



Battery Backup System Overview

For Outback Power Systems
Prepared by Cevyn L Miles-Monaghan, June 2016

Residential Battery Backup System Overview





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Safety Information

In the case of an emergency, call 911 first and then contact
MTVSolar:

Mountain View Solar, LLC
11500 Valley Road
Berkeley Springs, WV 25411

(304) 258-4733 or 877-96-SOLAR

Ground Faults:

Use extreme caution any time an electrical fault is indicated by the system!

The inverters will shut-down if a ground-fault is detected. **This will not necessarily eliminate the fault.** Refrain from touching metal system components if a ground fault is indicated.

In the event of a ground fault warning:

CALL US IMMEDIATELY!

Always contact us if you have any concerns regarding the system. Do not open any electrical enclosures within the system; there are no user serviceable components inside. Doing so may void the manufacturer's warranty.



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Circuit Breakers

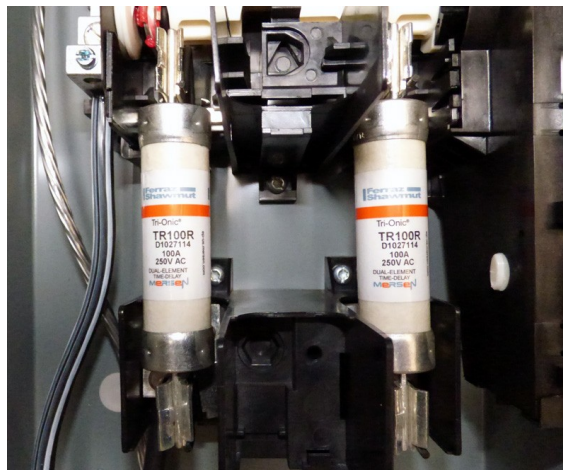
Circuit breakers are intended to protect wiring and components from dangerous meltdown due to overload or short circuit. A correctly functioning breaker will not trip unless an overload condition has occurred for a period of time. A tripped breaker can be re-set by the owner to resume operation.



The image above shows two breakers. The top one is ON and normal, the bottom one is tripped. The handle will be more centered and orange can be seen through the window to indicate that it had tripped. To reset a tripped breaker, correct the overload situation, and then switch it all the way to the OFF position, and then back ON.

Fuses

Fuses are also protection devices but they can not be reset. The fuses in a solar PV or battery backup system are often large and can carry high voltages and current. Fuses are generally hidden behind a cover secured with a screw and/or locked. If proper procedure is not followed during fuse replacement, electrocution and/or burns can result. Therefore it is **strongly advised** to contact MTVSolar for service if a fuse is suspected to have blown.





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Batteries

The batteries used in your system are AGM type sealed lead acid batteries unless otherwise specified. They require no user servicing or ventilation. If at any time you smell a foul "rotten egg" odor or see evidence of leaking around the battery, call Mountain View Solar immediately.



Loads

Your system is sized to properly run certain loads when the grid fails. These loads are located in your "critical loads" panel:



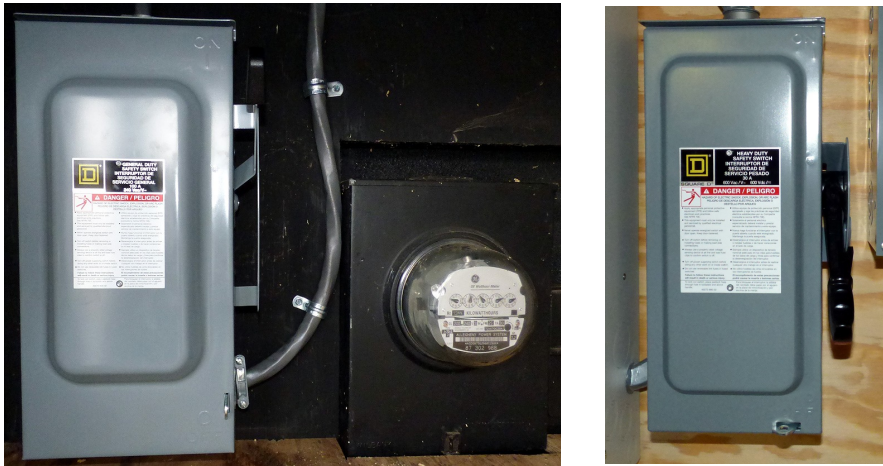


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Disconnect Switches

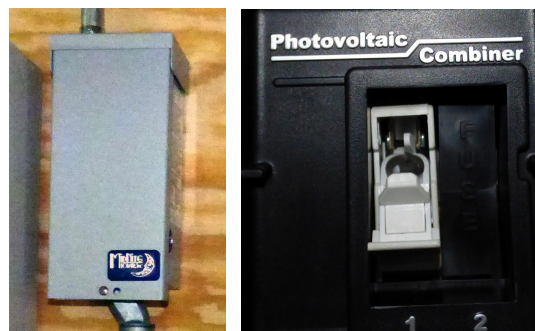
There are two main disconnects associated with your system. The DC Disconnect isolates the solar PV array from the charge controllers. The AC disconnect isolates the output of the inverters from the grid.



In this example, the one on the left is an AC disconnect, often located outside near the utility meter. The one on right is a DC disconnect, often located near the charge controllers. There are often fuses in the AC disconnect.

Solar Combiners

A combiner takes the output from multiple strings of solar modules and combines them into a single feed for the charge controller(s). There are often fuses in the combiner.



If your charge controllers are not producing during the day, and all breakers and disconnects are engaged, contact us to inspect the fuses.



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Breakers In Detail

There are many breakers in the Outback system, protecting every instance of power entering or leaving the system.



In this photo, the breakers at the right are for the inverter(s) DC input. The breakers at bottom left are for the charge controllers DC input and output. In the event of battery failure, these should all be turned off.

The breakers at the top left section of the panel control incoming power from the grid, outgoing power from the inverter, and optional generator power. These breakers also make bypass operation possible, which powers the critical loads directly from the grid and removes the equipment from the circuit in the event of servicing or a fault.



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Charge Controller

The charge controller(s) convert the incoming power from the solar array to a voltage compatible with the batteries, and also control the charging parameters. The charge controller(s) can be located by looking at the equipment for modules labeled FLEXmax:



The LCD display shows the current power being produced, along with other values. Please refer to the document "OutbackMPPTProductionTotals.pdf" for instructions on how to read the total lifetime production of the system.

Inverter

The inverter is the heart of the system. It powers the loads from a combination of the grid, batteries and solar, and optional generator. It also sends excess power back to the grid.



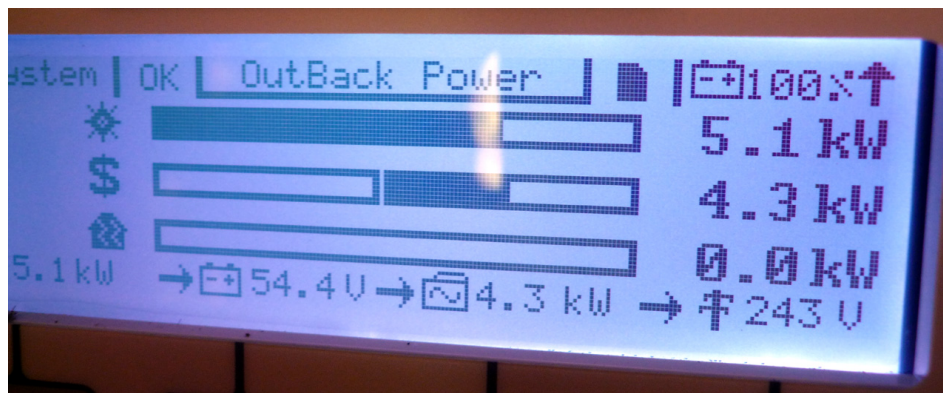


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System Control Panel - Outback MATE3

The system control panel (Outback MATE3) allows control of all system operations, viewing of energy data and faults, and other parameters.



In this photo, the top bar indicates how much solar power is coming into the system. The middle bar either indicates power being sold back to the grid as is the case here, or power being drawn from the grid. The bottom bar indicates the loads on the inverter. In this example, nothing is turned on.

At upper right is the estimated battery state of charge. This number may occasionally go out of whack, so the battery voltage shown at the bottom should be used to verify the reading; anything above 54v is a full battery.

Please refer to the Outback MATE3 spiral-bound manual for instructions for advanced use of the MATE3.