

Application Note

Whole-House Backup

OutBack equipment provides backup power for site loads during grid outages and intelligent energy management while on grid. Typically, backup power has been provided by separating the site loads into protected and unprotected categories. The protected loads are placed on a separate panel that is fed by the inverter rather than the utility service. However, some customers wish to back up their entire main panel rather than choosing only a few important loads. This is accomplished using a whole house backup system configuration. The paragraphs below describe such a system using OutBack equipment in combination with an off-the-shelf transfer switch.

Adding an Automatic Transfer Switch

When a protected loads panel has been installed, the inverter uses its internal transfer switch to isolate itself from the grid during an outage. This is insufficient for whole-house backup because it isolates the main load panel along with the grid.

A separate automatic transfer switch (ATS) should be used when backing up the entire main load panel. A single line diagram using an OutBack Radian as an example illustrates the concept below (Figure 1). A SkyBox or an FXR system could be used as well.

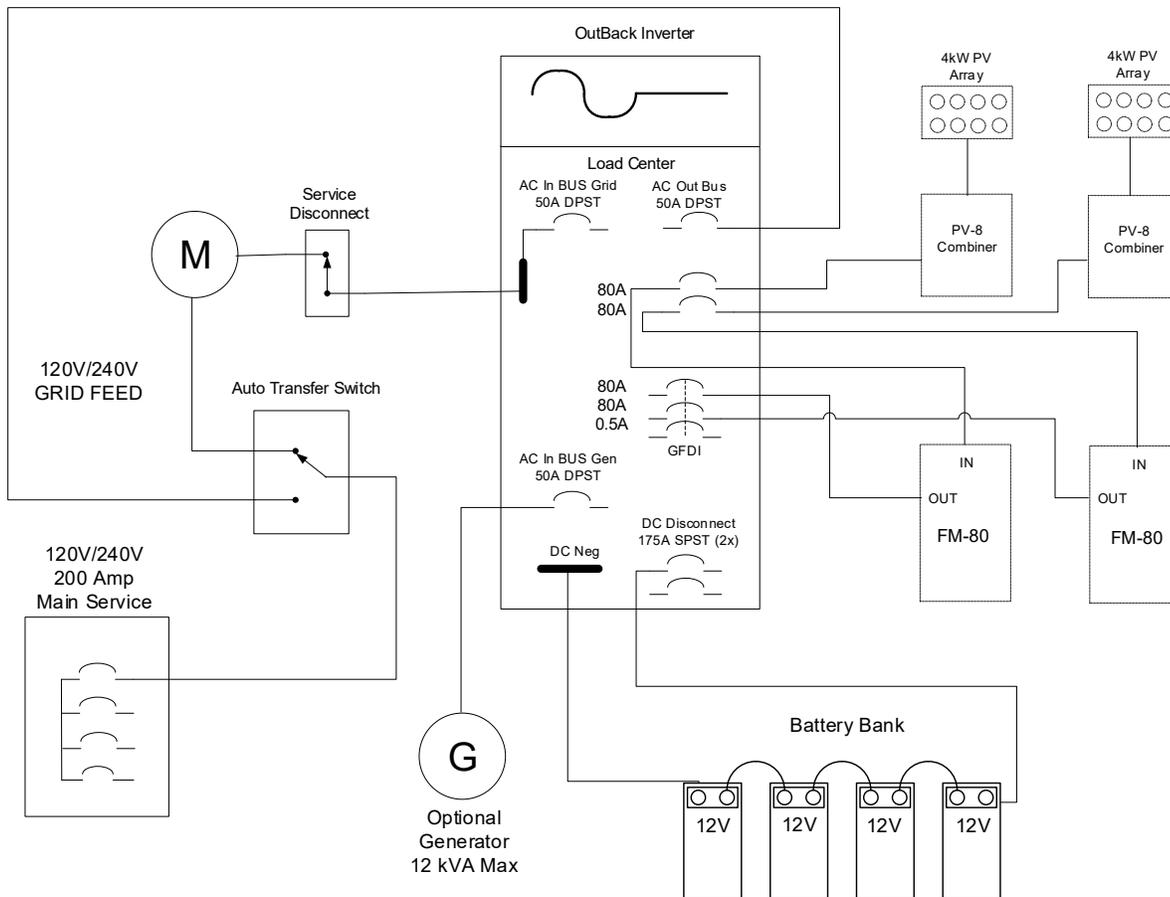


Figure 1

Application Note

Operation

When the utility grid is active, power flows to the main panel through the primary input of the ATS. Solar production is still exported from the inverter to the main panel loads or passed to the utility grid via a line side tap as long as the inverter is in 'Grid-Tied' mode. The output of the inverter is open circuit while the grid is active.

Upon loss of the primary input (grid), the ATS disconnects and transfers the loads to the alternate input (inverter output). The inverter directs power to the loads from the PV array and battery.

Once utility power is restored, 'normal seeking' transfer switches will disconnect from the inverter and reconnect to the grid, its 'normal' source. If a 'power seeking' transfer switch is installed, the transfer will not occur automatically and the main loads will need to be manually transferred back to the grid.

Recommendations

When used with an OutBack inverter, an automatic transfer switch allows for greater flexibility in system design and use while avoiding the difficulties of an additional load panel. Successful installations have been completed using the following automatic transfer switches and an OutBack inverter:

- ASCO Series 300
- Kohler RDT Series

When installing an ATS for whole house backup, a battery bank could be discharged very quickly during an outage. Proper precautions should be taken to ensure sufficient power is available for all planned loads and battery charging. Also, it is possible for loads transferred by the ATS to overwhelm the inverter if they exceed the inverter surge capacity or are not brought within the inverter nameplate capacity quickly. In this case, the inverter will shut down for safety and will require a manual reset once the total loads have been brought within system limits. Likelihood of an overload can be reduced by deploying multiple inverters or limiting maximum load.

About OutBack Power Technologies

OutBack Power Technologies is a leader in advanced energy conversion technology. OutBack products include true sine wave inverter/chargers, maximum power point tracking charge controllers, and system communication components, as well as circuit breakers, batteries, accessories, and assembled systems.

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Other

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