CRAGG RAILCHARGER™

Instruction Manual for

SMC Lite Battery Charger

Contents

List of Tables

1 WARNINGS, CAUTIONS, AND NOTES

Please read the entire instruction manual before using the SMC Lite.

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.**

WARNING: HIGH LEAKAGE CURRENT. EARTH CONNECTION IS ESSENTIAL BEFORE CONNECTING SUPPLY.

WARNING: Do not use this charger to recharge non-rechargeable batteries.

WARNING: Before connecting power to the battery charger, make sure AC power is turned off. Connect AC power to the battery charger per label above the WAGO terminal blocks.

WARNING: The appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

2 DESCRIPTION

The SMC Lite has an input voltage range of 115-230VAC, with a DC output voltage of 2.25-21.2VDC. The DC output current is 20A. The SMC Lite 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.

3 FEATURES

3.1 Standard Features

- Fully Automatic Charging
- Convection Cooled
- For use with Lead Acid and NiCad Batteries
- WAGO Terminals
- AC & DC Circuit Transient Protection
- Meets or Exceeds AREMA Specifications
- AC Input 115-230VAC 50, 60 Hz
- Operating Temperature -40°C to +70°C (-40°F to +158°F)
- ±0.4% + 30mV Voltage Regulation
- <100 mV Volt Peak to Peak Output Ripple
- 2-Year Warranty

3.2 Charger Regulation

The Charger will regulate output voltage to ±0.4% + 30mV from full load to no load with a supply voltage of 115-230VAC. The output ripple is less than 100mV at any load.
The Charger regulates current if the output voltage is less than the setpoint and will work down to 0V output.

3.3 Front of SMC Lite

3.3.1 Indication Light

The indication light is used to tell if the SMC Lite is functioning properly or if it is in fault.

Table 2: Indication LED

Description	Color
System has no fault	Green
System is in current limit	Green/Yellow
System is in fault	Red/Yellow

4 SMC LITE 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 above the WAGO terminal blocks.

WARNING: The appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

WARNING: Do not use this charger to recharge non-rechargeable batteries.

4.1 Input Connections

Use the AC terminal block to connect AC power to the SMC Lite. Use a 115-230V input source.

1. Connect the AC wires to the AC Input WAGO terminal block. The AC terminal block is labeled LINE 1, LINE 2/NEUTRAL, and GND.

2. Apply AC power to the SMC Lite.

4.2 Output Connections

WARNING: Batteries being used with this charger should be placed in a well ventilated area during charging.

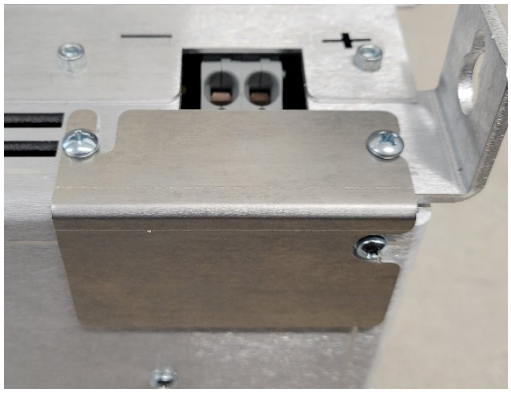
CAUTION: When connecting wires from the battery terminals to the charger, verify the voltage polarity.

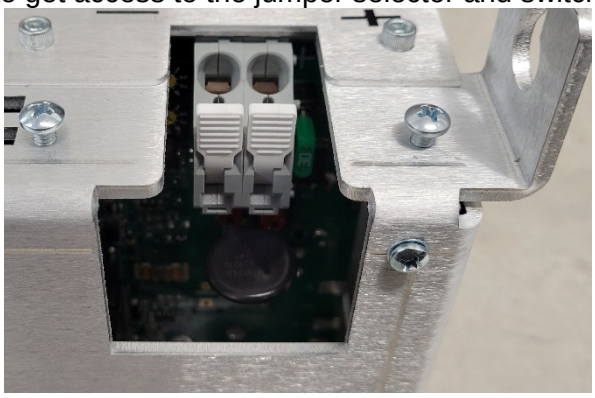
1. Connect the wires that will go between the battery and the DC Output WAGO terminal block labeled **–** and **+** first.

2. Then connect those wires to the battery terminals.
   NOTE: Be sure to observe correct polarity on battery terminals.

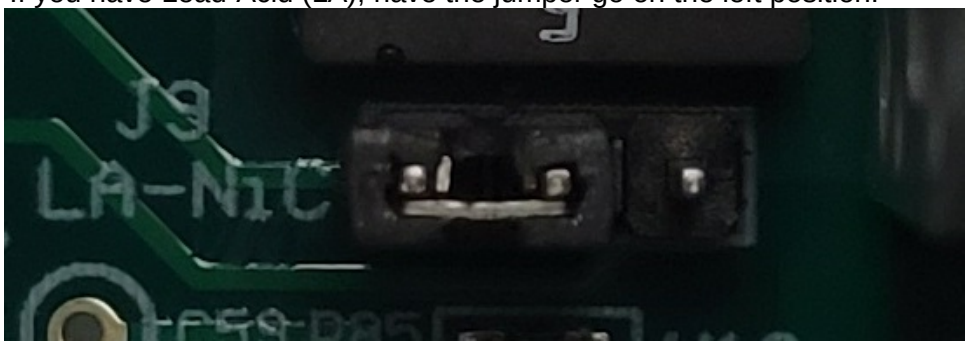
5 BASIC SETUP PROCEDURE

1. When you first get your SMC Lite Power Supply, you should configure the settings on the board. You will need to remove the cover to get access to the jumper selector and switches.

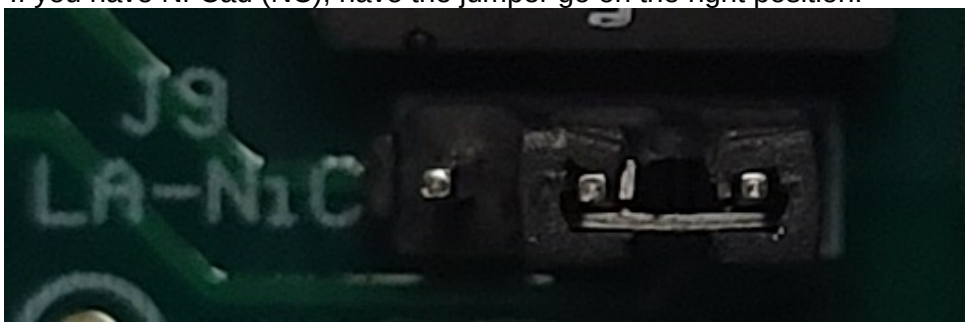




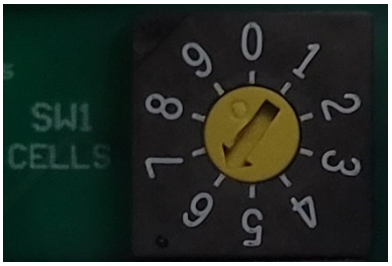
2. Select which type of batteries you have by moving the jumper. You might need to use a needle nose piler to be able to move the jumper.
   a. If you have Lead-Acid (LA), have the jumper go on the left position.



   b. If you have Ni-Cad (NC), have the jumper go on the right position.



3. Now select the number of cells you have by using SW1, this is the top switch dial.
NOTE: Select 0 to set to the minimum number of cells for Lead Acid or Ni-cad.



   a. Refer to the following equations and tables on selecting the correct number of cells for the battery types using SW1.

$$\boldsymbol{Cells(LA) = SW1, \quad 1 - 9\ Cells}$$

Use this table for Lead Acid ONLY
NOTE: The range of cells is 1-9.

SW1 Value	0	1	2	3	4	5	6	7	8	9
Corresponding Cell Value	1	1	2	3	4	5	6	7	8	9
Maximum Output Current (Amps)	5	5	5	20	20	20	20	20	20	5

NOTE: If 1, 2 or 9 cells are selected, this will make the charger be in low power mode for Lead Acid Cells.

$$\boldsymbol{Cells(NC) = (SW1 + 3), \quad 3 - 12\ Cells}$$

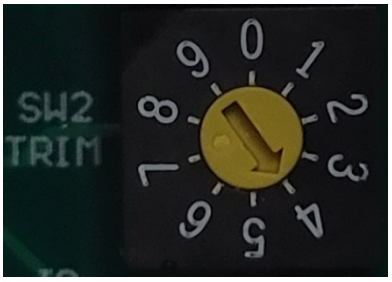
Use this table for Ni-Cad ONLY
NOTE: The range of cells is 3-12.

SW1 Value	0	1	2	3	4	5	6	7	8	9
Corresponding Cell Value	3	4	5	6	7	8	9	10	11	12
Maximum Output Current (Amps)	5	20	20	20	20	20	20	20	20	20

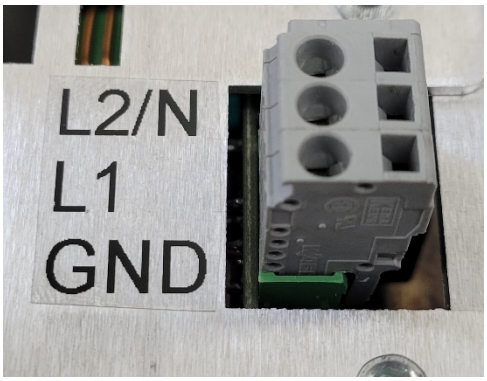
NOTE: If 3 cells are selected, this will make the charger be in low power mode for Ni-Cad Cells.

NOTE: To charge 1, or 2 Ni-Cad Cells remove the Ni-Cad/Lead Acid jumper and set SW1 to 1 for 1 cell Ni-Cad or 2 for 2 cells Ni-Cad.

4. After selecting the number of cells, you will set the Trim Value. The Trim Value is used for adjusting the output voltage up or down. Use SW2 to select this value, this is the bottom switch dial. For this step, select 4 on the dial. Refer to step #8 on adjusting the output voltage if needed.

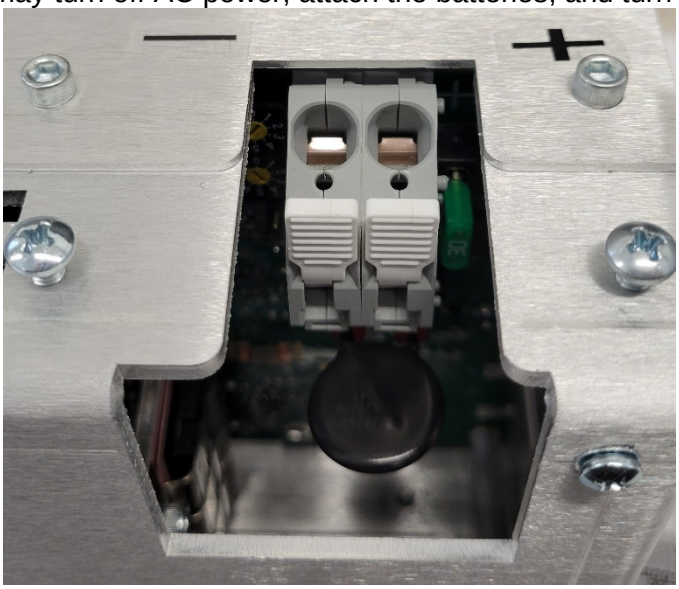


5. Once all settings have been selected, connect up an AC power source. You can use a source within the following range, 100-260VAC 50/60 Hz. Refer to the image below on the order of the wires.



6. Once power is connected, you should see a green flashing LED in the center of the front cover. This will indicate everything is working properly. Use a multimeter to verify the output voltage.

7. Attach your battery bank to the Charger using the 2 position WAGO block. The positive side is on the right and the negative side is on the left. Verify polarity before hooking up the battery bank.
   NOTE: You also may turn off AC power, attach the batteries, and turn power back on.



8. Measure the DC voltage of the battery bank.

   a. If you want to adjust the output voltage, change the Trim Value; refer to the following equation and table on setting the Trim Value.

$$\boldsymbol{Trim = (SW2 - 4)}$$

SW2 Value	0	1	2	3	4	5	6	7	8	9
Corresponding Trim Value	-4	-3	-2	-1	0	1	2	3	4	5

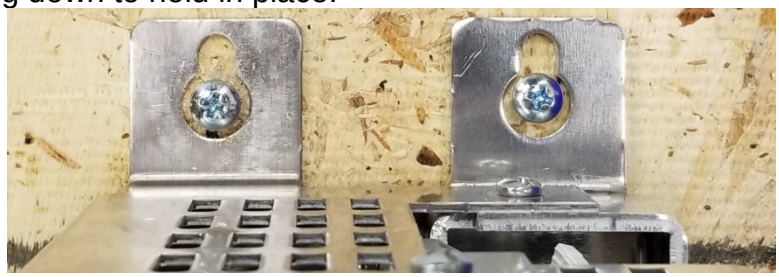
   b. Refer to the following equations on how the Trim Value will adjust the output voltage.

$$\boldsymbol{V(LA) = Cells * (2.25 + Trim * 0.02)}$$
$$\boldsymbol{V(NC) = Cells * (1.43 + Trim * 0.02)}$$

Example using the Trim Values
NOTE: Here we will be using 6 Lead Acid cells.

Trim Value	-4	-2	0	2	5
Output Voltage (VDC)	13.02	13.26	13.5	13.74	14.1

9. If you wish to mount the module to a wall, use the 2 keyhole slots at the back. Simply screw 2 screws to the wall that align with the slots. Slid the module onto the screws and finish tightening down to hold in place.



6 SPECIFICATIONS

Table 3: General Specifications

Description	Specification	
Input Voltage	110-260VAC, 50/60 Hz	
Voltage Regulation	± 0.4% + 30mV	
Voltage Ripple	< 100mV 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 4: Model Specifications

Number of Cells	110VAC Amps	260VAC Amps	Output Amps	Output Volts	Width x Height x Depth	Ship Weight
1-9 Lead Acid or 3-12 Ni-Cad	4.0 Amps	2.0 Amps	20.0 Amps	2.25 to 21.2 Volts	4 X 6.75 X 9.75 inches	4 lbs.

7 DRAWINGS

SMC LITE BATTERY CHARGER 520821