User Manual for CH-LF24V15-PFC

1. Overview

The CH-LF24V15-PFC charger is suitable for charging 25.6V LiFePO4 or 24V Lead Acid batteries such as those used in electric vehicle applications. The CH-LF24V15-PFC charger is designed to work seamlessly with Battery Management System (BMS) through the CAN interface or digital input for safe battery charging. Standard safety features include protection against a short circuit on the charger output, reverse polarity, over charging, over temperature, etc.

2. Technical Parameters

2.1 Specifications

- Model: CH-LF24V15-PFC
- Input Voltage: AC 96V-260V
- Output Voltage: 28.4V / 15A DC
- Maximum Output: 15A
- Power factor: ≥99%
- Efficiency: ≥92%
- Frequency range: 45 ~ 65Hz
- Communication: CAN and 12V Digital Input
- Vibration SAEJ1378
- Water resistance IP31

2.1 Operating Environment

- Altitude: ≤2000 Meters
- Temperature: -35°C ~ 65°C
- Installation Stress: ≤level 5
- Humidity: 5% ~ 70% RH – Non Condensing, keep away from exposure to moisture
- Storage environment: -30°C ~ 60°C – Keep away from combustible materials

3. Charging Status and Alarm Status Indication

3.1 1 Alarm Indication

- Reverse polarity or low voltage: light blinking, 20% light on
- Charger over heating: light blinking, 40% light on
- Ambient temperature too high: light blinking, 60% light on
- Charging time out: light blinking, 80% light on
- Over Voltage Protection: light blinking, 100% lights on
- BMS alarm/charging interruptions All LED's blinking

3.2 Charging Status Indication

- Shutdown status: Six lights blinking
- Charging stage: Percent light indicating pack voltage vs. max charging voltage
- Battery presence not detected: Red light blinking, 20% light on
- Charging complete: All green lights on

4. Functions

4.1 Output short circuit protection.

4.2 Over-temperature protection:

Temperature less than 85°C – Full charging power

Temperature is 85°C to 95°C – Power reduced to 50%

Temperature is greater than 95°C – No output

4.3 Reverse polarity protection: charger will not turn on if the battery pack is connected backwards (or less than 5V).

4.4 4 A switch on the charger marked "Override" is used to select either external or internal controlled charging.

Override Off – Use with BMS system, either CAN or digital input

Override On – Charger program based on pack voltage only (recommended for testing purposes only, do not use for normal charging).

4.5 When external control is selected and a CAN signal is used, if any cell reaches the recharge set point (default 3.7V as signaled by the BMS) the charger will automatically enter the final recharge cycles.

4.6 Recharge cycles. When the BMS detects any cell has reached the recharge set point (default 3.7V) or above, the charger reduces the charge current to zero amps for five minutes to allow the BMS to balance the battery pack. The charge will resume after five minutes at half the previous charge current and will again charge until it receives a signal from the BMS that a cell has reached the recharge set point. These recharge cycles continue until the charging current reaches the minimum charging current to complete the charging process.

4.7 Digital alarm input:

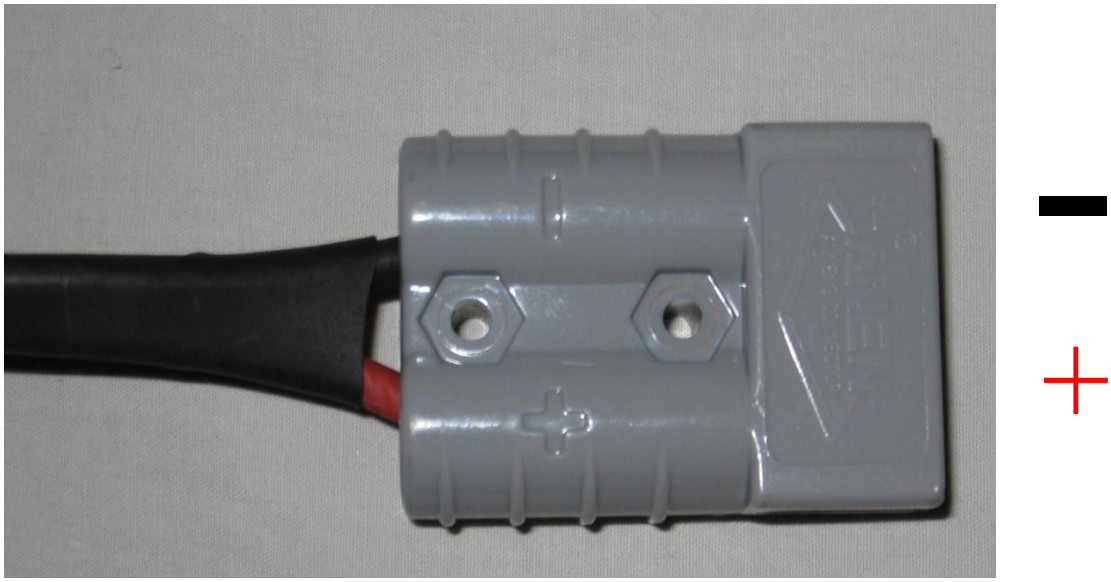
0.0V – 2.0V: Charging stopped

2.5V – 12.0V: Enable charging or resume charging

4.8 When both CAN and the digital control signals are available the charger is controlled by the CAN communication signal.

5. Connections

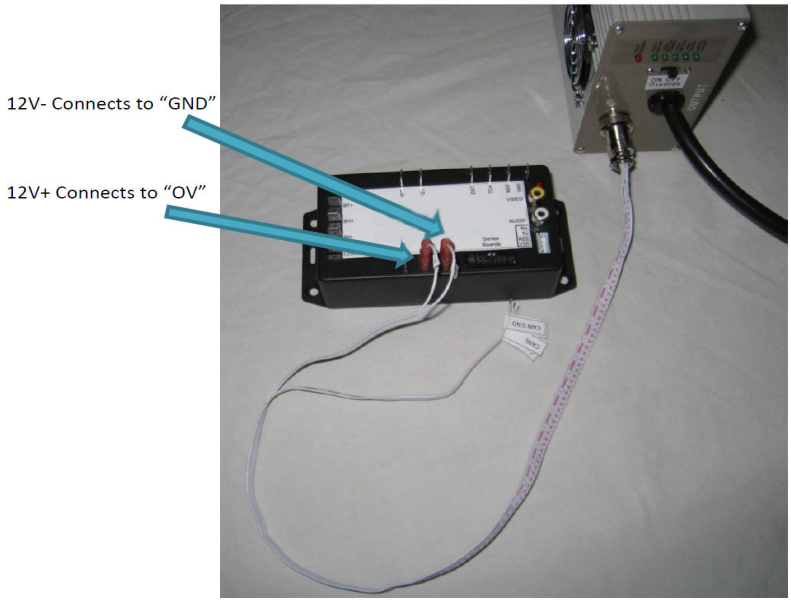
5.1 Anderson SB50 Connector for output. These connectors are labeled "+" and "-". A mating connector comes with the charger.



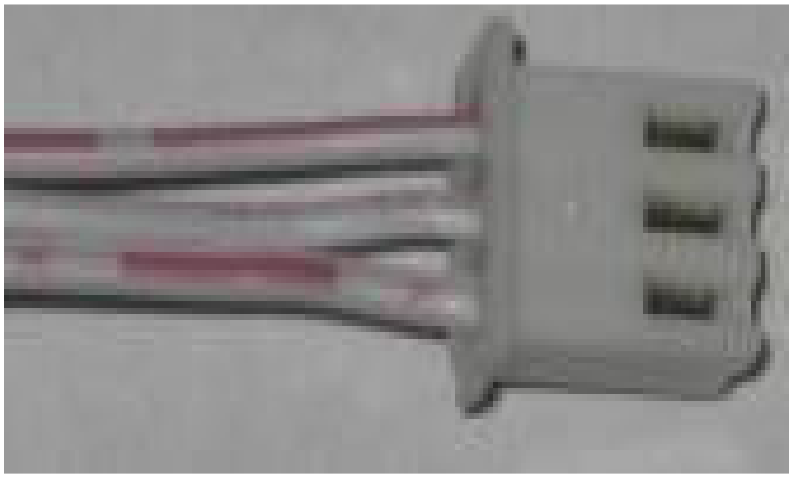
5.2 CAN and Digital Input Controls

A five wire connector connects to the charger for interfacing with the BMS. Three wires have a white connector attached, these three wires are the CAN interface. The other two wires are labeled "+ 12V" and "- 12V", these wires are the digital input used to control the charger from the BMS CPU. Connect the "+ 12V" to the OV connection on the BMS CPU and the "- 12V" to the GND connection on the BMS CPU.

The BMS CPU will output a 12 volt signal from the "OV" terminal whenever a pack normal situation is detected. During charging if a cell exceeds the maximum voltage limit this will drop to 0 volts which will trigger the charger to temporarily pause charging until the high voltage cell can return to a normal voltage. All green LED's on the charger will flash when this occurs.



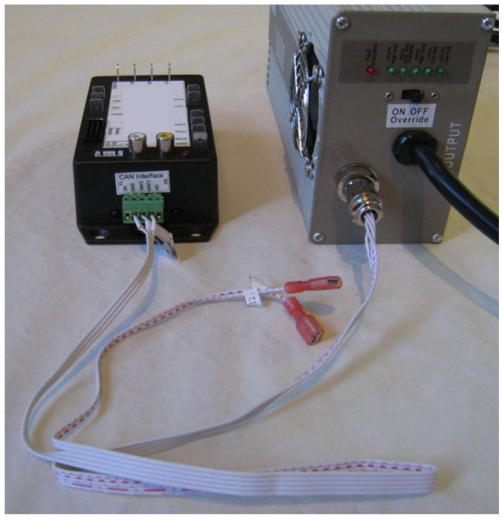
For a CAN communication connection connect the CANH, CANL and CAN GND to the matching connection on the CAN connection on the BMS CPU. The white connector may be cut off of the cable; however, note which wires are which before doing so.



CANH

CANL

CAN GND



If both the CAN communication and the digital inputs are connected CAN communications will take priority over the digital input for charge control. CAN communications requires the optional CAN board be installed on the BMS CPU.

***Caution* The BMS CPU has a programming port on it marked "Rx, Tx, RES, VSS". Do not attempt connect the CAN communication connection to this port!**

6. Cautions

- Make sure charger voltage output matches to the number of cells in the battery pack.
- Make sure positive output of the chargers is connected to a positive connection to the battery pack, and the negative output of the charger is connected to a negative connection of the battery pack.
- After a complete charge, disconnect the power source from the charger and then disconnect the connection between the charger and the battery pack.
- A BMS system must be used during the charging process either through CAN communication or through the digital alarm input to prevent over-charging.

7. Troubleshooting

- The charger must be installed in a cool well-ventilated area which is free of dust
- If the charger is not charging unplug the charger from the AC line and battery pack, then check for poor connections, short circuits, over heating conditions as well as alarm status from the Energy Management System.
- If charger does not display any LED's when plugged in and charging does not occur the fuse may be blow. Unplug the charger from the battery pack and AC line and check the fuse by unscrewing the cap with a #2 Philips screw driver. If the fuse is blown replace with an equivalent size fuse of the same voltage and amperage rating.
- If the charger finishes charging too early make sure that the connection from the charge to the battery pack is good and does not have high resistance.