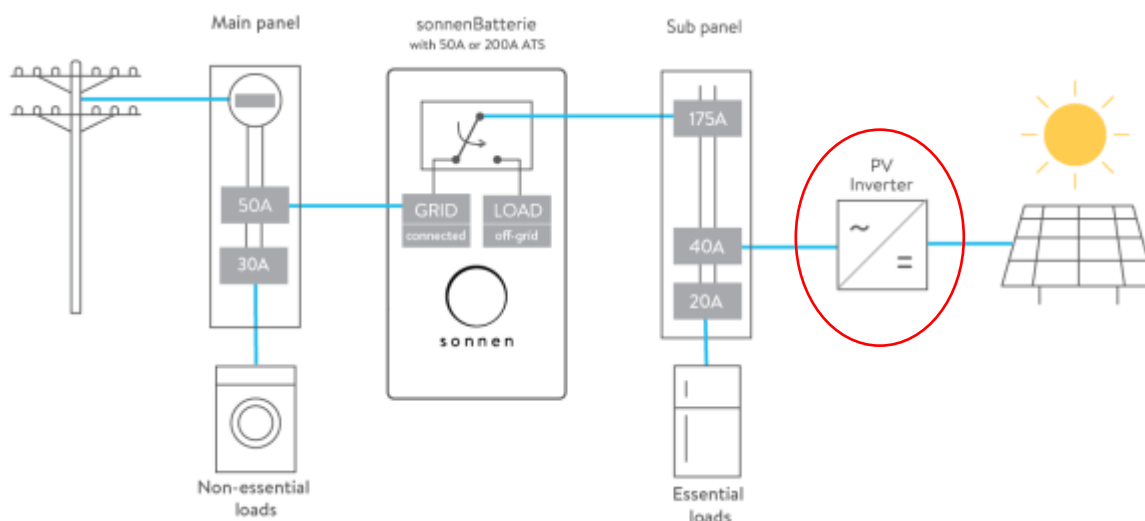


AC Coupling sonnen eco units to PV inverters larger than 8kW

The sonnenBatterie eco units are SC coupled to the PV system. The solar array is not directly connected to the sonnen energy storage system, but rather uses the excess PV energy from the PV inverter to charge the batteries using AC coupling. Here is a typical installation showing the concept.



The PV inverter connected to the backup loads panel will backfeed its energy to the sonnenBatterie after the loads have been satisfied. The maximum AC output limitation of either 4kW or 8kW, depending on the eco model should be considered. Again, we do not care about the DC size of the array, only the AC output of the PV inverter. Please refer to this chart for details:

4000W PV Inverter Output	8000W PV Inverter Output
Eco4	Eco10
Eco6	Eco12
Eco8	Eco14
	Eco16

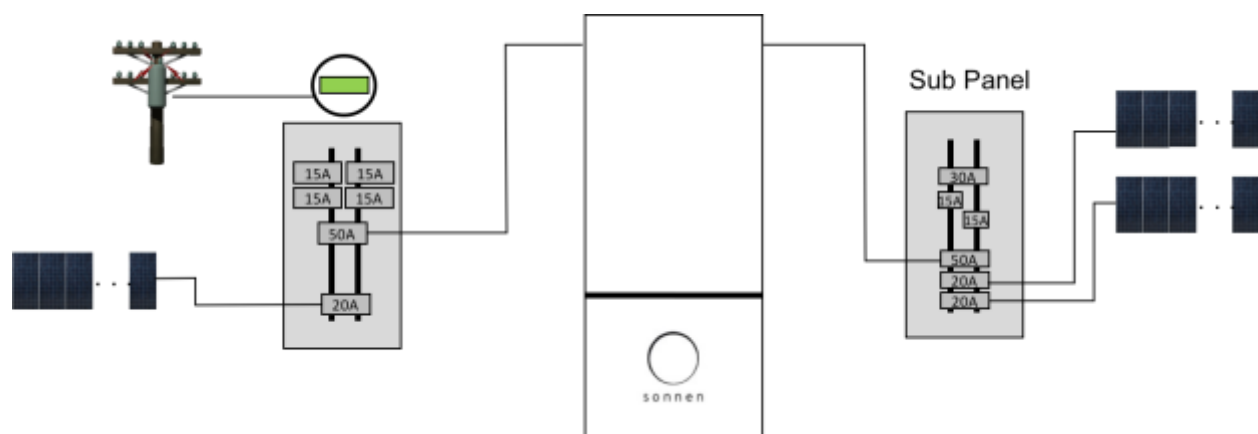


sonnen If you have an existing (or new) PV system that is larger than the ideal PV size then there are several options that will allow the PV inverter to still be compatible with the sonnenBatterie.

Micro inverter PV system compatibility:

Micro inverters offer the easiest solution for sonnenBatterie compatibility. Each branch circuit will typically connect to a 20A two pole breaker and each installation could have multiple branch circuit breakers. Sonnen recommends shifting the branch circuits from the main panel to the protected loads panel until the ideal PV size is reached. For example, this site has 40 250W micro inverters equaling a total PV system size of 10kW. The system is fed through 3 separate 20A two pole breakers, with two branch circuits equaling 3840W (16 micro inverters maximum per branch circuit) and 8 on the third breaker.

This site is going to use an eco12 which has a PV limitation of 8kW, so two of the branch circuits will be shifted from the main panel to the protected loads panel. This AC coupled PV system output equals 7680W and meets the PV limitation.



Another option for micro inverter installations is to put all 3 branch circuits on the protected loads panel for maximum self-consumption and then isolate one branch circuit when the grid goes down using a 120V powered relay. Although sonnen, Inc. does not

endorse specific third party products, we have found this relay device to work with the option of isolating an AC circuit to the breaker of a micro inverter system.

Allen Bradley #400-DP30ND2



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This is what it looks like installed:



String inverter system compatibility

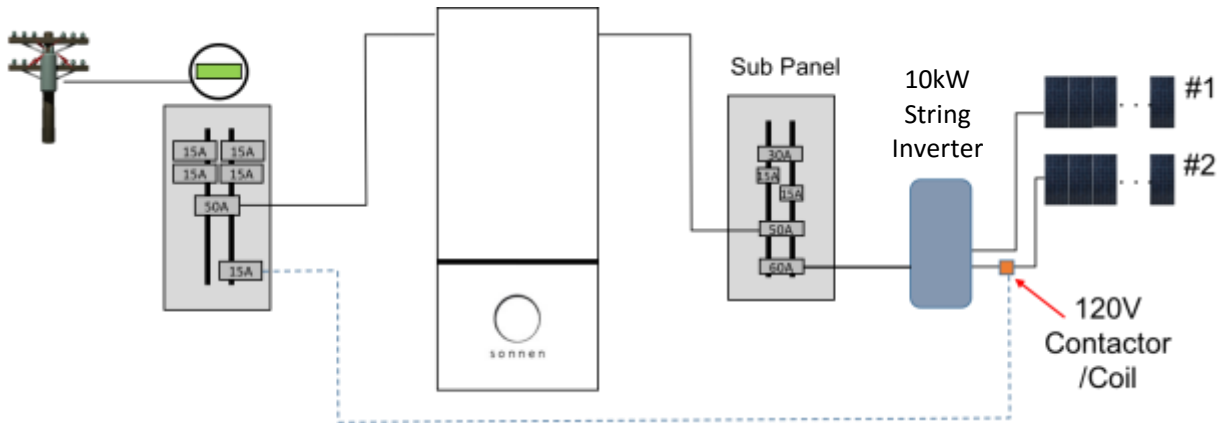
There are a few options to make string inverters compatible with the sonnen eco unit. For this example, the system uses a 10,000W string inverter and 2 strings of modules with DC optimizers.

This system feeds one 60A two pole breaker so it is not possible to break up branch circuits by shifting breakers from the main panel to the protected loads panel. Instead, we must limit the amount of power that reaches the 60A breaker:

1. Power limit the string inverter to 8000W. Contact inverter manufacturer for this procedure. The customer might not like this idea since they paid for a 10kW inverter.
2. If there are two string inverters in the installation then move one to the backup panel and keep one on the main panel.
3. Cut out one (or more) strings when the grid goes down. In the following example you can see that string #2 is connected to a contactor powered by 120V from the grid. When



the grid goes down string #2 will be disconnected and only half of the array will feed the inverter (5kW). Ensure that power limiting the array is accounted for in the sizing calculations.



Some of our customers have found 600VDC rated devices for these source circuits that will work in this solution at www.Gigavac.com