PV Combiner Boxes
Fact Sheet

Correctly connect combiner boxes and inverters with low input currents

This fact sheet is focusing on photovoltaic installations on top of buildings within the European Union. One essential part of such an installation is a combiner box. These boxes are used to combine several strings, to protect against overvoltage and offer many more functions.

Efficient combining of strings
Depending on the lightning protection requirement or installation conditions, it may be necessary to install a combiner box. See also our fact sheet "How to protect buildings against lightning strikes". It is popular to install these boxes close to the PV modules to combine strings at an early stage. The advantage of this is the reduced installation cost and the savings in cabling. However, it can cause the bundled string to have too high currents for the input of the inverter.

Example Huawei Inverters between 12 and 60kW
An example are the Huawei inverters with a rated power between 12 and 60kW (family -M2, -M3 and 60KTL). These have 2 inputs per MPPT and care must be taken that the max. current per input is not exceeded when bundling. The maximum values can be found in the following table (as of Feb. 2022).

Inverter type	12-20KTL-M2	30KTL-M3	60KTL-M0
No. of MPPT	2	4	6
Inputs per MPPT	2	2	2
Max. current per MPPT	22A (27A)	26A	26A
Max. current per input	14,5A (18A)	20A	18A

Possible solution
If the max. current of the bundled string is higher than the max. current of the input, this can be solved technically very easily. In this case, a corresponding Y-connector plug or a Y-connector cable must be connected to the string just before the inverter. According to the physical properties of the current, this is divided equally in the Y-connections respectively in the two inputs of the inverter. The danger of inductions of a too high current into the inverter is thus eliminated.

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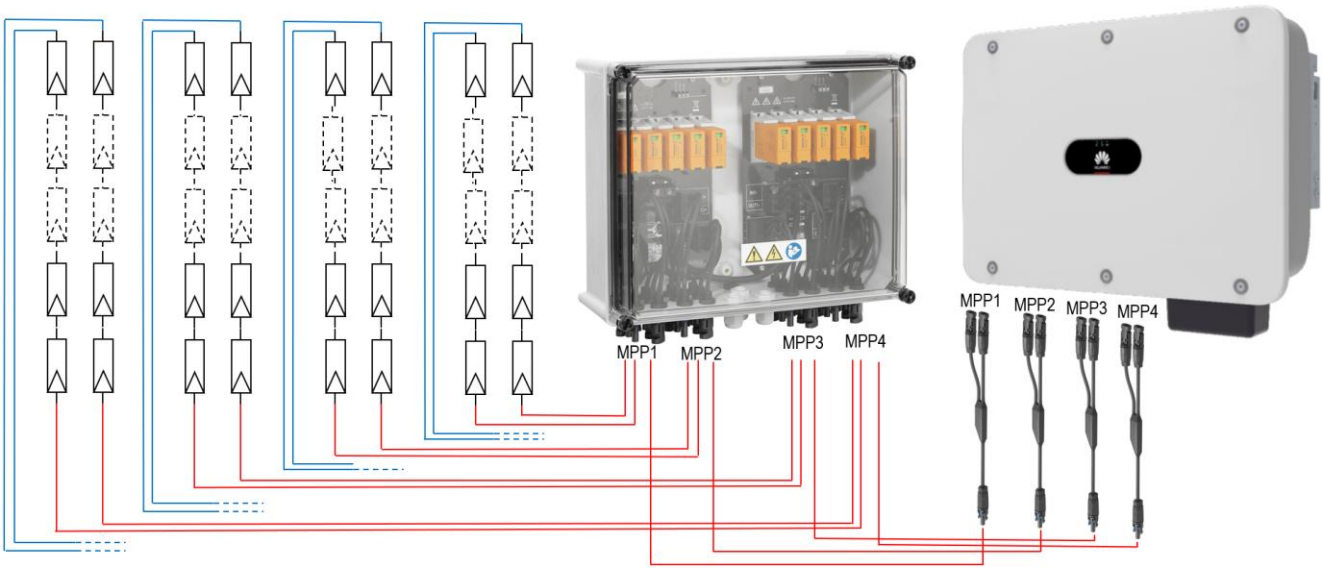
Example installation
The following connection diagram is intended to illustrate the interaction of the various components. Here, 2 strings per MPP are introduced into the combiner box from Weidmüller called PV Next (2737600000). A bundled string is then continued to the inverter. Before the inverter, the bundled string is connected to a Y-cable from Weidmüller (2877850000+2877860000), thus distributing the current evenly to the two inputs in the Huawei SUN2000-30KTL-M3. For reasons of illustration, only only the positive connection sides have been shown.



With this installation variant, 8 cables are saved due to the early bundling of the strings in the combiner box. This is about 80m less cable in a typical residential building. In addition, only 8 Y-cables need to be purchased. This saves time and material in the end.

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