

# A Study on Modular Power Compensation Technology to Improve the Efficiency of Sunlight Shaded Areas

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**1. Introduction** - Photovoltaic systems has no mechanical and chemical action in the process of energy conversion, it is environmentally friendly. Moreover, maintenance is convenient and life can be used for more than 20 years. Therefore, the solar power generation market is rapidly increasing. In response to an increase in the photovoltaic power generation market and interest is focused on research on solar power generation efficiency improvement in order to secure the economic efficiency of the photovoltaic power generation system. Mismatch occurs when shadows are generated in solar cells and power generation efficiency decreases. In this research, we developed a module mounting device that can improve this. In addition, we compare the method of this research with the system centralized inverter system of the existing system configuration type and the serial type micro inverter system, and analyzed them.



Image 1. Image of Shading Compensation Device

**2. Experimental** - Photovoltaic Cell Module Specifications: Q.Plus L-G4.2 330kW,  
Solar Inverter Specifications: PVES-003(3.0kW)  
Experiment Time: 10 a.m. to 2 p.m.

**3. Results and Discussion** - As a result, it was confirmed that the power generation efficiency of 9% or more improved compared with the past by applying it to a module affected by the development of sunlight shadows.

**Table I.** Photovoltaic Efficiency Comparison Experiment

DAY	Experimental group	Control group	efficiency of improvement
1	15.11 kW	13.84 kW	9.23%
2	16.83 kW	15.56 kW	8.17%
3	17.97 kW	16.51 kW	8.92%
4	20.16 kW	18.45 kW	9.31%
5	21.91 kW	20.11 kW	9.27%

**4. Conclusions** - Through this process, the electric circuit is constructed inside the solar power compensator to compensate for the significantly low or abnormal electrical characteristic values to maximize stable operation and efficiency values.

**5. References** –

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