Solution sheet Optimizer

Wels,24. Feb. 2025

Introduction

This solution sheet shows the use of **BRC optimizers M500/14** with the following Fronius inverters.

- Symo Gen24
- Symo Gen24 Plus
- Verto
- Verto Plus

Functionality

An optimizer is a power electronic circuit in its own housing, which is installed under the PV modules and connected to the respective modules. Using an integrated control algorithm that is independent of the inverter, the output voltage and the output current of the PV module are adapted to the conditions prevailing in the PV string.

Either all modules in a string can be equipped with optimizers ("Fully optimized") or only modules potentially affected by shading ("Partially optimized")

As Fronius inverters have their own integrated MPP trackers, Fronius recommends only partial optimization of the PV system for modules potentially affected by shading.

Required components and assembly instructions

As before, an inverter and the PV modules are required to set up the system and, depending on the desired PV modules to be optimized, a corresponding number of optimizers.

Please note that the optimizer manufacturer prohibits the parallel connection of optimized PV strings.

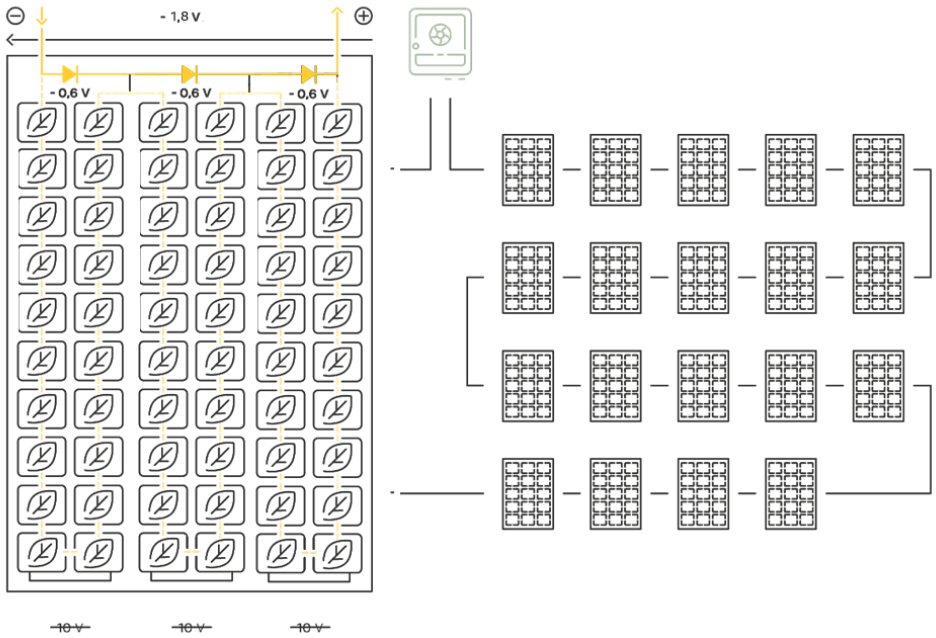
For any additional components required and the final assembly instructions for the optimizer, please refer to the optimizer manufacturer's website.

Comparison of shaded line with and without optimizer

The following is an example of how the optimizers work.

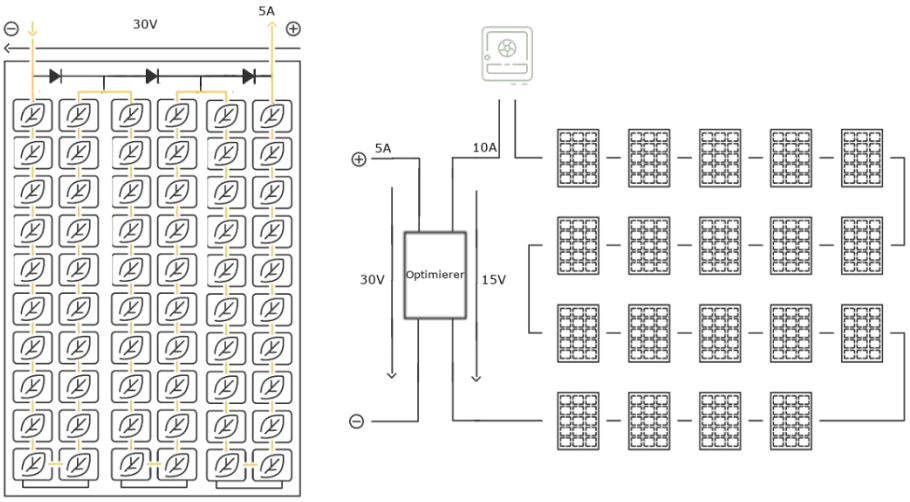
In principle, each shading scenario must be considered individually and the following results should not be transferred to other scenarios, as the results, advantages and disadvantages differ massively from case to case.

Without optimizer



- Assumption: 20 modules with 30 V and 10 A→ 6000 Watt peak power
- The light intensity on the fully shaded module is 50% of the other modules (all 3 rows of cells are affected by shading, but ambient light still falls on the module)
- Inverter reduces the voltage to make the bypass diodes conductive
- Voltage is reduced from 600 V to 568.2 V→ Bypass diodes are activated by the inverter (voltage drop of -1.8 V)
- The current remains at 10 A→ the system power is 5682 W (568.2 V * 10 A)

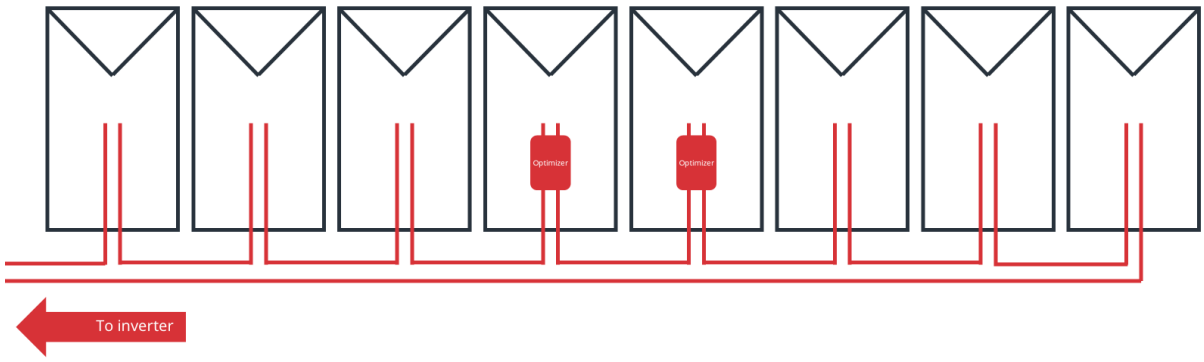
With optimizer



- Voltage in the string is reduced from 600V to 585 V→ Optimizer increases the output current to 10A and reduces the output voltage to 15V on the string side
- The current in the entire line remains at 10 A→ The system power is 5850 W (585 V * 10 A)

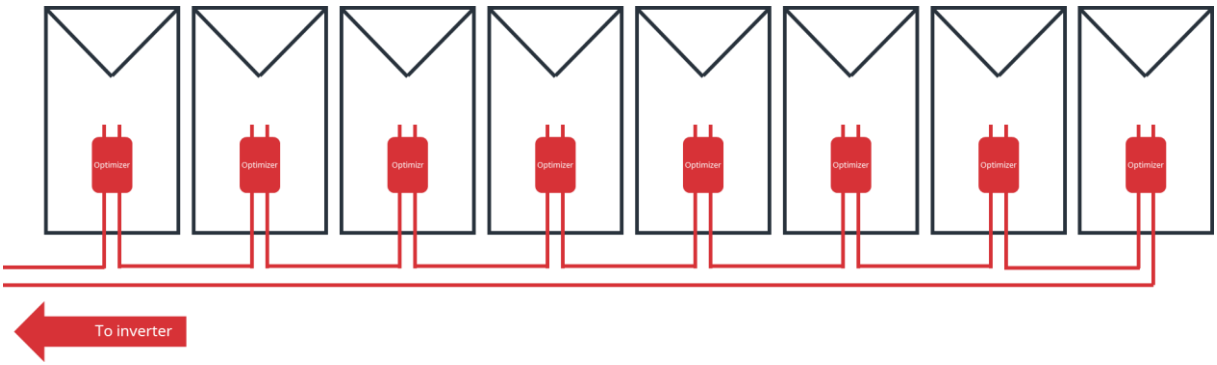
Exemplary structure

Partial optimization



In a setup with partial optimization, optimizers are only installed in the required modules. This type of installation is usually used for small-area shading on the PV field, such as roof structures. The respective optimizer automatically adjusts the current and voltage of the PV module to the current available in the string. No further adjustment or additional components are required on the part of the optimizer.

Full optimization



In a setup with full optimization, optimizers are installed in all modules. This type of installation is usually used to realize different orientations or roof pitches in one string. The respective optimizer automatically adjusts the current and voltage of the PV module to the current available in the string. No further adjustment or additional components are required on the part of the optimizer.

Inverter setting recommendations

	Fully optimized	Partially optimized
MPP tracker	Car	Car
DPM	Off*	On

*Depending on the system and local conditions, better yields can also be achieved with DPM "on".

Influence on AFCI

The use of BRC optimizers in combination with activated Fronius Arc Guard (AFCI function of the Fronius inverter) leads to a restriction of the sensitivity of the Arc Guard, but this has no influence on the certification of the Fronius ARC Guard according to IEC 63027.

Support

Fronius will provide technical support as usual via Solar.sos and the hotline. However, if specific support such as consulting services or design recommendations for the optimizers are required, please contact the manufacturer.

The use of BRC optimizers in accordance with the declaration of compatibility does not restrict the warranty claims of the Fronius system. The warranty conditions of the optimizers can be found on the respective manufacturer's website.

Fronius accepts no liability for reduced yields from optimized systems.

Declaration of compatibility

This document remains valid as long as the mutual declaration of compatibility, available on the Fronius website, is available and valid or the document is replaced by another one. Reference is also made to the Fronius website.

If you have any further questions, please get in touch with your contact person at Fronius.

Kind regards,

Your Fronius Team