



***La MARCHÉ***®

La Marche Manufacturing Company

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# *LmPower Series*

DC Power System



## Installation and Operation Manual



## Important Safety Instructions

Before using this equipment read all manuals and other documents related to this power system and other equipment connected to this power system. Always have a copy of a power system's manual on file nearby in a safe place; if a replacement copy of a manual is needed, it can be found at [www.lamarchemfg.com](http://www.lamarchemfg.com).

### Electrical Safety



**WARNING:** Hazardous Voltages are present at the input of power systems. The output from power systems and from batteries may be low in voltage, but can have a very high current capacity that may cause severe or even fatal injury.

When working with any live battery or power system, follow these precautions:

- Never work alone on any live power system; someone should always be close enough to come to your aid.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.



**WARNING:** Lethal Voltages are present within the power system. Parts inside the power system may still be energized even when the power system has been disconnected from the AC input power. Check with a meter before proceeding. Do not touch any uninsulated parts.

- A licensed electrician should be used in the installation of any power system.
- Always disconnect the power system from the supply, batteries, and loads before performing maintenance, replacing parts, or cleaning.
- Always assume that an electrical connection is live and check the connection relative to ground.
- Be sure that neither liquids nor any wet material come in contact with any internal components.
- Do not operate this power system outside the input and output ratings listed on the power system nameplate.
- Do not use this power system for any purpose not described in the operation manual.

### Mechanical Safety

- This power system or parts of the power system may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this power system. Incorrect re-assembly may result in a risk of electric shock or fire.

### Battery Safety



**WARNING:** Follow all of the battery manufacturer's safety recommendations when working with or around battery systems. DO NOT smoke or introduce a spark or open flame in the vicinity of a battery. Some batteries generate explosive gases during normal battery operation.

- To reduce risk of arc, connect and disconnect the battery only when the power system is off.
- If it is necessary to remove battery connections, always remove the grounded terminal from the battery first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber lined vest/apron when working near a battery.
- Have plenty of fresh water and soap nearby in enclosure the battery electrolyte contacts skin, clothing, or eyes.
- If the battery electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop or place any materials on a battery. A spark or short-circuit could cause an explosion.

## System Location

- Allow at least 6 inches of free air on all vented surfaces for proper cooling
- Allow sufficient clearance to open the front panel for servicing.
- Do not operate this power system in a closed-in area or restrict ventilation in any way.
- Do not place power system below battery.
- Never allow battery electrolyte to drip on this power system when reading the specific gravity or filling the battery.
- Never place this power system directly above a standard flooded battery. Gases from the battery will corrode and damage equipment.
- A sealed maintenance free or valve regulated lead acid (VRLA) battery may be placed below this equipment.

## Check for Damages

Prior to unpacking the product, note any damage to the shipping container and take pictures. Unpack the product and inspect the exterior and interior of product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the power system sent back for evaluation and repair.



**CAUTION:** Failure to properly file a claim for shipping damages, or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

## Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

## Inspection Checklist

- Enclosure exterior and interior is not marred or dented.
- There are no visibly damaged components.
- All internal components are secure.
- Printed circuit boards are firmly seated.
- All hardware and connections are tight.
- All wire terminations are secure.
- All items on packing list have been included.

## Handling

Equipment can be very heavy with uneven distribution of weight. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

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### Model Scope/General Description

The LmPower Series are compact -48V DC power systems with high-performance rectifiers. The LmPower is offered in 3 different configurations; LMP-100A (1RU), LMP-200A (5RU) and LMP-400A (6RU). LmPower series can be mounted on standard 19" and 23" racks.

The LmPower Series utilizes hot-swappable high efficiency LmPower R50 1RU 3000W (50A) rectifiers at 96% efficiency.

The LmPower Series offers a robust system controller with an embedded I/O interface equipped with digital inputs, dry contact alarm outputs and temperature sensors input ports. In addition, the system offers intelligent battery management, remote access, and a rectifier hibernation/cycling function for increased efficiency.

### Understanding the Model Number

The LMP model number is coded to describe the options that are included. Find the model number on the nomenclature nameplate of the power system. Then follow the chart to determine the configuration of your battery power system.

Model Number	Description	RUs	Number of Rectifier Slots	Number of Load Connections
LMP-100A	-48VDC 100A DC System	1 RU	2	2
LMP-200A	-48VDC 200A DC System	5 RU	4	16
LMP-400A	-48VDC 400A DC System	6 RU	8	20

## 1 Equipment Handling

### 1.1 Storing the LMP

If the LMP is to be stored for more than a few days after delivery, it should be stored within its shipping container. The location chosen for storage should be within an ambient temperature of -40 to 158°F (-40 to 70°C) with a non-condensing relative humidity of 5 to 95%.

### 1.2 Moving the LMP

After careful inspection and upon verification that the LMP is undamaged, identify the dimensions and weight of the LMP power system. Refer to the table below.

Model	Output Voltage	Output Amps	Input Voltage	Input Current	RUs	Dimensions (W x D x H)	Weight (w/o rectifiers)
LMP-100A	48VDC	100A	176-300VAC (1 Phase) 85-175VAC (Linearly derated)	36A	1 RU	17.32" x 14" x 1.73"	14.33 lbs.
LMP-200A	48VDC	200A	176-300VAC (1 Phase) 208/220/240/380VAC (3 Phase)	72A (1 Phase) 36A (3 Phase)	5 RU	17.32" x 14" x 8.75"	29.54 lbs.
LMP-400A	48VDC	400A	176-300VAC (1 Phase) 208/220/240/380VAC (3 Phase)	144A (1 Phase) 54A (3 Phase)	6 RU	17.32" x 14" x 10.5"	63.93 lbs.

Table 1 – Case and Weight

## 2 Installation

### 2.1 Mounting the LMP

Mounting brackets are provided for 19" and 23" rack mounting. When mounting the LMP, consider the size and weight of the power system. The rack must be able to support the weight of the power system, as well as an additional safety factor. Refer to the table above to verify the weight of the power system. The location chosen for the power system should be within an ambient temperature range of -40°F to 149°F (-40°C to 65°C) with a non-condensing relative humidity of 5 to 95%. The power system should be mounted in an area free of explosive materials and away from any liquids. Avoid using equipment in location with corrosive gases (e.g. over flooded Lead Acid batteries) and dust.

The LMP utilizes fan-assisted cooling, so a clearance of at least 6 inches of free air must be maintained in front and on top for proper cooling. Maintain 12 inches (300 mm) or more of clearance at the rear of the power system when rack mounting in order to allow for operation and maintenance. All hardware should be corrosion-resistant.

#### 2.1.1 Rack-Mounting the LMP

The LMP system can be mounted on a 19" and 23" relay rack. For rack mounting, mount the LMP system to the relay rack and use the hardware provided to secure the LMP to the rack. The 200A and 400A LMP systems should ONLY be center mounted. Refer to figure below.

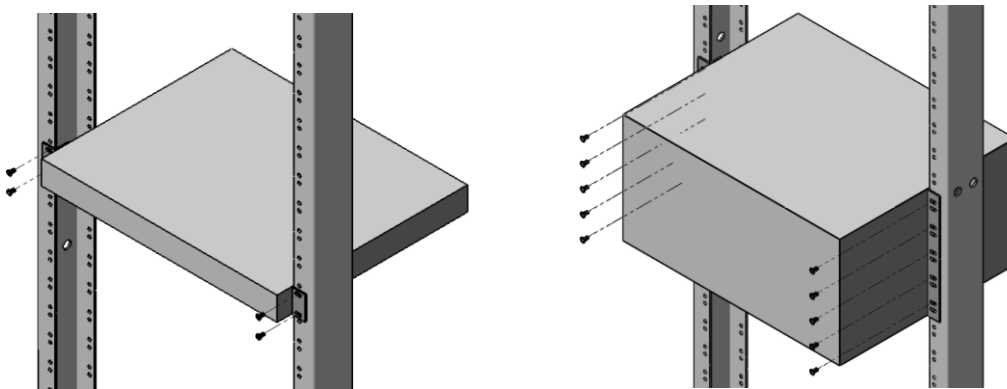


Figure 1 – Installing a Subrack (Left: 100A, Right: 200A/400A)

### 2.2 Installing a Rectifier/Controller

**Step 1:** Push the locking latch towards the left.

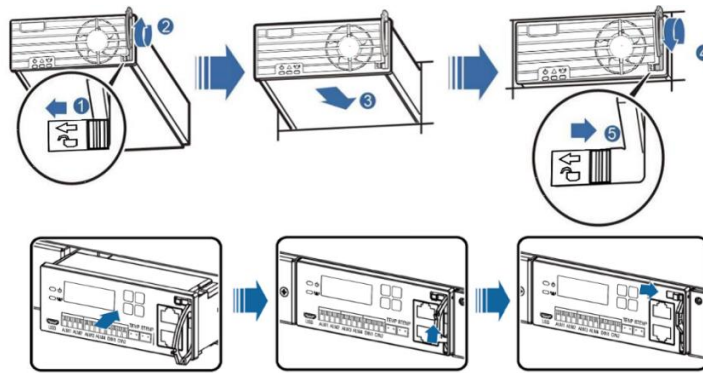
**Step 2:** Draw the handle downwards.

**Step 3:** Gently push the LMP-50R rectifier/LMP-SC controller into its slot along the guide rail.



**Step 4:** Push the handle upwards.

**Step 5:** Push the locking latch towards the right to secure the handle.



**Figure 2 – Installing a Rectifier/Controller**

**NOTE:** When installing the rectifier modules/controller, gently push it into its corresponding slot and assure it plugs in correctly. Use of excessive force may damage the slot or the rectifier module/controller.

**CAUTION:** The rectifier module may be hot when removed, take precautions from handling after removal to prevent burning hazards.

### 2.3 Electrical Connections

Before beginning any work on the power system, ensure that all incoming and output power is de-energized. Verify that no voltage is present by using a voltmeter at all input and output terminals. Check that the voltage and frequency match the power system front nameplate specifications. Select wire size using the table below.

Breaker Size/ Fuse Size - Amps	AWG Minimum Wire Size for AC/DC Connection (mm <sup>2</sup> )	AWG Minimum Wire Size for Equipment Grounding (mm <sup>2</sup> )
3	#14 (2.5)	#14 (2.5)
5	#14 (2.5)	#14 (2.5)
10	#14 (2.5)	#14 (2.5)
15	#14 (2.5)	#14 (2.5)
20	#12 (4)	#12 (4)
25	#10 (6)	#12 (4)
30	#10 (6)	#10 (6)
40	#8 (10)	#10 (6)
50	#8 (10)	#10 (6)
60	#6 (16)	#10 (6)
70	#6 (16)	#8 (10)
80	#4 (25)	#8 (10)
90	#4 (25)	#8 (10)
100	#4 (25)	#8 (10)

**Table 2 – AC/DC Wire Size Minimum Requirements  
(All wires specified in the table are rated at 90 °C or 194 °F)**

**NOTE:** These are recommended sizes per La Marche Standards. The National Electrical Code (NEC) and Local Wiring Codes must be followed.

#### 2.3.1 AC Input Connections

First, connect an adequate earth ground lead (use table above for sizing) to the terminal marked ground using the provided hardware, if applicable. Run the input AC wiring to terminals as shown in Figure 3.1. Carefully insert a flat-blade screwdriver into the top end of the terminal to open it (Figure 3.2). Refer to the table above for recommended wire size; based on AC protection size. Refer to note below for details.

**NOTE:** The AC protection used to feed AC power into the LMP system must be sized depending on the number of LMP-50R rectifiers installed in the LMP. 25A of AC protection should be considered per rectifier module.



Figure 3.1

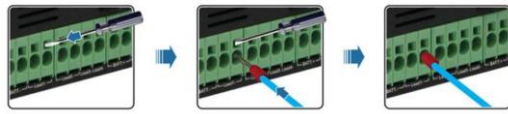


Figure 3.2

Figure 3.1, 3.2 – AC Input Connections (100A System)

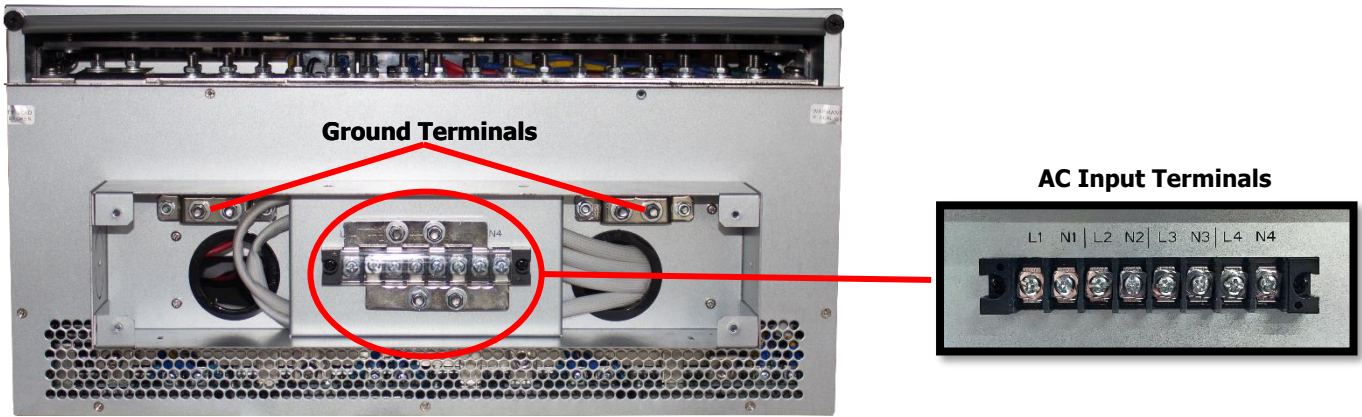


Figure 4 – AC Input Connections (200A System)

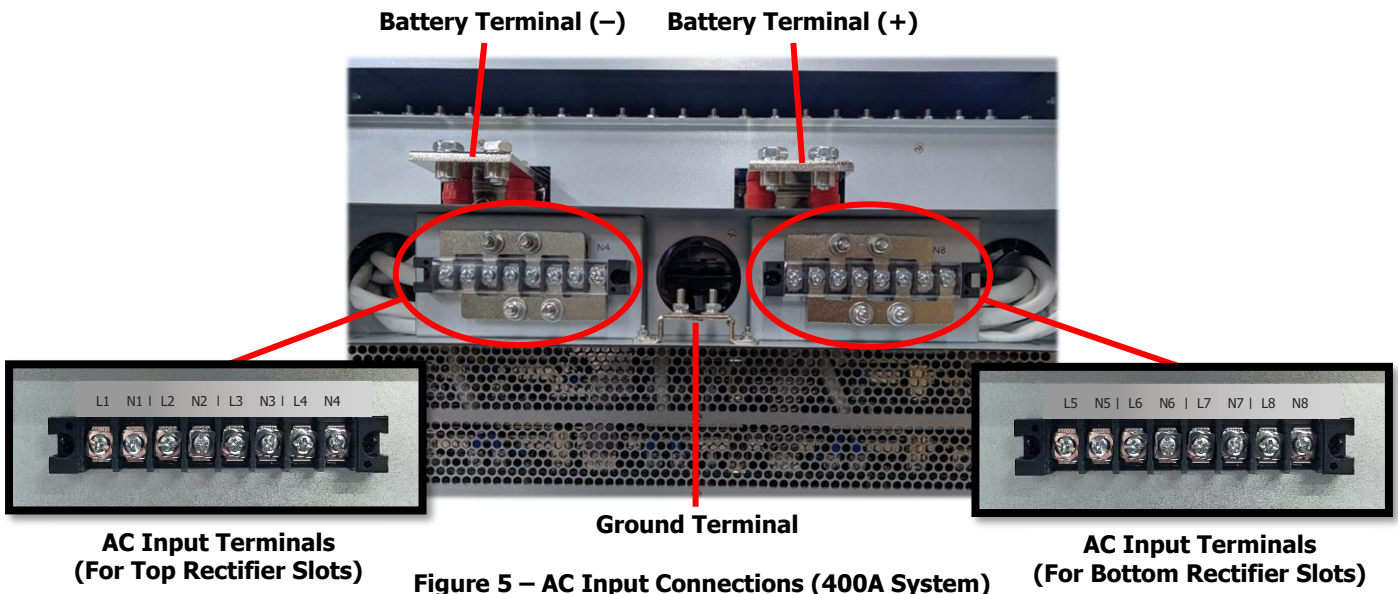


Figure 5 – AC Input Connections (400A System)

### 2.3.2 DC Output Connections

To select the proper size for the DC wiring, use the table below for battery and load protection ratings. Use Table 2 for minimum wire size requirements.

**NOTE:** The LMP system is a floating system, meaning it is not internally grounded to the positive output. The user must make the connection from ground to positive externally for a positive ground system.

Model	Output Amps	Battery Connections	Load Connections	Battery Protection	Load Protection
LMP-100A	100A	1	2 for Critical Loads	40A (2 x 20A Fuses)	Load 1: 80A (2 x 40A Fuses) Load 2: 40A Fuse
LMP-200A	200A	2	8 for Non-Critical Loads* 8 for Critical Loads	2 x Plug-in Breaker Slots (200A max per double slot)	16 x Plug-in Breaker Slots (100A max per slot)
LMP-400A	400A	1	10 for Non-Critical Loads* 10 for Critical Loads	None**	20 x Plug-in Breaker Slots (100A max per slot)

**Table 3 – LMP Connections and Protections**

\*All load connections are set to critical loads by default. To split loads to critical and non-critical, change the LLVD Enable setting to Yes. Use Section 3.3.5 as a menu structure reference.

\*\*400A LMP systems require external battery protection.

If the distance between the power system’s DC output and the DC load exceeds 10 feet, use the Power Cable Guide below to minimize the voltage drop across the wire distance.



**WARNING:** Connecting the battery to the power system may cause a spark at the point of connection. There is a RISK OF EXPLOSION in hazardous areas or locations where explosive gases have accumulated.

### Power Cabling Guide

Use the following formulas and table to determine proper wire size for minimal voltage drop.

#### Table of Conventions

- CMA = Cross section of wire in circular MIL area
- A = Ultimate drain in amperes
- LF = Conductor loop feet
- MaxAmp = Maximum allowable amperes for given voltage drop
- AVD = Allowable voltage drop
- K = 11.1 for commercial (TW) copper wire  
= 17.4 for aluminum

#### Calculating Wire Size Requirements

$$CMA = \frac{A \times LF \times K}{AVD}$$

#### Calculating Current Carrying Capacity of Wire

$$MaxAmp = \frac{CMA \times AVD}{LF \times K}$$

SIZE (AWG)	AREA CIR.MILS	SIZE (MCM)	AREA CIR.MILS
18	1620	250	250000
16	2580	300	300000
14	4110	350	350000
12	6530	400	400000
10	10380	500	500000
8	16510	600	600000
6	26240	700	700000
4	41740	750	750000
3	52620	800	800000
2	66360	900	900000
1	83690	1000	1000000
0	105600	1250	1250000
00	133100	1500	1500000
000	167800	1750	1750000
0000	211600	2000	2000000

**Table 4 – Wire Size/Area Table**

**NOTE:** These are recommended sizes per La Marche Standards. The National Electrical Code (NEC) and Local Wiring Codes must be followed.

#### DC Connection Procedure (LMP-100A System)

**NOTE:** Switch off all circuit breakers before installing battery and load cables.

**Step 1:** Carefully insert a flat-blade screwdriver into the top end of the battery/load cable jack to open it as shown in Figure 6.2.

**Step 2:** Insert the battery/load cable into the corresponding load cable jack.

**Step 3:** Remove the screwdriver and assure the battery/load cable is securely connected.

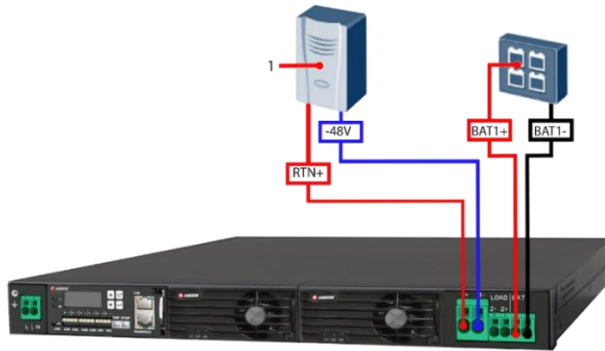


Figure 6.1

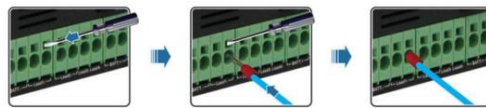


Figure 6.1

**Figure 6.1, 6.2– DC Output Connections to Battery/Loads (100A System)**

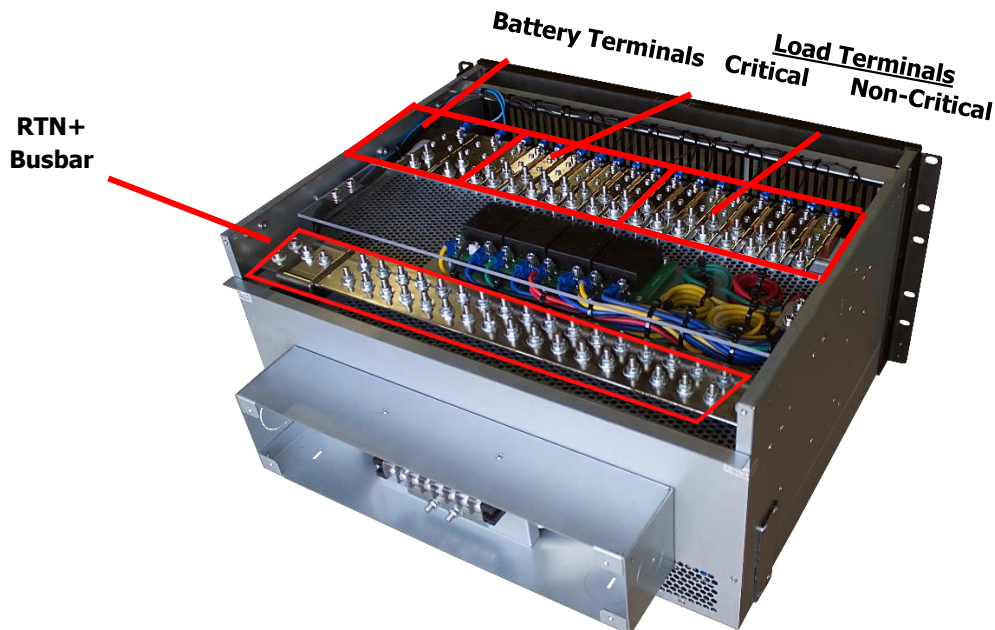
### DC Connection Procedure (LMP-200A/400A System)

**NOTE:** Switch off all circuit breakers before installing battery and load cables.

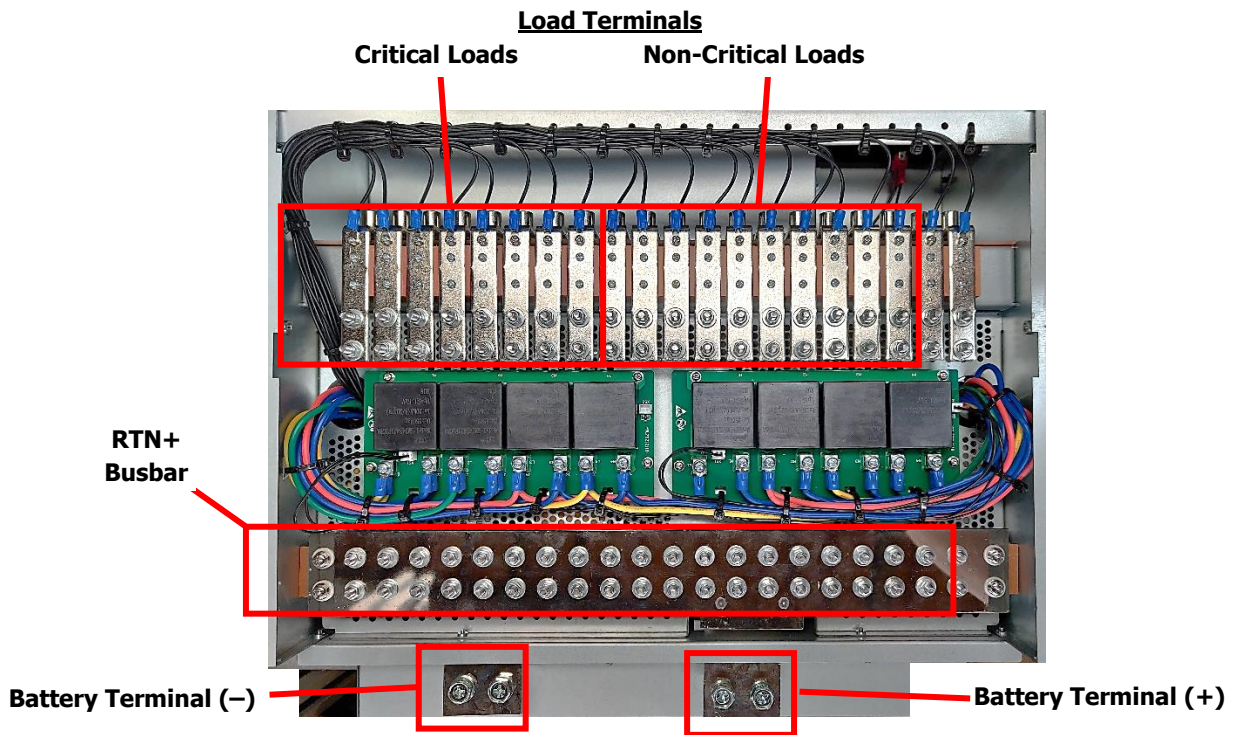
**Step 1:** Route DC output power cables through a cable hole on the rear of the subrack.

**Step 2:** For the loads, take into consideration if the loads are critical or non-critical and make the proper connections. Then, connect the negative load cables to the corresponding load terminal. For 200A systems, connect the negative battery cable to the battery terminals and for 400A systems, connect the battery to the negative battery terminal. Refer to figures below.

**Step 3:** For 200A systems, connect the positive battery/load cables to the RTN+ busbar. For 400A systems, connect the positive battery cable to the positive battery terminal.

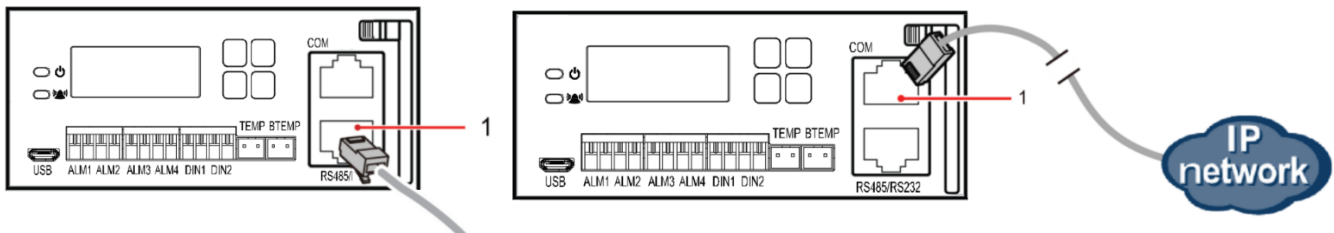


**Figure 7 – DC Output Connections to Battery/Loads (200A System)**



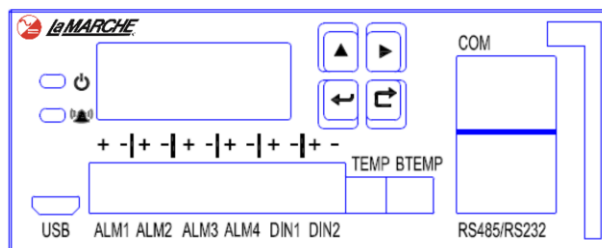
## 2.4 Monitoring Connections

The RS485/RS232 /SNMP telecom ports are used for remote central monitoring and control. Network ends are used as output terminal for telecom port. For over RS485/RS232 port, connect the network cable to the RS485/RS232 port on the LMP-SC, as shown below. For third-party NMS management (over SNMP), connect the COM port on the LMP-SC by using a network cable, as shown below.



## 2.5 Digital Input/Output Connections

Four alarm dry contact output ports and two digital input ports and are included as a standard feature of the LMP system controller, LMP-SC. The included alarms by default factory designation are as show on below table. Refer to the figure on the following page for alarm contact connections.



Alarm Contact No	Factory Default Designation	Relay Logic
ALM1	AC Failure	De-energize on fail
ALM2	Critical	De-energize on fail
	Major	
ALM3	Minor	De-energize on fail
ALM4	Warning	De-energize on fail

**Table 5 – Dry Contact Output Ports Assignment**

The LMP-SC controller can accommodate up to 2 channels, DIN1 & DIN2, and can monitor digital alarm/control signals from different types of equipment. All digital signals are connected via the LMP-SC front panel, see figure above. DIN1 and DIN2 require 3.3-12VDC input across in order to trigger the digital input. Shorting the two pins is another acceptable method of triggering the digital input.

**CAUTION:** *Ensure the correct polarity is used for all digital input cable terminations.*

### 3 Operation




#### 3.1 Starting the LMP

All equipment is shipped from the factory fully checked and adjusted based on the model number. Do not make any adjustments unless the equipment has been powered up and the settings have been determined to be incorrect. Check with battery manufacturer for recommended settings.

##### 3.1.1 Checking the Installation

Before attempting to start up the LMP, check and verify that all connections are correct. Check that all terminations and contacts are tightened securely. Check for any loose connection or unsecured components in the LMP. Check that the battery/load voltage matches the DC output voltage on the nameplate of the LMP. Verify AC feeder breaker matches power system input protection rating.

##### 3.1.2 Start-Up Sequence

Upon powering up the LMP, a test sequence is activated. After the LMP has completed the startup sequence, the green  LED on the front panel will be lit, additional indicators will be lit according to the system's status. Any rectifiers plugged into the LMP will also have their green  LED on the front panel illuminated. The digital meter display will show both the system AC input and DC output voltage, as well as the load current. Pressing the  arrow on the controller will change the parameter that is displayed.

The auto/manual toggle switch in the front panel allows the user to select the Battery Low Voltage Disconnect, BLVD, contactor modes. Below are the available modes:

- **AUTO:** The BLVD contactor is dependent on the state of the system.
- **MANUAL:** The BLVD contactor is always engaged, regardless of the state of the system.




#### 3.2 LmPower R50 Rectifier



Figure 11 – LMP-R50 Front Panel

The LMP-R50 rectifier converts AC power to DC power and utilizes high performance features, such as high efficiency (>96%), walk-in start, complete protection and low noise. The output voltage of the rectifiers can be adjusted through the LMP-SC controller. The rectifier is hot-swappable, providing easy installation and maintenance.

#### Indicators

Name	Color	Normal	Abnormal	Description
Run Indicator 	Green	On	Off	The power supply is not working, or indicator is broken.
			Flashing	The control module operates the rectifier module.
Alarm Indicator 	Yellow	Off	On	AC input overvoltage & under voltage, short circuit, over temperature.
			Flashing	Communication interrupt.
Fault Indicator 	Red	Off	On	Rectifier module fault, PFC output overvoltage.
			Flashing	Rectifier module fan fault.

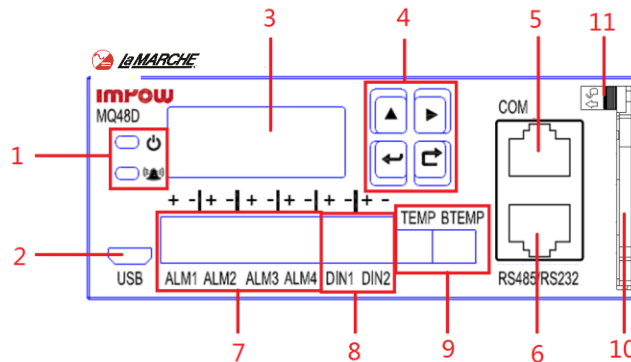
### 3.3 LmPower SC Controller



**Figure 12 – LMP-SC Front Panel**

The standard LMP comes with an LMP-SC controller. The LMP-SC features embedded battery and ambient temperature sensor ports, 2 common digital inputs and 4 dry contact alarm outputs. The LMP-SC controller is user-friendly with many additional features.

*NOTE: The LMP system can supply power without a controller installed. If controller is removed or is faulty, the output of the system will remain unchanged until replacement controller is installed. If no controller is present, the rectifier modules will have the yellow LED blinking, indicating a communication fault due to the missing controller.*



- (1) Operation Indicator
- (2) USB Port
- (3) LCD Display
- (4) Buttons
- (5) COM Port (SNMP)
- (6) RS485/RS232 Port
- (7) Dry Contact Output Ports
- (8) Digital Input Ports
- (9) Ambient Temperature / Battery Temperature Sensor Port
- (10) Handle
- (11) Locking Latch

The parameters viewable on the idle display are as follows (The date and time will alternate on the display):

<b>2022-08-12</b>	
<b>54.1 VDC</b>	<b>123VAC</b>
<b>Load:</b>	<b>0.2 A</b>

System DC Output Voltage  
AC Input Voltage  
Load Current

<b>2022-08-12</b>	
<b>Batt Cur.: 0.0 A</b>	
<b>Batt Stat.: Float</b>	

Battery Voltage & Charge Mode

<b>2022-08-12</b>	
<b>Batt. Temp.: NC</b>	
<b>Amb. Temp.: NC</b>	

Battery & Ambient Temperature

<b>2022-08-12</b>	
<b>Vinv: 0V</b>	
<b>Iout: 0.0 A</b>	





**Inverter & Voltage Current**  
(Currently not available, for future use)

<b>2022-08-12</b>	
<b>SysStatus: OK</b>	
<b>SysMode: Automatic</b>	

**Inverter & System Status**



## Buttons

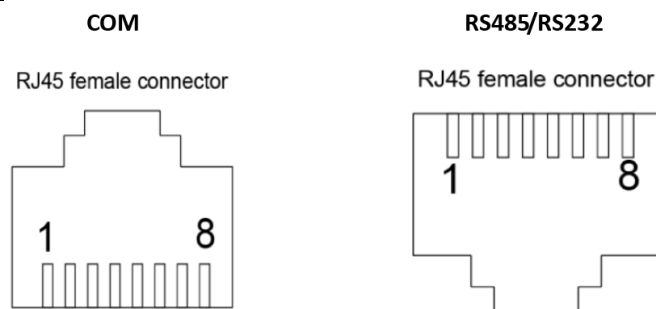
Button	Name	Description
	Page Up	Scrolls up menus or sets parameter values.
	Page Right	Scrolls down menus.
	Back	Returns to the previous menu without saving the settings.
	Enter	<ul style="list-style-type: none"> <li>• Enters the main menu from the standby screen.</li> <li>• Enters a submenu from the main menu.</li> <li>• Saves the menu settings.</li> </ul>
<ul style="list-style-type: none"> <li>• The LCD screen becomes dark if no button is pressed within 4 minutes.</li> <li>• You need to log in again if no button is pressed within 1 minute.</li> <li>• The preset password is 000001</li> </ul>		

## Indicators

Name	Color	Status	Description
Run Indicator	Green	Off	The LMP-SC is faulty or has no DC input.
		On	The LMP-SC is running properly.
Fault Indicator	Red	Off	No critical or major alarm is generated.
		On	A critical or major alarm is generated.

## Communications Ports

Communications Port	Communications Parameter	Communications Protocol	Function
COM Port	10/100M Auto-Adaptation	HTTPS and SNMP	Connects to an upper-level NMS
RS485/RS232 Port	<u>PORT1 Baud Rate:</u> 1200, 2400, 4800, 9600 bit/s <u>PORT2 Baud Rate:</u> 9600, 19200, 115200 bit/s	PORT1: BMS Protocol PORT2: Modbus Protocol	PORT1 connects to BMS PORT2 connects to upper-level device such as BBU



**Figure 13 – RS485/RS232 Port and COM Port Pinout**

Pin	Signal	Description
1	TX+	Sends data over the COM port.
2	TX-	
3	RX+	Receives data over the COM port.
6	RX-	
4, 5, 7, and 8	Not defined	None

**Table 7 – COM Port Pin Definitions**

Pin	Signal	Description
1	T232B	RS232 PORT1 can be connected to BMS
2	R232B	
3	GND232	
4	485AE	RS485 or RS232 PORT2
5	485BE	
6	T232E	
7	R232E	
8	485GND2	

**Table 8 – RS485/RS232 Port Pin Definitions**

### 3.3.1 Setting the Date and Time

Set the date and time as required.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Setting Wizard	Date and Time	Date Time	No default value	Set to the local date/time.

### 3.3.2 Setting Battery Parameters

Set the battery parameters, such as the battery capacity.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Setting Wizard	Battery Parameters	Batt1 Connected	Yes	Set parameter to desired value.
		Batt2 Connected	No	
		Battery Type	VRLA	
		Rated Capacity	100 AH	

Set the power system charge settings, such as the charge coefficient.

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Value Range
Settings	Battery	Charge Parameters	Auto. EC Enable	No	Yes, No
			FC – EC Cur. Coef.	0.05C10	0.01 ~ 0.25
			FC – EC Cur. Duration	30Min	2 ~1440
			FC – EC Cap. Percent	80%	50~ 100
			Sche. EC Enable	No	Yes, No
			Sche. EC Interval	30Day	1 ~365
			Sche. EC Duration	9h	1~ 24
			EC – FC Cur. Coef.	0.01C10	0.01~ 0.25
			EC – FC Cur. Duration	240Min	2 ~540
			EC Max Duration	8h	5~ 48
			Main Recovery EC En	No	Yes, No
			AC Fail Duration	10Min	0~ 30
Fast Charge Coef.	0.25C10	0.25~ 0.50			

### 3.3.3 Setting Rectifier Current Limit

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Value Range
Settings	Rectifier	Max. Limited Current	1.21	1~ 121

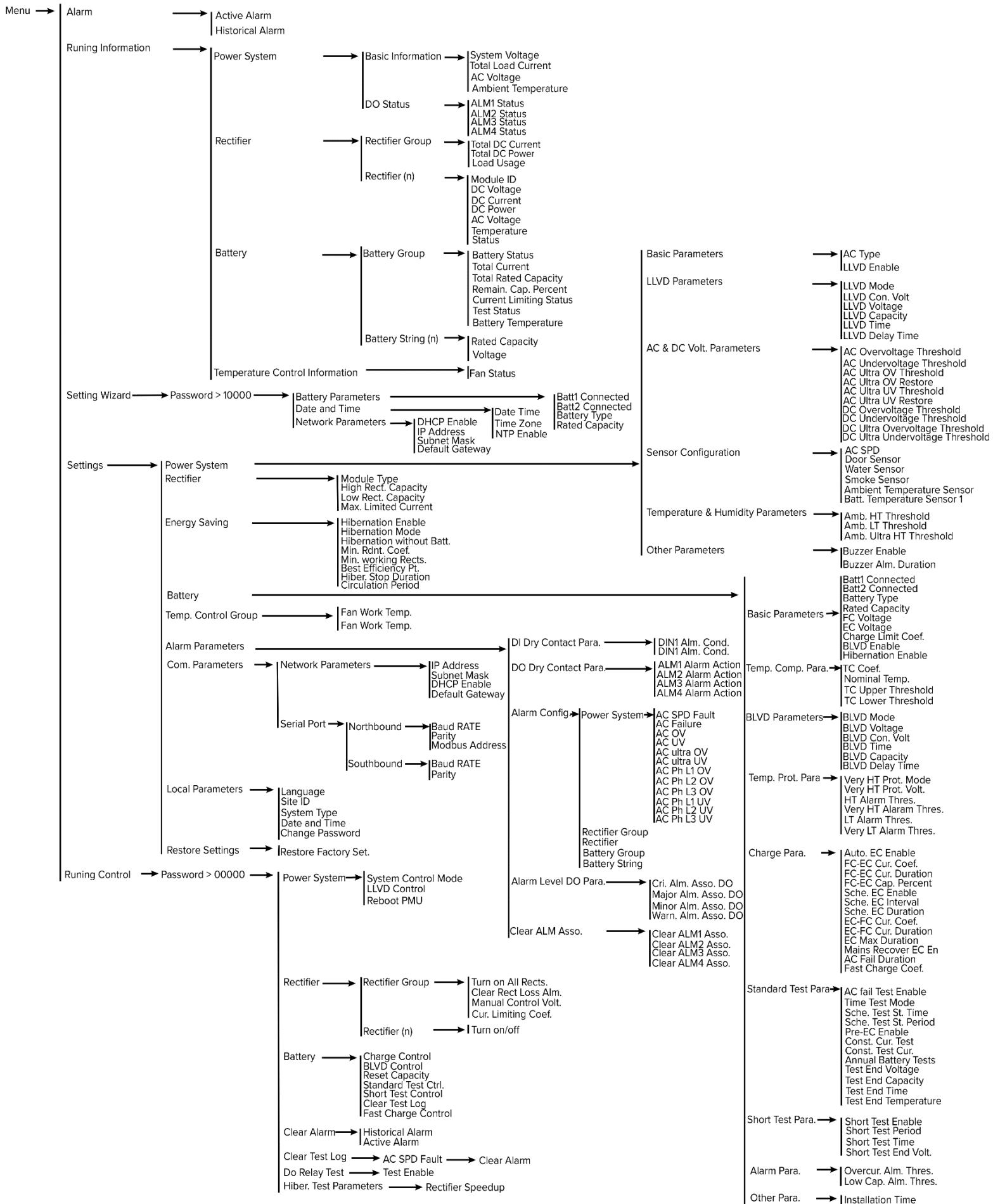
**NOTE:** The Rectifier current is the combination of the load current plus the battery charging current.

### 3.3.4 Setting Communication Parameters

Set the communication parameters, such as the IP address, subnet mask, gateway, and port number for SNMP management.

Main Menu	Second-Level Menu	Third-Level Menu	Default Value	Setting Value
Settings Wizard	Network Parameters	IP Address	192.168.001.190	Set parameter based on address assigned by network administrator.
		DHCP Enable	No	
		Subnet Mask	255.255.255.0	
		Default	192.168.1.1	

### 3.3.5 LMP Customer Configuration Menu Structure



## 4 Service

All work inside the LMP power system should be performed by qualified personnel. La Marche is not responsible for any damages caused by an unqualified technician.



Before working inside the LMP, ensure the AC power is off at the main breaker box and the battery has been removed from the power system's DC output terminals, either by removing the battery cables or exercising the battery disconnect. Verify that no voltage is present by using a voltmeter at all input and output terminals.

### 4.1 Performing Routine Maintenance

Although minimal maintenance is required with La Marche power systems, routine checks and adjustments are recommended to ensure optimum system performance.

#### Yearly

1. Confirm air vents are open. Remove dust and debris from interior of unit.
2. Verify all connections are tight.
3. Perform a visual inspection on all internal components.
4. Check front panel meters for accuracy and LED operation.

### 4.2 Troubleshooting Procedure

Troubleshooting should be performed only by trained service personnel or experienced electricians. Before setting up any complicated testing or making any conclusions, inspect the power system using the guide below.

Check the following:

1. Check DC output cables, connections, battery type, and number of cells against the power system's rating.
2. Check power system specifications against customer order.
3. Check input connections, input voltage and breaker size.
4. Check for shipping damage, loose connections, broken wires, etc.
5. Certain failures can be caused by defective batteries and customer loads; make sure batteries and loads are free from defects.

**NOTE:** *If the problem is found to be located in the printed circuit boards, the board should be replaced. No attempt should be made to repair circuit boards in the field.*

La Marche Service Technicians are available to help with troubleshooting or with scheduling power system service. When calling for a service inquiry or for troubleshooting assistance, be sure to have all of the following information on hand:

1. Equipment model number and serial number.
2. The measured AC input voltage.
3. The measured DC output voltage, with and without the battery.
4. Result of the check of the AC and DC breakers.
5. The DC output current and voltage, measured with battery and load connected to power system.

**NOTE:** *When ordering replacement parts, drawings, or schematics, provide the model number, serial number, and description of problem, if available.*

La Marche Phone Number: (847) 299-1188  
24-hour **Emergency** Number: (847) 296-8939

### 4.3 Troubleshooting Chart



Isolate from all power sources prior to performing any interior verifications or part replacements.

Symptom	Possible Cause	Action
AC Failure	The AC input power cable is faulty.	Check whether the AC input cable is loose. If yes, secure the AC input cable.
	The AC input circuit breaker is OFF.	Check whether the AC input circuit breaker is OFF. If yes, handle the back-end circuit failure and then switch on the circuit breaker.
	The mains grid is faulty.	Check whether the AC input voltage is lower than 50VAC. If yes, handle the mains grid fault.
AC Over Voltage	The AC overvoltage alarm threshold is not set properly on the LMP-SC.	Check whether the AC overvoltage alarm threshold is properly set. If no, adjust it to a proper value.
	The power grid is faulty.	Check whether the AC input voltage exceeds the AC overvoltage alarm threshold (280VAC by default). If yes, handle the AC input fault.
AC Under Voltage	The AC undervoltage alarm threshold is not set properly on the LMP-SC.	Check whether the AC undervoltage alarm threshold is properly set. If no, adjust it to a proper value.
	The power grid is faulty.	Check whether the AC input voltage is below the AC undervoltage alarm threshold (180VAC by default). If yes, handle the AC input fault.
DC Over Voltage	The DC overvoltage alarm threshold is not set properly on the LMP-SC.	Check whether the DC overvoltage alarm threshold (58VDC by default) is properly set. If no, adjust it to a proper value.
	The power system voltage is set too high in manual mode.	Check whether the system voltage is set too high in manual mode. If yes, confirm the reason and adjust the voltage to normal after the operation.
	Rectifiers are faulty.	Remove the rectifiers one by one and check whether the alarm is cleared. If the alarm still exists, reinstall the rectifier. If the alarm is cleared, replace the rectifier.
DC Under Voltage	An AC power failure occurs.	Check whether an AC power failure occurs. If yes, resume the AC power supply.
	The DC undervoltage alarm threshold is not set properly on the LMP-SC.	Check whether the DC undervoltage alarm threshold (45VDC by default) is properly set. If no, adjust it to a proper value.
	The system configuration is not proper.	Check whether the load current is greater than the current power system capacity. If yes, expand the power system capacity or reduce the load power.
	The power system voltage is set too low in manual mode.	Check whether the system voltage is set too low in manual mode. If yes, confirm the reason and adjust the voltage to a proper value after the operation.
	Rectifiers are faulty.	Check whether the power system capacity is insufficient for the loads due to rectifier failures. If yes, replace the faulty rectifier.
Battery Charge Overcurrent	The rectifier communication is interrupted.	Check whether an alarm is generated for rectifier comm. interruption. If yes, remove the rectifier and reinstall it to check whether the alarm is cleared. If the alarm still exists, replace the rectifier.
	Poor contact of the LMP-SC.	

	The LMP-SC is faulty.	Remove the LMP-SC and reinstall it to check whether the alarm is cleared. If the alarm still exists, replace the LMP-SC.
LLVD Disconnected	An AC power failure occurs.	Check whether an AC power failure occurs. If yes, resume the AC power supply.
	Loads are manually disconnected.	Check whether loads are manually disconnected. If yes, confirm the reason of the manual disconnect, and reconnect the loads after the operation.
	The load disconnect voltage is set too high on the LMP-SC.	Check whether the load disconnect voltage (44VDC by default) is set too high on the LMP-SC. If yes, adjust it to a proper value.
BLVD Disconnected	An AC power failure occurs.	Check whether an AC power failure occurs. If yes, resume the AC power supply.
	Batteries are manually disconnected.	Check whether batteries are manually disconnected. If yes, confirm the reason of the manual disconnect, and reconnect the batteries after the operation.
	The battery disconnect voltage is set too high on the LMP-SC.	Check whether the battery disconnect voltage (43.2VDC by default) is set too high on the LMP-SC. If yes, adjust it to a proper value.
Battery Loop Trip	The battery circuit breaker trips or battery fuse detection cable is disconnected.	Check whether the battery circuit breaker trips or battery fuse detection cable is disconnected. If yes, reconnect the cable.
	The battery circuit breaker trips or battery fuse is blown.	Check whether the battery circuit breaker trips or battery fuse is blown. If yes, rectify the battery loop fault and then switch on the circuit breaker or replace the fuse.
	The contactor is faulty.	Manually switch on or switch off the battery contactor and check the battery current changes accordingly. If no, replace the contactor.
High Ambient Temperature	The ambient overtemperature alarm threshold is not set properly on the LMP-SC.	Check whether the ambient temperature alarm threshold (55°C by default) is properly set on the LMP-SC. If no, adjust it based on site requirements.
	The temperature control system is faulty in the cabinet where the ambient temperature sensor is located.	Check whether the temperature control system in the cabinet is faulty. If yes, rectify the fault. The alarm is cleared when the cabinet temperature falls within the allowed range.
	The ambient temperature sensor is faulty.	Check whether the ambient temperature sensor is faulty. If yes, replace the temperature sensor.
Low Ambient Temperature (Optional)	The ambient undertemperature alarm threshold is not set properly on the LMP-SC.	Check whether the ambient undertemperature alarm threshold (-20°C by default) is properly set on the LMP-SC. If no, adjust it based on site requirements.
	The temperature control system is faulty in the cabinet where the ambient temperature sensor is located.	Check whether the temperature control system in the cabinet is faulty. If yes, rectify the fault. The alarm is cleared when the cabinet temperature falls within the allowed range.
	The ambient temperature sensor is faulty.	Check whether the ambient temperature sensor is faulty. If yes, replace the ambient temperature sensor.

High Ambient Humidity (Optional)	The ambient overhumidity alarm threshold is not set properly on the LMP-SC.	Check whether the ambient overhumidity alarm threshold (95% RH by default) is properly set on the LMP-SC. If no, adjust it based on site requirements.
	The humidity is too high in the cabinet where the humidity sensor is located.	Check whether water intrudes into the cabinet. If yes, wipe the water with dry cotton or other tools and rectify the fault.
	The humidity sensor is faulty.	Check whether the humidity sensor is faulty. If yes, replace the humidity sensor.
Low Ambient Humidity (Optional)	The ambient underhumidity alarm threshold is not properly set on the LMP-SC.	Check whether the ambient underhumidity alarm threshold (5% RH by default) is properly set on the LMP-SC. If no, adjust it based on site requirements.
	The humidity is too low in the cabinet where the humidity sensor is located.	Check whether the humidity inside the cabinet is too low. If yes, adjust the humidity. The alarm is cleared when the humidity returns to the allowed range.
	The humidity sensor is faulty.	Check whether the humidity sensor is faulty. If yes, replace the humidity sensor.
Battery High Temperature	The battery overtemperature alarm threshold is not set properly on the LMP-SC.	Check whether the battery overtemperature alarm threshold (50°C by default) is properly set. If no, adjust it to a proper value.
	The battery temperature controlling system is faulty.	Check whether the battery temperature controlling system is faulty. If yes, rectify the fault. The alarm is cleared when the battery temperature falls within the allowed range.
	The battery temperature sensor is faulty.	Check whether the battery temperature sensor is faulty. If yes, replace the temperature sensor.
Battery Low Temperature (Optional)	The battery undertemperature alarm threshold is not set properly on the LMP-SC.	Check whether the battery undertemperature alarm threshold (-10°C by default) is properly set. If no, adjust it to a proper value
	The battery temperature controlling system is faulty.	Check whether the temperature control system for the battery compartment is faulty. If yes, rectify the fault. The alarm is cleared when the temperature in the battery compartment becomes normal.
	The battery temperature sensor is faulty.	Check whether the battery temperature sensor is faulty. If yes, replace the temperature sensor.
Door Alarm (Optional)	The cabinet doors are open.	Close cabinet doors.
	The door status sensor is faulty.	Check whether the door status sensor is faulty. If yes, replace the door status sensor.
Water Alarm (Optional)	Water intrudes into the cabinet.	Check whether water intrudes into the cabinet. If yes, wipe the water with dry cotton or other tools and rectify the fault.
	The water sensor is faulty.	Check whether the water sensor is faulty. If yes, replace the water sensor.
Smoke Alarm (Optional)	There is smoke inside the cabinet.	Check whether there is smoke inside the cabinet. If yes, disconnect the power supply from the cabinet, handle the fault, and then resume system operation and clear the alarm on the LMP-SC.
	The smoke sensor is faulty.	Check whether the smoke sensor is faulty. If yes, replace the smoke sensor.



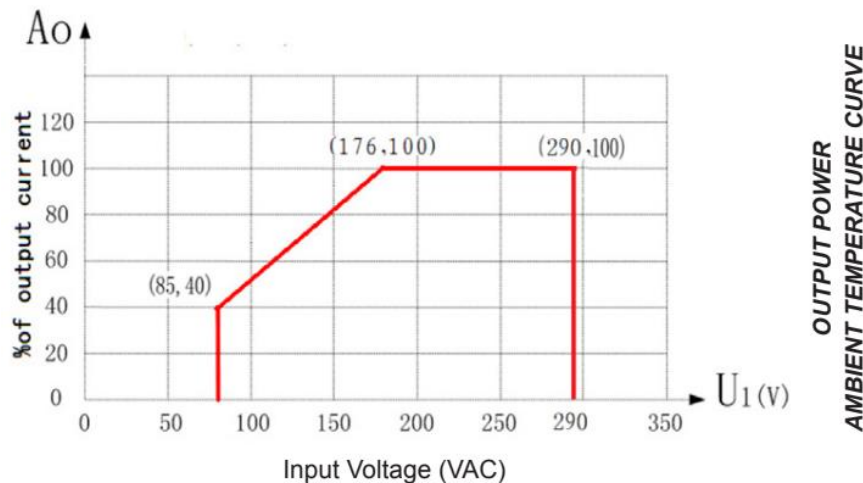
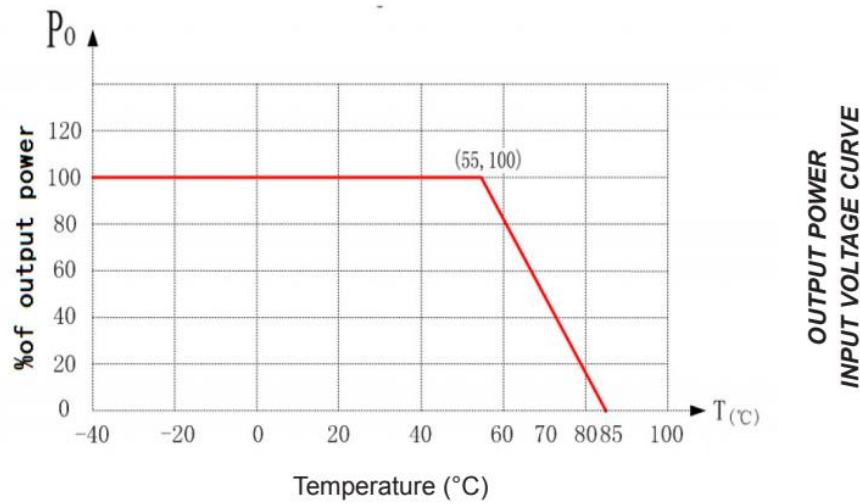
Rectifier Fault	The rectifier is in poor contact.	<p>Check the Fault indicator on the rectifier panel. If it is steady red, remove the rectifier, and then reinstall it after the indicator turns off.</p> <p>If the alarm still exists, replace the rectifier.</p>
	The rectifier is faulty.	
Rectifier Protection	The rectifier input voltage is too high.	Check whether the AC input voltage exceeds the upper threshold of the rectifier working voltage. If yes, rectify the power supply fault and then resume the power supply.
	The rectifier input voltage is too low.	Check whether the AC input voltage is below the lower threshold of the rectifier working voltage. If yes, rectify the power supply fault and then resume the power supply.
	The ambient temperature is too high.	Check whether the ambient temperature is higher than the normal operating temperature of the rectifier. If yes, check and rectify the temperature unit fault.
	The rectifier is abnormal.	Remove the rectifier that generates the alarm and reinstall it after the indicator turns off. If the alarm still exists, replace the rectifier.
Rectifier Communication Fault	The rectifier is removed.	Check whether the rectifier is removed. If yes, reinstall it.
	The rectifier is in poor contact.	<p>If the rectifier is in position, remove the rectifier and reinstall it.</p> <p>If the alarm still exists, replace the rectifier.</p>
	The rectifier is faulty	
Load Fuse Break	The load circuit breaker trips or fuse is blown.	Check whether the load circuit breaker trips or fuse is blown. If yes, rectify the back-end circuit fault and then switch on the circuit breaker or replace the fuse.
	The load circuit breaker or fuse detection cable is disconnected.	Check whether the load circuit breaker or fuse detection cable is disconnected. If yes, reconnect the cable.
AC SPD Alarm	The AC SPD is faulty.	Check whether the AC SPD indication window turns red. If yes, replace the SPD.
	The AC SPD detection cable is disconnected.	Check whether the AC SPD detection cable is disconnected. If yes, reconnect the cable.

## Appendix A: LMP Specifications

		100A (1RU)	200A (5RU)	400A (6RU)
AC Input	Input Mode	176-300VAC (1Ph) Linearly Derated (85-175VAC)	176-300VAC (1Ph) 208/220/240VAC or 380VAC (3Ph)	176-300VAC (1Ph) 208/220/240VAC or 380VAC (3Ph)
	Max Input Current	36A	72A (1Ph) 36A/Ph (3Ph)	144A (1Ph) 54A/Ph (3Ph)
	Input Frequency	50Hz/60Hz (45 to 66Hz)		
	SPD (Surge Protection)	20kA/40kA, 8/20 $\mu$ s		
DC Distribution*	Output Voltage	-42 to -58VDC, Nominal: -53.5VDC		
	Rated Output	6000W	12000W	24000W
	Battery Breakers	1 $\times$ 40A (Fuse)	2 x Plug-in Breaker Positions (Up to 200A per position)	Battery Connection Terminals
	Load Breakers (1P)	1 $\times$ 80A (Fuse) 1 $\times$ 40A (Fuse)	16 x Plug-in Breaker Positions (Up to 100A per position)	20 x Plug-in Breaker Positions (Up to 100A per position)
	Low Voltage Disconnect (1P)	LVBD	LVID LVBD (w/ bypass switch)	LVLVD
Rectifier	Input Voltage	85 to 300VAC, rated 220VAC		
	Rated Power	3000W (176 to 300VAC) Linearly Derated (85 to 175VAC)		
	Efficiency	>96% Peak		
	Power Factor	$\geq$ 0.99		
	THD	$\leq$ 5%		
	Operating Temperature	-40°C to 65°C (full load @ 55°C)		
	Dimension (WxDxH)	4.17 $\times$ 11.73 $\times$ 1.67in 106 $\times$ 298 $\times$ 42.5mm		
	Weight	3.53lbs (1.6kg)		
	Cooling	Forced Cooling		
Controller	Signal Input	1 Battery Temp, 1 Ambient Temp, 2 Common DI	1 Battery Temp, 1 Ambient Temp, 1 Smoke, 1 Gate, 2 Common DI	1 Battery Temp, 1 Ambient Temp, 1 Smoke, 1 Gate, 2 Common DI
	Alarm Output	4 Dry Contacts		
	Communication Port	RS232/485, Ethernet		
	Display Mode	LCD		
System**	Dimension (WxDxH)	17.32 $\times$ 14 $\times$ 1.73in 440 $\times$ 354 $\times$ 44mm	17.32 $\times$ 14 $\times$ 8.75in 440 $\times$ 354 $\times$ 222.2mm	17.32 $\times$ 14 $\times$ 10.5in 440 $\times$ 354 $\times$ 266.7mm
	Weight (w/out rect.)	14.33lbs (6.5kg)	29.54lbs (13.4kg)	63.93lbs (29kg)
	Safety	IEC 60950 Standards, EN 61000-4-5		
	Mounting	19-in Rack Mount (Available in 23" Mounting)		
	Terminals	Front Access	Top Access	Top Access
Safety	Safety Certifications	UL/IEC 62368-1 FCC Part 15 Subpart B		
Environmental	Operating Temperature	-40°F to 149°F (-40°C to 65°C)		
	Storage Temperature	-40°F to 158°F (-40°C to 70°C)		
	Operating Humidity	5% to 95% (Non-Condensing)		
	Altitude	0 to 6562ft (0 to 2000m)		

## Appendix B: LMP-R50 Specifications

AC Input	Voltage (V)	176-300VAC (1Ph) Linearly Derated (85-175VAC)
	Current (A)	≤18A
	Frequency	45Hz - 66Hz
	Power Factor	≥0.99
DC Output	Efficiency	>96% Peak
	Voltage Range	-42.0Vto-58.0VDC Rated Value: -53.5VDC
	Rated Power	3000W (176 to 300VAC) Linearly Derated (85-175VAC)
	Load Regulation	≤±0.5%
	Voltage Regulation	≤±0.1%
	Noise Level (mV)	≤2 (Balance Weight) ≤200 Peak-Peak ≤50 (3.4~150kHz) ≤20 (0.15~30mHz)
	Load Sharing	≤±5%
Environmental	Operating/Storage Temperature	-40°F to 185°F (-40°C to 85°C)
	Humidity RH	5% to 95% (Non-Condensing)
Safety	Safety Certifications	UL/IEC 62368-1 FCC Part 15 Subpart B
Other	Protective Function	Input Overvoltage, Under-Voltage; Output Overvoltage, Overload, Short Circuit; Over-Temperature and Fan Failure
	Cooling	Speed Controlled Forced Cooling
	Dimensions (W×D×H)	4.17" x 11.26" x 1.61" (106×286×41mm)
	Weight	4.19lbs (1.9kg)



## Appendix C: Manufacturer's Warranty

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within two years from date of purchase.

Should a piece of equipment require major component replacement or repair during the first year of the warranty period, these can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. Transportation charges or duties shall be borne by purchaser.
2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard LaMarche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes and is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

**Appendix D: Document Control and Revision History**

Part Number: 142884  
Instruction Number: P25-LLMP-1  
Issue ECN: 22586 – 05/20

<b>22864 – 04/21</b>	22687 – 09/20	22586 – 05/20	