

PV Fact Sheet

10 | DC Combiner boxes in string inverter plants

This fact sheet focuses on photovoltaic installations in solar parks worldwide. One essential part of such an installation is the PV combiner box. These boxes are used to combine several strings and to protect against overvoltage and feature many more functions.

What is the difference between central inverter and string inverter designed plant?

The principle of the structure of a solar plant, whether with central inverter or string inverter, is the same for all of it. It has solar panels, combiner boxes, communication boxes, weather boxes, inverters, etc. It's important to know the difference between the plants designed with central inverters and the plants with string inverters.

- Central inverter plant: The solar panels are connected between each other making a “string”, these strings are connected to a combiner box, which bundles, protects, and monitor these strings. All these combiner boxes are connected thereafter to a central inverter where DC power is transformed to AC power. Generally speaking, a central inverter has an output power larger or equal to 1MWac.
- String inverter plant: The string inverter plant has the same structure as the central inverter plant, with the difference that the strings are connected directly to the string inverter input (depending on the MPPT that the inverter has). It's more common in this type of plant to have an AC combiner box after the inverters to bundle and protect them. Generally, sting inverters used in utility scale project range from 60kWac up to 350kWac.

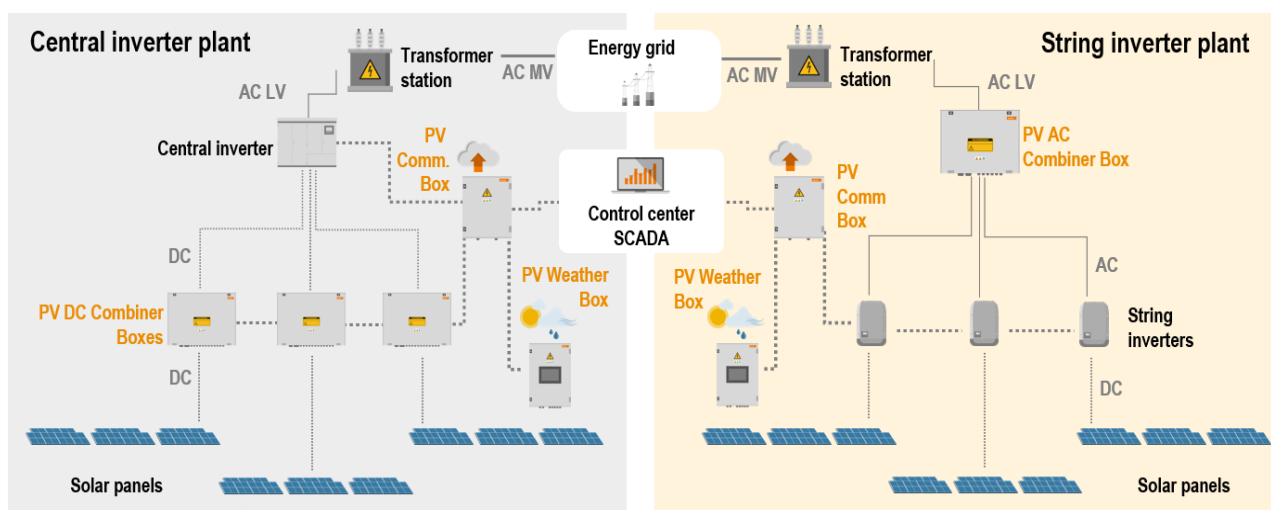


Image 1. Example of Central inverter and String inverter plants structures

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Can DC Combiner Boxes be used with a 1 MPPT string inverter?

Regularly in string inverter designed plant AC combiner boxes may be used to interconnect various string inverter outputs. However, it is possible to have DC combiner boxes with string inverter plants particularly when 1 MPPT string inverters are used.

These types of inverters may be as powerful as any other string inverter used for utility scale plants (from 60kW to 350kW) but instead of having multiple MPPT's entries at the DC side they only have one input with (with two poles, positive and negative). Therefore, a PV DC Combiner Boxes to collect bundle and protect the total number of strings connecting to one of these string inverters is needed. Depending on the inverter and plant configuration the number of inputs/strings per PV DC Combiner box may vary generally ranging from 8 up to 16 inputs.

The principle of operation and its structure is the same as a central inverter plant, connecting the combiner boxes before the inverter.

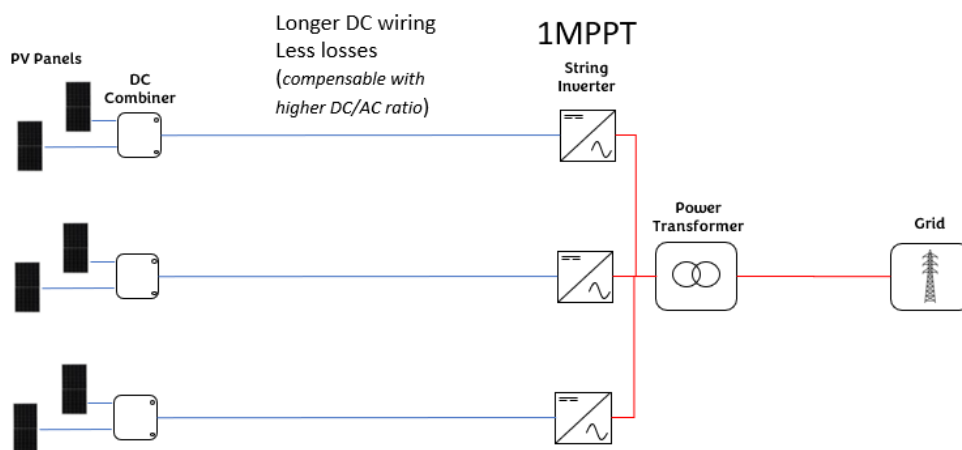


Image 2. Example DC combiner boxes connected to a string inverter plant