Sunny island relay settings

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The SMA Sunny Island is a grid-forming battery inverter that can be used for the construction of stand-alone power supply systems. The Sunny Island inverters are capable of forming an AC grid, this sine wave can be used as an interface for PV inverters to synchronize and feed power into the system which is used for supplying loads and recharging batteries.

Off-grid systems can be designed for supplying the complete load, but in order to do so, maximum load and unfavorable weather conditions are to be considered. When designing under these circumstances, the necessary PV system and battery capacity becomes very large which can result in a significant investment.

For the purpose of keeping the system size smaller and therefore reducing the necessary investment, an external AC power source such as a diesel generator set can be used, so that the system can make use of it during periods in which available power is not sufficient for feeding the loads. The generator is also used to supply power to charge the batteries in the case the battery State of Charge (SOC) drops too low.

The generator used must be able to provide a stable grid; typical nominal values are 230V at 50Hz. For a three phase Sunny Island system, a three phase generator will be required. When wiring the generator connections, please ensure that the installation complies with local codes and regulations.

In a single phase operation with multiple Sunny Islands i.e. one, two or three phase setup, the generator connections need to be paralleled to the second and third Sunny Island in order to get power from the generator of approximately 11.5kW per Sunny Island. In single--phase single-cluster systems, the Sunny Island inverters must be of device type SI6.0H-11 or SI8.0H-11.

For the three phase setup, each phase is connected directly to the corresponding Sunny Island, where phase 1 is connected to the master unit, phase 2 is connected to slave 1 and phase 3 is connected to slave 2.

The Sunny Island can request the generator to automatically use the built-in relay. To use this function, the generator must support the automatic startup functions. The two signal wires from the generator are connected directly to the built-in relay of the Sunny Island. An example of this wiring is given below.

The system at this stage should be operational without any further settings and will work based on the default parameters (generator nominal current greater than 16A or approximately 4KVA **). However, some useful settings can be used to fine tune the system.

Although the default settings should be enough to run the system, fine tuning the generator parameters will ensure that the system utilizes the generator more efficiently when required. The Sunny Island may need to be in standby mode while this process is being administered and Expert access will be required to access certain

parameters. The following settings below can be used to fine tune the generator parameters:

The settings of the generator can be found in "#234 Gen Control." The voltage and frequency operating range can be set under these settings. Current drawn from the generator is another major factor, by default the max generator current is set to 16A per Sunny Island. The value can be changed based on the generator rating up to 50A per Sunny Island inverter.

One other important parameter is the generator reverse power. The generator manufacturer will provide the maximum reverse current that the generator can handle and the time it is able to withstand the reverse power. By default it is set to 100Watts for 30 sec.

Another option is the load dependent generator request. This setting can be used to call the generator when the load consumption exceeds the power rating of the Sunny Island. Setting this feature will ensure that the system will be able to function normally even if there is some unexpected load in the system especially at night time.

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