

# ATLAS

**MODULAR SWITCH MODE  
BATTERY CHARGER / POWER SUPPLY**

**USER'S MANUAL**

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*Important Safety,  
Installation,  
Operation, and  
Maintenance  
Instructions*

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# ATLAS

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## **IMPORTANT SAFETY INSTRUCTIONS**

1. **SAVE THESE INSTRUCTIONS** – This manual contains important safety and operating instructions. Keep it in a location where it is available to anyone who may operate the charger.
2. Before using battery charger, read all instructions and cautionary markings on battery charger, battery, and product using battery.



**LOOK FOR THIS SYMBOL TO POINT OUT SAFETY PRECAUTIONS. IT MEANS: *BE ALERT—YOUR SAFETY IS INVOLVED.* IF YOU DO NOT FOLLOW THESE SAFETY INSTRUCTIONS, INJURY OR PROPERTY DAMAGE CAN OCCUR.**

3.  **DANGER:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CAREFULLY READ AND FOLLOW THESE IMPORTANT SAFETY AND OPERATING INSTRUCTIONS BEFORE INSTALLING OR OPERATING THE CHARGER.
4.  **INSTRUCTIONS IMPORTANTES CONCERNANT LA SECURITÉ.**
5.  **WARNING:** TO REDUCE THE RISK OF FIRE, INSTALL THIS BATTERY CHARGER ON A SURFACE OF NON-COMBUSTIBLE MATERIAL.
6.  **DANGER:** RISK OF ELECTRIC SHOCK. DISCONNECT CHARGER FROM BATTERY AND AC POWER BEFORE SERVICING. TURNING OFF THE CHARGER DOES NOT REDUCE THIS RISK.
7.  **DANGER:** RISK OF ELECTRIC SHOCK. DO NOT TOUCH UNINSULATED PORTION OF AC OR DC CONNECTORS OR UNINSULATED BATTERY TERMINAL.
8.  **DANGER:** RISQUE DE CHOCS ÉLECTRIQUES. NE PAS TOUCHER LES PARTIES NON ISOLÉES DU CONNECTEUR DE SORTI OU LES BORNES NON ISOLÉES DE L'ACCUMULATEUR.
9.  **CAUTION:** CHARGE ONLY BATTERIES OF THE SAME TYPE, VOLTAGE, CELL NUMBER, AND AMP-HOUR CAPACITIES AS THE CHARGER IS CONFIGURED FOR. OTHER TYPES OF BATTERIES MAY BURST CAUSING PERSONAL INJURY AND DAMAGE. BEFORE CHARGING ANY OTHER TYPE OF RECHARGEABLE BATTERY, CHANGE THE CHARGER CONFIGURATION/SETTINGS AS RECOMMENDED BY THAT BATTERY MANUFACTURER.
10.  **ATTENTION:** UTILISER POUR CHARGER UNIQUEMENT LES ACCUMULATEURS AU PLOMB À ELECTROLYTE LIQUIDE. D'AUTRES TYPES D'ACCUMULATEURS POURRAIENT ÉCLATER ET CAUSER DES.
11.  **DANGER:** TO PREVENT ELECTRICAL SHOCK, DO NOT TOUCH EITHER AC OR DC UNINSULATED PARTS. MAKE SURE ALL ELECTRICAL CONNECTORS ARE IN GOOD WORKING CONDITION. DO NOT USE CONNECTORS THAT ARE CRACKED, CORRODED OR DO NOT MAKE ADEQUATE ELECTRICAL CONTACT. USE OF A DAMAGED OR DEFECTIVE CONNECTOR MAY RESULT IN A RISK OF OVERHEATING OR ELECTRIC SHOCK.
12.  **WARNING:** HAZARD OF ELECTRIC SHOCK.

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13. **⚠ WARNING: BATTERIES GENERATE EXPLOSIVE GASES. TO PREVENT ARCING OR BURNING NEAR BATTERIES, DO NOT DISCONNECT DC CHARGING CORD FROM BATTERIES WHEN THE CHARGER IS OPERATING. KEEP SPARKS, FLAME, AND SMOKING MATERIALS AWAY FROM BATTERIES.**
  14. **⚠ WARNING: ALWAYS SHIELD EYES WHEN WORKING NEAR BATTERIES. DO NOT PUT WRENCHES OR OTHER METAL OBJECTS ACROSS BATTERY TERMINAL OR BATTERY TOP. ARCING OR EXPLOSION OF THE BATTERY CAN RESULT.**
  15. **⚠ WARNING: BATTERIES PRODUCE HYDROGEN GAS, WHICH CAN EXPLODE IF IGNITED. NEVER SMOKE, USE AN OPEN FLAME, OR CREATE SPARKS NEAR THE BATTERY. VENTILATE THE AREA WHEN THE BATTERY IS CHARGING IN AN ENCLOSED PLACE.**
  16. **⚠ WARNING: BATTERIES CONTAIN CAUSTIC MATERIAL, WHICH MAY CAUSE BURNS. DO NOT GET IN EYES, ON SKIN, OR CLOTHING. IF CONTACT WITH THE EYES OCCURS, FLUSH IMMEDIATELY WITH CLEAN WATER FOR 15 MINUTES AND OBTAIN MEDICAL ATTENTION.**
  17. **⚠ WARNING: DE-ENERGIZE ALL AC AND DC POWER CONNECTIONS BEFORE SERVICING THIS UNIT. IF INJURY DOES OCCUR, APPLY STANDARD TREATMENT FOR ELECTRICAL SHOCK AND, IF NECESSARY, CONSULT WITH A PHYSICIAN.**
  18. **⚠ WARNING: THE CHARGER IS NOT FOR OUTDOOR USE. DO NOT EXPOSE THE CHARGER TO RAIN OR SNOW.**
  19. **⚠ CAUTION: DO NOT OPERATE THE CHARGER IF IT HAS RECEIVED A SHARP BLOW, BEEN DROPPED, OR OTHERWISE DAMAGED. HAVE A QUALIFIED SERVICE TECHNICIAN EXAMINE AND REPAIR AS NEEDED.**
  20. **⚠ WARNING: DO NOT DISASSEMBLE THE CHARGER. HAVE THE CHARGER EXAMINED BY A NATIONAL RAILWAY SUPPLY SERVICE AGENT. INCORRECT RE-ASSEMBLY OF THE CHARGER MAY RESULT IN AN EXPLOSION, ELECTRIC SHOCK, OR FIRE.**
  21. **⚠ CAUTION: MAKE SURE THE BATTERY SYSTEM HAS THE PROPERLY RATED VOLTAGE, AMP-HOURS, AND TYPE FOR THIS CHARGING SYSTEM.**

## **SAVE THESE INSTRUCTIONS**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

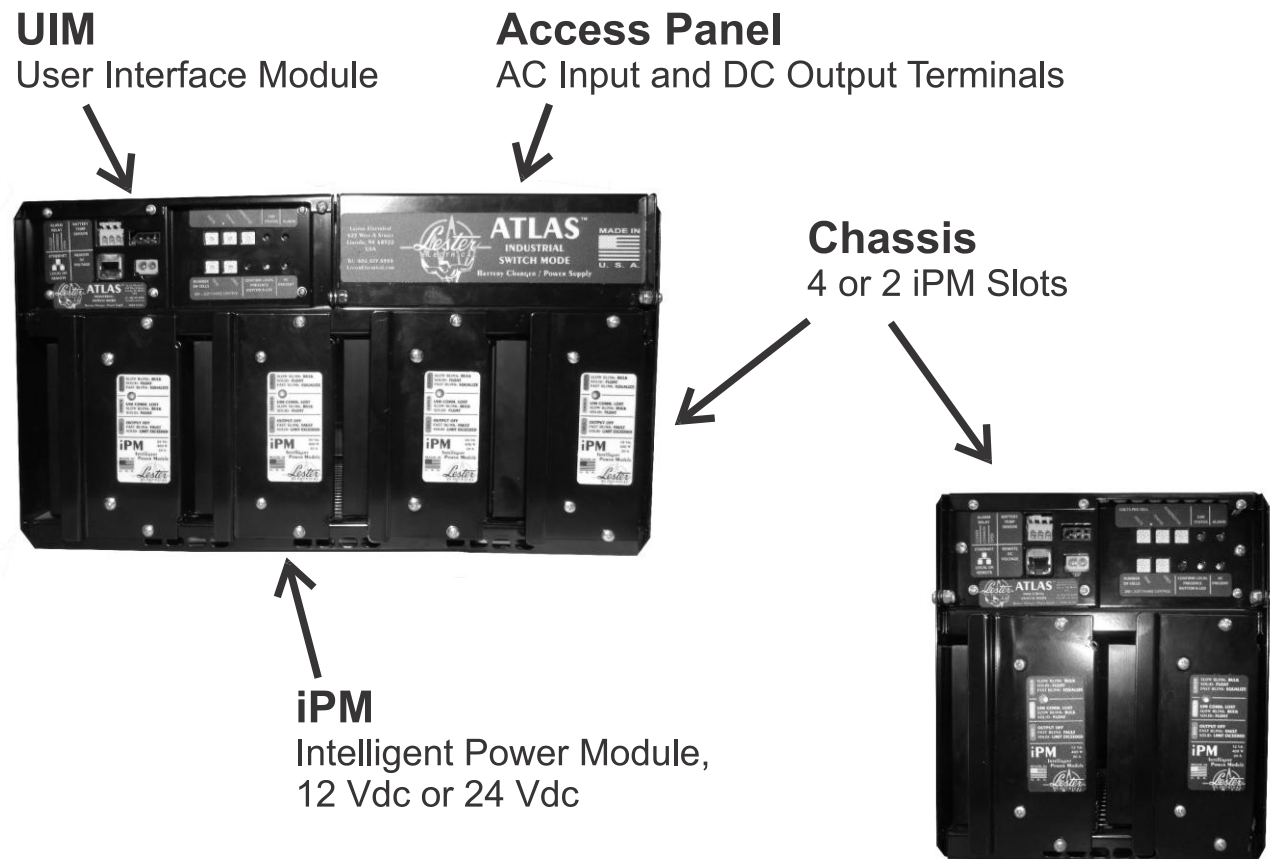
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## 1. INTRODUCTION

The ATLAS is a modular switch mode (high frequency) battery charger / power supply platform designed for railroad signal and communication, as well as other industrial stationary / reserve power applications.

ATLAS is convection cooled with no fans or other moving parts and designed to provide maximum reliability in industrial environments. The modular architecture provides redundancy and maximizes uptime, and the system controller combines the simplicity of rotary switches to adjust the float voltage with sophisticated communication, alarming, and logging options. The universal AC input enables the charger to be used with a wide range of AC voltages and frequencies, and the system features high energy efficiency and power factor.

As is illustrated in Figure 1-1, an ATLAS system includes a chassis. The chassis has a User Interface Module (UIM) that serves as the system controller and user interface and an access panel for the AC input and DC output terminals. Chassis are available with four (4) or two (2) slots for Intelligent Power Modules (iPMs).



**Figure 1-1: ATLAS System Components**

Both 12 Vdc, 400W, 20A and 24 Vdc, 400W, 10A iPMs are available. Figure 1-2 shows the corresponding maximum system DC output current for a given number of iPMs. An ATLAS system can be set to charge batteries within a voltage range of 1.00 to 20.00 volts (12 Vdc nominal system) or 10.00 to 40.00 volts (24 Vdc nominal system) for nickel-cadmium (Ni-Cd), valve regulated lead-acid (VRLA), and flooded/vented lead-acid batteries. The values shown throughout this manual in the instruction tables and figures are for generic use and may be different from the actual values programmed in your unit. Customized settings are available, contact a Lester Electrical service agent at 1-402-477-8988.

Number of iPMs	Maximum System DC Output Current (A)	
	12 Vdc iPMs	24 Vdc iPMs
1	20	10
2	40	20
3	60	30
4	80	40

**Figure 1-2: Number of iPMs and the Corresponding Maximum System DC Output Current**

## 2. THEORY OF OPERATION

The charger has an "IE" profile which is (1) a constant-current bulk/start phase followed by (b) a constant-voltage float phase. When the charger is first started, if the battery pack voltage is below the charger float voltage value, it will output a constant current in the bulk phase. The constant current value is controlled by the "Max DC Output Current" setting available via the charger web server using the Ethernet port.

When the battery pack nears the charger float voltage value, the charger will transition from the bulk phase into the float phase. The output current will decrease in order to maintain a constant float voltage. The charger float voltage value is controlled by either (1) the "NUMBER OF CELLS" and "VOLTS PER CELL" rotary switches on the UIM or (2), if the "NUMBER OF CELLS" rotary switches are set to "00", the "Number of Cells" and "Float Voltage Per Cell" settings available via the charger web server control the float voltage value (see Section 11.3 for valid ranges). The constant float voltage will be maintained indefinitely to keep the battery pack fully charged.

The charger web server, which is detailed in Section 11, includes other settings, such as battery temperature compensation, that can be adjusted per the requirements of the battery pack and overall system.

## 3. RECEIVING AND INSTALLING THE CHARGER

**⚠ WARNING: NEVER PLACE ANYTHING ON TOP OF THE CHARGER WHILE OPERATING. DAMAGE TO THE CHARGER OR BATTERIES COULD OCCUR.**

**⚠ WARNING: THE CHARGER MUST BE SET UP FOR THE PROPER USER SPECIFICATIONS BEFORE STARTING THE INITIAL CHARGE.**

**⚠ WARNING: CHARGERS CAN IGNITE FLAMMABLE MATERIALS AND VAPORS. DO NOT USE NEAR FUELS, GRAIN DUST, SOLVENTS, THINNERS, OR OTHER FLAMMABLES.**

**⚠ WARNING: REPLACE WORN, DAMAGED, OR CUT ELECTRICAL CORDS AND CONNECTORS IMMEDIATELY.**

Proper installation of the charger is important in order to achieve good charger performance and to prevent damage to the charger and batteries.

When a charger is received, a check for possible in-transit damage should be made. If any damage is found, it should be reported as a claim to the carrier.

The dimensions for the charger and mounting brackets are shown in Figure 3-1 (4-slot chassis) and Figure 3-2 (2-slot chassis).

To permit free air flow for convection cooling, allow 2 inches (2") minimum between the charger sides and other equipment and 4 inches (4") minimum on top of the charger. Do not mount the charger above other heat generating equipment.

The charger can be mounted on a shelf, countertop, floor, wall, or rack. The charger case includes four (4) cushioned feet that are designed to prevent marring of mounting surface and to absorb vibration. The charger includes adjustable mounting brackets that provide highly flexible mounting options. See Figure 3-1 (4-slot chassis) or Figure 3-2 (2-slot chassis) for details.

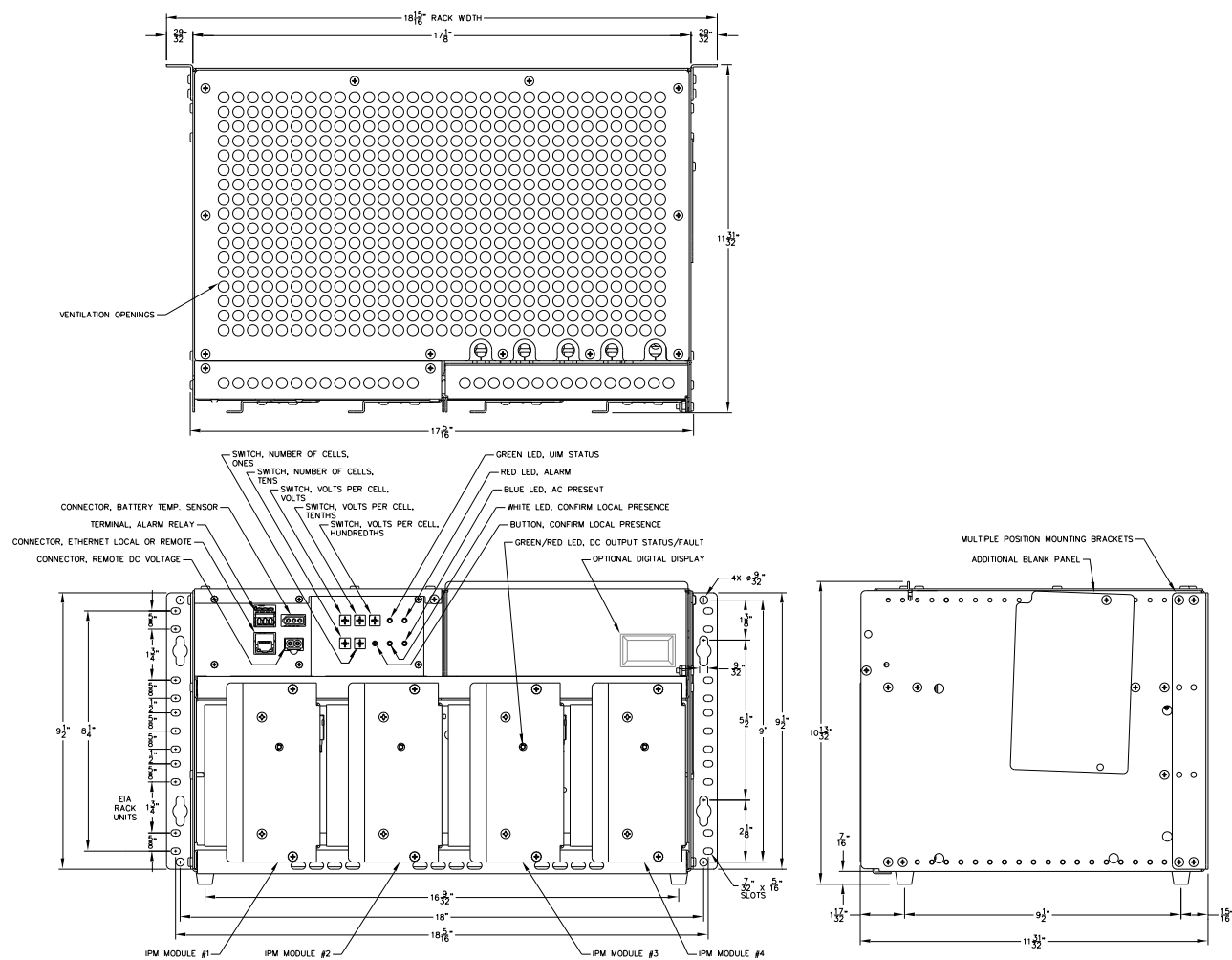
## Wall or Shelf Mounting

The charger can be fastened to a wall for wall or shelf mounting, by attaching the mounting brackets to the last two side mounting screw holes near the rear of the charger. Then, 1/4" bolts or lag screws can be installed in each of the (4) key slots or by using the top and bottom 0.281 diameter round holes in the mounting brackets (4 bolts total).

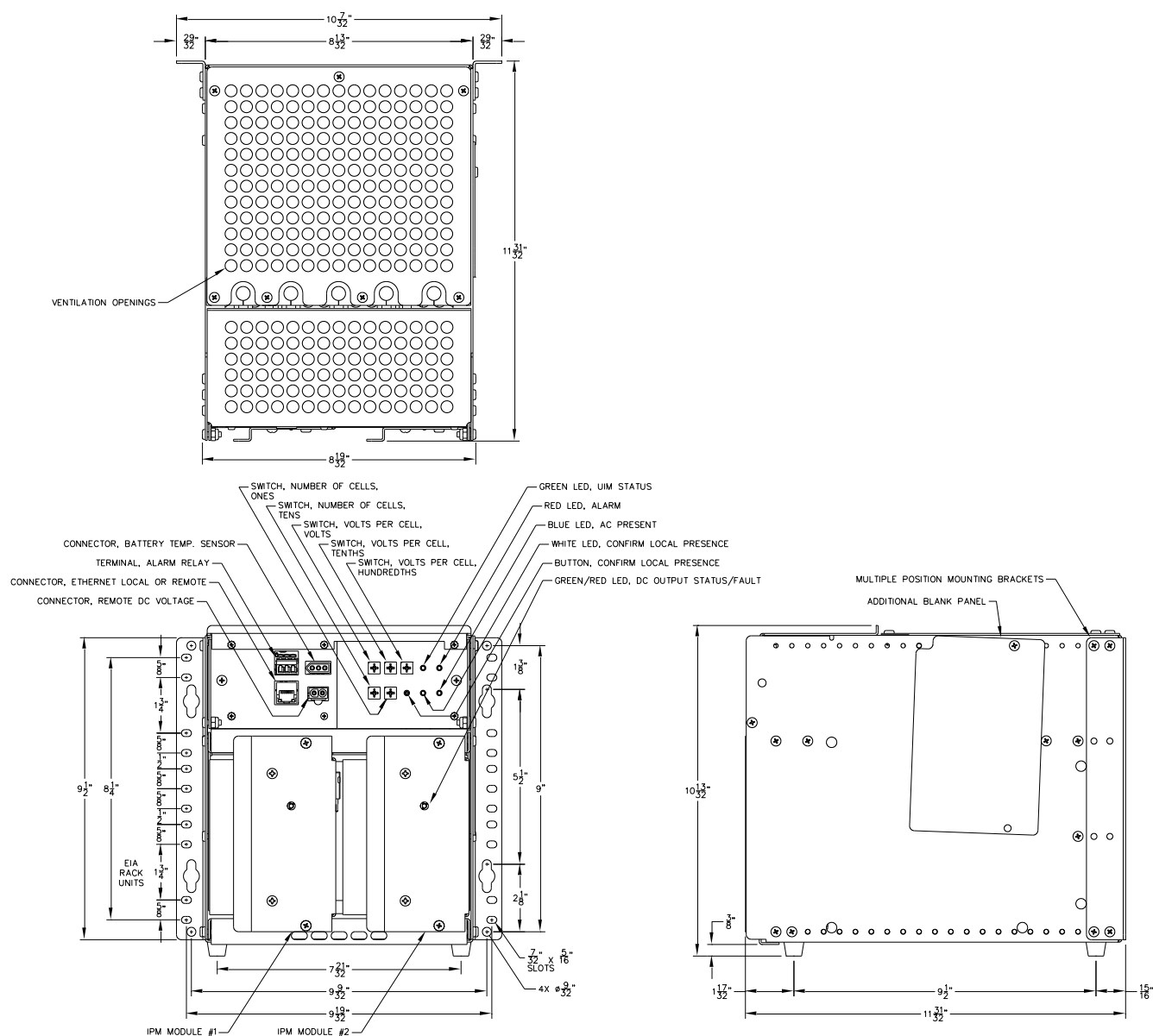
## Rack Mounting

The 4-slot chassis can be mounted to a standard Electronic Industries Association (EIA) 19" (483mm) rack system. The 2-slot can also be mounted to a standard EIA 19" rack system using an optional mounting bracket. An industry standard 3/8" square hole rack, 12-24 UNC cage nuts, and 12-24 UNC rack screws are recommended. A 12-24 screw should be installed through each of the 2 highest slots and 1 of the 2 lowest, 0.218" X 0.312" slots in both of the 2 mounting brackets (a total of 6 screws minimum). The 12-24 screws should be tightened to 40 in-lb. If other sizes and/or types of fasteners are used, the quantity, location and tightening torque should be designed as recommended by the manufacturer to be at least as strong as the above recommendation. By adjusting the locations of the mounting brackets along the 1/2" spacing of screw holes along the side of the charger, many different mounting configurations are possible, from flush mounted to forward mounted.

The patterns of the mounting bracket rack mounting holes and slots are shown in Figure 3-1 (4-slot chassis).



**Figure 3-1: Dimensions for 4-Slot Chassis and Mounting Brackets**



**Figure 3-2: Dimensions for 2-Slot Chassis and Mounting Brackets**



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## 4. AC INPUT

 **WARNING: FAILURE TO PROPERLY CONNECT THE AC VOLTAGE CONDUCTORS COULD CAUSE SERIOUS DAMAGE TO THE CHARGER.**

 **WARNING: DO NOT OPERATE THE CHARGER WITHOUT PROPER GROUNDING. IMPROPER GROUNDING CAN RESULT IN THE RISK OF AN ELECTRIC SHOCK.**

 **CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK OR FIRE, DISCONNECT AC POWER FROM THE CHARGER BEFORE INSTALLING OR REMOVING UNIT.**


 **WARNING: DO NOT TOUCH THE CHARGER'S TERMINALS OR AN ELECTRICAL SHOCK COULD OCCUR. A VOLTAGE IS PRESENT ON THE DC TERMINALS EVEN AFTER THE AC IS DISCONNECTED BECAUSE OF THE ENERGY STORED IN THE CAPACITORS.**

The charger has an AC input rating of 100-240 volts, 50-200 hertz, single-phase. The charger has an AC operating range of 90-264 volts, 45-205 hertz. Below 100 volts, the charger may reduce output power.

Use an appropriate size wire for the AC input. Quarter-inch (1/4") ring terminals are required for proper connection to the AC input binding posts (A.A.R.) located on the front of the charger. Open the access door cover on the front of the charger. Route the AC wires and/or conduit in accordance with the National Electrical Code and all local codes and ordinances. **Dress field installed Class 2 or Class 3 circuits at least 1/4 inch (6.3 mm) away from power, light, or Class 1 circuits.** Connect the AC input terminals on the two right-most posts, as marked on the A.A.R. terminal board, inside of the access door. Connect the AC ground to the terminal lug provided, as also marked on the inside of the access door. Close the access door after tightening all of the binding post nuts.

## 5. DC OUTPUT

 **WARNING: DO NOT TOUCH THE CHARGER'S TERMINALS OR AN ELECTRICAL SHOCK COULD OCCUR.**

 **WARNING: BATTERIES GENERATE EXPLOSIVE GAS. CHARGE ONLY IN WELL VENTILATED AREAS. TO PREVENT ARCING OR BURNING NEAR BATTERIES, DO NOT DISCONNECT THE DC CHARGING CONNECTOR(S) FROM THE BATTERIES WHEN THE CHARGER IS OPERATING. IF THE CHARGE CYCLE MUST BE INTERRUPTED, UNPLUG THE AC POWER CORD BEFORE DISCONNECTING THE DC OUTPUT CONNECTOR(S) FROM THE BATTERIES. KEEP SPARKS, FLAME, AND SMOKING MATERIALS AWAY FROM BATTERIES. TO REDUCE THE RISK OF FIRE, DO NOT USE THE CHARGER NEAR FLAMMABLE MATERIALS OR VAPORS.**

Use Table 5-1 to select the appropriate gauge and length DC output cable for your application. Maximum wire gauge is 4 AWG to fit the openings for the DC wiring above the binding posts (A.A.R.). **Dress field installed Class 2 or Class 3 circuits at least 1/4 inch (6.3 mm) away from power, light, or Class 1 circuits.**

Quarter-inch (1/4") ring terminals are required for proper connection to the DC output binding posts (A.A.R.) located on the front of the charger. Open the access door cover on the front of the charger. Connect the DC output terminals on the two left-most posts, with positive (+) on the left and negative (-) on the right, as marked on the A.A.R. terminal board, inside of the access door. Check to make sure that the polarity of the DC output wires are the same as those connected to the battery. The charger will not operate in a reversed polarity condition. If the DC polarity is reversed, the main DC output fuse will protect the charger from internal damage. Correct the reversed wires and replace the fuse. Close the access door after tightening all of the binding post nuts.

Maximum DC Cable Length per Wire Gauge			
Wire Gauge (AWG)	Rated Voltage / Chassis Size	Maximum Output Current in Amps	Maximum Length in Feet
12	24V / 2-slot	20	14
10	12V / 2-slot	40	10
	24V / 2-slot	20	20
	24V / 4-slot	40	10
8	12V / 2-slot	40	18
	24V / 2-slot	20	36
	24V / 4-slot	40	18
6	12V / 2-slot	40	29
	24V / 2-slot	20	58
	12V / 4-slot	80	15
	24V / 4-slot	40	29
4	12V / 2-slot	40	46
	24V / 2-slot	20	92
	12V / 4-slot	80	23
	24V / 4-slot	40	46

**Table 5-1: Maximum DC Cable Length**

## 6. BATTERY TEMPERATURE SENSOR



**WARNING: IT IS IMPORTANT TO MOUNT THE TEMPERATURE SENSOR ON THE BATTERIES FOR PROPER TEMPERATURE COMPENSATION. IF THIS CANNOT BE DONE, LOCATE THE SENSOR AS LOW AS POSSIBLE IN THE BUNGALOW, ENCLOSURE, OR CABINET.**

The external battery temperature sensor is an optional way of extending battery life by using temperature compensation. One end of the temperature sensor cable has a three-pin plug that plugs into a receptacle labeled "BATTERY TEMP SENSOR" on the UIM (see Figure 7-1). The other end of the cable has the temperature sensor sealed in a terminal.

The terminal-type sensor should be attached to a negative (-) battery post near the center of the battery pack. If the threaded stud is long enough above the battery jumper nut, attach the sensor with another nut. Torque this nut to proper specifications. If the stud is too short, the nut holding the jumper wire will need to be removed. Open or remove the load and charging circuits to the batteries. Remove the nut holding the jumper and add the sensor, then torque the nut to the proper specifications. Then close or connect the load and charging circuits back to the batteries.

**Securely fasten the temperature sensor cable to protect the sensor from being torn from the battery.** Secure the sensor cable to a fixed object to ensure the sensor will not be pulled loose. Use a cable tie mount on the battery or on the adjacent battery, if necessary.

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## 7. USER INTERFACE MODULE (UIM)

### 7.1. User Interface Module (UIM)

Below are descriptions of the user interface items found on the UIM. Figure 7-1 identifies these user interface items.

#### **Number of Cells Rotary Switches**

Used to manually set the number of battery cells. See Section 11.3 for valid ranges. Setting to “00” enables control via the web server.

#### **Volts Per Cell Rotary Switches**

Used to manually set the float voltage per cell. See Section 11.3 for valid ranges. Not used if the “NUMBER OF CELLS” rotary switches are set to “00”, which enables float voltage control via the web server.

#### **UIM Status LED**

Green LED. See the UIM LEDs table for possible states.

#### **Alarm LED**

Red LED. See the UIM LEDs table for possible states.

#### **AC Present LED**

Blue LED that is on when AC power is present.

#### **Confirm Local Presence Button and LED**

Pressing the button enables setting/alarm changes to be saved via the web server for a set amount of time. This ensures that the changes are being made locally and provides the highest level of possible security.

#### **Alarm Relay Terminals**

Form C, dry contacts. Configurable per alarm via the web server by selecting the K1 relay in the alarm settings menu.

#### **Relay Terminal Remote Wiring**

The terminal strip has OPEN, COMMON, and CLOSED relay contacts for remote wiring. COMMON to CLOSED has continuity when no alarms or faults for the K1 relay are active. To insert a 28 to 12 AWG wire striped 5 to 6mm, use a small screw driver to push the white tab at the top upwards. Insert the wire and verify good contact. The relay contacts are rated for 1A at 30Vdc or 0.5A at 120Vac.

#### **Battery Temperature Sensor Connector**

Can be connected to a battery temperature sensor in order to temperature compensate the charge profile. Enabled/disabled, compensation value, min compensation limit, and max compensation limit configurable via the web server. The reference temperature for compensation is 25°C or 77°F.

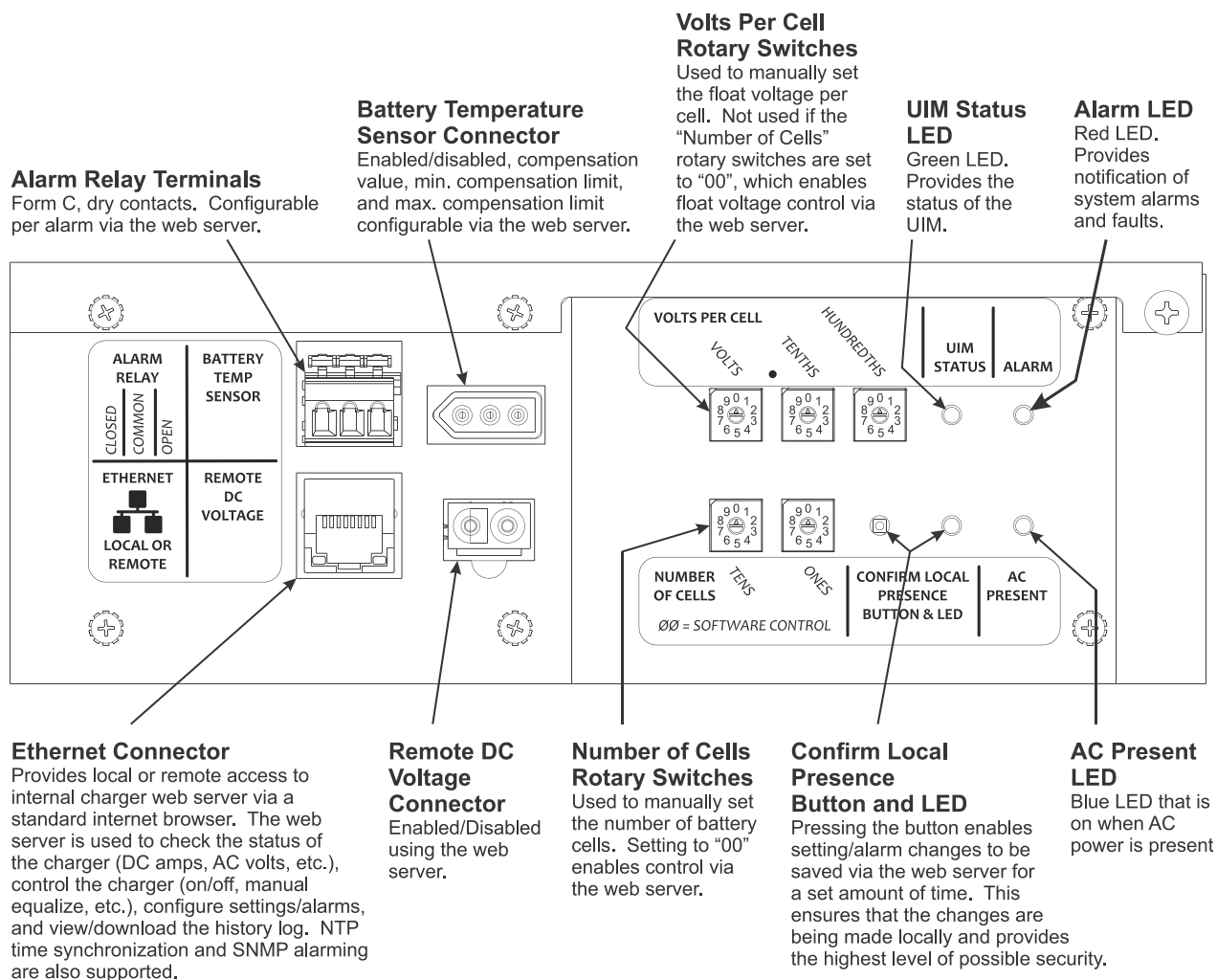
#### **Ethernet Connector**

Provides local or remote access to the internal charger web server via a standard Internet browser. The web server is used to check the status of the charger (DC amps, AC volts, etc), control the charger (on/off, manual equalize, etc), configure settings/alarms, and view/download the history log. NTP time synchronization and SNMP alarming are also supported.

#### **Remote DC Voltage Connector**

Can be wired directly to the battery pack in order to measure the voltage without any DC cable drop. Enabled/disabled via the web server. This option allows for a more accurate float voltage at higher current levels.

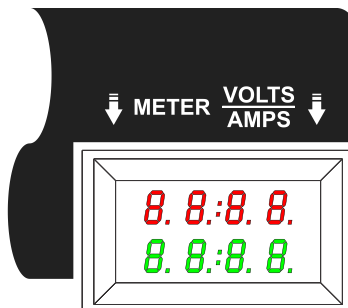
The UIM is powered by both AC and DC power so as to remain powered on when AC power is lost. This allows all alarms and the UIM to function as desired. Removal of both the AC and DC power and then return of either power source will allow for the UIM LED's to do a power up sequence and reboot the UIM.



**Figure 7-1: User Interface Items on the UIM**

## 7.2. Digital Meter

When the multi-function digital meter option is ordered, it is mounted on the front of the charger. The meter displays both the charger output voltage and current. The top red number displays the output voltage, which is measured internal to the charger. Because it is measured internal to the charger, it will differ from the voltage measured at the battery pack due to the voltage drop of the cabling between the charger and battery pack. It will also differ from the "Battery Voltage" displayed on the web server "Dashboard" for the same reason. The bottom green number displays the output current of the charger, so depending on the application, the battery pack and load may share this current. Figure 7-2 illustrates the digital meter.



**Figure 7-2: Optional Digital Meter**

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## 8. CHARGER OPERATION

**⚠ WARNING: TO REDUCE THE RISK OF AN ELECTRIC SHOCK, CONNECT ONLY TO A SINGLE-PHASE, PROPERLY GROUNDED (3-WIRE) AC SOURCE. REFER TO GROUNDING INSTRUCTIONS.**

**⚠ CAUTION: MAKE SURE THE BATTERY IS A RECHARGEABLE BATTERY WITH THE PROPER RATED VOLTAGE FOR THIS CHARGER.**

**⚠ DANGER: TO PREVENT ELECTRICAL SHOCK, DO NOT TOUCH UNINSULATED PARTS OF THE CHARGER AC INPUT OR DC OUTPUT TERMINALS, AC INPUT OR DC OUTPUT WIRING, OR BATTERY TERMINALS. MAKE SURE ALL ELECTRICAL CONNECTORS ARE IN GOOD WORKING CONDITION. DO NOT USE CONNECTORS THAT ARE CRACKED, CORRODED, OR DO NOT MAKE ADEQUATE ELECTRICAL CONTACT. USE OF A DAMAGED OR DEFECTIVE CONNECTOR MAY RESULT IN A RISK OF OVERHEATING OR ELECTRIC SHOCK.**

**⚠ WARNING: BATTERIES GENERATE GASES WHICH CAN BE EXPLOSIVE. TO PREVENT ARCING OR BURNING NEAR BATTERIES, DO NOT DISCONNECT THE CHARGER DC OUTPUT FROM THE BATTERIES WHEN THE CHARGER IS OPERATING. KEEP SPARKS, FLAME, AND SMOKING MATERIALS AWAY FROM BATTERIES.**

**⚠ WARNING: ALWAYS SHIELD EYES WHEN WORKING NEAR BATTERIES. DO NOT PUT WRENCHES OR OTHER METAL OBJECTS ACROSS BATTERY TERMINALS OR THE BATTERY TOP. ARCING OR EXPLOSION OF THE BATTERY CAN RESULT!**

**⚠ WARNING: DO NOT DISCONNECT THE CHARGER DC OUTPUT FROM THE DC WIRING WHILE A CHARGE CYCLE IS IN PROGRESS. THE RESULTING ARCING AND BURNING COULD CAUSE THE BATTERIES TO EXPLODE.**

- Check the “NUMBER OF CELLS” and “VOLTS PER CELL” rotary switches on the UIM to verify their settings against the specifications of the batteries ([see Section 11.3 for valid ranges](#)). If the “NUMBER OF CELLS” rotary switches are set to “00”, which enables software control of the float voltage value, refer to Section 11.3 in order to verify the “Number of Cells” and “Float Voltage Per Cell” setting values via the charger web server ([see Section 11.3 for valid ranges](#)).
- The float voltage should be set to the battery manufacturer’s specified voltage at 25 °C (77 °F).
- Refer to Section 11 in order to verify other charger web server settings, such as the battery temperature compensation values.
- The charger does not have a hardware power switch. When AC input power is applied to the charger, the DC output will start after a short delay unless the UIM Output Control has been turned off.
- The bi-color LED on the iPM(s) provides DC output status information along with iPM fault status information. It also specifies where in the charge profile the system currently resides (start/bulk, float, or equalize). See Section 9.2 for details.
- To stop the charger, disconnect the AC power source or use the “Output Control” button available on the charger web server “Dashboard” ([see Section 11.1](#)).

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## 9. LED INDICATORS

### 9.1. UIM LEDs

The table below outlines the functionality of the UIM LEDs. See Figure 7-1 as a reference to the location of the LEDs on the UIM.

	AC PRESENT	UIM STATUS	CONFIRM LOCAL PRESENCE	ALARM	Description
	Blue	Green	White	Red	
AC Input Power	Off				AC input power is not present.
	Solid				AC input power is present.
Power Up	Solid / Off	Solid / Off	Solid / Off	Solid / Off	LEDs turn on and then off independently on power up as an LED test.
UIM Status		Off			UIM is not functioning properly.
		Solid			UIM is functioning properly.
Confirm Local Presence			Off		Confirm Local Presence (CLP) timer is not active. Web server changes cannot be saved. CLP button must be pressed in order to activate the CLP timer.
			Solid		Confirm Local Presence (CLP) timer is active. Web server changes can be saved.
Alarms & Faults				Off	No alarms or faults are active.
		Fast Blink		Fast Blink	Switch settings are out of range; Number of Cells, Volts per Cell, or Number of Cells * Volts per Cell are either too high or too low (see Section 11.3 for valid ranges).
				Solid	At least one alarm is active with a priority of "Major" or "Minor". Alarms configured with a priority of "Warning" do not activate the "Alarm" LED.

## 9.2. iPM Bi-Color LED

The table below outlines the functionality of the iPM bi-color LED. When both green and red LEDs are on, the color appears amber.

	iPM Bi-Color LED			Description
	Green	Red	Amber	
Power Up	Solid / Off	Solid / Off		LEDs turn on and then off independently on power up as an LED test.
DC Output Status	Off			DC output is off. Either (1) AC input power is not present, (2) the output has been manually turned off via the UIM web server, or (3) the systems "Power Saving Mode" has been enabled and the iPM is not currently active (other iPMs in the system are still active).
	Slow Blink			DC output is in constant-current bulk/start mode.
	Solid			DC output is in constant-voltage float mode.
Alarms & Faults		Solid		An iPM fault is active. DC output is off.
		Slow Blink		The iPM is unable to communicate with the UIM, so the iPM is operating using the last configuration it received from the UIM before communication ceased.
		Fast Blink		DC output is off due to a limit being exceeded (max iPM temperature, etc). The DC output will turn back on when the limit is no longer being exceeded.
Equalizing			Slow Blink	DC output is in equalize mode. The charger output is in constant-current bulk/start mode while equalize mode is active.
			Solid	DC output is in equalize mode. The charger output is in constant-voltage float mode while equalize mode is active.

## 10. ETHERNET COMMUNICATION

The Ethernet port is located on the UIM (see Figure 7-1). It can be used to locally or remotely communicate with the internal charger web server via a direct local connection to a laptop computer accessed via a standard Internet browser or a networked connection to a remote or local laptop or desktop computer, smart phone, or tablet via a standard Internet browser. **Enable JavaScript within the Internet browser you plan to use per the browser instructions (JavaScript is typically enabled by default). The Internet browser must also support HTML5, which all popular modern browsers do (Internet Explorer is not recommended).**

### 10.1. Direct Local Communication

The charger Ethernet port is auto crossover, auto MDI-X, so it can be directly connect to a local laptop computer via either (1) a standard Ethernet cable or (2) a crossover Ethernet cable. See Section 10.3 for Manual (Static) Mode configuration instructions for direct local communication. The charger can then be accessed via a standard Internet browser.

---

## 10.2. Networked Remote or Local Communication

The charger Ethernet port can be connected to an Ethernet switch or router via a standard Ethernet cable in order to add the charger to network. See Section 10.3 for Manual (Static) Mode configuration instructions for networked communication. See Section 10.4 for Automatic (DHCP) Mode configuration instructions for networked communication. Once the charger has been added to a network, it can be accessed via a remote or local laptop computer, desktop computer, smart phone, or tablet via a standard Internet browser.

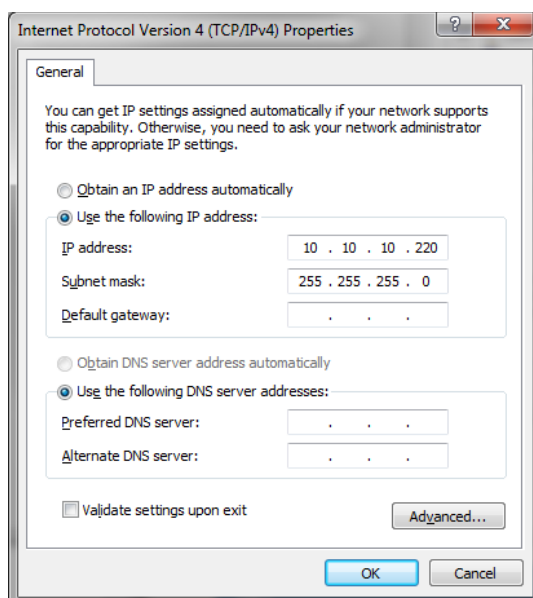
## 10.3. Manual (Static) Mode

The standard settings from the factory are “Manual (Static) Mode” with an “IP Address” of “10.10.10.210” and a “Subnet Mask” of “255.255.255.0”. **Your charger may have been factory-configured with alternate settings. If this is the case, the charger may include a “Quick Start Guide” that lists these settings or you may need to get these settings from your organization’s management.**

### Direct Local Communication

In order to establish direct local communication with a laptop computer, after connecting the charger Ethernet port to the laptop Ethernet port, follow the steps below on a laptop computer. (The steps below are for Windows 7. If you are using a different version of Windows or a different operating system, the steps will vary).

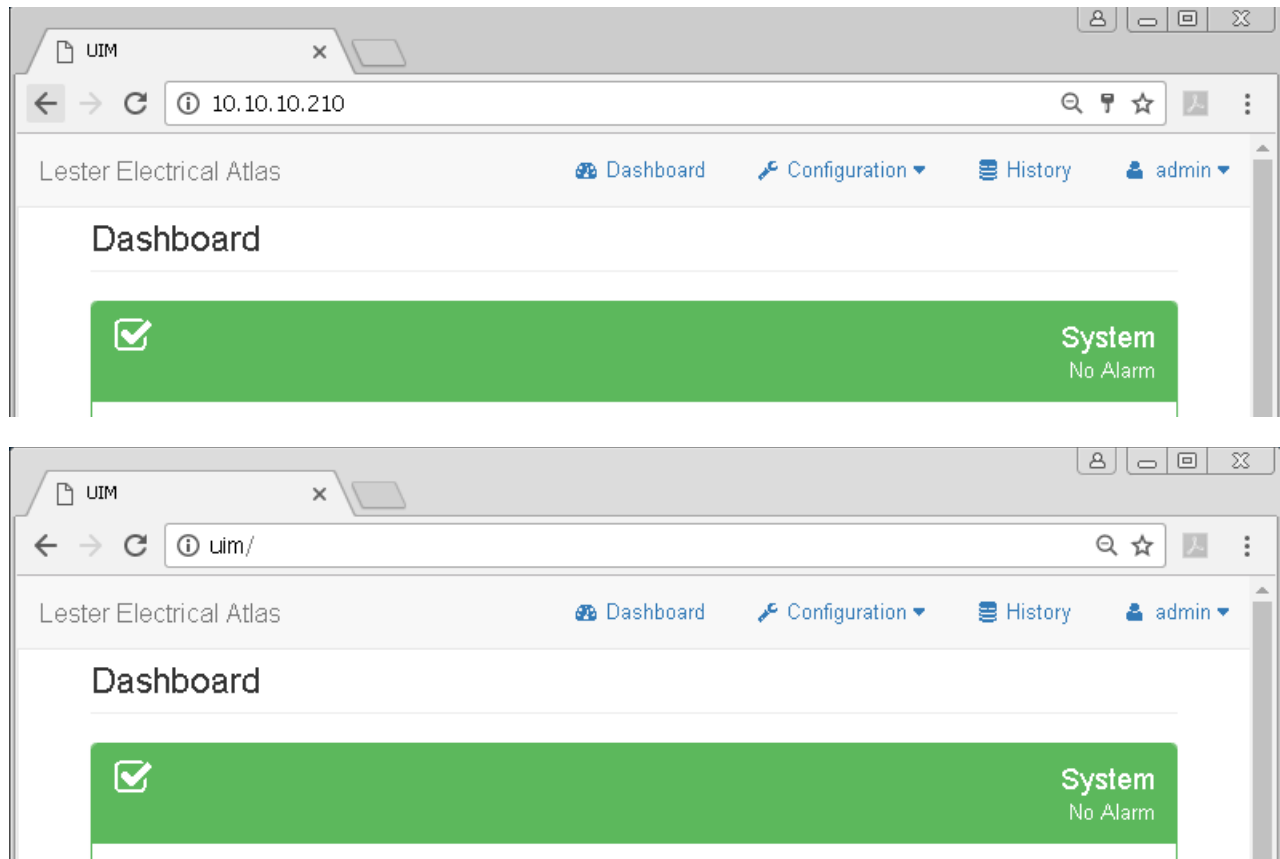
- Navigate to:
  - Start >> Control Panel (View by: Category) >> Network and Internet >> Network and Sharing Center >> Change Adapter Settings
  - OR-
  - Start >> Control Panel (View by: Large Icons or View by: Small Icons) >> Network and Sharing Center >> Change Adapter Settings
- Right-click on “Local Area Connection” and select “Properties”
- Select “Internet Protocol Version 4 (TCP/IPv4)” and click the “Properties” button
- Select “Use the following IP address:”
- Enter an “IP address:” of “10.10.10.XXX”, where “XXX” is any 3-digit number other than “210” (for example, “10.10.10.220”)
- Enter a “Subnet mask:” of “255.255.255.0”
- Press the “OK” button



**Figure 10.3-1: Laptop Computer Ethernet Port Settings – Manual (Static) Mode**



- Open an Internet browser (Windows Internet Explorer, Google Chrome, etc) and enter “10.10.10.210” or “uim” in the address bar. Note: If Internet Explorer is used it must be version 10 or higher.



**Figure 10.3-2: Accessing the Internal Charger Web Server via a Standard Internet Browser**

## 10.4. Changing the Ethernet Port Settings

The “Ethernet Port” section on the “Configuration >> Ethernet Settings” page is shown in Figure 10.4-1. The following settings can be viewed and/or changed per your direct or networked communication requirements.

- Physical Address
  - This is the MAC address of the charger Ethernet port, which is read-only
- Address Mode
  - “Manual (Static)” (see Section 10.3) or “Automatic (DHCP)” (see Section 10.5)
- IP Address
- Subnet Mask
- Gateway Address
- Primary DNS Address
- Secondary DNS Address

**Ethernet Port**

Physical Address  
D8-80-39-1D-68-1B

Address Mode  
Manual (Static) ▼

IP Address  
10.10.10.210

Subnet Mask  
0.0.0.0

Gateway Address  
0.0.0.0

Primary DNS Address  
0.0.0.0

Secondary DNS Address  
0.0.0.0

Update

**Figure 10.4-1: Ethernet Port Section of the Configuration >> Ethernet Settings Page**

## 10.5. Automatic (DHCP) Mode

When the charger is being connected to a network, it will often need to be configured for Automatic (DHCP) Mode. In order to do so, first follow the instructions in Section 10.3 to directly connect a laptop or desktop computer to the charger. Then, navigate to the “Ethernet Port” section on the “Configuration >> Ethernet Settings” page and change the “Address Mode” setting value to “Automatic (DHCP)”, as shown in Figure 10.5-1.

**Ethernet Port**

Physical Address  
D8-80-39-1D-68-1B

Address Mode  
Automatic (DHCP) ▼

IP Address  
10.10.10.210

Subnet Mask  
0.0.0.0

Gateway Address  
0.0.0.0

Primary DNS Address  
0.0.0.0

Secondary DNS Address  
0.0.0.0

Update

**Figure 10.5-1: Ethernet Port Section of the Configuration >> Ethernet Settings Page – Automatic (DHCP) Mode**

---

## 10.6. Restoring the Factory-Default Ethernet Port Settings

If you are unable to communicate with a charger after changing the settings within the “Ethernet Port” section on the “Configuration >> Ethernet Settings” page, you can restore the factory-default “Ethernet Port” settings by following the steps below

- Remove AC and DC (battery) power from the charger.
- Press and hold the “CONFIRM LOCAL PRESENCE” button on charger UIM.
- Re-apply AC and or DC (battery) power to the charger while continuing to hold the “CONFIRM LOCAL PRESENCE” button until the charger completes booting up (UIM LED startup sequence has finished.).
- The “Ethernet Port” settings have now been restored to the factory-defaults.
- Follow the steps in Section 10.3 again.

## 11.WEB SERVER

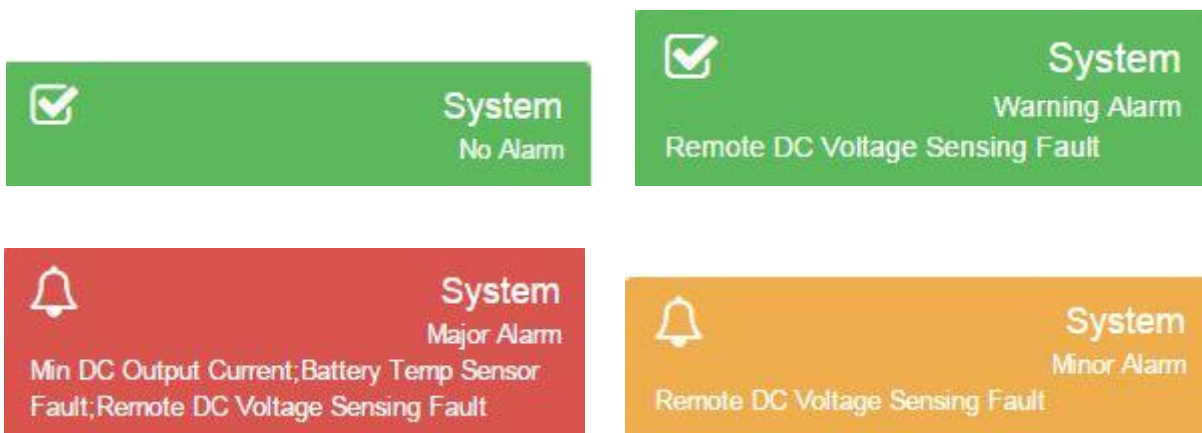
The internal charger web server can be accessed via a standard Internet browser on a local or remote laptop or desktop computer, smart phone, or tablet. See Section 10 for connectivity instructions.

Web server changes can only be made after the "CONFIRM LOCAL PRESENCE" button has been physically pressed on the UIM. Pressing this button starts a timer. After this time has expired, the "CONFIRM LOCAL PRESENCE" button must be pressed again to make additional web server changes.

### 11.1. Dashboard

#### System

The header for the “System” section on the “Dashboard” page displays the system alarm status as is illustrated in Figure 11.1-1.



**Figure 11.1-1: System Section Header on the Dashboard Page Displays the System Alarm Status**

Below are descriptions of the items displayed in the "System" section of the "Dashboard" page.

Name	Description
Site Name	"Site Name" setting value on the web server "Configuration >> System Settings" page.
Serial Number	Serial number of the chassis/UIM.
UIM Firmware	Firmware version on the UIM.
Webserver Firmware	Firmware version of the web server on the UIM.
Battery Voltage	DC voltage at end of DC cable or the remote battery sense cable.
DC Output Current	Total DC output current of the system.
DC Output Power	Total DC output power of the system.
AC Input Voltage	AC input voltage.
Battery Temperature	<p>Battery pack temperature.</p> <p>If the "Remote Battery Temperature" setting on the web server "Configuration &gt;&gt; System Settings" page is enabled then the Battery Temperature will be displayed if no temperature sensor faults.</p> <p>If the battery temperature sensor is disconnected or has failed then "Fault" will be displayed.</p> <p>If the "Remote Battery Temperature" setting on the web server "Configuration &gt;&gt; System Settings" page is disabled then "Disabled" is displayed.</p>
Internal Charger Temperature	Internal charger temperature at the UIM.
Float Voltage Controlled By	<p>Location of float voltage control.</p> <p><u>Rotary Switches</u>: rotary switches on the UIM.</p> <p><u>Web</u>: settings on the web server "Configuration &gt;&gt; Charge Settings" page in the "Charge Profile" section.</p>
DC Voltage Sensing	<p>Location of the DC voltage sensing.</p> <p><u>Local</u>: charger DC output terminals at the end of the DC cable. This dependent on proper output cord settings. See if the web server "Systems Settings" page to setup "DC Cable Gauge" and "DC Cable Length".</p> <p><u>Remote</u>: "REMOTE DC VOLTAGE" input on the UIM. This will be displayed if the "Remote Battery Voltage" setting on the web server "Configuration &gt;&gt; System Settings" page is enabled and sensed properly.</p> <p>Configured via the "Remote Battery Voltage" setting on the web server "Configuration &gt;&gt; System Settings" page.</p> <p>Local (Remote Fault): This will be displayed if the "Remote Battery Voltage" setting on the web server "Configuration &gt;&gt; System Settings" page is enabled but not sensed for some reason.</p>
Confirmed Local Presence Time Remaining	The amount of time remaining in minutes that web server changes can be made. After this time has expired, the "CONFIRM LOCAL PRESENCE" button on the UIM must be pressed again to make additional web server changes.

---

## **iPMs**

Below are the items displayed in the “iPMs” section of the “Dashboard” page for each active iPM in the system.

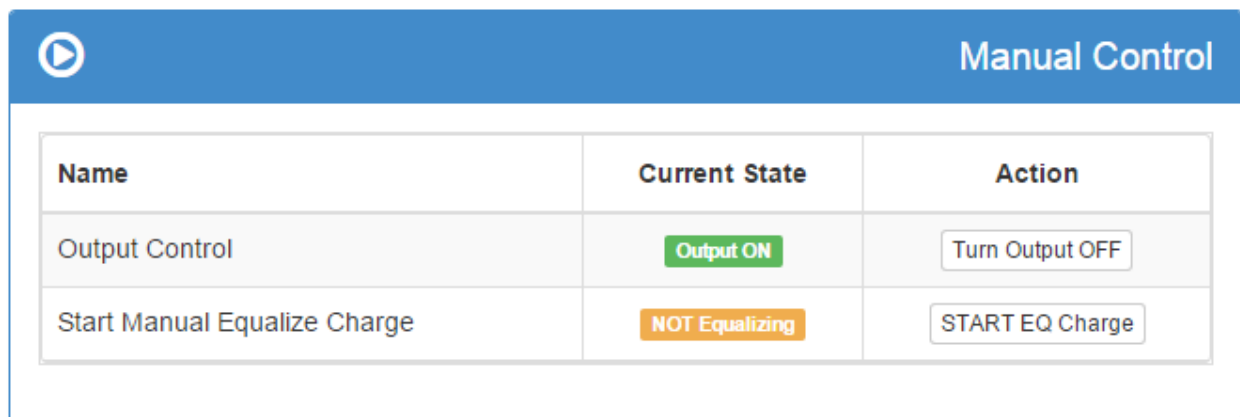
- Slot ID
- Model
- Serial Number
- Firmware
- Current
- Power

## **Manual Control**

The “Output Control” Action button in the “Manual Control” section of the “Dashboard” page can be used to manually turn the charger output off. The “Current State” column in the table lets you know if the charger output is currently on or off (see Figure 11.1-2).

The “Start Manual Equalize Charge” Action button in the “Manual Control” section of the “Dashboard” page can be used to manually start an equalize charge cycle. The “Current State” column in the table lets you know if an equalize charge cycle is currently in progress (see Figure 11.1-2).

The equalize voltage per cell for the battery pack is defined by the “Equalize Voltage Per Cell” setting value in the “Charge Profile” section on the “Configuration >> Charge Settings” page. The duration in minutes of the equalize charge cycle is defined by the “Equalize Time” setting value in the “Charge Profile” section on the “Configuration >> Charge Settings” page. See Section 11.3 for details regarding these settings.



Name	Current State	Action
Output Control	Output ON	Turn Output OFF
Start Manual Equalize Charge	NOT Equalizing	START EQ Charge

**Figure 11.1-2: Manual Control Section of the Dashboard Page**

## 11.2. Configuration >> System Settings

Name	Units	Valid Values	Notes
Site Name	None	30 characters (including spaces)	The "Site Name" is displayed on the web server "Dashboard" page in the "System" section.
Number of iPMs (Rectifiers)	None	1-2 (2-slot chassis) 1-4 (4-slot chassis)	Select the number of iPMs installed in the chassis. This setting is used to detect "iPM Communication Lost" faults and the maximum DC output current allowed for the charger system.
Nominal DC Output Voltage	V	12 or 24	Read-only setting is automatically selected based on the DC output voltage of the initial iPM installed in an empty chassis. This setting is used to detect "iPM Incorrect DC Voltage" faults if an iPM of the incorrect voltage is inserted into the chassis.
DC Cable Gauge	AWG	0-14	Used for DC cable compensation to automatically adjust the DC output voltage to compensate for voltage drop across the DC cables when the Remote Battery Voltage option is not being used. This must be set properly for the cable that is used in order for local voltage sense to work properly.
DC Cable Length	ft	1-100	Enter the DC cable length between the charger output terminals and the battery pack in a single direction only. Used for DC cable compensation to automatically adjust the DC output voltage to compensate for voltage drop across the DC cables when the Remote Battery Voltage option is not being used. This must be set properly for the cable that is used in order for local voltage sense to work properly.
Remote Battery Temperature	None	Disabled or Enabled	<p>"Enabled" must be selected in order to use the "BATTERY TEMP SENSOR" input on the UIM connected to a battery temperature sensor to measure the temperature of the battery pack.</p> <p>The "Temperature Compensation (TC)" setting must be enabled on the web server "Configuration &gt;&gt; Charger Profile" page for the charge profile to be temperature compensated.</p>
Remote Battery Voltage	None	Disabled or Enabled	"Enabled" must be selected in order to use the "REMOTE DC VOLTAGE" input on the UIM to sense the DC voltage at the end of the Remote Battery Sense cable that is connected to the battery instead of the cable drop adjust voltage at the battery terminals..
Temperature Units	None	°C or °F	The selected temperature units are used throughout the web server.
Start Delay	minutes	0-1440	When AC input power is applied to the charger, the start of the charge cycle will be delayed by this number of minutes. THIS FEATURE IS CURRENTLY NOT ACTIVE.

Power Saving Mode	None	Disabled or Enabled	When "Disabled" is selected, all iPMs are on and will evenly source the required DC output current. When "Enabled" is selected, the minimum number of iPMs will be on to source the required DC output current.
Confirm Local Presence Time	minutes	1-20	The amount of time in minutes that web server changes can be made after the "CONFIRM LOCAL PRESENCE" button has been physically pressed on the UIM. After this time has expired, the "Confirm Local Presence" button must be pressed again to make additional web server changes.

### 11.3. Configuration >> Charge Settings

#### Charge Profile

Name	Units	Values	Notes
Float Voltage Per Cell	Volts	Setting ranges: 1.00-3.00  <i>The charger will limit the total float voltage of the battery pack ("Float Voltage per Cell" * "Number of Cells") to these ranges:</i> <u>12V</u> 1.00-20.00 <u>24V</u> 10.00-40.00	The float voltage per cell for the battery pack. Disabled (grayed out) when the "NUMBER OF CELLS" rotary switches on the UIM are set to anything other than "00".
Number of Cells	Cells	Setting ranges: <u>12V</u> 1-13 <u>24V</u> 5-26  <i>The charger will limit the total float voltage of the battery pack ("Float Voltage per Cell" * "Number of Cells") to these ranges:</i> <u>12V</u> 1.00-20.00 <u>24V</u> 10.00-40.00	The number of cells in the battery pack. Disabled (grayed out) when the "NUMBER OF CELLS" rotary switches on the UIM are set to anything other than "00".
Max DC Output Current	Amps	<u>12V</u> 0.0-80.0 (4 iPMs) 0.0-60.0 (3 iPMs) 0.0-40.0 (2 iPMs) 0.0-20.0 (1 iPM) <u>24V</u> 0.0-40.0 (4 iPMs) 0.0-30.0 (3 iPMs) 0.0-20.0 (2 iPMs) 0.0-10.0 (1 iPM)	Used to limit the DC output current. This setting is the total system DC output current.

Automatic Equalize	None	Disabled or Enabled	When "Enabled" is selected, automatic equalization charge cycles occur using the settings below.
Equalize Interval	Days	1-365	The interval in days for automatic equalize charge cycles to occur. For example, entering a value of "90" would trigger an automatic equalize charger cycle every 90 days.
Equalize Voltage Per Cell	V	1.00-3.00	The equalize voltage per cell for the battery pack.  This setting is also used when the "Start Manual Equalize Charge" button is pressed on the web server "Dashboard" page in the "Manual Control" section.
Equalize Time	minutes	1-10080	The duration in minutes of the equalize charge cycle.  This setting is also used when the "Start Manual Equalize Charge" button is pressed on the web server "Dashboard" page in the "Manual Control" section.
Temperature Compensation (TC)	None	Disabled or Enabled	When "Enabled" is selected, temperature compensation of the charge cycle occurs using the settings below.
TC Min Temperature Adjust	°C or °F	-40 to 70 °C or -40 to 158 °F	Below this temperature, further temperature compensation adjustments will not occur.
TC Max Temperature Adjust	°C or °F	-40 to 70 °C or -40 to 158 °F	Above this temperature, further temperature compensation adjustments will not occur.
TC mV Per Degree Per Cell	mV/cell/(°C or °F)	0-10 for °C 0-5.6 for °F	The temperature compensation adjustment to the "Float Voltage Per Cell" setting or "VOLTS PER CELL" rotary switches setting on the UIM.  As the temperature of the battery pack decreases below 25 °C (77 °F), the float voltage per cell is increased by this value. As the temperature of the battery pack increases above 25 °C (77 °F), the float voltage per cell is decreased by this value.

### **Local Profile**

The "Local Profile" section displays the "VOLTS PER CELL" and "NUMBER OF CELLS" settings from the rotary switches on the UIM. See the "Float Voltage Per Cell" and "Number of Cells" rows in the Charge Profile table above for valid ranges for the rotary switches.

















## 11.4. Configuration >> Alarm Settings

Each system alarm is individually configurable as shown in example Figure 11.4-1. The table below outlines the alarms available on the “Configuration >> Alarm Settings” page, as well as the trigger level units and trigger level valid values for each alarm. Furthermore, each alarm can be individually configured as follows:

- A delay can be set between 0-1440 minutes. If the alarm condition clears itself within the delay time, the alarm is not generated.
- A priority of “Major”, “Minor”, and “Warning” can be selected. “Major” alarms are displayed as Red on the “Dashboard” page. “Minor” alarms are displayed as Yellow on the “Dashboard” page. “Warnings” are displayed as Green on the “Dashboard” page. See Section 11.1 for examples. Warning alarms do not trigger the RED UIM alarm LED to be ON.
- Manual clearing can be enabled or disabled. If enabled, the alarm will not automatically clear itself if the alarm condition no longer persists and manual clearing is required. THIS FEATURE IS CURRENTLY NOT ACTIVE.
- Activation of the “ALARM RELAY” terminal contacts on the UIM can be enabled by selecting the “K1” in the RELAY column of the alarm settings for each alarm type.
- Deactivation of the “ALARM RELAY” terminal contacts on the UIM can be enabled by selecting the “--” in the RELAY column of the alarm settings for each alarm type. With this selected only alarms with “K1” selected will trigger the contact to change states.

Name	Trigger Level Units	Trigger Level Valid Values
AC Input Power Lost	None	N/A
AC Input Voltage High	V	90-300
Battery Voltage Low	V/cell	0.80-4.00
Battery Voltage High	V/cell	0.80-4.00
Battery Temperature Low	°C or °F	-40 to 70 °C or -40 to 158 °F
Battery Temperature High	°C or °F	-40 to 70 °C or -40 to 158 °F
Min DC Output Current	A	<u>12V</u> 0.0-80.0 (4 iPMs) 0.0-60.0 (3 iPMs) 0.0-40.0 (2 iPMs) 0.0-20.0 (1 iPM)  <u>24V</u> 0.0-40.0 (4 iPMs) 0.0-30.0 (3 iPMs) 0.0-20.0 (2 iPMs) 0.0-10.0 (1 iPM)
iPM Fault	None	N/A
iPM Communication Lost	None	N/A
iPM Incorrect DC Voltage	None	N/A
UIM Fault	None	N/A
Battery Temp Sensor Fault	None	N/A
Remote DC Voltage Sensing Fault	None	N/A

<div>  <span>Alarms</span> </div>							
Name	Alarm	Trigger Level	Delay[m]	Priority	Manual Clearing	Relay	Action
AC Input Power Lost	Enabled	---	0	Major	Disabled	---	
AC Input Voltage High	Enabled	265 V	0	Major	Disabled	K1	
Battery Voltage Low	Enabled	1.75 V/cell	0	Major	Disabled	K1	
Battery Voltage High	Enabled	2.60 V/cell	0	Major	Disabled	K1	
Battery Temperature Low	Enabled	0 °C	0	Major	Disabled	K1	
Battery Temperature High	Enabled	45 °C	0	Major	Disabled	K1	
Min DC Output Current	Enabled	0.40 A	0	Major	Disabled	K1	
iPM Fault	Enabled	---	0	Major	Disabled	K1	
iPM Communication Lost	Enabled	---	0	Major	Disabled	K1	
iPM Incorrect DC Voltage	Enabled	---	0	Major	Disabled	K1	
UIM Fault	Enabled	---	0	Major	Disabled	K1	
Battery Temp Sensor Fault	Enabled	---	0	Major	Disabled	K1	
Remote DC Voltage Sensing Fault	Enabled	---	0	Major	Disabled	K1	

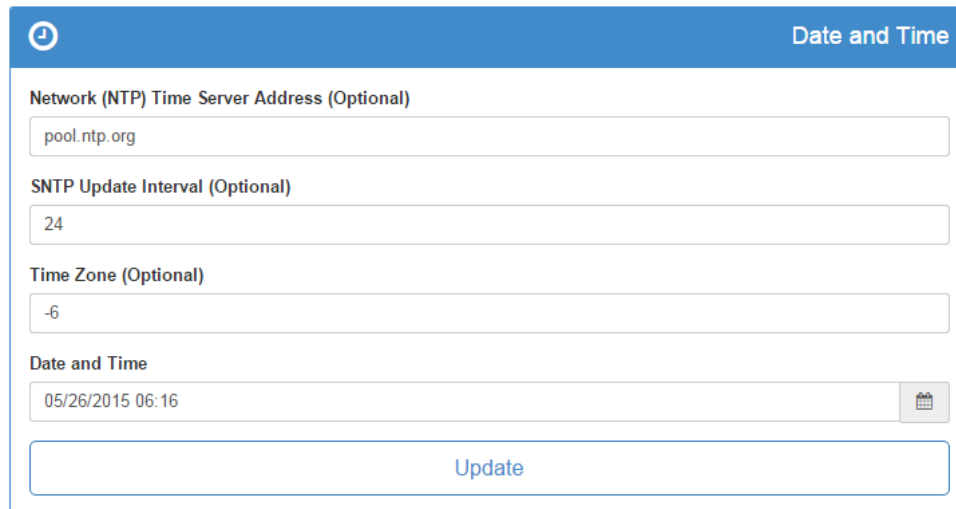
**Figure 11.4-1: Configuration >> Alarm Settings Page**

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## 11.5. Configuration >> Date and Time Settings

The “Configuration >> Date and Time Settings” page is shown in Figure 11.5-1. The system date and time is displayed in the “Date and Time” control. This control can be used to manually change the system date and time.

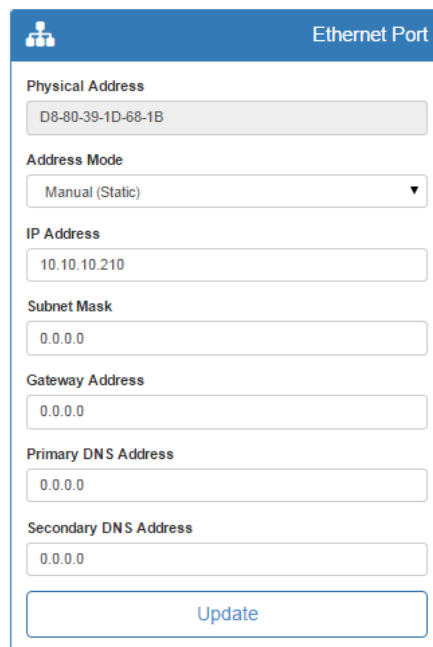
Optionally, the system date and time can be synchronized with a network (NTP) time server by setting the “Network (NTP) Time Server Address”, “SNTP Update Interval”, and “Time Zone” controls.



**Figure 11.5-1: Configuration >> Date and Time Settings Page**

## 11.6. Configuration >> Ethernet Settings >> Ethernet Port

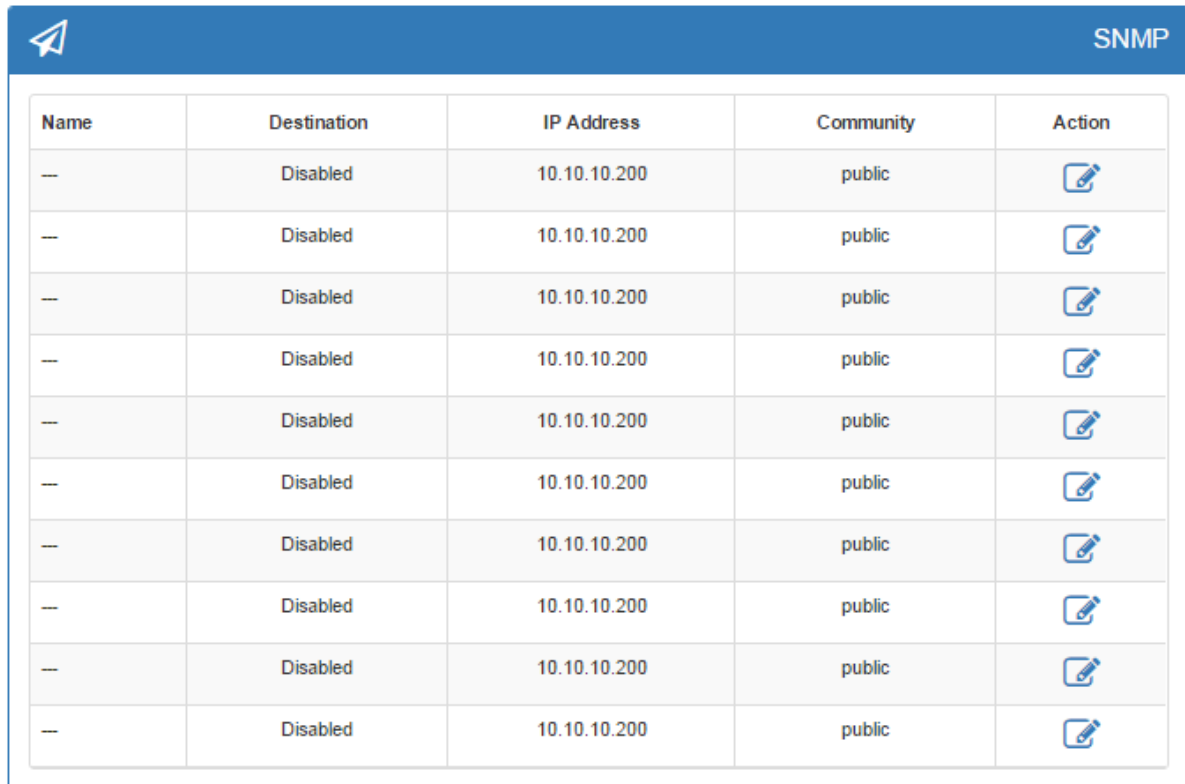
The “Ethernet Port” section on the “Configuration >> Ethernet Settings” page is shown in Figure 11.6-1. See Section 10 for details.



**Figure 11.6-1: Ethernet Port Section of the Configuration >> Ethernet Settings Page**

## 11.7. Configuration >> Ethernet Settings >> SNMP

Simple Network Management Protocol (SNMP) is a standard protocol for automatically sending alarms over Ethernet. The “SNMP” section on the “Configuration >> Ethernet Settings” page is shown in Figure 11.7-1. Up to 10 destinations can be enabled, named, and assigned IP addresses. When an enabled alarm is triggered or cleared (see Section 11.4), an SNMP trap will be sent over Ethernet to all enabled SNMP destinations.



Name	Destination	IP Address	Community	Action
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	
—	Disabled	10.10.10.200	public	

Figure 11.7-1: SNMP Section of the Configuration >> Ethernet Settings Page











## 11.8. Configuration >> User Accounts

The “Configuration >> User Accounts” page can only be accessed by users with “User Roles” of “Administrator”. The access provided to each of the four (4) different “User Roles” is outlined below.


	Dash-board	Configuration							History
		System Settings	Charge Settings	Alarm Settings	Date and Time Settings	Ethernet Settings	User Accounts	Upgrades	
Administrator	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Power User	R/W	R/W	R/W	R/W	R/W	R/W	-	R/W	R/W
User	R/W	R/W	R	R	R/W	R	-	R	R/W
Guest	R	R	R	R	R	R	-	R	R/W

**R: Read (Does NOT Include Pressing Buttons)**

**W: Write (Includes Pressing Buttons, Does NOT Include Deleting)**

Users			
Name	User	User Role	Action
admin	Enabled	Administrator	
Tech	Enabled	Power User	
guest2	Enabled	Guest	
guest3	Enabled	Guest	
guest4	Enabled	Guest	
guest5	Enabled	Guest	
guest6	Enabled	Guest	
guest7	Enabled	Guest	
guest8	Enabled	Guest	
guest9	Enabled	Guest	

**Figure 11.8-1: Configuration >> User Accounts Page**


admin

**User**

Enabled ▼

**Name**

admin

Max = (20 characters)

**User Role**

Administrator ▼

☐ Change Password

**Password**

Max = (20 characters)

**Re-enter Password**

Max = (20 characters)

Update

**Figure 11.8-2: Options Available When Editing a User Account**

## 11.9. Configuration >> Upgrades

The “Configuration >> Upgrades” page displays the current versions of the iPM Firmware (see Figure 11.9-1), UIM Firmware (see Figure 11.9-2), and Webserver Firmware (see Figure 11.9-3).

The iPM Firmware and UIM Firmware each have two (2) “banks” for holding up to two (2) versions of firmware. The currently loaded iPM firmware version is found in the Slot ID rows under firmware. When a new firmware version is uploaded to the UIM to be sent to the iPM's, that version will be displayed in the Bank 1 or Bank 2 rows under firmware..

The iPM Firmware can be upgraded by (1) selecting a firmware file and uploading it into a bank using the appropriate “Upload Into Bank” button, (2) selecting the “Bank #” with the desired “Firmware”, (3) selecting the “Slot ID” numbers for the iPMs that you would like upgrade, and (4) pressing the “Upgrade” button.

Bank #	Firmware	Action
Bank 1	iPM-SMBC-12V-400W SW v1.10 HW v1.00	<input type="button" value="Upload Into Bank"/>
Bank 2	iPM-SMBC-12V-400W SW v1.00 HW v1.00	<input type="button" value="Upload Into Bank"/>

Slot ID	Model	Hardware	Firmware	
1	iPM-SMBC-12V-400W	HW v1.00	SW v1.10	<input checked="" type="checkbox"/>
2	iPM-SMBC-12V-400W	HW v1.00	SW v1.10	<input checked="" type="checkbox"/>
3	iPM-SMBC-12V-400W	HW v1.00	SW v1.10	<input checked="" type="checkbox"/>
4	iPM-SMBC-12V-400W	HW v1.00	SW v1.10	<input checked="" type="checkbox"/>

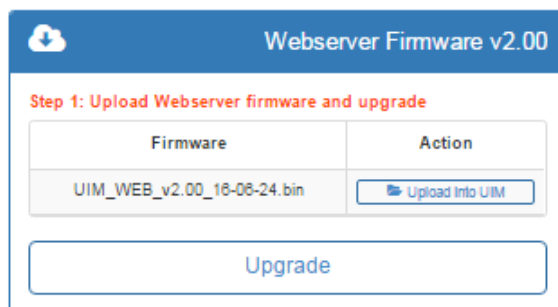
**Figure 11.9-1: iPM Firmware Section of the Configuration >> Upgrades Page**

The UIM controllers current version of firmware is displayed in the blue box labeled UIM firmware vX.XX. The UIM code version that has been uploaded into the bank or banks will be displayed in the Bank 1 or Bank 2 rows under the Firmware column. The UIM Firmware can be upgraded by (1) selecting a firmware file and uploading it into a bank using the appropriate “Upload Into Bank” button, (2) selecting the “Bank #” with the desired “Firmware”, and (3) pressing the “Upgrade and reboot” button.

Bank #	Firmware	Action
Bank 1	UIM SW v2.00 HW v2.00	<input type="button" value="Upload Into Bank"/>
Bank 2	UIM SW v1.00 HW v2.00	<input type="button" value="Upload Into Bank"/>

**Figure 11.9-2: UIM Firmware Section of the Configuration >> Upgrades Page**

The UIM webserver firmware current version is displayed in the blue box labeled Webserver Firmware vX.XX. When a new version of code is uploaded to the UIM that version will be displayed to the left of the "Upload to UIM" box. The Webserver Firmware can be upgraded by (1) selecting a firmware file and uploading it using the "Upload Into UIM" button and (2) pressing the "Upgrade" button.



**Figure 11.9-3: Webserver Firmware Section of the Configuration >> Upgrades Page**

## 11.10. History


On the "History" page, you will currently find the "Alarm Events" section, which is shown in Figure 11.10-1. All alarms that are enabled on the "Configuration >> Alarm Settings" page (see Section 11.4) will be logged. Separate records are logged when an alarm becomes Active (triggered) and when an alarm is Cleared.

The "Alarm Events" section includes two (2) sub-sections. The "Most Recent Alarm Records" sub-section includes a table with the 50 most recent alarm records. These records can be sorted by clicking on the table headers, searched using the "Search" box, or downloaded as a comma-separated values (CSV) file to be opened and analyzed in a spreadsheet program/app, such as Microsoft Excel (see Figure 11.10-2 for an example CSV file).


The "Download All Alarm Records" sub-section allows you to download all available alarm records as a CSV file. The total number of available records is listed in this sub-section. The charger can store over 10,000 records. When the record storage is full, the oldest 300 records (approximately) will be permanently deleted in order to make room for new records.

Alarm records include the following fields.

Field	Description
ID	Sequential record ID. The ID resets back to "1" for new records when the record storage is full and the oldest records have been deleted in order to make room for new records.
Time	The date and time when the alarm was cleared or became active (triggered).
Source	The source of the alarm ("UIM" for the User Interface Module or iPM and slot number for the intelligent Power Module).
Name	The name of the alarm (for example, "AC Input Power Lost").
Type	<ul style="list-style-type: none"> <li>"0" for records where an alarm was cleared.</li> <li>"1" for records where an alarm became active (triggered).</li> </ul>
Value	<ul style="list-style-type: none"> <li>"Cleared" for records where an alarm was cleared.</li> <li>"Active" for records where an alarm became active (triggered) for alarms that do not have a "Trigger Level" associated with them (for example, "AC Input Power Lost").</li> <li>For alarms that do have a "Trigger Level" associated with them (for example, "Min DC Output Current"), the actual value at the time that the alarm was triggered is included in the "Value" field.</li> <li>iPM fault codes in the value column will have "Active - Code: #" where the # will be replaced with a number based off the iPM fault code list. Reference the iPM Fault Code chart in Figure 11.10-3.</li> </ul>


Alarm Events

Most Recent Alarm Records




ID	Time	Source	Name	Value
52	2015-06-16 11:01:30	UIM	iPM Communication Lost	Cleared
51	2015-06-16 11:01:30	UIM	Min DC Output Current	Cleared
50	2015-06-16 11:01:27	UIM	AC Input Power Lost	Cleared
49	2015-06-16 11:01:17	UIM	iPM Communication Lost	Active
48	2015-06-16 11:01:17	UIM	Min DC Output Current	0.00 A
47	2015-06-16 11:01:16	UIM	AC Input Power Lost	Active
46	2015-06-16 11:00:56	UIM	iPM Communication Lost	Cleared
45	2015-06-16 11:00:56	UIM	Min DC Output Current	Cleared
44	2015-06-16 11:00:53	UIM	AC Input Power Lost	Cleared
43	2015-06-16 11:00:43	UIM	iPM Communication Lost	Active
42	2015-06-16 11:00:43	UIM	Min DC Output Current	0.00 A

Showing 1 to 50 of 50 rows

50

records per page

Download All Alarm Records

 \*.csv

Total Number of Records: 52

**Figure 11.10-1: Alarm Events Section of the History Page**

	A	B	C	D	E	F
	ID	Time	Source	Name	Type	Value
1	1	2/7/2018 16:07	UIM	Battery Voltage Low	1	10.49 V
2	2	2/7/2018 16:08	UIM	Battery Voltage Low	0	Cleared
3	3	2/7/2018 16:08	UIM	Battery Temp Sensor Fault	1	Active
4	4	2/7/2018 16:08	UIM	Battery Temp Sensor Fault	0	Cleared
5	5	2/7/2018 16:09	UIM	Battery Voltage Low	1	6.18 V
6	6	2/7/2018 16:09	iPM: #2	iPM Fault	1	Active-Code: 2
7	7	2/7/2018 16:09	UIM	Battery Voltage Low	0	Cleared
8	8	2/7/2018 16:09	UIM	Battery Voltage Low	1	7.43 V
9	9	2/7/2018 16:09	UIM	Remote DC Voltage Sensing Fault	1	Active
10	10	2/7/2018 16:10	UIM	Remote DC Voltage Sensing Fault	0	Cleared
11	11	2/7/2018 16:10	iPM: #2	iPM Fault	0	Cleared
12	12	2/7/2018 16:10	UIM	Battery Voltage Low	0	Cleared

**Figure 11.10-2: Example CSV File Downloaded from the Alarm Events Section of the History Page**



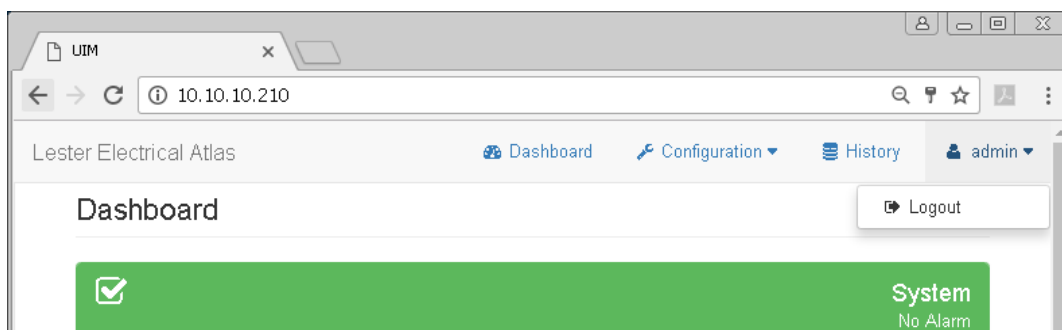
iPM Fault	iPM Error Codes Reported in Alarm Events History ***	iPM LED Status	iPM DC Output Status	Description / Recommended Action
AC Voltage Surge	1	Fast Blink Red	OFF	An AC voltage surge event > 330Vac occurred. Fault should clear when AC is within limits, if not replace iPM module or modules.
AC Voltage Low	2	Fast Blink Red	OFF	The AC voltage dropped below 80 volts. The iPM will recover when AC voltage goes back above 90 volts.
Over Temperature Shutdown	32	Fast Blink Red	OFF	This fault triggers when the heatsink temperature $\geq 115^{\circ}\text{C}$ ( $239^{\circ}\text{F}$ ). The iPM will shut down for protection and turns back on at $100^{\circ}\text{C}$ ( $212^{\circ}\text{F}$ ).
Heat Sink Temperature High	256	Normal Green Mode	ON	This fault triggers when the heatsink temperature goes above $100^{\circ}\text{C}$ ( $212^{\circ}\text{F}$ ). The fault will clear below $100^{\circ}\text{C}$ ( $212^{\circ}\text{F}$ ).
Heat Sink Temperature Failure	512	Normal Green Mode	ON	The heatsink temperature sensor has failed. The iPM will continue to function but should be replaced so as to protect against additional damage.
DC Fuse Open	2048	Solid Red	OFF	The DC output fuse has opened. Replace the iPM.
Power Stage Failure	4096	Solid Red	OFF	The iPM had or has a power stage problem. If fault code does not clear replace the iPM.
Over Voltage Shutdown	8192	Fast Blink Red	OFF	The iPM output voltage is either too high or is connected to a DC supply that is too high. Verify battery voltage and if fault does not clear replace iPM.
iPM Plug-in Failure	16384	Solid Red	OFF	The fault code happens when the short pin on the iPM edge connector is not making proper contact with the backplane shelf unit connector. Verify proper iPM engagement with the shelf connector.
*** If a value other than the number listed above is recorded in the alarm events then that means that more than one iPM fault code was active at that time. The values will be added together. ( Example: Heat sink Temperature High and Over Temperature Shutdown will give you a $256+32=288$ )				

**Figure 11.10-3 iPM Fault Code**

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## 11.11. Logout

The logout tab can be found under the current user name of who is logged into the webserver at the far right top of the page. This allows logout for security before the 10 minutes of web page activity has expired. This 10 minutes is how long you can access a web page without changing to another web page on the server.



*Figure 11.11: Logout*

## 12. MAINTENANCE

The charger requires minimal maintenance. It should be kept clean and all connections are to be periodically tightened. **BE SURE THE CHASSIS IS SECURELY GROUNDED.** If any problem cannot be resolved, contact Lester Electrical service agent at 1-402-477-8988.

## 13. TROUBLESHOOTING AND SERVICING

**⚠ CAUTION: DO NOT OPERATE THE CHARGER IF IT IS DAMAGED OR APPEARS TO BE MALFUNCTIONING. PERSONAL INJURY OR DAMAGE TO THE CHARGER OR BATTERIES MAY RESULT. INCORRECT REASSEMBLY AFTER SERVICING THE CHARGER MAY RESULT IN RISK OF ELECTRIC SHOCK OR FIRE.**

The charger was fully tested and calibrated before leaving the factory. It was delivered ready to charge. If properly installed, the charger should require very little attention. If improper charger operation occurs, follow the step below.

- Ensure that the “AC PRESENT” LED on the UIM is illuminated; indicating that AC input power is present.
- Check the “ALARM” LED on the UIM. If this LED is illuminated, refer to Section 11.1 in order to determine which alarm(s) is active.
- Check the “NUMBER OF CELLS” and “VOLTS PER CELL” rotary switches on the UIM to verify their settings against the specifications of the batteries. If the “NUMBER OF CELLS” rotary switches are set to “00”, which enables software control of the float voltage value, refer to Section 11.3 in order to verify the “Number of Cells” and “Float Voltage Per Cell” setting values via the charger web server.
- Check the AC input and DC output fuses to make sure they have not blown.
- Open the access panel on the front of the charger and make sure all of the binding posts nuts are tight.
- Check the polarity between the DC output terminals and the battery pack and make sure all connections are tight.
- Refer to Section 11 in order to verify all other charger web server settings.
- If the steps above do not solve the issue and you are qualified to do additional investigating of the issue then see the section of ATLAS Charger Troubleshooting chart (see section 13.1) to assist with the troubleshooting. The charger wiring diagram (see section 14) can also be used to help in determining the cause of the issues.
- If the steps above do not solve the issue, contact Lester Electrical service agent at 1-402-477-8988.

## 13.1. ATLAS Charger Troubleshooting Chart

The charts below and the UIM and iPM LEDs will assist with troubleshooting of charger issues. Refer to sections 9.1 and 9.2 of this manual for LED information. If available, use the web server, as the dashboard display of the battery voltage, DC output current, AC input voltage, iPM information, and manual control information can assist in troubleshooting. See the charger wire diagram in section 14 for additional assistance.

ATLAS CHARGER TROUBLESHOOTING		
Symptom	Possible Cause	Recommended Action
UIM Blue AC Present LED Off	AC Input Fuse or Fuses are Bad	<ol style="list-style-type: none"> <li>1) Are any iPM LEDs on? If iPM LEDs are on, then you have AC power to the charger chassis and the AC fuses are good. See next possible cause. If no iPM LEDs are on, then check step 2.</li> <li>2) Carefully check AC input voltage at input A.A.R. terminals behind the access panel door. If AC voltage at the terminals is good, then continue to step 3. If there is no AC voltage at terminals, then check the AC source.</li> <li>3) Check AC input fuses behind access panel door. (Be sure to disconnect AC input voltage before removing fuses to verify they are not bad. Be cautious of touching the DC connections if the DC battery voltage is still connected. If AC input fuses are bad, then replace them with same type and rating after doing a visual check of the charger unit.</li> </ol>
	No AC Input Power to UIM	<ol style="list-style-type: none"> <li>1) The UIM module gets its AC input from the 2 pin connector on the small circuit board of the module. Continuity can be measured at this connection before replacing the UIM module.</li> <li>2) For safety, disconnect both the AC input and DC battery voltages from the chassis.</li> <li>3) For a four module shelf, remove the screws on the top of the UIM cover and tilt the UIM out to access this connector. On a two module case, just open the access door and the connector is visible thru a hole in the UIM shield on the left. To access this connector the back shield will need removed. The white wire should have continuity to one AC input A.A.R. post and the black wire to the other. If necessary, the AC input voltage can be measured here if very cautious.</li> <li>4) If connections are bad, then the chassis will need replaced. If connections are good, see next possible cause.</li> </ol>
	UIM Module is Bad	<ol style="list-style-type: none"> <li>1) The UIM module is powered by both AC and DC (minimum 6 Vdc). Remove both power sources at the A.A.R. terminal connections, and then reconnect either AC or DC. This will reboot the UIM. On power up, watch for the UIM reboot LED sequence. All LEDs should go on, and then off in a sequence. If not, then replace the UIM.</li> <li>2) Reapply AC input to the unit. If the blue AC Present LED is now on, then verify normal charger function.</li> <li>3) If blue AC Present LED is still off, replace the UIM module. Follow replacement part instructions to remove and replace with a new UIM module.</li> </ol>

UIM Status LED Off	UIM Module is Bad	<ol style="list-style-type: none"> <li>1) The UIM module is powered by both AC and DC (minimum 6 Vdc). Remove both power sources at the A.A.R. terminal connections, and then reconnect either AC or DC. This will reboot the UIM. On power up, watch for the UIM reboot LED sequence. All LEDs should go on, and then off in a sequence. If not, then replace the UIM.</li> <li>2) After the power reboot, If UIM Status LED is still off and AC Present LED is on then replace the UIM module. Follow replacement part instructions to remove and replace with a new UIM module.</li> </ol>
UIM Alarm LED Does Not Turn On with Faults	UIM Module is Bad	<ol style="list-style-type: none"> <li>1) Verify Alarm settings first, as the Warning priority levels will not turn the Alarm LED on.</li> <li>2) The UIM module is powered by both AC and DC (minimum 6 Vdc). Remove both power sources at the A.A.R. terminal connections, and then reconnect either AC or DC. This will reboot the UIM. On power up, watch for the UIM reboot LED sequence. All LEDs should go on, and then off in a sequence. If not, then replace the UIM.</li> <li>3) If UIM Alarm LED is still off when it should be on, then replace the UIM module. Follow replacement part instructions to remove and replace with a new UIM module.</li> </ol>
UIM Confirm Local Presence LED Does Not Turn On When Button is Pressed	UIM Module is Bad	<ol style="list-style-type: none"> <li>1) The UIM module is powered by both AC and DC (minimum 6 Vdc). Remove both power sources at the A.A.R. terminal connections, and then reconnect either AC or DC. This will reboot the UIM. On power up, watch for the UIM reboot LED sequence. All LEDs should go on, and then off in a sequence. If not, then replace the UIM.</li> <li>2) Press the Confirm Local Presence Button again and if LED still does not come on replace the UIM module. Follow replacement part instructions to remove and replace with a new UIM module.</li> </ol>
Not Able to Communicate Via Ethernet Connector and WEB Server	UIM Module is Bad	<ol style="list-style-type: none"> <li>1) Verify the device trying to access the web server, the cable, and the Internet Protocol (IP) address are setup properly.</li> <li>2) The UIM module is powered by both AC and DC (minimum 6 Vdc). Remove both power sources at the A.A.R. terminal connections, and then reconnect either AC or DC. This will reboot the UIM. On power up, watch for the UIM reboot LED sequence. All LEDs should go on, and then off in a sequence. If not, then replace the UIM. After reboot retry to access the UIM via the server.</li> <li>3) If unable to access the web server, then see section 10.6 to restore the factory default Ethernet port settings and retry to access the UIM via the server.</li> <li>4) After the steps above are verified and the unit is still not functioning, then replace the UIM module. Follow replacement part instructions to remove and replace with a new UIM module.</li> </ol>

All UIM LEDs are Off When Connected to Battery Voltage without AC Input Applied to Charger	DC Output Fuse Bad	<ol style="list-style-type: none"> <li>1) Open the charger access panel and verify DC voltage is above 6 volts at the DC A.A.R. terminals. The UIM module needs a minimum of 6 volts to power on.</li> <li>2) If voltage is above 6 volts, verify the DC fuse on A.A.R. terminal board is not open. If fuse is still good, then see next possible cause.</li> <li>3) If DC fuse is bad, then replace it with the same type and rating after doing a visual check of charger unit.</li> </ol>
	No DC Voltage at the UIM	<ol style="list-style-type: none"> <li>1) The UIM gets DC voltage through the 5 wire cable from the back plane connected on the left side of the UIM board assembly.</li> <li>2) For safety, disconnect both the AC input and DC battery voltage from the chassis.</li> <li>3) For a four module shelf, remove the screws on the top of the UIM cover and tilt the UIM out to access this connector. On a two module case, the back cover over the UIM will need to be removed to access the connector.</li> <li>4) Continuity can be measured at this connection before replacing the UIM module. The red wire on the cable should have continuity with the DC plus at the A.A.R. terminals and the black wire on the cable should have continuity with the DC minus at the A.A.R. terminals. If necessary, the DC voltage can be measured here if very cautious.</li> <li>5) If connections are bad, then the chassis will need replaced. If connections are good, then see next possible cause.</li> </ol>
	UIM Module is Bad	<ol style="list-style-type: none"> <li>1) After the steps above are verified and the unit is still not functioning, then replace the UIM module. Follow replacement part instructions to remove and replace with a new UIM module.</li> </ol>
No iPM LED's are ON in Charger Chassis Unit	No AC Input Power to iPM	<ol style="list-style-type: none"> <li>1) Is the UIM blue AC present LED on? If the blue LED is on, then the AC input fuses are good and you have AC Input to the charger shelf unit via the 2 wire connector to the UIM board. If UIM blue AC Present LED is off, then see that symptom section.</li> <li>2) iPM modules do not require a working UIM module so if all iPM modules LEDs are off then continue to next possible cause.</li> </ol>
	Manual Control / Output Control Turned OFF	<ol style="list-style-type: none"> <li>1) Using the Web server interface, check to make sure the charger output has not been turned off by using the interface control. Check the Current State Box on the dashboard.</li> <li>2) Turn the charger output back on using the dashboard control if it was off.</li> </ol>

No iPM LED's are ON in Charger Chassis Unit Continued	iPM Module Connector or Backplane Connection Bad	<p>1) Using the Web server interface, go to the dashboard page and look at the iPM section and verify if the UIM is able to connect with them. Each iPM is connected to the UIM via the backplane and should be displayed on the dashboard.</p> <p>2) If the iPM is not displayed on the dashboard, then remove the screws holding the iPM in and pull the iPM out of the chassis. Inspect the connector on the backplane chassis and also on the iPM. If no issues are found, reinstall iPM making sure connector is fully engaged with the backplane board.</p> <p>3) On AC power up, the iPM LEDs should do a power up sequence with LED changing from red to green. If this does not happen, then see next possible cause.</p>
	iPM Module is Bad	<p>1) If it has been determined that the above possible causes and actions have not resolved the issue then, replace the iPM with the proper iPM type for the charger system.</p>

## 13.2. UIM Replacement Information

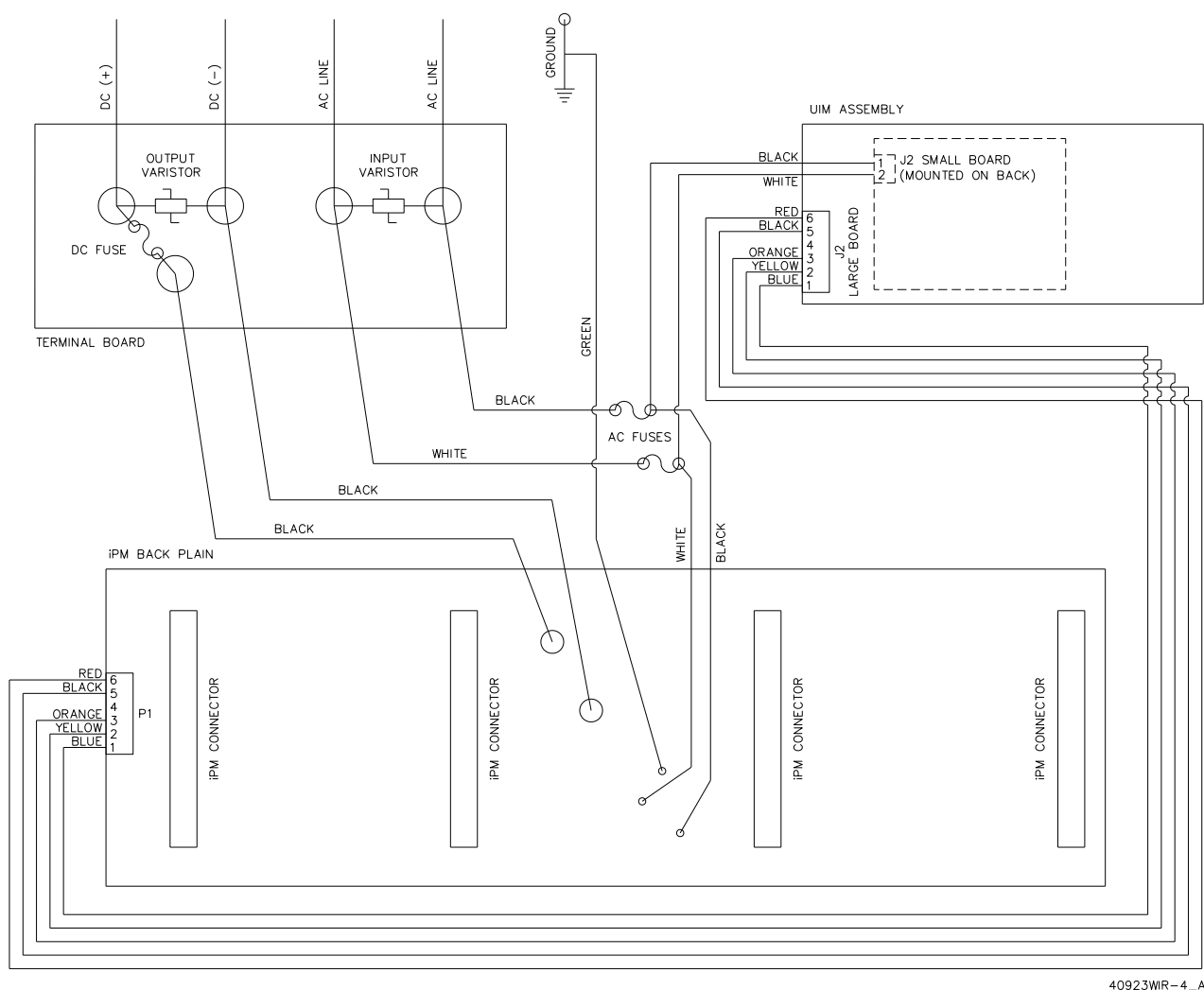
If for any reason a UIM assembly is needed to be replaced follow the procedure below to make sure the replacement UIM is setup properly for your system and functioning properly.

1. Install the UIM assembly using the instructions provided with the service part.
2. If using the UIM rotary switches to control float voltage make sure switches are set for the desired settings. If using web page UIM control then after AC is applied check all settings for proper setup.
3. With the proper voltage iPMs in the charger chassis apply AC power to the unit. Verify setting on web page or on rotary switches.
4. The UIM assembly will connect with the iPMs and determine the proper Nominal DC Output Voltage setting for the System Setting and adjust some charger settings based off of this information.
5. If the UIM assembly was factory set for a default of 12 volt nominal and being used in a 24 volt nominal system the iPMs will be turned off on power up (iPM LEDs off). This will also happen if the UIM assembly was setup for a 24 volt nominal system and now being used in a 12 volt nominal system.
6. One of two methods will need to be used to allow the iPMs to be turned on. Either reboot the UIM assemblies by removing all UIM power sources (AC and DC) or using the web page controls on the dashboard go to Manual Control, Output Control and click on the Turn Output On. Charger output should come on and iPM LEDs will come on.
7. With DC battery not connected you can check for proper float voltage at the charger terminal posts.

### 13.3. Service Parts List

Description	12V		24V	
	2 Module	4 Module	2 Module	4 Module
Mounting Bracket, Single 2M unit in 19" Rack	42292S	N/A	42292S	N/A
Mounting Bracket, Two 2M unit in 19" Rack	42296S	N/A	42296S	N/A
Carry Handle for 2M unit	42506S	N/A	42506S	N/A
Input AC Fuses, 2 per	16499S (15A)	41276S (25A)	16499S (15A)	41276S (25A)
Output DC Fuse	41253S (60A)	40694S (125A)	41284S (30A)	41253S (60A)
Intelligent Power Module (iPM)	42507-B02S	42507-B02S	42508-B02S	42508-B02S
User Interface Module (UIM)	40987-B10S	42276-B20S	40987-B11S	42276-B21S
Remote Battery Temperature Cable, 10 Ft.	40974S			
Remote Battery Temperature Cable, 30 Ft.	40976S			
Remote Battery Voltage Cable, 10 Ft.	40977S			
Remote Battery Voltage Cable, 30 Ft.	40978S			
Input Varistor, across input AAR terminals	31309S			
Output Varistor, across output AAR terminals	41283S			
Mounting Brackets, 4M in 19" Rack, 2M or 4M Back or Bottom	42193S			
iPM, Blank, Cover Plate, 1 per	41838S			

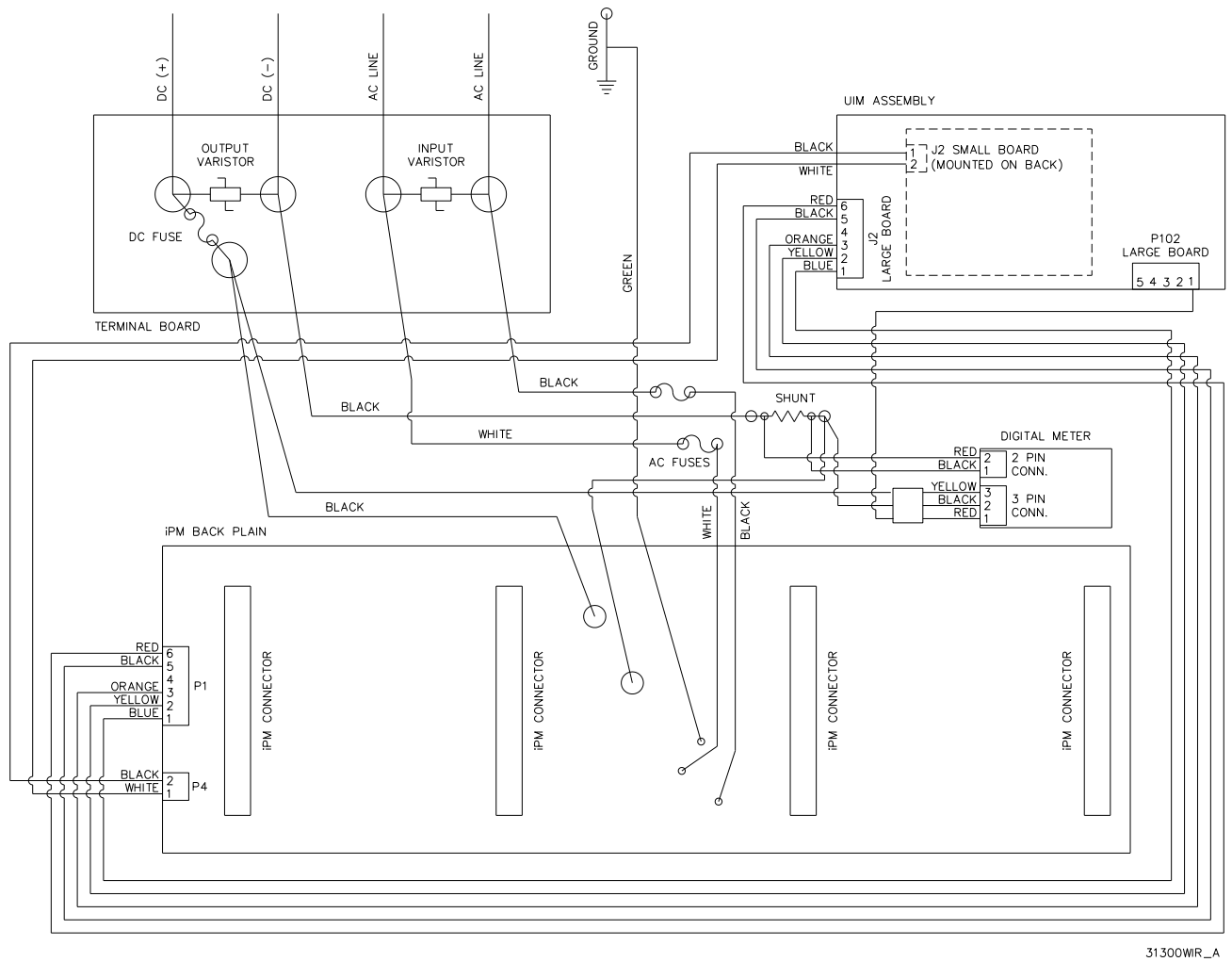
# 14.CHARGER WIRE DIAGRAMS



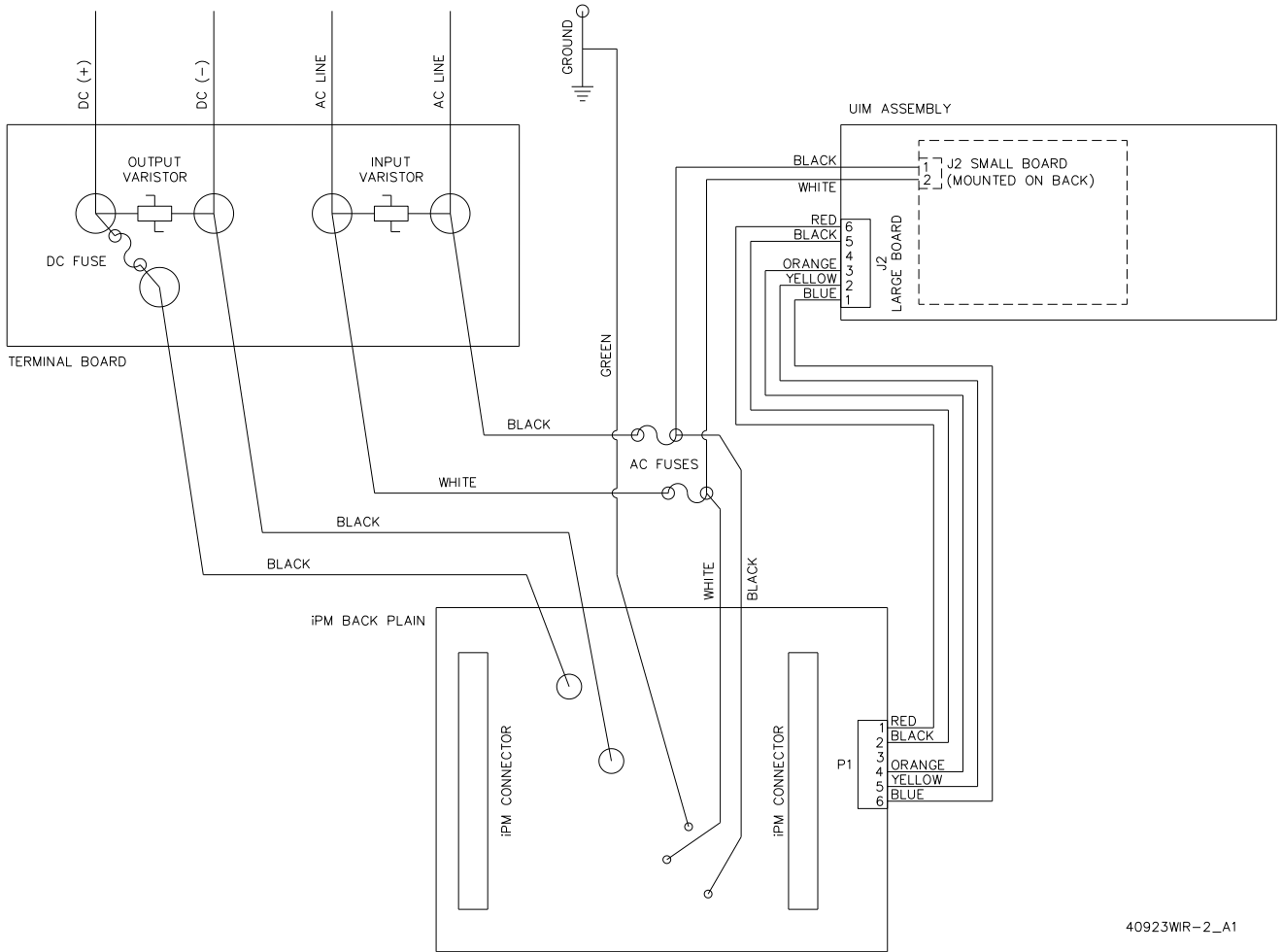
40923WIR-4\_A1

**Figure 14-1: Wire Diagram for 4-Slot Chassis without Digital Meter**





**Figure 14-2: Wire Diagram for 4-Slot Chassis with Digital Meter**



40923WIR-2\_A1

**Figure 14-3: Wire Diagram for 2-Slot Chassis**

## 15. SPECIFICATIONS

See the ATLAS datasheet for specifications.

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**NOTES**



**MADE IN**  
  
**U. S. A.**

41613 D