AUTOMATIC GENERATOR START

The combination of generator and inverter is common in remote or off-grid sites. Since OutBack inverters can recharge batteries with a generator, the inverter can automatically start the generator and do it for you.

Starting Requirements
This feature requires a generator with electric start and automatic choke. Additionally, you need to determine if your generator controls are classified as "two-wire-start" or "three-wire-start."

A two-wire-start generator has a simple on-off switch. If the switch is on, the generator runs. If the switch is off, it stops. All cranking, timing and other functions are automated within the generator. This is the simplest arrangement, and OutBack products can easily control this kind of generator. You can usually identify one because it has only a single switch with two positions: "on" and "off."

A three-wire-start generator has separate controls for starting, and for running and stopping. This requires three or more control wires. Because timers and other devices are required, OutBack products can only control this generator with the help of external products. You can usually identify one because it has multiple switches, or it has one switch with three positions, like "start", "run" and "stop."

If you have a three-wire-start generator, you can adapt it into a two-wire-start. Atkinson Electronics is one company that makes these adapters. You can get more information at www.atkinsonelectronics.com.
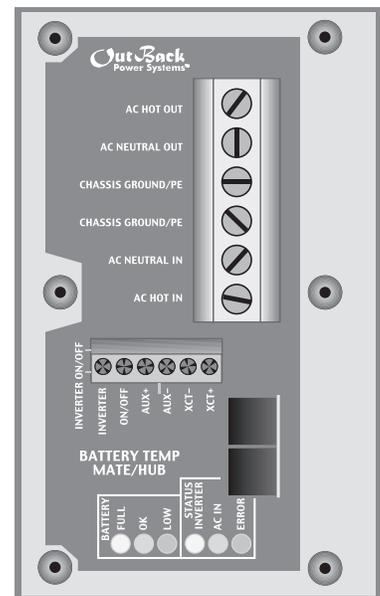
FX AUXILIARY OUTPUT
The OutBack FX Series of inverter/chargers have an auxiliary ("AUX") 12-volt output which can drive various devices. In this case the AUX can directly or indirectly send commands to the generator. Generally you need an intermediate relay. Thus, the AUX would send a 12-volt signal to the coil of the relay. Then the relay contacts would close, making the connection on the two-wire circuit and starting the generator.
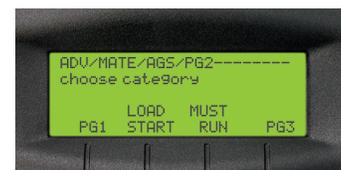

AC Wiring Compartment Board with AUX +/- Terminals

STARTING FUNCTIONS
The OutBack MATE's Automatic Generator Start ("AGS") feature will trigger the AUX output. AGS can control a generator according to various conditions:

- Low Voltage Start. AGS can be programmed for auto-start based on three different low voltages (user-settable) for three different periods of time: 24 hours, 2 hours and 2 minutes. This feature will put the batteries through a full charge cycle. At the end of the cycle, the AGS will shut the generator off instead of entering the Float stage.

- Load Start. AGS can start the generator if loads exceed an amount for a certain time. It will stop if the loads go below a certain amount for a certain time (all settable). Note: this feature is meant to rescue the batteries from heavy draw. It is not meant to rescue the inverter from an overload.
- Time of Day Start. AGS can start and stop the generator daily at specified times. It can also be set to run on a different schedule on weekends.
- Exercise Start. AGS can run the generator for brief periods, to keep it from being inactive. The generator can start after a number of days, at a particular time of day, and run for a number of minutes (all settable) before shutting off.

- Manual Start. AGS will run or stop the generator by manual command.
- Quiet Time. AGS can be ordered not to start the generator during certain hours (particularly when your neighbors are sleeping!). Certain criteria can override quiet time, for an emergency start.

- DC Genset. Normally, the FX inverter requires AC input to make certain the generator started. If you need to use a DC generator instead, you can tell the AGS not to look for AC input. AGS stops the generator when the DC voltage rises to a certain value. (This does not guarantee good battery charging. Also, the AGS has to take it on faith that the generator has even started.)

You do not have to select one function over another — the AGS can start the generator for any reason. If you don't know why the generator started, a MATE menu can tell you.

Starting Functions: Battery SOC
The OutBack FlexNet DC sends battery state-of-charge ("SOC") information to the MATE's AGS menus. If the FlexNet DC is present, AGS can also be programmed to start and stop the generator based on specified levels of charge. SOC is the most accurate AGS function if you are concerned about battery care.

Without the MATE
The AGS functions, including SOC, are based in the MATE itself and are programmed in the MATE's own menu area. If the MATE cannot be installed or must be removed for some reason, AGS cannot be used.

The OutBack FX inverter has a function of its own called GenAlert. GenAlert will energize the AUX output upon reaching low battery voltage for a certain amount of time, and will turn off the output after reaching a high voltage for a certain time (all settable). This can allow the inverter to automatically start the generator, even if there is no MATE. (However, this may not allow the full charge cycle.) The MATE must still be used for the initial setup, in the FX section of the menus.

The OutBack FlexNet DC has an AUX switch of its own. This is a set of dry contacts, instead of a 12-volt output. The FlexNet's AUX switch can perform automatic start if the 2-wire controls are connected directly to it, and it can do so based on SOC, from the FlexNet's own readings. (With no MATE, the other AGS functions are still unavailable. Unlike the MATE, the FlexNet's SOC feature cannot be used on the FX Aux output.) The MATE must still be used for the initial setup, in the DC section of the menus.

AGS and AUX Selection
AGS can only send commands to one AUX at a time. You can connect the 2-wire control to one FX inverter in a multi-unit system, and then direct the AGS commands there. All the above functions will be active on that unit, although not on any of the other FX inverters. (This will cancel GenAlert or other AUX function programmed into that inverter.) Similarly, AGS can be directed to the FlexNet's AUX switch instead, with all AGS functions being active there (although the FlexNet's own function is not cancelled). You cannot send AGS commands to the AUX of any OutBack charge controller.

Stopping
The AUX removes its output to stop the generator, whether operating by AGS, GenAlert, FlexNet DC. A two-wire-start generator will stop as soon as the wires are disconnected. Along with automatic shutoff, the generator can also be stopped manually, if the FX fails to see the proper input, or if another error occurs.

AGS can perform generator cooldown. It will disengage the inverter from the generator for a selectable time before sending the stop command, to keep the generator from stopping while under load. Similarly, AGS can also perform generator warmup, while starting. These functions are only present for AGS.