



La MARCHÉ

La Marche Manufacturing Company

www.lamarchemfg.com

A75R

SCR Battery Charger
for Railroad
Version V.3



Installation and Operation Manual

Important Safety Instructions

Before using this equipment read all manuals and other documents related to this charger and other equipment connected to this charger. Always have a copy of a charger'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.

Electrical Safety



WARNING: Hazardous Voltages are present at the input of power systems. The output from chargers 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 charger may still be energized even when the charger 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 charger.
- Always disconnect the charger 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 charger outside the input and output ratings listed on the charger nameplate.
- Do not use this charger for any purpose not described in the operation manual.

Mechanical Safety

- This charger or parts of the charger 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 charger. 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 charger 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.

Charger 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 charger in a closed-in area or restrict ventilation in any way.
- Do not place charger below battery.
- Never allow battery electrolyte to drip on this charger when reading the specific gravity or filling the battery.
- Never place this charger 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 charger 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.

Table of Contents

Important Safety Instructions	ii
Table of Contents	iv
A75R General Description	1
Charger Overview	2
1 Installation	3
1.1 Mounting the A75R	3
1.2 Input/Output Connections	4
1.3 Customer Connections.....	4
1.3.1 External Temperature Compensation (Option 11W/11Y)	5
2 Operation.....	5
2.1 Initial Startup.....	5
2.2 Changing Settings	5
2.3 Adjustment Potentiometers.....	6
3 Status and Alarm Indicators	7
3.1 Charger Fail Alarm Operation	8
3.2 Low Current Alarm Operation.....	8
3.3 Remote Shutdown Operation	8
Quick Start Guide.....	8
4.0 Performing Routine Maintenance	10
Manufacturer’s Warranty	11
Document Control and Revision History.....	12

A75R General Description

The La Marche model A75R uses proven SCR charging technology and is developed specifically for the railroad market. It is typically used for signaling, highway crossing and motion detection systems where the battery is cycled frequently. This filtered unit is designed and built to charge VRLA, Flooded Lead Acid and Nickel Cadmium batteries. Some of the features that make this product unique are remote shutdown, lightning protection and charger failure contacts, to name a few. Remote Shutdown allows you to place the charger offline for battery testing purposes. The A75R is equipped with AAR style hardware on the input and output connections. Temperature compensation is included standard to increase the longevity of the batteries and charger. The unit is convection cooled and the components are designed to achieve MTBF in excess of 100,000 hours.

Model Number	DC Output				AC Draw @ 100% Load	Dimensions	Weight	
	Amps	Volts	LA Range	NC Range			lbs	kg
A75R-10-12V-AB1	10	12	5-8	8-12	5.8 amps / 120 VAC 2.9 amps / 240 VAC	12" x 10" x 9" 305 x 254 x 228mm	34	15.5
A75R-20-12V-AB1	20	12	5-8	8-12	8 amps / 120 VAC 4 amps / 240 VAC	12" x 10" x 9" 305 x 254 x 228mm	37	16.8
A75R-40-12V-AB1	40	12	5-8	8-12	15 amps / 120 VAC 8 amps / 240 VAC	14" x 12" x 12" 356 x 305 x 305mm	58	26.4
A75R-30-24V-AB1	30	24	10-16	16-24	22 amps / 120 VAC 11 amps / 240 VAC	14" x 12" x 12" 356 x 305 x 305mm	76	34.5
A75R-60-12V-A1*	60	12	5-8	8-12	22 amps / 120 VAC	16.7" x 12" x 12" 427 x 305 x 305mm	80	36.3
A75R-60-12V-B1*	60	12	5-8	8-12	11 amps / 240 VAC	16.7" x 12" x 12" 427 x 305 x 305mm	80	36.3
A75R-60-12V-AB1	60	12	5-8	8-12	22 amps / 120 VAC 11 amps / 240 VAC	16.7" x 12" x 12" 427 x 305 x 305mm	80	36.3

* SINGLE AC INPUT ONLY. (120VAC OR 240VAC)

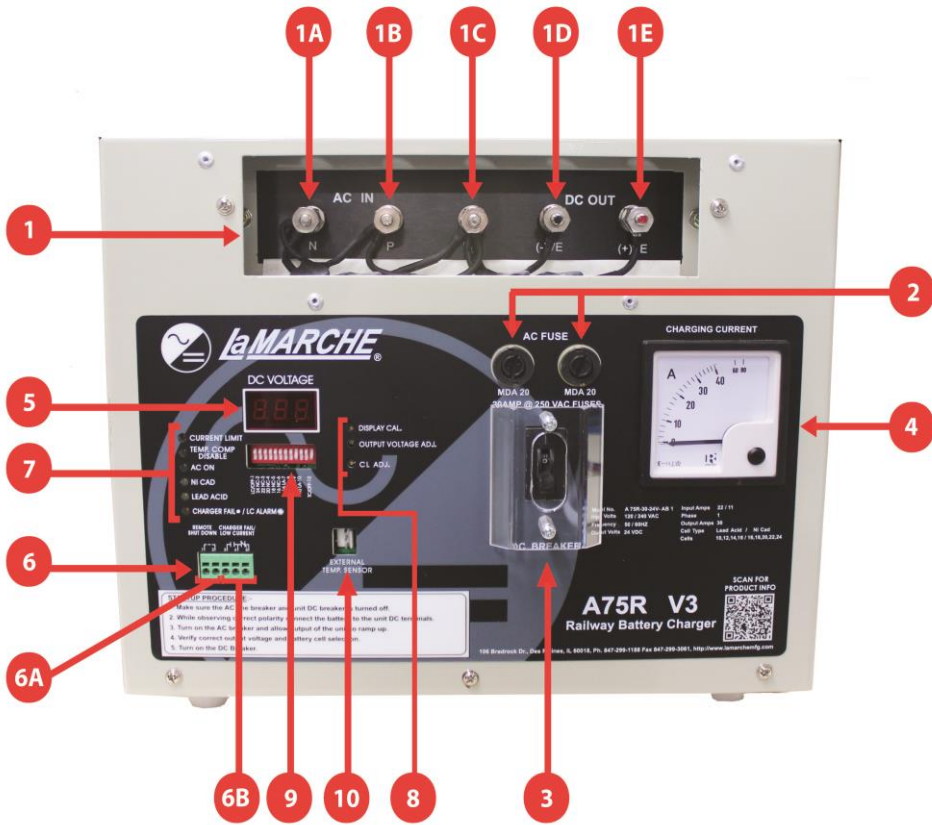
Standard Features

- Microprocessor Controlled SCR Charging Technology
- Single Phase AC Input 120/240V, 50/60Hz
- Automatic AC Input Voltage Compensation $\pm 10\%$
- Complete Isolation from AC to DC
- Lightning Protection
- Temperature Compensation with Enable/Disable Switch
- DC Analog Ammeter and Digital Voltmeter
- Adjustable Current Limit from 50% to 105%
- Filtered Output for VRLA Batteries
- Remote Shutdown
- Shared form 'C' Contact for Charger Failure and Low Current Alarms
- Meets AREMA specifications
- Meets ANSI C62-41
- 3-Year Warranty

Charger Overview

The A75R is simple and easy to use. It has an easy to read digital display for Output Voltage, and an analog meter for the Output Current. All settings on the A75R are done via the front panel DIP switches, so there is no need to navigate through confusing set up menus. A75R also includes Charger Failure and Low Current Alarms. These alarms give the user LED indication, as well as sharing a single set of contacts for remote annunciation.

The figure below shows all points of customer interaction with the A75R charger.



1. Input/Output Power Connections - Section 1.2
 - 1A. AC Input Neutral
 - 1B. AC Input Phase
 - 1C. Ground
 - 1D. Negative DC Output
 - 1E. Positive DC Output
2. AC Fuse
3. DC Breaker
4. Output DC Current
5. Output DC Volts

Figure 1 – A75R Railway Battery Charger

6. Customer Connections (Signal)
 - 6A. Remote Shutdown Input (12-24VDC) - Section 1.3
 - 6B. Alarm Relay Contacts - Section 1.3
7. Status & Alarm Indicators - Section 3
8. Output Adjustments - Section 2.3
9. Charger Settings - Section 2.2
10. External Temperature Probe Connection – Section 2.2

1 Installation

1.1 Mounting the A75R

Wall mounting is available using the keyholes at the top of the enclosure. Using the drawings provided below, drill two (or three) holes, appropriately sized for #10 hardware, for the keyholes. Attach the bolts (or screws) into the wall, lift the A75R onto the bolts, and tighten. Additionally, the A75R has feet so it may simply be mounted on a floor, shelf, or table that is appropriately sized for the charger's weight.

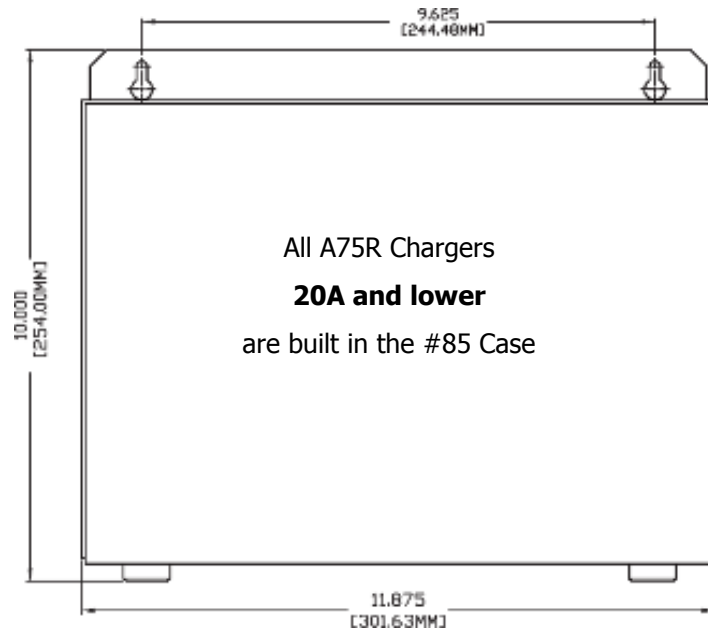


Figure 2 – #85 Case

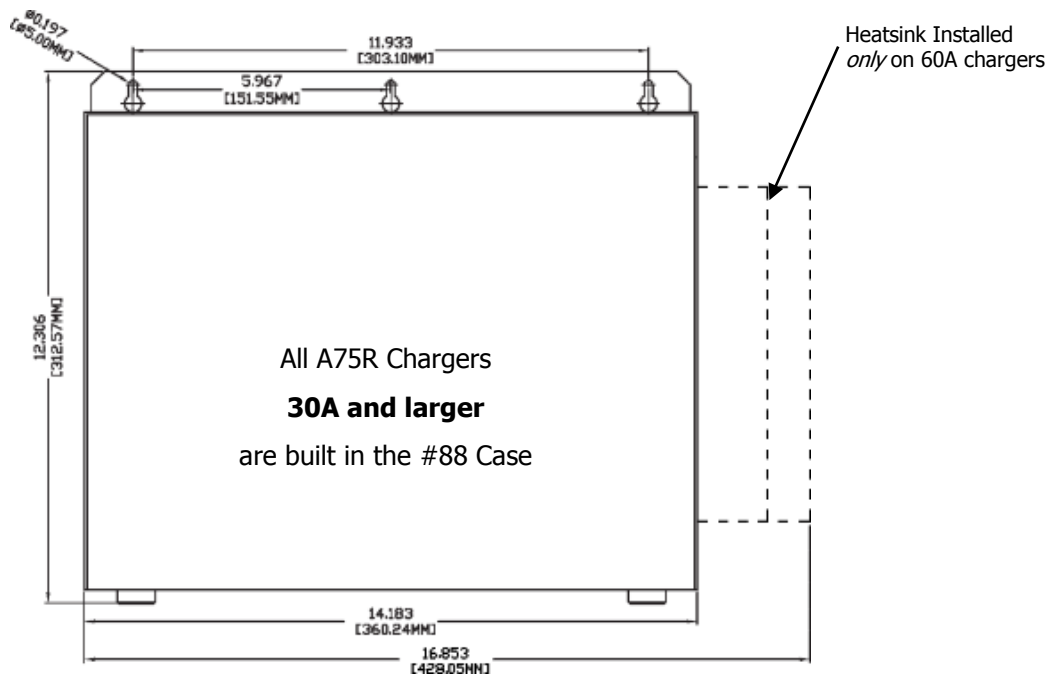


Figure 3 – #88 Case

1.2 Input/Output Connections

After the A75R is mounted, the input and output connections can be made. The A75R is equipped with ¼" AAR style hardware for the input/output connections. The wire should be sized based on the AC Draw listed on the front of the unit and DC Breaker size.

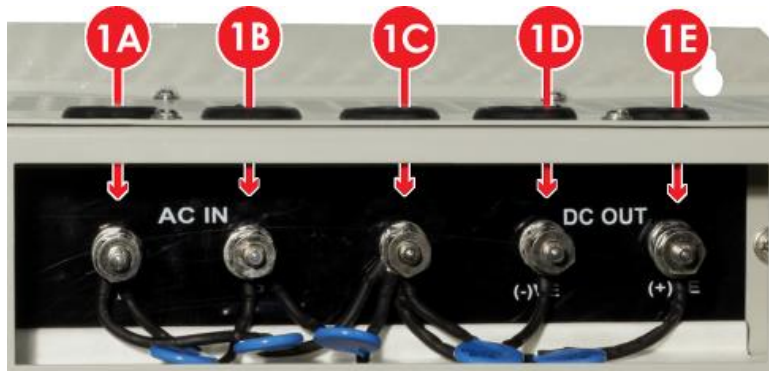


Figure 4 – Input/Output Connections

Using Figure 4 above, Connect the AC input to the terminals shown as "1A" and "1B". For a 120VAC input; connect the Neutral to the terminal "1A" and connect the AC Phase 1 to "1B". For a 240VAC input; connect the AC Phase 2 to the terminal "1A" and connect Phase 1 to "1B". Before making the DC connections, make sure the DC Breaker is off, then verify the DIP switch settings for DC output (Section 2.2). Connect the DC output (observe proper polarity). DC negative connects to the terminal shown as "1D" and DC positive connects to "1E". Connect the ground to the center ground terminal shown as "1C".

1.3 Customer Connections

The A75R includes customer connections for Remote Charger Shutdown, External Temperature Sensor, as well as a shared set of form 'C' contacts for the Charger Fail and Low Current Alarm. See Section 3.1-3.2 for further information on the operation of the alarm contacts.

The Remote Shutdown and Alarm connections are made via a spring type connector that accepts 16-22 AWG wire. The contacts are rated for up to 2A @ 12VDC (1A @ 24VDC).

To install wires, simply depress the spring with a small flat-head screwdriver (about 0.1 inch diameter) in the upper slot and plug the signal wire into the circular connectors below the slot. Remove the screwdriver and check that the wires are securely connected.



Figure 5 – Customer Connections

1.3.1 External Temperature Compensation (Option 11W/11Y)

The natural voltage of a battery changes as a function of temperature change. As the battery temperature rises, the effective voltage of the battery decreases. Without Temperature Compensation, the battery charger will always produce a set constant output voltage. As the battery temperature increases, this constant voltage will then induce a higher output current from the charger. This higher current can result in overcharging the battery, which in turn can result in damage to the batteries.

Temperature Compensation combats this overcharging by adjusting the charger's output voltage based on the temperature read by the internal temperature probe. In order to increase the accuracy of the temperature compensation, the external probe can be used to measure the temperature of the battery.

Option 11W includes a 24-foot temperature probe and Option 11Y includes a 100-foot temperature probe.

External Probe Connection Procedure

Before making any connections to the A75R, ensure that the AC power is off at the main breaker box and the charger's breaker is off. Verify that no voltage is present by using a voltmeter at all input and output terminals.

1. Locate the **EXTERNAL TEMP. SENSOR** terminal connection on the charger (use Figure 5 for reference).
2. Connect the external temperature probe (observe proper polarity).
3. Place the external probe in a desired location (it is recommended that the battery manufacturer be consulted for placement of the probe).
4. Enable the external temperature probe by toggling the SW12 DIP switch on the front panel to the ON position.

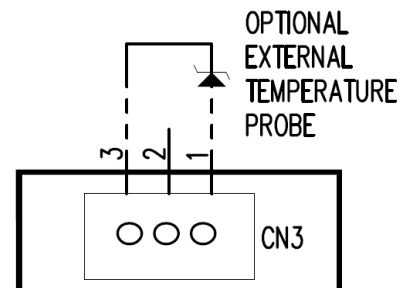


Figure 6 – External Temperature Compensation Connection

2 Operation

2.1 Initial Startup

Before applying AC power, be sure that the DC Breaker is turned off and output DIP switches are set correctly (see Section 2.2). Once all connections have been made and verified, the AC power may be turned on. The charger will automatically power up. There is a 5 second delay during startup while the charger automatically detects the AC input voltage. Once the unit output ramps up, close the DC breaker and verify the correct output voltage.

2.2 Changing Settings

Below the output voltage display is a set of 12 DIP switches. These switches are used to change settings of the charger. The function of each switch is shown in the image and table below.

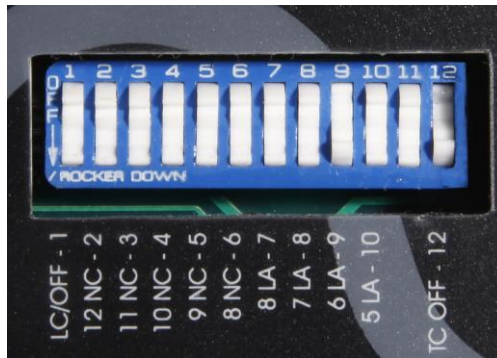


Figure 7 – Configuration Switches (12V Charger)

Switch	Battery Cells (12V)	Voltage Range (12V)	Battery Cells (24V)	Voltage Range (24V)
SW1	Disable Low Current Alarm			
SW2	12NC	16.68 – 17.88	24NC	33.3 – 35.7
SW3	11NC	15.29 – 16.39	22NC	30.5 – 32.7
SW4	10NC	13.90 – 14.90	20NC	27.8 – 29.8
SW5	9NC	12.51 – 13.41	18NC	25.0 – 26.8
SW6	8NC	11.12 – 11.92	16NC	22.2 – 23.8
SW7	8LA	17.20 – 18.80	16LA	34.4 – 37.6
SW8	7LA	15.50 – 16.45	14LA	31.0 – 32.9
SW9	6LA	12.90 – 14.10	12LA	24.6 – 28.2
SW10	5LA	10.75 – 11.75	10LA	21.5 – 23.5
SW11				
SW12	Disable Internal Temperature Compensation			

Table 1 – DIP Switch Settings

SW1 is used to disable the Low Current Alarm. In order to disable the alarm, this switch must be in the ON position (switch pushed up).

SW2-SW10 are used to set the battery type and number of cells. Only one of these switches should be set to ON at one time. If two switches are on at the same time, the charger will use the lower voltage of the two settings. *EX: On a 12V charger, SW2 (12NC) and SW8 (7LA) are both set to ON. The output of the charger will be set for 7LA.*

SW12 is used to disable the Internal Temperature Compensation Probe. In order to disable the Internal Probe, this switch must be in the ON position. If an external probe is to be used, the internal probe has to be disabled. If the internal probe is not disabled, Temperature Compensation will not function correctly.

2.3 Adjustment Potentiometers

There are three adjustment potentiometers located on the front of the charger (as shown on Figure 8).

The Output Voltage potentiometer (shown as **OUTPUT VOLTAGE ADJ.**) allows the customer to fine tune the output voltage. This adjustment should be done without the batteries connected to the output, if possible. Table 1 (DIP Switch Settings) shows the approximate range for voltage adjustment.

The Display Calibration potentiometer (shown as **DISPLAY CAL.**) allows the user calibrate the display voltage to match the measured output voltage. This adjustment does not affect the output voltage; it will only change display voltage.

The Current Limit potentiometer (shown as **CL ADJ.**) allows the user to adjust the maximum limit for the charger output current. This value is adjustable between approximately 50 and 105% of the rated charger output and factory set to 100%. The access to the current limit adjustment potentiometer is limited to prevent unintentional changes to the current limit calibration. No changes to this parameter are necessary and field adjustments should be avoided.

A clockwise adjustment increase the value of the potentiometer and a counter-clockwise adjustment decreases the value.



WARNING: Do **NOT** adjust the charger output voltage if the charger is in current limit (red Current Limit LED will be illuminated) as this can cause damage to connected loads or batteries.

3 Status and Alarm Indicators

The A75R front panel has six LED indicators as well as a three-digit seven segment LED display. Additionally, there is an analog DC ammeter for the output current.

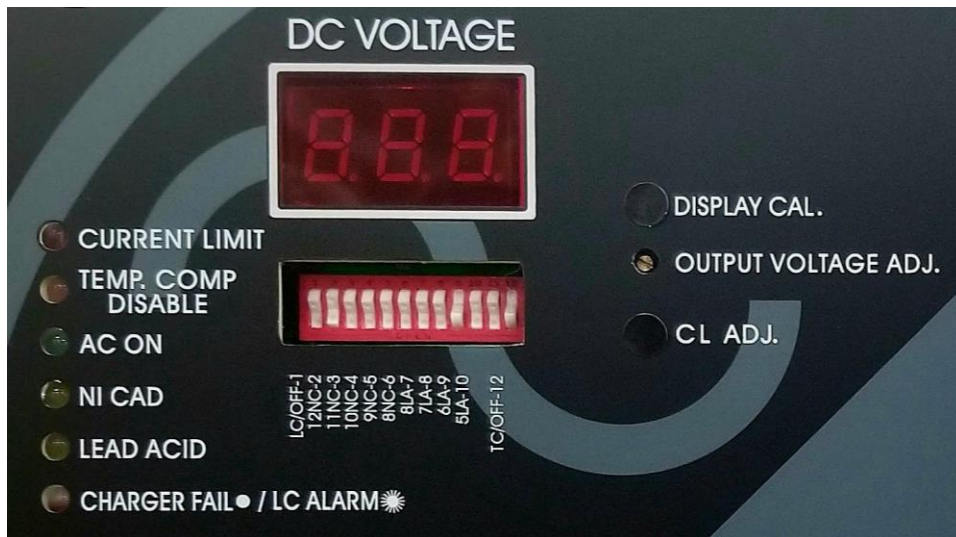


Figure 8 – Front Panel

Current Limit – This Red LED illuminates when the charger output reaches the set maximum output current and stays on until the battery is partially charged and the output current has fallen.

Temp. Comp. Disable – This Red LED illuminates if the internal temperature compensation switch is in the disable position and there is no external probe connected.

AC ON – This Green LED indicator illuminates to indicate the correct AC voltage is present.

Ni Cad – This Yellow LED illuminates to indicate that the Nickel Cadmium battery type is selected.

Lead Acid – This Yellow LED illuminates to indicate that the Lead Acid battery type is selected.

Charger Failure/LC Alarm – This Red LED indicator illuminates to indicate rectifier failure. It will blink when low output current is present.

3.1 Charger Fail Alarm Operation

The Charger Fail alarm shares the LED and the alarm relay contacts with the Low Current alarm. The Charger Fail alarm will trigger if the charger is not able to regulate the output voltage. The Charger Fail alarm will also trigger if the AC power is removed (and DC power remains). The Charger Fail alarm is a latching alarm and will not clear until the AC power is cycled. The alarm LED will blink in the Low Current condition and will remain solid for Charger Failure.

NOTE: The Low Current alarm and Charger Failure alarm share the same set of Form 'C' contacts. The contacts will change state under either alarm condition.

3.2 Low Current Alarm Operation

The Low Current alarm shares the LED indicator and the alarm relay contacts with the Charger Failure alarm. The Low Current alarm will trigger when there is no current driven from the unit for 20 seconds, such as when the battery is fully charged and no additional loads are connected. The alarm will clear when at least 0.25A is pulled from the charger. The alarm LED will blink in the Low Current condition and will remain solid for Charger Failure. The Low Current alarm can be disabled by switching the SW1 DIP switch to the on position. Disabling the Low Current Alarm will not affect the Charger Failure Alarm.

NOTE: The Low Current alarm and Charger Failure alarm share the same set of Form 'C' contacts. The contacts will change state under either alarm condition.

3.3 Remote Shutdown Operation

The Remote Shutdown feature allows the user to check the battery without disconnecting it from the charger. There are two methods of achieving this: The 12-24VDC input method and the closed condition method. The 12-24VDC input method is applying a 12-24VDC signal to the Remote Shutdown terminals (refer to Figure 9A for proper polarity). The closed condition method is connecting contacts from an external relay which are in the closed condition to the Remote Shutdown terminals. Applying one of these methods will cause the charger output voltage to drop to approximately 10.5VDC (21VDC for 24V chargers). Refer to Figure 9A and 9B for connections.

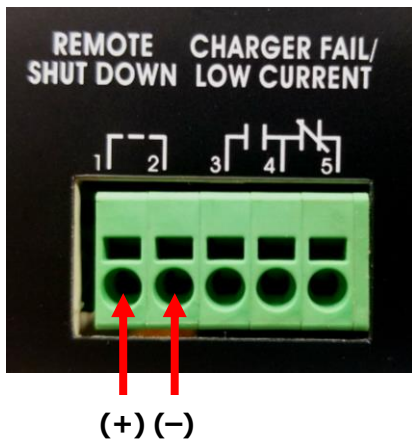


Figure 9A – Remote Shutdown Connections (12-24VDC Input Method)

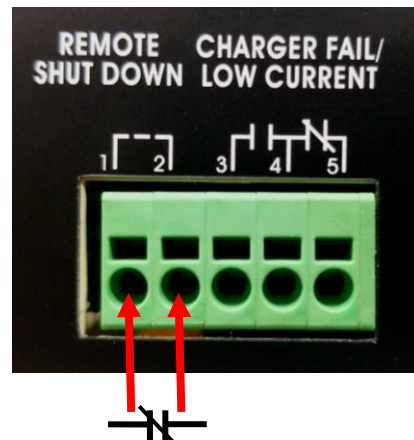


Figure 9B – Remote Shutdown Connections (Closed Condition Method)

Quick Start Guide

LA MARCHÉ A75R RAILROAD CHARGER GETTING STARTED

WARNING: Please refer to Instruction Manual for Important Safety Instructions. Make sure to check for any shipping damages before getting started.

- 1 Remove front panel.
- 2 Make sure DC Breaker and AC Feeder Breaker are OFF.
- 3 Connect AC input 120 VAC or 240 VAC.
- 4 While observing the correct polarity connect the battery.
- 5 Select appropriate dip-switch selection and monitor display.
- 6 Turn AC Feeder Breaker ON. The unit should be completely powered within 10 seconds.
- 7 Verify and adjust "Float Voltage" is necessary.
- 8 Turn DC Breaker ON.
- 9 Screw front panel back on.

Cell Setting Available

Position 1: LC OFF
Position 2: 12 NiCad
Position 3: 11 NiCad
Position 4: 10 NiCad
Position 5: 9 NiCad
Position 6: 8 NiCad
Position 7: 8 Lead Acid
Position 8: 7 Lead Acid
Position 9: 6 Lead Acid
Position 10: 5 Lead Acid
Position 11: Not Used
Position 12: TC OFF



4.0 Performing Routine Maintenance

Although very little maintenance is required with the A76R charger, 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.
5. Check capacitors for electrolyte leakage and replace if necessary.

Every 7 Years

If the charger is consistently operated in extreme temperature environments, the capacitors should be replaced.

Every 10 Years

1. Check magnetics, components and wiring for signs of excessive heat.
2. Replace capacitors if not done at the 7 year interval.

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 three (3) years from date of purchase.

Any part or parts of the equipment (except fuses, DC connectors and other wear-related items) that prove defective within a three (3) 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.

Should a piece of equipment require repair during the warranty period, the equipment can be returned to the La Marche factory to have the inspection, 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 three years. Transportation charges or duties shall be borne by purchaser.

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.

Document Control and Revision History

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