TM AEROVOLTZ EXPERIMENTAL SERIES CELL SYSTEMS

Aerovoltz Battery Management System: Professional Intelligent Digital Balance Charger

Instruction Sheet

Charging Specifications:
Operating voltage range: DC11.0~18.0 Volt
AC to DC adaptor (DC11.0~18.0V/5S)
Circuit power: Max. charge power 50W
Max. discharge power 5W
Charge current range: 0.1~5.0A
Discharge current range: 0.1~1.0A
Weight: 277g(Net Weight)
Dimensions: 133x87x33mm

Aerovoltz batteries are LiFePO4 (Lithium Ferrous Phosphate)

Cell Specs:
Voltage level: 3.3V/cell
Max. charge voltage: 3.6V/cell
Allowable fast charge current: 5 amps
Max discharge voltage cut off level: 2.0V / cell or higher

Aerovoltz Batteries Require a (LiFe) Lithium Charging Setting:
To begin charging your Aerovoltz Battery, connect the battery to the terminal of the charger: red is positive and black is negative. Then connect the supplied BMS charger connector to the BMS port on the battery. Always connect the charger to the battery before starting any charging functions.

WARNING: If your Aerovoltz Battery has been discharged below 8.0 volts, the BMS charger will not attempt to recharge the battery and will show a Cell Low Voltage error. You will need to recharge the battery above 8.0 volts with a conventional charger before attempting to use the BMS charger. We do not recommend discharging a Aerovoltz battery below 8.0 volts. Doing so may damage the cells. Recharge immediately if the battery is discharged below 8.0 volts.

Different batteries have different charge techniques. The program suitable for charging AEROVOLTZ Lithium Ferrous Phosphate (LiFePO4) batteries with a nominal voltage of 3.3V per cell is the (LiFe) charging setting. Press the BATT. TYPE button until you reach the setting for (LiFe BATT) and press START/ENTER.

If (LiFe BATT) is not an option when your charger is new, press the (Batt. Type) button until you reach (USER SET PROGRAM) and press enter. The first selection should be (V. Type). Press enter until the voltage type is set to 3.3V and then press enter to confirm. If you press the (Batt. Type) button again twice, the (LiFe BATT) available as a permanent option.

Aerovoltz Batteries should only be charged in the (LiFe) mode.

Balance Charging your Aerovoltz battery (LiFe BALANCE)

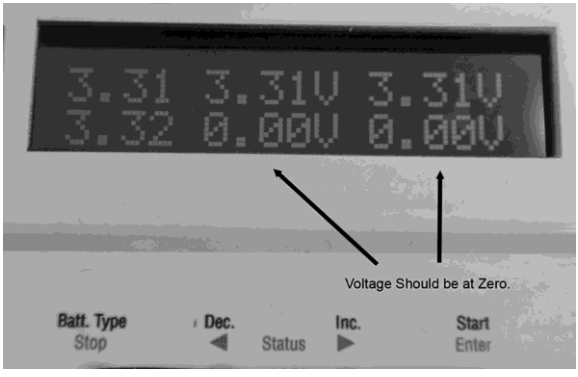
The primary advantage to the Aerovoltz BMS Charger is the balance charging function. The Balance mode balances the voltage of each cell or cell pack while charging. By balance charging your Aerovoltz Lithium Ion Battery you insure that the battery is operating at its maximum power. Periodic balance charging can also increase the expected life of your battery.

In order to balance charge your AEROVOLTZ battery you must connect the supplied BMS cable to the BMS port on the top of the battery along with the positive and negative leads from the charger. The BMS cable lead should connect to the individual port at the right side of the charger.

In this mode the built-in processor monitors the voltage of individual cells and controls input current fed into each cell to normalize the voltage.

After setting current (2.0A) and voltage (13.2V), press START/ENTER for more than 3 seconds to start the process. If both "R: 4SER" and "S: 4SER" values are the same you can start charging by pressing START/ENTER. If the value reads "R: 3SER" and "S: 4SER", then the battery is discharged below 30% of its capacity. Recharge immediately!

Once the charging process has started you can press the INC. button and see the status of each cell or series of cells as they charge in real time. All powersports based Aerovoltz Lithium Ion Batteries are (4S) / (4R) four series batteries. Even though the BMS charger has the capacity to charge up to a 6 Series battery, only 4 values should appear on the screen. All AEROVOLTZ batteries are four series batteries so when balance charging a 4 Cell battery, the voltage of the each cell will be displayed. When charging the 8 Cell, 12 Cell, 16 Cell, or 24 Cell battery the voltage displayed will be each of the 4 series. When charging a four series battery, two of the voltage displays will always be zero.



Fast Charging of Lithium Batteries (LiFe FAST CHG)

In the event that a AEROVOLTZ battery is discharged and must be recharged in a short period of time, the "Fast Charging" option is appropriate. Select (LiFe FAST CHG) or (LiFe CHG) and set current (5.0A) and voltage (13.2V) press START/ ENTER for more than 3 seconds to start the process. If both "R: 4SER" and "S: 4SER" values are the same you can start charging by pressing START/ENTER. If the value reads "R: 3SER" and "S: 4SER". then the battery is discharged below 30% of its capacity. Recharge immediately!

Note: If the charger displays INPUT VOL ERR then the amperage setting is too high. Reset the amperage for (2.0A) and restart the process. This happens when the battery is only discharged a small amount.

Note: It is not necessary to hook up the balance cable when in fast charge mode

Storage Control of Lithium Batteries (LiFe STORAGE)

The storage control function is used like a trickle charger for batteries that are not going to be used for long periods of time. The program will begin to discharge if the original state of the battery exceeds the voltage level of storage. Aerovoltz Lithium Ion Batteries only discharge at a rate of 10% per year when left static so the storage function should only be used in unique situations. Set current at (0.1A) and voltage at (13.2V)

Discharging Lithium Batteries (LiFe DISCHARGE)

The discharge function is used as an aid to the balance charging function. If battery is charged, but out of balance, then the discharge function can be used to discharge the entire pack and then the balance charge function should be used to charge and balance the battery so that each cell or pack of cells is at the optimum voltage.

You can view that voltage in real time of each cell or cell pack by pressing the INC. button while balance charging. If one cell is at maximum charge (3.6V) and the rest are out of balance then the entire pack should be discharged until in balance and then recharged in balance mode. Out of balance would be considered a voltage difference greater than .3 of a volt.

To Discharge the battery select the (LiFe DISCHARGE) and set current (1.0A) and Voltage (8.0V), then Press START/ENTER for more than 3 seconds to start. Press INC. to view the voltage of each cell or cell pack in real time. When the battery is discharged enough so that all the cells or cell packs are even then press BATT TYPE/ STOP to stop. Use the Balance function (LiFe BALANCE) to recharge the battery

Once the discharging process has started you can press the INC. button and see the status of each cell or set of cells as they charge in real time.

WARNING AND SAFETY NOTES

- These warnings and safety notes are important. Failure to follow these instructions for maximum safety may cause damage to the charger and battery or cause a fire.
- Failure to connect as described will damage this charger. The main battery leads must be connected along with the balance lead connector before charging your battery.
- If using Alligator clips make sure they are unable to touch together!
- Never leave the charger unattended when it is connected to its power supply. If any malfunction is found, TERMINATE THE PROCESS AT ONCE and refer to the instruction sheet.
- Keep the charger well away from dust, damp, rain, heat, direct sunlight and vibration.
- Never drop the unit.
- The allowable input voltage is 11-18V DC.
- This charger and the battery should be put on a heat-resistant, noninflammable and nonconductive surface. Never place them on a car seat, carpet or similar. Keep all the inflammable volatile materials away from the operating area.
- Make sure you know the specifications of the battery to be charged or discharged to ensure it meets the requirements of this charger. If the program is set up incorrectly, the battery and charger may be damaged. It can cause fire or explosion due to overcharging.
- The warranty is not valid for any damage or subsequent damage arising as a result of a misuse or failure to observe the procedures outlined in these instructions.
- To avoid short circuit between the charge lead always connect the charge cable to the charger first, then connect the battery. Reverse the sequence when disconnecting.
- Do not connect more than one battery pack to this charger at any one time.

Never attempt to charge or discharge the following types of batteries:

- A battery that is already fully charged or just slightly discharged
- A faulty or damaged battery
- Batteries installed in a device or which are electrically linked to other components
- Batteries that are not expressly stated by the manufacturer to be suitable for the currents the charger delivers during the charge process

Please bear in mind the following points before commencing charging:

- Did you select the appropriate program suitable for the type of battery you are charging? Aerovoltz Lithium Ion Batteries should be (LiFe BATT).
- Did you set up adequate current for charging or discharging?
- Have you checked the battery voltage?
- Have you checked that all connections are firm and secure? Make sure there are no intermittent contacts at any point in the circuit.

Warning and Error Information

In the event of an error, the unit will display the cause of the error and emit an audible sound.

REVERSE POLARITY - incorrect polarity connected.

CONNECTION BREAK - battery connection is interrupted.

SHORT ERR - short-circuit of the output termination.

INPUT VOL ERR - erroneous selection of voltage of Lithium pack. Check the pack's voltage.

VOL SELECT ERR - the voltage of the battery pack has been selected incorrectly.

BREAK DOWN - the charger has malfunctioned.

BATTERY CHECK LOW VOLTAGE - the voltage is lower than the set voltage. Check the number of cells in the battery pack.

BATTERY CHECK HIGH VOLTAGE - the voltage is higher than the set voltage. Check the number of cells in the battery pack.

BATTERY VOLTAGE CELL LOW VOL - voltage of one cell in the battery pack is too low. Check the voltage of each cell.

BATTERY VOLTAGE CELL HIGH VOL - voltage of one cell in the battery pack is too high. Check the voltage of each cell.

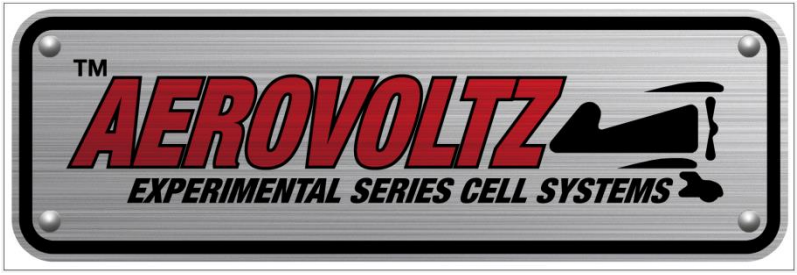
BATTERY VOLERR CELL CONNECT - wrong connection detected. Check the connector and cable.

TEMP OVER ERR - the internal temperature is too high. Cool down.

CONTROL FAILURE - the processor cannot control the feeding current. Repair it.

WARRANTY AND SERVICE

We guarantee this product to be free of manufacturing and assembly defects for a period of one year from the time of purchase. The warranty only applies to material or operational defects, which are present at the time of purchase. During that period, we will repair or replace free of service charge those products deemed to have these defects. You are required to provide proof of purchase. This warranty is not valid for any damage or subsequent damage arising as a result of misuse, modification or as a result of failure to observe the procedures outlined in these instruction



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