GS-S-100-Fab36

Connection Guide

Series vs. Parallel Connections

Grape Solar 100W panels can be connected in parallel or series when used in conjunction with an appropriately sized charge controller.

Connecting panels in series will result in a higher input voltage to a charge controller while a parallel connection will result in a higher input current. Since the charge controller works as a transformer, and increases the output current up as it reduces the voltage, the power fed to the battery will be the same in both configurations.

It is a popular misconception that two panels in series are for charging a 24V battery bank and two panels in parallel are for charging a 12V battery bank. In reality a 12V battery bank can be charged with an array voltage of anything greater than 16V. That means a 1000V could charge a 12V battery. But, in order to charge a 24V battery bank one would need at least 32V.

Advantages of a series connection:

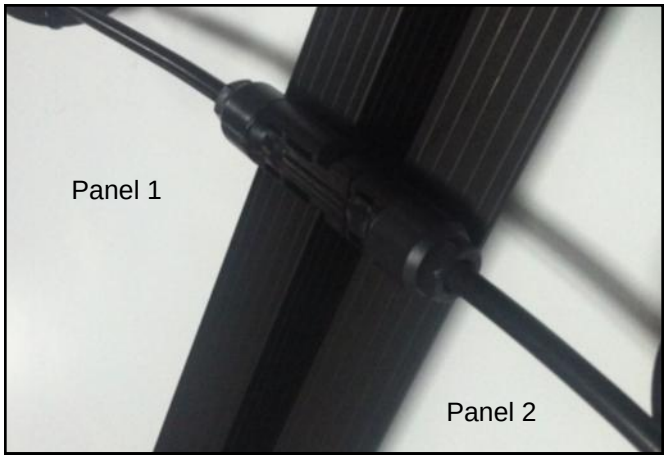
Since a series connection results in a higher voltage, that means that current is lower and there will be less line losses. Less line losses means that smaller, less expensive wire can be used to connect the panels to the charge controller on long runs. Also, money can be saved by not having to purchase MC4 T Branch connectors.

Advantages of a parallel connection:

Many charge controllers have an input voltage limit of 25V. If the charge controller in your system has this limitation a series connection would overload your charge controller.

Connecting Panels in Series

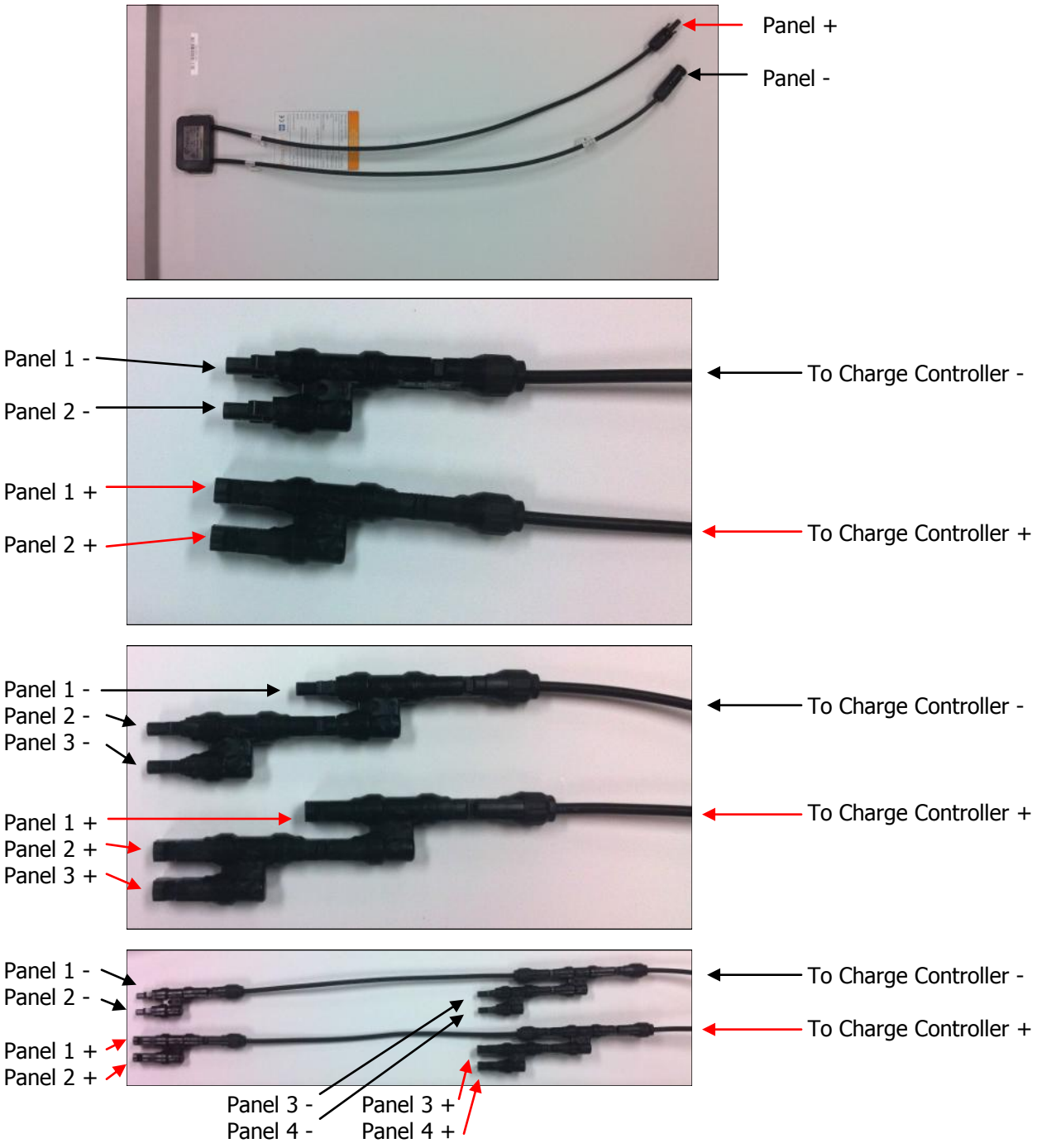
The Grape Solar 100W panels come with two 900mm MC4 leads, one for positive + and the other for negative -. A connector from one panel can plug into the connector on another panel to form a series connection.



Connecting Panels in Parallel

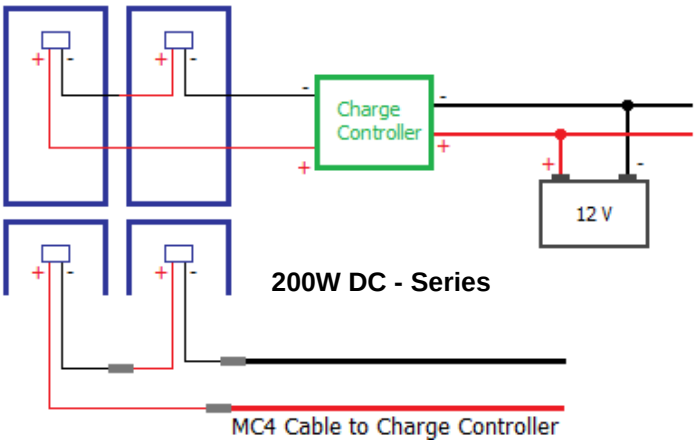
For parallel connections, the MC4 connectors plug into MC4 T Branch connectors.

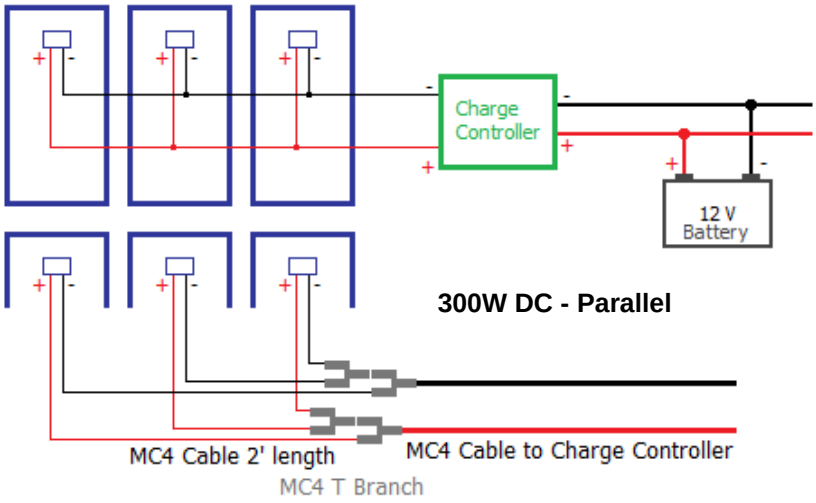
MC4 cables and connectors can be found in well stocked electrical supply warehouses or on Amazon.com using the keyword “MC4”.

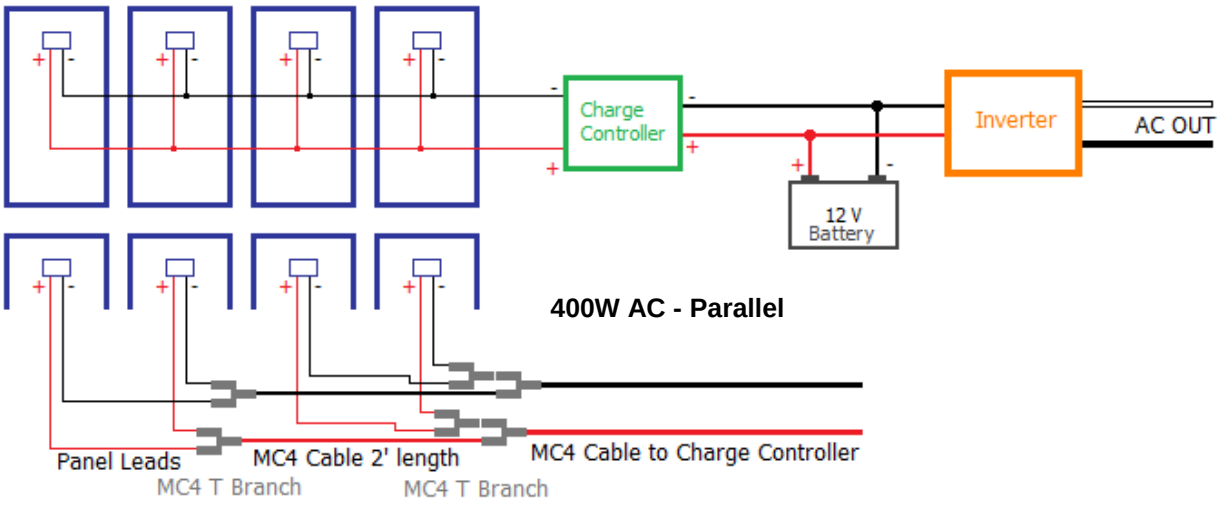


Example Schematics

Below are some sample schematics detailing the connections between panels.



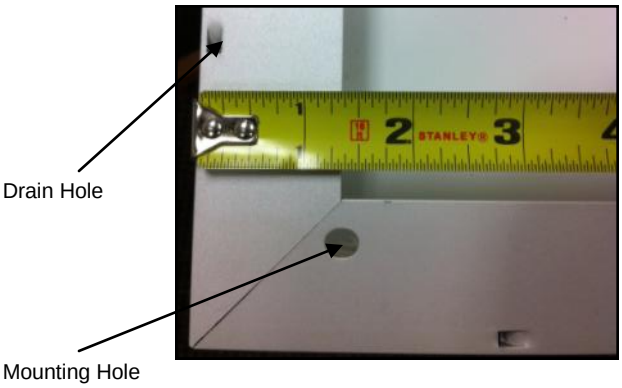


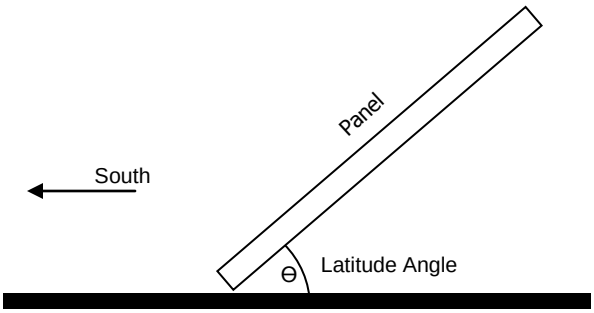


Mounting Hardware & Additional Accessories

Mounting

Because of the wide variety of possible user applications, Grape Solar panels do not come standard with mounting hardware, but the panels come with study aluminum frames that have mounting holes and can be mounted to a variety of structures and materials including wooden or metal frames.





For optimum energy production solar panels should be pointed in the direction of the sun to maximize the surface area that can receive light. Since the sun is a moving target, this is best approximated by pointing the panel to the South (for those of us that live in the Northern hemisphere) at a tilt angle equal to your latitude.

Grounding

The inverters and panels have grounding terminals but grounding is not a requirement for operation. The systems in our test lab have been operated with and without grounding with no differences in performance.

Positive Grounding

The GS-S-100-TS panel uses an advanced, back contact cell. In grid-tied systems, these cells require positive grounding to prevent the build up of ions on the cell's surface which reduce the panel's efficiency. But, in low voltage battery charging systems, we have found that the reduced efficiency as a result of ion build-up with improper grounding is negligible. To minimize the effect of ion build up, Grape Solar recommends against connecting more than two of the GS-S-100-TS panels in series when not using a positive ground compatible charge controller. The buildup of ions does not harm the panel. When the sun sets the ions dissipate.

For more information contact Grape Solar Technical Support at:

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