customer Engineers.

**Battery IEEE Certification Inspection**—The Battery Specialist will perform a detailed inspection of the entire battery system to ensure it meets current IEEE standards.

### Maintenance Agreements: The Signature Program

**UPS Service Agreements**—Liebert Services (LGS) has a variety of available maintenance agreements, depending on specific site needs. Choose the level of support appropriate for each installation.

Mission-critical sites can have the standard parts-and-labor, around-the-clock coverage for their UPS, with or without scheduled preventive maintenance visits. Other sites can benefit from a variety of money-saving options.

Vertiv recommends two preventive maintenance visits per year for the UPS. The first can be conducted with the UPS operational and includes an infrared scan of key UPS components.

The annual visit will require taking the UPS off-line for a thorough non-powered inspection.

These visits are in addition to the general housekeeping tasks (changing air filters, etc.) that can be performed by customer personnel.

**Battery Service Agreements**—The same flexible Signature Program can also be applied to contracts for battery maintenance. Again, the coverage needed will depend on the type of battery purchased and the degree of support required from Liebert Services.

### Training

Customer training courses include the proper operation of the system, emergency procedures, preventive maintenance and some corrective maintenance.

### Warranties

Contact Liebert Services if you have any questions regarding the warranty on your Liebert NXL UPS or the batteries.



## 4.3 ROUTINE MAINTENANCE

You should become thoroughly familiar with the equipment, but at no time should you go beyond the specific procedures in this manual while performing maintenance or correcting a malfunction.

If you have any doubt as to what must be done, call Liebert Services at 1-800-LIEBERT for further instructions.



### NOTE

*Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations as well as with manufacturers' specifications.*

The UPS is designed for unattended operation, but does require some common-sense maintenance.

- Keep good records—Troubleshooting is easier if you have historical background.
- Keep it clean—Maintain the UPS free of dust and any moisture.
- Keep it cool—Battery systems must be kept in the range of 72-77°F (22-26°C) in order to meet design specifications for capacity and longevity.

The UPS will reliably meet all performance specifications and design life at temperatures up to 104°F (40°C). However, performance and longevity will be optimized when the UPS is operated at the same temperature as the batteries. Contact your local Vertiv sales representative or call 1-800-LIEBERT for further details.

- Keep connections tight—Tighten all connections at installation and at least annually thereafter.
- Keep it inspected—Periodically inspect external upstream and downstream circuit breakers to assure that the trip current settings are correct.

Become familiar with typical ambient conditions surrounding equipment so that abnormal conditions may be more quickly recognized. Know what typical meter readings are and where adjustable settings should be.

### 4.3.1 Record Log

Set up a maintenance log to record scheduled checks and any abnormal conditions.

The log should have space for all metered parameter indications including phase readings, alarm messages, UPS mode of operation, air filter replacement date and observation notes. A second log should be maintained for the DC source as directed by the DC source manufacturer.

A periodic walk-through inspection of the UPS and DC source rooms is advised to check for visible and audible indications of problems. Log the inspection, metered parameter indications and any discrepancies.

### 4.3.2 Air Filters

The air filters must be inspected and serviced on a regular schedule. The period between inspections will depend upon environmental conditions. Under normal conditions, the air filters will require cleaning or replacement approximately every two months. Abnormal or dusty conditions will require more-frequent cleaning and replacement of air filters. Inspect installations in new buildings more often, then extend the inspection period as experience dictates.

All NXL models have a replaceable air filter located inside the front doors. These filters can be changed while the UPS is in operation.

### 4.3.3 Limited Life Components

The Liebert NXL UPS has a design life well in excess of 10 years. Well-maintained units can continue to provide economic benefits for 20 years or more. Long-life components are used in the UPS wherever practical and cost-effective. However, due to the currently available component material, manufacturing technology limitations and the general function and use of the component, a few components in your Liebert UPS will have a shorter life cycle and require replacement in less than 10 years.

The following components utilized in your UPS system have a limited life cycle and are specifically exempt from warranty. To prevent a wear-out failure of one of these components affecting your critical load operations, Liebert recommends these components be periodically inspected and replaced before the expected expiration of their life cycle. The expected life of each component listed below is simply an estimate and is not a guarantee. Individual users may have site-specific requirements, maintenance and other environmental conditions that affect the length of the component's useful life cycle.

**Table 5 UPS component service life**

Component	Expected Life	Replace in:
Power AC filter capacitors	> 7 years (~62,000 hours)	5 to 6 years
Power DC filter capacitors	> 7 years (~62,000 hours)	5 to 6 years
Low-profile fans	> 7 years (~62,000 hours)	5 to 6 years
Air filters	1 to 3 years	Check four times per year
Battery, lithium logic memory backup	10 years (~87,600 hours)	8 to 9 years
Battery, storage		
Lead-acid wet-cell (user selection)	10 to 20 years	1 to 2 years before end-of-life
Valve-regulated, lead-acid (VRLA)	5 years	3 to 4 years
	10 years	6 to 8 years

In most cases, replacement components must exactly match the original component specifications. These replacement components are not readily available from third-party component distributors. For assistance with your specific component specifications, replacement component selection and sourcing, call 1-800-LIEBERT. For customers using Liebert Services' preventive maintenance services, periodic inspection of these components is part of this service, as well as recommending component replacement intervals to customers to avoid unanticipated interruptions in critical load operations.

## 4.4 DETECTING TROUBLE

It is important that the operator check the instrument readings if abnormal equipment performance is suspected. Any metered value that differs appreciably from normal could mean an impending malfunction and should be investigated.

Items to check include:

- If the UPS has not operated on battery power during the last 10 hours, the batteries should require little charging current. Battery mimic should indicate normal DC voltage with the battery charge current no more than 1% of maximum discharge current.
- Input current on each phase should be within 10% of the average input current.
- Alarm messages indicate malfunction or impending malfunction. A daily check of the Display Screen will help to provide an early detection of problems. Refer to **Table 6** for information about interpreting alarm messages.
- Tracing a problem to a particular section is facilitated by alarm messages and the metered parameter indications.

### NOTICE

If the UPS system has an open fuse, the cause should be determined before replacing the fuse.  
Contact Liebert Services for assistance.

## 4.5 REPORTING A PROBLEM

If a problem occurs within the UPS, review all alarm messages along with other pertinent data. Contact Liebert Services at 1-800-LIEBERT to report a problem or to request assistance.

## 4.6 CORRECTIVE ACTIONS

The recommended corrective action for each alarm message on the Display Screen is in **Table 6**.

## 4.7 UPSTREAM FEEDER CIRCUIT BREAKER SETTING INSPECTIONS

During normal UPS operations, short-term overload current demand from the bypass source may reach 10 times the UPS output current rating. This overload current demand may be caused by the magnetizing inrush current of one or more downstream transformers (i.e., power distribution units) or faults on downstream branch circuits. The instantaneous trip point(s) of the upstream bypass feeder breaker(s) must be set to support these temporary overloads. The magnitude of short-term overload bypass current demand is typically six to eight times the UPS current rating, but must be determined by analysis on a per-site basis. This analysis, generally known as an End-to-End Fault Coordination Study, must be done by a registered professional engineer experienced in this activity and familiar with local codes and related requirements.

Vertiv strongly recommends periodic inspections of the bypass feeder breaker instantaneous trip settings, as well as the module input (rectifier) feeder breaker trip settings, to ensure that they are correct. For a variety of reasons, although typically during circuit breaker maintenance procedures by others, trip settings have been known to be inadvertently left improperly set. Correct trip setting of these circuit breakers is most important to achieving high-availability from your Liebert UPS system. For further information regarding proper trip settings for your feeder breakers, call 1-800-LIEBERT.



### NOTE

*The instantaneous trip setting of the breaker feeding the UPS bypass input should be high enough to accommodate short-duration overloads. The bypass static switch power path inside the UPS can draw up to 10 times the system's rated current for up to three cycles.*



### NOTE

*While Vertiv can provide typical guidelines, the responsibility for the proper breaker trip settings outside the Vertiv-manufactured UPS equipment resides with the owner. Contact Liebert Services at 1-800-LIEBERT for further details.*

## **DISCLOSURES WITH REGARD TO EMBEDDED SOFTWARE LICENSED FROM NOKIA, INC., (“SUBLICENSED SOFTWARE”)**

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# APPENDIX A - UPS ALARM AND STATUS MESSAGES

**Table 6** shows alarm and status messages as they appear in the Liebert NXL's touchscreen and in the history log, along with a description and recommended actions, if any.

If the recommended action fails to correct the condition, contact your factory-authorized service provider.

The "Service Telephone Number" can be found by pressing "CONFIG," "Ratings," "More>>" on the menu bar.



## NOTE

*In Event log, take the number for the "Data" Column. Convert that number from Decimal to Hex. Each digit will explain the reason for the Inhibit signals.*

*Example: Data = 512d =0200h->"Removing Module will cause Overload or Drop the Load"*

**Table 6** Liebert NXL alarm and status messages

Event Message	Event Definition	Recommended Action
Auto Rexfer Failed	The condition that caused the system to automatically disconnect the inverter from the critical bus has failed to clear within a specified time delay. An example of a recoverable condition (one which the controls may attempt to recover from automatically) is an overload that exceeded the overload capability.	Press "SILENCE" to silence the audible alarm. Press "RESET" to attempt to clear active events. This does not clear the "Auto Retransfer Failed" alarm. If all other alarm conditions are clear, for a single module system attempt a manual transfer to Inverter by pressing "Transfer," "UPS." For a multi-module system attempt to manually reconnect this inverter by pressing "Transfer," "Connect This Inverter." If successful, press "RESET" to clear this alarm from the Active Event Window. If the UPS fails connect the inverter to the critical bus and the active messages do not explain the reason, contact your factory-authorized service provider.
BFB Open	The Backfeed Breaker is open. The Backfeed Breaker feeds the Static Bypass Switch (BPSS). The physical location of the breaker depends on unit configuration. It may be located in the UPS, or it may be located external to the UPS. The purpose of the Backfeed Breaker is to prevent leakage current through the bypass circuit during an outage. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	This status message is informational. If the breaker was not opened intentionally, or if the breaker is actually closed and this message is active, contact your factory-authorized service provider.
BPSS is On	The Bypass Static Switch is On.	
BPSS Ovld Exceeded	The Bypass Static Switch (BPSS) was turned Off due to an extended overload. While the BPSS can sustain an overload greater than the Inverter and for a longer period of time, there are still limits on the amplitude and duration of overload that the BPSS can handle. This alarm indicates the overload was greater in amplitude and time than the BPSS can handle, and therefore shut Off to prevent damage to the equipment.	Press "SILENCE" to silence the audible alarm. Once the overload source is isolated, restart the UPS by pressing "Startup," "Manual Start" and follow the prompts. If the overload condition does not clear, or the overload is cleared but the UPS does not restart, contact your factory-authorized service provider.
BPSS Start Inhibit	When starting the module BPSS's in a 1+N system without a MBB, there are not enough module BPSS's ready with their MOB closed to support the rated capacity. This alarm is a latching alarm that must be cleared at each module after enough Bypass Static Switches are available to support the system load.	Press "SILENCE" to silence the audible alarm. Contact your factory-authorized service provider if there are enough Bypass Static Switches available to support the existing system load.
BPSS Unable	A problem has been detected in the Bypass Static Switch.	Press "SILENCE" to silence the audible alarm. Press "RESET" to attempt to clear the fault. Contact your factory-authorized service provider.

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Breaker Close Fail	This is a summary event that informs the user that a circuit breaker that was either signaled to close or was manually closed failed to report a closed status. The Breaker Close Fail event indicates a mismatch between the expected state of a breaker and the reported state of the breaker.	Press "SILENCE" to silence the audible alarm. Check the One-Line Display and the Active Event Window to determine which breaker or switch is open. If the open breaker cannot be reset or closed, or if all breakers are closed but the One-Line Display does not agree, or the alarm cannot be cleared, contact your factory-authorized service provider.
Breaker Open Fail	This is a summary event that informs the user a circuit breaker that was either signaled to open or was manually opened failed to report an open status. The Breaker Open Fail event indicates a mismatch between the expected state of a breaker and the reported state of the breaker.	Press "SILENCE" to silence the audible alarm. Check the One-Line Display and the Active Event Window to determine which breaker or switch that should be open is still closed. If a breaker that should be open shows closed, or if the breaker in question actually is open but the fault is still present, attempt to clear the fault by pressing "RESET." If the event does not reset, contact your factory-authorized service provider.
Byp Overload Ph A	The critical load is greater than 110% while the UPS is on bypass. The controls may shut the unit down if the overload condition does not clear within the allotted time. Allotted time is variable, and is inversely proportional to the amplitude of the overload, i.e., the greater the amplitude of the overload, the less time the unit continues to support the load. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Observe the calculated load percentage on A phase displayed on the Module Output Meter. If the A phase steady state load percentage exceeds 110%, perform the following: If Maintenance Bypass is available, follow Standard Operating Procedures to transfer the load to Maintenance Bypass. Investigate the overload condition. If the Module Output Meter does not indicate an overload condition, perform the previous steps and contact your factory-authorized service provider.
Byp Overload Ph B	The critical load is greater than 110% while the UPS is on bypass. The controls may shut the unit down if the overload condition does not clear within the allotted time. Allotted time is variable, and is inversely proportional to the amplitude of the overload, i.e., the greater the amplitude of the overload, the less time the unit continues to support the load. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Observe the calculated load percentage on B phase displayed on the Module Output Meter. If the B phase steady state load percentage exceeds 110%, perform the following: If Maintenance Bypass is available, follow Standard Operating Procedures to transfer the load to Maintenance Bypass. Investigate the overload condition. If the Module Output Meter does not indicate an overload condition, perform the previous steps and contact your factory-authorized service provider.
Byp Overload Ph C	The critical load is greater than 110% while the UPS is on bypass. The controls may shut the unit down if the overload condition does not clear within the allotted time. Allotted time is variable, and is inversely proportional to the amplitude of the overload, i.e., the greater the amplitude of the overload, the less time the unit continues to support the load. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Observe the calculated load percentage on C phase displayed on the Module Output Meter. If the C phase steady state load percentage exceeds 110%, perform the following: If Maintenance Bypass is available, follow Standard Operating Procedures to transfer the load to Maintenance Bypass. Investigate the overload condition. If the Module Output Meter does not indicate an overload condition, perform the previous steps and contact your factory-authorized service provider.
Bypass Breaker (SBB) Open	The bypass circuit breaker indicates that it is in the open position.	

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Bypass Not Avail	<p>This summary event indicates a problem with the detected bypass voltage. If bypass is not available, transfers to bypass are disabled.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Observe the One-Line Display. The bypass power line feeding the static switch is green when bypass power is within normal operating range. If the line feeding the static switch is orange, gray, or black, bypass voltage is out of tolerance. Also check the bypass voltage readings on the Bypass Meter.</p> <p>When the bypass returns to normal, this alarm clears automatically. If all indications checked above are normal and the alarm is still present, contact your factory-authorized service provider.</p> <p>If there is a problem indicated with the bypass voltage, investigate and resolve the issue. Examples of conditions which could cause this alarm: Unstable generator voltage; or, Bypass Feeder Breaker tripped.</p>
Bypass OF/UF	<p>The bypass frequency has exceeded the bypass frequency limit of <math>\pm 5</math> Hz of nominal. If this alarm is active, transfers to bypass are disabled.</p> <p>This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Check the frequency on the Bypass Meter. If the frequency is outside the synchronization range, investigate and resolve the issue.</p> <p>This alarm is commonly the result of an uncalibrated generator, or power anomalies on the utility feed. Check bypass power for nominal limits.</p> <p>If bypass frequency appears normal, contact your factory-authorized service provider.</p>
Controller Error	<p>This is a summary event that indicates a DSP communication error.</p> <p>The Controller Error event is a fault condition that indicates a loss of communications in the controls.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to attempt to reset the fault.</p> <p>Contact your factory-authorized service provider</p>
Controls Comm Fail	<p>The Controls Communication Failure event indicates a loss of communications between the Controls and Human Machine Interface (HMI).</p> <p>The Controls Communication Failure event is displayed when the HMI detects a loss of communication with Controls on the Controller Area Network (CAN).</p> <p>An infrequent occurrence that resets immediately is probably not serious.</p>	<p>If the alarm does not clear, or if the alarm condition returns, contact your factory-authorized service provider.</p>
Controls Reset Required	<p>This alarm means one or more critical settings have been changed by user during UPS operation.</p> <p>The change(s) will not take effect until after a UPS Controls reset. This operation should only be performed by an authorized service personnel.</p> <p>This alarm is cleared after UPS Controls reset.</p>	<p>Press "SILENCE" to silence the audible alarm.</p>
ECO Mode Active	<p>This event indicates that ECO Mode operation is active.</p> <p>The ECO Mode feature improves the overall efficiency of the UPS system by powering the critical bus from the bypass static switch instead of the inverter. If the critical bus goes out of tolerance (voltage, frequency or slew rate), the BPSS is turned Off and the inverter quickly assumes powering the critical bus. The inverter is always ready to take the load in the event that the bypass source fails.</p> <p>The user has the ability to start and stop ECO Mode manually via the user interface or automatically based on a user-defined schedule.</p>	<p>Under normal circumstances, none.</p> <p>Perform ECO Mode setup and operation by pressing "CONFIG," "User Settings," "ECO Mode" from the Menu Bar. ECO Mode can be manually controlled under the "Operation" submenu, or configured to run automatically under the "Schedule" submenu.</p> <p>If this message is active, and there is no clear reason why the UPS is in ECO Mode, contact your factory-authorized service provider.</p>

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
ECO Mode Suspended	<p>This event indicates that ECO Mode operation is suspended.</p> <p>When the ECO Mode feature is enabled and active, the UPS system powers the critical bus from the bypass static switch instead of the inverter. But if the critical bus goes out of tolerance (voltage, frequency or slew rate), ECO mode is temporarily suspended (or "inhibited.") The BPSS is turned Off and the inverter quickly assumes powering the critical bus.</p>	<p>Under normal circumstances, none.</p> <p>Typically ECO Mode operation will resume soon after the bypass source becomes qualified again, unless the ECO Mode session is terminated due to a manual or scheduled 'Stop' command or if excessive ECO Mode suspensions occur.</p> <p>Perform ECO Mode setup and operation by pressing "CONFIG," "User Settings," "ECO Mode" from the Menu Bar. ECO Mode can be configured via the "Settings" submenu and manually controlled under the "Operation" submenu.</p> <p>If this message is active, and there is no clear reason why ECO Mode is inhibited, contact your factory-authorized service provider.</p>
EMO Shutdown	<p>An Emergency Module Off (EMO) command has been detected.</p> <p>The EMO signal means the front panel EMO button was pressed. A Remote EMO would display the "REMO Shutdown" alarm.</p> <p>In response to an EMO, the UPS transfers to Bypass and shuts Off.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Resolve the issue that precipitated the EMO.</p> <p>For safety, the UPS latches an EPO event. To clear the latch, press the EMO Reset push button on the External Interface Board (EIB).</p> <p>Verify the EMO is cleared by pressing "RESET" and observing that the EPO alarm in the Active Event Window is gone.</p> <p>Restart the UPS by pressing "Startup," "Manual Start," and follow the prompts.</p>
EPO Shutdown	<p>The UPS shuts down in response to an active Emergency Power Off (EPO) command.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Resolve the issue that precipitated the EPO.</p> <p>For safety, the UPS latches an EPO event. There are two ways to clear the latch:</p> <ol style="list-style-type: none"> <li>1. Press the EPO Reset push button on the External Interface Board (EIB).</li> <li>2. From HMI front panel display, press OK button when "Press OK to Reset EPO Latched signal" message is displayed in a dialog box.</li> </ol> <p>Verify the EPO is cleared by observing the EPO alarm in the Active Event Window is gone.</p> <p>Restart the UPS by pressing "Startup," "Manual Start," and follow the prompts.</p>
Equip Ovttemp	<p>This summary event indicates the UPS is nearing an over temperature condition. Depending on which sensor is reporting the high temperature, the UPS may do one of three things once the limit is reached: shut down, transfer to bypass, or transfer to battery operation. This is a potentially serious event.</p>	<p>Investigate possible causes for a rising temperature condition, such as loss of air conditioning, airflow obstructions, etc. If the ambient temperature is high due to loss of air conditioning and cannot be addressed immediately, perform the following:</p> <p>Press "Transfer," "Bypass" to transfer the UPS to bypass.</p> <p>Press "SILENCE" to silence the audible alarm.</p> <p>Wait at least 15 minutes, then attempt to reset the alarm by pressing "RESET."</p> <p>If the alarm clears and proper cooling has been restored to the UPS, press "Transfer," "UPS" to transfer back to UPS.</p> <p>If this alarm is present and no external factors are affecting proper cooling of the UPS, contact your factory-authorized service provider.</p>



**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Equip Ovtemp Limit	<p>This summary event occurs when one or more internal temperatures have exceeded the maximum temperature setpoint. This is the second of two over temperature alarms. The first, "Equipment Overtemperature Warning," sets when the detected temperature is near the limit.</p> <p>The controls react to this condition in various ways, depending on which sensor is reporting the over temperature condition.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Check the One-Line Display for system status:</p> <p>UPS Off</p> <p>If external Maintenance Bypass is available, close the Maintenance Bypass Breaker (MBB) to restore power to the load. Do not attempt to restart the UPS without first contacting your factory-authorized service provider.</p> <p>UPS On Bypass</p> <p>Verify the bypass line is green. If it is not, contact your factory-authorized service provider immediately and prepare to shut down the load.</p> <p>If external Maintenance Bypass is available, close the Maintenance Bypass Breaker (MBB) to place the load on Maintenance Bypass. Do not attempt to re-transfer to UPS without first contacting your factory-authorized service provider.</p> <p>UPS On Battery</p> <p>Verify the bypass line is green. If it is not, contact your factory-authorized service provider immediately and prepare to shut down the load.</p> <p>If the bypass line is green, press "Transfer", "Bypass," to transfer the load to bypass.</p> <p>If external Maintenance Bypass is available, close the MBB to place the load on Maintenance Bypass. If external Maintenance Bypass is not available, shut down the UPS by pressing "Shutdown," "UPS" and contact your factory-authorized service provider.</p>
Excess Auto Rexfers	<p>The UPS has tried to reconnect the inverter to the critical bus too many times. For a single module system, the load will be on the bypass static switch. For multi-module systems the load will be supported by the other modules.</p> <p>The UPS will attempt to automatically recover and reconnect the Inverter to the critical bus, if the reason that caused it to disconnect has cleared and the event is recoverable; for example, a temporary overload.</p> <p>The number of times the UPS attempts to recover is limited. When the number of attempts exceed the allowable number (default is 5 attempts per hour), the inverter will remain disconnected from the critical bus and this event will be displayed.</p> <p>An example of a condition that could cause this alarm is a cycling load on the UPS where the peak load exceeds the overload capability. If the cycling load exceeds the overload capability for more than the allowable number, the UPS will have to be put online manually by selecting "Transfer," "UPS."</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to clear any active faults or alarms.</p> <p>Provided there are no alarms or faults still present that could prevent a transfer, press "Transfer," "UPS," to reconnect the Inverter to the critical bus.</p> <p>If successful, press "RESET" to clear the alarm. Otherwise, contact your factory-authorized service provider.</p>
Excess ECO Suspends	<p>This event indicates that ECO Mode operation has been terminated due to an excessive number of suspensions.</p> <p>When the ECO Mode feature is enabled and active, the UPS system powers the critical bus from the bypass static switch instead of the inverter. But if the critical bus goes out of tolerance (voltage, frequency or slew rate), ECO mode is temporarily inhibited (or "suspended.") This event is generated when ECO mode is repeatedly suspended and exceeds the user setting for the maximum number of automatic suspensions allowed.</p>	<p>This event will clear the next time ECO Mode is initiated by a manual or scheduled 'start' command.</p> <p>Perform ECO Mode setup and operation by pressing "CONFIG," "User Settings," "ECO Mode" from the Menu Bar. ECO Mode can be configured via the "Settings" submenu and manually controlled under the "Operation" submenu.</p> <p>If this message is active, and there is no clear reason why excessive ECO Mode suspensions are occurring, contact your factory-authorized service provider.</p>

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Excess Paralleling	When the controls detect a high amplitude, short duration overload condition on the output, the static switch is turned on momentarily in parallel with the Inverter to attempt to clear the condition. If the fault clears, the controls turn Off the static switch and the load remains on Inverter. This fault condition indicates the UPS pulse paralleled too many times and is now locked on bypass (auto re-transfers to Inverter are inhibited).	Press "SILENCE" to silence the audible alarm. Check the Module Output Meter and verify the output currents are normal, the kVA/kW percentages are less than 100%, and the Rexfer Time out is 00:00. Verify the Inverter box on the One-Line Display is green. Investigate any other active alarms or faults before attempting to clear this fault. Press "RESET" to clear the fault. If the Event Window is clear, press "Transfer," "UPS" to transfer the load back to Inverter. If the "UPS" button is grayed out, or pressing the "UPS" button does not transfer the unit back to Inverter, or if the UPS immediately transfers back to bypass, contact your factory-authorized service provider.
Fuse Fail	This is a summary event that indicates a fuse has opened. There are several fuses that can cause this fault. The Fuse Failure event is caused by one or more fuses reporting a failed status. The UPS may or may not transfer to bypass as a result of the failed fuse.	Press "SILENCE" to silence the audible alarm. Check the One-Line Display and other indicators to determine the state of the unit and take appropriate action. Contact your factory-authorized service provider.
Inlet Ovttemp	The air flowing into the UPS is too warm. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check the Inlet Air Temperature on the One-Line Display and verify the reading is accurate, i.e. is the room temperature warmer than normal? If the room temperature is warmer than normal, investigate and resolve the issue. If the room temperature is normal, and the Inlet Air Temp reading on the One-Line Display is higher than normal, contact your factory-authorized service provider.
Input Contact "XY"	The displayed text for this alarm depends on settings. In response to this alarm, the user may see any of four possible messages: No message at all, but the help icon is present; A custom message programmed by the user; "Input Contact XY" if the contact is unconfigured; "Stop Batt Charge" if the contact is programmed as Pre-assigned. If this event is active, an external signal is wired into channel Y of Input Contact Isolator #X. If the display shows Case 1 above (blank message), it means the contact channel is set to default but the default message was erased. If the display shows Case 2, the user-programmed event is active and the displayed text is customer defined. If the display shows Case 3, the contact is active but was not pre-programmed (default condition). If the display shows Case 4, the controls disable Battery charging operation. This alarm message is self-clearing. When the condition is no longer present, the message and any control activity tied to the alarm will revert to normal.	Check the wires landed on Input Contact Isolator #X. If this signal is not active, or if no signal wires are present, contact your factory-authorized service provider.
Internal Comm Error	This is a summary event caused by an interruption in communication between the controls and a device on the Controller Area Network (CAN). The Internal Communication Error event indicates a loss of communications between the controls and an external device. The Internal Communication Error is displayed when the controls detect a loss of communication to a device on the Controller Area Network (CAN). An infrequent occurrence that resets immediately is probably not serious.	Press "SILENCE" to silence the audible alarm. Press "RESET" to clear the alarm. If the alarm cannot be reset, or if the alarm condition returns, contact your factory-authorized service provider.

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
LBS Active - Master	This UPS system has been enabled as the functional Master Load Bus Synchronization (LBS) system. The functional Master is sending the LBS sync pulse. This status message is self-clearing when the LBS is disabled or this system is no longer selected as the LBS Master. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Under normal circumstances, none. If this message is active, and there is no clear reason why the LBS circuit should be active, contact your factory-authorized service provider
LBS Inhibited	With LBS operation enabled, conditions required to allow LBS operation are not met. Voltage or Frequency differences sensed by the LBS control are preventing the ability of LBS to function correctly. This alarm is self-clearing. When the condition is no longer present, the alarm and any control activity tied to the alarm reverts to normal.	Press "SILENCE" to silence the audible alarm. Check both Systems and verify normal operation: Both Systems running online on inverter; Neither System in Maintenance Bypass; No Bypass, Input, or Synchronization errors present on either system. If the cause of the alarm cannot be determined by checking both Systems, contact your factory-authorized service provider.
Load Bank Breaker (LBB) Open	The load bank breaker indicates that it is in the open position.	
Load on Bypass	The load is being supplied by bypass.	
Load on Maint Byp	The load is on Maintenance Bypass	
Load on UPS	The load is being supplied by the Inverter	
Loss of Redundancy	The multi-module system has less than one redundant module online. The number of redundant modules is calculated by taking the number of modules online minus the numbers of modules of load, rounded down to the nearest whole number (i.e., 3 Modules Online - 1.75 Modules of Load = 1 redundant modules online). This is a "notification only" type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The alarm is self-clearing. The alarm condition can be permanently terminated by selecting NO in the Paralleling Modules selection of the Service Settings located in the configuration screen.	Press "SILENCE" to silence the audible alarm. Check the system load and verify that the system is non-redundant. To enable/disable the setting for the Loss of Redundancy you must select YES/NO (Enable/Disable) in the Paralleling Modules selection located in the User Settings of the Configuration screen. Press "Config.,....." "User Settings," "Paralleling Modules."
Loss of Sync Pulse	A module in a multi-module system has detected a loss of the sync pulse. The system shall change sync master in an attempt to correct the loss of sync pulse. If operating normally, the SCC always posts this event.	Press "SILENCE" to silence the audible alarm. Contact your factory-authorized service provider.

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Low Power Factor	<p>The output power factor is low.</p> <p>The output power factor is less than 70% leading or lagging. A simplified explanation of power factor is the ratio of energy being supplied to energy being used by the load. For a given load, the current output of the UPS goes up as power factor decreases.</p> <p>This results in the UPS output being derated.</p> <p>For example, study the following:</p> <p>Load = 100 kw @ 480V</p> <p>amps = <math>\text{kW} \times 1000 / \text{volts} \times \text{power factor} \times 1.73</math> (square root of 3)</p> <p><math>100\text{kW} \times 1000 = 100000</math></p> <p><math>480\text{V} \times 0.9\text{PF} \times 1.73 = 747.36</math></p> <p><math>100000 / 747.36 = 133.8\text{A}</math></p> <p>Now, replace the 0.9 power factor (typical computer load power factor) with 0.7 power factor:</p> <p><math>100\text{kW} \times 1000 = 100000</math></p> <p><math>480\text{V} \times 0.7\text{PF} \times 1.73 = 581.28</math></p> <p><math>100000 / 581.28 = 172\text{A}</math></p> <p>The load remains the same, but the current required to supply it is roughly 30% higher. The extra current is wasted energy that can result in nuisance trips of breakers, overheating of cables, and other unwanted conditions. The UPS cannot control the output power factor.</p> <p>This alarm is notification to the user that the load should be evaluated.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Evaluate the load on the UPS. For more information, contact your factory-authorized service provider</p>
Main Control Fault	<p>The UPS has transferred to Bypass due to a loss of communications with the Main Controller.</p> <p>All Transfers, Startup, Shutdown, and Metering screens are locked out.</p> <p>The Controls attempt to reestablish communications but will not return the load to inverter automatically</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Contact your factory-authorized service provider.</p> <p>If communications are reestablished, the One-Line Display will be restored; however, Liebert does not recommend attempting to return the load to inverter until a service visit has been made and action taken to determine why the fault occurred.</p> <p>Action will involve resetting the UPS controls by removing and then reapplying control power. Therefore, it will be necessary to utilize maintenance bypass by closing the optional external Maintenance Bypass Breaker (MBB).</p> <p>Liebert does not recommend the user, or operator, attempt this without first speaking with an authorized service associate from Liebert.</p>
Maintenance Bypass Breaker (MBB) Open	The maintenance bypass breaker indicates that it is in the open position	
Maintenance Isolation Breaker (MIB) Open	The maintenance isolation breaker indicates that it is in the open position.	

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action																																
Man Rexfer Inhibit	<p>This summary event means the conditions required to perform a manual transfer to Inverter (online) are not met (Inverter must be in sync with bypass).</p> <p>This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.</p>	<p>The condition clears from the Active Event Window when manual re-transfers are enabled.</p> <p>A possible reason for this condition is an unstable generator. If the generator frequency is not stable, or not at 60 Hz, the Inverter may have difficulty maintaining or acquiring synchronization with the bypass source.</p> <p>To check the synchronization of the Inverter to bypass, click “Transfer” and observe the synchroscope. A non-sync condition is indicated by a varying phase angle error, rather than a stable “0” degree indication.</p> <p>If the unit is not on generator, and the bypass voltage otherwise appears normal, contact your factory-authorized service provider.</p> <p>Parametric Data (Note 1)</p> <table><tr><th>Bit</th><th>Reason</th></tr><tr><td>0x0001</td><td>Transfer to UPS Inhibited Internally (SCR Open, SCR Shorted, MBB &amp; MIB Both Closed)</td></tr><tr><td>0x0002</td><td>Inverter not Ready (Inverter Walking In or Inverter not Qualified or Bypass not Synchronized)</td></tr><tr><td>0x0004</td><td>Pulse Parallel Active</td></tr><tr><td>0x0008</td><td>Bypass to Output Phase Error</td></tr><tr><td>0x0010</td><td>Critical Bus not Qualified</td></tr><tr><td>0x0020</td><td>Not Enough Inverters Available to Support the Load</td></tr><tr><td>0x0040</td><td>Phase Error Exceeds Manual Transfer Limit Setting</td></tr><tr><td>0x0100</td><td>Kirk Key Inserted</td></tr><tr><td>0x0200</td><td>BPSS Board has Failed</td></tr><tr><td>0x0400</td><td>MBB &amp; MIB Both Closed</td></tr><tr><td>0x0800</td><td>Bypass Sync Error</td></tr><tr><td>0x1000</td><td>Inverter not Qualified</td></tr><tr><td>0x2000</td><td>Inverter in Walkin</td></tr><tr><td>0x4000</td><td>Loss of Sync Pulse</td></tr><tr><td>0x8000</td><td>Critical Bus in Overload</td></tr></table>	Bit	Reason	0x0001	Transfer to UPS Inhibited Internally (SCR Open, SCR Shorted, MBB & MIB Both Closed)	0x0002	Inverter not Ready (Inverter Walking In or Inverter not Qualified or Bypass not Synchronized)	0x0004	Pulse Parallel Active	0x0008	Bypass to Output Phase Error	0x0010	Critical Bus not Qualified	0x0020	Not Enough Inverters Available to Support the Load	0x0040	Phase Error Exceeds Manual Transfer Limit Setting	0x0100	Kirk Key Inserted	0x0200	BPSS Board has Failed	0x0400	MBB & MIB Both Closed	0x0800	Bypass Sync Error	0x1000	Inverter not Qualified	0x2000	Inverter in Walkin	0x4000	Loss of Sync Pulse	0x8000	Critical Bus in Overload
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**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action																										
Manual Xfer Inhibit	<p>This summary event means the conditions required to perform a manual transfer to bypass are not met (Inverter must be in sync with bypass). This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.</p>	<p>The condition clears from the Active Event Window when manual transfers are enabled.</p> <p>A possible reason for this condition is an unstable generator. If the generator frequency is not stable, or not at 60 Hz, the Inverter may have difficulty maintaining synchronization with the bypass source.</p> <p>To check the synchronization of the Inverter to bypass, click “Transfer” and observe the synchroscope. A non-sync condition is indicated by a varying phase angle error, rather than a stable “0” degree indication.</p> <p>If the unit is not on generator, and the bypass voltage otherwise appears normal, contact your factory-authorized service provider.</p> <p>Parametric Data (Note 1)</p> <table><thead><tr><th>Bit</th><th>Reason</th></tr></thead><tbody><tr><td>0x0001</td><td>Bypass not Qualified</td></tr><tr><td>0x0002</td><td>Bypass to Output Phase Error</td></tr><tr><td>0x0004</td><td>Phase Error Exceeds Manual Transfer Limit Setting</td></tr><tr><td>0x0008</td><td>Voltage Exceeds Manual Transfer Limit Setting</td></tr><tr><td>0x0010</td><td>BFB is Open</td></tr><tr><td>0x0020</td><td>BPSS Board has Failed</td></tr><tr><td>0x0040</td><td>Bypass Sync Error</td></tr><tr><td>0x0080</td><td>Loss of Sync Pulse</td></tr><tr><td>0x0100</td><td>BPSS not Enabled</td></tr><tr><td>0x0200</td><td>Removing Module will cause Overload or Drop the Load</td></tr><tr><td>0x0400</td><td>CB2 Open</td></tr><tr><td>0x0800</td><td>MOB Open</td></tr></tbody></table>	Bit	Reason	0x0001	Bypass not Qualified	0x0002	Bypass to Output Phase Error	0x0004	Phase Error Exceeds Manual Transfer Limit Setting	0x0008	Voltage Exceeds Manual Transfer Limit Setting	0x0010	BFB is Open	0x0020	BPSS Board has Failed	0x0040	Bypass Sync Error	0x0080	Loss of Sync Pulse	0x0100	BPSS not Enabled	0x0200	Removing Module will cause Overload or Drop the Load	0x0400	CB2 Open	0x0800	MOB Open
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Max Load Alarm Ph A	<p>The user adjustable maximum load alarm threshold was exceeded. This is a “notification only” type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The setting allows the user to monitor the load status of the UPS. For example, if the current load on Phase A is 50%, the user can set this setpoint to 80% and an alarm is received if the added load exceeds 80%. The alarm may also be configured with a delay, to prevent nuisance alarms due to cycling loads. The alarm is self-clearing. Once the load level decreases to less than 95% of the level setting, the alarm clears.</p>	<p>Press “SILENCE” to silence the audible alarm.</p> <p>Check the kW load % displayed for A phase.</p> <p>To check the setpoint for the alarm, press “Config,” “User Settings,” “Adjustable Setpoints,” “Max Load Alarm.”</p> <p>Compare the setpoint to the displayed load percentage. If the load percentage displayed is correct and the value exceeds the setpoint, raise the setpoint to clear the alarm, or reduce the load below the setpoint.</p> <p>Contact your factory-authorized service provider.</p>																										
Max Load Alarm Ph B	<p>The user adjustable maximum load alarm threshold was exceeded. This is a “notification only” type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The setting allows the user to monitor the load status of the UPS. For example, if the current load on Phase B is 50%, the user can set this setpoint to 80% and an alarm is received if the added load exceeds 80%. The alarm may also be configured with a delay, to prevent nuisance alarms due to cycling loads. The alarm is self-clearing. Once the load level decreases to less than 95% of the level setting, the alarm clears.</p>	<p>Press “SILENCE” to silence the audible alarm.</p> <p>Check the kW load % displayed for B phase.</p> <p>To check the setpoint for the alarm, press “Config,” “User Settings,” “Adjustable Setpoints,” “Max Load Alarm.”</p> <p>Compare the setpoint to the displayed load percentage. If the load percentage displayed is correct and the value exceeds the setpoint, raise the setpoint to clear the alarm, or reduce the load below the setpoint.</p> <p>Contact your factory-authorized service provider.</p>																										

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Max Load Alarm Ph C	The user adjustable maximum load alarm threshold was exceeded. This is a “notification only” type alarm, meaning the UPS takes no action other than sounding an audible alarm based on this setpoint. The setting allows the user to monitor the load status of the UPS. For example, if the current load on Phase C is 50%, the user can set this setpoint to 80% and an alarm is received if the added load exceeds 80%. The alarm may also be configured with a delay, to prevent nuisance alarms due to cycling loads. The alarm is self-clearing. Once the load level decreases to less than 95% of the level setting, the alarm clears.	Press “SILENCE” to silence the audible alarm. Check the kW load % displayed for C phase. To check the setpoint for the alarm, press “Config,” “User Settings,” “Adjustable Setpoints,” “Max Load Alarm.” Compare the setpoint to the displayed load percentage. If the load percentage displayed is correct and the value exceeds the setpoint, raise the setpoint to clear the alarm, or reduce the load below the setpoint. Contact your factory-authorized service provider.
MMS Rexfer Inhibit	This summary event means the conditions required to perform a transfer to inverter are not met. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	The condition clears from the Active Event Window when manual retransfers are enabled. Possible reasons for this condition are: 1. With the collective not on UPS inverters and Module Output Breaker (MOB) open (if installed) active or Output Isolator (QE) open (if installed) active or 2. Manual Retransfer Inhibit is active or 3. Not enough inverters are available to support the measured load or 4. Any module's inverter is connected to the collective.
MMS Xfer Inhibit	This summary event means the conditions required to perform a transfer to bypass are not met. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	The condition clears from the Active Event Window when manual transfers are enabled. Possible reasons for this condition are: 1. With the collective on UPS inverters and Module Output Breaker (MOB) open (if installed) active or 2. Manual Transfer Inhibit is active or 3. Not enough BPSSs are available to support the measured load or 4. Any module's BPSS is connected to the collective.  Parametric Data (Note 1) <u>Bit</u> <u>Reason</u> 0x0001 Bypass not Qualified 0x0002 Bypass to Output Phase Error 0x0004 Phase Error Exceeds Manual Transfer Limit Setting 0x0008 Voltage Exceeds Manual Transfer Limit Setting 0x0010 BFB Open 0x0020 BPSS Board has Failed 0x0040 Bypass Sync Error 0x0080 BPSS not Enabled 0x0100 Bypass Overload Shutdown
Module Alarm Active	One or more modules have active event(s).	Press “SILENCE” to silence the audible alarm. From the front panel display, touch “Status View On” in the mimic one-line pane. A pop-up module status view displays which of the modules have an active event and the type of event (Fault, Alarm). Go to the module(s) and investigate.
Multiple Fan Fail	This summary event is active when more than one fan has failed.	Press “SILENCE” to silence the audible alarm. Press “RESET” to clear the alarm. If the alarm will not clear, contact your factory-authorized service provider
On Gen Active	The UPS input source is generator. An external signal is being used to inform the UPS when the power source is generator rather than utility, and the signal is active. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Under normal conditions, no user action is required. If the UPS is not actually on generator and this message is active, contact your factory-authorized service provider.



**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Output Fault	<p>This summary event occurs when the detected system output exceeds acceptable voltage limits.</p> <p>If the UPS was on Inverter at the time of the event, the UPS transfers to bypass provided the bypass voltage is available.</p> <p>If the UPS was on bypass at the time of the event, the UPS shuts down rather than allowing unacceptable voltage to reach the load.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Check the Active Event Window and investigate other events to further analyze.</p> <p>Press "RESET" to attempt to reset any latched events.</p> <p>Check the One-Line Display to determine the system status (On UPS, Bypass, or Off).</p> <p>Check the input and bypass (dual input only) and observe the One-Line color. Green indicates good power present, orange means power is present but outside nominal range, and gray means power is not present.</p> <p>If the load is Off and the input voltage is ok, attempt to restart the UPS by pressing "Startup," "Manual Start," and follow the prompts.</p> <p>If the Input Meter indicates input or bypass is not available, investigate and resolve the power problem.</p> <p>If the load is on bypass and all alarms are reset, press "Transfer," "UPS," to attempt to transfer back to Inverter.</p> <p>If the issue cannot be resolved, contact your factory-authorized service provider.</p>
Parallel Comm Warn	The control has detected a communication failure on one of the redundant communication buses. One of the paralleling control communication buses is no longer communicating within the system.	Press "SILENCE" to silence the audible alarm.
Power Supply Fail	The controls have detected a problem with a power supply. This is a summary event. There are several power supplies, most of them redundant. In most cases, the UPS can operate normally even with a failed supply.	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to attempt to clear the alarm.</p> <p>Check the Active Event Window to check for other events that might explain the Power Supply Fail alarm. For example, if the bypass is not available, a Power Supply Fail alarm is normal, because the Bypass Power Supply has no input power.</p> <p>Contact your factory-authorized service provider.</p>
Redundant Fan Fail	This alarm indicates a fan has failed.	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Contact your factory-authorized service provider.</p>
REPO Shutdown	The UPS shuts down in response to an active Remote Emergency Power Off (REPO) command.	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Resolve the issue that precipitated the REPO.</p> <p>For safety, the UPS latches on REPO event. There are two ways to clear the latch:</p> <ol style="list-style-type: none"> <li>1. Press the Reset push button on the External Interface Board (EIB).</li> <li>2. From the HMI front panel display, press the OK button when the "Press OK to Reset EPO Latched signal" message is displayed in a dialog box.</li> </ol> <p>Verify the REPO is cleared by observing the REPO alarm in the Active Event Window is gone.</p> <p>Restart the UPS by pressing "Startup," "Manual Start" and follow the prompts.</p>
System Comm Fail	<p>The control has detected a communication failure of a device on the multi-module communication bus.</p> <p>For example, the event will be annunciated if a module is not communicating with the SCC.</p> <p>The alarm is self-clearing. Once all modules are communicating with the SCC, the alarm clears.</p>	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Use the System View on the touchscreen to see what modules are not communicating. If one more than one module is not communicating, then the Parallel Communication cables have failed. If one module is not communicating, then that module might have developed a fault. Do not attempt to transfer the load while this alarm is present.</p> <p>Contact your factory-authorized service provider if the condition continues.</p>



**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
System Low Battery	<p>The number of modules with Low Battery Warning event active exceeds the number of redundant modules online.</p> <p>This alarm is self clearing. When the number of modules with Low Battery Warning alarm active is less than the number of redundant modules online or when no modules has a Low battery Warning event, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Check to see if bypass is available by observing the System One-Line Display. Acceptable bypass voltage is indicated by a green power line feeding the Static Bypass Switch (BPSS) box.</p> <p>The Control Software provides optimum load protection by maintaining the load on UPS outputs for as long as possible. If not enough modules recover from a low battery condition to support the load and if bypass is available, the load will be transferred to bypass. Check the bypass line on the one-line display. If the line feeding the Static Bypass Switch (BPSS) is green, the system can be transferred to bypass manually by pressing "TRANSFER," "BYPASS." Note that transferring to bypass could expose the load to an outage if the bypass source fails.</p> <p>If bypass is not available, prepare to shut down critical loads, or remove non-essential loads in order to extend battery run time so that critical loads may be shut down in an orderly manner.</p>
System On Battery	<p>The number of modules on battery exceeds the number of redundant modules online.</p> <p>This alarm is self clearing. When the number of modules on battery is less than the number of redundant modules online or when no module is on battery, the alarm and any control activity tied to the alarm reverts to normal.</p>	<p>Press "SILENCE" to silence the audible alarm. Observe the module one-line display. If the input line is orange, black, or gray, the battery discharging condition is normal. If the input line on the one-line display is green, check the Active Event Window for potential fault conditions that could explain why the UPS is on battery. An example of this could be "Rectifier Fault."</p> <p>Monitor the UPS during the battery discharge. The display shows the discharge curve of the battery. When the battery voltage line touches the End of Discharge line, the UPS shuts down.</p> <p>The Control Software provides optimum load protection by maintaining the load on UPS outputs for as long as possible. If not enough modules recover from a battery discharging condition to support the load and if bypass is available, the load will be transferred to bypass. Check the bypass line on the one-line display. If the line feeding the Static Bypass Switch (BPSS) is green, the system can be transferred to bypass manually by pressing "TRANSFER," "BYPASS" to transfer the load to the bypass source. Note that transferring to bypass could expose the load to an outage if the bypass source fails.</p> <p>If the battery is discharging because of a fault such as "Rectifier Fault" in the Active Event Window rather than an actual power outage, transfer to bypass if available, and contact your factory-authorized service provider.</p>
System Output Breaker (UOB) Open	The system output breaker indicates that it is in the open position.	
System Overload	One or more modules in a multi-module system is reporting an overload on at least one phase.	
Temp Sense Fail	An equipment temperature sensor is reporting an invalid temperature. The controls ignore temperatures from a failed sensor.	<p>Press "SILENCE" to silence the audible alarm.</p> <p>Press "RESET" to clear the alarm.</p> <p>If the alarm cannot be reset, or if the alarm condition returns, contact your factory-authorized service provider.</p>

**Table 6 Liebert NXL alarm and status messages (continued)**

Event Message	Event Definition	Recommended Action
Xfer to Byp Failed	An event (such as an Inverter fault) caused an attempted automatic transfer to bypass and the transfer failed. The controls detect the Static Bypass Switch (BPSS) failed to assume the load and the Inverter was Off.	Press "SILENCE" to silence the audible alarm. Check the Event Log by pressing "Status Reports," "Event Log" to investigate why the UPS tried to transfer to bypass and why the BPSS failed. Press "RESET" to attempt to clear any latched alarms or faults. If conditions appear normal, attempt to restart the UPS by pressing "Startup," "Manual Start" and follow the prompts. Contact your factory-authorized service provider.
Xfer to Inv Inhibit	Transfers from bypass to Inverter are disabled due to an external signal. The UPS has been fitted with an Input Contactor Isolator Board, and one channel on the board was assigned the transfer to Inverter inhibit function and that contact is now active. This status message is self-clearing. When the condition is no longer present, the message and any control activity tied to the status event reverts to normal.	Remove the external signal forcing the transfer to Inverter inhibit. If an external signal is not wired to the UPS to provide this control, contact your factory-authorized service provider.
Service Reminder	Schedule or perform the maintenance indicated. By default this event is latched in the active events list. Press the event list "Reset" button to clear it from the list.	Parametric data: 1 = AC Filter Caps Expiring Soon 2 = AC Filter Caps Expired 3 = DC Filter Caps Expiring Soon 4 = DC Filter Caps Expired 5 = Fans/Blowers Expiring Soon 6 = Fans/Blowers Expired 7 = Warranty Expiring Soon 8 = Warranty Expired 9 = Maintenance Agreement Expiring Soon 10 = Maintenance Agreement Expired 11 = Air Filter Needs To Be Replaced Soon 12 = Air Filter Needs To Be Replaced



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