PV Fact Sheet
01 | PV Next special features

What are the special features of PV Next combiner boxes and how do I find the right variant?

This fact sheet focuses on photovoltaic installations on top of buildings within the European Union. 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.

PV Next is a global PV box portfolio made by Weidmüller. PV Next boxes are based on a modular concept. The aim is to cover as many variants as possible with the lowest number of final products. For instance, if the installation requires a version with one input and one output, then a version with 2 input and 1 output can be used. This ensures high stock availability, flexibility of use and cost optimisation.

The following will focus on the main functions and the philosophy of PV Next.

The philosophy of MPPs and PV Next circuit boards

One essential aspect of the modular concept is the use of a very limited amount of printed circuit boards or PCBs. All electrical connections are made with robust and durable conductor tracks.

PV NEXT for inverters with 1 MPPT, 2 MPPT, 3 MPPT and up to 6 MPPT

To quickly find the right combiner box for the corresponding inverter, Weidmüller offers a digital selection guide in its online catalogue.

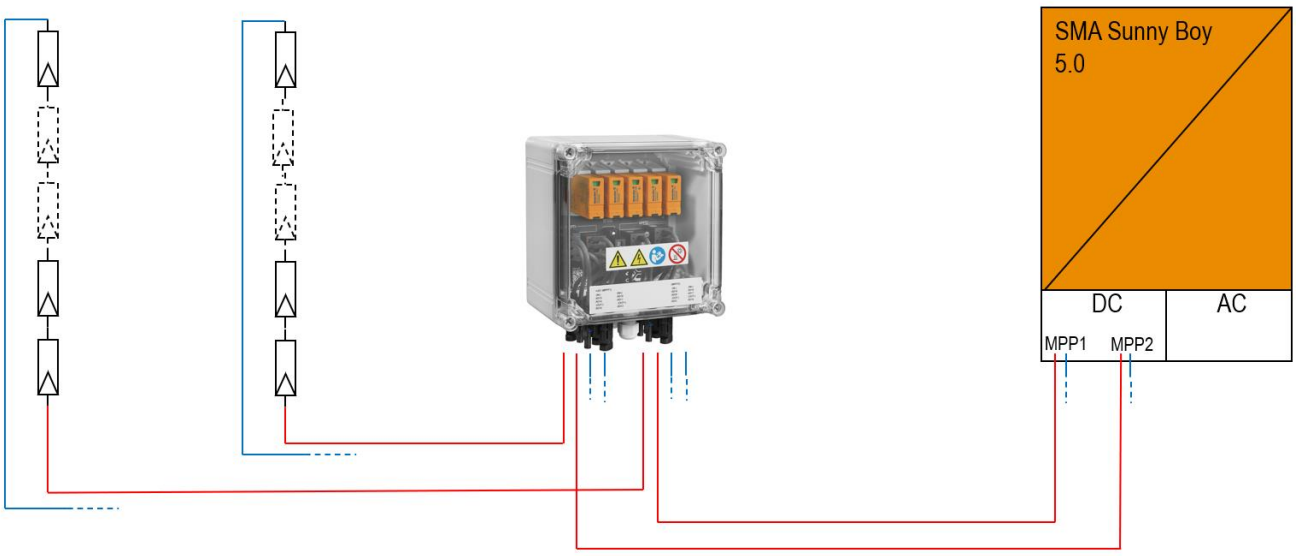
Issue 06/2023

PV Fact Sheet
01 | PV Next special features

How do I protect installations against a power surge?

According to the European Regulation EN 51643-32:2020, all photovoltaic installations mounted on buildings must be protected against surges on the DC side. Depending on the installation type, overvoltage protection Type II or Type I+II is required. The PV Next portfolio offers the appropriate solution for both types.

Example: The SMA Sunny Boy 5.0 with 2 inputs (each with one MPP) connected to a rooftop installation without a lightning protection system requires a PV Next with two PCBs and a Type II overvoltage protection. Only 1 input per PCB is used. The remaining 2 inputs remain unused.



2 MPPT combiner box for a SMA Sunny Boy 5.0 (7.5 kWp installation)

Details on overvoltage protection in combiner boxes can be found in the fact sheet entitled “How do you protect PV installations against lightning strikes?”

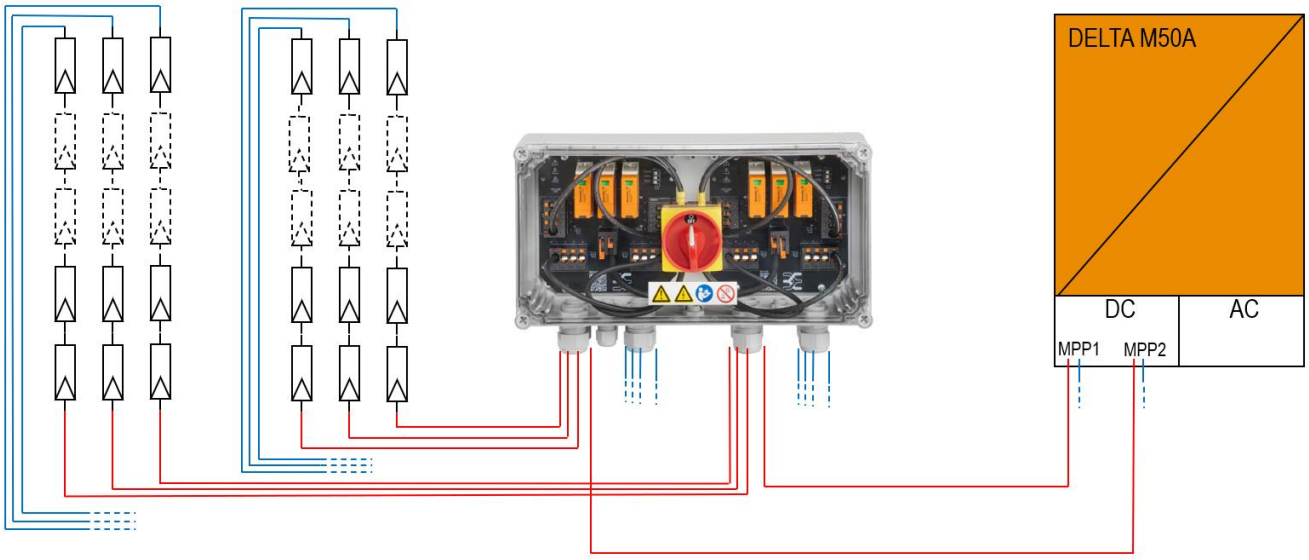
Issue 06/2023

PV Fact Sheet
01 | PV Next special features

Combining strings with PV Next

In addition to the overvoltage protection function, it is also possible to combine strings with all types of versions. The range extends to the combination of twelve input strings / 6 MPP with 2 string inputs each. All designs are certified to IEC 61439-2.

Example: A rooftop installation of 45 kWp is implemented with a DELTA M50A. This inverter can handle 58 kWp with one input per MPP. Because of the high power and low number of inputs, the installation requires a combiner box with 3 strings per MPP combined. The solution is visualised in the graphic below.



2 MPPT PV box for a DELTA M50A inverter (58 kWp installation)

Issue 06/2023

PV Fact Sheet
01 | PV Next special features

Additional features of PV Next

The modularity of the designs is also continued in further features of the portfolio.

- In all designs, a **functional earth** is ready for use. The functional earth guarantees the proper functioning and trouble-free operation of the electrical system.

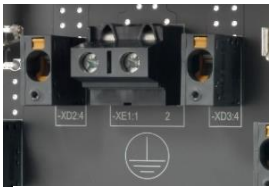


Image 1: Functional earth in all designs

- The designs can be ordered with a **load-break switch** to turn the DC current flow on and off. This basic design, including the number of PCBs and the size of the enclosure, remains the same. Our factory only needs to prepare the cover, mount the switch and connect the cables with the PCB board. In the designs without a switch, this part is bridged with a cable (preinstalled). All switches can easily be locked or sealed if necessary.

Image 2: PV Next with load break switch

- The **connection of the strings** (input +/-) can be implemented in two different ways. The first option is to use the Weidmüller PV connector with a quick connection outside the box. The second is to run the string cables through standard cable glands inside the box. Inside the box, the connection then can easily be done with help of the PUSH-IN terminal blocks. This technology requires only a stripped cable, and this can be directly entered into the terminal block (only a standard screwdriver is required).
- Combiner boxes are often installed under rough climatic conditions. This will lead to condensation inside the box. To get rid of this humidity, all PV Next boxes have an **integrated pressure compensation element**.


Image 3: Box with Weidmüller WM4 C connector; in the middle: pressure compensation element

- The status of the overvoltage arrestors can be seen from the colour code (green = OK to operate, red = to be replaced). This requires a visual check by looking through the transparent cover of the box. An alternative is to check the status in a monitoring system. For this purpose, all PV Next designs contain a **remote contact**, which enables a cable connection with the communication unit.


Image 4: Visual check of overvoltage arrestors made super easy

Issue 06/2023

PV Fact Sheet
01 | PV Next special features

Guideline to find the right PV Next box

1. How many MPPTs does your plant have? How many MPPTs do your inverters have?
   You can protect multiple inverters with a single PV Next box. This depends on the philosophy of the installer.
2. How many inputs should the combiner box have?
   With PV Next, you can handle 2 input strings (+/-) for up to 12 MPPs. To find out the right combination, the installation needs to be simulated or calculated. The required parameters are the power, voltage and number of the solar panels and the power, voltage and number of inputs per MPP of the inverter.
3. Which overvoltage protection type is required? Type I/II or Type II?
   Within the European Union, Type I/II has to be used if the building has an external lightning protection system, otherwise type II must be used. Details on overvoltage protection in combiner boxes can be found in our fact sheet “How do I protect buildings against lightning strikes?”.
4. Does the installation require a DC load break switch?
   According to the IEC 60364-7-712 a load break switch has to be installed on the DC site. This can be part of the inverter or part of the combiner box.
5. Is a box with PV connectors or cable glands with PUSH-IN terminals required? Customers can decide on the type of connection. They can choose between a pre-wired box with PV connectors or a box with cable glands and PUSH IN terminal blocks inside. The second option requires wiring inside the box at the installation site.

Pascal Niggemann
Head of PV Systems Home & Business,
Weidmüller Interface GmbH & Co. KG, Germany
Pascal.Niggemann@weidmueller.com | www.weidmueller.com/pv-rooftop

Issue 06/2023