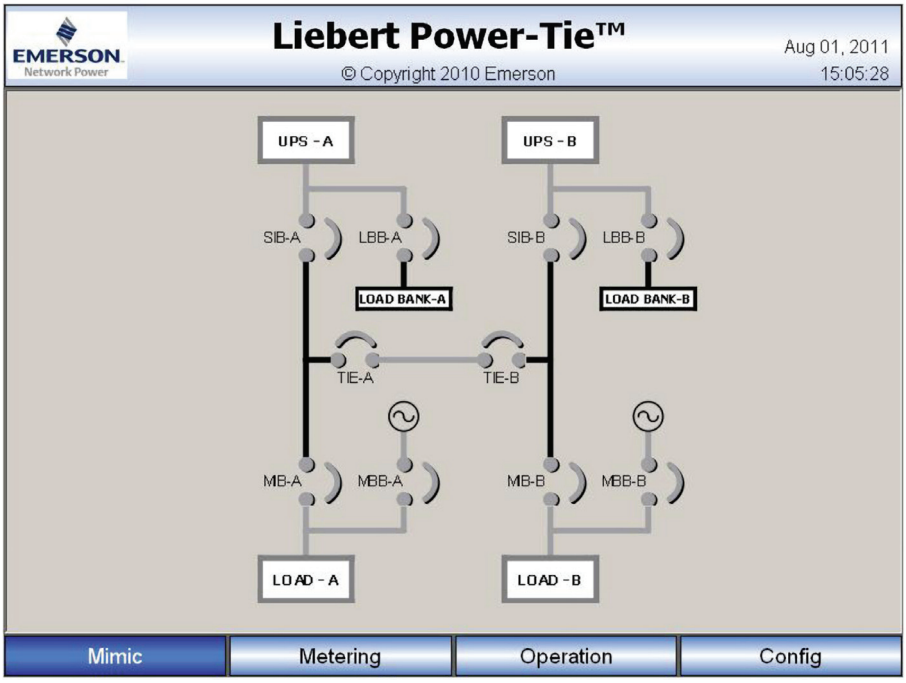
AC Power
For *Business-Critical Continuity™*

Liebert® NXL™ Power-Tie Controls

Operation and Maintenance Manual



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Contact Emerson Network Power 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: _____

Product Warranty Registration

To register for warranty protection, visit the **Service and Support** section of our Web site at:

www.liebert.com

Click on **Product Registration** and fill out the form.

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FIGURES

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during operation and maintenance of your Liebert NXL™ Power-Tie equipment. Read this manual thoroughly, paying special attention to the sections that apply to your installation, before working with the unit. **Retain this manual for use by operating personnel.**

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 the installation manual, SL-25520, for equipment handling information and installation procedures. The manual is available at the Liebert Web site: **www.liebert.com**

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 manufacturer's 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 both AC and DC voltmeters 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 while it is under power, service personnel and test equipment should be standing on rubber mats. 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.

1.0 INTRODUCTION

The Liebert NXL Power-Tie system provides manually initiated, uninterrupted transfers of a critical load bus between two or more UPS systems.

This permits one UPS and its associated distribution system to be shut down for maintenance while another UPS continues supplying power to the load without transferring the load to bypass, protecting the load from fluctuations in the utility power supply.

The Liebert NXL Power-Tie is designed to operate in these modes.

- **Normal**—Each critical load is fed from its respective UPS system and the tie breakers are open. Each inverter is synchronized to its respective bypass source. Each load is supplied by its inverter, with its bypass available.
- **Momentary Tie**—The critical loads and the two UPSs are momentarily paralleled through a tie breaker. Both UPSs are on-line and the bypass source of one UPS is selected as the primary sync source. One of the UPS systems is selected to be isolated from the critical load.
  - A momentary tie is typically between multiple UPS systems when all UPS systems are on inverter.
  - The Liebert NXL Power-Tie allows a UPS system on inverter to be momentarily tied with another UPS system on bypass. The UPS system on bypass will be the primary sync source.
- **Combined Loads**—Both critical loads are running on one selected UPS system through the tie breakers with that UPS system's bypass available as the alternate source. The other UPS system is not connected to any critical load.

2.0 OPERATION

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

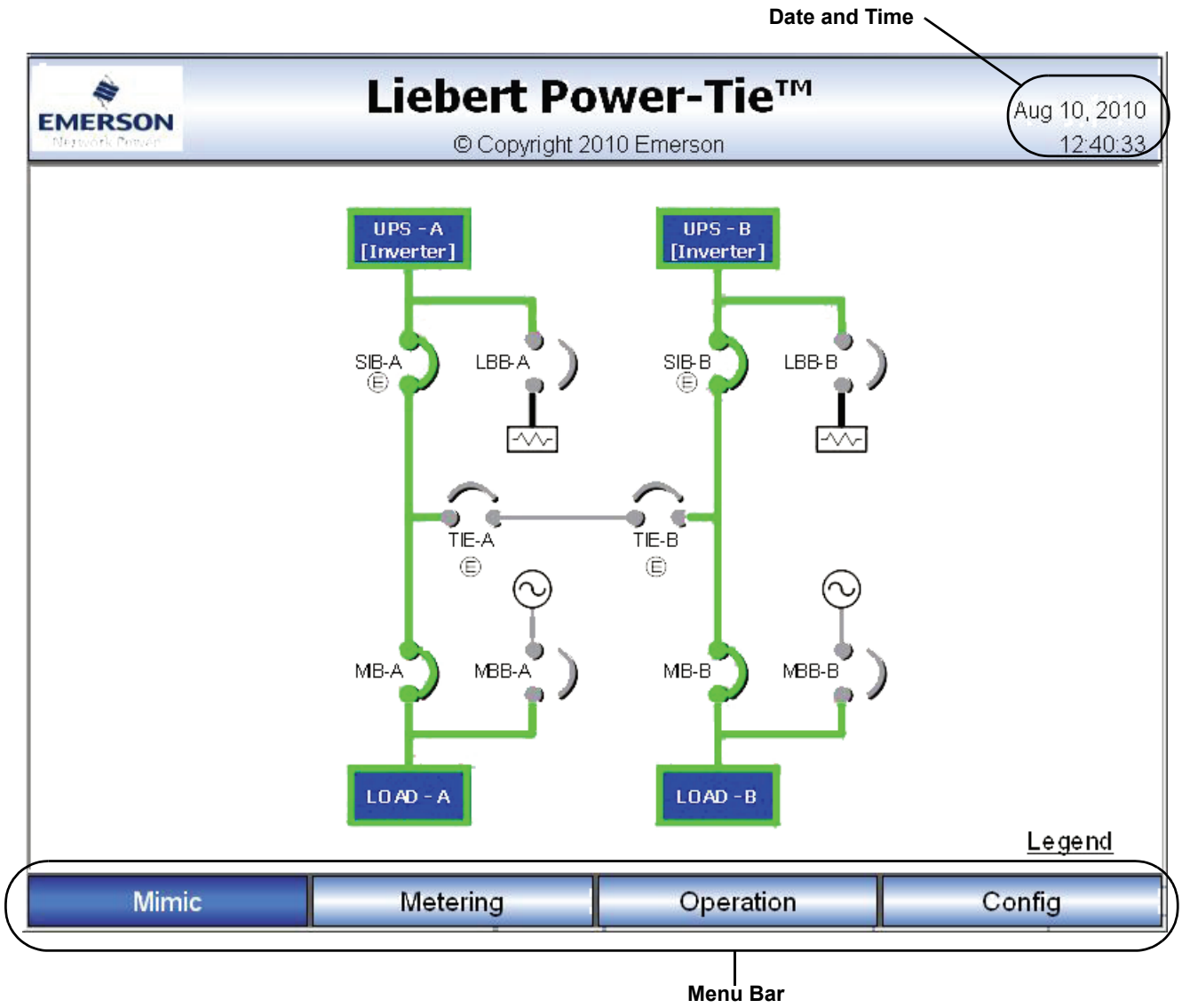
2.1 Features

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
- Adjust programmable parameters (access limited by security access function)

The touchscreen has a white background and multicolor text. The display turns on automatically, but after 15 minutes of inactivity the backlight will go out and the display will dim. Touching the screen will reactivate the backlight, which 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



2.2 Mimic Screen

This screen is the default view. It shows the status of the breakers in the Liebert NXL Power-Tie system, the status of each UPS and the current power flow.

Breaker Status

- SIB: System Isolation Breaker
- TIE
- MIB: Maintenance Isolation Breaker (optional)
- MBB: Maintenance Bypass Breaker (optional)
- LBB: Load Bank Breaker (optional)

NOTE
If a breaker is not present in the system, it will not be displayed on the HMI screen.

UPS Systems Status

- [Inverter]: UPS System is on Inverter
- [Bypass]: UPS System is on Static Bypass
- [Maint]: UPS System is on Maintenance Bypass

Current Power Flow

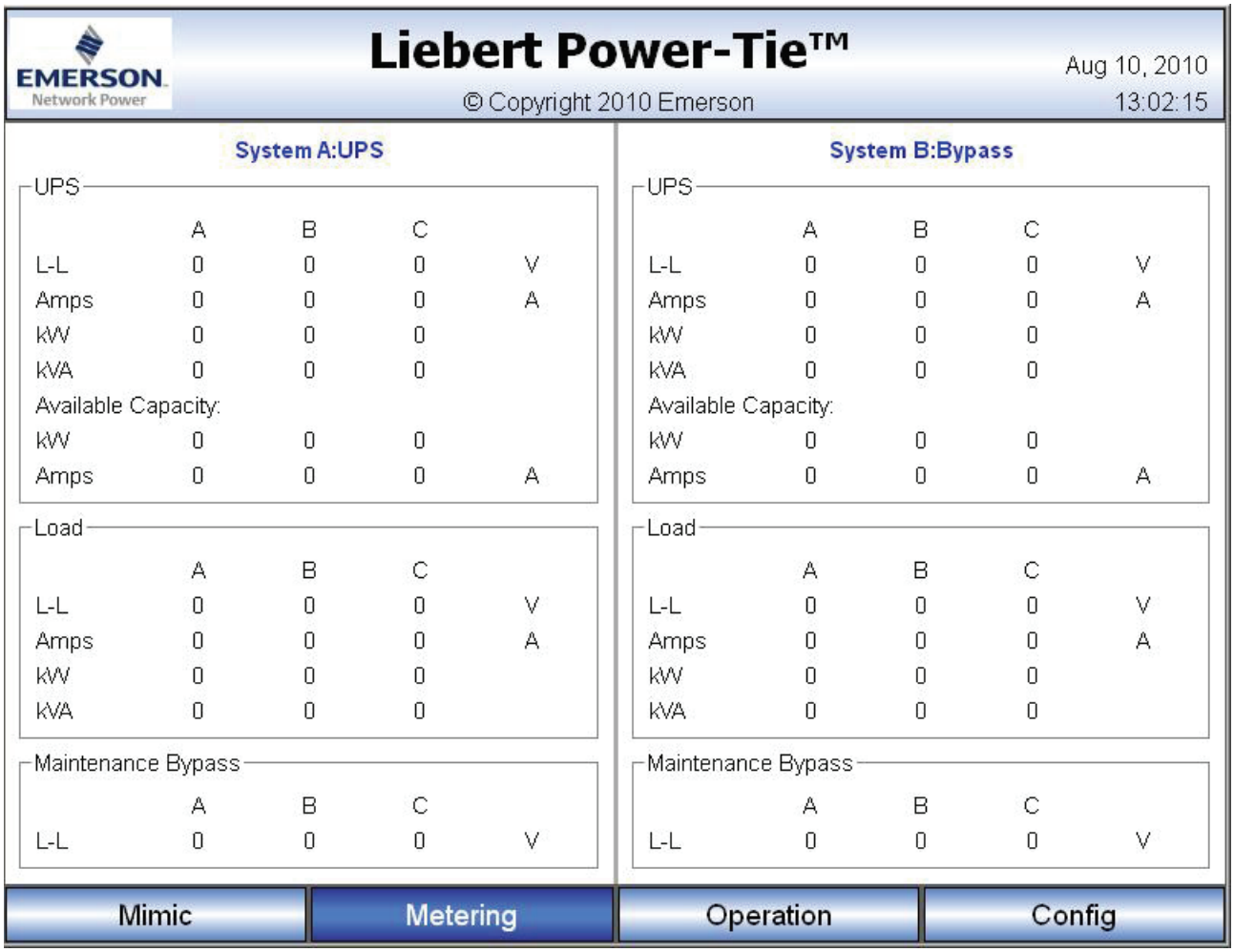
- Green: Normal
- Orange: Marginal
- Gray: Absent
- Black: Unknown

2.3 Metering Screen

The Metering screen displays these parameters for each system (see **Figure 2**):

- UPS System
  - Output Voltage
  - Output Amps
  - Output kW
  - Output kVA
  - Available Capacity, kW
  - Available Capacity, Amps
- Load
  - Voltage
  - Amps
  - kW
  - kVA
- Maintenance Bypass (if installed)
  - Voltage

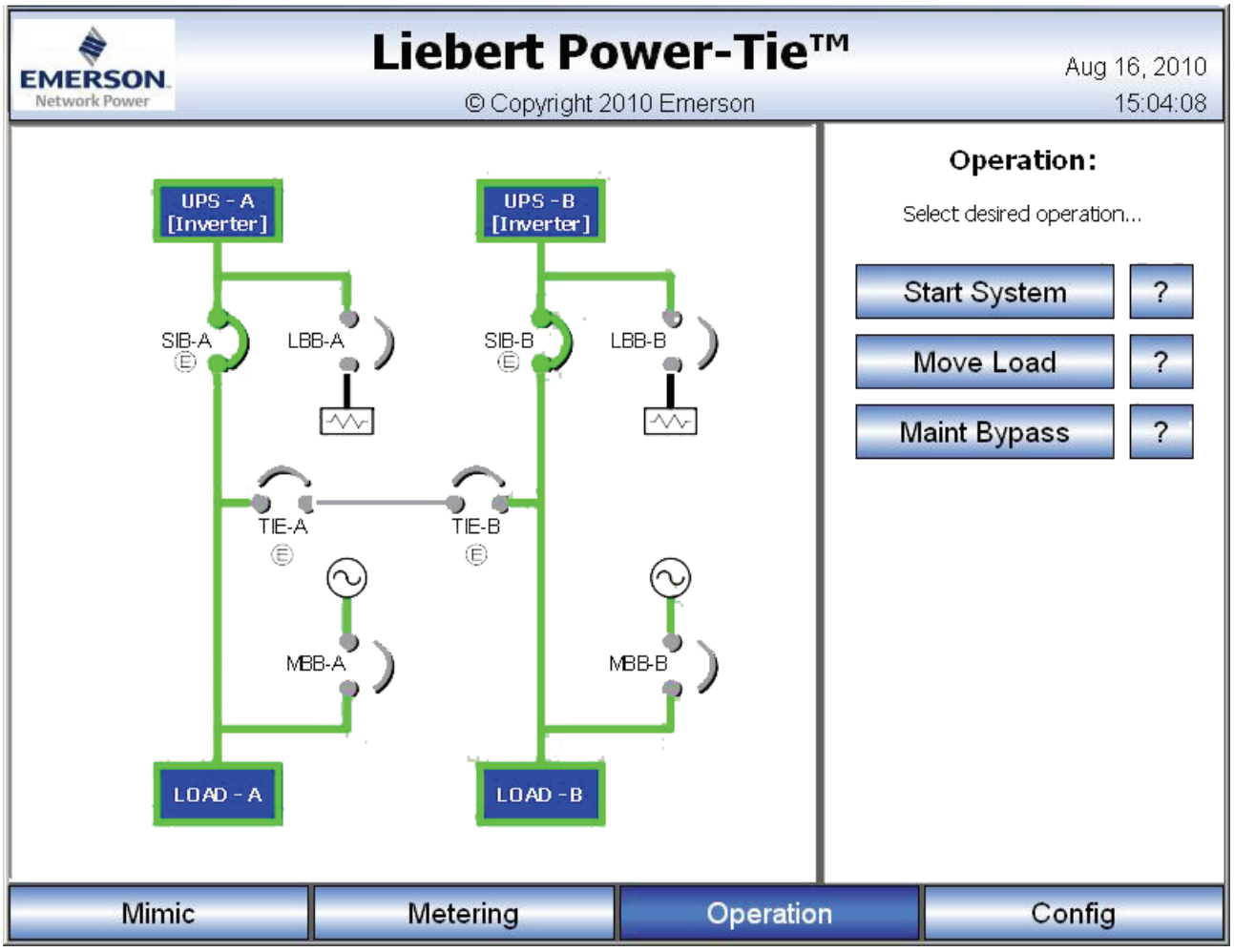
Figure 2 Metering display



2.4 Operations Screen

This screen allows the Liebert NXL Power-Tie system to start up, transfer load between UPS systems and transfer the load to Maintenance Bypass (if available).

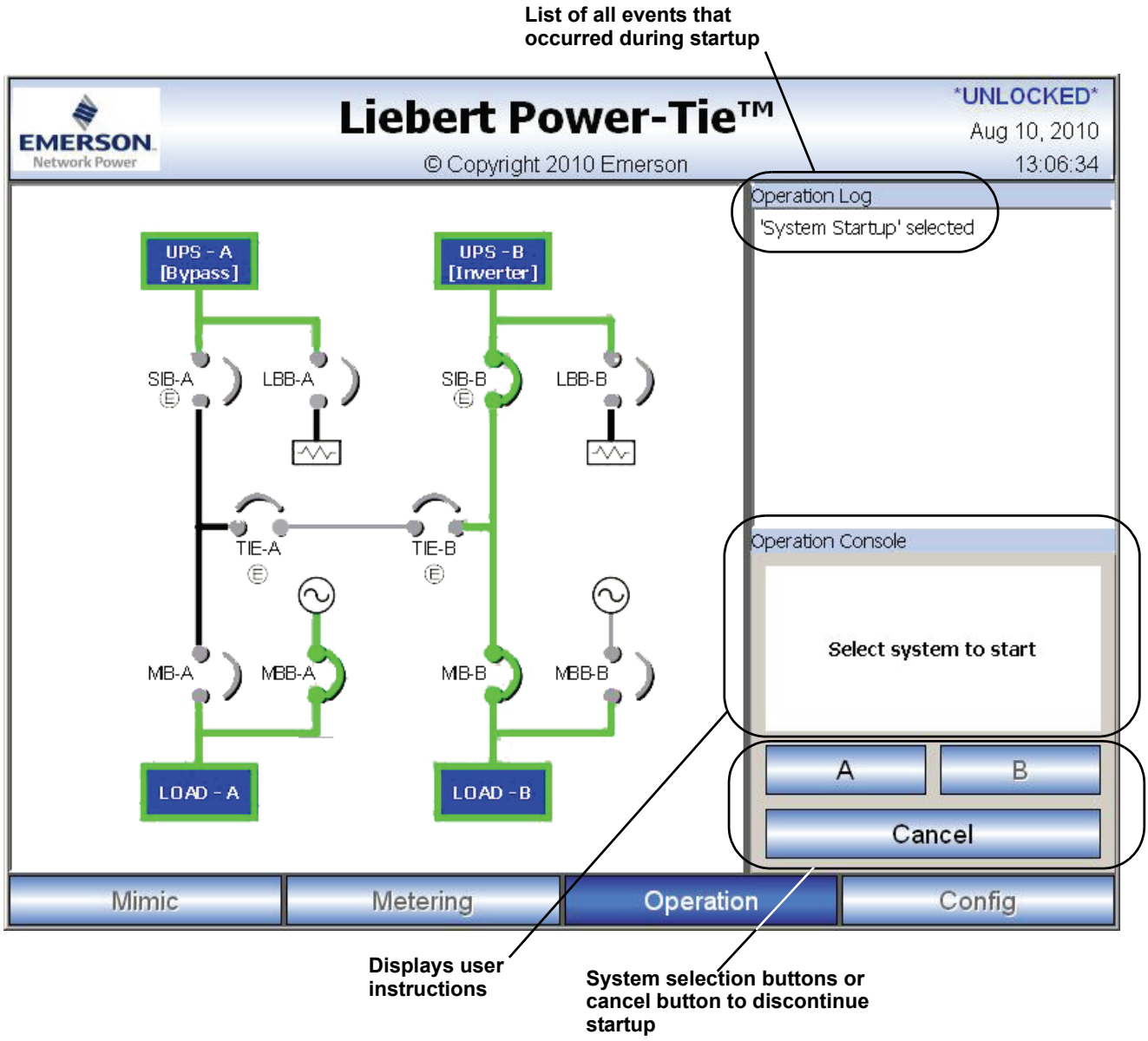
Figure 3 Liebert NXL Power-Tie operation display



2.4.1 Startup

This screen is used to start the Liebert NXL Power-Tie system (see **Figure 4**).

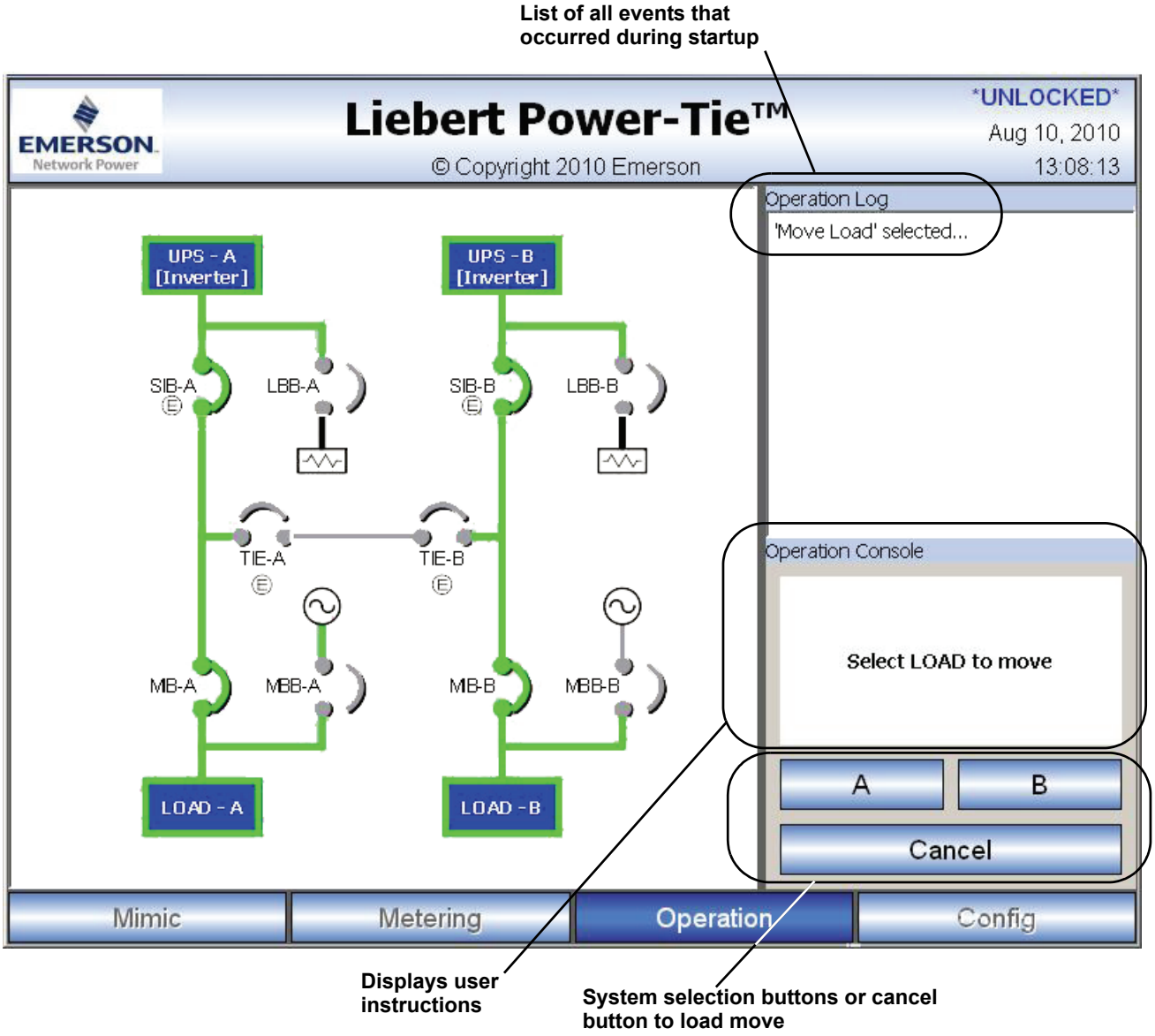
Figure 4 Liebert NXL Power-Tie system startup display



2.4.2 Move Load

This screen is used to transfer the load between UPS Systems (see **Figure 5**).

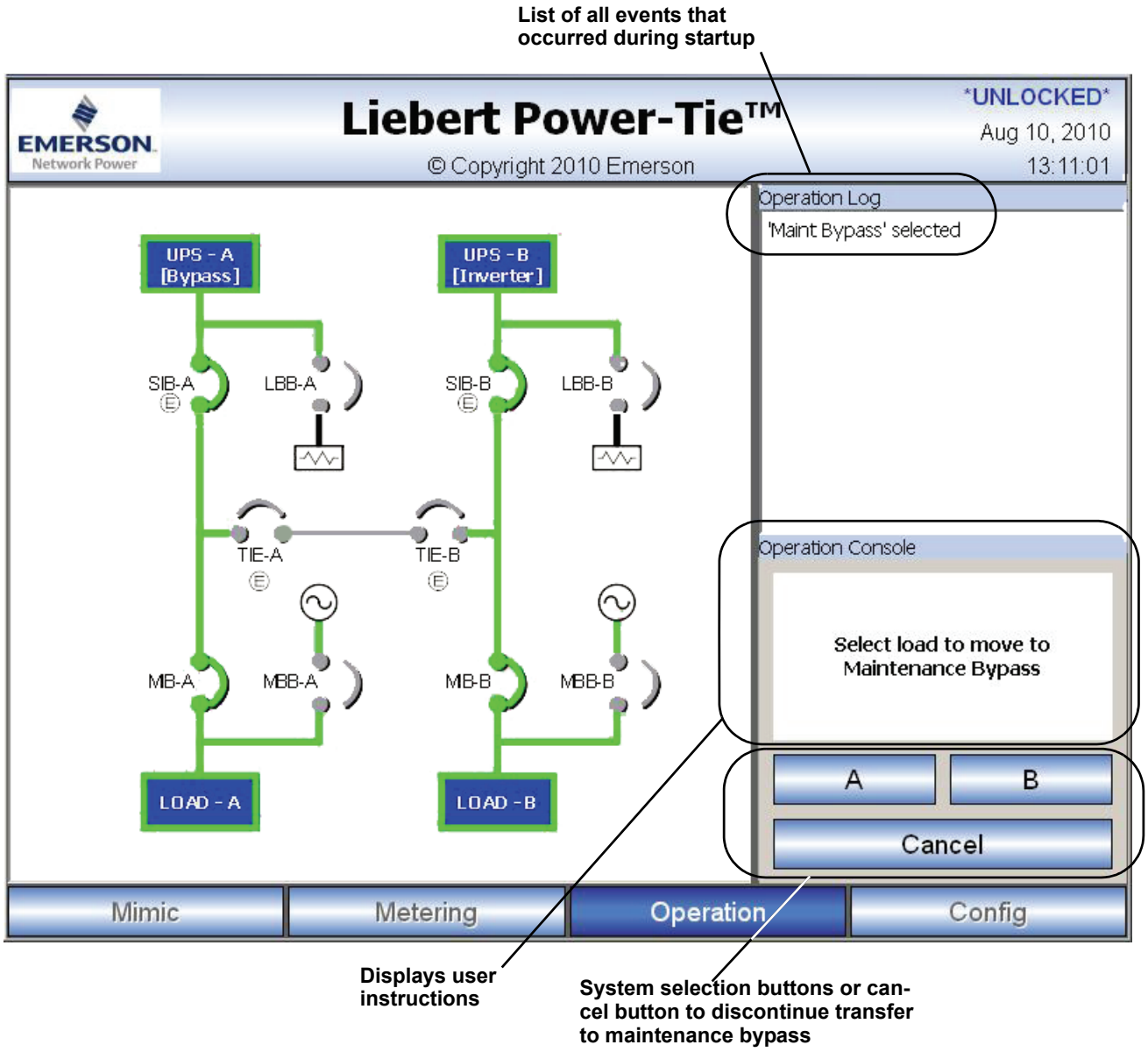
Figure 5 Move Load screen



2.4.3 Maintenance Bypass

If Maintenance Bypass is available, this screen may be used to transfer the load to Maintenance Bypass.

Figure 6 Maintenance Bypass transfer screen



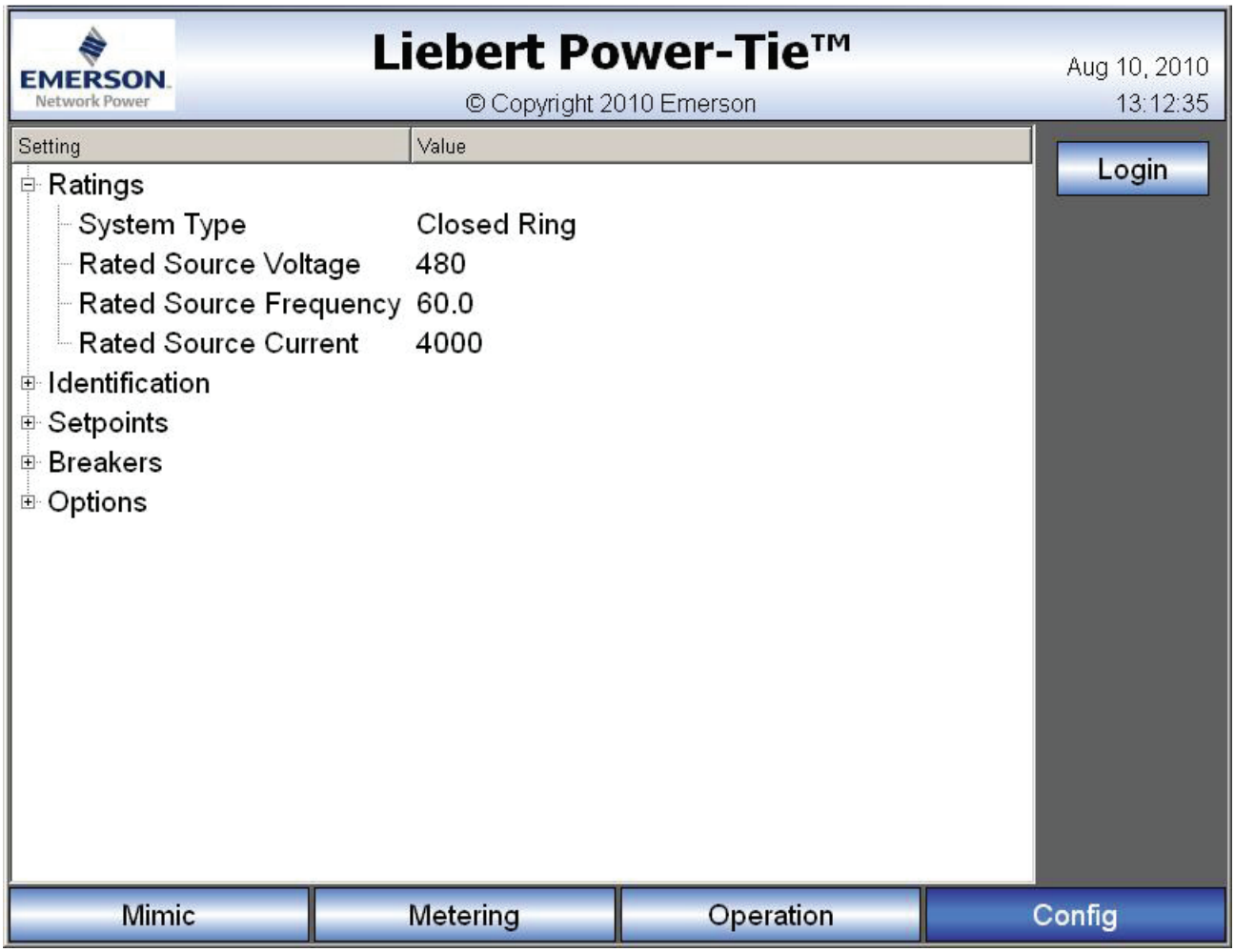
2.5 Config Screen

This screen allows configuring parameters for the Liebert NXL Power-Tie system. Pressing the Login button allows the user to enter the password and unlock all user available inputs. See **2.5.3 - Set-points** for details on entering the password.

2.5.1 Ratings (Read Only - Based on System Type)

- System Type
- Rated Source Voltage
- Rated Source Current
- Rated Source Frequency

Figure 7 Ratings screen



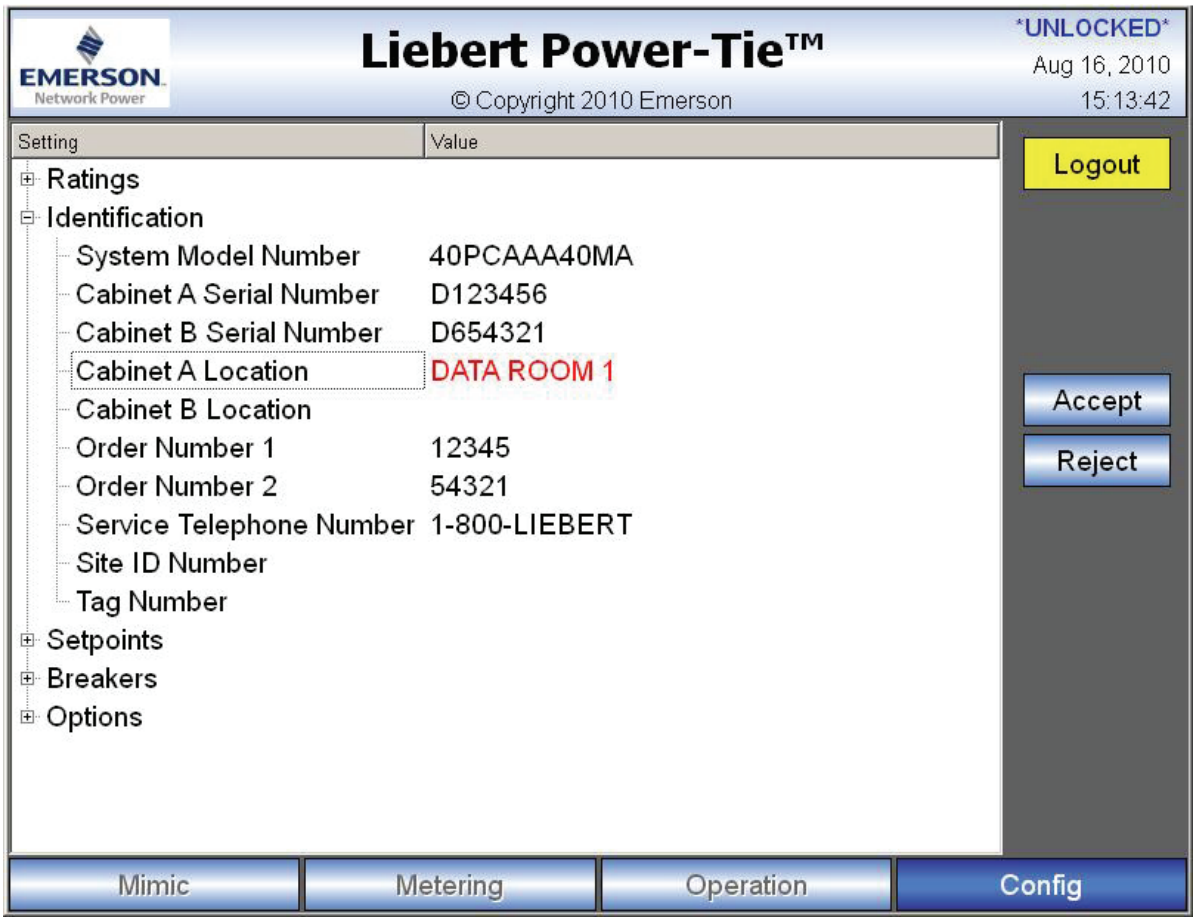
2.5.2 Identification

- System Module Number (Read Only)
- Cabinet A Serial Number (Read Only); see **Note 1** below
- Cabinet B Serial Number (Read Only); see **Note 1** below
- Cabinet A Location—Up to 33 alphanumeric characters (default: blank); see **Note 2** below
- Cabinet B Location—Up to 33 alphanumeric characters (default: blank); see **Note 2** below
- Order Number (Read Only); see **Note 1** below
- Order Number (Read Only); see **Note 2** below
- Service Telephone Number (Read Only)
- Site ID Number (Read Only)
- Tag Number (Read Only)

NOTE

1. *If more than two systems are installed, all systems will be displayed.*
2. *After items have been entered, the Accept button must be pressed.*

Figure 8 Identification screen



2.5.3 Setpoints

- User Password: Up to five alphanumeric characters; the default is *NXL* (refer to **Figure 10**)
- Backlight Brightness: Low/High; the default is *Low* (refer to **Figure 11**)
- Time & Date: Time displayed as hours, minutes and seconds (hh:mm:ss); date displayed as month, day and year (refer to **Figure 12**)
- Number of UPS Systems Installed (Read Only)

NOTE
*After all items have been entered, press the **Accept** button to save the changes.*

Figure 9 Setpoints screen

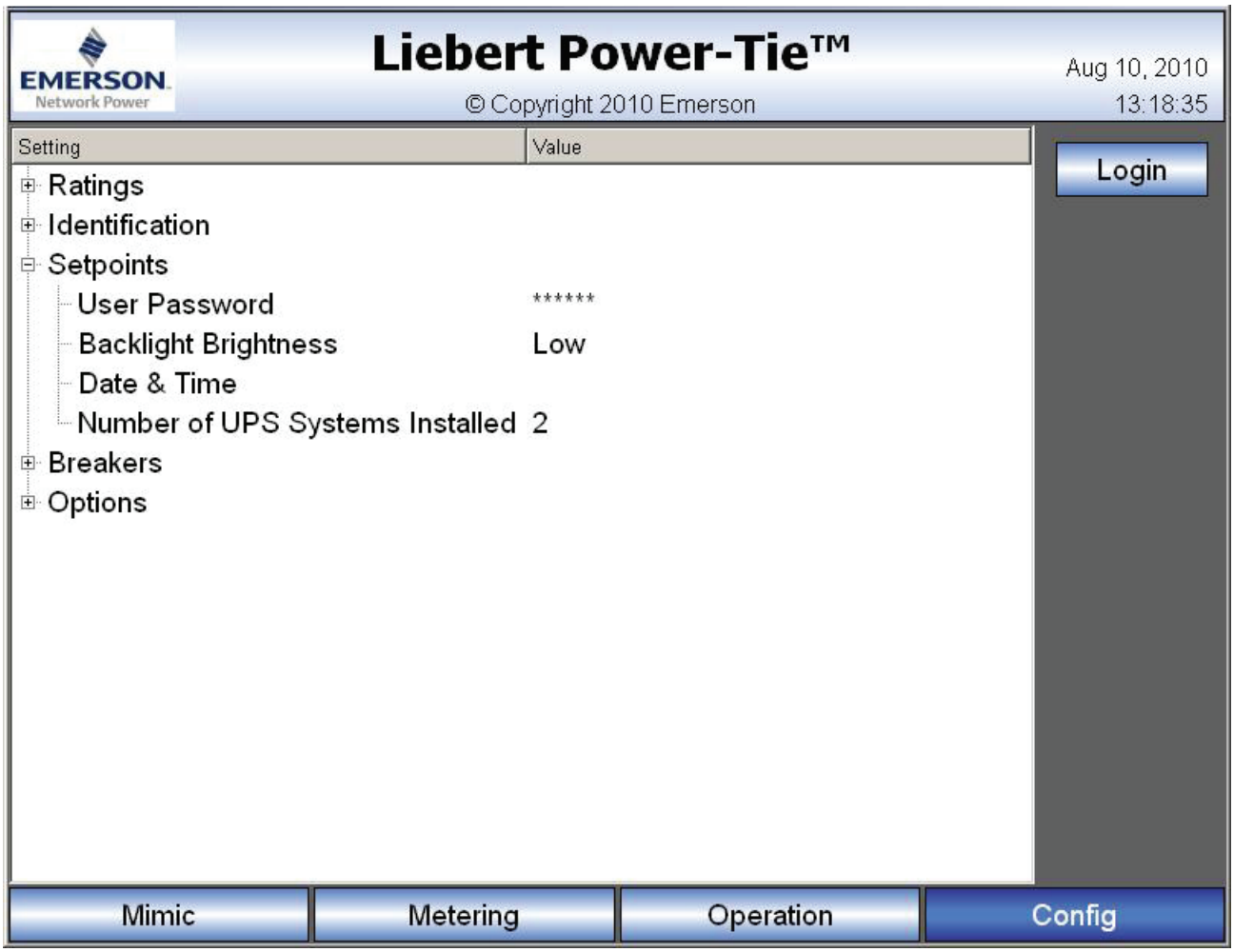
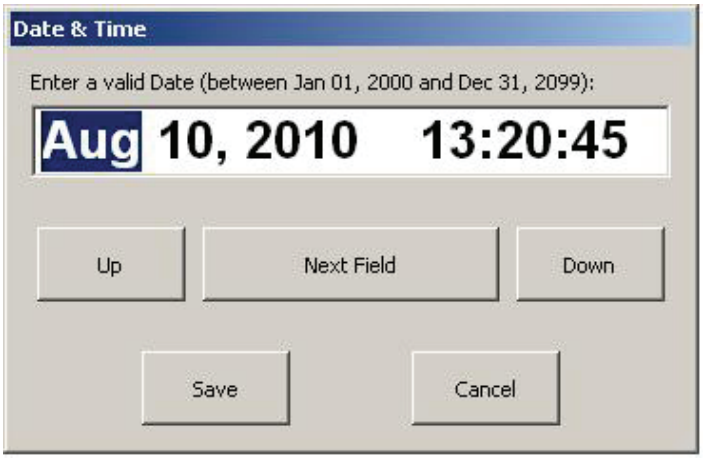


Figure 10 Change password screen

Figure 11 Change backlight setting

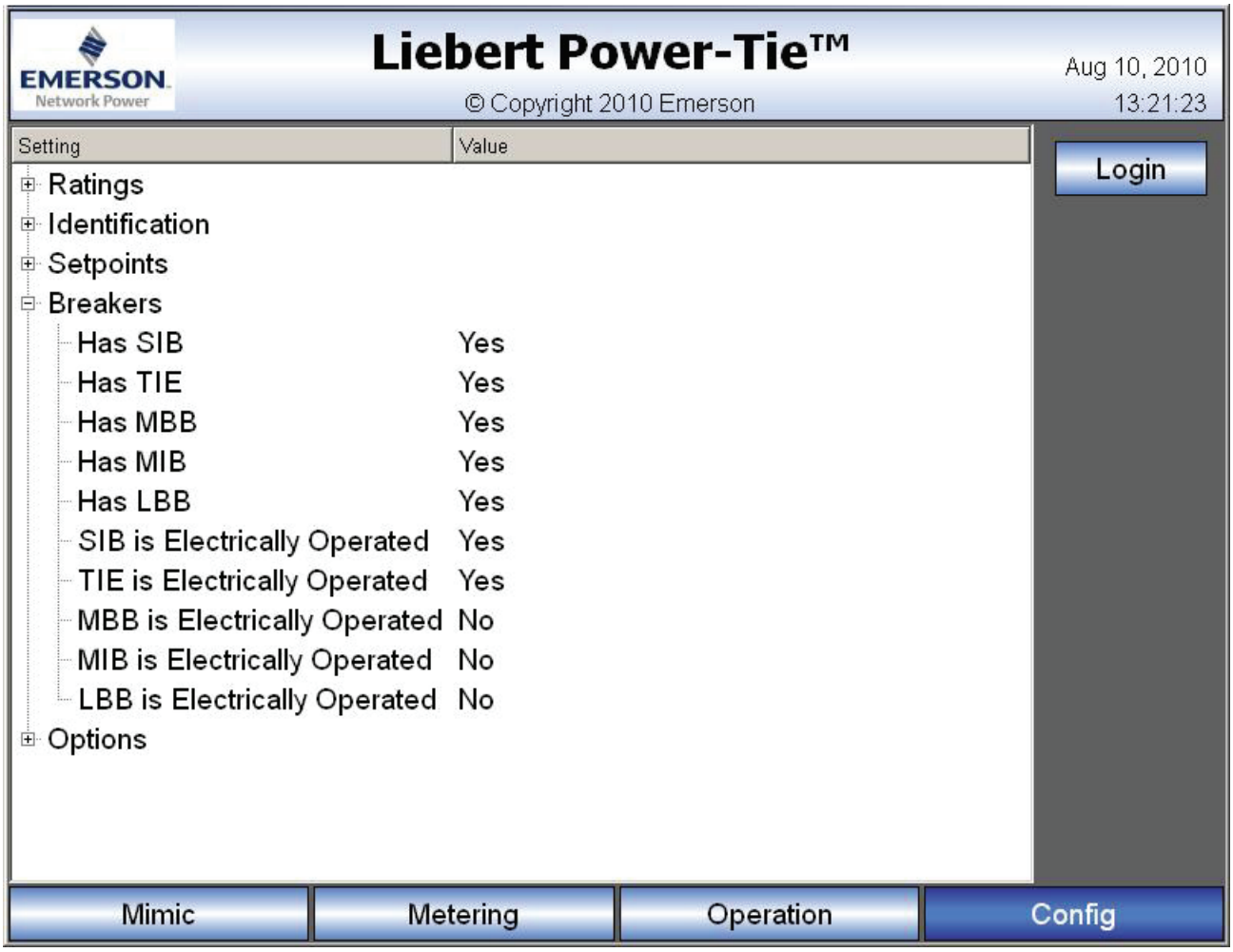
Figure 12 Change date and time screen



2.5.4 Breakers (Read Only - Based on System Type)

- Has SIB - Yes/No
- Has TIE- Yes/No
- Has MBB- Yes/No
- Has MIB- Yes/No
- Has LBB- Yes/No
- SIB is Electrically Operated- Yes/No
- TIE is Electrically Operated- Yes/No
- MBB is Electrically Operated- Yes/No
- MIB is Electrically Operated- Yes/No
- LBB is Electrically Operated- Yes/No

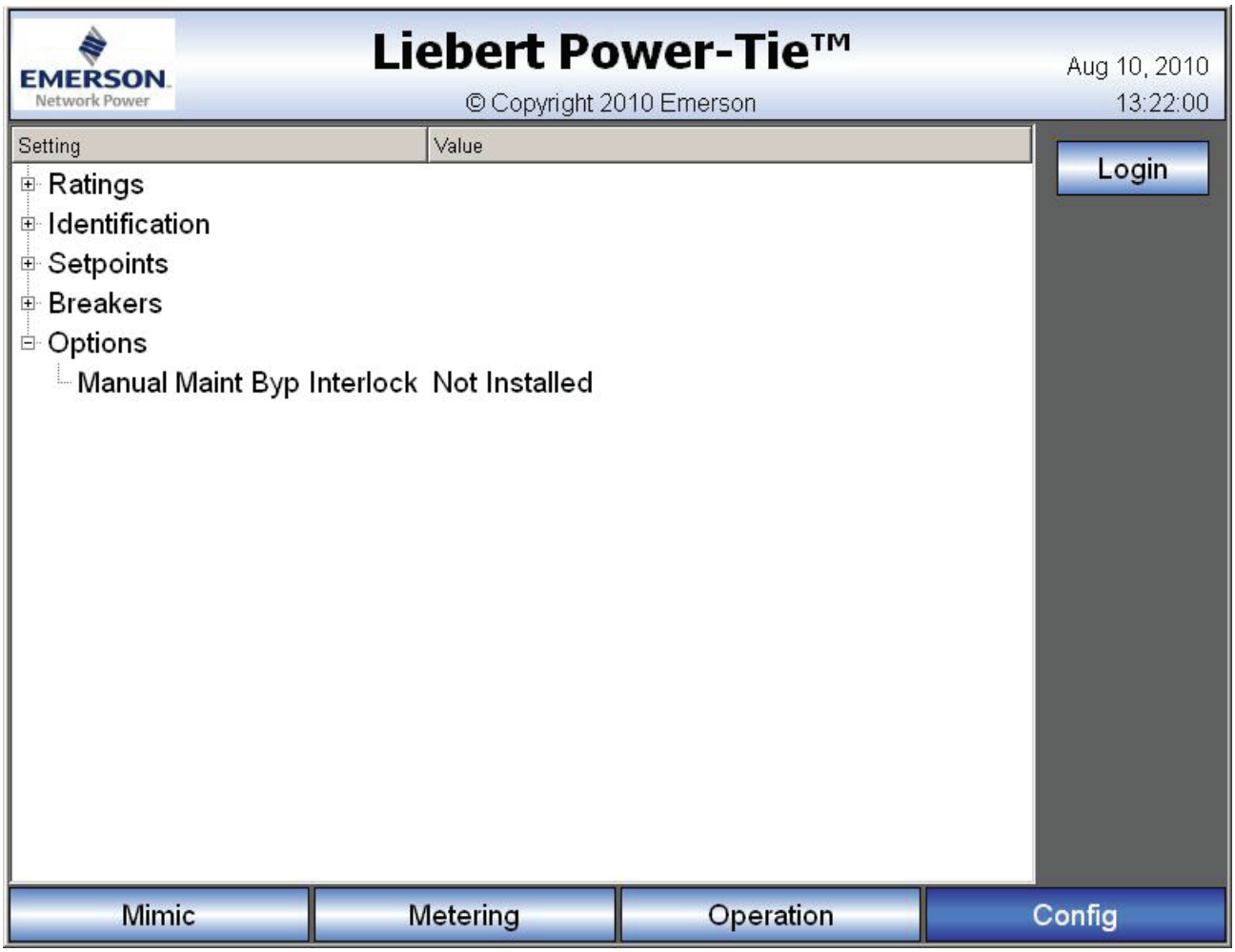
Figure 13 Breakers screen



2.5.5 Options (Read Only - Based on System Type)

- Manual Maint Byp Interlock Options- Installed/Not Installed

Figure 14 Options screen



3.0 OPERATION

3.1 Start the Liebert NXL Power-Tie System

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

*Not all systems will have the breakers listed in **2.2 - Mimic Screen**. Review the system configuration to see whether all breakers installed in the system are displayed.*

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 2 minutes before continuing.

WARNING

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

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

3.1.1 Full System Startup

1. Before applying power to the system, verify that these circuit breakers are open:
   - SIB
   - TIE
   - MBB
   - MIB
   - LBB
2. Start the UPS system and place it in Bypass mode.
3. On the Liebert NXL Power-Tie HMI screen, press the "Operation" and then the "Start System" menu buttons.

NOTE

*A password is required to execute the commands in this procedure to prevent unauthorized changes (see **2.5.3 - Setpoints**).*

4. Select the system being energized.
5. If MBB is installed: When prompted on the HMI display, close the MBB breaker.
6. If MIB is installed: When prompted on the HMI display, close the MIB breaker.
7. When prompted on HMI display, close the SIB breaker.
8. If MBB is installed: When prompted on HMI display, open the MBB breaker.
   This UPS system can now be transferred to Inverter (Normal Mode)
9. Repeat **Steps 2** through **9** for all the systems to be energized.

3.1.2 Adding a System

If adding a new system that is not currently energized, follow the steps in **3.1.1 - Full System Startup**.

If adding a system that is on Maintenance Bypass:

1. On the Liebert NXL Power-Tie HMI screen, press the “Operation” then “Start System” menu buttons.

NOTE
*A password is required to execute the commands in this procedure to prevent unauthorized changes (see **2.5.3 - Setpoints**).*

2. Select the system being energized.
3. If MIB is installed: When prompted on the HMI display, close the MIB breaker.
4. When prompted on HMI display, close the SIB breaker.
5. If MBB is installed: When prompted on the HMI display, open the MBB breaker.
   This UPS system can now be transferred to Inverter (Normal Mode)

3.2 Transfer Loads Between UPS Systems

The Liebert NXL Power-Tie can transfer a load from one UPS System to another smoothly.

3.2.1 Types of Load Transfers

- From System on Inverter to System on Inverter
- From System on Bypass to System on Inverter
- From System on Inverter to System on Bypass
- Shared load from one system to another system (i.e., System B is carrying Loads A and B. Can transfer Loads A and B to System A in one step)

3.2.2 Conditions to Transfer Loads

The following conditions must be present before a load transfer can be performed:

- At least one UPS system involved in the transfer must be on Inverter (Normal Mode).
- The MBB breaker must be open and MIB closed on both systems involved in the load transfer.
- The system taking the load must have enough capacity to accept the transferred load without overloading.

If these conditions are not present, the Load Transfer buttons will not be active.

3.2.3 Load Transfer Procedure

Following these steps to execute any of the transfers in **3.2.1 - Types of Load Transfers**.

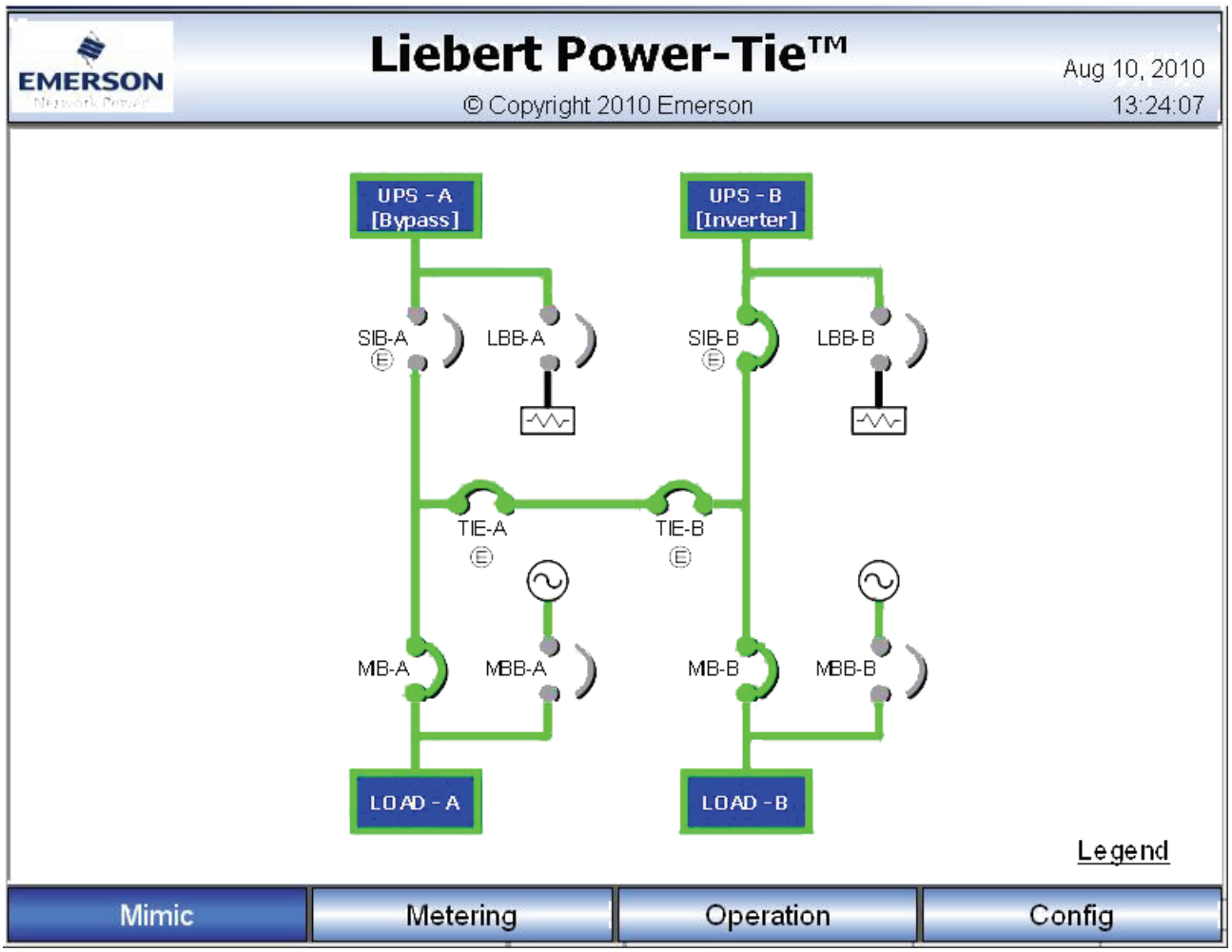
1. On the Liebert NXL Power-Tie HMI screen, press the “Operation” then “Move Load” menu buttons.

NOTE

*A password is required to execute the commands in this procedure to prevent unauthorized changes (see **2.5.3 - Setpoints**).*

2. Select to load to be moved.
3. Select the system that will supply power to the load.
   During this step, one TIE breaker will close. The two UPS systems will synchronize to each other. Depending on how far out of synch the two sources are, this step may take several seconds to complete.
4. When prompted on the HMI screen, Press “Move Load” or press “Cancel” to return the system to its previous state.

Figure 15 Typical Mimic screen with load transfer



3.3 Maintenance Bypass Transfer

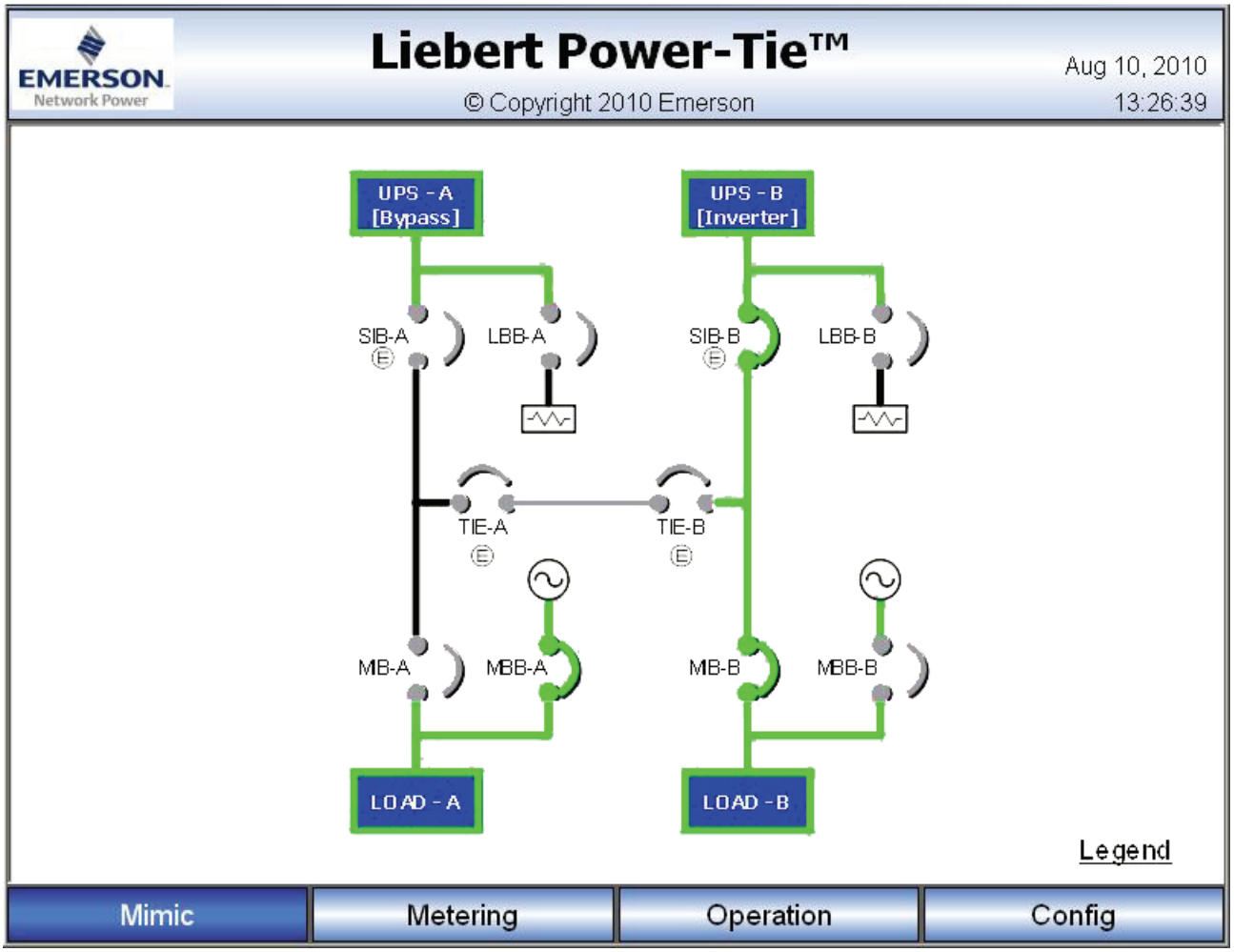
If the Liebert NXL Power-Tie System has a Maintenance Bypass, the following steps will transfer the load from the UPS system to its Maintenance Bypass

1. For the system being transferred to Maintenance Bypass, verify the UPS system is in Bypass mode.
2. On the Liebert NXL Power-Tie HMI screen, press the “Operation” then Maint Bypass menu buttons.

NOTE
*A password is required to execute the commands in this procedure to prevent unauthorized changes (see **2.5.3 - Setpoints**).*

3. Select the load to be moved.
4. When prompted on the HMI screen, close the MBB.
5. When prompted on the HMI screen, open the MIB.

Figure 16 Typical Mimic screen with load on Maintenance Bypass



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