

# Symmetrical Boost Concept for Solar Applications up to 1000V

*Multiple input as a new option*

*In a transformerless solar inverter application the symmetry of split supply DC voltages with ground is an important issue. The following concept shows the handling of both the input and the output asymmetry in an MPP booster circuit.*

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The first example demonstrates how to connect solar panel strings with different power and intensity conditions on a solar inverter environment.

### High Efficiency with low Effort

The figure 1 shows a circuit, which is able to adjust the MPP (maximum power point) of the solar panel, to correct the asymmetry of the input while keeping the symmetry of the NP (neutral point) of the booster output. The circuit comprises 2 boost circuits: a positive and a negative one. The symmetry will be achieved with a corrected PWM (pulse with modulation) of the boost circuits.

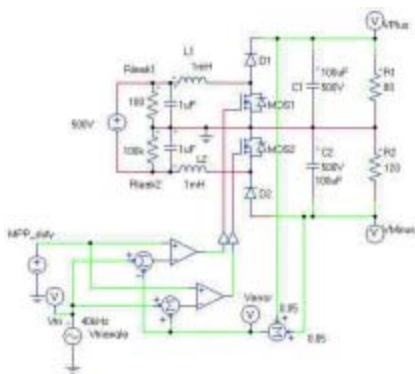


Figure 1:

In the example in Figure 2 there is a very high non-symmetry in the input (10kΩ vs. 100kΩ) and at the output 40Ω vs. 60Ω load simulated.

The result shows that it is possible to cover such conditions with such a simple boost circuit by only using the right PWM signal generating the exact software algorithm needed. For the control the following signals are required: Input voltage (for the MPP tracking) and the positive and the negative DC-

output voltages to be adjusted for symmetrical values.

### Multiple Input as a New Option

However, it is not only possible to control a non-symmetrical solar panel and load condition, but also to combine panels with different powers and MPP characteristics within the boosters.

The solution in Figure 3 explains a solution for the connection of 2 "low voltage" solar strings and a "high voltage" string to a 3-phase NPC solar inverter. The input stages are designed based on 2 Vincotech P915 power modules and the output is built



Figure 2:

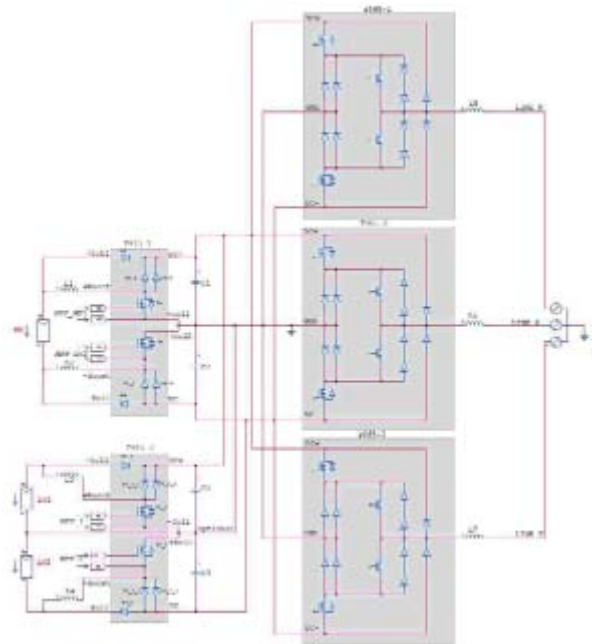


Figure 3:

up with 3 Vincotech P965 mixed component 3-level power modules.

This is an example for using two lower voltages (125-500V) and a higher voltage (250-1000V) PVs with independent MPP tracking in a 3 phase output system (ca.24kW). By eliminating the optional GND connection to the LV1, LV2 allows independent MPP tracking for LV1 and LV2.

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