WORKSHEET 3 · CHAPTER 11

Connection Math Worksheet

The 120% rule, from Chapter 11 and Worksheet 11.1. Under the 2023 NEC, with the solar breaker at the opposite end of the busbar from the main: 125% of the inverter's rated output current, plus the main breaker's rating, cannot be more than 120% of the busbar's rating. The rule uses the inverter current from the datasheet, not the breaker size.

Your name / address: _____ Panel make / model:

_____

Line	Sample house	Your house	Checked backward
Busbar rating, A	200 A, end-fed, two open spaces at the bottom (Ch 7)		
Main breaker rating, A	200 A		
120% of the busbar, A	200 x 1.2 = 240 A		
Room for 125% of inverter current, A	240 minus 200 = 40 A		
Most inverter current that fits, A	40 / 1.25 = 32 A		

Micro path

Line	Sample house	Your house	Checked backward
Micros and rated output current each	20 micros at 1.21 A each (Ch 9)		
Total inverter current, A	20 x 1.21 = 24.2 A		
125% of inverter current, A	24.2 x 1.25 = 30.25 A		
Main plus 125% of inverter current, A	30.25 + 200 = 230.25 A		
Compared with 120% of the busbar	230.25 A is under 240 A. It fits, with 9.75 A to spare.		

The spare 9.75 A is room for about 7.8 A more of micro output, which is 6 more micros at 1.21 A (6 x 1.21 x 1.25 = 9.08 A). So the two spots saved on the west plane for the EV still fit later (Ch 11).

String path

Line	Sample house	Your house	Checked backward
Inverter rated output current, A	One 7.6 kW inverter at 31.7 A (Ch 9)		
125% of inverter current, A	31.7 x 1.25 = 39.6 A		
Main plus 125% of inverter current, A	39.6 + 200 = 239.6 A		
Compared with 120% of the busbar	239.6 A is under 240 A by 0.4 A. It fits, just barely. Any bigger inverter would not.		

If it does not fit

On a 200 A bus with a 200 A main, the 100% method leaves zero room, so it does not work on the sample house (Ch 11). Chapter 11 also covers the sum of breakers, power control systems, a second sample panel that does not fit, and supply-side connections. A later battery stage can change this math (Ch 32). If the 120% rule fails on your panel, stop and use that chapter. The solar breaker stays at the opposite end of the busbar, and the code requires a warning label not to move it (Ch 24).

Use the edition your building department enforces. The 2023 NEC lists these options in 705.12. Use this worksheet with the book, not in place of it.