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LMDC

LA MARCHE DISTRIBUTION CENTER WITH LMHF RECTIFIER SYSTEM



INSTALLATION AND OPERATION MANUAL

ECN/DATE

CPN 123963

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ISSUE DATE: **ECN 19373/01-12**

INSTRUCTION DRAWING NUMBER:
 P25-**LLMDC-1**

IMPORTANT SAFETY INSTRUCTIONS
FOR THE
LA MARCHE POWER CONVERSION EQUIPMENT
SAVE THESE INSTRUCTIONS

This manual contains important safety and operating instructions for the La Marche Power Conversion Equipment.

Before using this equipment, read all instructions and cautionary markings on (1) unit, (2) battery, and (3) product using the battery.

CAUTION: To reduce risk of injury and/or damage to the batteries, use only the type of batteries specified on the charger.

Do not expose equipment to rain or snow.

Do not operate equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.

Do not disassemble this unit; take it to a qualified serviceman when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

To reduce risk of electric shock, disconnect this unit from the AC supply, or batteries and loads before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

WARNING – THERE IS A RISK OF EXPLOSIVE GASSES AND WORKING IN THE VICINITY OF A BATTERY IS DANGEROUS. SOME BATTERIES GENERATE EXPLOSIVE GASSES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE USING THIS UNIT, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.

To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in the vicinity of the battery.

Review cautionary marking on all products.

PERSONAL PRECAUTIONS:

1. Someone should be within range of your voice or close enough to come to your aid when you work near a battery.
2. Have plenty of fresh water and soap nearby in case the battery electrolyte contacts skin, clothing, or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near a battery.
4. 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 get medical attention immediately.
5. Never smoke or allow a spark or flame in vicinity of a battery.
6. Be extra cautious, DO NOT drop metal onto a battery. It might spark or short-circuit the battery or cause an explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short-circuit current high enough to weld these items causing severe burns.
8. NEVER charge a frozen battery.

PREPARING TO CHARGE

1. If it is necessary to remove the battery connections, always remove grounded terminal from the battery first. Make sure all loads are disconnected and unit is off, so as not to cause an arc.
2. Be sure the area around the battery is well ventilated while the battery is being charged.
3. When cleaning battery terminals, be careful to keep corrosion from coming in contact with eyes.
4. Study all the battery manufacturer's specific precautions such as removing or not removing cell caps while charging, recommended rates of charge, and maintenance procedures.

UNIT LOCATION

- Never place this unit directly above the standard flooded battery. Gases from the battery will corrode and damage equipment. A sealed maintenance free or valve regulated lead acid (VRLA) may be placed below this equipment.
- Never allow the battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.
- Do not set any battery on top of this unit.

DC CONNECTION PRECAUTIONS

Connect and disconnect DC output cables only after setting all of this unit's switches to off position and removing AC input supply.

GROUNDING INSTRUCTIONS

This battery charger should be connected to a grounded, metal, permanent wiring system; or an equipment grounding conductor should be run with circuit conductors and connected to equipment-grounding terminal or lead on battery charger. Connections to battery should comply with all local codes and ordinances.

CAUTION: DO NOT PULL ON OUTPUT CABLES WHEN DISCONNECTING CHARGER FROM BATTERY.

RECEIVING INSTRUCTIONS

CAUTION: To ensure safe installation and operation, the information given in the instruction manual should be read and understood before installing or using the equipment.

Unpacking and Inspection: Examine the shipping crate upon arrival. If there is obvious damage, describe on the receiving documents. Within a few days after delivery, the equipment should be uncrated and carefully inspected for hidden damages. When removing packaging material, be careful not to discard any equipment, parts, or manuals. If any damage is detected you should:

1. File a claim with the carrier within five (5) days.
2. Send a copy of the claim to La Marche Mfg. Co.
3. Call La Marche Mfg. For a RETURN MATERIAL AUTHORIZATION NUMBER.

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

HANDLING

WARNING: Equipment can be very heavy, and top-heavy. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent the equipment from being accidentally tipped over.

NOMENCLATURE PLATES

Each piece of La Marche Mfg. Equipment shipped is identified by part number on the nomenclature plate.

ADJUSTMENTS

All equipment is shipped from the factory fully checked and adjusted. Do not make any adjustments unless the equipment has been powered-up and the settings have been determined to be incorrect.

SPARE PARTS

To minimize downtime during installation or normal service, it is advisable to purchase spare fuses, circuit boards and other recommended components. Please refer to the list of recommended spare parts and their La Marche Mfg. Part numbers included with the instruction manual. It is recommended that spare fuses be ordered for all systems.

To order spare parts, please contact La Marche Mfg. (847)-299-1188 during business hours and ask for the Parts Department.

LMDC GENERAL DESCRIPTION

The La Marche Distribution Center is designed for the La Marche LMHF modular rectifiers. It is a Distribution Breaker Box for a common connection to customer loads, the LMHF rectifier system and an optional battery. The LMDC comes in a Single or Double Tier configuration. It has 20 positions per tier for Plug-In bullet type breakers. The LMDC system is also available with either a shelf mounted controller (where the LMHF controller occupies a single shelf bay), or a rack mounted controller (where the LMHF controller is installed into the access door of the LMDC). The LMDC is a floating system with a common return bus bar for all connections to system loads. For ease of access all connections to the LMDC can be made from the front of the unit through a front access door.

MODIFICATIONS TO LMHF CONFIGURATION

In order to work correctly with the LMDC, the configuration files for the LMHF Software have been modified. If the LMHF controller needs to be replaced or reset the configuration file will need to once again be modified for proper operation with the LMDC. The modified configuration files can be obtained by contacting the factory. For information on uploading the configuration files to the LMHF controller see Section 6.7 of the *LMHF Software Manual*.

LMHF RECTIFIER SYSTEM MANUALS

Throughout this Manual references are made to both the LMHF Software Manual and LMHF Hardware Manual. These manuals are included with the purchase of the LMDC (with LMHF Rectifier System). If the manuals were not received or have been misplaced, soft copies can be found by visiting www.lamarchemfg.com and entering LMHF in the search box. Alternatively they can be found using the following direct link: <http://www.lamarchemfg.com/productdetails.php?productid=270>

1. INSTALLATION



CAUTION: Before beginning the installation process it is recommended to have read the entire LMHF Hardware Manual

The LMDC is designed for simple connection of all system loads. All load connections can be made from the access door on the front of the unit.



WARNING

Hazardous AC voltages may be present. Ensure power at the AC service panel is off before attempting work on the AC connections. Use a voltmeter to verify the absence of voltage. Clearly mark the correct polarity of the battery leads before commencing work on DC connections.

1.1 TOOLS REQUIRED

Various tools are essential for product installation. Use this list as a guide:

- Digital voltmeter equipped with test leads
- Cutters and wire strippers (#10 to #22AWG) (6 to 0.34mm²)
- Crimping tool (optional for large gauge wire)
- Socket and ratchet set (Imperial measure)
- Anti-static wrist strap

1.2 CALCULATING WIRE SIZE REQUIREMENTS

Wire size is calculated by first determining the appropriate maximum voltage drop requirement. Using the formula below calculate the Circular MIL Area (CMA) wire size requirement. Determine the size and number of conductors required to satisfy the CMA requirement.

$CMA = (A \times LF \times K) / AVD$, where:

A = Ultimate drain in amps

LF = Conductor loop feet

K = 11.1 constant factor for commercial (TW type) copper wire

AVD = Allowable voltage drop

Check again that the capacity rating of the cable meets the requirement for the installation application. Consult local electrical codes (NEC, CEC, etc.) for guidelines. If required, increase the size of the cable to meet the code.

1.3 POWER SYSTEM CHASSIS GROUND AND DC GROUND REFERENCE

For safety reasons, ensure the system is properly bonded to the building's ground grid. Both the shelf chassis ground (via power system chassis ground) and common return may be connected to the site ground.

1.4 DC INPUT CONNECTIONS

WARNING: Leave cables or bus bars disconnected at battery and verify output polarity using a voltmeter. Make battery connections only after all other wiring is completed.

Using vertical bus bars connect the LMDC input bus bar adapter (located at the bottom of the LMDC) to the LMHF shelf output bus bar adapter (located at the top of the LMHF shelf). If more than one shelf is installed, a single longer bus bar should be used for connection between the LMDC and all LMHF shelves.

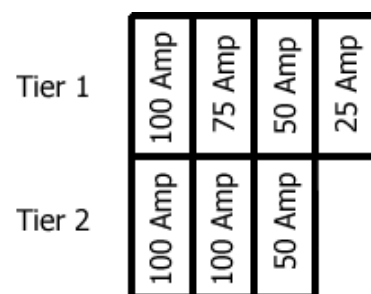
Secure the positive and negative LMDC bus bar adapters to the vertical bus bars of the correct polarity; i.e., $+V_{LMDC}$ to $+V_{Bus Bar}$. Repeat this procedure to connect each of the LMHF shelves.

1.5 WIRING DC LOADS

The Single Tier LMDC can support up to 20 DC Loads, and the Double Tier LMDC can support up to 40 DC Loads use the following instructions to wire the DC loads and there protection to the LMDC.

BREAKERS

The LMDC has 20 circuit breaker positions per Tier to install Plug-In bullet type breakers. Before a breaker is installed be sure that the bullet is tight on the breaker. When installing breakers be sure that they set up with the largest on the left and the smallest on the right, also in a double tier unit be sure the breakers are balanced between tiers. The figure to the right can be used as a guideline.



WARNING: Breakers are NOT hot-swappable; the LMDC and LMHF must be completely de-energized before adding, removing or repositioning any breakers (or system loads).

SYSTEM LOAD CONNECTIONS

All return connections are connected to a common return bus bar within the LMDC enclosure. All charge connections are connected to the individual breaker output posts within the LMDC.

For each return lead, terminate the cable lead with an appropriate crimp lug for a ¼" bolt. Secure the return cable lead to the common return load bus bar using customer supplied ¼"x20x.625" bolt, washer, and lock washer.

For each charge lead terminate the cable lead with an appropriate crimp lug for a ¼" bolt. Secure the charge cable lead to the appropriate LMDC breaker output post using customer supplied washer, lock washer, and ¼"x20 nut.

CAUTION: *The LMDC is available from the factory in two arrangements; a positive return system, or a negative return system. Be sure that the load connections are correct for the LMDC arrangement purchased.*

1.6 LMHF CONNECTIONS

For installation and wiring instructions of the LMHF controller and rectifiers, refer to Section 6 and Section 7 of the LMHF Hardware Manual.

LOW VOLTAGE LOAD DISCONNECT

Low Voltage Load Disconnect (LVLD) is provided as a standard feature of the LMDC. The LMDC has one LVLD contactor per breaker tier. Using a Double Tier LMDC and the LMHF controller, a customer can setup load shedding; where the least critical loads are disconnected first. For more information on LVLD and load shedding, see Section 6.5.2 of the *LMHF Software Manual*.

1.7 BATTERY CONNECTIONS

The LMDC is designed to accommodate connection to a battery or battery bank. If the customer setup requires a battery to be connected; connect the negative battery cable to the negative bus bar on the top rear of the LMDC, and connect the positive battery cable to the positive bus bar on the top rear of the LMDC.



CAUTION: *Before making any connections to the battery, be sure that all other connections have made both within the LMDC and LMHF shelves.*

2. OPERATION



CAUTION: Before beginning operation it is recommended to have read the entire LMHF Software Manual.

After completing all wiring and installation, perform the following startup and test procedure to ensure proper operation:

CHECK SYSTEM CONNECTIONS

- Make sure the AC is off, battery is disconnected, and power modules are removed from the shelf.
- Triple check the polarity of all connections.

VERIFY AC AND POWER THE SHELF

- Install one power module.
- Verify AC input voltage is correct and turn on the corresponding AC input feeder breaker.
- The power module OK LED should illuminate after a preset start delay.
- Using the LMHF controller, test functionality of various module alarms and controls.

CHECK BATTERY POLARITY AND CONNECT

- Verify correct battery polarity using a voltmeter (ensuring no cells or batteries are reversed).
- Connect battery as required to the output of the system or turn on battery breaker.
- Install remaining power modules.
- In the adjustments menu of the LMHF controller, set Float and Equalize voltage to the levels specified by the battery manufacturer.
- Using the LMHF controller, test functionality of various module alarms and controls. In addition, perform a load test with the system using a resistive load box as needed.

Once the system is powered up and adjusted correctly, the digital display of the LMHF controller displays system status information and monitors all input channels. Adjustments to systems settings can be made via the Touch Screen (see Sections 4-8 of the LMHF Software Manual for complete details) or via an externally connected computer (see Sections 9-10 of the LMHF Software Manual for complete details).

NOTE: To set up the connections to a computer or network (for remote access) see Section 7.9 of the LMHF Hardware Manual.

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 (2) years from date of purchase under normal use.

If the equipment proves defective within a two year period, it shall be replaced without charge after examination at our factory, providing such defect in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation.

Should the equipment require major replacement or repair, the equipment must 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 to the factory, the customer or Sales representative must first obtain a RMA (Return Material 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 warranty period.

All internal maintenance is to be performed by La Marche.

La Marche reserves the right to honor the warranty with a replacement unit.

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.

All sales are final. Only standard La Marche 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 alteration 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.