How the Sonnen eco is applied to 705.12(D)(2)

Because residential energy storage is a new and emerging technology, some installers and inspectors are unfamiliar with how to take the sonnenBatterie eco storage system into account when sizing distribution panels in regards to NEC 705.12(D)(2), the 120% rule. Because the storage system has dedicated grid and microgrid ports, only load centers located on the microgrid side need to take the output of the sonnenBatterie eco into consideration.
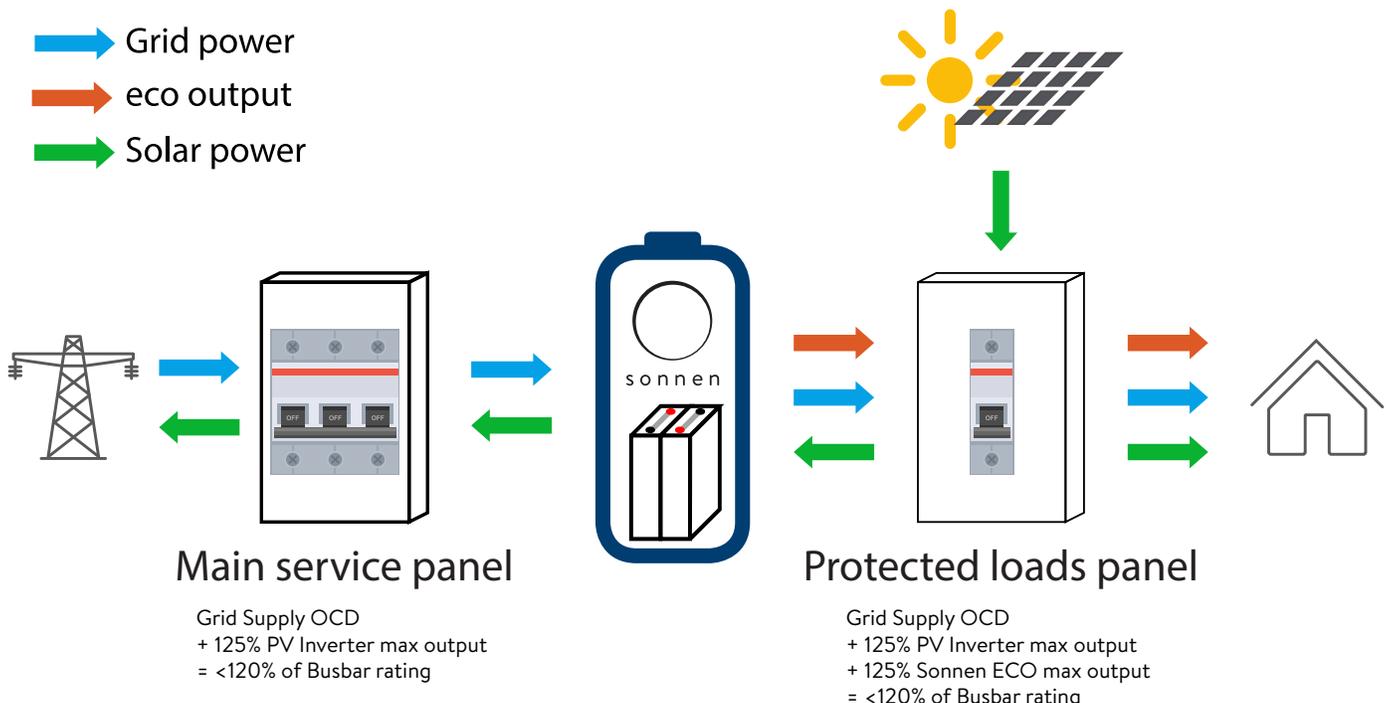
The storage system only discharges energy when loads are present "downstream"; that is, on the protected load panel. This is in contrast to a PV system, which supplies energy whenever grid voltage is present. Because of this, the main service panel should be sized for only grid and PV, if applicable. The protected load panel, however, needs to take the grid supply overcurrent protection device, PV, and the storage system into account for proper rating.
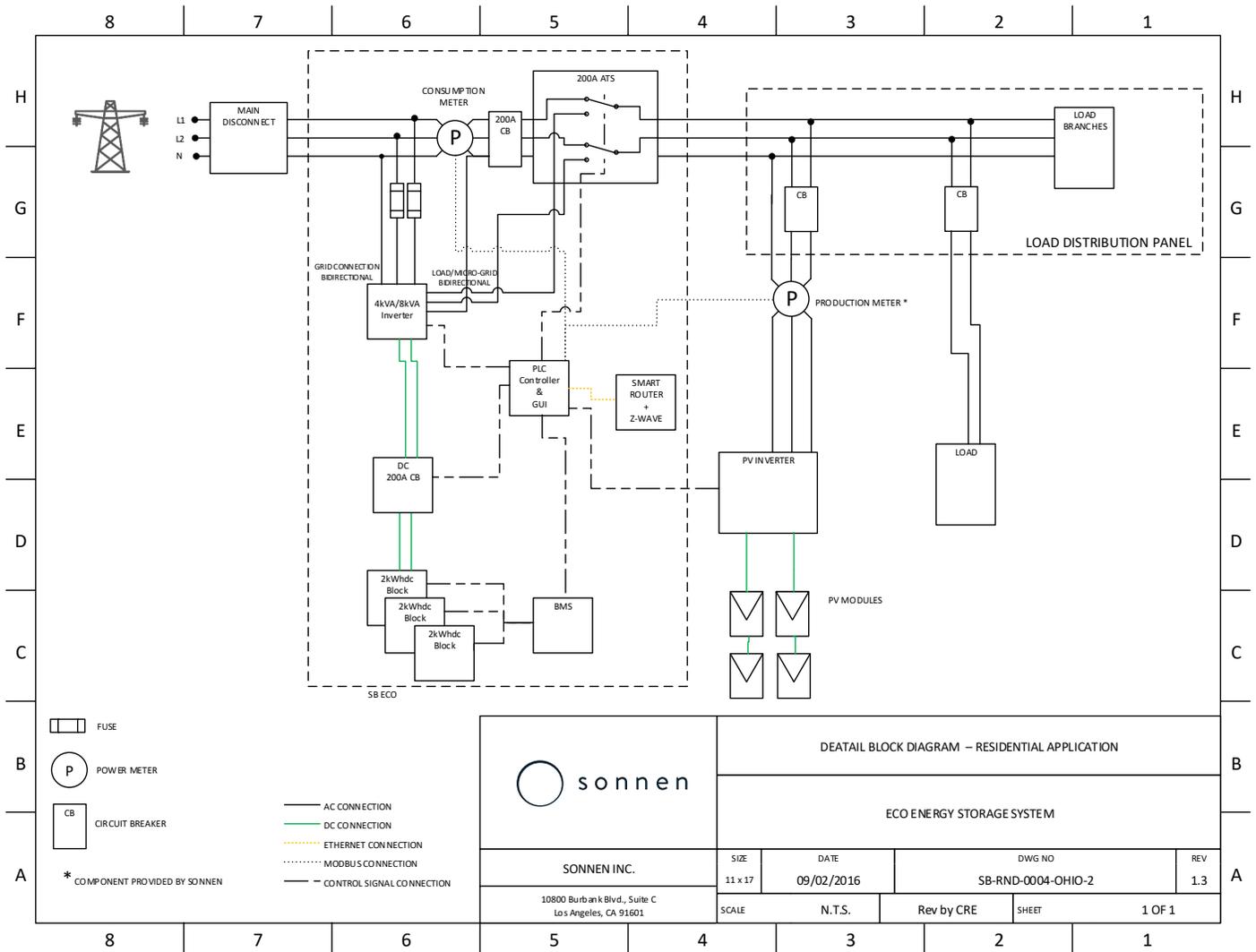
The storage system incorporates an internal power meter to measure loads. This meter uses current transformers on the microgrid side of the storage system to determine when loads

Nominal Output Current	
eco 4, 6, and 8	15 amps
eco 10, 12, 14, and 16	30 amps

are present and how much energy to discharge. Because of this design, the storage system will not discharge more energy than necessary to power loads on the microgrid. The main distribution panel, located on the grid side of the storage system, need not take the sonnenBatterie eco into consideration because the storage system will not discharge to upstream loads.

The overcurrent protection device used to supply the sonnenBatterie eco can be up to 200 amps, based on the storage system's internal ATS and wiring, as the sonnenBatterie eco will act as a pass-through for the grid power to serve the load distribution panel. PV in excess of loads also has a path to the grid from the microgrid load distribution panel. See example illustration and single-line drawing.

→ Grid power
→ eco output
→ Solar power

Main service panel

Grid Supply OCD
+ 125% PV Inverter max output
= <120% of Busbar rating

Protected loads panel

Grid Supply OCD
+ 125% PV Inverter max output
+ 125% Sonnen ECO max output
= <120% of Busbar rating

Grid / System block diagram labels:

- L1 / L2 / N
- MAIN DISCONNECT
- CONSUMPTION METER
- 200A CB
- 200A ATS
- LOAD BRANCHES
- LOAD DISTRIBUTION PANEL
- CB
- CB
- GRID CONNECTION BIDIRECTIONAL
- LOAD/MICRO-GRID BIDIRECTIONAL
- 4kVA/8kVA Inverter
- PLC Controller & GUI
- SMART ROUTER + Z-WAVE
- PRODUCTION METER *
- PV INVERTER
- LOAD
- DC 200A CB
- 2kWhdc Block
- 2kWhdc Block
- 2kWhdc Block
- BMS
- PV MODULES
- SB ECO

Legend:

- ▭ FUSE
- (P) POWER METER
- [CB] CIRCUIT BREAKER
- * COMPONENT PROVIDED BY SONNEN

- —— AC CONNECTION
- —— DC CONNECTION
- ···· ETHERNET CONNECTION
- ···· MODBUS CONNECTION
- — — CONTROL SIGNAL CONNECTION

sonnen		DEATAIL BLOCK DIAGRAM – RESIDENTIAL APPLICATION			
		ECO ENERGY STORAGE SYSTEM			

SONNEN INC.	SIZE	DATE	DWG NO		REV
10800 Burbank Blvd., Suite C Los Angeles, CA 91601	11 x 17	09/02/2016	SB-RND-0004-OHIO-2		1.3
	SCALE	N.T.S.	Rev by CRE	SHEET	1 OF 1