# PV Power Source Labeling in a SolarEdge system

Introduction

String design and installation is significantly different in a SolarEdge system when compared to a traditional string inverter. PV modules do not get connected in series directly. Every PV module in the array is first connected to the input of a SolarEdge power optimizer, the power optimizer output cables are connected to other power optimizer output cables connecting the power optimizers in series.
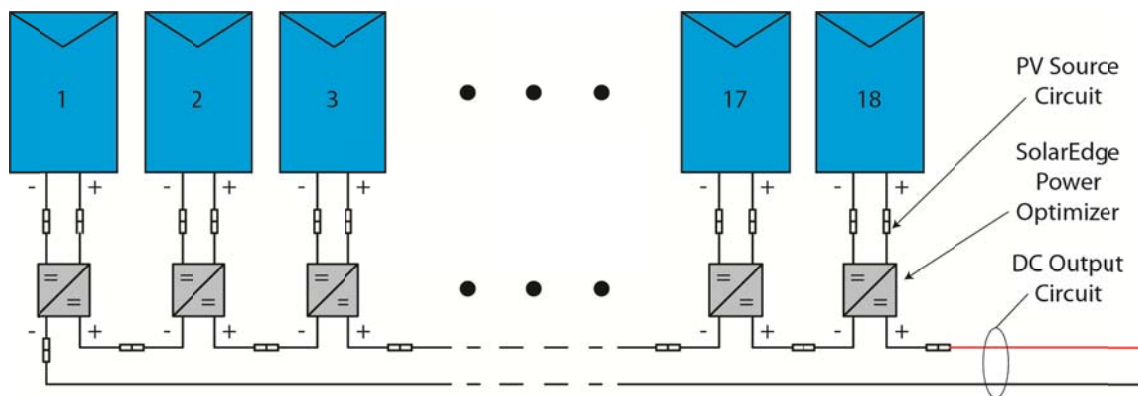
PV module open circuit voltage at low temperature needs to be considered to avoid exceeding the power optimizer input voltage rating but it does not have an impact on string length. Both voltage and current are regulated at the string level. SolarEdge inverters operate with a fixed string voltage regardless of the number of power optimizers connected in series.

NEC Requirements

NEC Article 690.53 specifies that the following PV power source information be provided in a permanent label at the PV disconnecting means:

(1) Rated maximum power point current.

(2) Rated maximum power point voltage.

(3) Maximum system voltage.

(4) Maximum circuit current.

SolarEdge system labeling

(1) Rated maximum power point current

The maximum power point current is the lower of the following 2 values:

The total STC DC power rating for all PV Modules divided by the nominal string voltage value listed in item (2) below for maximum power point voltage.

For example, a system with 28 – 260 watt PV Modules with the SE6000A-US inverter connected to a 240 Vac single phase grid connection would be: 7280 watts divided by 350 Vdc = 20.8 amps.

The maximum input current rating of the inverter.

For example the SE6000A-US inverter has a maximum input current rating of 18 amps and will limit current to 18 amps.

If the calculated maximum power point current is lower than the inverter input rating, the calculated value should be used. In this case the calculated value is higher than the inverter input current rating so the 18 amp inverter current limit should be used.

(2) Rated maximum power point voltage

SolarEdge inverters operate with a fixed string voltage. This voltage value is determined by the AC grid voltage that the inverter is connected to. The labeling requirement for the supported grid voltages are below:

Single Phase Inverters

208 Vac grid = 325 Vdc nominal string voltage

240 Vac grid = 350 Vdc nominal string voltage

277 Vac grid = 400 Vdc nominal string voltage

Three Phase Inverters

208/120 Vac grid = 400 Vdc nominal string voltage

480/277 Vac grid = 850 Vdc nominal string voltage

(3) Maximum system voltage

In a SolarEdge system the PV Modules are not connected directly to the DC output circuit. When the inverter is offline for any reason, on-off switch turned off or no AC voltage applied to the inverter, the power optimizers are in their safe-mode and only output 1 Vdc per power optimizer. During the inverter startup process the power optimizers are instructed by the inverter to exit safe-mode and the string voltage will be slightly higher than the values listed above for maximum power point voltage until the inverter starts to regulate current in the string. The value for this labeling requirement should be the maximum input voltage rating of the inverter below:

All Single Phase Inverters

500 Vdc

Three Phase Inverters

SE9k-US - 208/120 Vac grid = 500 Vdc

SE10k-US, SE20k-US - 480/277 Vac grid = 980 Vdc

(4) Maximum System current

Under normal operating conditions, the string current is regulated by the inverter and will never exceed the maximum input current rating of the inverter. SolarEdge power optimizers provide internal current limitation as described in NEC article 690.8(B)(2). The power optimizers limit current at the PV module source circuit input to 10 amps and limit current at the power optimizer DC output circuit to 15 amps. The maximum current value of 15 amps should be used to determine DC output circuit conductor size and overcurrent protection requirements. The value for this labeling requirement should be 15 amps per string of power optimizers. Since SolarEdge inverters can be fully loaded with either 1 or 2 strings, the value would be either 15 or 30 amps

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