MODEL

A96

SERIES

130Vdc Switchmode Utility
Rectifier / Battery Charger

Used with LaMarche Power Cage

ECN/DATE

CPN112138

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P25-**LA96-1**

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 GASES 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.

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.

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.

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

No user serviceable parts - refer servicing to factory. La Marche Mfg. (847) 299-1188

1.0 General

The La Marche Model A96 Switchmode Float Rectifier has many inherent advantages: Voltage Regulation, Current Limiting Circuitry, High Efficiency and High Power Factor. The Model A96 compact size and lightweight (less than 40 lbs.) provides a small system footprint and ease of service.

These rectifiers provide separate adjustable voltages for floating or equalizing lead-acid or nickel cadmium cells. A float/equalize selector switch is located on the front of the rectifier.

Note: Some A96 systems use the A96 Controller for the Float/Equalize Adjustments. See Controller Manual.

The Model A96 was designed to be mounted in a La Marche Power Cage, which will fit in a 23-inch relay rack. The 23 inch cage will hold up to four (4) La Marche Model A96 rectifiers with the same output voltage. The A96 in the cage was designed for a "Hot" plug in which allows addition or removal of units without requiring a system shutdown. Cover plates are provided for cage bays that are not used.

Note: There are no serviceable parts within the A96 rectifier(s). Should the A96 stop operating correctly, contact the La Marche Service Department for a Return Authorization Number (RMA).

2.0 Functional Requirements

This section outlines the general, electrical and mechanical specifications controlled by this document for switchmode rectifiers.

2.1 Design

As a minimum, the switchmode rectifier shall be designed so that any failure of the rectifier does not damage or degrade the equipment it powers. A failure in the alarm and control circuitry of the rectifier shall not cause a service interruption.

2.2 Environmental

The rectifier shall remain operational when subjected to the following criteria

2.2.1 Temperature

Operational - -25 degrees C to +50 degrees C
Starting - -40 degrees C to +50 degrees C
Storage - –40 degrees C to +50 degrees C

2.2.2 Altitude

Operational - -0 meters (0 ft to 10000 ft)
Storage - Meters to 10,000 meters (0 ft to 30,000 ft)

2.2.3 Humidity – Non Condensing

Operational - 0% RH to 85% RH
Storage - 0% RH to 95% RH

3.0 Electrical Specifications

3.1 Nominal Output Voltage

FLOAT VOLTAGE	EQUALIZE VOLTAGE
130V (LEAD)	130V (LEAD)

3.2 Adjustment Range

Float adjust 118Vdc – 145Vdc - Set at 130Vdc
Equalize adjust 118Vdc - 150Vdc - Set at 130Vdc

Customer to adjust as needed.

3.3 Current

Imax continuous 20 Amps

3.4 Current Limit

Rectifier to automatically reduce its current limit set point with changes in ambient temperature input voltage and output voltage. Current limit is of the constant current type.

3.5 Load Regulation

1% from no load to full load.

3.6 Input Voltage

3.6.1 Operating - min 188Vac - max 264Vac

3.7 Input Frequency

45Hz to 65Hz

3.8 Input Power

16 amps at full load.

3.9 Power Factor

Typical 0.98% at minimum 20% full load.

3.10 Efficiency

86%

3.11 Input Fusing

Internally fused at 20 amps in both the live and neutral lines.

3.12 Remote Sense

Total lead voltage drop 1V.

3.13 Temperature Co-efficient

Temperature range -25 degrees C to +55 degrees C +/- 0.015%/degrees C.

3.14 Series Output Diode

All rectifiers are to be equipped with a series diode in the positive output.

3.15 Alarm Signals and Lights

3.15.1 **Input Available** -Yellow LED

Operates when ac input is above 165Vac, extinguishes as input voltage declines to 145Vac.

3.15.2 **Output Available** - Green LED

Operates when the output voltage is above 120Vdc but below overvoltage trip.

3.15.3 **Current Limit** - Red LED

Operates when the rectifier is in current limit.

3.15.4 **Over Voltage** - Red LED

Operates when the rectifier output exceeds 151Vdc - the output shuts down.

3.15.5 **Output Current** - Green LED

Operates when the output current is above 15% output rated current.

3.15.6 **Thermal Control** - Yellow LED

Thermal control of current limit activates the LED.

3.15.7 **Over Temperature** - Red LED

Operates when the internal temperature exceeds 90 degrees C.
Will reset when the internal temperature falls below 80 degrees C.

3.15.8 **Fan Fail** - Red LED

Operates when the fan fails.

3.15.9 **Equalize** - Yellow LED

Activated by front panel switch or remote equalize signal.

3.16 Front Panel Features

3.16.1 **Float/Equalize Switch**

Switch selectable to raise or lower the output voltage. Remote equalize will override the selection.

3.16.2 **Float Voltage Adjustment**

Voltage range 118Vdc to 145Vdc - set at 130Vdc.

3.16.3 **Equalize Voltage Adjustment**

Voltage range 118Vdc to 150Vdc - set at 130Vdc.

4.0 Mechanical Specifications

4.1 External Dimensions

127.0 x 139.7 x 330.6 mm (5.0 x 5.5 x 13 inches)

4.2 Front Panel Dimensions

147.4 x 132.1 mm (5.80 x 5.20 inches) per La Marche drawing P15-F822.

4.3 Weight

14.5 pounds

4.4 Ventilation and Cooling

An integral replaceable fan cools the rectifier(s). A fan guard will cover the fan.

5.0 Output Ratings

5.1 D.C. Voltage

The A96 series provide separate voltages for Floating or Equalizing lead or nickel cadmium cells. The float or equalize mode of operation is selected by a switch located on the front of the rectifier.

The factory settings are as follows:

Float voltage	*Equalize voltage*
2.17 volts/cell (Lead)	2.17 volts/cell (lead)

D.C. Voltage Range:

Float voltage	*Equalize voltage*
1.96-2.41 volts/cell +/-.1 volts (Lead)	1.96-2.5 volts/cell +/-.1 volts (Lead)

5.2 Output Current Limit

Set to 20.5A

6.0 Input Ratings

6.1 AC Voltage

The A96 is designed for 188 - 264 Vac.

6.2 Input Frequency Range

Range - 45 to 75 HZ

6.3 Input Current

AC input – Approximately 16 amps at full load.

6.4 Power Factor

The A96 is provided with Power Factor correction circuitry, which corrects the AC input power factor to approximately 0.98 at minimum 20% full load.

7.0 Installation Information

The A96 was designed to be mounted in a cage provided by La Marche. Up to four (4) rectifiers are mounted in the 23" cage.

7.1 Minimum Wire Sizes

All wire sizes and cabling should be sized for four (4) chargers.

7.2 National Codes

All wiring should be done following the National Electric Code and all local building and electrical codes.

8.0 Electrical Connections & Field Wiring

8.1 AC Input

Terminals are provided in the back of the cage for all AC connections. Each rectifier has its own set of AC terminals.

8.2 D.C. Output

All rectifier outputs are paralleled and brought to the cage DC buss.

9.0 Troubleshooting

Be sure all connections to the cage are correct. Check polarities. Check for loose connections. Be sure all units are locked into place. Check for correct AC input and DC output voltages.

There are no user serviceable parts internal to the A96. Should the A96 stop operating correctly, contact the La Marche service department for a Returned Material Authorization (RMA) number and return the rectifier for repair.

To avoid damage caused by shipping, the units should be returned in their original shipping container with the original packing material, if available. La Marche will not be responsible for damage when returned to factory.

10.0 Power Cage

The cage shall fit a standard 23 inch relay rack four rack units high, and shall be capable of handling four rectifiers.

10.1 Input Voltage

188 –264Vac single phase—can be configured to operate on a three phase line.
Maximum AC draw for each cage is 64 amps.
Input frequency 45-65 Hz

10.2 Output Current

80 amps total, 20 amps per rectifier

10.3 Size

Width – 23 inch
Depth – 18 inch
Height – 7 inch

10.4 Temperature range

-40 degrees C to +50 degrees 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 one (1) year from date of purchase under normal use.

If the equipment proves defective within a one 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 to be performed by La Marche. **Warranty is void if seal is damaged.**

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 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.