

Adaptive Reactive Power Control of PV Power Plants for Improved Power Transfer Capability under Ultra-Weak Grid Conditions

<https://www.youtube.com/watch?v=HdcmPvXO6zE>

This project analyzes the power transfer limitation of the PV power plant under the ultra-weak grid condition, i.e., when the Short-Circuit Ratio (SCR) is close to 1. It explicitly identifies that a minimum SCR of 2 is required for the PV power plant to deliver the rated active power when operating with the unity power factor. Then, considering the reactive power compensation from PV inverters, the minimum SCR in respect to Power Factor (*PF*) is derived, and the optimized coordination of the active and reactive power is exploited.

To design this project solar panel, DC/DC converter and DC/AC converter interfaced to Microcontroller. It contains numerous generation units and each unit contains a DC/DC converter for local maximum power point tracking (MPPT) control and a DC/AC inverter for grid-connections. All the generation units are connected to the PCC through low-voltage power cables and then fed into the high-voltage transmission network through the substation. To minimize the power loss on the low-voltage cable, the generation units are distributed evenly around the substation in order to minimize the length of the low-voltage cables.

Major blocks present in this project:

1. Regulated power supply
2. Micro controller
3. Solar Panel
4. DC/DC convertor
5. DC/AC Convertor
6. LED Indicator

www.hvstechnologies.in

Ph: +91 9603140482

Ameerpet: #A-7, 2nd floor, Eureka court, Above KS bakers, Ameerpet, Hyderabad – 73.

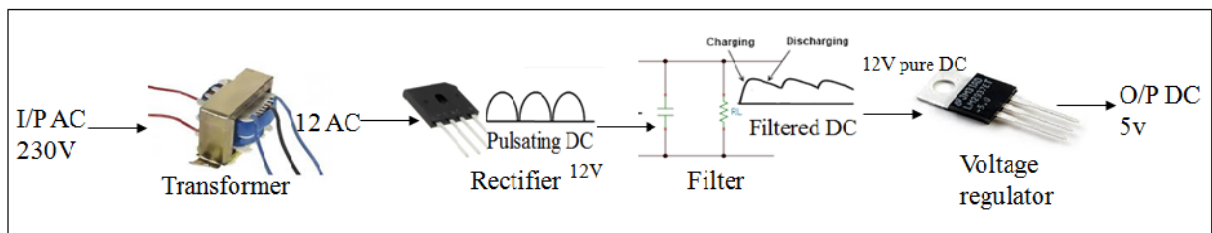
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7. Crystal Oscillator
8. Reset Button

Software's used in this project:

1. PIC Compiler for Programming.
2. Express SCH for Circuit design.

Regulated power supply:



Block Diagram:

