Application Note: Single String Design Guidelines

This application note establishes guidelines for implementing the single string design topology.

NOTES

- In case of a conflict between these guidelines and local regulations, local regulations shall prevail.
- If your system uses a battery, we recommend installing two strings even if all the below rules are met, to allow maximizing battery charge and inverter production.
- Verify yield factor losses when using the single string design on multi-facet roofs. If losses are greater than 1%, it is recommended to use optimizers with a higher output voltage or multiple strings, where possible.

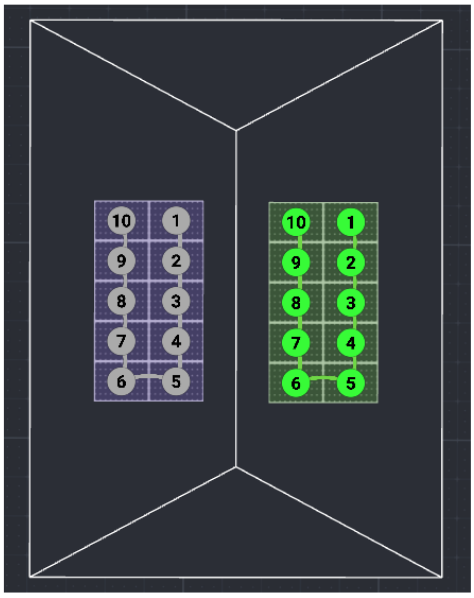
When the inverter AC nameplate is lower or equal to the maximum nominal string power for the connected inverter (mentioned in the optimizer's data-sheet), all power optimizers can be connected to a single string, as long as the following conditions are observed:

- The connected string power does not exceed the total allowed inverter DC/AC oversizing ratio
- The maximum allowed number of power optimizers per string does not exceed:
  - 25 power optimizers for a single phase inverter (see Example 1 below)
  - 50 power optimizers for a three phase inverter, when used in residential settings (see Example 2 below)

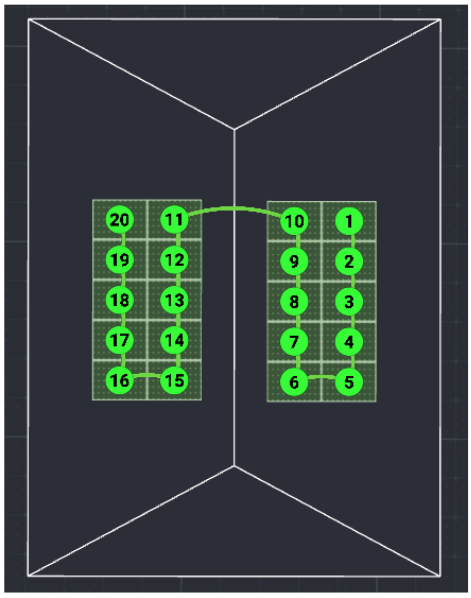
Example 1 – Valid Use

In a system with an SE5000H inverter installed with 20 x 345W modules connected to P370 (138% oversizing), the installed DC capacity will be 6.9kW STC. The inverter AC nameplate is 5kWac, which is lower than the maximum nominal string power of 5.7kW for P370 with single phase HD-Wave inverter (15Ax380V=5.7kW). In addition, 20 optimizers are smaller than the maximum allowed optimizers per string with a single phase inverter and the DC capacity of 6.9kW STC can be installed in one string. The inverter nameplate limit will ensure the maximum nominal string power is not exceeded.

Regular Design



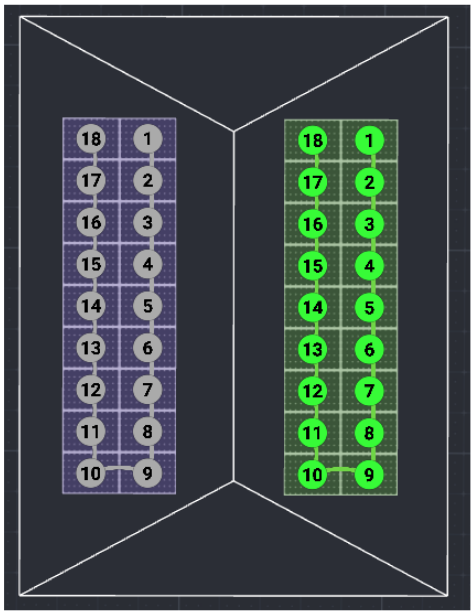
Single String Design



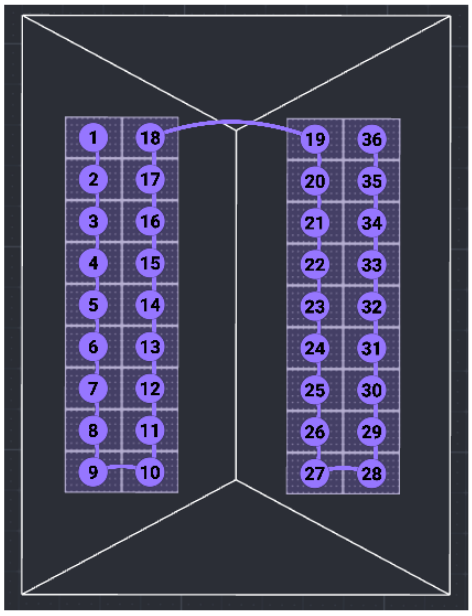
Example 2 – Valid Use

In a system with an SE10K inverter installed with 36 x 350W modules connected to P370 (126% oversizing), the installed DC capacity will be 12.6kW STC. The inverter AC nameplate is 10kWac, which is lower than the maximum nominal string power of 11.25kW for P370 with three phase inverter (15Ax750V=11.25kW). In addition, 36 optimizers are smaller than the maximum allowed optimizers in one string with a three phase inverter and the DC capacity of 12.6kW STC can be installed in one string. The inverter nameplate limit will ensure the maximum nominal string power is not exceeded.

Regular Design



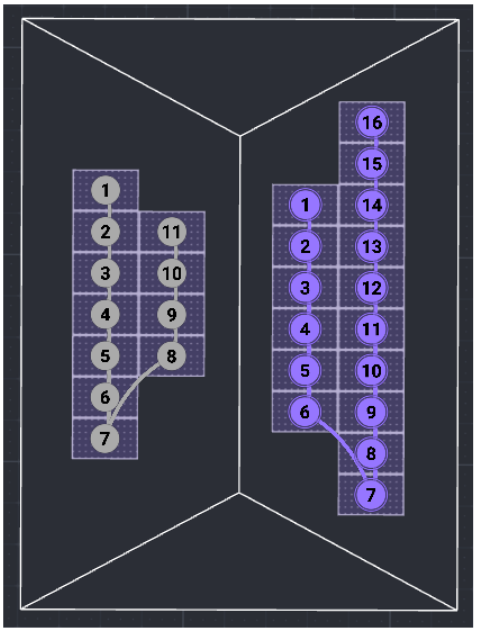
Single String Design



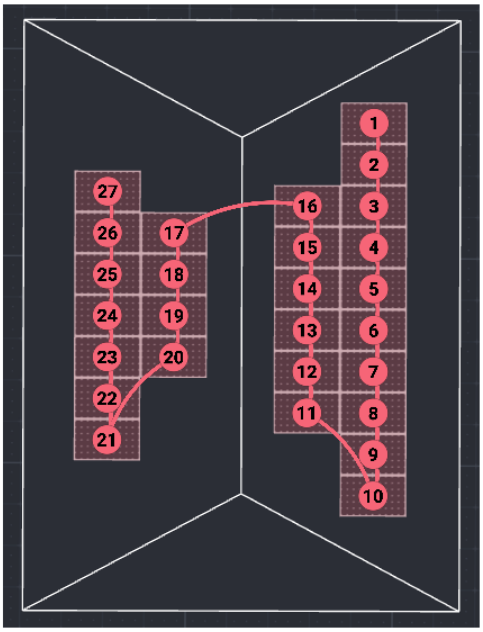
Example 3 – Invalid Use

In a system with an SE5000H inverter installed with 27 x 370W modules connected to P370 (199.8% oversizing), the installed DC capacity will be 9.99kW STC. The inverter AC nameplate is 5kWac, which is lower than the maximum nominal string power of 5.7kW for P370 with single phase HD-Wave inverter (15Ax380V=5.7kW). However, the 27 optimizers are exceeding the maximum allowed optimizers per string with a single phase inverter (25) and therefore the DC capacity of 9.99kW STC should be installed in **two strings**.

Regular Design



Single String Design



Applicable Inverters

These guidelines apply to the following SolarEdge inverters:

- Single phase inverters SE5000 or lower
- Single phase inverters with HD-wave technology SE5500H or lower
- Three phase Hybrid inverter–SE5K and lower
- Three phase inverters–SE10K and lower (not applicable, when connected to a Delta grid)