

*Instruction Manual for*  
**RAILWAY EQUIPMENT Co.**  
**BATTERY CELL MONITOR**  
for 1 to 3V cells



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

# Contents

1	Warnings, Cautions, and Notes .....	1
2	Description .....	2
3	Features .....	2
3.1	STANDARD FEATURES.....	2
3.2	FRONT PANEL FEATURES .....	3
3.2.1	<i>OLED Display</i> .....	3
3.2.2	<i>OK LED</i> .....	3
3.2.3	<i>Fault LED</i> .....	3
3.2.4	<i>Push Button Control</i> .....	4
3.2.5	<i>Battery Terminal Input</i> .....	4
3.2.6	<i>DC Input</i> .....	4
3.2.7	<i>Output Relay</i> .....	4
3.3	BOTTOM PANEL FEATURES .....	3
3.3.1	<i>RJ45 Port</i> .....	5
3.3.2	<i>Thermocouple Temperature Sensor Port</i> .....	5
3.3.3	<i>Relay 1 Fuse</i> .....	5
3.3.4	<i>Relay 2 Fuse</i> .....	5
3.3.5	<i>Ethernet</i> .....	5
4	Operation.....	6
4.1	FRONT PANEL DISPLAY AND PUSH BUTTON CONTROL.....	6
5	Installation .....	7
5.1	MOUNTING .....	7
5.1.1	<i>Wall Mount</i> .....	7
5.2	EXTERNAL WIRING CONNECTOR .....	7
5.3	SETUP.....	7
5.4	INPUT POWER CONNECTIONS.....	7
5.5	TEMPERATURE SENSOR INPUT.....	7
5.6	VOLTAGE MONITOR RELAY .....	7
6	Basic Setup Procedure .....	7
7	Menu Control And Adjustment: .....	8
7.1	STATUS .....	8
7.1.1	<i>Basic</i> .....	8
7.1.2	<i>Advanced</i> .....	8
7.2	FAULT HISTORY MENU .....	9
7.2.1	<i>Basic</i> .....	9
7.2.2	<i>Advanced</i> .....	9
7.3	SETPOINTS MENU.....	10
7.3.1	<i>Basic</i> .....	10
7.3.1	<i>Advanced</i> .....	11
7.4	FACTORY DEFAULTS.....	11
7.5	CELL MONITOR.....	11
8	Hosted web page.....	12
8.1	LOGIN .....	12
8.2	STATUS PAGE.....	12
8.3	SETTINGS.....	13
9	Specifications .....	14

# List of Tables

- Table 1. Warnings, Cautions, and Notes..... 1
- Table 2. FAULT LED States ..... 4
- Table 3. Temperature Compensation Rate ..... **Error! Bookmark not defined.**
- Table 4. General Specifications ..... 14
- Table 5. Model Specifications ..... 14

# List of Figures

- Figure 1. Front of Battery Cell Monitor ..... 3
- Figure 2. Bottom of Batter Cell Monitor ..... 5
- Figure 3. Push Button Controls..... 6
- Figure 4. System Status ..... 12
- Figure 5. Monitor Settings..... 13



## 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.
<b>NOTE</b>	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 Railway Equipment Battery Cell Monitor is capable of monitoring 15 battery voltages at one time with a maximum string voltage of 50VDC.

The Railway Equipment Battery Cell Monitor has an input voltage range of **10-30VDC** to power it. Cell Monitor has an operating temperature range of -40°F to +158°F (-40°C to 70°C) allowing it to work effectively in a wide temperature range.

A set of contacts are provided for monitoring the High and Low Battery Voltage, Current and Temperature alarms, which have user defined settings.

## 3 FEATURES

### 3.1 Standard Features

- For Use with 1 – 15 1-3VDC battery cells Ni-Cad or Lead Acid
- Accurate Monitoring of Each Battery Cell
- Relay Output
- Local Battery Voltage Sensing
- RS485 Port for up to 12 Current Coils
- AC & DC Circuit Transient Protection
- Meets or Exceeds AAR/AREMA Specifications
- Wide DC Input Range from +10 VDC to +30VDC
- Operating Temperature -40° to +70° C (-40° to +158° F)
- Ethernet Port for Monitoring and Configuration.
- 2-Year Warranty

### 3.2 Front Panel Features

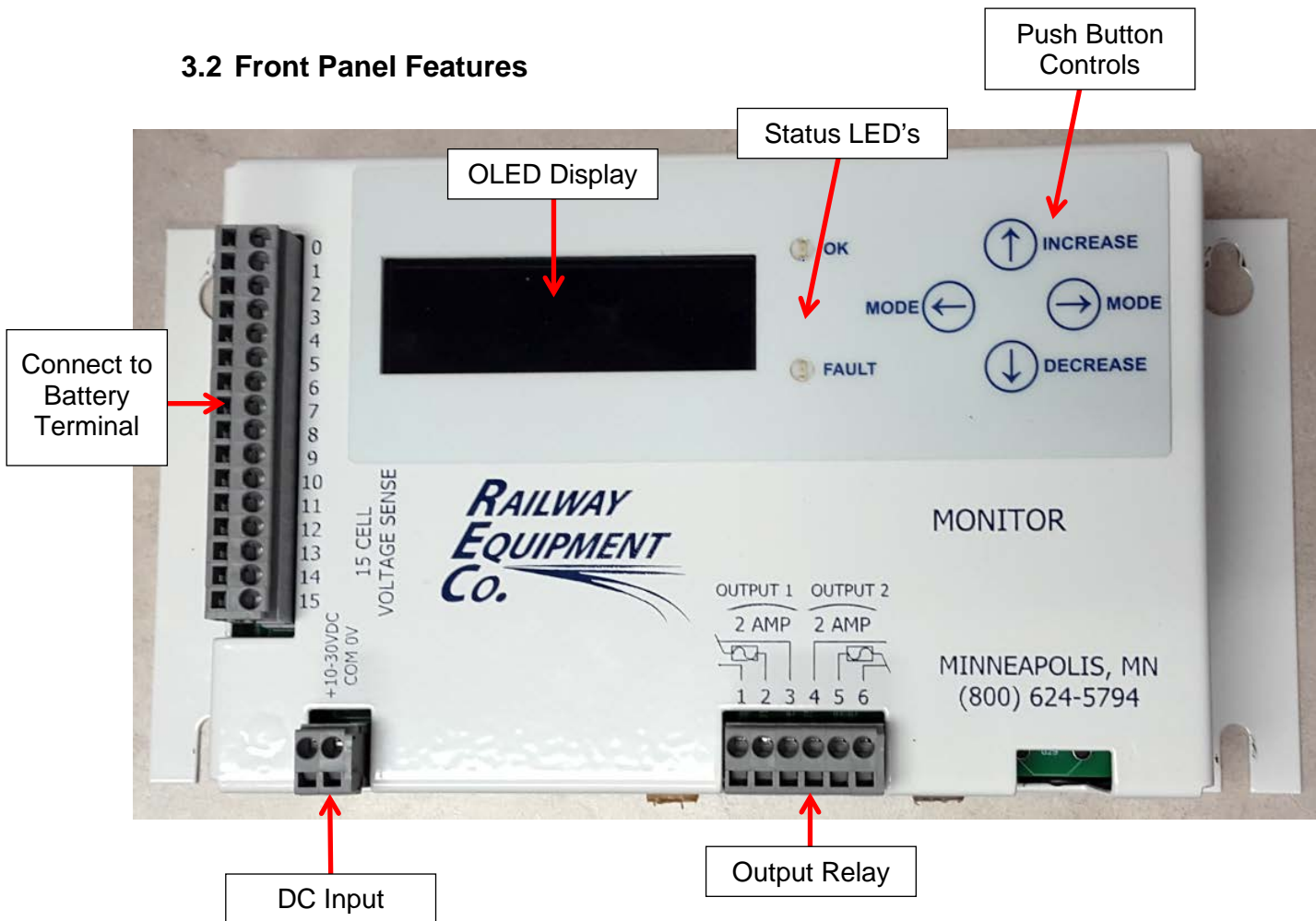


Figure 1. Front of Battery Cell Monitor

#### 3.2.1 OLED Display

The display is a long life OLED display. It enters “sleep mode” after inactivity to extend the life of the display. To “wake” the display, press any control button.

#### 3.2.2 OK LED

The OK LED is on when the DC Output Voltage is between the **HIGH VOLTAGE FAULT** and **LOW VOLTAGE FAULT** settings (see section 8.3.1 for configuration).

#### 3.2.3 FAULT LED

The FAULT LED has three different states, OFF, ON and FLASH. In addition to the FAULT LED, the display will show fault description. The fault conditions are described in the table below.

**Table 2. FAULT LED States**

<b>Description</b>	<b>FAULT LED (Red)</b>
No Fault	OFF
Battery Temperature Fault	ON
Battery Current Fault	ON
Battery Voltage Fault	ON

### **3.2.4 Push Button Controls**

The push button controls have mode left / mode right / increase / decrease. See section 4 and section 7 for operations and menu options.

### **3.2.5 Battery Terminal Input**

This port is designed to be connected to battery cell to provide accurate voltage reading of each cell. Position 0 is for the lowest negative terminal. Position 1 is for the highest positive terminal. Position 2 is for the second highest positive terminal and so on for up to 15 cells.

### **3.2.6 DC Input**

The voltage monitor should be powered by a DC voltage between +10V and +30V. The COM 0V port should be connected to 0V.

### **3.2.7 Output Relay**

The voltage monitor provides a Form C dry contact relay which can be used to indicate when the battery voltage, current and temperature are either above or below the parameter settings.

The voltage monitor circuit is independent from the battery charger system and the AC power. Voltage monitor can operate from the battery voltage.

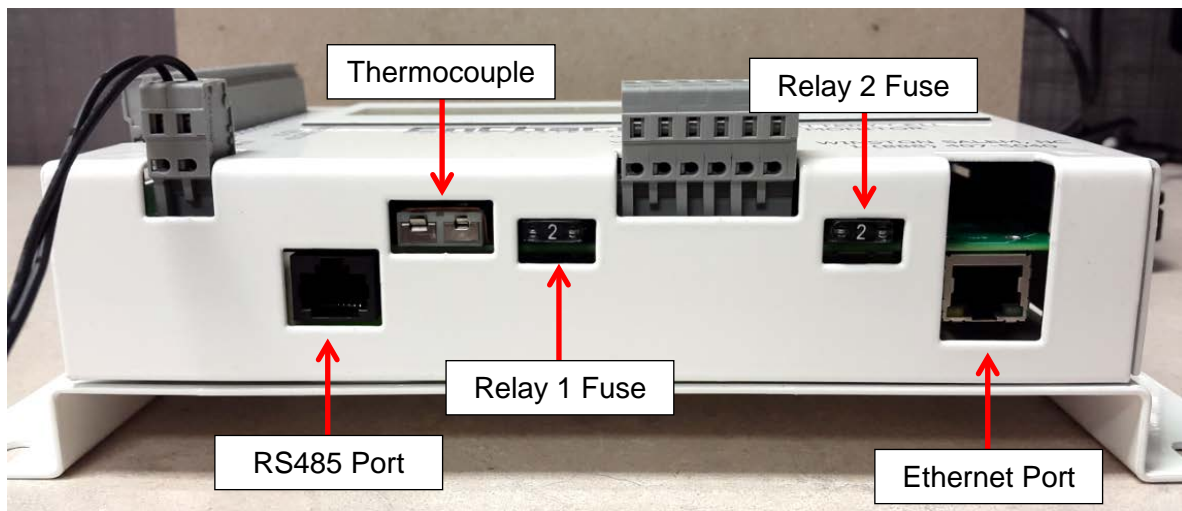
The “normally open” contact is closed when the battery voltage, current and temperature is between the high and low settings.

The relay is rated for 2 Amps at 60 VDC, or 2 Amps at resistive loads. The mechanical contact life is 5,000,000 operations. Minimum inductive life @ .5 Amps, 12vdc is 50,000 times.

The voltage monitor can be used for an alarm by connecting the coil of an indication relay to the normally open relay contact terminals on the battery charger, with power for the relay supplied by others.

The voltage monitor relay is protected with a 2 Amp, 32 VDC, fast acting mini fuse (use Littelfuse® part number 0297002 or equivalent).

### 3.3 Bottom Panel Features



**Figure 2. Bottom of Battery Cell Monitor**

#### 3.3.1 RS485 Port

The RS485 is connected to current coils for current sensing capability.

#### 3.3.2 Thermocouple Temperature Sensor

Plug type K thermocouple probe into the thermocouple port. The probe end can be placed between battery cells to accurately monitor battery temperature.

#### 3.3.3 Relay 1 Fuse

Relay 1 is protected with a 2 Amp, 32 VDC, fast acting mini fuse (use Littelfuse® part number 0297002 or equivalent).

#### 3.3.4 Relay 2 Fuse

Relay 2 is protected with a 2 Amp, 32 VDC, fast acting mini fuse (use Littelfuse® part number 0297002 or equivalent).

#### 3.3.5 Ethernet

This RJ45 Ethernet connection is used for accessing the monitor, either via its internal webpage or via the Remote Monitoring Server.



## 4 OPERATION

### 4.1 Front Panel Display and Push Button Controls

The front panel has OLED display, status LED display and four control buttons. The OLED display will auto dim after several minutes of inactivity. Once a button is pressed the display will return to full brightness.

**SET-UP AND ADJUSTMENTS:** To change settings do the following:



Figure 3. Push Button Controls

#### **MODE LEFT/MODE RIGHT**

Pushing the **MODE UP** or **MODE DOWN** push button will cycle up or down through the menus. Each time you press one of the **MODE** buttons, you will advance one menu selection.

#### **VALUE INCREASE/VALUE DECREASE**

The **VALUES INCREASE** and **DECREASE** push button allows you to change the displayed values. NOTE: Values that are changed will be saved after 15 minutes, or when you return to the status screen.

## 5 INSTALLATION

### 5.1 Mounting

#### 5.1.1 Wall Mount

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

### 5.2 External Wiring Connector

On the left of the front panel there is a sixteen position socket with a removable connector for external wiring. Connect the negative of the first cell to the 0 pin, then connect the positive of the first cell to pin 1, connect the positive second cell to pin 2, connect the positive third cell to pin 3 and so on.

### 5.3 Setup

Setup the monitor according to section 6 of this manual.

### 5.4 Input Power Connections

1. Connect AC/DC power adaptor to 110V AC power.
2. Apply DC power to the monitor.

### 5.5 Temperature Sensor Input

The Temperature Sensor is a Type K thermocouple wire. Plug the probe into the thermocouple port and place the other end on the battery.

### 5.6 Voltage Monitor Relay

Wire size should be minimum 18GA, maximum 16GA. This is a Form C dry contact relay with a Normally Open and Normally Closed set of contact.

## 6 BASIC SETUP PROCEDURE

To initially set up the charger, use the **INCREASE/DECREASE** buttons to move between **MENU**s, the **MODE** buttons to navigate between screens, and **INCREASE/DECREASE** buttons to change parameter values.

Go to the **SET POINTS** menu.  
Set the **PASSWORD** to **5**.  
Leave **USER LEVEL** at **BASIC**.  
Select **BATTERY TYPE** (**LEAD ACID** or **NI-CAD**)  
Set **NUMBER OF CELLS** per your battery bank.  
Set **VOLTS PER CELL** to battery manufacturers specs.

The battery cell monitor should be ready to operate.

P/N 520920-2V	REV. D	© 2016 RAILWAY EQUIPMENT Co.	PAGE 7
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## 7 MENU CONTROL AND ADJUSTMENTS:

### Controller Menu

The controller has 5 Menu Screens:

1. **STATUS**
2. **FAULT HISTORY**
3. **SET POINTS**
4. **FACTORY DEFAULTS**
5. **CELL MONITOR**

#### Menu Screen Selection:

To select the desired Menu Screen, press the **MODE LEFT** or **RIGHT** button until \*\*\*\***MENU SELECT** \*\*\*\* is displayed, on line 1, and then use the **INCREASE** or **DECREASE** Value button to select the appropriate menu. Once the appropriate menu is selected, use the **MODE LEFT** or **RIGHT** buttons to view the contents of the menu.

**NOTE:** Use the Increase or Decrease buttons to change set point values.

### 7.1 STATUS

The STATUS Screen can display **BASIC** or **ADVANCED** information based on what the **USER LEVEL** is set to.

#### 7.1.1 BASIC

**Battery Cell VOLTAGE** – Displays the voltage of each cell

**TC TEMP** – Displays the temperature measured by **Thermocouple** if a temperature probe is installed. If there isn't a temperature probe installed, this field will be blank.

**Total Voltage** – Displays the total voltage of the battery

#### 7.1.2 Additional features under **ADVANCED** mode

**TOTAL OUTPUT POWER** – This displays the total output power provided over time.

**RESETTABLE OUTPUT POWER** – This is a resettable display of output power utilized over time. To reset this meter to zero, press the **DECREASE** button.

**TOTAL HOUR METER** – This displays the total hours this battery monitor has been operating.

**RESETTABLE HOUR METER** – This displays the total hours this battery monitor has been operating since this counter has been reset. To reset this counter to zero, press the **DECREASE** button.

**CIRCUIT BOARD TEMP** – This displays the temperature of internal circuit board.

## 7.2 FAULT HISTORY MENU

NOTE: Some faults may not show in Fault History until there is an actual fault. Press the decrease or increase button to reset the fault count.

### 7.2.1 BASIC

**HIGH VOLTAGE FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a high voltage fault.

**LOW VOLTAGE FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a low voltage fault.

**HIGH CURRENT FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a high current fault.

**LOW CURRENT FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a low current fault.

**CHARGER OVER TEMP WARNING COUNTER** – Shows the number of instances a charger over temperature warning has occurred.

**CHARGER OVER TEMP FAULT COUNTER** – Shows the number of times that a charger over temperature fault has occurred.

**BATTERY OVER TEMP WARNING COUNTER** – Shows the number of instances a battery over temperature warning has occurred.

**BATTERY OVER TEMP FAULT COUNTER** – Shows the number of times that a battery over temperature fault has occurred.

### 7.2.2 ADDITIONAL FEATURES UNDER ADVANCED MODE

**OUTPUT RELAY/EQ RELAY** – Shows the number of times the battery monitor's relay has cycled, and the number of times entering equalization.

**POWER UP COUNTER** – Shows the number of times the battery monitor input power was turned on.

**DAYS COUNTER** – Shows the total number of days the battery monitor has been operating.

**TOTAL SECOND COUNTER** – Shows the total number of seconds the battery monitor has been operating.

### 7.3 SETPOINTS MENU

Under the **SET POINTS** menu, the user defined variables are entered. The parameter screens are:

**PASSWORD** – To change any user defined parameter, use the increase button to enter the password of **5**. To prevent others from changing parameters, return the password to **0** after making changes. **Note:** If the password is left at **5**, it will automatically reset to **0** after ten minutes.

**USER LEVEL** (Requires password)

The options are **BASIC** and **ADVANCED**.

**BASIC** - Access to the basic menu options

**ADVANCED** – Access to the advanced menu options

#### 7.3.1 BASIC SET POINTS

**BATTERY TYPE** – The options are **GENERIC LEAD ACID**, **GENERIC NI-CAD**.

**GENERIC LEAD ACID** – The type of battery being used is Lead Acid.

**GENERIC NI-CAD** –The type of battery being used is Ni-Cad.

**Note:** Also included are presets for several specific brands such as **GNB Absolyte** and **SAFT SPL NI-CAD**.

**NUMBER OF CELLS** –

**LEAD ACID** - 1-15 cells are useable.

**VOLTS PER CELL\TOTAL VOLTS** –

**LEAD ACID** – The values range from **6-14VDC**.

**HIGH VOLTAGE FAULT** – This adjustment is for setting the voltage level when the voltage monitor relay toggles for an over voltage fault.

**LOW VOLTAGE FAULT** – This is used to set the voltage below which the voltage monitor relay changes state. As an example, it could be set for 10% below the normal battery output voltage, to trigger an alert before the voltage dropped to a point where it would no longer operate the equipment it was attached to.

#### 7.3.2 ADVANCED SET POINTS

**HIGH CURRENT FAULT** – The parameter is the high amperage setting. The voltage monitor relay will toggle if the current is higher than the selected current.

**LOW CURRENT FAULT** – The voltage monitor relay will toggle if the current is lower than the selected current. This should be set lower than the expected lowest current output, as when the batteries are fully charged and no equipment is running.

**HIGH BATTERY TEMP** – This setting allows the user to set the temperature that will trigger a high battery temperature fault. If a high battery temperature fault occurs, the voltage monitor relay will toggle.

**LOW BATTERY TEMP** – This setting allows the user to set the temperature that will trigger a low battery temperature fault. If a low battery temperature fault occurs, the voltage monitor relay will toggle.

**SELECT F OR C** – This is used to choose the temperature units of measure. The choices are F for Fahrenheit and C for Celsius.

**MY IP ADDRESS** – Shows the chargers IP address. (DHCP is enabled by default)

**PROG REV & DATE** – This displays the firmware revision level and the date that revision was released.

## 7.4 FACTORY DEFAULTS

**FOR FACTORY DEFULTS PRESS DECREASE** – This is to allow the user to return most settings to the original factory settings by pressing the **DECREASE** button. A password of **5** is required to change this setting.

## 7.5 CELL MONITOR

**BATTERY AMP HOURS SIZE** – Shows the amount of maximum power stored in the battery in terms of current fully supplied in an hour.

# 8 HOSTED WEB PAGE

Settings can be changed from the hosted web page as well as from the push buttons and display on the front of the charger.

## 8.1 Login

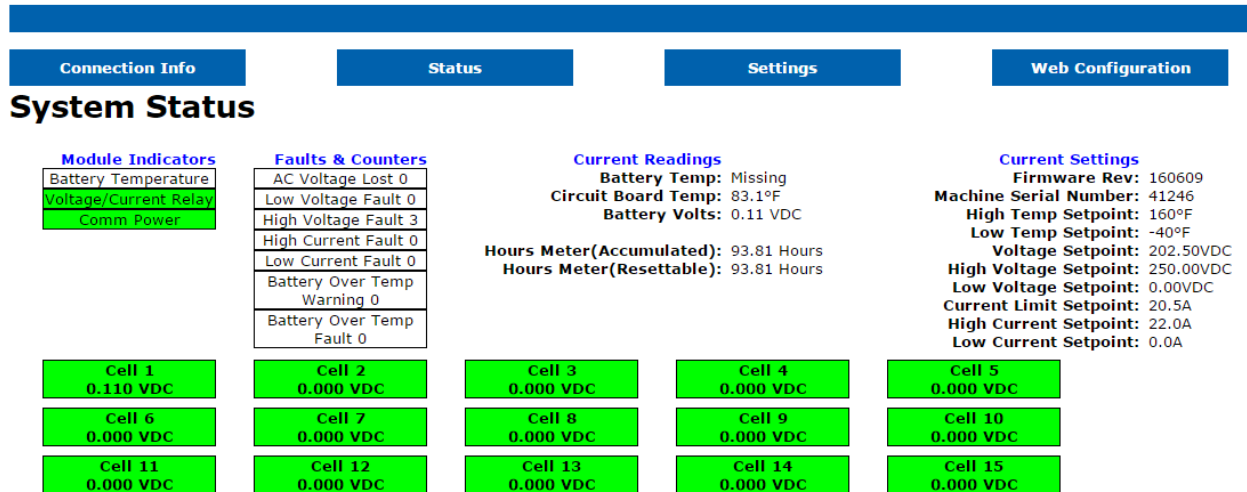
To login, look up the IP address under the **SET POINTS - MY IP ADDRESS (SECTION 7.3.1 of this manual)**, and enter it in to your browser. The format should look like this <http://192.168.4.99:50000>. Make sure to add the port number of **:xxxxx** after the IP address.

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

## 8.2 Status page

Show the status of the battery cell monitor.

**RECo**



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Figure 4. System Status

### 8.3 Settings

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

#### Monitor Settings

This page allows the configuration of the board's internal settings.

Enter the new settings for the board below:

<b>Password:</b>	5
<b>Machine Serial Number:</b>	41246
<b>Battery Type:</b>	Lead Acid
<b>Number of Cells:</b>	8
<b>Volts Per Cell:</b>	2.000 Volts
	<b>**Total Voltage(16.00)**</b>
<b>Temperature Compensation:</b>	Off
<b>Update Interval:</b>	5 Min
<b>Total Second Counter:</b>	
	<b>**Currently(2920 Thu Jan 1 00:48:40 1970 GMT)**</b>
<b>High Battery Temp Setpoint:</b>	160 F
<b>Low Battery Temp Setpoint:</b>	-40 F
<b>High Voltage Setpoint:</b>	250.00 Volts
<b>Low Voltage Setpoint:</b>	0.00 Volts
<b>Voltage Cal 1:</b>	133.13
	<b>**Currently(0.11)**</b>
<b>Hours Meter(Accumulated):</b>	97.11 Hours
<b>Hours Meter(Resettable):</b>	97.11 Hours
<b>Cell Volt Deviation At Dis/Recharge:</b>	65.535 Volts
<b>Cell Volt Deviation At Float:</b>	65.535 Volts
<b>High Ripple Setpoint:</b>	N/A Volts
<b>Battery AMP Hour Size:</b>	2500 AH
<b>Cell Temp Deviation Setpoint:</b>	10.0 F
<b>Cell Voltage Warning Timer Setpoint:</b>	1 SEC
	<b>**Currently(0)**</b>
<b>Cell Fault Reset Timer Setpoint:</b>	0 SEC
	<b>**Currently(0)**</b>
<b>Timer Fault Threshold:</b>	65535 SEC
<b>Current For Profile Start:</b>	-0.1 Amps
<b>Profile Window Time:</b>	2550.0 SEC
<b>Switch Temp Comp:</b>	255 %
<b>Profile Send Delay:</b>	255.0 SEC
<b>Check box to clear counters:</b>	

**Figure 5. Monitor Settings**



## 9 SPECIFICATIONS

**Table 4. General Specifications**

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

**Table 5. Model Specifications**

Model Name	Cells	Length x Width x Height	Ship Weight
Battery Cell Monitor	1-15	10.75 x 5.375 x 2.5 inches	3 LB
		27.30 x 13.65 x 6.35 cm	1.3 KG

*Instruction Manual for*  
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for 6 to 12V cells



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# Contents

1	Warnings, Cautions, and Notes .....	1
2	Description .....	2
3	Features .....	2
3.1	STANDARD FEATURES.....	2
3.2	FRONT PANEL FEATURES .....	3
3.2.1	<i>OLED Display</i> .....	3
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3.2.7	<i>Output Relay</i> .....	4
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5.1	MOUNTING .....	7
5.1.1	<i>Wall Mount</i> .....	7
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6	Basic Setup Procedure .....	7
7	Menu Control And Adjustment: .....	8
7.1	STATUS .....	8
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7.2.1	<i>Basic</i> .....	9
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7.4	FACTORY DEFAULTS.....	11
7.5	CELL MONITOR.....	11
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# List of Figures

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## 2 DESCRIPTION

The Railway Equipment Battery Cell Monitor is capable of monitoring 15 battery voltages at one time with a maximum string voltage of 205VDC.

The Railway Equipment Battery Cell Monitor has an input voltage range of **10-30VDC** to power it. Cell Monitor has an operating temperature range of -40°F to +158°F (-40°C to 70°C) allowing it to work effectively in a wide temperature range.

A set of contacts are provided for monitoring the High and Low Battery Voltage, Current and Temperature alarms, which have user defined settings.

## 3 FEATURES

### 3.1 Standard Features

- For Use with 1 – 15 6/12VDC Lead Acid battery cells
- Accurate Monitoring of Each Battery Cell
- Relay Output
- Local Battery Voltage Sensing
- RS485 Port for Current Coils
- AC & DC Circuit Transient Protection
- Meets or Exceeds AAR/AREMA Specifications
- Wide DC Input Range from +10 VDC to +30VDC
- Operating Temperature -40° to +70° C (-40° to +158° F)
- Ethernet Port for Monitoring and Configuration.
- 2-Year Warranty

### 3.2 Front Panel Features

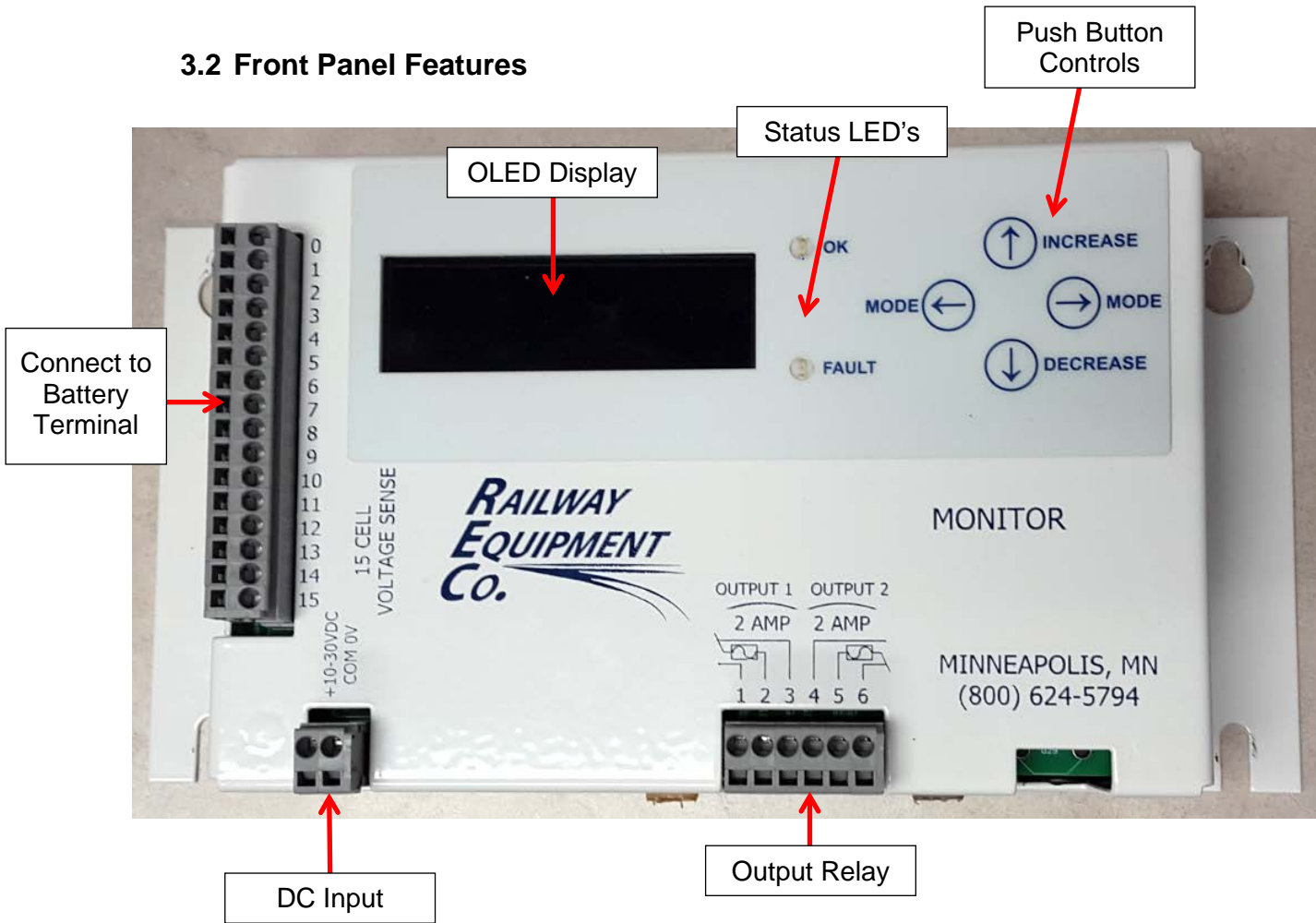


Figure 1. Front of Battery Cell Monitor

#### 3.2.1 OLED Display

The display is a long life OLED display. It enters “sleep mode” after inactivity to extend the life of the display. To “wake” the display, press any control button.

#### 3.2.2 OK LED

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This port is designed to be connected to battery cell to provide accurate voltage reading of each cell. Position 0 is for the lowest negative terminal. Position 1 is for the highest positive terminal. Position 2 is for the second highest positive terminal and so on for up to 15 cells.

### **3.2.6 DC Input**

The voltage monitor should be powered by a DC voltage between +10V and +30V. The COM 0V port should be connected to 0V.

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The voltage monitor circuit is independent from the battery charger system and the AC power. Voltage monitor can operate from the battery voltage.

The “normally open” contact is closed when the battery voltage, current and temperature is between the high and low settings.

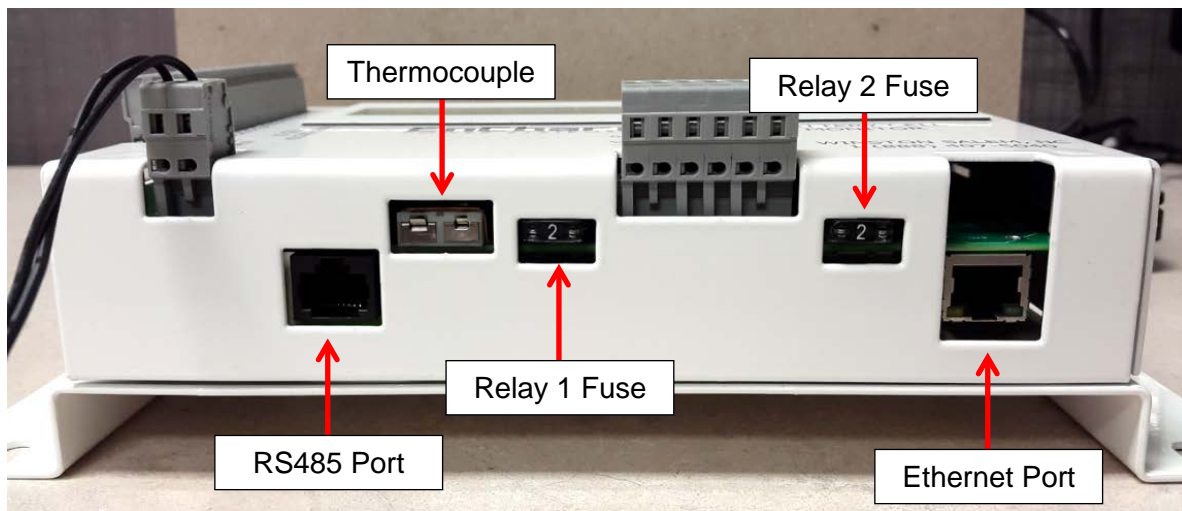
The relay is rated for 2 Amps at 60 VDC, or 2 Amps at resistive loads. The mechanical contact life is 5,000,000 operations. Minimum inductive life @ .5 Amps, 12vdc is 50,000 times.

The voltage monitor can be used for an alarm by connecting the coil of an indication relay to the normally open relay contact terminals on the battery charger, with power for the relay supplied by others.

The voltage monitor relay is protected with a 2 Amp, 32 VDC, fast acting mini fuse (use Littelfuse® part number 0297002 or equivalent).



### 3.3 Bottom Panel Features



**Figure 2. Bottom of Battery Cell Monitor**

#### 3.3.1 RS485 Port

The RS485 is connected to current coils for current sensing capability.

#### 3.3.2 Thermocouple Temperature Sensor

Plug type K thermocouple probe into the thermocouple port. The probe end can be placed between battery cells to accurately monitor battery temperature.

#### 3.3.3 Relay 1 Fuse

Relay 1 is protected with a 2 Amp, 32 VDC, fast acting mini fuse (use Littelfuse® part number 0297002 or equivalent).

#### 3.3.4 Relay 2 Fuse

Relay 2 is protected with a 2 Amp, 32 VDC, fast acting mini fuse (use Littelfuse® part number 0297002 or equivalent).

#### 3.3.5 Ethernet

This RJ45 Ethernet connection is used for accessing the monitor, either via its internal webpage or via the Remote Monitoring Server.

## 4 OPERATION

### 4.1 Front Panel Display and Push Button Controls

The front panel has OLED display, status LED display and four control buttons. The OLED display will auto dim after several minutes of inactivity. Once a button is pressed the display will return to full brightness.

**SET-UP AND ADJUSTMENTS:** To change settings do the following:



**Figure 3. Push Button Controls**

#### **MODE LEFT/MODE RIGHT**

Pushing the **MODE UP** or **MODE DOWN** push button will cycle up or down through the menus. Each time you press one of the **MODE** buttons, you will advance one menu selection.

#### **VALUE INCREASE/VALUE DECREASE**

The **VALUES INCREASE** and **DECREASE** push button allows you to change the displayed values. NOTE: Values that are changed will be saved after 15 minutes, or when you return to the status screen.

## 5 INSTALLATION

### 5.1 Mounting

#### 5.1.1 Wall Mount

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

### 5.2 External Wiring Connector

On the left of the front panel there is a sixteen position socket with a removable connector for external wiring. Connect the negative of the first cell to the 0 pin, then connect the positive of the first cell to pin 1, connect the positive second cell to pin 2, connect the positive third cell to pin 3 and so on.

### 5.3 Setup

Setup the monitor according to section 6 of this manual.

### 5.4 Input Power Connections

1. Connect AC/DC power adaptor to 110V AC power.
2. Apply DC power to the monitor.

### 5.5 Temperature Sensor Input

The Temperature Sensor is a Type K thermocouple wire. Plug the probe into the thermocouple port and place the other end on the battery.

### 5.6 Voltage Monitor Relay

Wire size should be minimum 18GA, maximum 16GA. This is a Form C dry contact relay with a Normally Open and Normally Closed set of contact.

## 6 BASIC SETUP PROCEDURE

To initially set up the charger, use the **INCREASE/DECREASE** buttons to move between **MENUS**, the **MODE** buttons to navigate between screens, and **INCREASE/DECREASE** buttons to change parameter values.

Go to the **SET POINTS** menu.  
Set the **PASSWORD** to **5**.  
Leave **USER LEVEL** at **BASIC**.  
Select **BATTERY TYPE** (**LEAD ACID** or **NI-CAD**)  
Set **NUMBER OF CELLS** per your battery bank.  
Set **VOLTS PER CELL** to battery manufacturers specs.

The battery cell monitor should be ready to operate.

P/N 520920-12V	REV. D	© 2016 RAILWAY EQUIPMENT Co.	PAGE 7
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## 7 MENU CONTROL AND ADJUSTMENTS:

### Controller Menu

The controller has 5 Menu Screens:

1. **STATUS**
2. **FAULT HISTORY**
3. **SET POINTS**
4. **FACTORY DEFAULTS**
5. **CELL MONITOR**

#### Menu Screen Selection:

To select the desired Menu Screen, press the **MODE LEFT** or **RIGHT** button until \*\*\*\***MENU SELECT** \*\*\*\* is displayed, on line 1, and then use the **INCREASE** or **DECREASE** Value button to select the appropriate menu. Once the appropriate menu is selected, use the **MODE LEFT** or **RIGHT** buttons to view the contents of the menu.

**NOTE:** Use the Increase or Decrease buttons to change set point values.

### 7.1 STATUS

The STATUS Screen can display **BASIC** or **ADVANCED** information based on what the **USER LEVEL** is set to.

#### 7.1.1 BASIC

**Battery Cell VOLTAGE** – Displays the voltage of each cell

**TC TEMP** – Displays the temperature measured by **Thermocouple** if a temperature probe is installed. If there isn't a temperature probe installed, this field will be blank.

**Total Voltage** – Displays the total voltage of the battery

#### 7.1.2 Additional features under **ADVANCED** mode

**TOTAL OUTPUT POWER** – This displays the total output power provided over time.

**RESETTABLE OUTPUT POWER** – This is a resettable display of output power utilized over time. To reset this meter to zero, press the **DECREASE** button.

**TOTAL HOUR METER** – This displays the total hours this battery monitor has been operating.

**RESETTABLE HOUR METER** – This displays the total hours this battery monitor has been operating since this counter has been reset. To reset this counter to zero, press the **DECREASE** button.

**CIRCUIT BOARD TEMP** – This displays the temperature of internal circuit board.

## **7.2 FAULT HISTORY MENU**

NOTE: Some faults may not show in Fault History until there is an actual fault. Press the decrease or increase button to reset the fault count.

### **7.2.1 BASIC**

**HIGH VOLTAGE FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a high voltage fault.

**LOW VOLTAGE FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a low voltage fault.

**HIGH CURRENT FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a high current fault.

**LOW CURRENT FAULT COUNTER** – Shows the number of times the battery monitor relay has cycled due to a low current fault.

**CHARGER OVER TEMP WARNING COUNTER** – Shows the number of instances a charger over temperature warning has occurred.

**CHARGER OVER TEMP FAULT COUNTER** – Shows the number of times that a charger over temperature fault has occurred.

**BATTERY OVER TEMP WARNING COUNTER** – Shows the number of instances a battery over temperature warning has occurred.

**BATTERY OVER TEMP FAULT COUNTER** – Shows the number of times that a battery over temperature fault has occurred.

### **7.2.2 ADDITIONAL FEATURES UNDER ADVANCED MODE**

**OUTPUT RELAY/EQ RELAY** – Shows the number of times the battery monitor's relay has cycled, and the number of times entering equalization.

**POWER UP COUNTER** – Shows the number of times the battery monitor input power was turned on.

**DAYS COUNTER** – Shows the total number of days the battery monitor has been operating.

**TOTAL SECOND COUNTER** – Shows the total number of seconds the battery monitor has been operating.

### 7.3 SETPOINTS MENU

Under the **SET POINTS** menu, the user defined variables are entered. The parameter screens are:

**PASSWORD** – To change any user defined parameter, use the increase button to enter the password of **5**. To prevent others from changing parameters, return the password to **0** after making changes. **Note:** If the password is left at **5**, it will automatically reset to **0** after ten minutes.

**USER LEVEL** (Requires password)

The options are **BASIC** and **ADVANCED**.

**BASIC** - Access to the basic menu options

**ADVANCED** – Access to the advanced menu options

#### 7.3.1 BASIC SET POINTS

**BATTERY TYPE** – The options are **GENERIC LEAD ACID**, **GENERIC NI-CAD**.

**GENERIC LEAD ACID** – The type of battery being used is Lead Acid.

**GENERIC NI-CAD** –The type of battery being used is Ni-Cad.

**Note:** Also included are presets for several specific brands such as **GNB Absolyte** and **SAFT SPL NI-CAD**.

**NUMBER OF CELLS** –

**LEAD ACID** - 1-15 cells are useable.

**VOLTS PER CELL\TOTAL VOLTS** –

**LEAD ACID** – The values range from **6-14VDC**.

**HIGH VOLTAGE FAULT** – This adjustment is for setting the voltage level when the voltage monitor relay toggles for an over voltage fault.

**LOW VOLTAGE FAULT** – This is used to set the voltage below which the voltage monitor relay changes state. As an example, it could be set for 10% below the normal battery output voltage, to trigger an alert before the voltage dropped to a point where it would no longer operate the equipment it was attached to.

#### 7.3.2 ADVANCED SET POINTS

**HIGH CURRENT FAULT** – The parameter is the high amperage setting. The voltage monitor relay will toggle if the current is higher than the selected current.

**LOW CURRENT FAULT** – The voltage monitor relay will toggle if the current is lower than the selected current. This should be set lower than the expected lowest current output, as when the batteries are fully charged and no equipment is running.

**HIGH BATTERY TEMP** – This setting allows the user to set the temperature that will trigger a high battery temperature fault. If a high battery temperature fault occurs, the voltage monitor relay will toggle.

**LOW BATTERY TEMP** – This setting allows the user to set the temperature that will trigger a low battery temperature fault. If a low battery temperature fault occurs, the voltage monitor relay will toggle.

**SELECT F OR C** – This is used to choose the temperature units of measure. The choices are F for Fahrenheit and C for Celsius.

**MY IP ADDRESS** – Shows the chargers IP address. (DHCP is enabled by default)

**PROG REV & DATE** – This displays the firmware revision level and the date that revision was released.

## 7.4 FACTORY DEFAULTS

**FOR FACTORY DEFULTS PRESS DECREASE** – This is to allow the user to return most settings to the original factory settings by pressing the **DECREASE** button. A password of **5** is required to change this setting.

## 7.5 CELL MONITOR

**BATTERY AMP HOURS SIZE** – Shows the amount of maximum power stored in the battery in terms of current fully supplied in an hour.

# 8 HOSTED WEB PAGE

Settings can be changed from the hosted web page as well as from the push buttons and display on the front of the charger.

## 8.1 Login

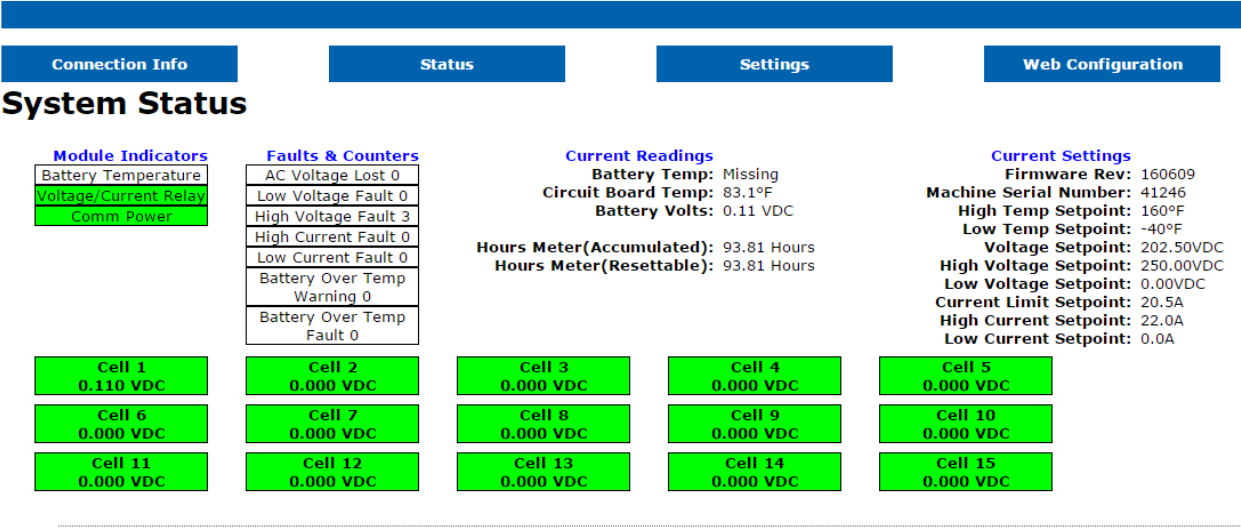
To login, look up the IP address under the **SET POINTS - MY IP ADDRESS (SECTION 7.3.1 of this manual)**, and enter it in to your browser. The format should look like this <http://192.168.4.99:50000>. Make sure to add the port number of **:xxxxx** after the IP address.

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

## 8.2 Status page

Show the status of the battery cell monitor.

RECo



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Figure 4. System Status



### 8.3 Settings

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

#### Monitor Settings

This page allows the configuration of the board's internal settings.  
Enter the new settings for the board below:

<b>Password:</b>	5
<b>Machine Serial Number:</b>	41246
<b>Battery Type:</b>	Lead Acid ▼
<b>Number of Cells:</b>	8
<b>Volts Per Cell:</b>	2.000 Volts
	**Total Voltage(16.00)**
<b>Temperature Compensation:</b>	Off ▼
<b>Update Interval:</b>	5 Min
<b>Total Second Counter:</b>	
	**Currently(2920 Thu Jan 1 00:48:40 1970 GMT)**
<b>High Battery Temp Setpoint:</b>	160 F
<b>Low Battery Temp Setpoint:</b>	-40 F
<b>High Voltage Setpoint:</b>	250.00 Volts
<b>Low Voltage Setpoint:</b>	0.00 Volts
<b>Voltage Cal 1:</b>	133.13
	**Currently(0.11)**
<b>Hours Meter(Accumulated):</b>	97.11 Hours
<b>Hours Meter(Resettable):</b>	97.11 Hours
<b>Cell Volt Deviation At Dis/Recharge:</b>	65.535 Volts
<b>Cell Volt Deviation At Float:</b>	65.535 Volts
<b>High Ripple Setpoint:</b>	N/A Volts
<b>Battery AMP Hour Size:</b>	2500 AH
<b>Cell Temp Deviation Setpoint:</b>	10.0 F
<b>Cell Voltage Warning Timer Setpoint:</b>	1 SEC
	**Currently(0)**
<b>Cell Fault Reset Timer Setpoint:</b>	0 SEC
	**Currently(0)**
<b>Timer Fault Threshold:</b>	65535 SEC
<b>Current For Profile Start:</b>	-0.1 Amps
<b>Profile Window Time:</b>	2550.0 SEC
<b>Switch Temp Comp:</b>	255 %
<b>Profile Send Delay:</b>	255.0 SEC
<b>Check box to clear counters:</b>	

**Figure 5. Monitor Settings**

## 9 SPECIFICATIONS

**Table 4. General Specifications**

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

**Table 5. Model Specifications**

Model Name	Cells	Length x Width x Height	Ship Weight
Battery Cell Monitor	1–15 Lead Acid	10.75 x 5.375 x 2.5 inches	3 LB
		27.30 x 13.65 x 6.35 cm	1.3 KG