

Optimizer Configuration Principles

When installing PV optimizers for different types of inverters, the number of optimizers supported by the string, the upper limit of the string power, and the parallel requirements for the strings are different. It is necessary to comprehensively consider the inverter parameters and module parameters.

The principles of string configuration are as follows

- The string voltage should be **less than** the maximum input voltage of the inverter to prevent damage. To ensure the conversion efficiency of the inverter, the string voltage should be **greater than or equal to** the nominal input voltage of the inverter;
- The string current is **less than** the maximum input current of each MPPT of the inverter. For parallel string input, the string current will be the sum of the currents from all strings.

Example:

The inverter specifications are as follows: maximum input voltage is 1000V, nominal input voltage is 720V, each MPPT supports 2 parallel string inputs, and each MPPT has a maximum input current of 30A.

Input			
Max. Input Voltage (V)	1000		
MPPT Operating Voltage Range (V)	180 ~ 980		
Start-up Voltage (V)	200		
Nominal Input Voltage (V)	720		
Max. Input Current per MPPT (A)	30		
Max. Short Circuit Current per MPPT (A)	50		
Number of MPP Trackers	5		6
Number of Strings per MPPT		2	

Inverter

The PV module specifications are as follows: open circuit voltage is 52.2V, short circuit current is 14.66A.

Nominal Max. Power (Pmax)	600 W	605 W	610 W	615 W	620 W	625 W	630 W
Opt. Operating Voltage (Vmp)	44.0 V	44.2 V	44.4 V	44.6 V	44.8 V	45.0 V	45.2 V
Opt. Operating Current (Imp)	13.64 A	13.69 A	13.74 A	13.79 A	13.84 A	13.89 A	13.94 A
Open Circuit Voltage (Voc)	51.8 V	52.0 V	52.2 V	52.4 V	52.6 V	52.8 V	53.0 V
Short Circuit Current (Isc)	14.54 A	14.60 A	14.66 A	14.72 A	14.78 A	14.84 A	14.90 A
Module Efficiency	22.2%	22.4%	22.6%	22.8%	23.0%	23.1%	23.3%
Operating Temperature	-40°C ~ +85°C						
Max. System Voltage	1500V (IEC/UL)						
Module Fire Performance	TYPE 29 (UL 61730) or CLASS C (IEC 61730)						
Max. Series Fuse Rating	25 A						
Protection Class	Class II						
Power Tolerance	0 ~ + 10 W						
* Under Standard Test Conditions (STC) of irradiance of 1000 W/m ² , spectrum AM 1.5 and cell temperature of 25°C.							
PV module							

According to the above inverter parameters and PV module parameters:

The maximum number of modules in a string = $1000V \div 52.2V = 19.2$, rounded down to 19;

The minimum number of modules in a string = $720V \div 52.2V = 13.7$, rounded up to 14;

String current = $2 \times 14.66A = 29.32A$, which is less than the maximum MPPT input current(30A).

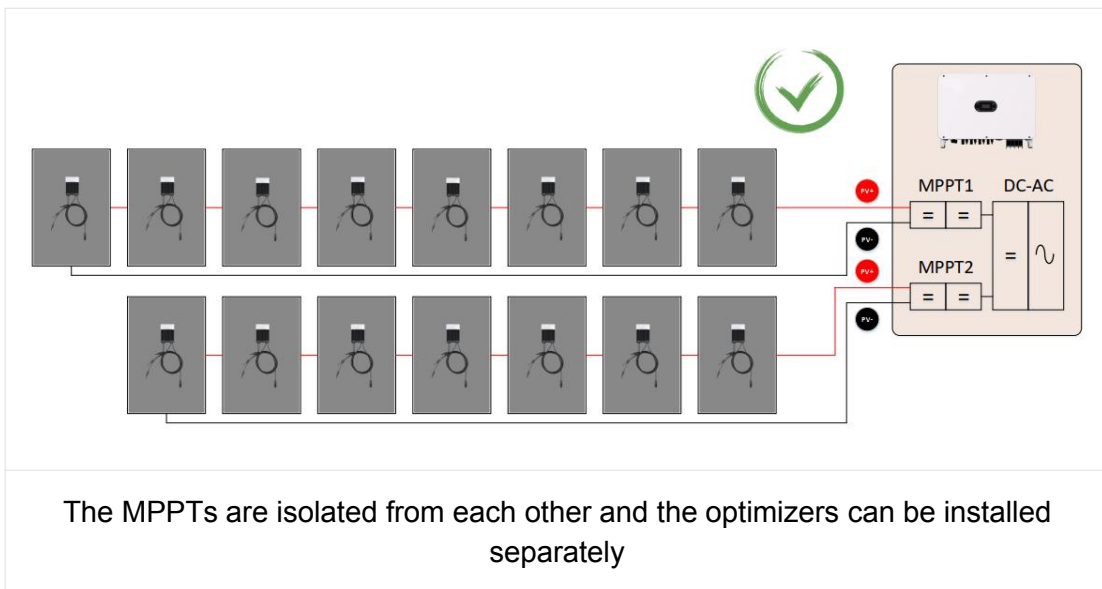
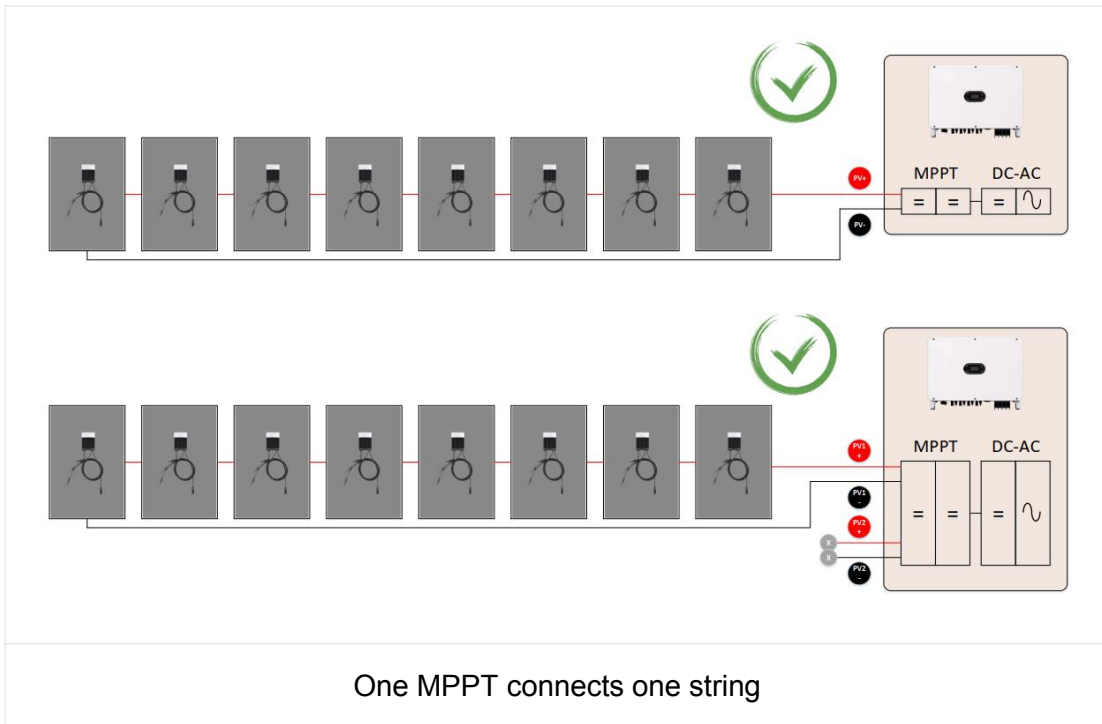
Therefore, for the above inverters and modules, the number of modules supported by the string is 14pcs~19pcs.

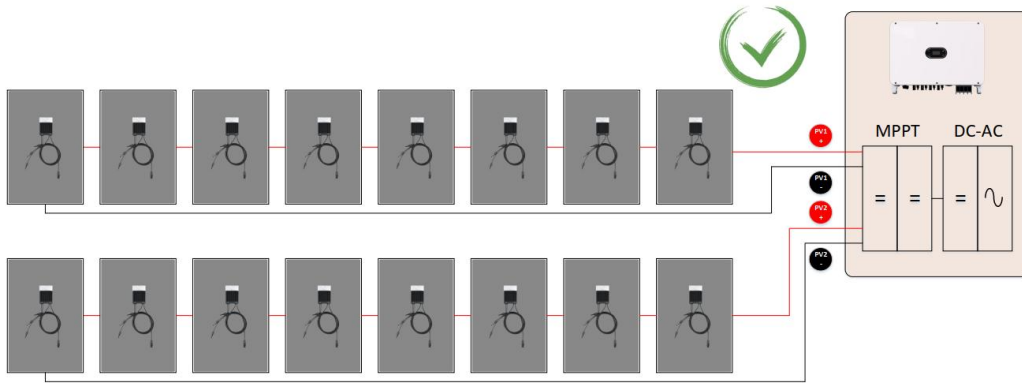
The principles of PV Optimizer configuration are as follows

- If only one string is connected to one MPPT, all of the modules in the string need to be installed with PV optimizers;
- If multiple strings are connected in parallel under one MPPT, the number and model of modules in different strings must be exactly the same, and all modules need to be installed with PV optimizers.

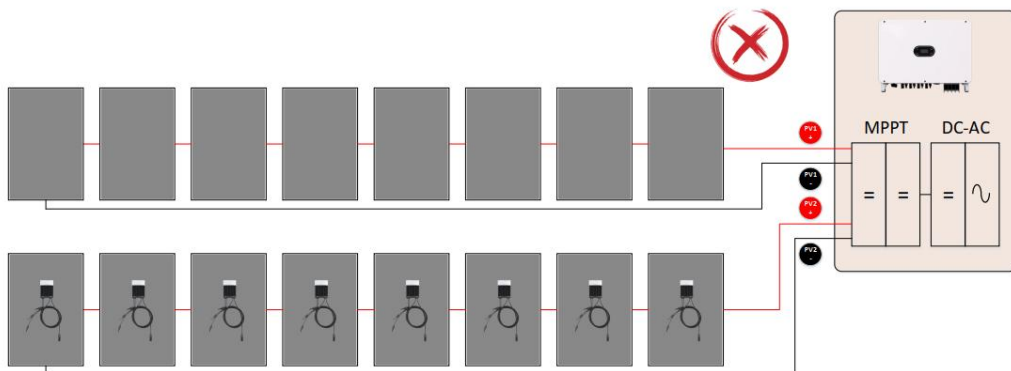
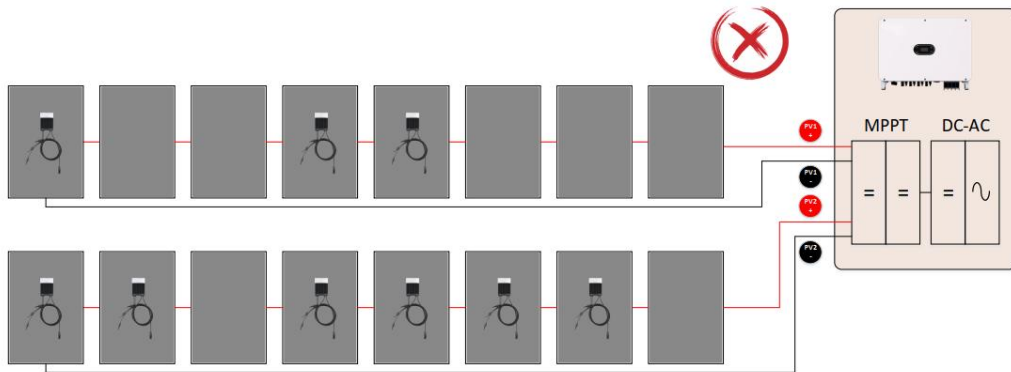
Example:

The following figures take SP1 PV optimizer as an example. SP4 PV optimizer follows the same configuration principle.





One MPPT supports multiple strings. The number and model of modules in the string must be exactly the same, and all of them must be installed with optimizers



One MPPT supports multiple strings which do not support installing optimizers on some modules