Instruction Manual
for

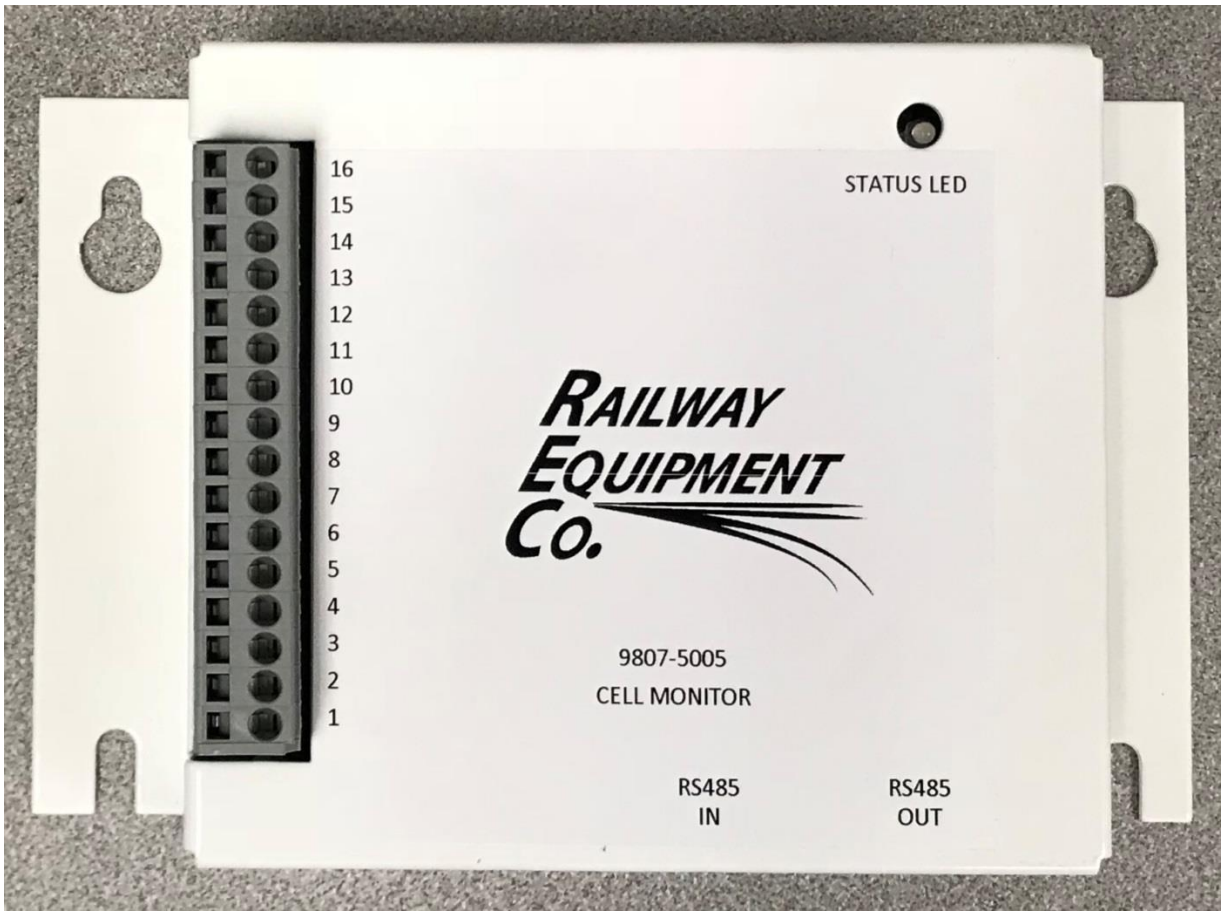
Model: MCM-Slave

CELL MONITOR PUCK

From

RAILWAY EQUIPMENT Co.

BATTERY CELL MONITOR
For up to 15 individual cells



Railway Equipment Company Minneapolis, MN (800) 624-5794

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1 WARNINGS, CAUTIONS, AND NOTES

Please read the entire instruction manual before using the battery cell monitor.
Also, read the warnings, cautions, and notes in Table 1. Failure to observe the warnings and cautions can lead to equipment damage or personal injury.
If you have any questions concerning the manufacture, design, function, installation, operation or maintenance, contact Railway Equipment Company before proceeding.

Table 1. Warnings, Cautions, and Notes

Symbol	Description
	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury. It may also be used to alert against unsafe practices.
NOTE	NOTE indicates explanatory information that applies to the next step in the procedure. It is used to clarify and expand upon the importance of the procedural step when needed.

2 DESCRIPTION

The Multiple Cell Monitor Slave is capable of monitoring 15 battery cell voltages at one time, each of the cell has a maximum voltage of 15 volts and all of them together has a maximum string voltage of 225VDC.

3 FEATURES

3.1 Standard Features

- Monitors voltage of each individual battery cell
- Monitors & records optional current levels
- Draws minimal power from the battery bank
- Dual RS485 ports
- AC & DC Circuit Transient Protection
- Meets or Exceeds AAR/AREMA Specifications

3.2 Front Panel Features

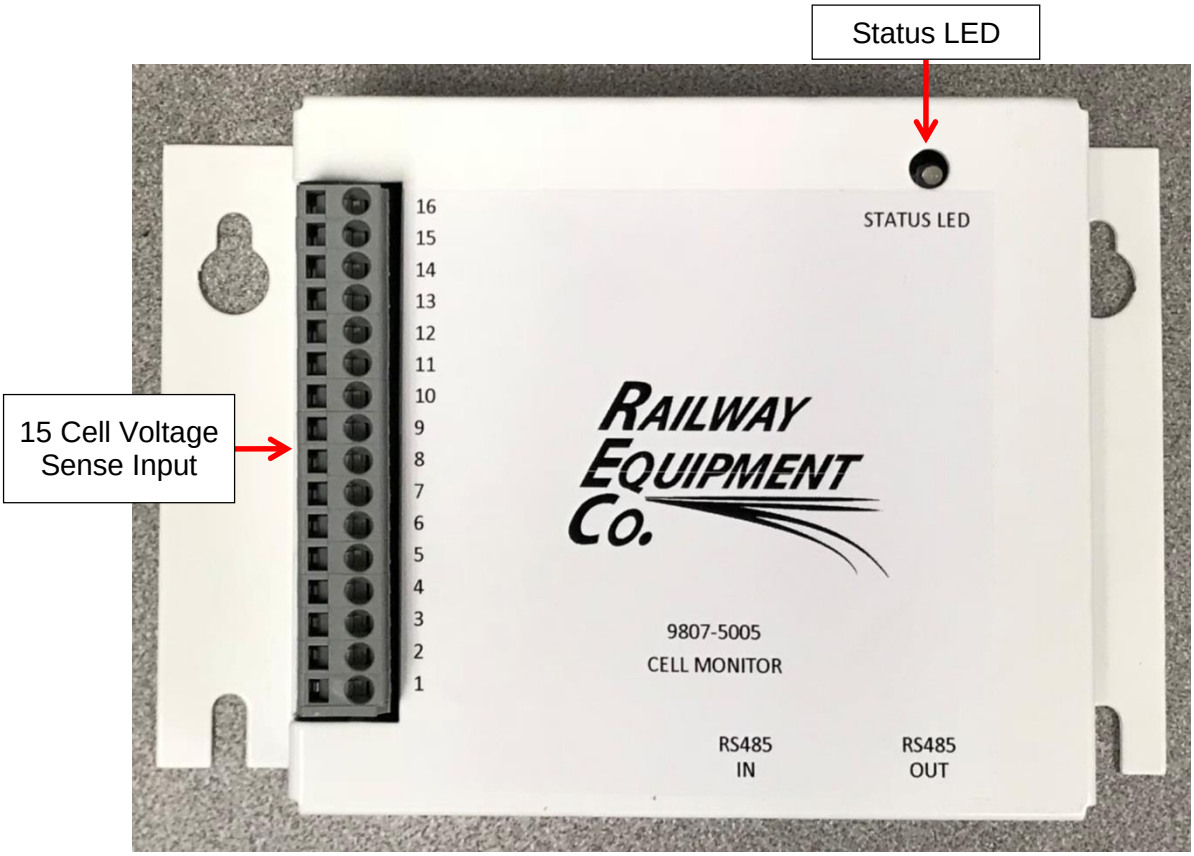

Figure 1. Front of Multiple Cell Monitor Slave

3.2.1 STATUS LED

The STATUS LED has two different color states, Orange and Green. When the Puck is first powered on and not connected to a Master Cell Monitor, the LED will flash Orange. When the Puck is connected to the Master Cell Monitor, the LED will flash Green, indicating that the devices are communicating. This can take up to one minute for the Cell Monitor Puck to establish this connection with the Charger.

Table 2. STATUS LED States

Description	STATUS LED COLOR
Communicating with Master	GREEN
Disconnected from Master	ORANGE

3.2.2 15 Cell Voltage Sense Input

The Multiple Cell Monitor Slave's (16) position WAGO terminal connector is used to connect the red voltage sense wires from the monitor to the battery bank.

3.3 Bottom Panel Features

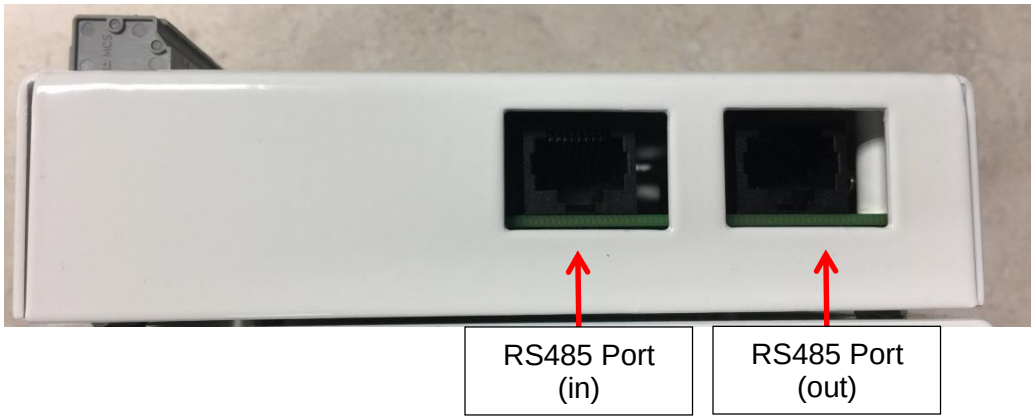

Figure 2. Bottom of Multiple Cell Monitor Slave

3.3.1 RS485 Port (input)

This RS485 port is connected to the Master Battery Cell monitor. This port provides power to the Puck and allows the Master to communicate with the Puck.

3.3.2 RS485 Port (output)

This RS485 port can be used to connect additional Puck devices in order to monitor larger banks of batteries.

4 INSTALLATION

WARNING: It is advised to take extreme caution when dealing with high DC voltages. If precautions are not taken, injury or even death can result.

NOTE: The term “Highest” refers to the battery cell with the highest potential. The term “Lowest” refers to the battery cell with the lowest potential.

NOTE: The Voltage Sense and Negative Voltage Sense Wires should be connected closest to the battery terminals.

4.1 Mounting

4.1.1 Wall Mount

Use the two-four keyed slots on the back of the monitor for mounting to a wall.

4.2 External Wiring Connections to Battery Cells

4.2.1 For an installation that has 15 battery cells:

For an installation that has 15 battery cells:
Voltage Sense (Red Wire)

1. Connect the red “1” wire to the positive terminal of the highest battery cell
2. Connect the red “2” wire to the positive terminal of the second battery cell
3. Connect the red “3” wire to the positive terminal of the third battery cell
4. Connect the red “4” wire to the positive terminal of the fourth battery cell
5. Connect the red “5” wire to the positive terminal of the fifth battery cell
6. Connect the red “6” wire to the positive terminal of the sixth battery cell
7. Connect the red “7” wire to the positive terminal of the seventh battery cell
8. Connect the red “8” wire to the positive terminal of the eighth battery cell
9. Connect the red “9” wire to the positive terminal of the ninth battery cell
10. Connect the red “10” wire to the positive terminal of the tenth battery cell
11. Connect the red “11” wire to the positive terminal of the eleventh battery cell
12. Connect the red “12” wire to the positive terminal of the twelfth battery cell
13. Connect the red “13” wire to the positive terminal of the thirteenth battery cell
14. Connect the red “14” wire to the positive terminal of the fourteenth battery cell
15. Connect the red “15” wire to the positive terminal of the lowest battery cell
16. Connect the red “16” wire to the negative terminal of the lowest battery cell

5 CELL MONITOR

Settings and values can be changed using the push buttons and display found on the front of the Cragg Railcharger DTC-G.

5.1 Viewing Cell Monitor

1. To view the cell monitor on the Cragg Railcharger DTC-G, use the increase or decrease buttons on the MENU SELECT until you get to the “CELL MONITOR”.

2. Here you are able to see the information for each of the individual cells you have by using the left and right mode buttons.

3. To change the values for the different menus, you need to enter a password of 5 into the password area within the set point menu. Refer to 5.2 on how to enter a password.

5.2 Entering a password

1. To enter a password in, first navigate to the SET POINT’s menus under MENU SELECT using the increase or decrease buttons.

2. Click the right mode button once to get to the password screen.

3. Use the increase or decrease buttons to set the desired password of 5.

4. Click the right mode button when done.

5.3 Changing Cell Monitor Values

1. Once you are done with entering the password, click the left mode button to go back to MENU SELECT.

2. Click the increase button once to get to the CELL MONITOR area again.

3. Now you are able to use the left or right mode buttons to navigate through the cell's information.

4. Use either the increase or decrease buttons to change the values for the certain category you are on.

5.4 Cell Monitor Is Installed / Is Not installed

1. Navigate to the SET POINTS menu under the MENU SELECT using the increase or decrease buttons.
    a. Make sure you have 5 entered as a password.

2. Click either the left or right mode buttons until you find, "CELL MONITOR IS NOT INSTALLED" or "CELL MONITOR IS INSTALLED".
    a. Make sure you have selected "CELL MONITOR IS INSTALLED" using the increase or decrease buttons.

6 HOSTED WEB PAGE

Settings and values can also be changed from the hosted web page.

6.1 Login

6.1.1 How to find MY IP ADDRESS

1. Using either the increase or decrease buttons, navigate to the SET POINT's menu under MENU SELECT.

2. Once there, click the right or left mode buttons until you come across MY IP ADDRESS.

6.1.2 Logging in on existing Network

To login, look up the IP address under the **SET POINTS - MY IP ADDRESS (SECTION 6.1.1** of this manual**)**, and enter it in to your browser. The format should look like this http://192.168.4.99:50000. Make sure to add the port number of **:50000** after the IP address. (The IP address given to the monitor will be provided by the DHCP server on the network)

6.1.3 Logging in with a Direct Connection to the Battery Charger

To login, first enable the Direct Connect Ethernet Mode on the battery charger. This will set the battery charger's IP address as static and allow a user to access the charger's webpage via direct Ethernet connection.

NOTE: If connecting directly to the monitor from a computer, the computer and battery charger need to be on the same subnet. If the computer doesn't support Ethernet crossover detection, a crossover Ethernet cable would be required.

Steps to change IP address of the Windows PC

- Click on the Start Menu icon in the lower left of the Desktop.
- In the search box, type **Network and Sharing Center**.
- Click on the **Network and Sharing Center** search result.

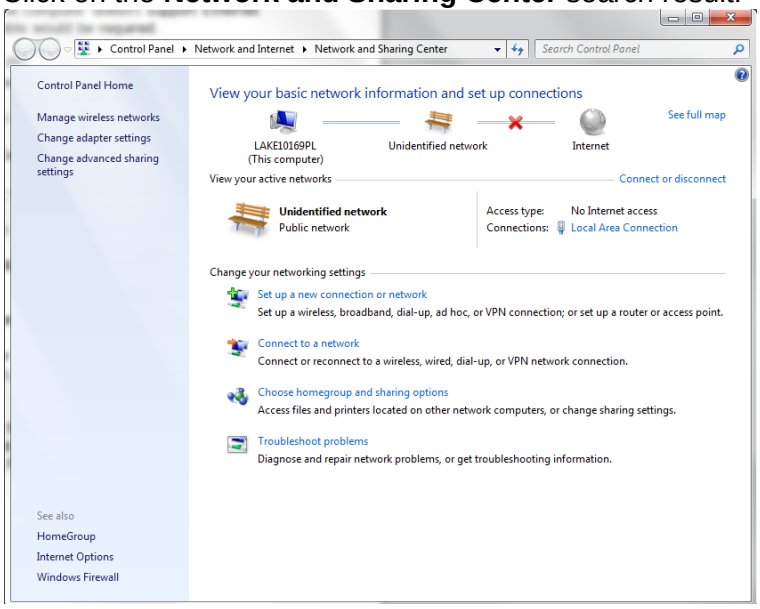

Figure 3. Network and Sharing Menu

- Click on **Change adapter settings** on the left side.

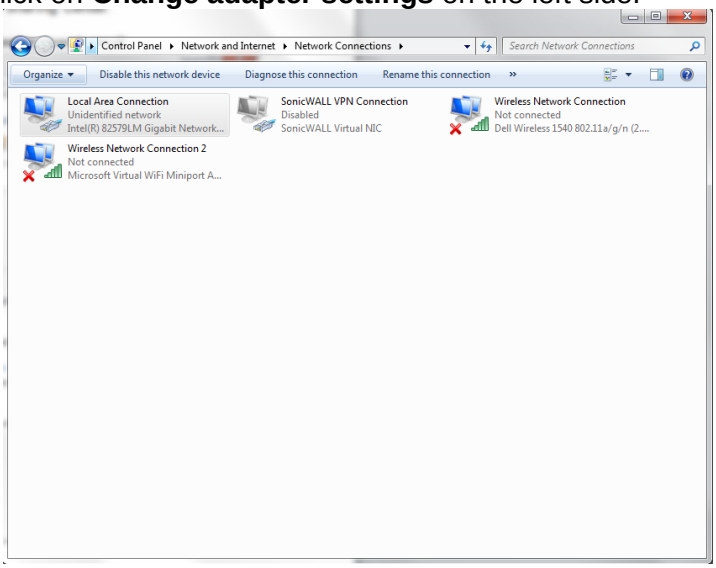

Figure 4. Change Adapter Settings Tab

- Right-click the Local Area Connection and then select **Properties**.

- Under **This connection uses the following items**, select **Internet Protocol Version 4 (TCP/IPv4)**.

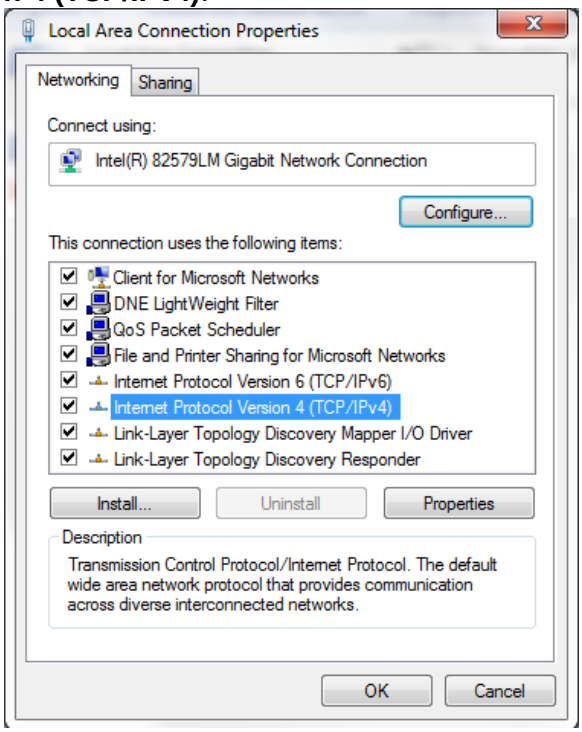

Figure 5. Local Area Connection Properties

- Click “Use the following IP Address”

- Enter in the **IP address**, **Subnet mask**, and **Default gateway**
  - IP Address will be on the **192.168.4.X** subnet (i.e. **192.168.4.2**)
  - Subnet mask will fill in automatically as **255.255.255.0**
  - Default Gateway is **192.168.4.1**

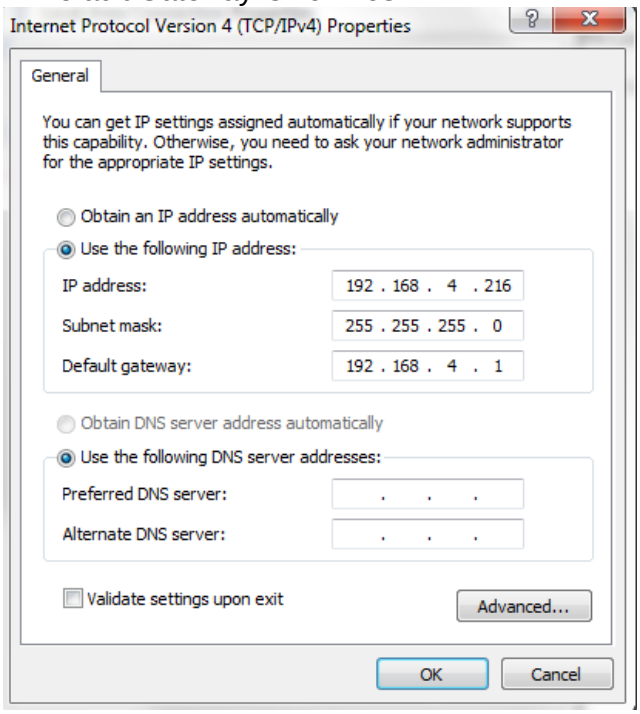

Figure 6. IPv4

6.2 Status Tab

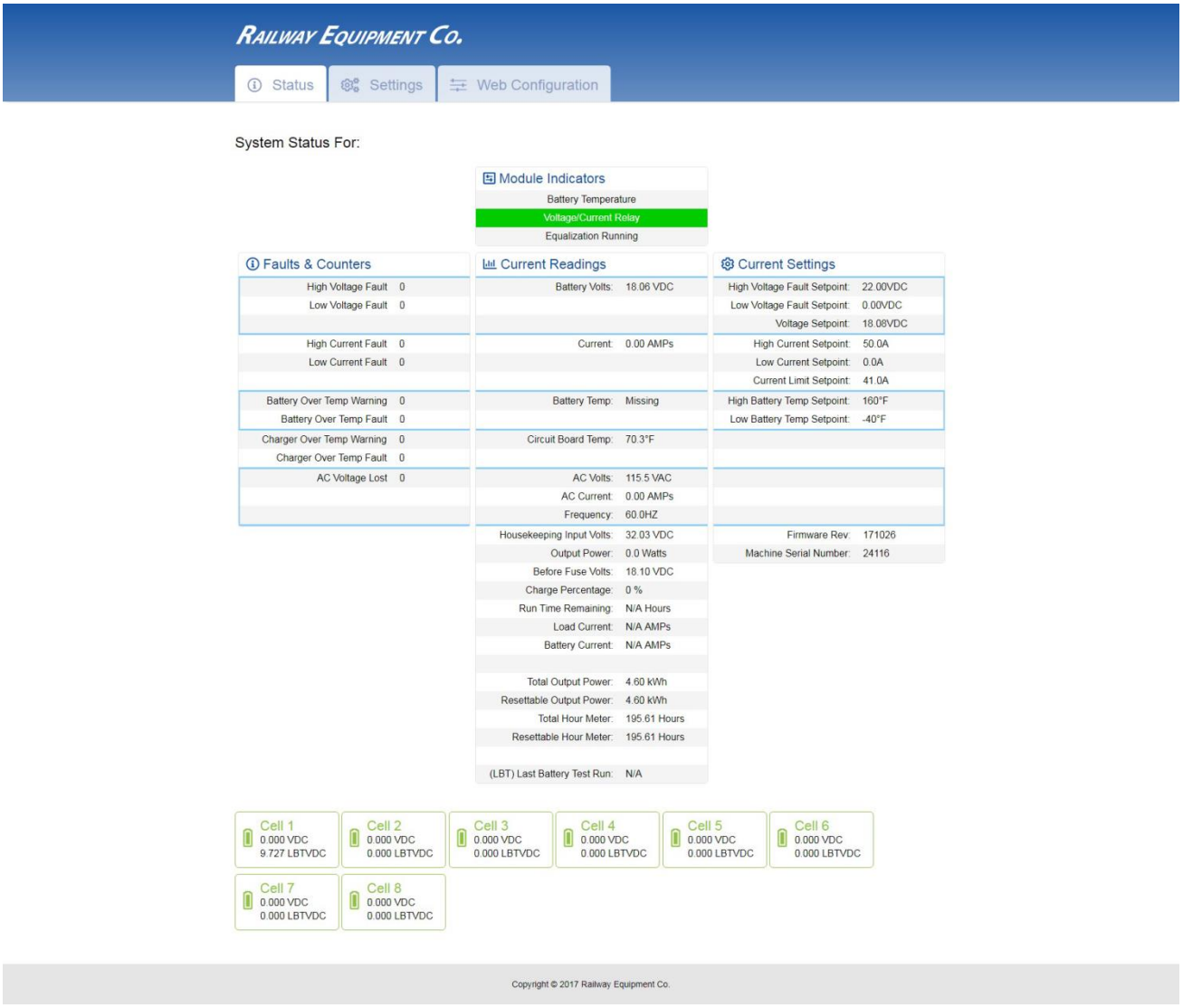

Figure 7. Status Tab

6.3 Settings Tab

Settings tab allow you to change the settings. The **username** is **admin**, and the **password** is **5**.

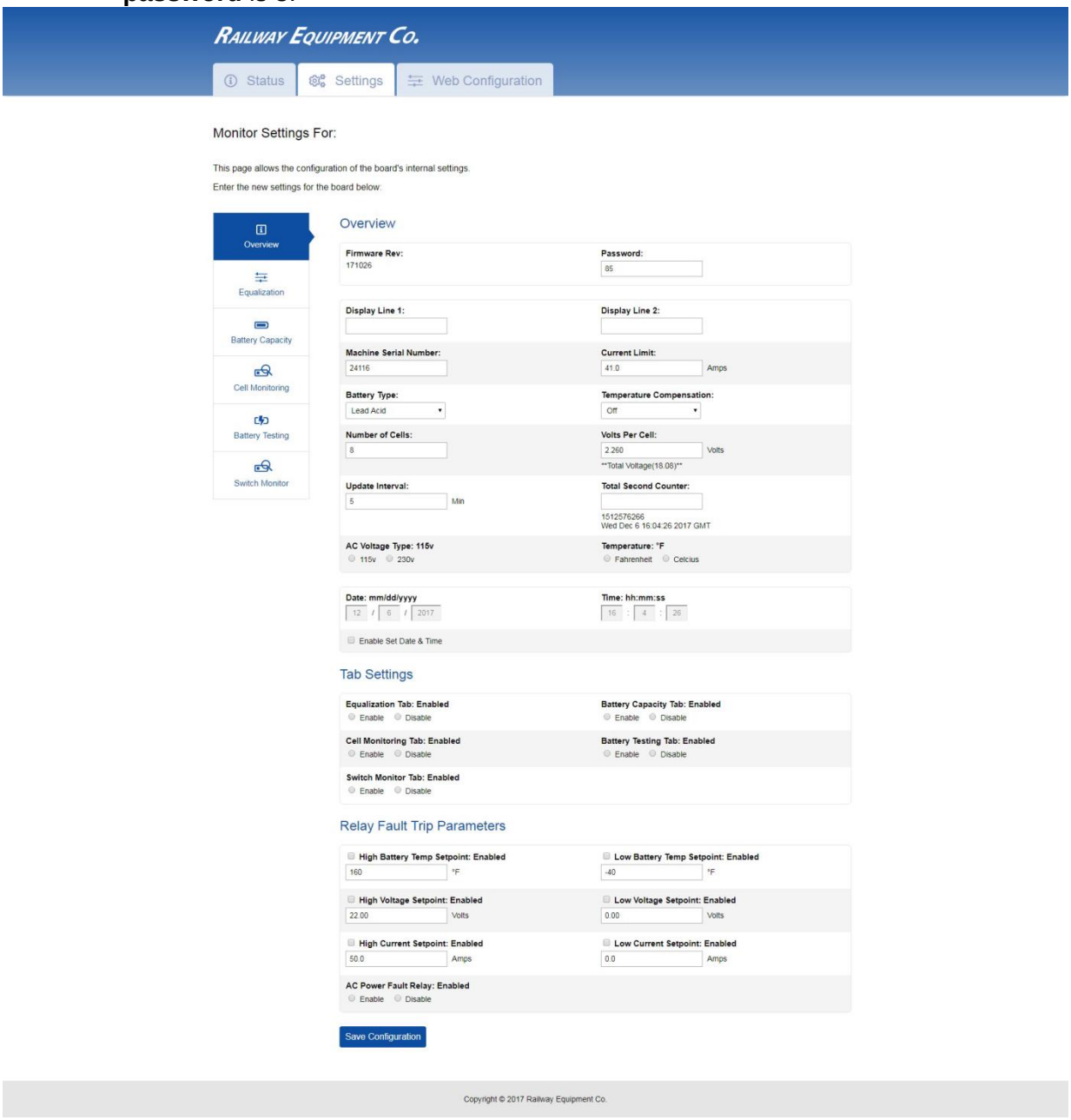

Figure 8. Overview of the Charger Settings

6.3.1 Device Installed

To have the cell monitor working, you need to go to the device installed area in the system tab and clicked yes for cell monitor installed.

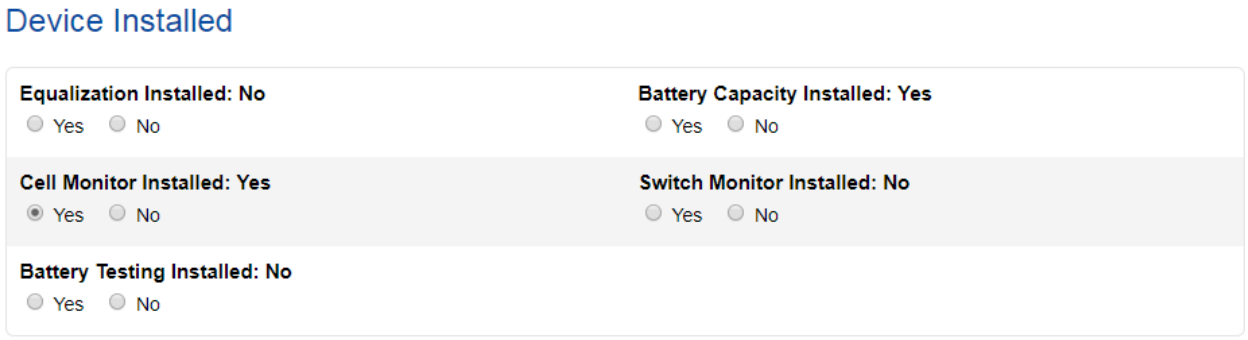

Figure 9. Device Installed

6.3.2 Cell Monitoring

You will also have to enter in the Cell Puck serial number that is on your Cell monitor, and the number of cells.

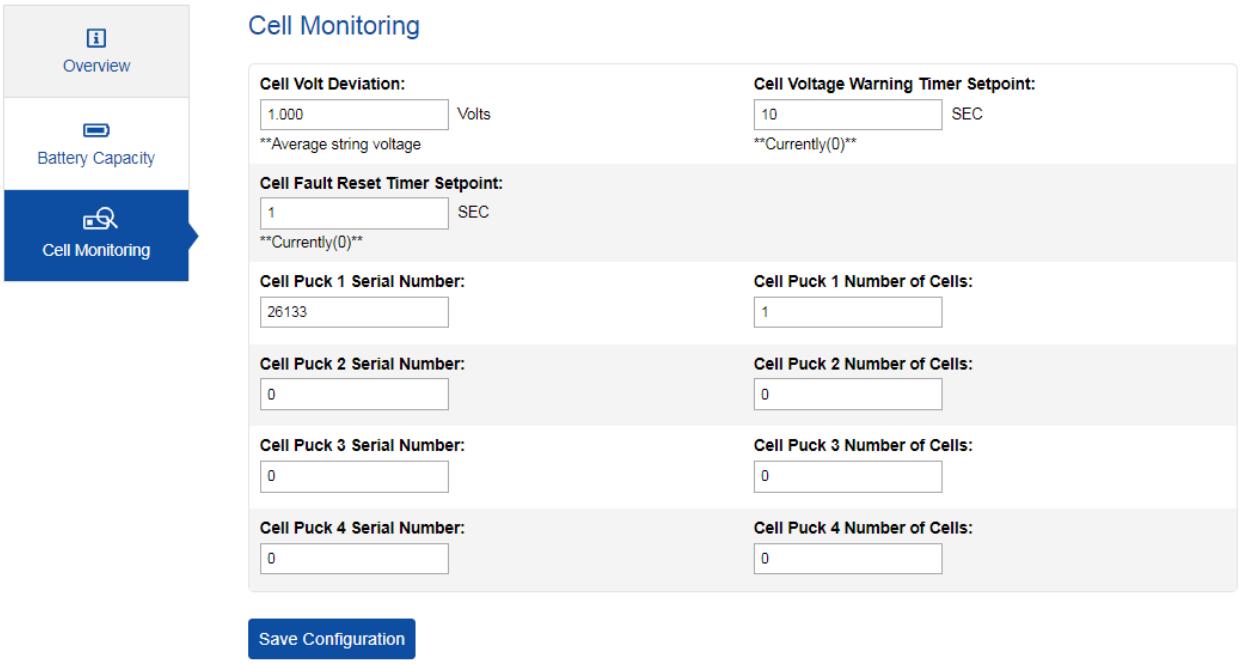

Figure 10. Cell Monitoring

7 SPECIFICATIONS

Table 3. General Specifications

Description	Specification	
Input Voltage	+10 to 30VDC	
Warranty	2 Years	
Operating Temperature (0-95% non-condensing humidity)	-40°F to +158°F	-40°C to +70°C

Table 4. Model Specifications

Model	Part no.	Cell Voltage	No. of Cells	Monitoring Accuracy (per battery cell)	Physical Dimensions WxHxD (in inches)
MCM	9807-5005	0-15VDC	1-15 Ni-Cad or Lead Acid	±10mV	7.50 x 4.50 x 2.00

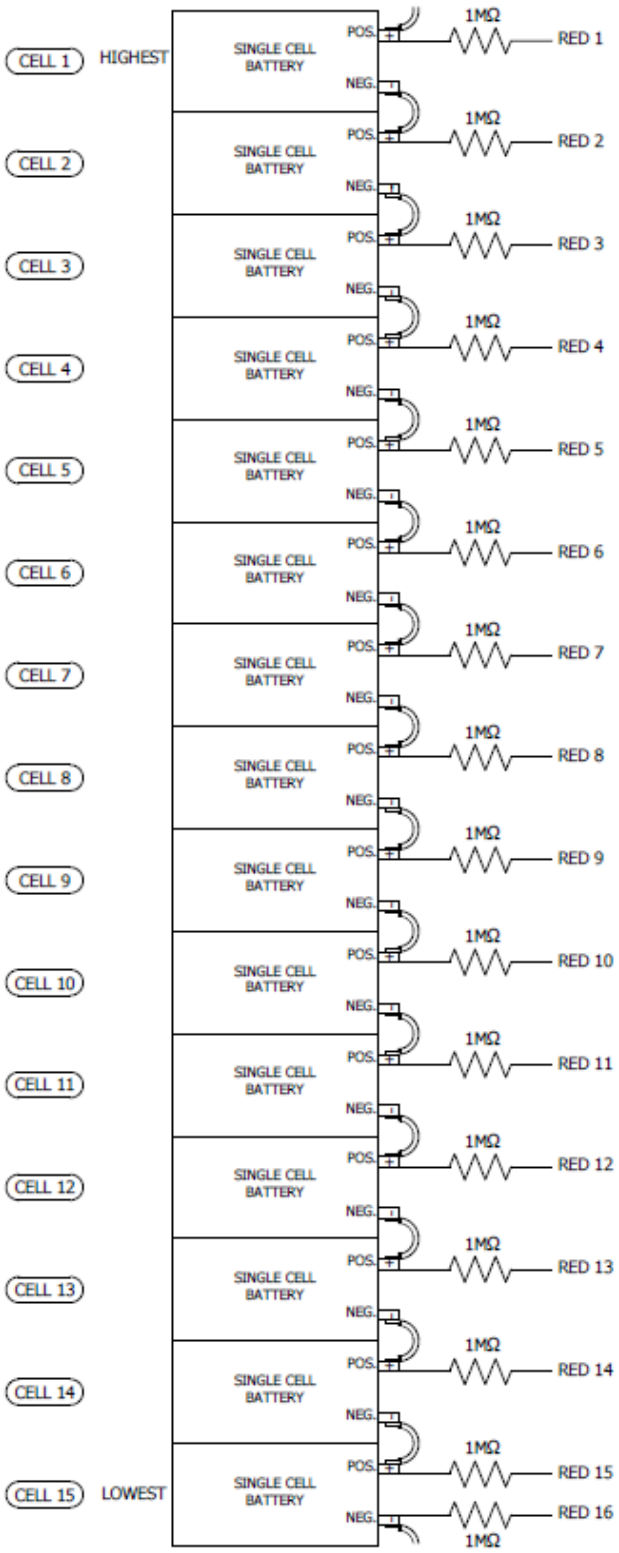

Figure 11. Wiring Diagram for Voltage Sense Wires

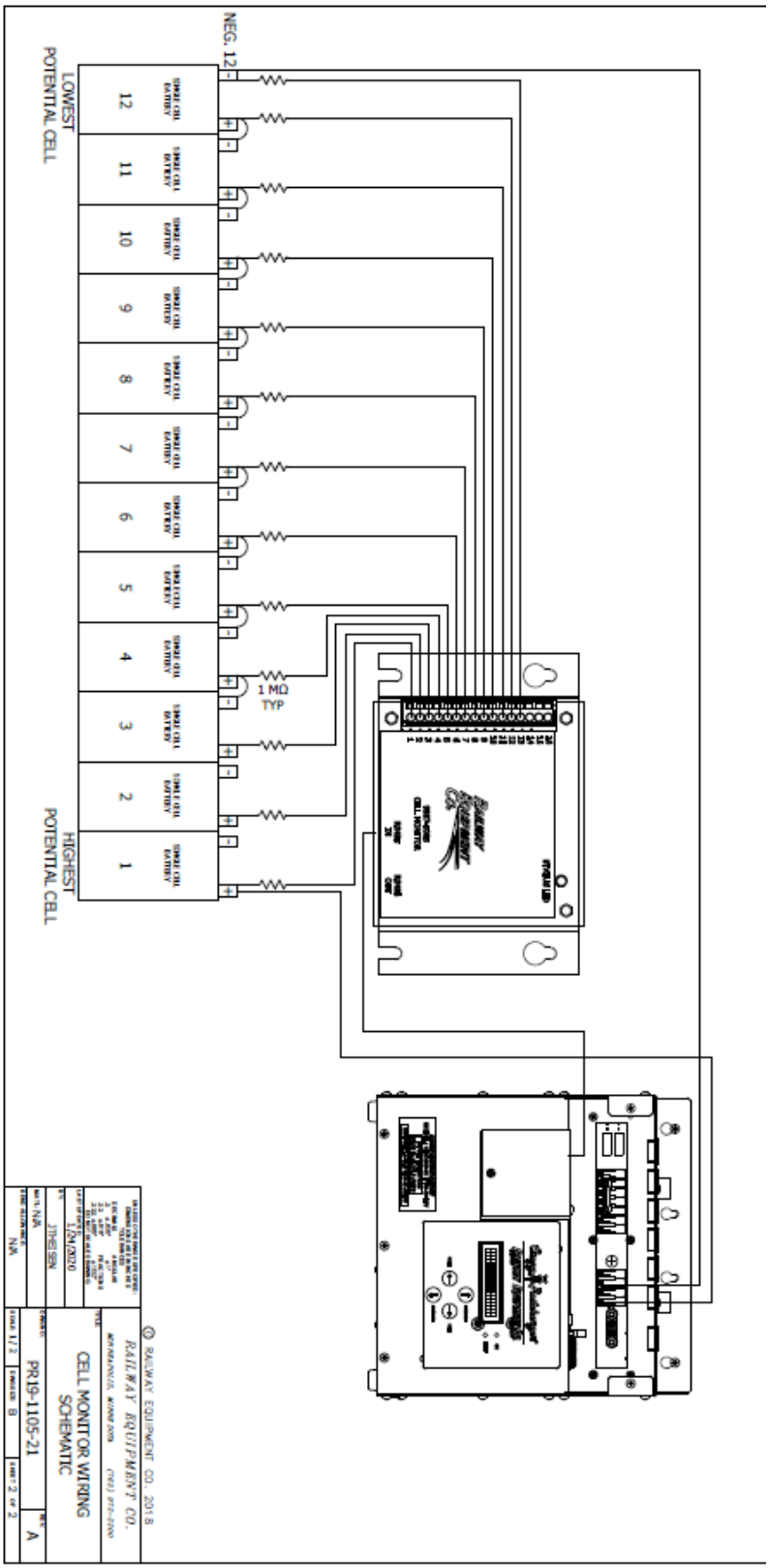

Figure 12. Cell Monitoring Wiring Schematic