

**PRELIMINARY WARNINGS BEFORE USING MANZANITA EQUIPMENT!**



# **READ THIS FIRST!**



ADDITIONAL NOTES AND PRODUCT MANUALS AVAILABLE AT: [www.manzanitamicro.com](http://www.manzanitamicro.com)

**CAUTION:** Your PFC-Charger uses High Voltage DC and AC electricity.

The chargers have been designed to be adaptable for use with many different battery types and voltages. It is the responsibility of the end user to properly set up the charger making necessary adjustments so that it can work with their unique system. With such flexibility, the charger is intended to be able to be configured for use in various experimental applications and Manzanita Micro LLC and its employees, contractors and affiliates cannot be responsible for any damages due to any Manzanita Micro product that has been set up by the end user. There are too many variables out of Manzanita Micro's control. It is entirely the responsibility of the end user to make sure that they are competent to work with potentially lethal voltages and that they have a solid understanding of how to safely integrate the Manzanita Micro product(s) into their application.

The information contained in this warning and in the product manuals is intended to be used as a guide to better familiarize oneself with the product(s) but Manzanita Micro has no control over how the information will be used or not used and cannot possibly foresee all possible configurations that a user may come up with.

- Do not work on the PFC-Charger or attempt to use one if you are not qualified
- Observe the owner's manual procedures and cautions
- Avoid working on an electric vehicle while it's charging
- ALWAYS assume that high voltage is present
- Use electrical tape or another suitable insulator to cover all exposed high voltage connection points and also cover metal tools to reduce the likelihood of the tool completing a current path
- DO NOT USE A CONDUCTIVE METAL SCREW DRIVER TO ADJUST THE VOLTS TRIM ON YOUR CHARGER!
- When using a Manzanita Micro BMS with older charger models the Regbus GND return line is NOT ISOLATED FROM MAIN BATTERY PACK NEGATIVE! Never touch or create a path from the regbus conductors to any battery in the pack or serious shock could occur!
- Disconnect all other non-isolated chargers from the battery pack and from line current
- Make sure there is NO PATH TO GROUND or the vehicle chassis from any portion of the main battery pack.
- Make sure the polarity is correct BEFORE you hook the battery pack to the charger cable.
- Make sure the area around and above the workplace is clean and dry
- Do not compress or set heavy objects on the charger. Deforming the case can result in shorting the internal circuit boards to the case.
- DO NOT operate this charger unloaded! A battery pack must always be plugged in to the DC output plug from the charger if it is turned on!

FAILURE TO HEED THESE WARNINGS AS WELL AS THE BATTERY WARNINGS ON THE BACK OF THIS SHEET MAY RESULT IN PHYSICAL INJURY, DEATH, OR DAMAGE TO YOUR CHARGER, BMS OR OTHER EQUIPMENT WHICH WILL NOT BE COVERED UNDER YOUR WARRANTY.

IT IS RISKY TO PLUG ANY BATTERY CHARGER INCLUDING MANZANITA MICRO CHARGERS INTO GENERATORS. MANY GENERATORS ESPECIALLY THE LESS EXPENSIVE GENSETS DO NOT HAVE A CLEAN, WELL REGULATED, PREDICTABLE OUTPUT AND THEY CAN CREATE HIGH VOLTAGE SPIKES WHICH CAN DAMAGE COMPONENTS IN THE CHARGER. SOME CUSTOMERS HAVE HAD SUCCESS WITH HIGH END PURE SINE WAVE COMPUTER GRADE GENERATORS BUT MANZANITA MICRO CANNOT RECOMMEND A SPECIFIC MODEL AT THIS TIME AND CANNOT BE RESPONSIBLE FOR ANY DAMAGE DUE TO GENERATORS OR OTHER POWER SOURCE PROBLEMS.

**TURN OVER THIS SHEET AND READ THE OTHER SIDE AS WELL!**

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# **BATTERY NOTES!**



**CAUTION:** Your PFC-Charger can output over 400 volts DC and many thousands of watts of electrical power! It is imperative that the end user have a clear understanding of how to safely charge their particular battery!

Manzanita Micro sells very flexible charging systems that can be used with almost any type of battery. Manzanita Micro chargers are used in all sorts of applications. Manzanita Micro LLC cannot be held responsible for any problems arising from the improper use of the charger or BMS with a battery pack or other storage device.

**FAILURE TO OPERATE BATTERIES OR OTHER ENERGY STORAGE DEVICES WITHIN THEIR SAFE DESIGN PARAMETERS CAN RESULT IN CATASTROPHIC FAILURES INCLUDING BUT NOT LIMITED TO FIRE, EXPLOSION, TOXIC FUMES, EXCESSIVE HEAT, THE RELEASE OF CAUSTIC OR POISONOUS MATERIALS, PHYSICAL DEFORMATION AND VARIOUS OTHER POTENTIALLY LETHAL SITUATIONS.**

**ALWAYS WEAR EYE PROTECTION AND OTHER PROPER PERSONAL PROTECTIVE EQUIPMENT WHEN WORKING AROUND BATTERIES. UNDERSTAND THE SAFE HANDLING INSTRUCTIONS AND IMPORTANT SPECIFICATIONS OF YOUR PARTICULAR BATTERY PACK OR ENERGY STORAGE DEVICE! IF EVER IN DOUBT, CONTACT THE BATTERY MANUFACTURER!**

**NEVER ALLOW MORE THAN ONE PERSON TO WORK ON THE SAME HIGH VOLTAGE SYSTEM OR BATTERY PACK AT THE SAME TIME. IF TWO OR MORE PEOPLE ARE TOUCHING PARTS OF THE SYSTEM IT IS EASIER TO COMPLETE A CIRCUIT AND CAUSE ELECTROCUTION. WHILE MULTIPLE PEOPLE SHOULD NEVER WORK ON THE SAME SYSTEM, IT IS ADVISABLE TO HAVE MORE THAN ONE PERSON NEAR BY WHENEVER ONE PERSON IS WORKING WITH HIGH VOLTAGE.**

**NEVER TOUCH ANYBODY WHILE THEY ARE WORKING ON A HIGH VOLTAGE SYSTEM OR BATTERY PACK! IF SOMEONE IS GETTING SHOCKED AND CANNOT LET GO OF THE ELECTRICAL SOURCE, THE EXTRA PERSON CAN SAFELY DISCONNECT THE ELECTRICAL SUPPLY AND/OR GET HELP. IF IT IS NOT POSSIBLE TO DISCONNECT THE SUPPLY, AND IF PROPERLY INSULATED EQUIPMENT IS AVAILABLE THEN THE EXTRA PERSON MAY USE A DEVICE SUCH AS AN INSULATED HUMAN HOOK TO PULL THE PERSON BEING SHOCKED AWAY FROM THE ELECTRICITY. NEVER EVER TOUCH SOMEONE WHO IS BEING SHOCKED!**

**Manzanita Micro chargers are very powerful. Do not exceed the safe charging rates as specified by your particular battery manufacturer!**

**Manzanita Micro chargers are capable of outputting any charging voltage from 12 to 450 volts DC. It is up to the end user to understand the safe voltage range for their particular battery, cell, battery pack or other energy storage device. Do not exceed the peak charging voltage given by the battery manufacturer. Carefully read the Manzanita Micro Owner's Manual(s) for your particular product(s). For chargers, it is essential to understand how to properly set the peak charging limit using the volts trim potentiometer. For BMS (Battery Management Systems) it is imperative that the user makes sure that the BMS is properly set to match the safe and appropriate parameters for their particular make and model of battery.**

**Ask the battery manufacturer for all parameters on how to safely charge their batteries and do not use any charger or BMS if you cannot properly tune the equipment to meet those specifications.**

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