

Whole-Home Self-Consumption Kit Installation Instructions

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This manual refers to:

Hardware version: 1.00

Latest revision: 04/09/2020

If you need help or service, contact the company that commissioned your storage system.

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Installing the Whole-Home Self-Consumption Kit

Some self-consumption configurations place little load on a Protected Load Panel to maximize backup capability. Such setups can be detrimental to self-consumption performance because the sonnen system can only respond to loads connected to the same distribution panel. Installing a consumption meter between the utility meter and the main distribution panel will increase performance by allowing the storage unit to discharge to upstream, non-essential loads for the purpose of offsetting additional grid purchase. Special care must be taken not to overload the distribution panel and to adhere to NEC 705.12(D) (2), the 120% rule.

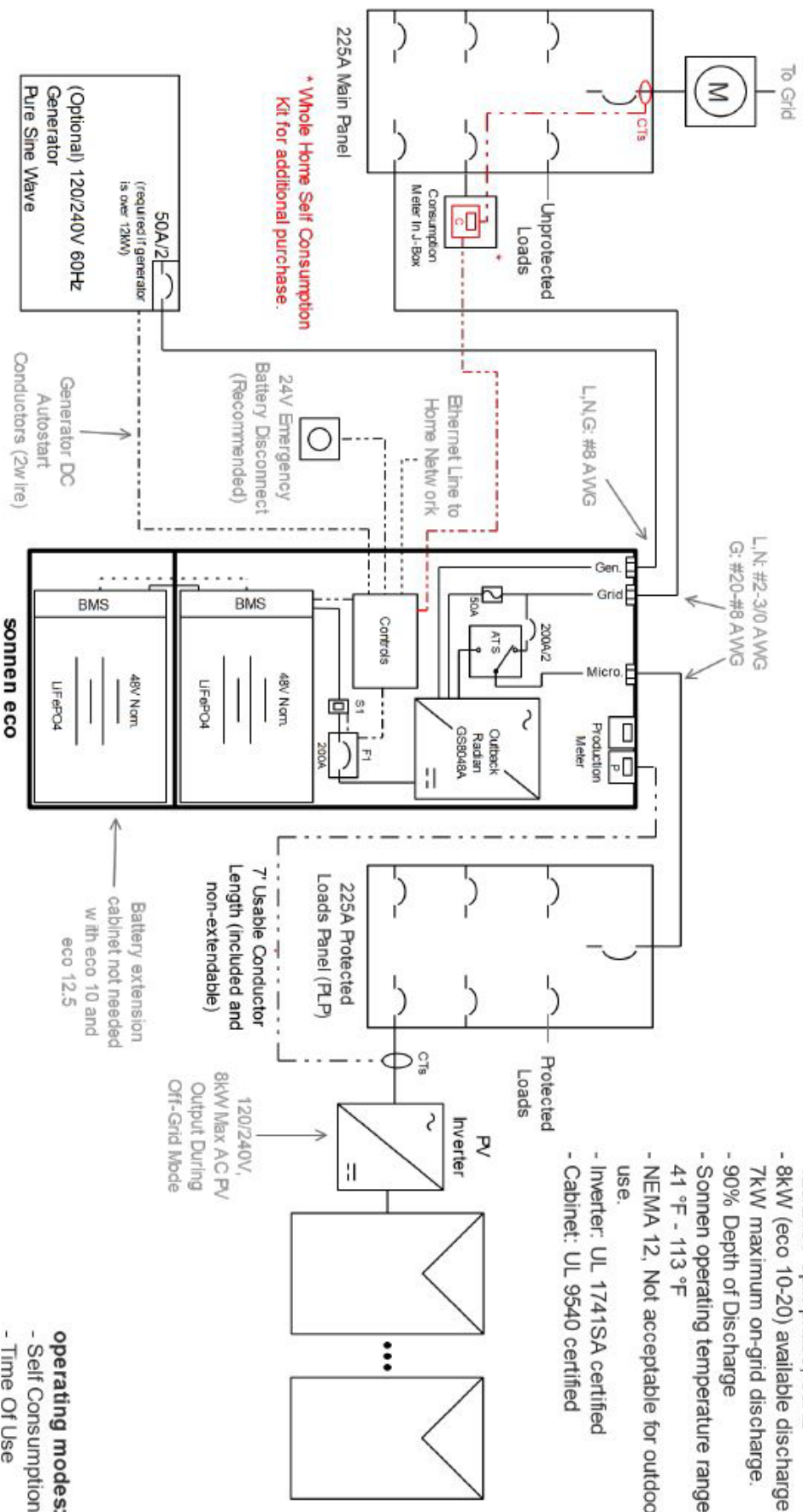
Requirements

Meter package:	38440 - External self-consumption metering kit
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Package contents:	Pre-wired consumption meter and two 200A CTs (400A CTs also available)
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Required communication cable:	Belden 9533
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Required overcurrent protection:	2 Pole 15A
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- sonnen specifications:**
- 120/240V split phase, 60Hz
 - 8kW (eco 10-20) available discharge. 7kW maximum on-grid discharge.
 - 90% Depth of Discharge
 - Sonnen operating temperature range: 41°F - 113°F
 - NEMA 12, Not acceptable for outdoor use.
 - Inverter: UL 1741SA certified
 - Cabinet: UL 9540 certified

- operating modes:**
- Self Consumption
 - Time Of Use
 - Battery Backup

- notes:**
- Drawing is for wire reference only, and is not reflective of actual wire penetrations.
 - **Protected Loads Panel may contain loads migrated from existing main panel. Not indicative of work being done.**
 - All electrical work shall comply with the National Electric Code (NEC 2017)
 - Refer to NEC 705.12(D)(2) for panel busbar sizing.

		SINGLE LINE DIAGRAM - WHOLE HOME SELF CONSUMPTION			
		ENERGY STORAGE ECO 10-20 (8000VA/10-20kWh)			
SONNEN, INC. 2048 Weems Rd. Tucker, GA 30028		SIZE LTR	DATE 03/18/2019	DWG NO SLD_1903_ECO_10-20_WHSC	REV 1.0
		SCALE N.T.S.	Rev by AA	SHEET	1 OF 1

Tools required:

- 14 AWG wire stripper
- 14 AWG wire ferrules
- Wire crimper

Design

If you are installing the kit to maximize self-consumption, please refer to the diagram on page 6 to ensure your design is correct.

Connection

To enable self-consumption on loads outside the Protected Loads Panel, disconnect the communication cable inside the storage system and install new meter and CTs externally.

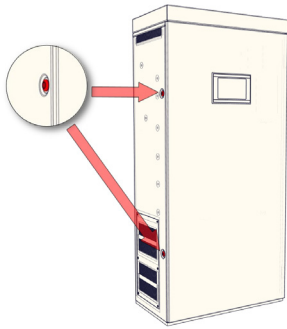
1. Shut down unit

Perform a software shutdown as described in the Installation and Operation Manual.

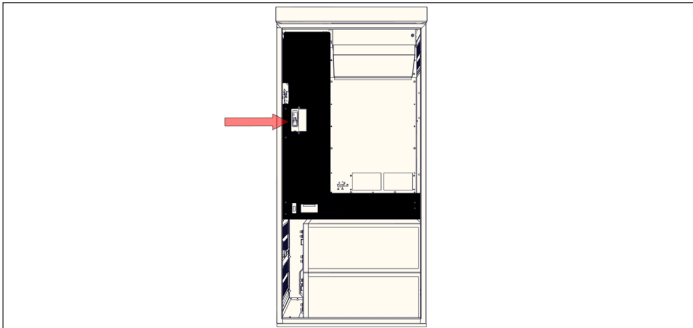
2. Turn off the main AC disconnect.

3. Remove the battery access panel(s).

4. Open the storage unit's door(s).



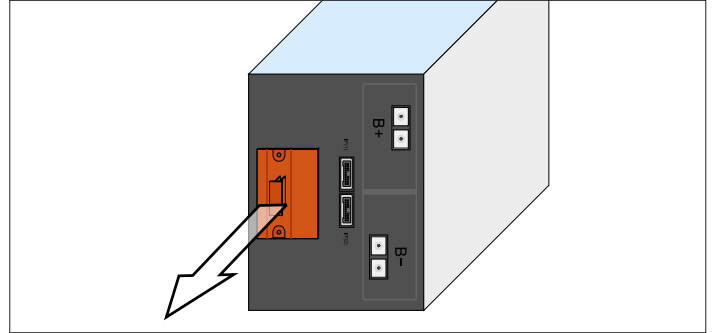
5. Turn off the AC breaker.



6. Shut down batteries

Systems with LFP1 batteries

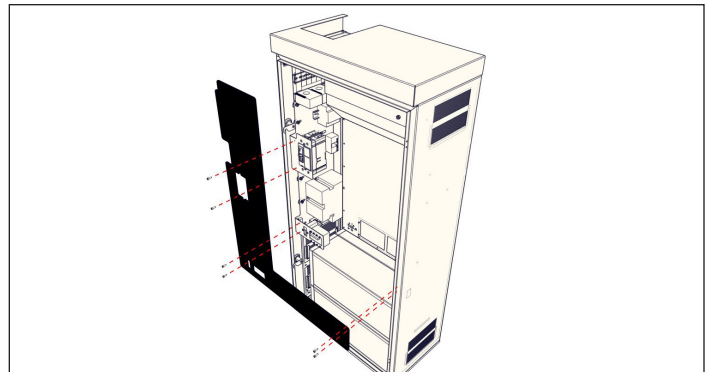
- ▶ Remove the orange battery safety plugs



Systems with LFP2/Ndure batteries

- ▶ Press the power button on battery #0 for 3 seconds.
- ▶ Wait for all battery power LEDs to go off.
- ▶ Ensure both the “Power” and “Status” LEDs are off on each battery module.

7. Remove dead front



- ▶ Remove the dead front to access the electrical connections.

8. Disconnect Modbus cables



Install the consumption meter

The components of the whole-home self-consumption kit are pre-wired. You will only have to connect the L1, L2, and N lines to a 15-amp, two-pole circuit breaker in your distribution panel and run a communication cable from the meter to your sonnen storage unit. The grounding cable runs from the meter base to the load center ground bar. The included CT wires are 10ft and **CANNOT BE EXTENDED**.

1. Mount components

- ▶ Mount the meter in a location with access to the distribution panel. The CT wires are only 10 feet long so the meter should be placed within 6-7 feet of the main panel to allow for some slack.
- ▶ Disassemble the split top part of the CT. Install the CT around the main service entrance conductors. Verify the CT is installed with the CT arrows pointing in the same direction as the current flow. In this case, towards the main panel.

Attention

The power meter will produce incorrect measurements if the current transformers are installed incorrectly!

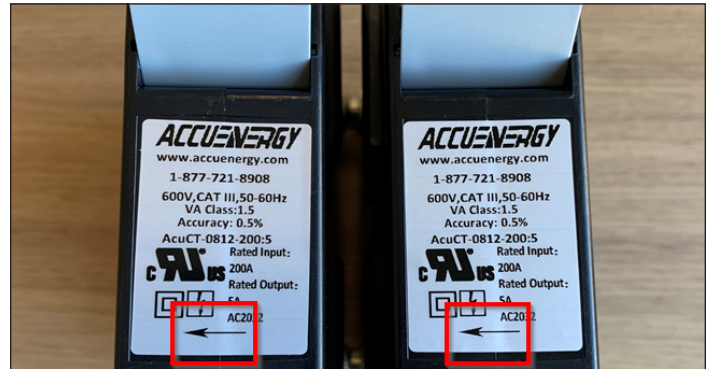
Take special care to install the current transformers on the correct line as shown on the label and the voltage-sensing wires as shown on the wire label. Installing a current transformer or wire on L1 that was designated for L2 will cause the power meter to produce incorrect measurements.

Attention

The power meter will produce incorrect measurements if the current transformers are installed backwards!

Pay close attention to the labels on each current transformer to ensure they are oriented correctly. Incorrect orientation will produce inaccurate measurements.

- ▶ Connect the L1 & L2 to the 15A two pole breaker, connect the N to the load center Neutral bar, Ground to the grounding bar in the load center.



Attention

The power meter will produce incorrect measurements if the current transformer wires are extended!

Doing so will lead to inaccurate measurements.

Prepare the communication cable

Trained, electrically qualified person only!

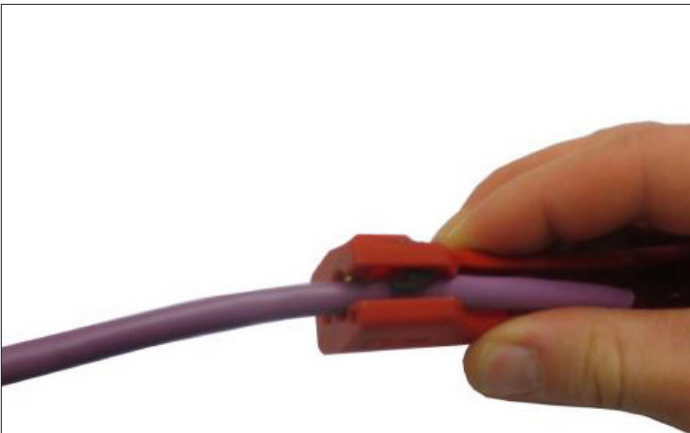
Attention

Components can be damaged if the installation is performed out of order!

The Modbus cable must be connected first to the power meter and then to the storage system.

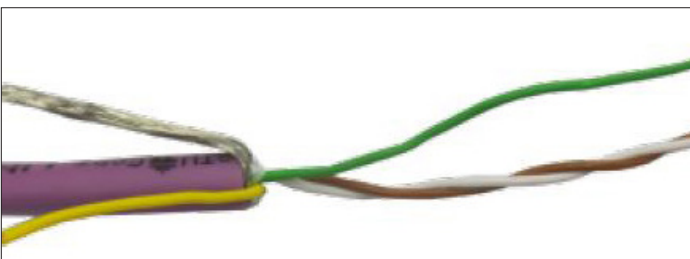
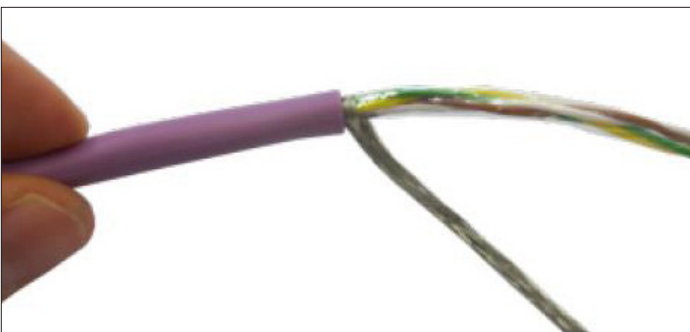
The power meter and the storage system communicate via the Modbus protocol. The Modbus cable is comprised of data signal wires (A- and B+) and a ground wire (GND). To prepare a Modbus cable, use a Belden 9533 or similar shielded, multi-conductor cable.

1. Strip Modbus cable



Remove the outer insulation from the cable. Be careful not to damage the wire shielding.

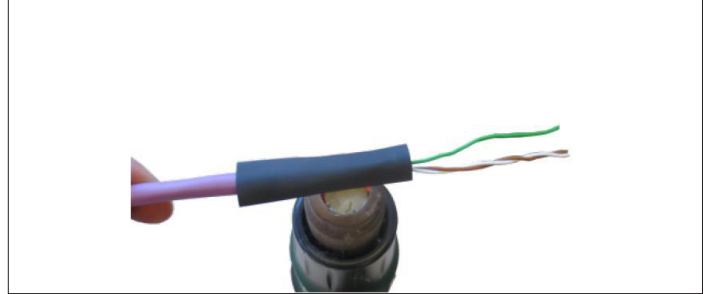
2. Remove plastic film



You will need three wires, one each for A-, B+, and ground.

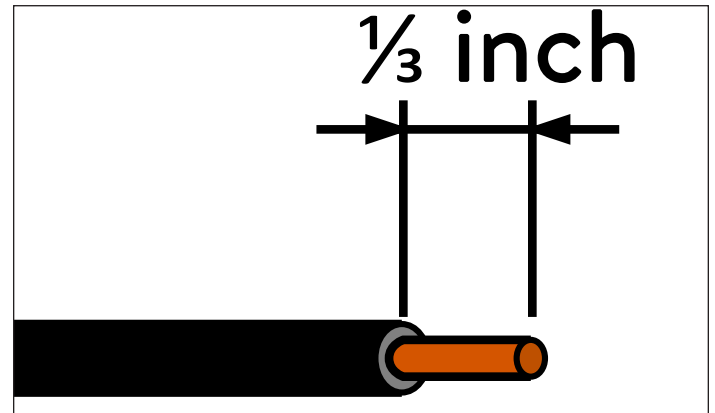
- Flex the shielding and any additional wires backwards.

4. Add insulation



- Use heat shrink tubing as insulation.

5. Strip wires

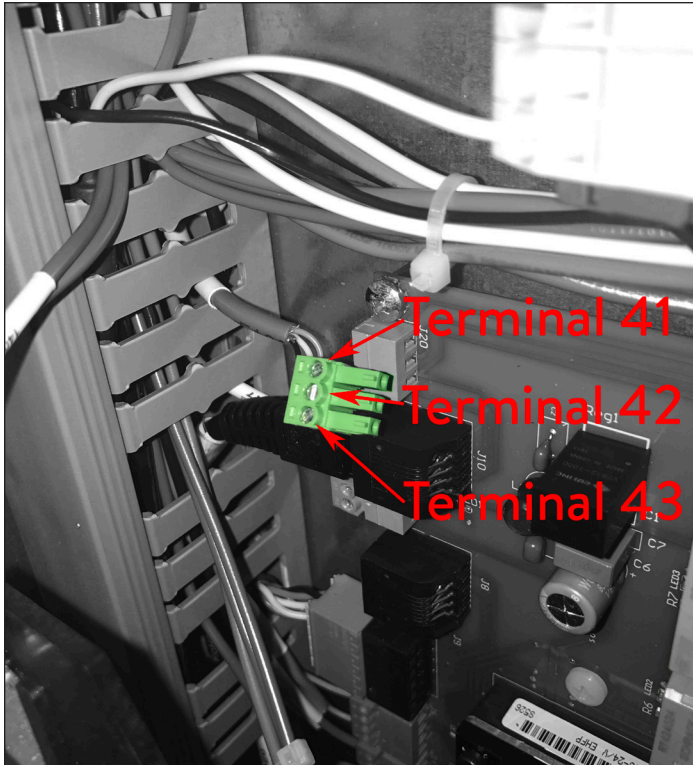


6. Crimp wire ferrules



7. Connect communication cable to unit

1. Connect Belden ferruled wires to consumption meter: black to 41, red to 42 and white to 43.
2. Connect the terminals on the power meter to the connector as shown below.



3. If possible, check your connections using your multimeter's continuity function to ensure you have wired the communication cable correctly.
4. Reinstall the connector into Port J20.

8. Reinstall ATS shield

9. Reinstall No-Touch screen

Systems with LFP1 batteries

- ▶ Replace the orange battery safety plugs

Systems with LFP2/Ndure batteries

- ▶ Press the power button on battery #0 for 3 seconds.
- ▶ Wait for all battery power LEDs to turn on.

- ▶ Ensure both the “Power” LED is blinking on each battery module.

10. Turn on AC breaker

11. Close cabinet door(s)

12. Reinstall battery access panel(s)

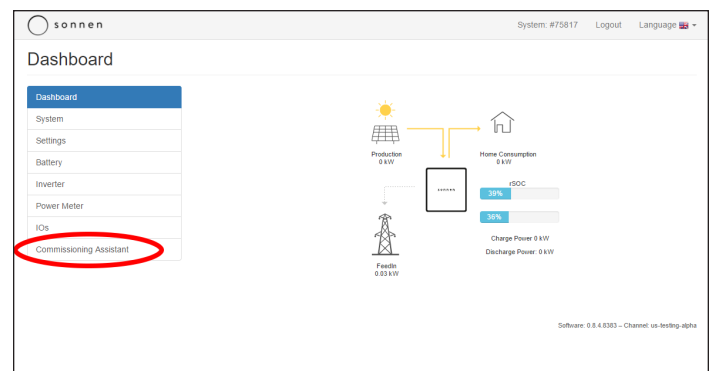
13. Turn on main disconnect

14. Turn on storage system

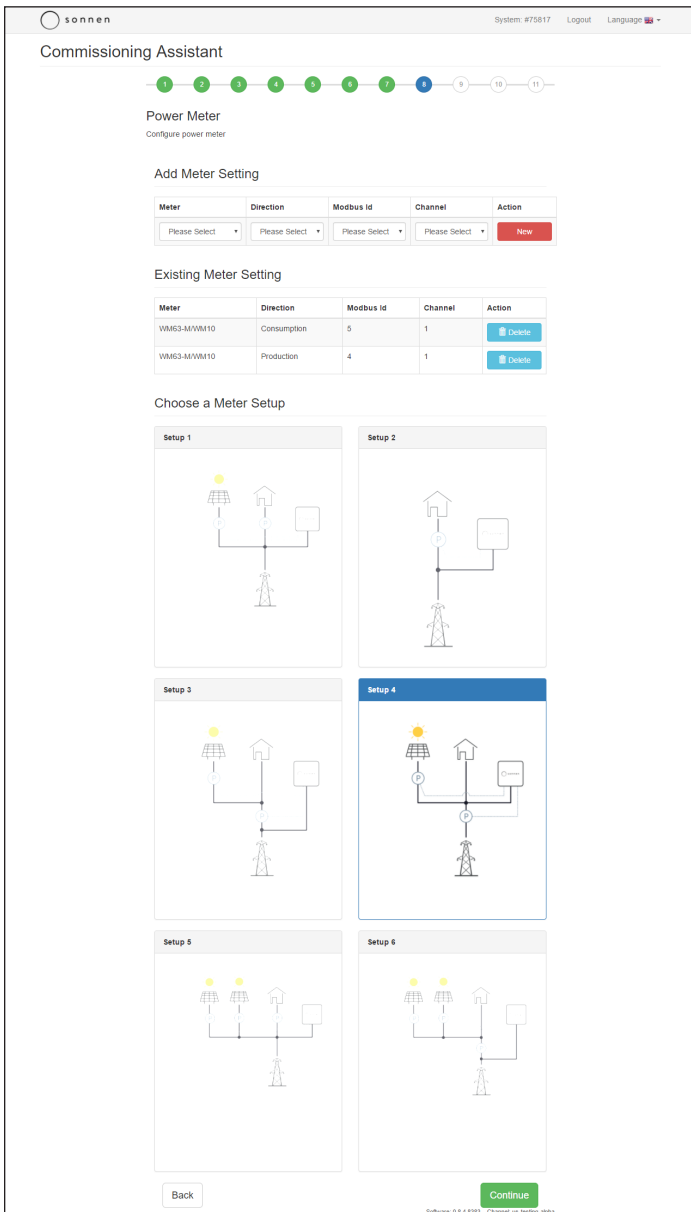
Configure the system to use new meter

To complete the meter installation process, log in to the unit's installer account as described in the installation manual.

- ▶ Log into the system's installer account.
- ▶ When the dashboard appears, select “Commissioning Assistant.”



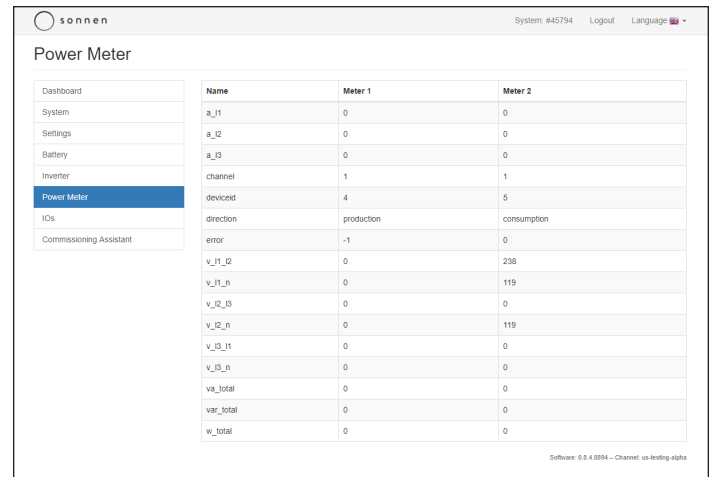
- ▶ Proceed through the commissioning assistant.



- ▶ Select Setup 4.
- ▶ Press Continue.
- ▶ Continue through the commissioning assistant until it is complete.

To confirm that the meter has been installed and figured correctly, perform the following steps:

1. Select the “Power Meter” screen.

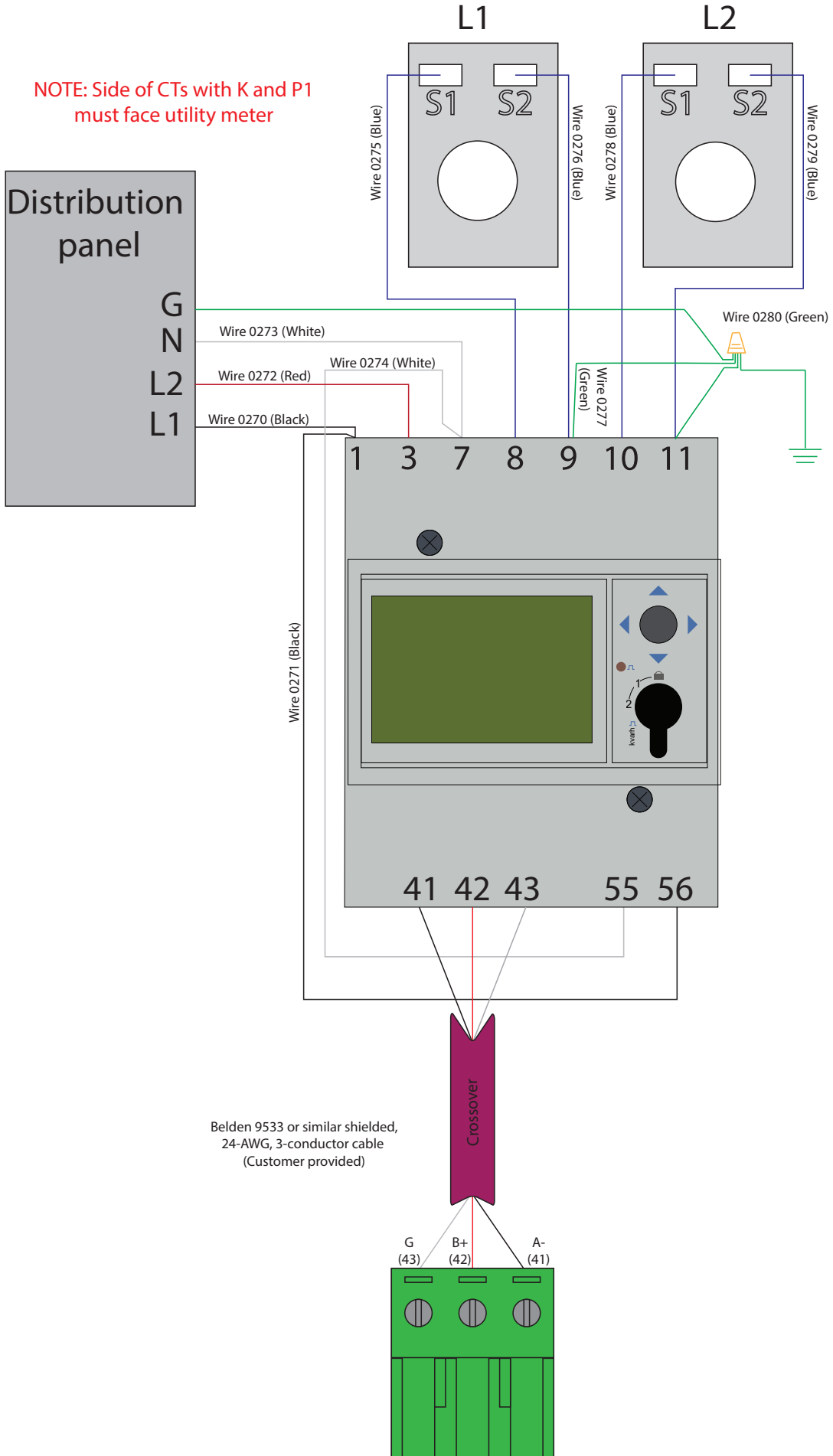


2. Ensure that the value for V_L1_L2 is about 240. This value measures the voltage between L1 and L2.
3. Ensure that the value for V_L1_N is about 120. This value measures the voltage between L1 and N.
4. Ensure that the value for V_L2_N is about 120. This value measures the voltage between L2 and N.
5. Ensure that the value for error is 0. This value measures the error count registered by the meter.
6. If any of these values are incorrect, check your installation and configuration.

- ▶ Log out of the system.

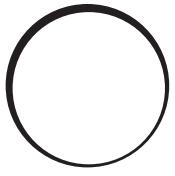
Your storage system will now respond to loads electrically downstream of the newly installed current transformers.

NOTE: Side of CTs with K and P1 must face utility meter



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