

CRAGG
RAILCHARGER™
Instruction Manual for
10DTC-12V
20DTC-12V
30DTC-24V
40DTC-12V
60DTC-12V



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1 WARNINGS, CAUTIONS, AND NOTES

Please read the entire instruction manual before using the battery charger.

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. |
|  | Hook up all DC connections before energizing the AC power, if the red led is on or the DC fuse blows you have hooked up the DC connections incorrectly. |

2 DESCRIPTION

The DTC charger has an input voltage range of **115/230VAC**, with a DC output voltage of 7 - 18.8VDC or 24 to 42.5VDC, depending on the model. Depending on the model, the DC output current ranges from 10A to 60A. The DTC has a operating temperature range of -40°F to +158°F (-40°C to +70°C) allowing it to work effectively in a wide temperature range.

The DTC also has a Temperature Compensation feature. Using the included thermocouple wire, the charger can adjust the DC Output based on the temperature of the battery, there by extending the life of the battery and adhering to the manufacturer's specifications. Contact Railway if you need a longer thermocouple wire.

A remote voltage sense capability is used to compensate for voltage drop across wires between the charger and the battery.

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

- Fully Automatic Charging
- Convection Cooled
- For use with Lead Acid and NiCad Batteries
- Temperature Compensation with Controlled Limits
- Adjustable Current Limit
- Battery Voltage Monitor with Relay Output
- Remote or Local Battery Voltage Sensing
- Equalization Feature to Extend Battery Life
- AAR/AREMA Terminals
- AC & DC Circuit Transient Protection
- Meets or Exceeds AAR/AREMA Specifications
- Rack Mounting Kit Available
- AC Input 115/230VAC 50, 60 Hz
- Operating Temperature -40° to +70° C (-40° to +158° F)
- Ethernet and USB Ports for Monitoring and Configuration.
- ±1% Voltage Regulation
- <1 Volt Peak to Peak Output Ripple
- 2-Year Warranty

3.2 Charger Regulation

The charger will regulate output voltage to less than ± 1 percent from full load to no load with a supply voltage of 115/230VAC. The output ripple is less than 1V at any load.

3.3 Top Panel Features and Components

This section describes the features and components that are on the front panel of the battery charger (see Figure 1).

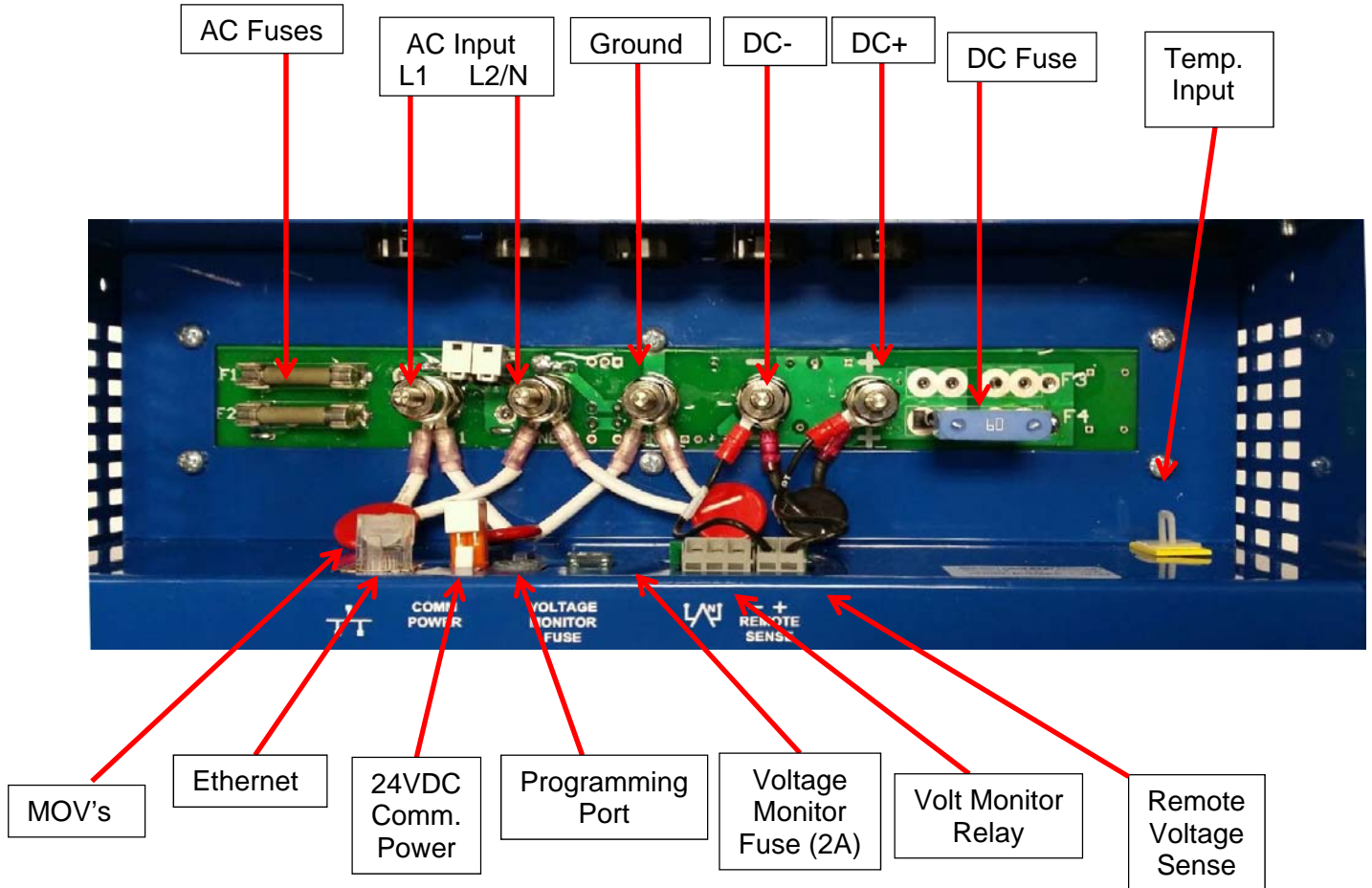


Figure 1. Top of Battery Charger (Model 40DTC-12V)

3.3.1 MOV's

MOV's are used to protect the charger from voltage spikes. There are three used on the AC Input terminal posts before the fuse, L1 – L2/N, L1 – GND and L2/N to Ground.

3.3.2 AC Terminal posts

These terminal posts are labeled **LINE 1**, **LINE 2** and **GND**.

3.3.3 DC Terminal posts

The DC Output terminal posts are labeled **-** and **+**.



CAUTION: Be sure to observe correct polarity on battery and remote sense connections.

3.3.4 AC Fuses

The AC input fuses are labeled **F1 and F2**. These should be replaced with MDA, 250 Volt, slow blow fuses (use Cooper Bussman® part number BK/MDA-xx or equivalent).

Table 2. AC Fuse Ratings

| Model Number | MDA Fuse Rating |
|---------------------|------------------------|
| 10DTC-12V | 6 Amp |
| 20DTC-12V | 6 Amp |
| 30DTC-24V | 15 Amp |
| 40DTC-12V | 15 Amp |
| 60DTC-12V | 15 Amp |

3.3.5 DC Output Fuse

The DC output fuses are labeled **F3 and F4**. They protect the customer load and battery charger from malfunctioning. This is a MAXI, 32 Volt, slow blow fuse (use Littelfuse® or equivalent).

Table 3. DC Fuse Ratings

| Model Number | MAXI Fuse Rating |
|---------------------|-------------------------|
| 10DTC-12V | 15 Amp |
| 20DTC-12V | 30 Amp |
| 30DTC-24V | 50 Amp |
| 40DTC-12V | 60 Amp |
| 60DTC-12V | 50 Amp x 2 |

3.3.6 Voltage Monitor Fuse

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

3.3.7 Remote Voltage Sense

It is recommended that two separate wires be connected from the battery terminals to the remote voltage sensor input terminals on the charger. If the batteries to be charged

are located more than 12 feet from the charger, there will be significant voltage drop through the wires.

3.3.8 Ethernet

This RJ45 Ethernet connection is used for accessing the charger, either via its internal webpage or via Sno-NET®. See section **8.4** and **9**, of this manual for more information on configuration.

3.3.9 Comm Power

The Comm Power provides a Form C normally closed dry contact which can be used to cycle power to communications equipment. If the charger detects it hasn't communicated to Sno-NET® in a predetermined amount of time, it will toggle this contact.

3.3.10 Programming Port

This is for manufacturers use only.

3.3.11 Voltage Monitor 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, and operates 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).

3.3.12 Temperature Input

The temperature input provides the input for the remote temperature sensor cable assembly. This is used in conjunction with the Temperature Compensation Rate. By default Temperature Compensation is disabled, to enable, see **8.1.1 Basic Set Points**.

When the temperature sensor is connected and Temperature Compensation is enabled, the battery charger will adjust the output voltage up or down depending on the temperature of the batteries and the Temperature Compensation Rate (see **Table 4**.)

Table 4 defines the temperature compensation rate when the battery charger adjusts the output voltage. If the remote temperature sensor is not used, the temperature compensation function will be fixed at 77°F.

Table 4. Temperature Compensation Rate

| Battery Type | Compensation Mode | Compensation Slope | Low Temp Limit | High Temp Limit |
|--------------|-------------------|--------------------|------------------------|-------------------------|
| Lead Acid | 50% V/T | 1.47mV/°F/cell | 2.35 volts/cell@ +3°F | 2.20 volts/cell@ +116°F |
| Lead Acid | 100% V/T | 3.0mV/°F/cell | 2.35 volts/cell@ +37°F | 2.20 volts/cell@ +95°F |
| Ni-Cad | 50% V/T | 0.967mV/°F/cell | No Limit | No Limit |
| Ni-Cad | 100% V/T | 1.94mV/°F/cell | No Limit | No Limit |

3.4 Front Panel Features

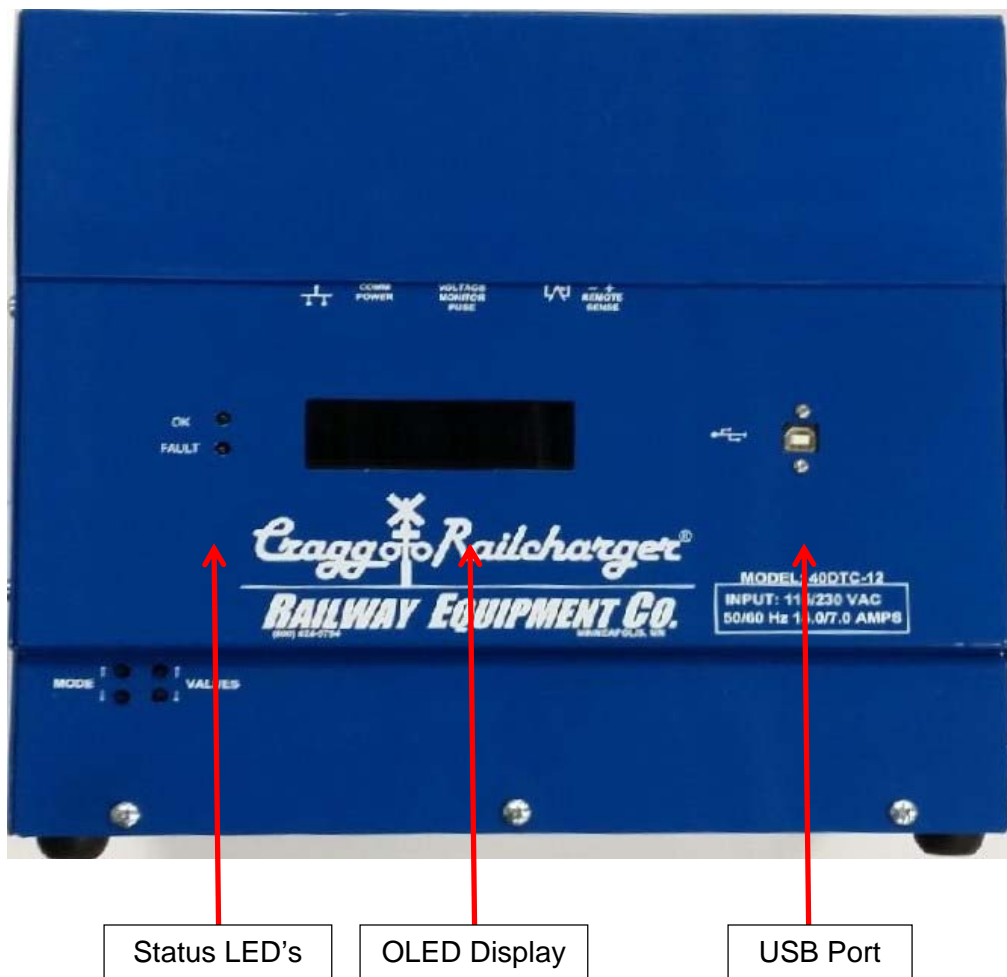


Figure 2. Front of Battery Charger (Model 40DTC-12V).

3.4.1 USB Port

The USB port is located on the front of the charger. It is used to access basic information and to configure the charger. An installable application is required and must be obtained from Railway Equipment Company. For more information see section 10 of this manual. A USB Type A male to Type B male cable is required.

3.4.2 Display

The display is a long life OLED display. It automatically dims after inactivity to extend the life of the display.

3.4.3 OK LED

The OK LED is on when the DC Output Voltage is within the **HIGH VOLTAGE FAULT** and **LOW VOLTAGE FAULT** settings (see section 8.1.1 for configuration).

Table 5. OK LED States

| Description | OK LED (Green) |
|--------------------------|----------------|
| DC Output Voltage OK | ON |
| DC Output Voltage not OK | OFF |

3.4.4 FAULT LED

The FAULT LED has three different states, OFF, ON and FLASH. These are described in the table below.

Table 6. FAULT LED States

| Description | FAULT LED (Red) |
|---------------------------------------|-----------------|
| No Fault | OFF |
| Battery Temperature Fault | ON |
| DC Output Current Fault | ON |
| DC Output Voltage Fault | ON |
| Temp Comp On, No Temp Probe Connected | ON |
| AC Power Lost | FLASH |
| DC Output Fuse Blown | FLASH |
| DC Output Reverse Polarity | FLASH |

4 OPERATION

4.1 Front Panel Display and Push Button Controls

The front panel has a digital display and four control buttons. The 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 UP Push Button

Pushing the **MODE UP** push button will cycle up through the menus. Each time you press the **MODE UP** push button you will advance one menu selection.

MODE DOWN Push Button

Pushing the **MODE DOWN** push button will cycle down through the menus. Each time you press the **MODE DOWN** push button you will move down one menu selection.

VALUES INCREASE

The **VALUES INCREASE** push button allows you to increase the displayed values.

NOTE: Values will be saved after 15 minutes or when you return to the status screen.

VALUES DECREASE

The **VALUES DECREASE** push button allows you to decrease the displayed values.

NOTE: Values will be saved after 15 minutes or when you return to the status screen.

5 INSTALLATION



Warning: Before connecting power to the battery charger, make sure AC power is turned off. Connect AC power to the battery charger per label below the terminal posts.

5.1 Mounting

5.1.1 Shelf Mount

The charger is designed to allow enough air flow through the bottom of the charger when it is set on a shelf.

5.1.2 Wall Mount

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

5.1.3 Rack Mount

Optional Rack Mount brackets are available for purchase. These attached to the sides of the charger and allow for mounting at various different depths.

20DTC -P/N 31084708

30/40/60DTC - P/N31084709

5.2 Output Connections



CAUTION: WHEN CONNECTING WIRES FROM THE BATTERY TERMINALS TO THE CHARGER, VERIFY THE VOLTAGE POLARITY.

1. Connect the wires that will go between the battery and the DC Out terminal posts labeled – and +.
2. Connect those wires to the battery posts. The charger should now power up from the battery.

5.3 Setup

1. Setup the charger according to section 6 of this manual.

5.4 Input Connections

1. Connect the AC wires to the AC Input terminal posts. These terminal posts are labeled **LINE 1**, **LINE 2/NUETRAL** and **GND**.
2. Apply AC power to the charger.

5.5 Temperature Sensor Input

The Temperature Sensor is a Type K thermocouple wire. Plug the connector end into the temperature input on the Charger, and the other end can be placed between the individual cells of the battery bank.

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 contacts.

5.7 Remote Voltage Sense

This is done by removing the two pre-installed jumper wires from the remote voltage sense terminals and the DC output terminals and replacing them with wires from the battery terminals to the remote voltage sense terminals. If the remote voltage sensing function is not used, leave the two jumpers from remote voltage sense terminals to the DC output terminals connected.



CAUTION: WHEN CONNECTING WIRES FROM THE BATTERY TERMINALS TO THE CHARGER, VERIFY THE VOLTAGE POLARITY.

1. Disconnect the two jumper wires from the remote voltage sense terminals inside the wire terminal area and the DC battery output terminals.

NOTE: Before connecting the two wires to the battery terminals, make sure that the polarity is correct to avoid other equipment damage and prevent personnel injury.

2. Using minimum 18GA, maximum 16GA wire, connect two wires to the remote voltage sensing input terminals using a WAGO 210-719 terminal block operating tool on the terminal insertion tabs.
3. Ensuring proper polarity, connect the two wires to the battery terminals.

6 BASIC SETUP PROCEDURE

1. Use the **MODE** and **VALUES** buttons to navigate to the “**SET POINTS**” Screen.
2. Press the **MODE UP** button to display the “**PASSWORD**” Screen.
3. Enter a **PASSWORD** of **5** using the **VALUES UP** button.
4. Press the **MODE UP** button to go to the “**USER LEVEL**” Screen.
5. Select Basic for a user level using the **VALUES UP\DOWN** buttons.
6. Press the **MODE UP** button to go to the “**BATTERY TYPE**” Screen.
7. Select the Battery Type by using the **VALUES UP\DOWN** buttons.
8. Use the **MODE UP** button to go to the “**NUMBER OF CELLS**” Screen.
9. Select the number of cells using the **VALUES UP\DOWN**.
10. Use the **MODE UP** button to go to the “**VOLTS PER CELL**” Screen.
11. Select the voltage per cell using the **VALUES UP\DOWN**.
12. Use the **MODE UP** button to go to the “**TEMPERATURE COMPENSATION**” Screen.
13. Select the either **ON** or **OFF** using the **VALUES UP\DOWN**.
14. Use the **MODE UP** button to go to the “**CURRENT SETPOINT**” Screen.
15. Select the maximum output current by using the **VALUES UP\DOWN**.
16. Use the **MODE UP** button to go to the “**HIGH VOLTAGE FAULT SETPOINT**” Screen.
17. Select the voltage by using the **VALUES UP\DOWN**.
18. Use the **MODE UP** button to go to the “**LOW VOLTAGE FAULT SETPOINT**” Screen.
19. Select the voltage by using the **VALUES UP\DOWN**.
20. Use the **MODE UP** and **VALUES** buttons to go back to the “**STATUS**” Screen.
21. Press the **MODE UP** button to now display the Voltage, Current and Temperature Screen. This will save the settings that were just entered.

7 SPECIFICATIONS

Table 7. General Specifications

| Description | Specification | |
|--|---|----------------|
| Input Voltage | 115/230VAC 50, 60 Hz | |
| Voltage Regulation | ± 1% | |
| Voltage Ripple | < 1 volt ripple, peak to peak at maximum output current | |
| Operating Temperature (0-95% non-condensing humidity) | -40°F to +158°F | -40°C to +70°C |

Table 8. Model Specifications

| Model No. | Cells | 115VAC Amps | 230VAC Amps | Output Amps | Output Volts | Width x Height x Depth | Ship Weight |
|-----------|--------------------------------------|----------------|----------------|----------------|------------------------|---------------------------------|-------------|
| 10DTC-12V | 5-8 Lead Acid 5-12 NiCad | 4.2 Amps | 2.1 Amps | 10 Amps | 7 to 18.8 Volts | 12.00 x 10.12 x 8.75 inches | 40 lbs. |
| | | | | | | 30.5 x 25.7 x 22.2 cm | 18.1 kg |
| 20DTC-12V | 5-8 Lead Acid 5-12 NiCad | 8.0 Amps | 4.0 Amps | 20 Amps | 7 to 18.8 Volts | 12.00 x 10.12 x 8.75 inches | 40 lbs. |
| | | | | | | 30.5 x 25.7 x 22.2 cm | 18.1 kg |
| 40DTC-12V | 5-8 Lead Acid 5-12 NiCad | 14 Amps | 7.0 Amps | 40 Amps | 7 to 18.8 Volts | 13.00 x 13.75 x 11.75 inches | 52 lbs. |
| | | | | | | 33.0 x 34.9 x 29.8 cm | 23.6 kg |
| 60DTC-12V | 5-8 Lead Acid 5-12 NiCad | 18 Amps | 9.0 Amps | 60 Amps | 7 to 18.8 Volts | 13.00 x 13.75 x 11.75 inches | 74 lbs. |
| | | | | | | 33.0 x 34.9 x 29.8 cm | 33.6 kg |
| 30DTC-24V | 11-18 Lead Acid 19-26 NiCad | 20Amps | 10 Amps | 30 Amps | 24 to 42.5 Volts | 13.00 x 13.75 x 11.75 inches | 63 lbs. |
| | | | | | | 33.0 x 34.9 x 29.8 cm | 28.6 kg |

8 USER MENUS

The controller has 4 Menu Screens:

1. **STATUS**
2. **FAULT HISTORY**
3. **SET POINTS**
4. **FACTORY DEFAULTS**
5. **ETHERNET SETTINGS** (Available when a password of **85** is used)

Menu Screen Selection:

To select the desired Menu Screen, press the **MODE UP** or **DOWN** 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 UP** or **DOWN** buttons to view the contents of the menu.

8.1 SET POINTS

NOTE: Use the Increase or Decrease Values button to change set point values.

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

USER LEVEL – The options are **BASIC** and **ADVANCED**.

The **BASIC** user level allows any user to edit and display the minimal necessary menus and settings. The **ADVANCED** user level allows the user to display advanced menus and edit settings.

8.1.1 BASIC SET POINTS

PASSWORD – To change any parameter screen, 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.

BATTERY TYPE – The options are **GENERIC LEAD ACID**, **GENERIC NI-CAD**. Also included are presets for several specific brands, **GNB Absolyte** and **SAFT SPL NI-CAD**.

NUMBER OF CELLS – For **NI-CAD**, **5-12** cells are selectable, for **LEAD ACID** its **5-8** cells. This is used to adjust the **TOTAL VOLTS** on the next screen.

VOLTS PER CELL\TOTAL VOLTS – For **NI-CAD** the values range from **1.2-1.6VDC**, for **LEAD ACID** it is **2-2.45VDC**. For **GNB Absolyte** and **SAFT SPL NI-CAD** this value is fixed base on the manufacturers spec. **TOTAL VOLTS** is a calculation of **NUMBER OF CELLS x VOLTS PER CELL**.

TEMPERATURE COMPENSATION – By default this is disabled, otherwise it can be enabled from this screen. Selecting a brand of battery (GNB, SAFT, etc.) from the “**BATTERY TYPE**” menu may enable this feature if that is the manufacturer’s suggested

use. See **TABLE 4** for Temperature Compensation rates.

CURRENT SET POINT – This is utilized to adjust the maximum output current limit.

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.

8.1.2 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 is for setting the temperature you wish to trigger a high battery temperature fault. If a high battery temperature fault occurs, the voltage monitor relay will toggle.

LOW BATTERY TEMP – This is for setting the temperature you wish to 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.

CHARGER OVER TEMP PROTECTION – This cannot be disabled without calling tech support at (763-972-2200). When enabled, if the temperature of the battery charger becomes critical, it automatically decreases the output current limit so to reduce the potential of failure from overheating.

BATTERY OVER TEMP PROTECTION – When enabled the charger will go to 50% of the set current output when the battery temp exceeds the **HIGH BATTERY TEMP** set point. If the battery temp exceeds the **HIGH BATTERY TEMP** set point by 10°F, then the charger will go to 0% output. The charger will go back to 100% output once the temperature has dropped 5°F below the **HIGH BATTERY TEMP** set point.

EQUALIZATION – This is used to enable or disable the equalization charge function. If enabled, the remaining screens will appear when the **MODE** button is pushed. If equalization is disabled, the following 4 Equalization screens are hidden from view.

EQ FREQUENCY IN DAYS (viewable if **EQUALIZATION** is enabled) – This is used to set the frequency at which equalization charge cycle will occur. It will increment in days.

EQUALIZATION RUN TIME IN xx HOURS (viewable if **EQUALIZATION** is enabled) – This sets the length of time the equalization charge cycle will run in hours. This can be set in 1 hour increments from 1 to 24.

EQUALIZATION VOLTAGE SETPOINT (viewable if **EQUALIZATION** is enabled) – Set the voltage that you want the charger to produce for the equalization charge cycle.

PRESS INCREASE TO RUN EQUALIZATION (viewable if **EQUALIZATION** is enabled) – By pressing the **INCREASE** button, the equalization cycle will begin.

AC VOLTAGE TYPE – used for displaying what voltage the charger is setup for. This does not affect the performance of the charger.

MY IP ADDRESS – Shows the chargers IP address.

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

8.2 STATUS

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

8.2.1 BASIC

DC OUTPUT VOLTAGE

DC OUTPUT CURRENT

TEMP COMP AND BATTERY TEMP – displays whether or not **TEMPERATURE COMPENSATION** is enabled or disabled, and displays the temperature of the batteries if a temperature probe is installed. If there isn't a temperature probe installed, this field will be blank.

8.2.2 ADVANCED

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.

OUTPUT WATTS – This displays the real time output power.

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

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

AC VOLTAGE and **AC CURRENT** – displays the voltage that the charger is set up for, and also displays the current being used by the charger.

AC FREQUENCY – This displays the input AC line frequency.

POSITIVE CABLE RESISTANCE – This displays the resistance of the DC + cable between the charger and the battery.

NEGATIVE CABLE RESISTANCE – This displays the resistance of the DC - cable between the charger and the battery.

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

8.3 FAULT HISTORY

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

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

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

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

HIGH VOLTAGE FAULT COUNTER – Shows the number of times the battery charger voltage's monitor relay has cycled do to a high voltage fault.

LOW VOLTAGE FAULT COUNTER – Shows the number of times the battery charger voltage's monitor relay has cycled do to a low voltage fault.

HIGH CURRENT FAULT COUNTER – Shows the number of times the battery charger voltage's monitor relay has cycled do to a high current fault.

LOW CURRENT FAULT COUNTER – Shows the number of times the battery charger voltage's monitor relay has cycled do to a low current fault.

CHARGER OVER TEMP WARNING COUNTER – Show 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 – Show 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.

AC POWER LOST COUNTER – Shows the number of occasions that the AC line voltage was lost (with the charger connected to a battery).

8.4 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.

8.5 ETHERNET SETTINGS

These can be configured by entering a password of **85** in the **SET POINTS** screen.

WEB SERVER ADDRESS – Sno-NET® servers IP address, default of 208.42.179.9

DHCP IS ENABLED\DISABLED – if DHCP is enabled and a router is being used, the charger will obtain an IP address from it. With DHCP disabled an IP address needs to be entered on the **MP IP ADDRESS** screen.

MY IP ADDRESS – if DHCP is enabled it will display the current IP address of the charger. If DHCP is disabled the IP address of the charger can be set on these screens.

MY MASK – display and configure the subnet mask.

MY GATEWAY – display and configure the gateway.

PRIMARYDNSSERVER – display and configure the Primary DNS Server.

SECOND DNSSERVER – display and configure the Secondary DNS Server.

WEB REMOTE PORT – default of 49152, this is the port needed to communicate to Sno-NET®.

WEB LOCAL PORT – if the charger is connected to a router, enter the port number of the router the charger is connected to.

9 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.

9.1 Login

To login, look up the IP address under the **SET POINTS - MY IP ADDRESS (SECTION 8.1.2)** of this manual), and enter it in to your browser. The format should look like this http://***.***.***.***:50000. Make sure to add the port number of :50000 after the IP address.

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

9.2 Status page

Show the status of the battery charger.

RECo

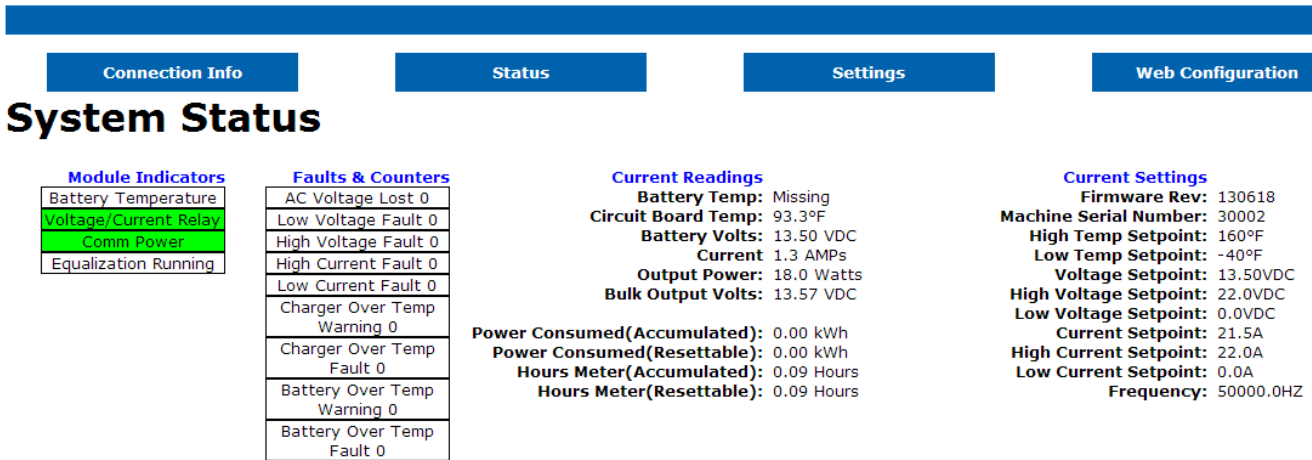


Figure 4. System Status

9.3 Settings

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

RECo



Monitor Settings

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

Enter the new settings for the board below:

| | |
|-----------------------------|--|
| Password: | <input type="text" value="0"/> |
| Machine Serial Number: | <input type="text" value="30002"/> |
| Charger Type: | <input type="text" value="12VDC/20AMP"/> |
| Battery Type: | <input type="text" value="Lead Acid"/> |
| Number of Cells: | <input type="text" value="6"/> |
| Volts Per Cell: | <input type="text" value="2.250"/> Volts ***Total Voltage(13.50)*** |
| Temperature Compensation: | <input type="text" value="Off"/> |
| Current Setpoint: | <input type="text" value="21.5"/> Amps |
| Update Interval: | <input type="text" value="5"/> Min |
| Total Second Counter: | <input type="text" value=""/> |
| | ***Currently(418)*** |
| High Battery Temp Setpoint: | <input type="text" value="160"/> |
| Low Battery Temp Setpoint: | <input type="text" value="-40"/> |
| High Voltage Setpoint: | <input type="text" value="22.0"/> Volts |
| Low Voltage Setpoint: | <input type="text" value="0.0"/> Volts |
| High Current Setpoint: | <input type="text" value="22.0"/> Amps |
| Low Current Setpoint: | <input type="text" value="0.0"/> Amps |
| Charger Frequency Setpoint: | <input type="text" value="50000.0"/> HZ |
| Equalization Frequency: | <input type="text" value="0.00"/> Days ***Currentlv(0.00)*** |

Figure 5. Monitor Settings

10 USB APP

The USB application allows configuration of the charger from a computer. An installable application is required and must be obtained from Railway Equipment Company. A USB Type A male to Type B male cable is required. The screenshots below show detailed images of the information that can be viewed and edited from each of the different tabs on the application.

10.1 Status Page

View the status of the charger, including temperatures, current, voltages, faults, etc.

The screenshot shows the 'RECo' application window titled 'Railway Equipment Co. Battery Charger USB Connection'. The 'Status' tab is selected, showing a 'Warning: last communication from unit was 74 seconds ago'. The interface is divided into several sections:

- Module Indicators:** Battery Temperature, Voltage/Current Relay, Comm Power, Equalization Running.
- Faults & Counters:** AC Voltage Lost 1, Low Voltage Fault 0, High Voltage Fault 0, HighCurrentFault 0, Low Current Fault 0, Charger Over Temp Warning 0, Charger Over Temp Fault 0, Battery Over Temp Warning 0, Battery Over Temp Fault 0.
- Current Readings:** Battery Temp: 72.1 °F, Circuit Board Temp: 101.0 °F, Battery Volts: 5.18 VDC, Current: 0.1 AMPs, Output Power: 0.4 Watts, Bulk Output Volts: 3.37 VDC, Bulk Input Volts: 9.91 VDC, AC Volts: 0.0 VAC, AC Current: 0.0 AMPs.
- Current Settings:** Firmware Rev: 130919, Machine Serial Number: 30002, High Temp Setpoint: 159.0 °F, Low Temp Setpoint: -40.0 °F, Voltage Setpoint: 13.50 VDC, High Voltage Setpoint: 25.0 VDC, Low Voltage Setpoint: 0.0 VDC, Current Setpoint: 21.5 A, High Current Setpoint: 20.0 A, Low Current Setpoint: 0.0 A, Frequency: 50000.0 Hz.
- Power and Hours:** Power Consumed (Accumulated): 0.69 kWh, Power Consumed (Resettable): 0.15 kWh, Hours Meter (Accumulated): 170.50 Hours, Hours Meter (Resettable): 170.50 Hours.

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Figure 6. Status Page

10.2 Connection Info Page

This page displays the IP configuration of the charger.

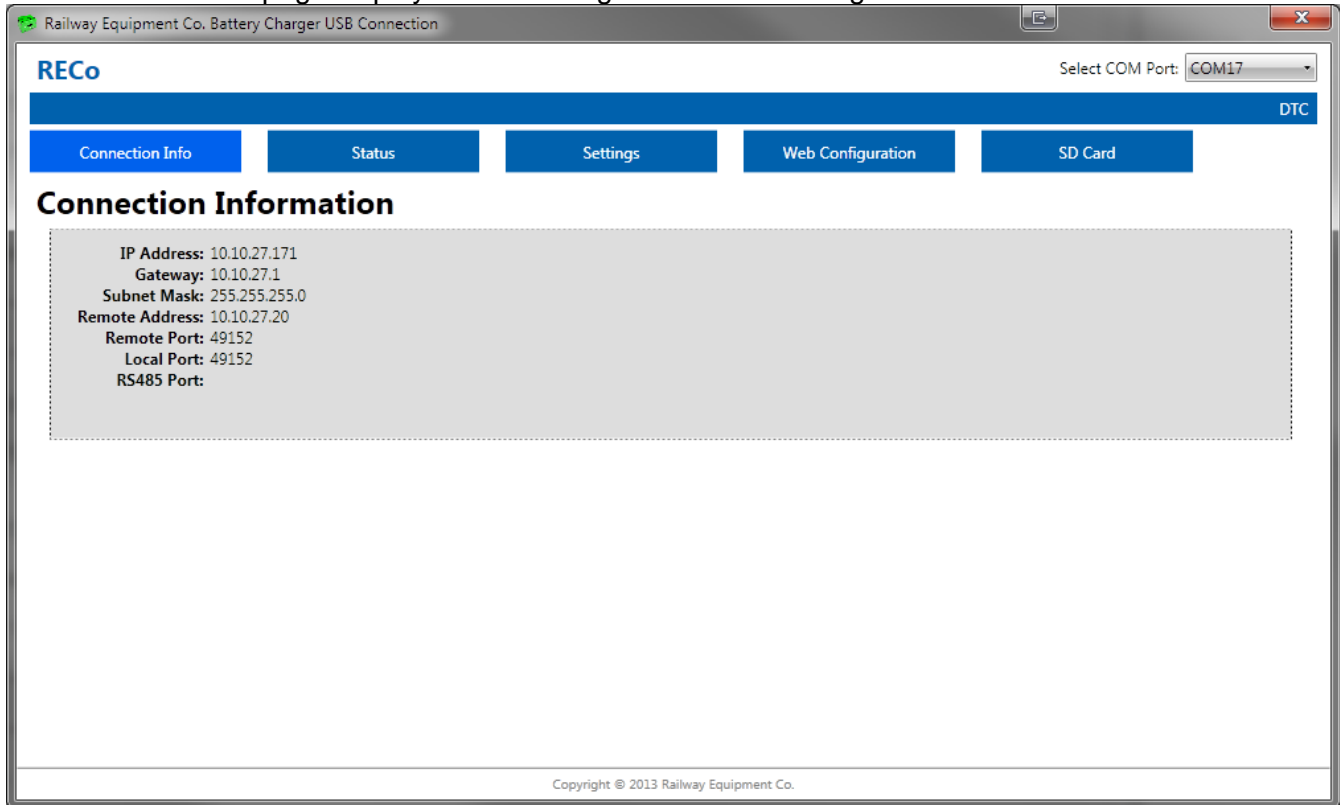


Figure 7. Connection Info Page

10.3 Web Configuration Page

This page allows you to edit the IP configuration of the charger.

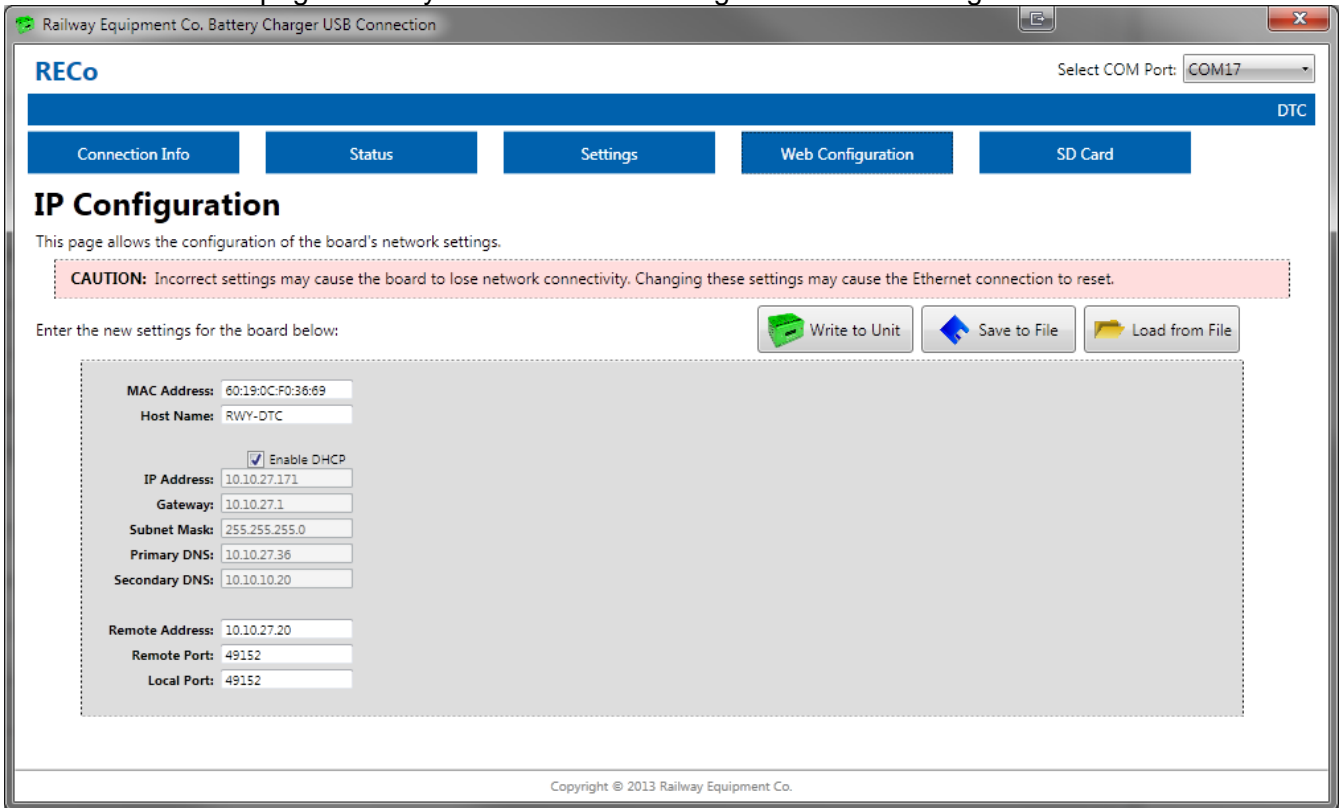


Figure 8. Web Configuration Page

10.4 Settings Page

This page allows you to edit the configuration of the charger.

The screenshot displays the 'Settings' page of the RECo DTC Battery Charger. The interface includes a navigation bar with 'Connection Info', 'Status', 'Settings', 'Web Configuration', and 'SD Card'. A 'Monitor Settings' section shows a warning: 'Warning: Last communication from unit was 80 seconds ago'. Below this, there are three buttons: 'Write to Unit', 'Save to File', and 'Load from File'. The main settings area is divided into three columns:

- Left Column:** Password (0), Machine Serial Number (30002), Charger Type (12VDC/20AMP), Battery Type (Lead Acid), Number of Cells (6), Volts per Cell (2.250), Temperature Compensation (Off), Current Setpoint (21.5), Update Interval (5), Total Second Counter (619036), High Battery Temp Setpoint (159), Low Battery Temp Setpoint (-40), High Voltage Setpoint (25.0), Low Voltage Setpoint (0.0), High Current Setpoint (20.0), Low Current Setpoint (0.0).
- Middle Column:** Charger Frequency Setpoint (50000.0 Hz), Equalization Frequency (0.00 Days), Equalization Voltage Setpoint (14.0 Volts), Equalization Run Time (60 Min), Voltage Cal 1 (133.19), Voltage Cal 2 (1979.51), PWM Voltage Cal (108.59), Current Cal (126.00), PWM Current Cal (29.73), Power Consumed (Accumulated) (0.69 kWh), Power Consumed (Resettable) (0.15 kWh), Hours Meter (Accumulated) (170.50 Hours).
- Right Column:** Check to clear counter, or to turn an option on/off: EE Write Counter (198), OClRS (-Unknown Counter), ADC Samples Per Second (263), Output Relay Counter (0), Equalization Enable (False), Equalization Relay Counter (0), *F Is Selected (True), Charger Over Temp Protection (True), Battery Over Temp Protection (True), ONE SECOND UPDATE (False), Power Up Counter (1), RCC Timer (6), Comm Reset Counter (8), Clear Fault Counters, Set Factory Default, Send EEPROM, Clear EEPROM, Reset Board.

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Figure 9. Settings Page