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MSM

Marine High Frequency Battery Charger

Installation and Operation Manual

Important Safety Instructions

Before using this equipment read all manuals and other documents related to this unit and other equipment connected to this unit. Always have a copy of a units manual on file nearby, in a safe place; if a replacement copy of a manual is needed it can be found at the www.lamarchemfg.com.

Electrical Safety

WARNING: Hazardous Voltages are present at the input of power systems. The output from rectifiers 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 unit may still be energized even when the unit 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 unit.
- Always disconnect the unit from the supply, batteries and loads before performing maintenance or cleaning.
- If the unit is hot-swappable, simply remove it from the shelf for any maintenance 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 unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

Mechanical Safety

- This unit or parts of the unit 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 unit. 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 unit is off.
- If it is necessary to remove the 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 case 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 metal on a battery. A spark or short-circuit could occur and could cause an explosion.

Unit Location

- Allow at least 6 inches of free air on all vented surfaces for proper cooling
- 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.
- Never allow battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Never place this unit 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. Unpack the product and inspect the exterior of product for damage. If any damage is observed, contact the carrier immediately. Continue the inspection for any internal damage. In the unlikely event of internal damage, please inform the carrier and contact La Marche for advice on the risk due to any damage before installing the product. Verify that you have all the necessary parts per your order for proper assembly.

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 and/or 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.

Table of Contents

MSM General Description

The La Marche model MSM series uses proven High Frequency charging technology and is developed specifically for the marine applications. The MSM unit incorporates power factor correction to achieve high efficiency and wide ac input range. This filtered unit is designed and built to charge VRLA, Flooded Lead Acid and Nickel Cadmium batteries. Internal temperature compensation is standard to increase the longevity of the batteries and the charger. With the optional communications capabilities the charger can be monitored remotely via Ethernet browser or SNMP. Integrated battery charge divider/isolator provides connections for charging up to three independent battery banks simultaneously. The unit is built in a robust, non corrosive aluminum enclosure that in conjunction with the drip shield and conformal coated boards makes it a prefect solution for marine applications.

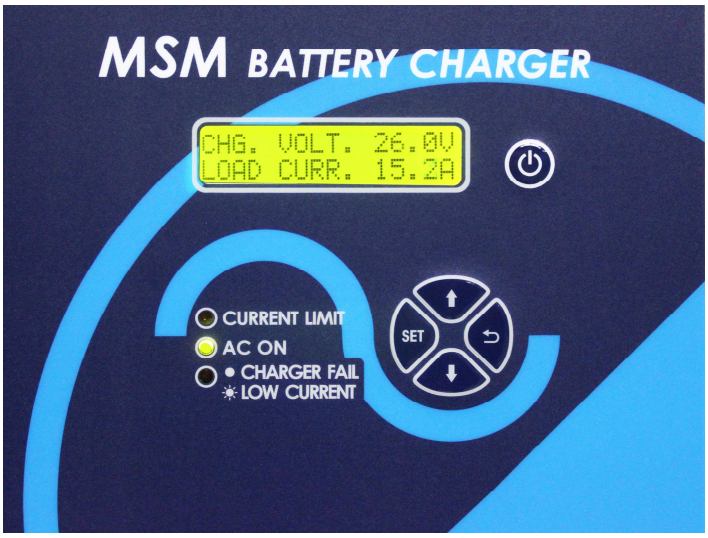


Figure 1 – MSM Display

Standard Features

- Microprocessor Controlled High Frequency Charging Technology
- Wide AC input range (105-264 VAC 45-65 Hz)
- Complete Isolation from AC to DC
- LCD Digital Voltmeter & Ammeter
- Adjustable Current Limit from 50-105%
- Filtered Output for VRLA Batteries
- Form "C" Contact for Charger Failure
- Meets ABS specifications
- Meets ANSI C62-41
- On / Off switch (Hold for 2 seconds to operate)
- Power Factor Correction Better Than .90 Within 20-100% Of Rated Load
- 2-Year Warranty
- Operating Temperature: -40° to 50°C
- Storage Temperature: -40° to 85°C

Symbol	***Color***	***Description***
CURRENT LIMIT	Red	Indicates if the charger is running in current limit
AC ON	Green	Indicates that correct AC voltage is present in the Rectifier
CHARGER FAIL/ LOW CURRENT	Red On / Blinking	Indicates a Rectifier fail, AC out of range

Table 1 – Front Panel Overview

1 Installation

1.1 Mounting

The MSM is designed with simple installation in mind. The system is wall mounted using four #10 bolts. To mount the MSM on the wall, install two #10 bolts on the wall. Place the MSM on the bolts, add appropriate mounting hardware and tighten. Add the additional two bolts with the appropriate mounting hardware and tighten.
Refer to figure 2 for mounting dimensions.

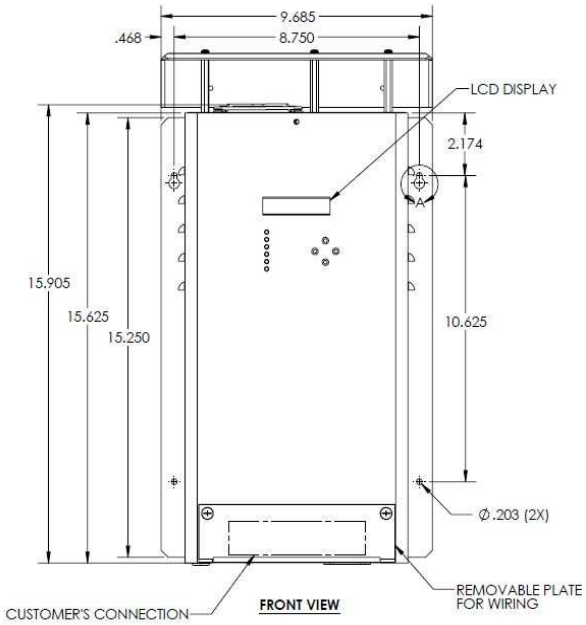


Figure 2 – Mounting Dimensions

1.2 Connections

After the MSM is mounted, the input and output connections can be made. The MSM is equipped with ¼" AAR style hardware for the output connections.
Built in charge divider/isolator provides means to connect up to three separate battery banks to the charger. The charge divider uses common negative connection for all three batteries. The positive cable from each battery should be connected to separate positive dc output terminal. **Observe the correct polarity when connecting batteries to the charger.** See the figure 3 below. The charger is equipped with a standard 7ft long ac power cord with standard NEMA 15 type connector.

DC Wire size requirements

Output Current Rating	Recommended wire size (AWG)
10A	#14
20A	#12
30A	#10
40A	#8

Table 2 – DC wire size requirements

Figure 3 – Output Connections

Note: *All National and local wiring codes must be followed. Wire insulation must be rated 90C or better.*

Charger Fail Alarm

The MSM unit is equipped with a single set of Form C dry type relay contacts for Charger Fail Alarm. The Alarm will activate when the unit is unable to regulate the output voltage. The connection for the alarm is made by pushing in a small flat head screwdriver to open the contact point, then placing the wire in and releasing. See figure 4.

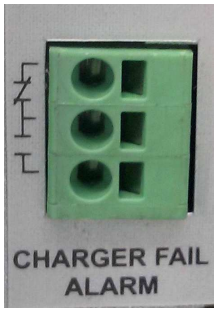


Figure 4
Charger Fail Connections

2 Operation

2.1 Initial Setup

Once all connections have been made and the input cable is plugged into the AC source, the unit will automatically power up. At the initial startup the MSM will run at the default settings (26 Volt Output for 24V units and 13 Volt Output for 12V units. Current Limit is set to 105%). In order to change these settings simply press the SET button to enter configuration mode.

2.2 Configure Mode

Once in Configure mode, use the Up and Down buttons to cycle through the available options and the set button to choose the highlighted option. The return button is used to return to the previous menu, or to exit the calibration. See the chart below for the adjustable settings in the calibration mode. The controller settings will remain stored even in the event of total power failure.

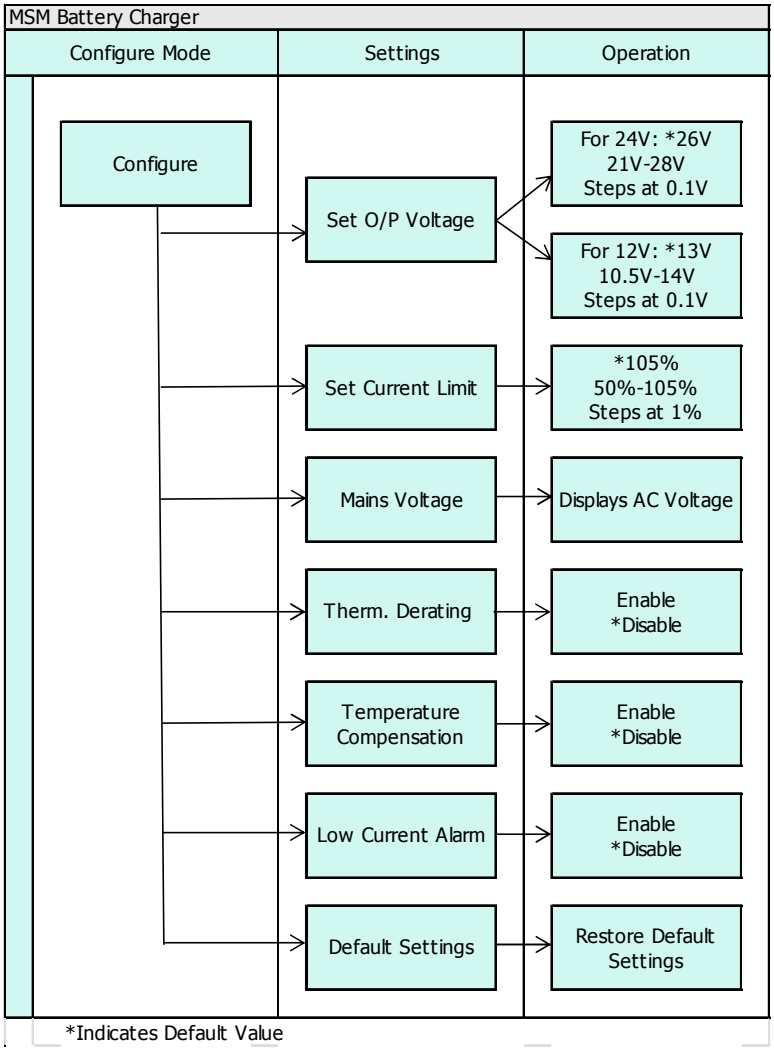
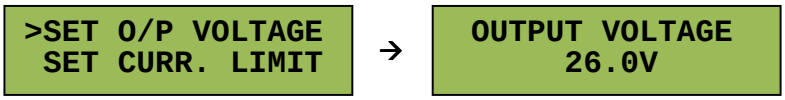


Figure 5 - MSM Configuration Tree

2.2.1 Setting Output Voltage

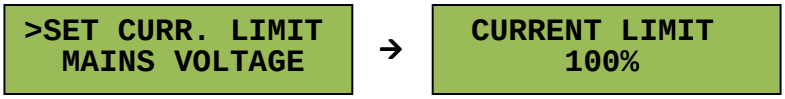
Press the SET switch with "SET O/P VOLTAGE" selected in order to change the output voltage setting.



Pressing the UP switch will increment the output voltage by 0.1V. Pressing the DOWN switch will decrement the output voltage by 0.1V. The output voltage setting range for 12V units is 10 – 14V, with a default value of 13V. The output voltage setting for 24V units is 21 – 28V, with a default value of 26V. Pressing the BACK switch will store the value in memory return to the configuration menu.

2.2.2 Setting Current Limit

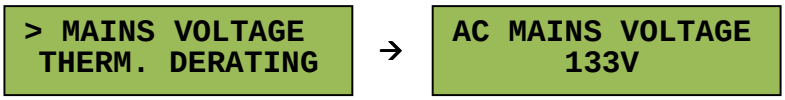
Press the SET switch with "SET CURR. LIMIT" selected in order to change the maximum charging current of the MSM battery charger.



Pressing the UP switch will increment the current limit by 1%. Pressing the DOWN switch will decrement the current limit by 1%. The range for the battery current limit is 50 – 105%. The default value is 100%. Please consult the battery manufacturer for the maximum charging current of the connected batteries. Pressing the BACK switch will store the value in memory and return to the configuration menu.

2.2.3 AC Mains Voltage

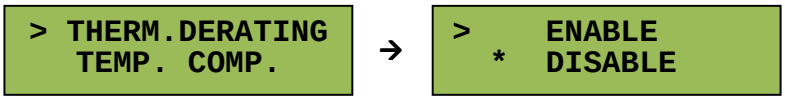
Press the SET switch with "MAINS VOLTAGE" selected in order to view the Voltage from the AC mains. The Mains Voltage is not a setting; it is simply a way to view the AC Voltage present to the MSM. Press BACK to return to the configuration menu.



2.2.4 Thermal Derating

Press the SET switch with "THERM.DERATING" selected in order to enable/disable Thermal Derating. The asterisk (*) on the display indicates the current setting. When enabled, the unit will monitor the rectifier's temperature. If the ambient temperature exceeds 50°C, it will lower the current limit to 70% in order to prevent the charger from overheating. When the ambient temperature returns below 50°C, the current limit will return to the previously set value.

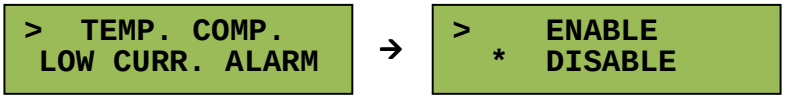
Additionally, all chargers are equipped with a thermal shutdown function; which cannot be disabled. If the ambient temperature exceeds 70°C, the DC output will shut off. The charger will continue to monitor the ambient temperature. When the temperature returns to a safe level of 40°C the output will be restored.



To turn on temperature derating move the arrow in front of the "ENABLE" selection and press SET. To turn off thermal derating move the arrow in front of the "DISABLE" selection and press SET.

2.2.5 Temperature Compensation

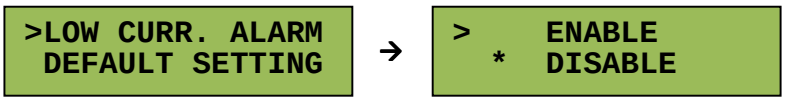
Press the SET switch with "TEMP. COMP." selected in order to set Temperature Compensation. The asterisk (*) on the display indicates the current setting. When enabled the output voltage will change dynamically in respects to the internal temperature of the MSM.



To turn on temperature compensation move the arrow in front of the "ENABLE" selection and press SET. To turn off temperature compensation move the arrow in front of the "DISABLE" selection and press SET.

2.2.6 Low Current Alarm

Press the SET switch with "LOW CURR. ALARM" selected in order to enable/disable the low current alarm. The asterisk (*) on the display indicates the current setting. When enabled the low current alarm will be activated. The low current alarm shares the same LED and Relay contacts as the Charger Fail Alarm. In the case of low current the CHARGER FAIL LED will blink.



To turn on low current alarm move the arrow in front of the "ENABLE" selection and press SET. To turn off low current alarm move the arrow in front of the "DISABLE" selection and press SET.

2.2.7 Default Setting

Press the SET switch with "DEFAULT SETTING" selected in order to reset the controller settings to default. The control will ask to verify the reset settings. Press SET to reset the settings or BACK to exit and cancel the change.

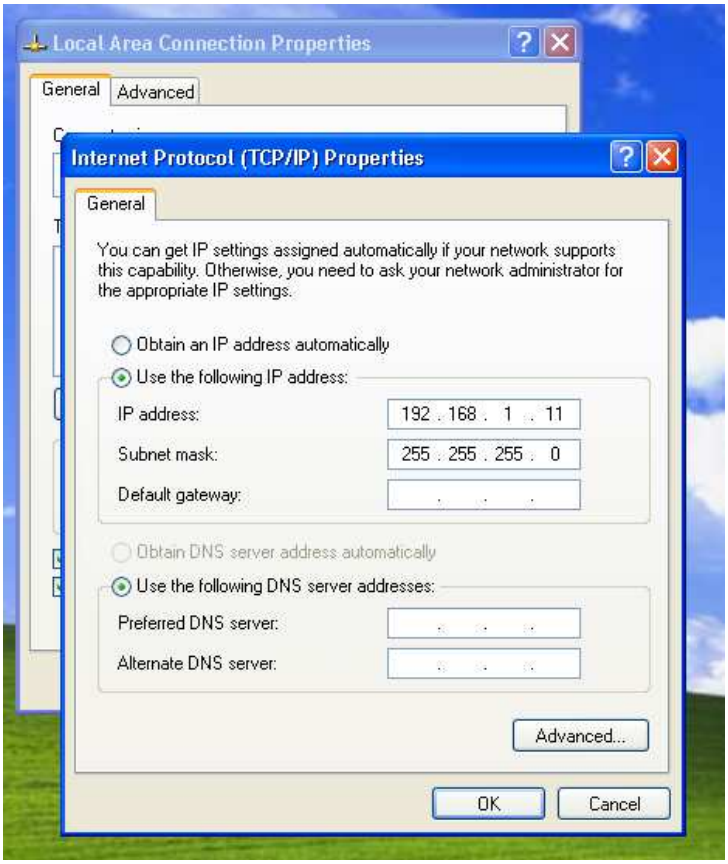
2.3 Normal Operation

The MSM is designed to be set only once and require no additional attention.

3 Communications (Optional).

3.1 Setting up a Local Network Connection using Static IP

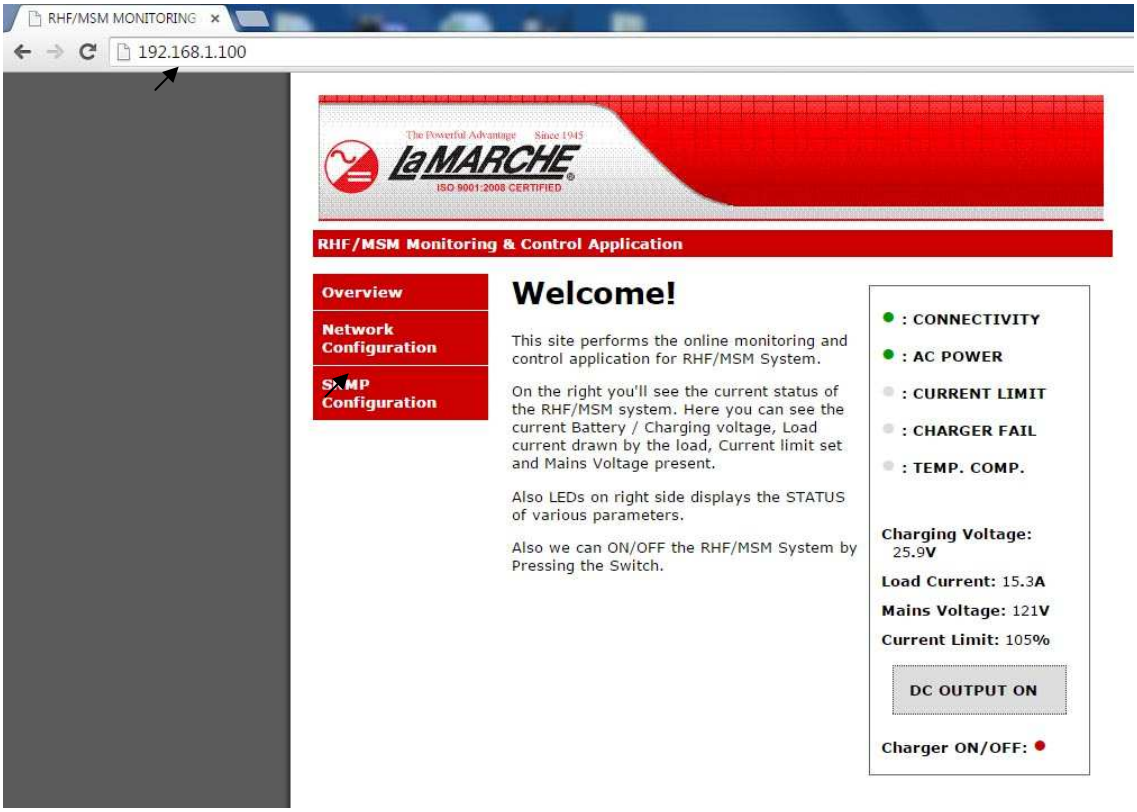
Go to the Internet Protocol (TCP/IP) Properties in windows and change the computer IP address using the specified Subnet mask (255.255.255.0).



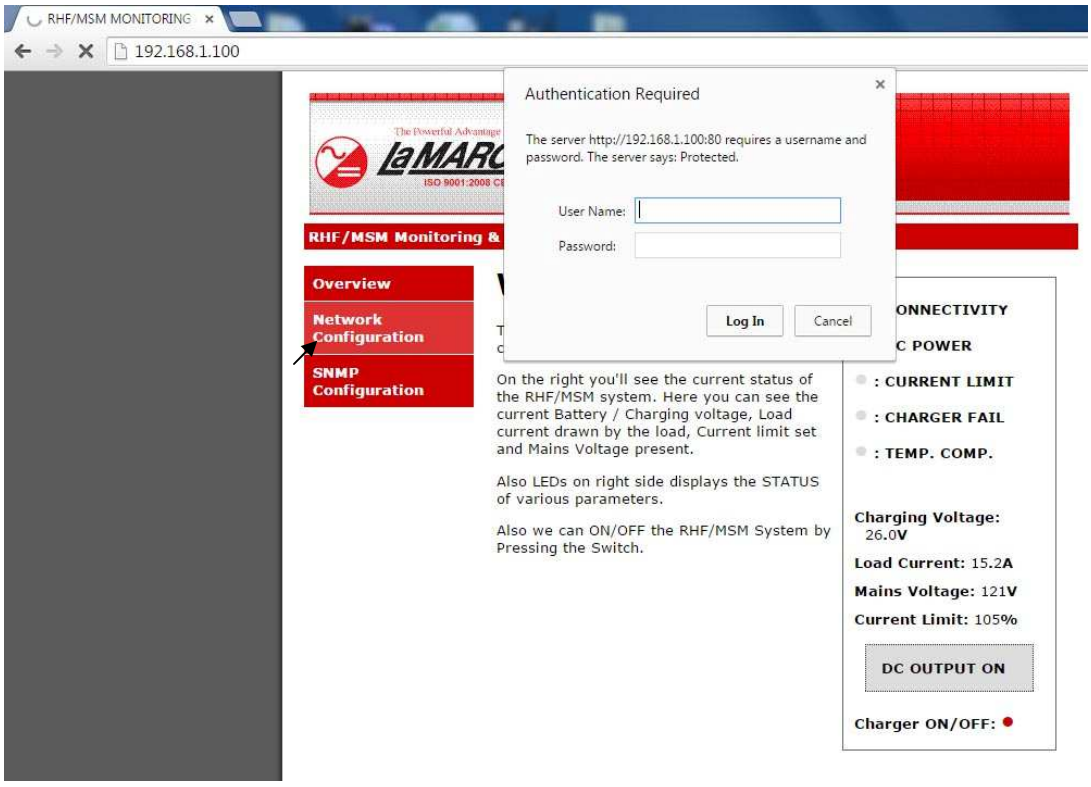
The MSM is setup with a Static IP. The default static IP is 192.168.1.100. If more than one MSM are to be used on a network, the IP address will need to be changed manually.

To change the IP address, enter 192.168.1.100 into the browser address bar. The MSM home page shown on the next page will load. Click the network configuration button to the left. The IP address can be changed on the network configurations page

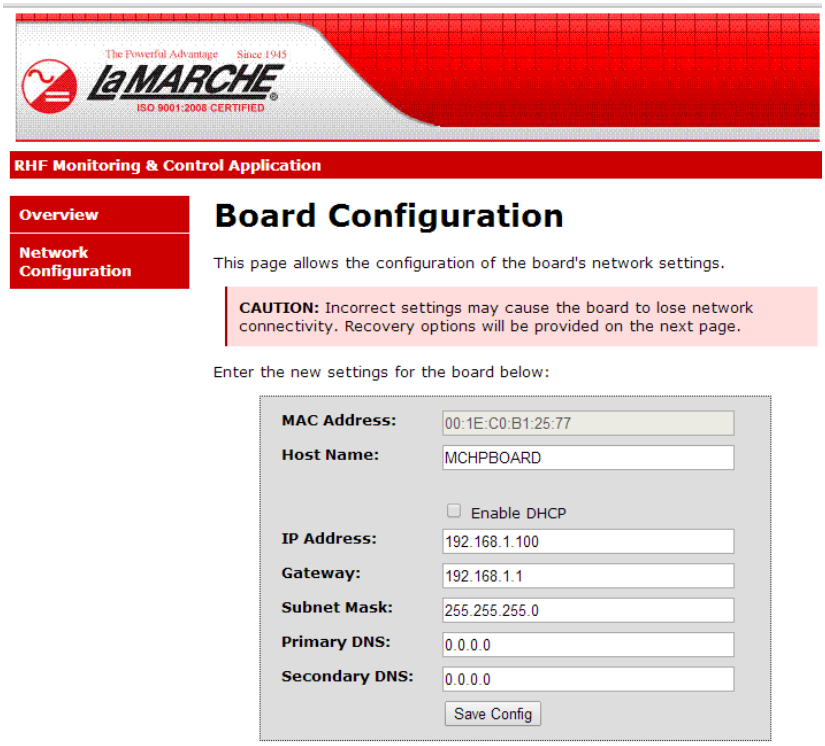
Open an internet browser and type the default IP address in the address bar. A website will be loaded that will look similar to the one below.



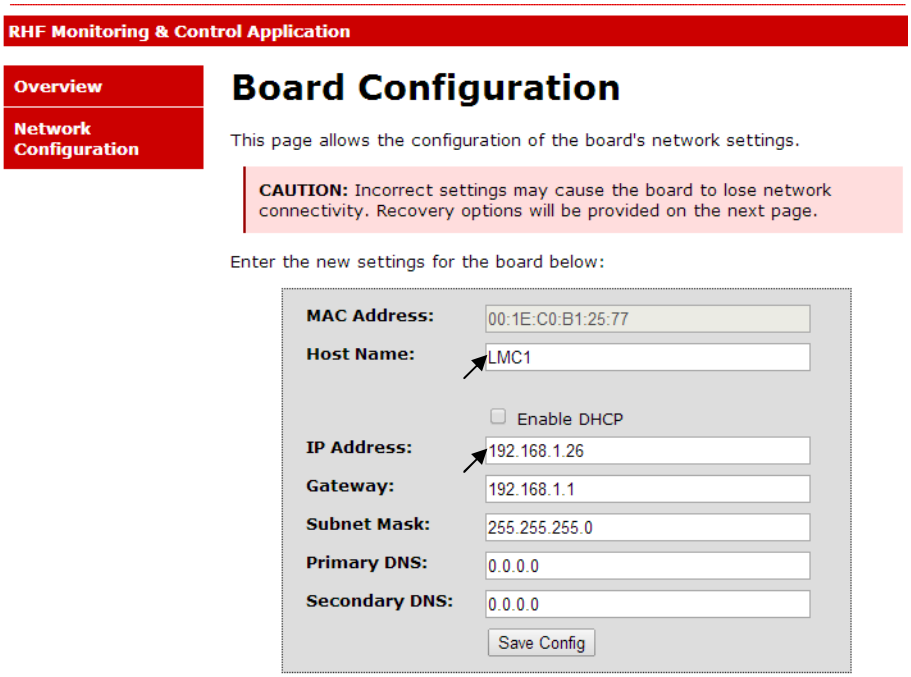
In order to access the MSM communication card's IP address settings, click on Network Configuration. A window will popup asking for the user name as password. By default the username is *admin* and the password is *lamarche*.



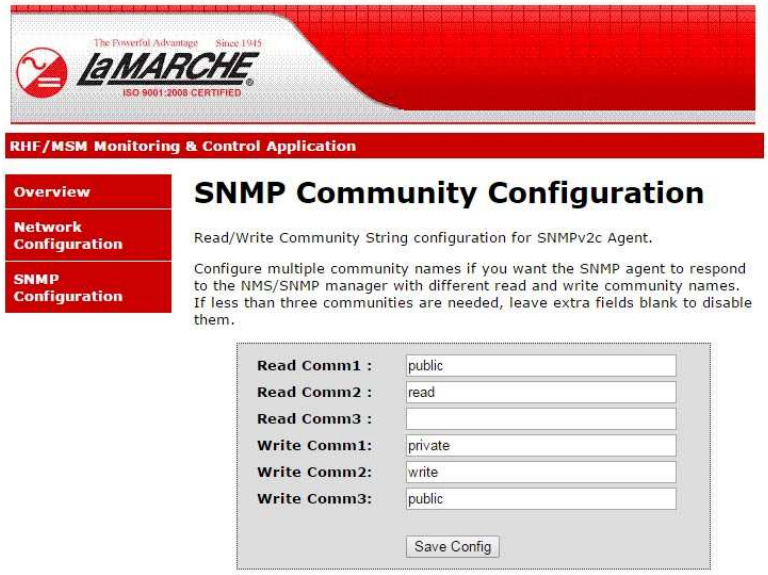
The Board Configuration screen includes the MAC Address, the name of the MSM, and all of the IP information. The name can be changed to differentiate the different MSM units connected on the same network.



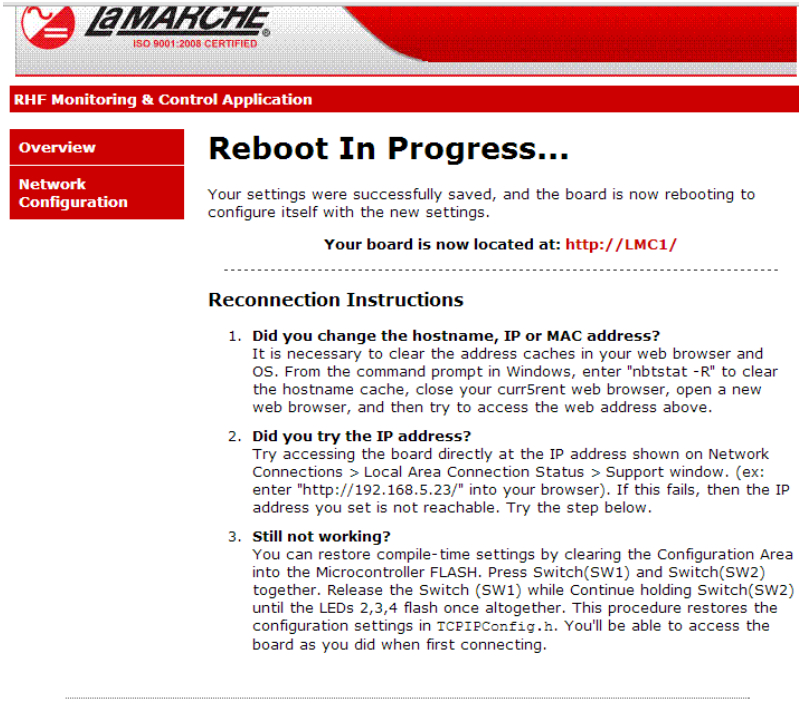
In the example below, we change the "Host Name" to LMC1 and the "IP Address" to 192.168.1.26 .



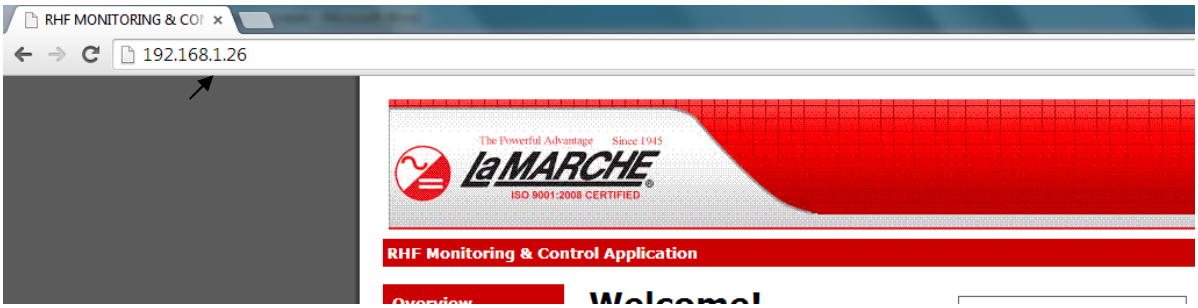
Page below allows the configuration of the SNMP settings.



As soon as the Save Config button is clicked, the website will show the following message. The connection to the MSM will be lost.



Open the internet browser and enter the new IP Address (192.168.1.26 in this example case) or the new device name (LMC1 in this example).



If everything has been done correctly the MSM is now setup to be operated on the Local Network. Follow this same procedure to setup addition MSM systems. Make sure that the IP address and name for each MSM is different.

3.2 Ethernet LED Indicators

There is one LED indicators located above the Ethernet port on the MSM enclosure. The LED indicators are used to display the status of the Ethernet connection. Green indicates that the Power to the communications card is on. Yellow indicates that the communications card is sending/receiving data. The Red LED indicates a Fault.

3.3 Reset Communications card to default settings

The communications card can be reset to default settings. In order to reset the card hold SW1 and SW2, release SW1 while continuing to hold SW2 for an additional four seconds.

Document Control and Revision History

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Instruction Number: P25-LMSM-1
Issue ECN: 20411

20615 / 10-14	20925 / 8-15	**21176 / 6-16**	