



***La MARCHÉ***®

MODEL

**A75D / A75DE**

SCR BATTERY CHARGER /  
ELIMINATOR  
Digital METERS

**ECN/DATE**

**CPN115668**

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P25-**LA75D-A75DE-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, and batteries and loads before attempting any maintenance or cleaning. Turning off controls will not reduce this risk. Wait five (5) minutes for capacitors to discharge before doing any work.

**WARNING – THERE IS A RISK OF EXPLOSIVE GASES 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.

### **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** **AND** **GENERAL EQUIPMENT INFORMATION**

**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.

### **RECEIVING INSTRUCTIONS**

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.**

## **\*\*\*CAPACITOR PRE-CHARGE INSTRUCTIONS\*\*\***

**WARNING: READ INSTRUCTIONS BEFORE CONNECTING BATTERY**

To prevent the DC output fuse from blowing when connecting the battery, connections to the power supply and batteries should be done in the following order (single power supply).

- Connect AC input line to the terminal block provided. Be sure the units' AC circuit breaker is off.
- Observe the polarity of the battery cables, charger output, and relay rack terminals. Connect the proper battery cable to the ground bar or battery charger output terminal.
- Energize the power supply by turning on the units' AC breaker. This will charge the capacitors inside the power supply and eliminate heavy arcing when the remaining battery cable is connected. After approximately one (1) minute, turn off the power supply and immediately connect the remaining battery cable.
- Connect loads.
- Turn on the power supply again and the charger will commence charging the batteries and powering the load. (NOTE: For units equipped with a low-voltage disconnect panel, the "Load On" switch must be put in the "Load On" position.)

## **GENERAL**

The LaMarche models A75D and A75DE are SCR battery chargers. These models are designed with a LCD Digital Display. The A75DE is designed as a battery eliminator and can be operated with or without batteries connected.

The LaMarche model A75D/A75DE series battery charger is a solid state unit utilizing SCR technology. It has +/- 0.5% regulation from no load to full load over the specified input voltage, frequency and ambient temperature range.

The A75D/A75DE series is offered with DC output voltages of 24, 48 or 130VDC with output currents from 6 to 100 Amps. These chargers may be powered with 120, 208, 240, or 480VAC. The current limit is factory set at 105% and is adjustable from 50 to 110%.

## **OUTPUT RATINGS**

### **DC VOLTAGE**

The A75D/A75DE series battery chargers provide separate voltage adjustments for floating or equalizing lead or nickel cadmium cells. The float or equalize mode or operation is selected by pressing the equalize button on the display which is located on the front of the battery charger.

The factory settings are as follows:

<u>Float Voltage</u>	<u>Equalize Voltage</u>
2.17 volts/cell (lead)	2.33 volts/cell (Lead)
2.25 volts/cell (VRLA)	2.27 volts/cell (VRLA)
1.40 volts/cell (NC)	1.4 volts/cell (NC)

### **VOLTAGE RANGE**

	Float	Equalize	Lead Acid	NiCad
24V	23 – 29.5	24 - 31	11 – 13L	17 – 20N
48V	46 - 57	48 - 61	22 – 26L	33 – 39N
130V	115 - 140	123 - 145	53 – 62L	83 – 93N

**Note:** Typical cell ranges are based on the following:

Lead Acid 2.17 V/C Float, 2.33V/C Equalize

NiCad 1.44 V/C Float, 1.55V/C Equalize

### **OUTPUT CURRENT**

Single Phase – Three Phase

See Input Current Chart

### **REGULATION**

Steady State output voltage remains within +/- 0.5% of rated voltage for any load current from no load to full load and for input voltages within +10% / -12%.

### **FILTERING**

A75D – NO FILTERING

A75DE - 30 mv RMS, with or without a battery connected, for a single phase unit

A75DE - 100 mv RMS, with or without a battery connected, for a three phase unit

**MEAN TIME BETWEEN FAILURE**

The mean time between failure (MTBF) in excess of 100,000 hours at 50 degrees C

**INPUT RATINGS**

**AC VOLTAGE**

6 Amps through 25 Amps models have input taps for 120/208 or 240Vac these are also available with a 480Vac input.

30 Amps through 100 Amps models as 120Vac or 208Vac or 240Vac or 480Vac, (50a AND 75a 130v MODELS 240Vac or 208Vac or 480Vac)

**INPUT FREQUENCY RANGE**

60Hz +/- 5%

**INPUT CURRENT – SINGLE PHASE**

MODEL NUMBER	MULTI VOLTAGE			SINGLE PHASE VOLTAGE			
	A	B	D	A	B	D	C
A75D/A75DE -	120	208	240	120	240	208	480
6-24V	2.4 /	1.2 /	1.4				
12 – 24V	4.8 /	2.4 /	2.8				
16 – 24V	7 /	3.5 /	4				
20 – 24V	9.6 /	4.8 /	5.6				
25 – 24V	12.3/	6.1 /	7				
30 – 24V				14	7	8	4
35 – 24V				17.1	8.5	9.8	4.3
40 – 24V				19.5	9.8	11.2	4.9
50 -24V				24.5	12.3	14	6.1
75 – 24V				35	17.5	20	8.8
100 – 24V				49.1	24.5	28	12.2
6 – 48V	4.8 /	2.4 /	2.8				
12 – 48V	9.6 /	4.8 /	5.6				
16 – 48V	14 /	7 /	8				
20 – 48V	19.5/	9.8 /	11.2				4.9
25 – 48V	24.5/	12.3/	14				6.1
30 -48V				28	14	16	7
35 – 48V				32.6	16.3	18.7	8.2
40 -48V				39	19.5	22.5	9.8
50 -48V				48.8	24.4	28.2	12.2
60 -48V				58.6	29.3	33.9	14.8
75 – 48V				73.2	36.6	42.3	16.5
100 – 48V				97.6	48.7	56.4	24.4
6- 130V	14 /	7 /	8				3.5
12- 130V	28 /	14 /	16				7
16 -130V	33 /	16.5 /	19				9.6
20 -130V	44 /	22 /	25.3				11
25 – 130V	55 /	27.5 /	31.7				13.8
30 -130V				66	33	38	16.5
35- 130V				77	38.6	44	19.2
40 -130V				88	44	50.6	22
50 -130V					55	63.3	27.5
75 -130V					77	88	38.4

INPUT CURRENT – THREE PHASE

THREE PHASE VOLTAGE			
MODEL NUMBER	D	B	C
A75D/A75DE-	208	240	480
50 - 24V	30	26	13
75 - 24V	44	38	19
100 - 24V	59	51	26
125 - 24V	74	64	32
150 - 24V	89	77	38
200 - 24V	118	102	51
50 - 48V	15	13	6
75 - 48V	22	19	10
100 - 48V	30	26	13
125 - 48V	37	32	16
150 - 48V	44	38	19
200 - 48V	59	51	26
250 - 48V	74	64	32
300 - 48V	89	77	38
400 - 48V	118	102	51
25- 130V	18	16	8
30- 130V	22	19	10
40 -130V	30	26	13
50 -130V	37	32	16
75 - 130V	55	48	24
100 -130V	74	64	32
125- 130V	92	80	40
150 -130V	111	96	48
200 -130V	148	128	64
250 -130V	185	160	80
300 -130V	222	192	96
400 -130V	296	256	128

## **SPECIFICATIONS**

### **ELECTRICAL**

#### **AC Input**

Voltage range +10% / -12%  
Frequency Range 60Hz +/- 5%

#### **DC Output**

6 to 100 amps  
24 or 48 or 130Vdc

#### **Output Filtering**

A75D NO FILTERING

A75DE - 30mv RMS, with or without battery connected, for a single phase unit

A75DE - 100mv RMS, with or without battery connected, for a three phase unit

#### **Regulation**

+/- 0.5% from no load to full load over the specified input voltage, frequency and ambient temperature range.

#### **Audible Noise**

Less than 65dBA at any point 5 feet from any vertical surface of the battery charger.

#### **Load Sharing**

The Load sharing terminal is located inside the unit. When connected, identical LaMarche units are forced to load share. Connect the LS terminals together.

### **PROTECTION**

#### **Current Walk-In**

The output current will gradually increase after the charger is turned on, eliminating surges and overshoot.

#### **Current Limit**

Electronic current limiting control circuitry provides for an adjustable current limit of 50 to 110% output current. It is factory set at 105%.

#### **AC Breaker**

AC breaker is standard equipment.

#### **DC Breaker**

DC breaker is standard equipment.

### **INDICATORS**

On the LCD Digital display the DC Voltage and Amps are displayed. The timer mode and time remaining are also displayed. There is also a Red Alarm indicator, when this Led is lit, the type of alarm will indicate on the digital display and the correct Led listed below will indicate.

Led Indications for:

Float – Green

Equalize – Yellow

AC "ON" – Green

AC Failure – Red

High DC Voltage – Red

Low DC Voltage / End of Discharge – Red

High DC Voltage Shutdown – Red

Low DC Current – Red

Summary - Red

Positive and Negative Ground - Red

**PARALLELING**

This battery charger will parallel with any other LaMarche model A75D/A75DE with the same output voltage.

**LOAD SHARING**

A load sharing circuit is provided. When connected two (2) or more A75D/A75DE units are forced to share the load equally (less than +/- 5%). To load share, connect the unit outputs (must be the same DC voltage) in parallel and connect the LS terminals together.

**CURRENT WALK-IN**

Output current will gradually increase after the battery charger is turned on, reducing current surges.

**EMERGENCY RESTORATION**

The battery charger may be connected to a battery which is heavily discharged and recharge it without clearing any protective devices.

**METERS**

- LCD Digital Display
- 1% Accuracy DC Ammeter
- 1% Accuracy DC Voltmeter

**MOUNTING**

See data sheet for dimensions

CASE NO.	CABLE ENTRY		STANDARD MOUNTING	OPTIONAL MOUNTING KITS
	AC INPUT	DC OUTPUT		
4B - 75	Rt top/Bottom	Lf Top/bottom	WALL	19/23" Rack-----Floor
4 - 75	Rt top/Bottom	Lf Top/bottom	WALL	19/23" Rack-----Floor
9	Rt top/Bottom	Lf Top/bottom	FLOOR	23" RACK
72	Bottom Rt	Bottom Lf	FLOOR	

**ENVIRONMENTAL**

**OPERATING TEMPERATURE:**

0 to 50 degrees C (32 to 122 degrees F)

**STORAGE TEMPERATURE:**

-40 to 85 degrees C (-40 to 185 degrees F)

**RELATIVE HUMIDITY:**

0 to 95% (non-condensing)

**COOLING:**

Convection cooled

## SHOCK

The battery charger in its shipping container withstands shock developed when one edge of the container is dropped six (6) inches while the opposite edge is resting on the ground, or it is dropped two (2) inches without any physical damage or degradation of the electrical performance.

## VIBRATION

The battery charger in its shipping contained, withstands vibration encountered in shipping without physical damage or degradation of the electrical performance.

## ALTITUDE

This battery charger is capable of operation at altitudes up to 10,000 feet at an ambient temperature of up to +40 degrees C.

## VENTILATION

The unit should be mounted so that ventilating openings are not blocked and air entering the cabinet does not exceed 50 degrees C (122 degrees F).

# **INSTALLATION INFORMATION**

## MINIMUM WIRE SIZES

See Wire Size Chart, lists the ac input and dc output minimum wire size requirements. At distances exceeding 10 feet, the dc wire size should be chosen to keep the voltage difference between the units dc output terminals and the battery at less than ½ volt when the unit is fully loaded. See the section on "POWER CABLING FORMULAS". The total loop length is twice the distance from the wiring point to the unit.

## NATIONAL CODES

These wire sizes are based on those recommended in the National Electric Code table 310-16 for copper wire at 75 degrees C conductor temperature operating in an ambient of 30 degrees C. For higher operation temperatures refer to the de-rating factors in the National Electric Code table 310-16.

## FIELD GROUND TERMINAL

This terminal should be connected to an earth ground. The size of the conductor is based on National Electric Code table 250-95 for copper wire at 75 degrees C. See table for recommended wire sizes.

## MOUNTING

Install the battery charger so that the flow of air through the ventilators is not obstructed.

**POWER CABLING FORMULAS**

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

\*DENOTES ALL SIZES LARGER THAN =0000 ARE EXPRESSED IN MCM.

**TABLE OF CONVENTIONS**

- CMA = Cross section of wire in circular MIL area
- A = Ultimate drain in amperes
- LF = Conductor loop feet
- MAX AMP = Maximum allowable amperes for given voltage drop
- AVD = Allowable voltage drop
- K = 11.1 Constant factor for commercial (TW type) copper wire (KS5482-01)
- = 17.4 for aluminum (KS20189)

**Calculating Wire Size Requirements**

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

**Calculating Current carrying capacity of wire**

$$\text{Max Amp} = \frac{CMA \times AVD}{LF \times K}$$

Source: Handbook 100-National Bureau of Standards

NOTE: All Wire #6 and larger is stranded.

**NOTE: These are recommended wire size. All National and Local Wiring Codes must be followed.**

The table lists the AC input and the DC output minimum wire size requirements. At distances exceeding 10 feet, the DC wire size should be chosen to keep the voltage difference between the units DC output terminals and the battery at less than 1/2 volt when the unit is fully loaded. If the distance between the units DC output and the battery exceeds 10 feet, use the Power Cable Formula to determine wire size.

FUSE SIZE	WIRE SIZE REQUIREMENT CUSTOMER CONNECTION	EQUIPMENT GROUNDING CONDUCTOR MINIMUM	FUSE SIZE	WIRE SIZE REQUIREMENT CUSTOMER CONNECTION	EQUIPMENT GROUNDING CONDUCTOR MINIMUM
1	#14	#14	150	#1	#6
3	#14	#14	175	#1/0	#6
4	#14	#14	200	#2/0	#6
5	#14	#14	225	#2/0	#4
6	#14	#14	250	#4/0	#4
10	#14	#14	300	250-MCM	#4
15	#12	#12	350	350-MCM	#2
20	#12	#12	400	400-MCM	#2
25	#10	#12	450	500-MCM	#2
30	#10	#10	500	600-MCM	#2
35	# 8	#10	600	900-MCM	#1
40	# 8	#10	700	1500-MCM	1/0
45	# 8	#10	800	2/500-MCM	1/0
50	# 8	#10	1000	2/800-MCM	4/0
60	# 6	#10	1200	2/1000-MCM	4/0
70	# 6	# 8	1600	2/2000-MCM	4/0
80	# 4	# 8	2000		250-MCM
90	# 4	# 8	2500		350-MCM
100	# 4	# 8	3000		400-MCM
110	# 2	# 6	4000		500-MCM
125	# 2	# 6	5000		700-MCM
130	# 2	# 6	6000		800-MCM

## **ELECTRICAL CONNECTIONS & FIELD WIRING**

A terminal board is provided for connecting the AC input and DC output. A ground wire must be connected to the unit's case ground.

### **AC INPUT**

Make sure that AC power is off at the main AC breaker box before installation begins.

Make sure that the input source is the same voltage and frequency as that which is marked on the nameplate of the rectifier.

The wire size and distribution protection should be adequate for the nameplate input current of the rectifier plus the overload current (usually 10%-15% higher than the nominal rating).

An adequate earth ground lead should be connected to the terminal marked "GROUND" or "GND".

Be sure the transformer taps are set for the correct AC input.

### **DC OUTPUT**

Make sure that the battery voltage, which is being connected to the rectifier, matches the rectifier's output voltage.

**\*\*\*\*\*OBSERVE PROPER POLARITY!\*\*\*\*\***

The negative wire from the battery must be connected to the terminal marked "NEGATIVE" or "NEG" and the positive wire from the battery must be connected to the terminal marked "POSITIVE" or "POS" on the rectifier.

To prevent the DC output breaker from tripping when connecting the battery, connections to the power supply and batteries should be done in the following order (single power supply).

1. Connect AC input line to the terminal block provided. Be sure the AC circuit breaker is off.
2. Observe the polarity of the battery cables and the rectifier output. Connect the negative battery cable to the negative rectifier output terminal.
3. Energize the unit by turning the AC breaker to the "ON" position. This will charge the capacitors inside the power supply and eliminate heavy arcing when the remaining battery cable is connected. After approximately one (1) minute, turn off the power supply and immediately connect the remaining battery cable.
4. Connect the loads.
5. Turn the AC breaker to the "ON" position again and the rectifier will commence charging the batteries and powering the load.

### **LOAD SHARING**

When the load sharing terminal (LS) on the terminal boards is connected, multiple units are forced to share the load.

## ALARM CONNECTIONS

Form "C" contacts are provided which indicate an AC power failure and Summary Alarm. These alarm contacts de-energize on alarm. There is a 5 second delay on alarm. The contacts are rated at 60Va at 125 Vdc or AC.

## **OPERATION**

### START UP

**When all connections have been made, verify that they are correct!**

Apply the correct AC voltage to the input terminals.

Verify the output voltage, output current, and the alarm and status lights to be sure the unit is operating properly.

If the unit is not operating correctly check the connections again and read "TROUBLE SHOOTING".

## **ADJUSTMENTS**

### CURRENT LIMIT ADJUSTMENT

The current limit adjustment is factory set at approximately 105% of rated DC output current. The adjustment provides a means of changing the rectifier current limit between 50-110% of rated output. Turning the adjustment, which is located on the unit front panel, clockwise lowers the current limit; turning counterclockwise raises the current limit.

**CAUTION: CURRENT LIMIT MUST NOT EXCEED 110%. OF RATED OUTPUT CURRENT.**

### FLOAT ADJUSTMENT

The float adjustment is factory set at 2.17 volts/cell (Lead), 2.25volts/cell (VRLA) or 1.4 volts/cell (N.C.). Turning the adjustment, which is located on the front door of the unit, clockwise raises the float voltage (the F/E switch must be in the float position).

The adjustable range is as follows:

2.12-2.3 volts/cell +/- .1 Volts (Lead) (VRLA)  
1.39-1.45 volts/cell +/- .1 Volts (N.C.)

### EQUALIZE/SELECT SWITCH:

This switch is located on the unit front panel.

### EQUALIZE ADJUSTMENT

The equalize adjustment is factory set at 2.33 volts/cell (Lead), 2.27 volts/cell (VRLA) or 1.55 volts/cell (N.C.). Turning the adjustment, which is located on the front panel of the unit, clockwise raises the equalize voltage (the F/E switch must be in the equalize position).

The adjustable range is as follows:

2.25-2.4 volts/cell +/- .1 Volts (Lead) (VRLA)  
1.5 - 1.6 volts/cell +/- .1 Volts (N.C.)

In the equalize position, the rectifier will maintain the battery at the voltage level preset by the "Equalize" potentiometer adjustment and at the same time maintain the load up to the rectifier's rated output.

## **DIGITAL DISPLAY**

### **OPERATION**

Once the proper AC input and battery are connected to the system, the digital display will indicate the system DC Output Voltage and Output Current. Pushing the "UP" button changes the display.

The following items can be checked:

- AUTO EQUALIZE TIMER MODE
- AUTO EQUALIZE OFF/ON
- EQUALIZE TIME
- AC ALARM
- LOW VOLTAGE 1 ALARM
- BATTERY END OF DISCHARGE
- HIGH VOLTAGE ALARM
- HIGH VOLTAGE SHUT DOWN ALARM

**NOTE: To reset the HVSD Alarm, push the LMC Logo on the membrane panel.**

- LOW DC CURRENT ALARM
- SUMMARY ALARM

### **ALARM IDENTIFICATION:**

If the alarm condition occurs (Alarm LED ON) the specific failure can be identified by using the UP button to scroll thru each alarm setting, FAIL on the display will indicate which alarm is ON.

This alarm package is shipped with the following factory settings, unless otherwise specified.

Low DC voltage (1):	1.98 Vpc Lead-Acid	Flashing LED
Battery End of Discharge:	1.75 Vpc Lead-Acid	Solid LED
High DC voltage :	2.45 Vpc Lead-Acid	
High DC voltage shutdown (HVSD):	2.5 Vpc Lead-Acid	
Low DC current:	.5 A	
Timer mode:	Mode 0	
Equalize Time:	8 Hours	

### **OPTION 46R – RELAY PACKAGE**

#### **Optional Alarm Contacts 2 sets of dry "Form C" contacts for each customer alarm**

These relay contacts cover the following conditions: Low DC Voltage, High DC Voltage, High Voltage Shutdown, Low DC Current, Positive Ground, Negative Ground, Battery End of Discharge and Charger Failure. A Charger Failure alarm occurs when one of the following conditions are present: Simultaneous Low DC Voltage and Low DC Current, High Voltage or High Voltage Shutdown. The alarm relays function as follows: High Voltage, High Voltage Shutdown, Positive Ground and Negative Ground will pick up on alarm. Low DC Voltage, Battery End of Discharge, Low Current and Charge Failure will drop out on alarm.

*Note: All alarm contacts are factory set for a 5 second delay except the high voltage shutdown contacts, which are set for a 20 second delay.*

**Contact Data:**

<b>LOAD</b>	<b>RESISTIVE LOAD (p.f. = 1)</b>
Rated load	0.60va at 120Vac 2A at 30Vdc
Contact material	Ag(Au clad)
Carry current	2A
Max. operating voltage	125Vac 125Vdc
Max. operating current	2A
Max. switching capacity	62.50Va 60W
Min. permissible load	10uA, 10mVdc

To check or reset the Alarm Settings, push the "UP" button for 1 second then at the same time push the "MODE" button for 5 seconds. The display will read CUSTOMER CAL.. Push the "MODE" button to change the display to the next desired setting. To raise the setting, use the "UP" button, to lower use the "DOWN" button.

TIMER MODES

**NOTE: IN ALL MODES, THE UNIT WILL RETURN TO FLOAT IF THE EQUALIZE SWITCH IS PUSHED.**

**MODE 0 DISPLAY indicates P00**

This is the standard timer mode. If the "EQUALIZE" switch is pushed the timer will switch the charger into the equalize mode and the equalize "LED" will indicate. The timer will automatically return the charger to the float mode when the equalize cycle is complete.

**MODE 1 DISPLAY indicates P01**

This mode of operation automatically starts an equalize cycle every 7 days after. The length of this cycle is again determined by the timer setting. After the equalize period the timer will wait for another 7 days and then restart.

**MODE 2 DISPLAY indicates P02**

This mode of operation automatically starts an equalize cycle every 14 days. The length of this cycle is again determined by the timer setting. After the equalize period the timer will wait for another 14 days and then restart.

**MODE 3 DISPLAY indicates P03**

This mode of operation automatically starts an equalize cycle every 30 days. The length of this cycle is again determined by the timer setting. After the equalize period the timer will wait for another 30 days and then restart.

**MODE 4 DISPLAY indicates P04**

This mode of operation automatically starts an equalize cycle when the DC voltage drops below the low voltage setting for 30 seconds or longer. The battery voltage must rise approximately 8% above the low voltage set point.

## **TROUBLE SHOOTING**

Troubleshooting should be performed only by trained service personnel or experienced electricians.

***CAUTION: Hazardous AC and DC voltages are present within the rectifier cabinet.***

### **EQUIPMENT:**

The only equipment required is a multimeter for voltage or resistance readings and analog ohmmeter

### **GENERAL INSPECTION**

On servicing new equipment, before setting up any complicated testing or jumping to any conclusions, give the unit a general inspection.

Check the following:

1. Check DC output cables, connections, battery type, and number of battery cells with rectifier rating.
2. Check unit specifications with customer order.
3. Check input connections, input voltage and line 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.

### **SERVICE INFORMATION**

Information you should have when calling in for troubleshooting assistance:

1. Equipment model number and serial number.
2. The actual AC input voltage.
3. The DC output voltage with and without the battery.
4. Result of the check of AC breaker and DC output fuse.
5. The actual DC output current and voltage when measured with battery and load connected to rectifier.

### **SYMPTOMS & CAUSES**

#### **A.C Fuse Opens (Breaker Trips)**

##### ***Possible Cause:***

1. Wrong AC input voltage.
2. The AC input taps on power transformer set incorrectly.
3. (See schematic wiring diagram)
4. An AC to DC short or AC or DC short to ground (see ground short circuit test).
5. High DC output voltage.  
Check battery voltage for proper number of cells.  
Check control fuse on alarm interface board.  
Float/Equalize voltage potentiometers not set properly. (See Float/Equalize adjustment procedure for proper voltage setting.)
6. Check for shorted SCR's.

### **Open DC Fuse or breaker.**

#### ***Possible Cause:***

1. Shorted power SCR. (repair/replace as required).
2. Shorted battery cells or customer equipment.
3. Shorted output cables.
4. Capacitors not pre-charged.
5. Loose connections on the DC fuse.

### **Charger operates but output voltage/current is low.**

#### ***Possible Cause:***

1. Float/Equalize voltage potentiometers not set correctly (see float/equalize adjustment procedure for proper voltage setting).
2. Check SCR's
3. Control assembly is defective. (Replace as required)
4. Unit in current limit.
5. Defective shunt.

### **Charger operates but output voltage is high.**

#### ***Possible Cause:***

1. Float/Equalize voltage pots not set correctly (see float/equalize adjustment procedure for proper voltage setting).
2. Control assembly is defective. (Replace as required)

### **Ground and short circuit test.**

A simple ohmmeter check can be performed to check the unit for a short to ground, primary to secondary breakdown, AC-DC short, or DC ground. Before installation of a new unit, the above checks should be made before installing. If a short of this type is suspected on a unit in service, check as follows:

1. Disconnect AC input power to the unit. Disconnect the DC battery and loads from the rectifier.
2. Set ohmmeter scale on ohms scale RX100.
3. Measure from one terminal of the input to one terminal of the output. Meter should not indicate. If the meter reads full scale deflection, this indicates an ac-dc short. During shipping, an AC wire may rub against the DC lugs, terminals, etc. and cause a short. These problems may be eliminated by being very careful in inspecting the wiring to make certain the AC wires are not touching the DC wiring.
4. Check the input terminals to ground and check the output terminals ground. If the meter indicates full scale deflection, a wire is touching a metal part of the rectifier. Look for wires that are near any metal part and inspect for possible breakdown caused by shipping. The heatsink of the diodes and the control unit are insulated from ground through the mounting legs.

## **CHECKING CAPACITORS**

When checking capacitors be sure all AC power is turned off and battery is disconnected from unit. Check capacitors with DC voltmeter to see that DC voltage is at near -0- volts, then short circuit capacitor. Momentarily short circuit the capacitor leads to assure complete discharge. Connect the meter test leads to the capacitor leads or terminals and observe indicated resistance.

A good capacitor will indicate an initial low resistance and gradually increase as the capacitor charges. The final resistance of a good capacitor is usually several hundred thousand ohms approaching a megohm.

Initial high resistance approaching infinity indicates an open capacitor. Initial and continued low resistance readings indicate a shorted capacitor.

**When ordering replacement parts, drawings, or schematics, always give model number, serial number and AC input voltage.**

## General Maintenance Procedure

### Yearly

1. Blow out rectifier/inverter with a low-pressure air hose.
2. Make sure all connections are tight.
3. Perform a visual check on all internal components.
4. Check front panel meters and alarms for accuracy.

### 4th Year

**REPEAT** ABOVE WITH THE ADDITION OF:

1. Check relay contacts for pitting or corrosion.
2. Check capacitors for leakage.

### 7th Year

**REPEAT** ALL, WITH THE ADDITION OF:

1. Filter, resonating capacitors and control relays should be replaced.

### 10th Year

**REPEAT** ALL WITH THE ADDITION OF: (except replacing capacitors, they should be replaced every 7 years)

1. Check magnetics, components and wiring for signs of excessive heat.

## **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 year from date of purchase. In addition to the standard one (1) year warranty, La Marche warrants its magnetics and power diodes on a parts replacement basis only for one (1) additional year under normal use.

Any part or parts of the equipment (except fuses, DC connectors and other wear-related items) that prove defective within a one (1) year period shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Magnetics and power diodes are warranted for two (2) years after date of purchase. During the last one (1) year of this two (2) year warranty period, the warranty covers parts replacement only, and no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed.

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.

## **MANUFACTURER'S EXTENDED PARTS WARRANTY**

**(THIS IS YOUR WARRANTY IF YOU HAVE PURCHASED THE EXTENDED PARTS WARRANTY AS SHOWN ON OUR INVOICE TO YOU OR IF YOU PURCHASE THE EXTENDED PARTS WARRANTY ANYTIME DURING THE FIRST 12 MONTHS AFTER THE DATE OF OUR INVOICE)**

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory. Any part or parts of the equipment (except protective devices, DC connectors and other wear-related items) that prove defective within a one (1) year period from the date of our invoice to you shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Labor and parts are covered during this one (1) year period.

For the next four (4) years after the expiration of the one-year warranty, on a parts replacement only basis, any part or parts of the equipment (except protective devices, DC connectors and other wear-related items) that prove defective within the additional four (4) year period shall be replaced providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. During this four (4) year period, the warranty covers parts replacement only, no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed. If you return the equipment to our factory (freight prepaid), we will repair and cover parts and labor.

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

1. If the Purchaser elects to take the responsibility of repairing the equipment and requests replacement part(s), Purchaser or Sales Representative must contact Factory for return authorization and a purchase order must be issued. Replacement part(s) will be promptly shipped and invoiced. After the defective part(s) are returned and inspected at the Factory, if the defect(s) were due to faulty material or workmanship, credit will be issued.
2. 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 under the Extended Warranty. Transportation charges or duties shall be borne by Purchaser.
3. 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 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 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, OR 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.**