

# Backup Power During Power Outage

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## Overview

The objective is to supply power to the house for critical systems in the event of a power outage. We have 2.4 kW of lithium battery power and multiple inverters. Ideally, we would like to group our batteries and connect the inverter directly to the panel and select what circuits we need to power.

**We will be supplying 120VAC to only 1 phase.**

## Inverter Connect Directly to Appliance

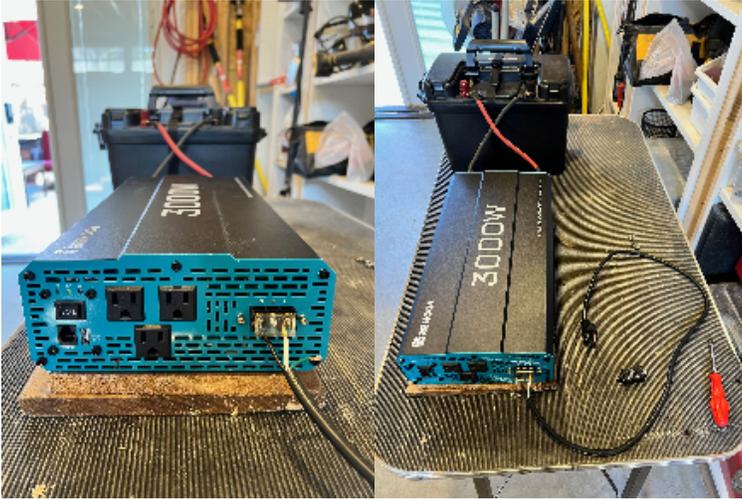
Here is an example of what we used initially. Just a battery and inverter independently powering our espresso machine.



## Renogy Pure Sine Inverter

The inverter we are using is a Renogy 3000W pure sine inverter. This inverter has ground and neutral bonded together inside the inverter. This is good when installed in a RV but won't work when tying it to your panel.

In order to get this to work when connected to our house, we will leave the ground disconnected. The thought here is that the ground is supplied by the house which will protect our connected devices.



## Panel Rework

We moved around some circuits in the panel to ensure all critical circuits are on the same phase. This is not important if you will power both phases. If you do have critical circuits on one panel it will be easier since you don't have to supply power to both phases. This however does require you to rework your fuse panel.

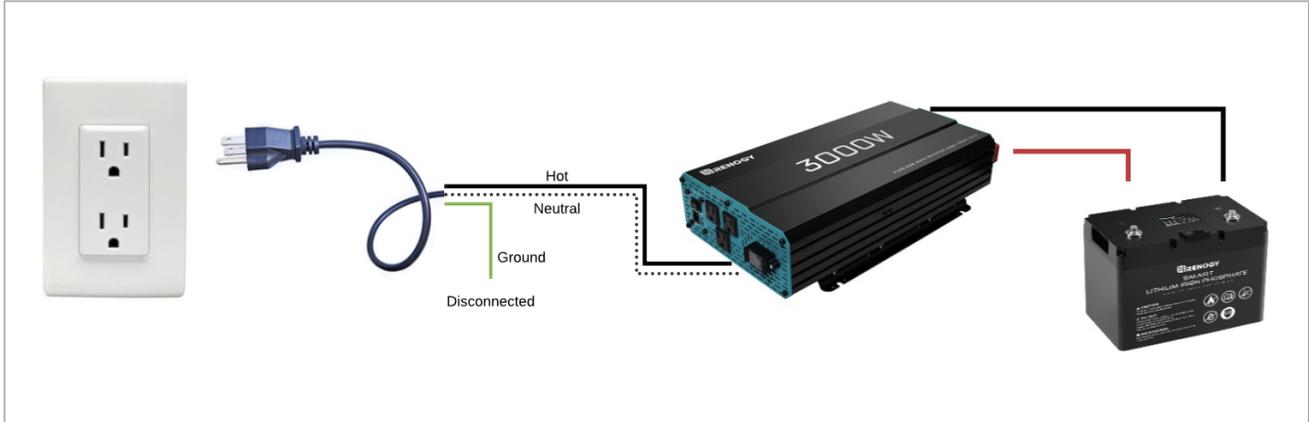
Here we have moved circuits that would be useful in the event of a power outage to our L2 phase. This includes **heat, hot water, tv, internet and coffee!**

Panel								
#	Line	Location	Amps	Circuit	#	Location	Amps	Circuit
1	L1	Kitchen	15	Lights	31		15	Backdoor/Exterior Lights/Backyard Plugs??
2	L1		15	Microwave	32		20	Pool
3	L2		20	Counter 1	33			
4	L2		20	Counter 2	34		15	Entryway Plugs/Front Light/Porch Plug?
5	L1		20	Counter 3/Island	35	1st Floor	15	Living Room Plugs
6	L1		20	Dishwasher	36		15	Dinning Room Plugs & Living Room Switched Plug
7	L2		15	Fridge	37		15	Lights/Dinning Sw Plugs
8	L2		15	Computer Nook/Beerfridge/Wifi	38		15	TV/Fireplace Fan
9	L1		50	Stove	39		15	Bathroom
10		40						
11	L2				41	2nd Floor	15	Lights/Sunroom
12					42			
13	L1	Basement	15	Brewery Lights/Plug & Utility Room	43		15(AF)	Front Bedrooms
14	L1		15	Utility Plug & Light (near panel)	44			
15	L2		15	Furnace	45		15(AF)	Back Bedroom/TV Room/Wifi
16	L2		20	Brewery Fridge/Standup Freezer	46			
17	L1		20	Brewery Counter 1	47		15	Bathroom
18	L1		20	Brewery Counter 2	48			
19	L2		50(GFCI)	Brew Panel	49		15	Sunroom Heated Floors
20					50		30	Dryer
21	L1				51			Dryer
22					52		15	Washer
23	L2		15	Lights/Hot Water Tank/Internet	53	3rd Floor	15	Lights
24	L2		20	Air Conditioner	54			
25	L1				55		15(AF)	Front Bedroom
26	L1		15	-- SPARE --	56			
27	L2	Outside	60	Hot Tub/Garage	57		15(AF)	Back Bedroom/Wifi
28					58			
29	L1				59		15	Bathroom
30					60			

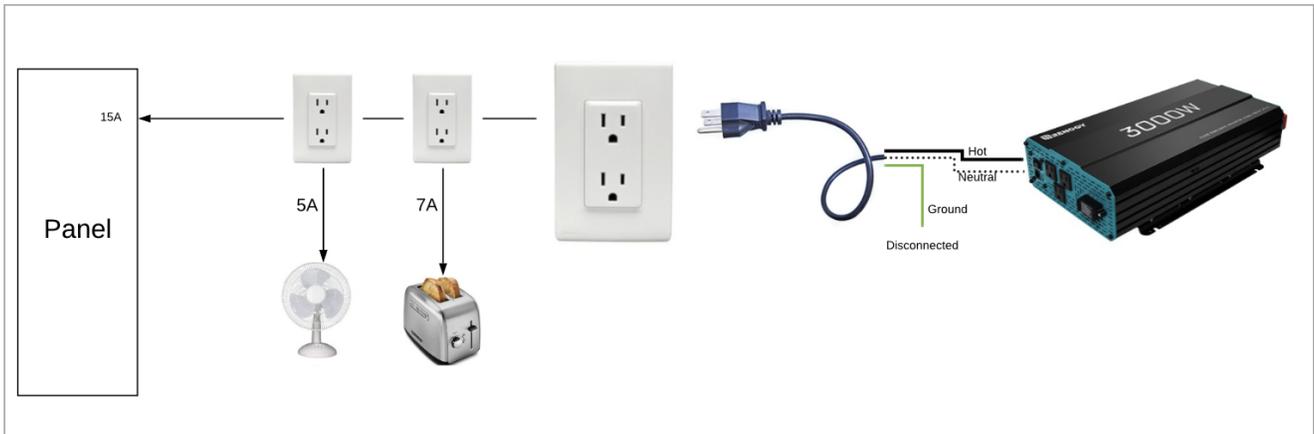
◆ Critical Circuits during Power Outage

## Connecting to the Panel

To connect our inverter to the panel, we simply connected our inverter to a receptacle which was running on the desired phase (L2 in our case). Ideally, this receptacle should not be on a circuit containing a GFCI or arc fault breaker and should not have any loads between the inverter and the panel.



Please consider the following situation:



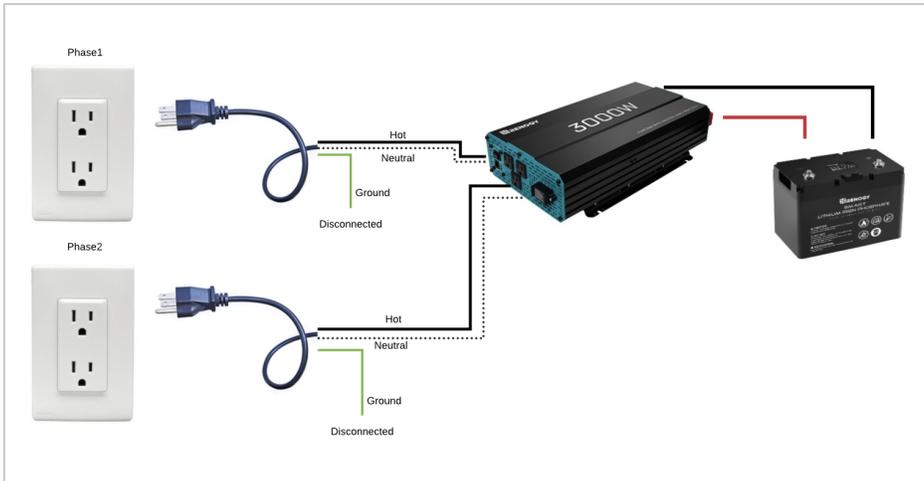
In the above situation, the 15A breaker is not protecting you. If the inverter can supply more than 15 amps, then the wires between panel and the inverter could be carrying up to 27 amps in the above diagram which would be over the rated amperage of the wires!

### Connection Steps

- Turn off the main power circuit on panel!
- Turn off all circuits
- Ensure all 240v breakers are OFF. Any 240v breakers that feed sub panels can be kept on. Ensure 240v breakers on sub panels are OFF.
- Connect inverter to receptacle on desired phase. (Ideally a circuit not protected by a GFCI or arc fault breaker)
- Power on inverter
- Turn on critical circuits on panel.

## Connecting to the Panel - Both Phases

To connect our inverter to both phases we will need to connect to two different receptacles on different phases. We will need to ensure all 240v breakers are turned off.



### Connection Steps

- Turn off the main power circuit on panel!
- Turn off all circuits
- Ensure all 240v breakers are OFF. Any 240v breakers that feed sub panels can be kept on. Ensure 240v breakers on sub panels are OFF.
- Connect inverter to receptacle on each phase. (Ideally a circuit not protected by a GFCI or arc fault breaker)
- Power on inverter
- Turn on critical circuits on panel.

## References

Reference	URL
How to Power your House with an Inverter/Generator During a Power Outage Part 1/3	<a href="https://www.youtube.com/watch?v=yiyri0Kb9Ww">https://www.youtube.com/watch?v=yiyri0Kb9Ww</a>
How to Power your House with an Inverter/Generator During a Power Outage Part 2/3	<a href="https://www.youtube.com/watch?v=A-OfcgU_7Fs">https://www.youtube.com/watch?v=A-OfcgU_7Fs</a>
How to Power your House with an Inverter/Generator During a Power Outage Part 3/3	<a href="https://www.youtube.com/watch?v=a5BziLct3E&amp;list=RDCMUCVktNhxFtBnrLfele1tdgSQ&amp;index=3">https://www.youtube.com/watch?v=a5BziLct3E&amp;list=RDCMUCVktNhxFtBnrLfele1tdgSQ&amp;index=3</a>